



Economies of scale: Benefits and losses to IPLCs amidst the Oil and Gas and Agro-commodities expansion with reference to the Bugoma landscape.

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Executive Summary

The Green Livelihoods Alliance (GLA 2), 2021-2025 is being implemented in Uganda within the Albertine Graben with a specific focus on the Bugoma comprised in the districts of Hoima, Kikuube, Masindi and Buliisa. The overall goal of the GLA 2 in Uganda is to ensure “Uganda’s Albertine Rift Landscapes are protected from oil and gas challenges and sustainably and inclusively governed”.

The Uganda GLA 2 Programme has three pathways:

- I. Indigenous Peoples and Local Communities (IPLCs) sustainably govern increased areas of forest landscapes;
- II. Drivers of deforestation and forest degradation - Halting deforestation and addressing people's concerns on forests and human rights by holding governments and agro-commodities, extractives, energy, and infrastructure industries accountable; and
- III. Civic Space - secure civic spaces for environment and human rights defenders, Civil Society Organisations (CSOs) and IPLC leaders to speak out for their rights, livelihoods and the forest landscape. The GLA 2 aims to ensure that tropical forests and forest landscapes are sustainably and inclusively governed to mitigate and adapt to climate change, fulfill human rights and safeguard local livelihoods. This research activity on seeks to establish a baseline and provide a situation analysis, synthesis of core issues, and priorities that impact on current and future livelihoods of IPLCs, and other community members of the Albertine Graben.

Overall Objectives

The overall objective of the research is to assess economies of scale; benefits versus losses to IPLCs in the oil and gas and agro-commodities sectors in the Bugoma Forest landscape. The specific objectives of this research are to:

- I. describe economic activities, provide baseline information on economies, players and explain the issues therein within the landscape; and
- II. provide a situational analysis with markets and value chain for now and the future inferences.

Approach Adopted

The research approach adopted was a participatory exploratory and descriptive evaluation design. The information generated was compiled through literature review, field observations, and discussions with key informants comprising district natural resources and agricultural production staff. The researcher conducted field observations of the value chains of agricultural and forestry commodities and held informal conversations with actors along the value chains of crop and forestry commodities. The report relies on descriptive analysis of the scale of economic opportunities and challenges for Indigenous peoples and local communities in four Albertine Graben districts of Buliisa, Hoima, Kikuube and Masindi.

Findings

The findings of the research are summarised as follows.

- The oil and gas industry is the major industrial within the Albertine Graben, and it is the main factor in all future economic planning in the landscape. The Government has provided information on the current and future direct revenue, jobs and indirect industries and employment. However, agricultural land use and commercial forestry are the main factors influence the economic opportunities available to IPLCs. There are growing supply chain deficits for food items including grains and pulses, fruits and vegetable, milk, beef, and fish, among others. Commercial agriculture has thus far concentrated on sugarcane and maize while all other crops are grown in small quantities. Livestock production is low, while fisheries are still dominated by capture fisheries from Lake Albert. Therefore, good agricultural practices particularly for subsistence farmers seeking to become commercial is a large opportunity.
- There is a clear strain on ecosystems particularly forests and wetlands due to land use expansion for agriculture, forest depletion for fuel wood, and wetland conversion for rice production, and other land uses. The oil and gas industry and sugarcane production are likely to exacerbate the land use conversion. Commercial forestry thus far is largely concentrated in Hoima and Kikuube districts. Hoima and Kikuube are a key hub for timber production particularly high value mahogany that is supplied within the country. However, with the reduced wood supply and degradation in Budongo and Bugoma central forest reserves, respectively there is very little supply of high value nature wood in the market and current supply relies on pine and eucalyptus from commercial forest farms.
- Many economic opportunities for IPLCs are constrained by the poor governance of food value, and low technical capacity at local government and for community-based organisations, as well as the IPLCs themselves. As land poor farmers seek to produce marketable sugarcane, maize and rice, large tracts of land remain unused. This drives communities and immigrants into further encroachment of wetlands and forests, where the monitoring is limited.

Recommendations

The following recommendations are proposed to address the challenges observed and to optimise the available economies of scale for IPLCs.

1. Strategic land use plan at the landscape level in the Albertine Graben. Land use planning will allow for sustainable and optimal appropriate of the available land to allow for biodiversity conservation, tourism, agriculture, commercial forestry, and industrial activities. The land use planning can then be integrated through a bottom approach that includes households and communities. The land use planning should also aim at strengthening the tenure rights of IPLCs.
2. Strengthening commodity market structure and value chains. Support the development of a strong market structure and governance for agricultural production. These value chain systems will support the already established enterprises such as sugar cane while also streamlining maize, rice, and other enterprises with potential for growth in future. Indeed, the streamlined value chains may attract increased participation from IPLCs, and investors from the outside.
3. Build the technical capacity of cooperatives and local governments engaged in economic production activities of agriculture and natural resources. Technical capacity building for cooperatives, and local governments need to be a key component intervention. There is need for capacity to practice good agriculture practices that meet the market demand and standards, need to include sustainable agricultural practices such as climate smart agriculture to ensure that the soil fertility is maintained and improved, water is sustainably used, and external polluting elements are minimised on the farm.
4. Need to invest in policy instruments for sustainability for the agricultural system, and environment and natural resources. Long-term contractual arrangements for biodiversity conservation in the wildlife corridor, carbon sequestration, and watershed management undertaken in partnership with the oil and gas companies, the sugar companies and communities will ensure that the sustainable landscape design developed is consultative and participatory, can be financed at landscape level, and works for everyone especially the users and providers of ecosystem services.

Introduction

1.1 Background

The Albertine Graben is an important biodiversity hotspot known for being a habitat for 39% of Africa's mammal species, 35% of Africa's insect species, 51% of Africa's bird species, 19% of Africa's amphibian species, 14% of Africa's plant and reptile species plus 79 threatened terrestrial vertebrates according to the International Union for Conservation of Nature (IUCN) Red Data book and lists. The Graben also hosts about 70% of Uganda's major protected areas, based on the 2010 Uganda Environmental Sensitivity Atlas developed by the National Environment Management Authority (NEMA).

