POWER FOR ALL FACT SHEET

Leveraging decentralized renewables for Uganda's agricultural sectors

POWER FOR ALL

72%

UGANDA'S WORKFORCE IN AGRICULTURE

2 years

PAYBACK PERIOD OF SOLAR WATER PUMPS DISPLACING DIESEL PUMPS IN UGANDA

2 years

PAYBACK PERIOD OF REFRIGERATORS FOR MILK CHILLING IN UGANDA

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Decentralized renewable energy (DRE) has the potential to bridge the energy access gap in the agricultural sector in Uganda. For smallholder farmers to benefit from DRE access, however, it is vital to consider the technical and commercial viability of electrical appliances for various agricultural value chains. This summary provides an overview of successful use cases of DRE-powered productive use applications and the solutions emerging.

DRE technologies are already electrifying 3% of Uganda's residential energy needs. Leveraging DRE for agriculture improves income for Uganda's smallholder farmers and creates livelihoods in the downstream stages of the agri-food system.

» Uganda is one of the countries that have the fastest electrification pace, at 4% per annum. DRE has already electrified 3% of Uganda's population and has the potential to bring clean energy to an additional 20.5 million people by 2030.[1, 2]
» Despite the rapid expansion of DRE, the mechanization of Uganda's agricultural sector is low. According to the Uganda Bureau of Standards, more than 95% of farmers rely on human power for their farming activities without mechanized support.[3]
» The agricultural sector employs over 72% of Uganda's workforce and has a significant potential for value addition across the country.
» Reports suggest productive use of energy (PUE) in agriculture could increase smallholder farmers' farm yield and farmers' income.[4, 5] For instance, the introduction of 47 maize shellers in the Busoga region of Uganda doubled local farmers' incomes in 3 years.[6]
» Key success factors included addressing the market access gap by bringing together multiple actors along the supply chain, managing partnerships through clear agreements, and developing innovative business models that bring value to each actor.[7]
» The ILO projects that agricultural productivity growth will likely see the workforce shift away from on-farm activities and will generate strong employment multiplier effects in the downstream stages of the agri-food system.[8]

DRE-powered agricultural applications already have successful use cases in various value chains in Uganda, including solar irrigation and milk chilling.

» Solar irrigation has the potential to serve a large number of farmers in the north of Uganda. Due to its low operating costs, a solar water pump that displaces diesel can achieve payback in 2 years.[9, 10]
» Milk is highly perishable without appropriate cooling. In Uganda, the overall spoil rate of milk at the farm level is 22.5%, and it can be as high as 37% in informal markets. DRE-powered cooling solutions such as refrigerators and milk coolers have about 2 years of payback period and positive 5-year ROI, benefiting dairy communities particularly in the north and southwest regions.[11, 12, 13]

DRE-powered agro-processing, though just emerging, has a high potential to add value to other value chains such as coffee pulping, oil pressing, and grains milling. These activities are yet to be integrated into DRE systems' load due to various technical and commercial constraints.

» While coffee constitutes over 18% of Uganda's formal exports in 2014 at US$410 million, coffee farmers' income remained significantly lower than other farming households. Currently, solar-powered coffee pulper is already available on the Ugandan market; its high capital cost (US$2,000+), however, makes it inaccessible for smallholder farmers.[14]
» Domestic demand for milling is high. Currently, there are more than 780 milling plants. Most of them are concentrated in urban areas. Energy access is a main operational

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challenge for these mills, either due to the high electricity tariff or unreliability of diesel generators.[15]

» For solar mills to displace diesel mills, however, technical challenges persist, such as low throughput, 10x capital cost, lack of 3-phase motor. Mini-grids, on the other hand, can overcome these challenges and provide a more lucrative case at a tariff of US$0.32/kWh.[16]

» Oil pressing can add value to Uganda's top crops such as groundnuts, soya beans, simsim, and sunflower seeds, meeting its domestic vegetable oil demand while displacing imports. Oil pressing machinery, however, is expensive and not widely available locally.[17, 18]

Share the Message

» Electrifying agricultural activities can bring additional income for smallholder farmers while generating multiplier employment effects in the downstream stages of the agrifood system.

» The rapid expansion of DRE electrification in Uganda brings its agricultural sectors into the spotlight as the next frontier of energy access.

» Promising applications that can be economically viable for smallholder farmers include solar irrigation and milk chilling.

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