

flaring and boost its production of natural gas to supplement the fall in production of crude oil as the demand of crude oil falls. However, as we transition toward sustainable energy, the focus is shifting to renewable alternatives and reducing greenhouse gas emissions associated with its use. It is paramount Nigeria start diversifying our economy by fostering growth in agriculture, manufacturing, and technology to prevent instability and economic regression

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DEVELOPMENT OF AGRICULTURE IN UGANDA THROUGH THE USE OF WIND MILLS

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Green technology is increasingly central to agricultural transformation in Africa, providing solutions for climate resilience, productivity enhancement, and sustainable resource management. Uganda, where agriculture supports over 70% of livelihoods, faces challenges including climate variability, low mechanization, and post-harvest losses. This article examines Uganda's current experience with green technologies—such as solar irrigation, renewable energy, climate-smart agriculture, and precision farming—and draws lessons from African peers, including Kenya, Morocco, and South Africa. The study identifies key enablers, challenges, and policy recommendations to accelerate adoption and ensure equitable and sustainable agricultural development. Agriculture in Uganda is divided into different sectors (Figure 1).

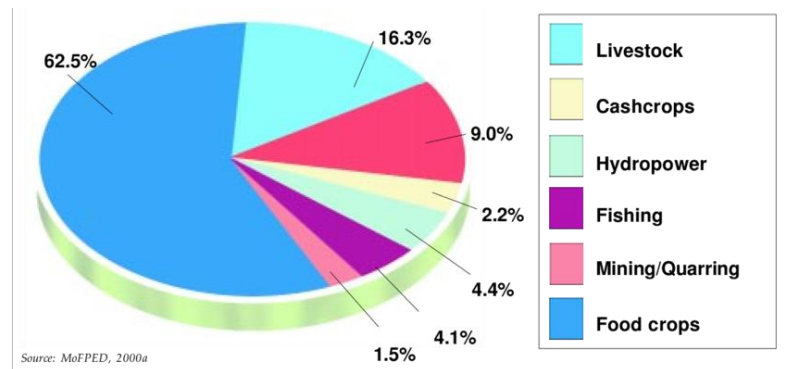


Figure 1 – Chart showing different Agricultural sectors with other economic activities in Uganda

Agriculture is a cornerstone of Uganda's economy, employing a significant proportion of the population and contributing roughly 24% of GDP (World Bank, 2024). However, the sector is heavily dependent on rainfall and faces persistent challenges, including soil degradation, erratic weather patterns, low mechanization, and limited access to modern inputs. Climate change has exacerbated these challenges, leading to reduced crop yields, food insecurity, and economic vulnerability among smallholder farmers [1].

Green technology offers a pathway to address these challenges by improving efficiency, reducing environmental impact, and promoting climate resilience. In the context of Uganda, green agricultural technologies include renewable energy applications (solar and biogas), precision agriculture (soil sensors, drone mapping, and smart irrigation), and climate-smart practices (agroforestry, drought-resistant crops, and integrated water management). Several African countries have successfully adopted similar technologies, offering valuable lessons for Uganda's policy and practice.

Let's say we use drones and solar systems.

- Drones can precisely manage irrigation, reducing water waste and improving crop yields.
- Solar energy can power both irrigation systems and drones, significantly cutting energy costs.
- Integrating drones with solar systems allows for real-time monitoring and management of crops.
- While the initial investment is high, the long-term savings make this technology cost-effective.

The Importance of Green Technology in Uganda may include; Climate Adaptation and Resilience: Uganda's agriculture is highly vulnerable to climate variability, including irregular rainfall, prolonged dry seasons, and localized flooding. Climate-smart and green technologies, such as drip irrigation, solar water pumps, and improved seed varieties, help farmers adapt to changing conditions while maintaining productivity [2].