With this diversity, the Albertine Graben experiences considerable competition for land use change associated with the pressure to explore, extract, and develop oil and gas resources, other mineral resources, and commercial agricultural production. The alternative land use developments require changes in stable land use of protected areas for biodiversity conservation, and community land use into built up areas within physical infrastructure, settlements, and commercial farmlands at the expense of existing biodiversity and ecosystems. Indigenous people and local communities (IPLCs) have a limited role in the decision over land use. Many of the decisions

Ecological Trends Alliance (ETA) as the lead CSO is working with a team of independent experts including an agricultural and environmental economist to generate evidence-based research and information. This will be used to create to reach out to duty bearers and the public. The research and knowledge generated will be used

made over land use change directly impact the capacity of IPLCs to achieve sustainable livelihoods, and their capacity to contribute to biodiversity conservation, and participate in the new economic opportunities that emerge because of the land use change.

The Green Livelihoods Alliance (GLA 2), 2021-2025 is being implemented in the Albertine Graben with a specific focus on the Bugoma Forest Landscape. The focal districts are Hoima, Kikuube, Masindi and Buliisa. The region has a several major activities in conflict with biodiversity and ecosystem conservation, including oil and gas exploitation and associated infrastructure development, illegal trade in forest products, ongoing development of hydropower plants in an ecologically sensitive environment, and expansion of agro-commodity production and processing. The Uganda GLA 2 Programme has three long-term objectives: (i) indigenous peoples and local communities sustainably govern forest landscapes; (ii) engagement of Government of Uganda (GoU) and private sector, in sustainable extractives, and agro-commodities, and reduced deforestation; and (iii) secure civic spaces for environment and human rights defenders, Civil Society Organisations (CSOs) and IPLC leaders to speak out for their rights, livelihoods and the forest landscape.

to build capacity of IPLCs and CSOs to engage Government and private sector, among others leading to the enhanced and sustainable livelihoods. This is seen to further improve human rights for IPLCs/(W)HRDs on one hand, and increased conservation, sustainability and rights over the land resources, and ecosystems services.

1.2 Purpose and objectives

The GLA 2 aims to ensure that tropical forests and forest landscapes are sustainably and inclusively governed to mitigate and adapt to climate change, fulfil human rights, and safeguard local livelihoods. This research seeks to establish a baseline and provide a situation analysis, synthesis of core issues, and priorities that impact on current and future livelihoods of IPLCs, and other community members of the Albertine Graben.

The overall objective of the research is to assess economies of scale; benefits versus losses to IPLCs

in the oil and gas and agro-commodities sectors in the Bugoma Forest landscape.

The specific objectives of this research are to:

1. Describe economic activities, provide baseline information on economies, players and explain the issues therein within the landscape.
2. Provide a situational analysis with markets and value chain for now and the future inferences.



Methods and Tools for the Assessment

2.1 Design

The study is an exploratory survey that seeks to lead to a description of the baseline and situation analysis of economic enterprises for IPLCs and other economic opportunities in the Albertine Graben. The study seeks to develop a basic value chain of economic enterprises and describe the impact of the value chains on livelihoods, conservation of the forested landscape, and human and land rights for IPLCs. The exploratory

evaluation will identify priority issues for further research to capacitate CSOs and IPLCs to lobby Government and private sector.

The research addresses the needs of CSOs and local government for scientific /evidence-based information that informs their lobby and advocacy for a sustainable and inclusive landscape governance.

2.2 Data type, collection, and analytical approaches

The data covers the enterprises, the stakeholders engaged in the value chain activities for the enterprise, the impacted members of the community as well as current practice in implementation of rules and regulations that support enterprises.

The data was collected through key informant discussions, literature review, transect walks and discussions with stakeholders and value chain actors. The structure collation of data on economic enterprises was through the Natural Resources and Commercial officers of the different districts, and urban authorities.

Stakeholder analysis was used to identify stakeholders and prioritize them based on interest, influence, and financial investment, among other relevant factors. The value chain description was used to show the range of activities which are required to bring a product or service from conception, through the different phases of production (involving a combination of physical transformation and the input of various producer services), delivery to final consumers, and final disposal after use. The value chain analysis assessed the potential of scaling up, and the overall sustainability impacts associated with the different enterprises.

Benchmarking the Economy and Players in the Landscape

3.1 Oil and Gas developments in the Albertine Graben

Uganda confirmed commercial petroleum resources in 2006. By June 2016, the discovered resources in the country were estimated at 6.0 billion barrels of oil equivalent in place with about 1.4 billion barrels of these resources are recoverable. The area explored presently represents less than 40% of the total area with the potential for petroleum production in the Albertine Graben and only 12% is licensed. There is therefore potential for additional petroleum resources to be discovered in the country when additional exploration is undertaken (PAU 2022).

Nine (09) production licenses have been issued over fourteen oil fields and development plans for three fields are under discussion. Eight production licenses are operated by Total Energies, and one license operated by CNOOC Uganda Ltd. The companies have embarked on the journey commercial production and field development as a precursor to attaining the agreed commercialization strategy, which includes: (i) use of petroleum, starting with associated gas, for power generation; (ii) supply of crude oil to 60,000 barrels per day refinery (to be developed in Uganda) to meet national and regional petroleum productions requirement; and (iii) export of crude oil through an export pipeline. New exploration is ongoing in the Kanywataba Exploration Area in Ntoroko district, and in the two stratigraphic/ vertical licenses in the Ngassa Exploration Area in Hoima district.

3.1.1 Infrastructure development

The infrastructure development required to produce and commercialize the country's oil and gas resources is expected to bring into the country investments of between US\$15 to 20 billion in the next three (3) to five (5) years after the Final Investment Decision (FID) is made. These investments are to be made in the development of the following infrastructure (PAU 2021):

- i) Infrastructure to produce the oil which includes drilling and completing more than 400 wells, setting up two Central Processing Facilities (CPF s), laying over two- hundred (200) kms of in-field flow lines, laying over one hundred fifty (150kms) of feeder pipelines, together with construction of base camps and in field access roads, among others. These facilities are required for the two field development projects of Tilenga and Kingfisher which are collectively estimated to cost US\$ 8 billion.
- ii) Construction of the East African Crude Oil Pipeline (EACOP) a one thousand, four hundred forty-three (1,443km) heated pipelines from Hoima in Uganda to the port of Tanga in Tanzania which is estimated to cost US \$3.5 billion.
- iii) Development of a 60,000 barrels per day green-field Refinery in Uganda estimated to cost over US\$3 billion.
- iv) In addition, several supporting infrastructure projects are being developed, including a network of twelve tarmac roads covering over five hundred (500km), and an International Airport.
- v) A twenty- nine (29 sq km) petroleum based Industrial Park which will host the refinery, crude oil and products storage facilities, a crude oil transmission hub, logistics warehousing, offices and petrochemical industries and the construction of over seven hundred (700km) of highway and bridges.

