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Powering Agriculture in Nigeria through Decentralised Renewable Energy: Benefits and Policy Considerations



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Introduction

Access to energy is vital to the industrial and technological development of any economy and the consistent functioning of basic services. Over the years, Nigeria has striven to ensure adequate basic electricity for various aspects of its economy, particularly the agricultural sector. As such, the production, processing, and preservation of most agricultural products will require the deployment of electricity.

Nigeria's agriculture is largely driven by smallholder farmers, who constitute more than 80% of the total Nigerian farmer population¹ and are based in rural Nigerian communities, where mini-grids, small-scale electricity grids that can power a community independently, are often the least-cost electrification option. Using electricity to power opportunities like these can drive a virtuous cycle for rural development by increasing incomes and community resilience and improving the financial performance of the mini-grid utility.²

Benefits of Deploying Decentralised Renewable Energy for Agricultural Activities in Nigeria

Decentralised renewable energy ("DRE") can significantly benefit agricultural activities in Nigeria by addressing key challenges faced by the sector. The following paragraphs discuss some of the benefits of DREs for agricultural activities in Nigeria.

Improved access to electricity in rural areas

Many rural communities in Nigeria lack access to reliable and affordable electricity from the national grid. DREs, such as solar photovoltaic (PV) systems and micro wind turbines, can provide electricity to these areas. This access to electricity can power irrigation systems, cold storage facilities, and agricultural processing equipment, thereby reducing post-harvest losses.

Reliable power for irrigation

The lack of a reliable power supply is a major barrier to efficient irrigation. DREs, such as solar PV systems or biogas generators, can provide a consistent and cost-effective power source for irrigation pumps, enabling farmers to optimise water usage and increase crop yields.

Reduced reliance on fossil fuels

Traditional agricultural activities in Nigeria often rely on diesel-powered machinery and generators, which are expensive and contribute to greenhouse gas emissions. DREs offer a clean and sustainable alternative, reducing the reliance on fossil fuels and minimising the environmental impact of agricultural activities. Compared to centralised energy systems, DREs are less vulnerable to disruptions caused by climate change-related events, such as droughts or extreme weather conditions.

¹ AfCFTA Workshop: Current State of Nigeria Agriculture and Agribusiness Sector | accessed at <[afcfta-agribusiness-current-state-nigeria-agriculture-sector.pdf \(pwc.com\)](#)> on the 25th May 2024.

² REA Launches New Program to Boost GDP, Accelerate Renewable Energy and Unlock Agricultural Productivity in Nigeria | accessed at <<https://energyalliance.org/rea-launches-new-program-to-boost-gdp-accelerate-renewable-energy-and-unlock-agricultural-productivity-in-nigeria/>> on the 25th May 2024.

Participation in Carbon Offset Programmes

DREs can also serve as an extra source of income for farmers. While the regulatory structure for a compliance carbon market is yet to be operationalised, farmers who generate their needed electricity from DREs may, in the meantime, register their DRE facilities and corresponding electricity generation data in carbon offset programmes such as the African Carbon Market Initiative in exchange for cash from businesses willing to voluntarily offset their greenhouse gas emissions.

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Adoption of Modern Technologies

Stable power supply resulting from DRE deployment in subsistence and commercial farming will ease the adoption of modern precision agriculture techniques, such as automated irrigation systems, precision planting, and sensor-based soil monitoring.³ As these modern technologies require a stable power supply, DREs will enable their adoption, leading to more efficient and sustainable agricultural practices in Nigeria.

Enhanced food preservation

The lack of proper storage facilities and refrigeration leads to significant food losses in Nigeria. DREs can power cold storage facilities and refrigeration units, allowing farmers to preserve their produce for longer periods, reducing waste, and increasing food availability. There are examples of solar-powered refrigeration and cold chain companies providing Cooling as a Service, lease-to-own, etc., to help businesses and food-producing communities mitigate food loss/waste. Eja-Ice⁴, Koolboks⁵, Ecotutu⁶, Manamuz Cold Box⁷

Increased agricultural productivity

Where DREs are properly deployed for agricultural purposes, more individuals will be encouraged to participate in agribusiness, which will, in turn, increase agricultural productivity and crop yields in Nigeria and higher incomes for farmers. There is also a symbiosis through the growth of plants like sugarcane, jatropha and other biofuel-producing plants, which will serve as feedstock for renewable electricity.

Participation in Net-Metering Arrangements as Prosumers

As more State Governments in Nigeria continue to gain regulatory independence with respect to areas within the borders of their respective States as contemplated under the Electricity Act 2023, there is a possibility of such State Governments developing innovative policy frameworks such as net-metering arrangements where users of electricity (*prosumers*) (including farmers using DREs) who self-generate renewable energy are able to feed the excess electricity back to the grid and earn money or electricity tokens (for grid-supplied electricity).