Productivity and Economic Benefits: Green technology can improve crop yields, reduce input costs, and minimize post-harvest losses. Solar-powered irrigation and precision fertilization optimize water and nutrient use, reducing

waste and increasing farm incomes. For instance, pilot solar irrigation schemes in Uganda have demonstrated yield increases of 20–30% for vegetables and high-value crops [3].

Environmental Sustainability: By reducing reliance on fossil fuels and promoting efficient resource use, green technologies mitigate agriculture-related greenhouse gas emissions and soil degradation. For example, solar irrigation avoids diesel use, and drip irrigation reduces water wastage.

With the Current Implementation Efforts in Uganda, we have the **Solar-Powered Irrigation Programs:** The Ministry of Agriculture, in collaboration with development partners and private companies, has introduced solar-powered irrigation for smallholder farmers. Initiatives such as the National Renewable Energy Platform (NREP) promote the installation of solar pumps and micro-irrigation systems. These initiatives often use pay-as-you-grow (PAYG) financing, allowing farmers to make installment payments over time [4].

Climate-Smart Agriculture (CSA) Integration: Uganda has integrated CSA principles into national agricultural strategies, emphasizing soil and water conservation, drought-resistant crops, agroforestry, and integrated pest management. CSA projects, supported by CGIAR and FAO, focus on knowledge transfer and farmer training to improve adoption rates [5].

Private Sector Participation: Private enterprises have been instrumental in providing affordable green technology solutions. Companies like SunCulture and FuturePump distribute solar-powered irrigation systems and provide technical support, often combined with mobile finance platforms. These private-sector models reduce upfront costs and enhance access for resource-constrained smallholders [4].

Some Challenges to Green Technology Adoption in Uganda include **High Upfront Costs:** Despite subsidies and PAYG schemes, solar pumps and precision agriculture tools remain expensive for smallholders, limiting widespread adoption [6].

Technical Capacity and Maintenance: Effective use of green technology requires trained technicians and reliable supply chains for spare parts. Many rural areas lack adequate technical support, affecting system sustainability [3].

Water Resource Management: Expanding irrigation without proper water governance risks over-extraction and environmental degradation. Integrated water management strategies are needed to ensure sustainability [1].

Equity and Inclusion: Women, youth, and small-scale farmers may be excluded if adoption programs do not prioritize inclusivity. Lessons from Kenya show that cooperative models and targeted finance can help bridge this gap [6].

We can recommend the following policies such as **Strengthening Blended Financing Models** – Combine subsidies, concessional loans, and PAYG schemes to make technology accessible.

Develop Rural Technical Capacity – Train technicians at district and sub-county levels to provide installation and maintenance services.

Integrate Water Resource Management – Monitor groundwater use, enforce water permits, and promote efficient irrigation practices.

Promote Cooperative Adoption Models – Encourage farmer groups to purchase and manage shared equipment.

Enhance Monitoring and Evaluation – Track productivity, income, environmental, and social outcomes to inform adaptive management.

In conclusion, Uganda has made progress in adopting green technologies to improve agricultural productivity, resilience, and sustainability. By learning from Kenya, Morocco, and South Africa, the country can scale up solar irrigation, precision agriculture, and climate-smart practices while addressing financing, capacity, water governance, and inclusion challenges. Implementing these strategies will enhance food security, boost farmer incomes, and position Uganda for climate-resilient agricultural growth.

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EFFECTS OF ALUMINIUM PRODUCTION ON OTHER SECTORS OF THE CAMEROONIAN ECNONOMY

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The nation of Cameroon is situated in the central African sub region and is really blessed with a variety of natural resources .and these resources have great affected its socioeconomic environment. Amongst these well-known resources are resources such as aluminum which definitely come from bauxite and bears a huge potential and ability for economic advancement. This is mostly due to its relevance in industry, construction, and a key role in manufacturing and one of the backbones of exports in Cameroon to global markets. This exploitation comes with a lot of Advantages and disadvantages or drawbacks positive and negative impacts on its economy.