- vi) Upgrading and expanding the existing Information, Communication and Technology (ICT), and upgrading the country's electricity network, which is estimated to cost over US\$1 billion.
- vii) Other investments in the sector include the acquisition and processing of seismic data together with drilling of wells in the areas which are newly licensed for petroleum exploration.

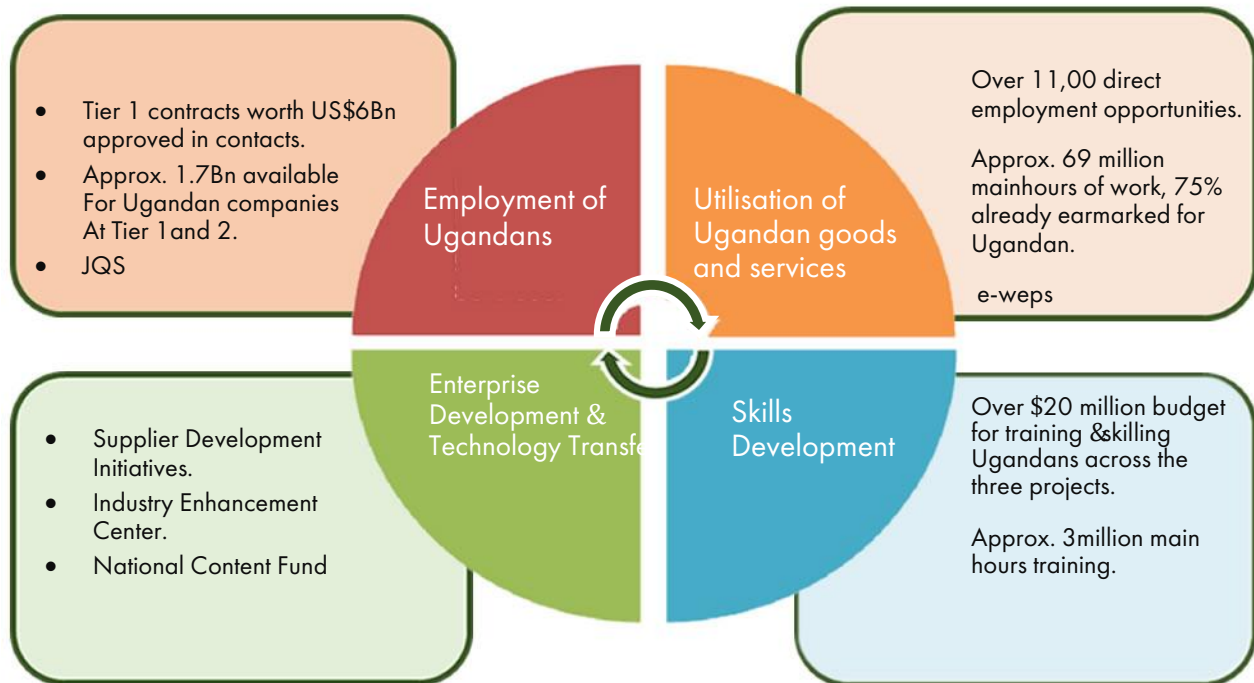
3.1.2 Scale of economic opportunity associated with local content development

A cumulative investment of \$4.8 billion was made by the end of 2021. The launch of the projects in April 2021, and the Final Investment Decision (FID) announcement on 1st February 2022 unlocked a \$15 billion investment in the next five years, with \$3 billion in 2022. An additional \$40 billion is expected to be spent over the following 25 years of operations and maintenance of the oil fields and other infrastructure.

The economic value of the current scale of interlinkages between oil and gas development and other economic activities is valued at US\$8 billion (PAU 2022). The linkages are in agriculture, housing, tourism, civil works, health, and transport.

The direct benefits in financial terms are highlighted below (Figure 1). At the end of May 2022, 5,070 persons of whom 4,805 (95%) were Ugandans, 389 persons out of the 4,584 contractor and subcontractor employees from the local communities. Over 11,800 Ugandans have been trained and certified in various oil and gas disciplines of Welding, Health Safety and Environment, Heavy Goods Vehicle, and Scaffolding among others.

International accreditation and certification of vocational training Institutions-City & Guilds, ECITB, OPITO, and NEBOSH for 200 government officers from various ministries and agencies trained in oil and gas related disciplines.



Source: PAU 2022

3.1.3 Revenue from oil and gas

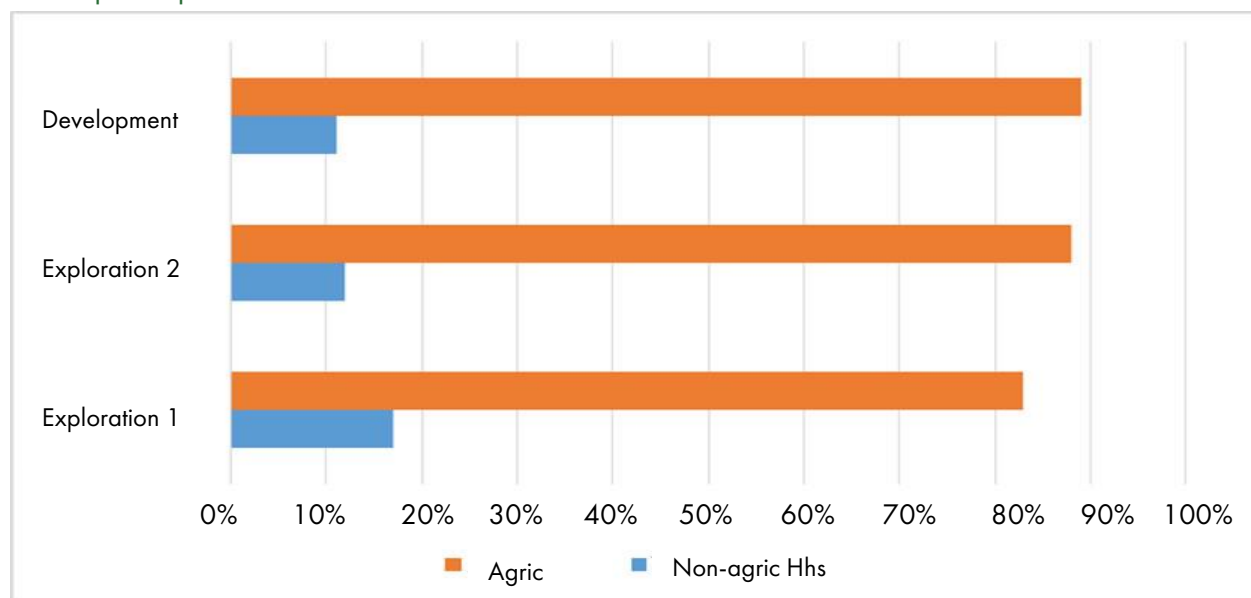
Government revenues from the oil and gas sector include royalties, profit oil share, state participation and taxes. The overall projected annual revenues from the sector are estimated at US\$1.5 billion to US\$2 billion. The royalties, which are also the resource rents, represent the compensation to society, and the environment and natural resources for the management of the resource. The royalties are expected to range between \$75 million and \$250 million per year based on the information provided by PAU (PAU 2022). According to the Public Finance Management Act (2015) Article 75 the Government shall retain 94% of the revenue from royalties arising from petroleum production and the remaining 6% will be shared among the local governments located within the petroleum exploration and production areas of Uganda.