Considerations for Driving DRE Adoption for Farming in Nigeria

Regulatory framework

A clear and supportive regulatory framework is essential for successfully integrating DREs into agricultural activities. Policies should streamline the approval processes for DRE deployment in agricultural activities. While the Mini-Grid Regulations 2024 and the Eligible Customer Regulations 2024 may be helpful in this regard, it is recommended that the Nigerian Electricity Regulatory

³ AGRI-FOOD INVESTMENT IN NIGERIA; POLICY & INCENTIVES by Francisca Beke | accessed at <<https://www.linkedin.com/pulse/agri-food-investment-nigeria-policy-incentives-francisca-walter/>> on the 25th of May 2024.

⁴ Welcome to Eja-Ice | accessed at <<https://ejaice.com/#home>> on the 25th of May 2024.

⁵ Koolboks | accessed at <<https://www.koolboksnigeria.com/>> on the 25th of May 2024.

⁶ Ecotutu | accessed at <<https://ecotutu.com/>> on the 25th of May 2024.

⁷ Manamuz Cold Box Store | accessed at <<https://manamuz.com/services/#cold-box-store>> on the 25th of May 2024.

Commission create regulations around co-operatives for renewable energy or community-owned renewable energy (COREs) targeted specifically at smallholder farmers.

Rural electrification programs

Governments can implement targeted rural electrification programs that prioritise the deployment of DREs in remote and off-grid areas where smallholder farmers operate. Such programs can leverage public-private partnerships to accelerate the installation of DREs in these communities. In Nigeria, the Rural Electrification Agency in 2022 partnered with the Rocky Mountain Institute and the Global Energy Alliance for People and Planet to roll out the Energising Agriculture Programme⁸ (“EAP”). The EAP is targeted at rural communities in Nigeria and aims to stimulate the productive use of mini-grid electricity in agriculture by enabling market-led solutions such as electric vehicles (including two-wheelers) for farm logistics, mini-grid-powered cold storage, mini-grid-powered oil palm milling and rice milling.

Capacity building and awareness

There is a need for capacity-building and awareness programs to educate smallholder farmers about the benefits and operation of DREs. This can include training programs, demonstration projects, and dissemination of information through agricultural extension services. Companies like Babban Gona⁹ are already doing this through group trainings and education of franchise farmer groups.

Support for Research and Development

Research and development (R&D) for DRE adoption in agriculture can drive innovation and cost reductions, making these systems more affordable and efficient for smallholder farmers. Research and development efforts should focus on adapting technologies to local contexts and addressing farmers' specific needs.

Enabling infrastructure

Adopting DREs in agriculture cannot be sustained without supporting necessary farm infrastructures, such as rural distribution networks, energy storage solutions, and maintenance and repair services. Accordingly, this can ensure the reliable and continuous operation of DREs in agricultural communities.

⁸ REA launches the Energising Agriculture Programme (EAP), Minigrid Solution for Rural Operators | accessed at <<https://rea.gov.ng/rea-launches-the-energizing-agriculture-programme-eap-minigrid-solution-for-rural-operators/>> on the 25th of May 2024.

⁹ Babban Gona Service Delivery Models | accessed at <<https://babbangona.com/our-model/>> on the 25th of May 2024.

“ Active participation of smallholder farmers, cooperatives, and local communities in the planning and decision-making processes related to deploying DREs is required to increase buy-in, address local concerns, and ensure that the solutions align with the specific needs and challenges of smallholder agriculture.



Inclusive participation and integrated business

Active participation of smallholder farmers, cooperatives, and local communities in the planning and decision-making processes related to deploying DREs is required to increase buy-in, address local concerns, and ensure that the solutions align with the specific needs and challenges of smallholder agriculture. One great initiative in this regard is the Special Agro-Industrial Processing Zones (SAPZs), an initiative of the African Development Bank, which are purpose-built shared facilities, to enable agricultural producers, processors, aggregators, and distributors to operate in the same vicinity to reduce transaction costs and share business development services for increased productivity and competitiveness.¹⁰ More smallholder farmers need to be involved and infrastructures such as DREs deployed to attract investors and agro-industrial enterprises to rural and peri-urban-based agriculture.

Fiscal Incentives

Several fiscal incentives, such as investment tax credits under the Income Tax Act LFN 2004 and pioneer incentives under the Industrial Development (Income Tax Relief) Act LFN 2004, encourage developers and businesses to deploy DREs in agriculture. However, investors need to approach experienced advisers to take maximum advantage of these various tax incentives available to players in Nigeria's growing agricultural sector.

Conclusion

Agriculture provides food for many and livelihood for many others. For this reason, governments and individuals need to make concerted efforts to power agriculture in the ways they can. Governments, through the issuance of clear, policy frameworks and private sectors through participation in the deployment of DREs for productive use in agriculture. Both government MDAs¹¹ and private sector participants must be involved in the ongoing monitoring, reporting, verification, and enforcement of DRE policies and projects, especially those related to agricultural activities in Nigeria.

¹⁰ SPECIAL-AGRO INDUSTRIAL PROCESSING ZONES (SAPZ): Transforming African Agriculture: The Feed Africa Agenda | accessed at <https://www.afdb.org/sites/default/files/2021/12/13/sapz_va-brochure.pdf> on the 25th of May 2024.

¹¹ Ministries, Departments and Agencies



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