The Government will grant one percentage point of the royalty due to the Central Government to a gazetted cultural or traditional institution. The revenue from royalties shall be appropriated to a local government in the annual budget for development purposes. The revenue from royalties shall be considered as part of the revenue of the local government and shall be integrated in the budget of the district to be spent on priorities determined by the Local Government Council, taking into consideration national priority programme areas (GoU 2015).

3.2 Scope of agriculture in Albertine Graben during the oil and gas exploration and development phases.

Over the transitional period from exploration to development, the proportion of agricultural households engaged in agriculture production has increased from 83% to 89% (Figure 2). Concurrently, the proportion of the community members in non-agriculture households decreased between 2008 and 2021 (EPRC, 2022). The emergence of the oil and gas industry created opportunities in agriculture production due to migrants who came to the Albertine Graben to engage in agriculture thereby filling up some of the agriculture supply deficits.

Figure 2: Livelihood dependence of households from the oil and gas exploration to the development phases

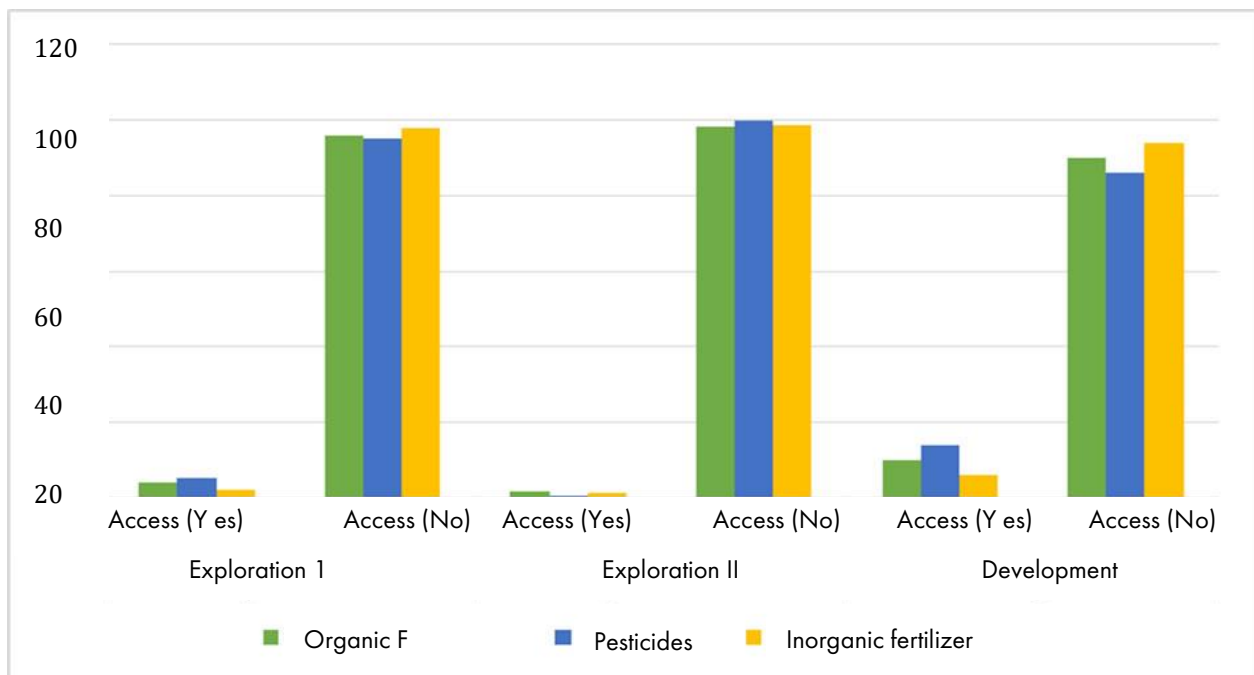


Source: adapted from EPRC (2022)

The growth of commercial agriculture for sugarcane, maize, tea, and tobacco, among others has also increased the proportion of people, both locals and recent migrants, engaged in agriculture. The emergence of plantation forestry particularly for pine and eucalyptus has increased commercial land use over the traditional subsistence farming systems.

Figure 3 shows the access to quality external inputs to increase agriculture production in the Albertine Graben. The access to high quality external inputs comprising organic and inorganic fertilisers and pesticides increased from 4 to 10%, 2 to 6%, and 5 to 14% respectively. The improvement in agriculture inputs is associated with the increased emergence of commercial plantations of sugarcane (both nucleus estate and out-growers), tea, tobacco, and maize. In addition, there are various government led programmes including the National Agricultural Advisory Services (NAADS), and Agriculture Cluster Development Project (ACDP), among others.

Figure 3: Access to quality agricultural inputs for sustainable agriculture production



Source: adapted from EPRC (2022)

The aggregate supply for agriculture products continued to be higher than the demand from the exploration to the oil development phases (EPRC 2022).

Over the transition from oil and gas exploration to development, the supply deficit of vegetables, fruits, meat, and milk increased. The supply deficit was largely in the core oil districts of Buliisa, Masindi, Hoima and Kikuube but was increasingly expanding to the spill over districts adjacent to the oil districts such as Kibaale, Kiryandongo, and Kabarole, among others. The supply deficits are met through sourcing of food from further away from the oil districts from southwestern and central Uganda, including importation from Kenya (EPRC 2022). The local supply deficits deny the local communities an opportunity to participate in an existing economic opportunity.

Table 1: Comparison of demand/ supply of agricultural products in the Albertine Graben (Bn UGX)

	D/S	Cereals	Pulses	Vegetables	Fruits	Meat	Milk+	All
Exploration 1								
Core oil districts	Demand	9.44	8.89	3.06	1.40	5.76	1.74	30.20
	Supply	44.00	26.63	3.03	14.64	0.16	0.18	88.65
Spillover districts	Demand	57.99	41.10	18.71	17.43	36.10	21.57	192.90
	Supply	396.65	299.59	25.85	416.32	0.48	31.97	1,170.86
Exploration 2								
Core oil districts	Demand	69.70	87.52	49.20	31.89	100.03	20.97	359.31
	Supply	123.97	218.60	12.46	21.35	0.11	13.37	389.87
Spillover districts	Demand	305.52	249.07	163.89	146.30	425.80	124.84	1,415.42
	Supply	1804.79	1599.19	302.02	273.65	0.41	86.67	4,102.73
Development								
Core oil districts	Demand	117.28	131.63	95.29	49.64	105.13	37.35	536.31
	Supply	354.89	327.74	3.65	44.10	24.97	0.31	755.67
Spillover districts	Demand	469.15	536.47	265.93	231.99	399.15	189.88	2,092.57
	Supply	990.28	916.15	76.58	138.17	37.09	168.57	2,326.85

Source: adapted from EPRC (2022)

3.3 Land use change and farmland expansion in the Albertine Graben

Whereas commercial agriculture became more prominent increasing by 15,661 ha for all four districts between 1990 and 2015, it pales in size when compared to the small-scale agricultural land expansion of 137,645 ha. Commercial agricultural expansion was just 11% of the expansion in small scale farmlands. Despite their relatively modest expansion, commercial agriculture is common in the landscape particularly in Masindi and Hoima districts.

Figure 4: Land use change in the focus districts of Buiisa, Hoima, Kikuube and Masindi, 1990-2015.



Source: adapted from UBOS 2019

Figure 4 shows that the major land use change (LUC) in the Albertine Graben focus districts of Buiisa, Hoima, Kikuube and Masindi, between 1990 and 2015, was the depletion of woodlands. Woodlands host short trees and shrubs, which are known for high quality as wood fuel, particularly for charcoal production. The woodlands were largely converted into small-scale farmlands, and bushlands both of which represent both a loss of wood biomass and biodiversity, as well as the ecosystem services associated with forests and woodlands such as wildlife habitats, medicinal plants, carbon sequestration services, and hydrological services, among others. Indeed, the grasslands one of the dominant land use systems in the Albertine Graben also reduced considerably between 1990 and 2015.

As early as 2000, the Government was aware of the vulnerability of the Albertine Graben to deforestation therefore at least 20 riverine forests and wetlands, including Bugoma and Budongo central forest reserves, were designated as part of the wildlife corridor to conserve both wildlife habitats and forest and grassland biodiversity (NEMA 2021). Across the four study focus districts, the reduction in woodland cover was equivalent to 61% reduction in woodlands from 1990 to 2015. On the other hand, the small-scale farmlands increased by 65% of their original cover from 1990.

3.4 Tourism and conservation activities of protected areas

The Albertine Graben has over 100 central forest reserves (CF Rs) of national importance, local forest reserves and forests on private land. Whereas the priority areas of the study fall within the Murchison Falls Conservation Area, the key protected areas are Bugoma CF R in Kikuube and Hoima districts, Budongo CF R crosses from Masindi to Hoima District. The Murchison Falls National Park is in Masindi, Buliisa districts, and districts outside the study area including Nwoya, Kiryandongo, Nebbi and Packwach district. Table 2 and Table 3 are lists of the conservation areas within the four focus districts of the study in the Albertine Graben.

Table 2: Forests of priority conservation importance in the Albertine Graben

No.	Name of the Forest	Size (Ha)	Districts
1.	Budongo	82,530	Masindi/Hoima
2.	Kasokwa	73	Masindi
3.	Bugoma	41,144	Kikuube
4.	Wambabya	3,429	Hoima

Source: World Bank 2020

There are 11 national priority national parks and wildlife reserves in the AG. These areas provide a habitat for conservation of biodiversity in the country, also provide aesthetic amenities that attract tourists from Uganda and other parts of the world. The national parks and wildlife reserves were not a specific priority of the study; however, the national parks and wildlife reserves in Masindi, Buliisa, Hoima and Kikuube were considered for the participatory key informant value chain development.

Table 3: National Parks and Wildlife Reserves in the Albertine Graben

No.	Name of the Park/Wildlife Reserve	Size (Ha)	Districts
1.	Murchison Falls National Park	384,000	Masindi, Buliisa, Nwoya, Nebbi
2.	Kabwoya Wildlife Reserve	8,700	Hoima, Kikuube
3	Kaiso Tonya Community Wildlife Area	10,700	Hoima, Kikuube

Source: World Bank 2020 and UWA 2016

Wildlife tourism is a core component of the tourism sector, one of the four economic growth drivers to spur economic transformation. UWA shares 20% of park entrance fees with local communities surrounding wildlife protected areas where tourism revenue is generated. The goal for revenue sharing is for the communities living adjacent to protected areas to derive benefits from tourism and conservation and thus be more committed to conservation. The shared revenue is managed by the respective District Local.

Governments and is used to fund livelihood and public goods projects decided upon by the beneficiary communities. It has also been noted that because of more revenue shared, there was reduction in illegal activities, resulting in a positive impact on conservation and environmental management (MTWA, 2014). Communities also benefit directly from tourism through community-based tourism enterprise initiatives that have been established since 1998 under Uganda Community Tourism Association (UCOTA) and Community Based Tourism Initiative (COBATI). There are about 60 community initiatives under UCOTA.

Despite the positive forecasts for increased contribution of the wildlife sector to the national economy, challenges regarding the narrow base of this contribution persist and will need to be addressed in the immediate to the medium term. Whereas 10% of Uganda lies under protected areas of national parks and wildlife reserves, approximately 83% of protect area revenue comes from only three national parks (Bwindi Impenetrable, Murchison Falls and Queen Elizabeth National Parks) of which 51% comes from the sale of gorilla tracking permits in Bwindi Impenetrable National Park (BINP) and some from Mgahinga Gorilla National Park (MGNP). The rest of the protected areas come largely as cost centres. This is because many of these protected areas have a limited range of products to attract substantial tourist numbers or to increase tourists' length of stay and expenditure (MTWA 2018).



Economies for indigenous people and local communities (IPLCs)

4.1 Agricultural livelihoods

4.1.1 Food crop production

The Albertine Graben economy is largely driven by agriculture. About 80% of the households are engaged in agriculture as a key source of livelihoods. Whereas agriculture is predominantly subsistence there is a growing commercial agriculture for tea, sugar cane, tobacco, cotton, coffee, and cocoa (MWE 2022).

Agriculture is generally rain-fed. As much as aggregate supply of produce particularly cereals, and pulses exceeds the local demand, the major production is dominated by cereals and pulses of local importance. The dominant cereals are maize and rice, while beans, groundnuts and peas are the main pulses. There is a supply deficit of vegetables, fruits and milk, and the deficit extends to the nearby districts. On the one hand, this represents potential for increased production due to demand which outstrips production, on the other hand, it also shows the low capacity to produce high quality fruits, vegetables, and milk in sufficient quantity to meet the demands of the market. In addition to supporting increased production, there is a need to support a value chain upgrade to achieve market quality and quantity

The Local Government Technical officers acknowledge that crop production particularly for rice and maize have increased in recent times due to an influx of people in search of economic opportunities. Many of the migrants, from other part of Uganda, were attracted first by the economic opportunities associated with oil and gas, and the prospects of the commercial commodity agriculture of sugarcane, maize, and coffee, among others. Gradually, the migrants have settled to produce food crops such as maize, rice, vegetables, and beans.

4.1.2 Commercial commodity agriculture.

Sugarcane is by far the leading commercial commodity crop for smallholder farmers, and it is followed by maize production particularly in Masindi district. Rice is an emerging commercial crop with considerable potential for growth within the region. Tobacco, coffee, and cocoa are important cash crops because of the historical production and the importance of the region for production of Tobacco.

Due to strong promotion, Uganda's forest plantations have expanded by 837% and 654% for broadleaved and coniferous (thin-leaved) plantations respectively between 2000 and 2017. In the four focus districts all the forest plantation expansion occurred in Hoima and Kikuube districts. The broad-leaved plantation forests expanded by 2132% from 47 ha to 1,002 ha while the coniferous plantations contracted by 10% from 432 ha to 387 ha between 1990 and 2015.

The level of large-scale smallholder, out-grower sugarcane production is at crisis level that in many cases, the farmers are not able to sell all their sugarcane to the local sugar processing plants. The two largest local plants are Kinyara Sugar Works in Masindi district and Hoima Sugar Ltd. In Kikuube district The market situation for sugarcane in the three study districts became dire. In 2018/19, the sugar factories increased the average age of cane for sale from 18 months of maturity to 30 months of maturity. Many of the new farmers cannot cope with the extended gestation period before harvesting and have either sold their sugarcane fields to more stable farmers or opted to sell their sugarcane elsewhere.

The common alternative markers are Atiak Sugar in Amuru district (that later closed due to fires), Victoria Sugar in Luwero district, Kiryandongo The Masindi Sugarcane Out-growers Association was formed to support farmers to negotiate for a fair price and bulk sale of the sugarcane to the factories, particularly Kinyara Sugar Works. However, field reports indicate that the out growers' association was captured by a few of the farmers who negotiated exclusive purchase agreements with Kinyara Sugar Works, while many of the farmers are unable to sell through the association.

Tobacco has traditionally been grown in fertile forest soils, which encourages encroachment on forests. Although tobacco farmers have gradually adopted sustainable production of owning woodlots and soil fertility improves on their individual farms, the poor market for Tobacco between F Y 2017/20 and F Y 2020/21 where the Tobacco companies did not buy enough from farmers due to the market decline. The tobacco farmers suffered considerable losses due to the weak tobacco farmer associations and the poor contracts with the Tobacco companies who took the farmers' stock. In F Y 2019/20, the Ministry of Finance, Planning and Economic Development (MoFPED) indicated a willingness to pay the farmers and recover the money from the companies, Continental Tobacco Uganda and Nimatabac Tobacco Company Limited.

4.1.3 Livestock.

The main livestock kept in the area are cattle, goats, and sheep. Livestock keeping is an important economic activity in the districts of Buliisa, and Masindi (Busongora areas) and Hoima along the rivers and lakeshores in the rift valley where there is high carrying capacity. The main types of cattle kept are Ankole longhorn and Zebu. However, due to low animal genetic performance of the local breed, some farmers are switching to cross breeds especially among the dairy farmers in the highland areas of the escarpment.

Sugar Works in Kiryandongo district and Kyenjojo Sugar in Kyenjojo district.

Large scale production of rice and vegetables leads to destruction of wetlands. The rice and vegetables are generally grown by immigrants who have a limited civic participation in the community and tend to encroach on wetlands with the support of local leaders. The paddy rice produced is quite popular in the market because of a superior flavour to the alternatives. The rapid clearance of the local Super Rice produced in the wetlands encourages further encroachment.

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Watering points are mainly river points and streams for communal use and the Lakes. There are no designated watering points for livestock, animals share water sources with people. For example, only one dam is reported to be in Buseruka sub-county in Hoima district, while there is none in Buliisa District. There are a lot of dry season movements of livestock within the Albertine Districts in search of water and pasture resulting in conflicts over water access, crop damages and spread of diseases.

Buliisa District has been under quarantine of foot and moth diseases for the past 3 years, which has

greatly affected the livelihoods of the people as they cannot sell the animals nor products like milk.

4.1.4 Fishing

Fisheries activities provide an important source of livelihoods for the people in the Albertine Graben. The region contributes 18.7% of the total national fish catch, which is quite significant and of this, 15% is contributed by Lake Albert alone, (MAAIF 2020). Other important sources of fish in the region are rivers Waki, and Wambabya in Hoima district.

Discussions with District Local Governments and fishing communities suggest declining fish catches. Even though fisheries committees exist their efforts are generally limited to support fisheries

enforcement to minimise the use of illegal fishing gear in the lake. Because Lake Albert is a transboundary fishery, there is competition in fishing effort with fishermen indicating superior boats used by fishermen from the Democratic Republic of Congo (DRC). Moreover, the fishing boats from the DRC employ trawler fishing techniques which also damage the fish breeding areas. District Local Governments are supporting efforts to diversify fisheries through introduction of fishponds, and cage fish farming with support of the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF).

4.1.5 Opportunities for value chain development

There is subsistence production for food crops particularly cereals; maize, rice, and pulses; beans, groundnuts, peas; and vegetables, and bananas. The districts have benefited from initiatives under the Agriculture Cluster Development Project where farmers' organisations have been funded to construct food stores and acquire maize mills and coffee mills. Farmer groups are formed at sub-county level. The stores and grain processing has improved local access for processed food. The marketing challenge within the three districts remains. The dominant maize flour, rice, fruits, and vegetables on the stalls. The opportunity for value chain development seems to lie in developing marketing cooperatives for farmers as a next step to supporting the groups engaged in group storage and processing. The immediate areas for boosting production within the supply chain are the supplies of vegetables, fruits, and milk, and local super rice. Improved vegetable, fruits and local super rice production can be achieved through intensification of smallholder irrigation systems.

in markets are obtained from outside the Albertine Graben.

Imported Pakistan rice and rice from Tanzania were dominant in the markets because of low production of the local "Super rice". At the same time, the local "Super rice" is very popular and is quickly bought by traders and transported outside of the district. However, the vegetables, fruits are largely from outside the region with small supplies reported from Buliisa, Hoima, Masindi and Kikuube, as collaborated by EPRC (2022).

Milk production targets can be achieved by switching from agro-pastoral (49%), and pastoral (40%) systems to a combination of semi-intensive (25%) and ranching system (30%), with agro-pastoral and pastoral systems reduced to just 25% and 20% of cattle based on a national average. The figures proposed are based on a sustainable livestock projection for 2050 for Uganda (FAO 2019).

4.2 Local content and revenues from oil and gas

About US\$8 billion over a 25-year period is directed at local content from contracting for infrastructure development and supplies of goods to the oil companies. The benefits also include jobs, skills training, and improvements in social services.

A synthesis of the oil revenues (MWE 2022) established that total royalties to be received by the Government per year will average between \$70.5 million and \$235 million. The royalties will increase with more discoveries and development of the oil and gas resources. Up to 10% of the royalties can be allocated to the districts in the Albertine Graben equivalent to \$7 and 23.5 million/ year from the national Government. The

royalty receipts to be used in bankable projects are likely to roughly range between \$0.45 and 1.5 million/ year from the different District Local Governments. Whereas this revenue will significantly boost the revenue stream of local governments, the likelihood of contributing to local livelihoods will be from identification and development of projects that can enhance the value of existing livelihoods. Investments in the sustainable ecosystems and biodiversity that can provide the base for optimal agricultural value chains of crops, livestock and fisheries, tourism, and human capital development to participate in the oil and gas sector and the services and the industrial sectors. In this way, the revenues obtained from the oil and gas can be optimized.

4.3 Tourism and ecotourism

Outside of the protected area system of National Parks, Wildlife Reserves and Central Forest Reserves (CF Rs), there is very little activity in ecotourism. Only one eco-lodge was indicated in Kikuube adjacent to Bugoma CFRs. There are several hotels and lodging facilities in Hoima district; however, no private investment in ecotourism trails was indicated.

In Masindi district, a private conservation area, the Kigaju Forest Camp, for chimpanzees was established 15 km from Masindi Town as a forest camping site with eco-lodging facilities and tracking of habituated and wild chimpanzees. The ecotourism facility struggled with human-wildlife conflict (HWC) as neighbours complained about crops raided by the chimpanzees. In 2020, the ecotourism site closed due to the COVID-19 pandemic, as no tourist came, and there was no revenue. The proprietor has since converted the

facility into a goat rearing farm although he is committed to restoring the ecotourism facility when tourists return.

Buliisa, Masindi, Hoima and Kikuube districts are part of the critical wildlife corridor that allows the upper Albertine conservation areas of Murchison Falls National Park and Budongo central forest reserve to connect with the Kabwoya-Kaiso Wildlife Management Area (KKWMA), and in turn the Kibaale Conservation Area that comprises Kibale National Park, Semliki National Park, Katonga and Toro – Semliki Wildlife Reserves. These interconnected zones make the Murchison Falls Conservation Area one of only two, along with Bwindi-Mgahinga Conservation Area, financially profitable conservation areas based on tourism revenues. The potential for increasing the tourism revenues in the landscape is high and will likely be boosted further by the oil and gas developments.

4.4 Innovative mechanisms for sustainable land use and biodiversity conservation

1. Managing the unutilized land, and landless and those with small pieces of lands

This assessment found that in many areas of Kikuube, Hoima and Masindi large tracts of land remain unutilized. The owners of the large tracts of land do not rent or allow IPLCs to use them for fear they will become encroachers and claim ownership. The squatters have often made claims to be acknowledged although they are not customary landowners and bona-fide occupants as indicated in the Uganda Land Act cap 227. The legal and physical costs of removing squatters may often be high. The options for ensuring use of land and avoidance of the squatter problem include:

- (i) Renting land. Immigrants often rent land at a cost of UGX1 50,000 per acre per season. IPLCs also rent land in areas where the land holdings are very small at the same rate.

2. Switching from sugarcane to food crops

Whereas many immigrants come to the Albertine Graben as workers in the sugarcane plantations and factories, many have also realised the food supply deficit, and they have convinced IPLCs to rent them their land to produce food crops including rice, vegetables, and fruits. However, some of the immigrants target wetlands. There is a

3. Community forestry

Masindi district has 10 community forests. Community forests are created to allow a community to contribute to conservation of critical fragile ecosystems while also obtaining ecosystem services such as firewood, poles, medicinal plants, and fibres, among others for their livelihoods. The community forestry approach was only found in Masindi district. In some of the successful cases, such as the Ongo community forest, the community has signed agreements for purchase of verified

- (ii) In Masindi one landowner, who also owns a mill, allows IPLCs and immigrants to rent his land and compensate him in kind with grain produce, equivalent to rent value of the land.
- (iii) It has been suggested through this assessment that the district land offices are willing to support landowners to create leases for the IPLCs and investors who seek to use their land.
- (iv) In Hoima district, the District Natural Resources Office, which also includes the Lands office, is exploring introduction of a land charge for landowners who leave land unutilized, as a means of ensuring land-less IPLCs and those with small pieces of land are able to farm them.

growing pattern, although small of some farmers abandoning sugarcane due to the unsustainable 30-month gestation period and switching back to food crops particularly where the land is hired by immigrants from the paddy rice and fruit/vegetable growing areas of eastern Uganda.

emissions reductions by the Environmental Conservation Trust (ECOTRUST), and conservation of the wildlife corridor between Budongo and Bugoma CF Rs. The community forest then plays a critical conservation role of protecting rivers and tributaries of the river Waki system. The river Waki system hosts a 4.8 mega-watt small hydro power station that is connected to the national electricity grid.

4. Payments for ecosystem services, conservation of wildlife corridors and private ecotourism

One of the most successful cases of PES is a hybrid of verified carbon emissions reductions and biodiversity conservation under the Plan Vivo standard that is operated by ECOTRUST in the Albertine Graben. This instrument has been used to support community forest management between the National Forestry Authority (through CF M) and communities adjacent to the CF Rs leading to reduced encroachment, and to support the establishment and sustainability of community wildlife and serve as a wildlife corridor within the Albertine Rift. Whereas the sustainability of the financing was not demonstrated, the emergence of interventions such as private ecotourism areas to service tourists and obtaining tourism revenue for

forest associations. Ongo community forest association is one of the beneficiaries of such a PES.

In 2014, the National Environment Management Authority (NEMA) and the Chimpanzee Trust piloted payments for biodiversity conservation ecosystem services project. Private forest owners were compensated for allowing their forests to host

conservation was directly linked to the project as an outcome. This instrument represents a future opportunity to support biodiversity conservation in the Albertine Graben.

5. Farmer cooperatives for storage, processing, and marketing of agricultural produce

The successful farmer associations currently observed in Kikuube, Hoima and Masindi district have largely benefited from external support through the Ministry of Agriculture, Animal Industry and Fisheries (MAAIF) under the World Bank funded Agriculture Cluster Development Project (ACDP). There are many cooperatives for coffee

in Hoima and Masindi districts that have not been successful. Nonetheless, the use of cooperatives represents a future opportunity of allowing smallholders to participate in the economy, and to create local content to benefit from the economic transformation associated with the oil and gas industry.

Conclusions and Recommendations

5.1 Conclusions

- Although the emergence of the oil and gas industry portends better economic opportunities of employment, and direct income to the central government, local governments, cultural institutions from royalties and taxes, the direct revenue to the indigenous peoples and local communities (IPLCs) is quite minimal. Therefore, the real opportunities for IPLCs are the indirect economic opportunities from the oil and gas industry such as the growing supply chain for food items, many of which are in deficit within the community, the need improved housing and social services for the immigrants, and tourists who come to the landscape. The opportunities for employment in both the oil and gas sector, as well as the tourism and travel, and the forecasted growth in agro processing are quite strong.
- Commercial agriculture has a strong foothold particularly sugar production while commercial forestry in Hoima and Kikuube districts is also a major land use. Sugar cane production is constrained by elite capture in the supply chain particularly for Kinyara Sugar Works, the largest processing factory in the region. Many of the small sugar producers rely on sales to middlemen and transporters to the other sugar companies in the landscape, which cuts into the profits. The market structure needs improvement. On the other hand, the opportunities in food crops, livestock and livestock products and fish and fish products remains quite strong.
- As the economy in the Albertine Graben grows, the strain on the existing ecosystems, within the landscape, is exacerbated. The encroachment of central forest reserves, and other natural forests on private land, grasslands and wetlands increases. The encroachment is primary for agriculture land expansion; however, the harvest of wood for fuel and timber important drivers as well. The agricultural expansion will also lead to further reductions in soil fertility, the ecosystem encroachment will reduce the wildlife corridor, affecting wildlife habitats and the biodiversity they hold as well as tourist activities.
- The major indirect drivers observed that constrain economic opportunities and sustainability of ecosystems are poor governance for value chains and natural resources, and low technical capacity particularly for the institutions supporting the IPLCs. The poor governance was seen in the sugarcane value chain from elite capture to poor supply chain management for the other sugar cane factories, which drives up farmers' transaction costs. However, the land use planning for integration of sugarcane, other crops such as rice and maize at a commercial scale, while large tracts of land remain unused leads to a lot of inefficiency and drives the communities and immigrants into further encroachment of wetlands and forests, where the monitoring is limited. The technical capacity is needed for both local government staff, and cooperatives and community associations that the first line of interaction with communities.
- The land use planning at landscape level must be a priority for sustainable and secure allocation of land for tourism, forestry conservation and commercial forestry, agricultural production, industrial activities including oil and gas and agro processing, among others. The absence of a strategic land use plan at landscape level, community and individual household level is a critical challenge that needs addressing as well.

5.2 Recommendations

1. There is need for strategic land use plan at the landscape level in the Albertine Graben. The land use will allow for sustainable and optimal appropriate of the available land to allow for biodiversity conservation, tourism, agriculture, commercial forestry, and industrial activities. The land use planning can then be integrated through a bottom approach that includes households and communities. The land use planning should also aim at strengthening the tenure rights of IPLCs.
2. Support the development of a strong market structure and governance for agricultural production. These value chain systems will support the already established enterprises such as sugar cane while also streamlining maize, rice, and other enterprises with potential for growth in future. Indeed, the streamlined value chains may attract increased participation from IPLCs, and investors from the outside.
3. With streamlined value chains and improved land use plans, then technical capacity building for cooperatives, and local governments need to be a key component intervention. There is need for capacity to practice good agriculture practices that meet the market demand and standards, need to include sustainable agricultural practices such as climate smart agriculture to ensure that the soil fertility is maintained and improved, water is sustainably used, and external polluting elements are minimised on the farm.
4. There is need for investment in policy instruments for sustainability for the agricultural system, and environment and natural resources. Long-term contractual arrangements for biodiversity conservation in the wildlife corridor, carbon sequestration, and watershed management undertaken in partnership with the oil and gas companies, the sugar companies and communities will ensure that the sustainable landscape design developed is consultative and participatory, can be financed at landscape level, and works for everyone especially the users and providers of ecosystem services.

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