

FEATURE

A harvest of sunshine

Every year, Nigeria losses an estimated \$9billion worth of fresh produce largely because she has no energy plan in its agricultural policies. Large swaths of small holder farmers depend on rain-fed agriculture and an inability to preserve their produce means that 40 percent of their harvest goes to waste. This situation is driving some smart businesses to look to the sun which seems to hold the promise of a harvest of sunshine, writes ISAAC ANYAOGU.



Farmers have long relied on drying pepper in open spaces



Innotech 18 Meter Tunnel Solar Dryer in use, Kaduna State



Habiba Ali demonstrates the operation of the solar dryer

Between September and November last year, the air around Baawa and Kadabo farming communities in Makarfi Local government area of Kaduna State, was tear-inducing, heavy and pungent with the smell of dried pepper.

Her solution now assists the farmers dry their pepper in about two days. In these communities, women undertake 70% of post-harvest activities, so Sosai Renewable Energies is working with women to serve as the custodians of the solar dryers. They rent out the use of the dryers, for between N200-N500 per bag, using the proceeds to pay back the cost of the dryer in instalments. This involvement in the management of the dryer has led to both women's economic and social empowerment.

"First and quite importantly is that these dryers save time, saving them 2.5 days of the 5 days it would normally take to dry the peppers. This has ensured that they get their peppers on time to get to the market and they do a better bid because they now have cleaner peppers ensuring they sell at a 20% premium."

Besides just driving up profits, Amina like dozens of other women in the communities are now empowered enough to care for their families and keep their children in school.

Sosai also provides clean cook stoves, water filters, solar refrigerators, solar lamps and solar dryers through a lease-to-own model. These products and services are distributed through community center solar kiosks that are run by women entrepreneurs.

This structure allows Sosai to increase the incomes of both their products' consumers and women entrepreneurs. For farmers, Sosai offers solar dryers, refrigerators and other services that enable them to preserve and package their product. This allows farmers to sell at a premium by taking advantage of off-season sales of preserved fruit.

According to the Food and Agriculture Organization of the U.N. (FAO), nearly one-third of all food produced globally for human consumption goes to waste, much of this a function of poor post-harvest processing techniques.

Pepper is the key crop in this region and the people depend on it for cash, so over three quarters of these farmers grow peppers but about 40 percent is lost after harvest," says Ali, MD/CEO of Sosai.

This happens because Nigeria depends on rain-fed agriculture as its 264 dams with combined storage facility of 33 billion cubic meters (BCM) of water lie idle.

Findings from a BusinessDay investigation last year, indicated that dams in Ogun, Oyo, Ekiti and Kwarra states constructed to generate power and serve irrigation purposes have been abandoned.

Many of the farming communities do not even have power supply because Africa's most populous country has not harnessed hydro-power potentials from 127 sites across 20 states capable of yielding about 500MW of power according to a 2013 United Nations Industrial Organisation Development Organisation (UNIDO).

"Now is the time for the Ministries of Agriculture, Trade and Investment and Power to sit down and design a Powering Agriculture Programme for Nigeria. Solar drip Irrigation and renewable energy powered storage and transport systems should be designed along major agricultural corridors like LAKA-JI," says Godwin Aigbokhan, Renewable Energy Market Adviser at National Competitiveness Council of Nigeria.

Nigeria currently loses about 40 to 50 per cent of fresh fruits and vegetables produced as a result of poor packaging, handling and preservation.

"This loss happens when food rots in markets, when it is poorly stored and can no longer be consumed, and when there is insufficient uptake from buyers," explains Mamadou Biteye, the managing director for the Rockefeller Foundation Africa Regional Office.

In the absence of quick, official action, private organisations are rising to the challenge. Like Femi Oye's GoSolar Africa which has recently introduced a solar powered refrigerator, capable of extending the shelf life of foods and vegetables from 2 to 21 days in markets around the country.



School in Wuna, Gbagabala LGA, Abuja, powered by Solar



Camera shy... electricity has raised school enrolment



Go Solar Africa cold rooms



Discarded fridges converted to solar powered fridges

"The Solar Refrigeration kiosk operates with pure sine wave MPPT intelligent equipment that can transform the direct current to stable alternating current. It has decent appearance easy operation and visual indication of LCD with the project protection function, high charging efficiency and low-no load loss. Its capacity ranges from 21.2 Cubic meter, 33.2 cubic meters and 63.1 CM sizes," said Oye in an interview.

In Charwa/Chakun, in Markarfi Local government area of Kaduna state, each of the homes have sufficient solar electricity to power three LED light bulbs, an electric fan, a radio set and mobile phone charging system.

"I follow what is happening in Abuja," said Usman, a local farmer. Pointing to a stack of books on a mat in the sparsely furnished room, he said, "Halima, my daughter reads them to me at night, because of this light," he said with a sense of pride.

Similar sentiments were expressed in Rije and Wuna communities in Abuja where Ajima farms and Azuri Technologies are powering the largely farming communities using biomass and solar energy respectively.

Ajima farms managed by Fatima Ademoh, is powering Rije village in Kuje Area Council of the Federal Capital Territory, FCT, Abuja.

corporate has over 20,000 farmers and many of them live very far from the nearest electricity grid. So we decided to work with their corporate to provide them power, to enable them charge their phones, give them access to information with the objective of improving the quality of their lives," said Odebunmi.

With a \$150,000 grant from the United States African Development Foundation, USAID, the project, called Ajima Farms Biogas Digester Off-Grid, converts huge volumes of wastes generated from large poultry farms around the communities into power.

"We were presented with two problems, agricultural wastes that constitute hazards and villages that are not connected to the national grid. They need electricity and the gases released by these wastes into the atmosphere are 24 times dangerous more than carbon dioxide as a greenhouse gas," said Ademoh in an interview.

The solution was to convert the waste to electricity watts: "Poultry, human and vegetables wastes are collected in a biogas digester, which generates gas and in turn powers a biogas generator and electricity generated from the generator is distributed by a minigrid system to power over five hundred people in the community," Danladi Aminu, who mans the plant tells BusinessDay.

A largely agrarian community with about a hundred houses, a quarter being mud houses, residents enjoy between 12 and 15 hours of power supply every day and pay less than N2,000 monthly.

"The light has been a blessing to my business," says Augustine Iliah, who runs a sparsely stocked, and the only local pharmacy in the community. "I can open my place till 10pm, there is security with street lights and people come in to buy at night."

In January, Yemi Osinbajo, then Acting President, launched the Solar Home system powered by Azuri Ltd in Wuna village, Gbagabala Area Council of the Federal Capital Territory.

Months later, a new industry has been born. Lawal Yakubu along with half a dozen others now eke a living as installers of solar component. Residents pay N1,000 fee to top up power which lasts an average of 8 hours daily. They are issued a pin code which they input into the solar box. After 36,000 months, the solar infrastructure becomes theirs.

"Though I have not been here very long, but I can see the positive effect this is having on class attendance, many can now read in the night and their grades are up," said Olusola Omolara, the head teacher of the local primary school.

Aisha Mohammad Yusuf, the wife of the Elsu of Wuna, the local traditional ruler tells BusinessDay that their lives in the community have taken a different turn with the deployment of rooftop solar systems.

"Please tell them to bring the ones with bigger capacity to carry fridges and television," Aisha said. Wuna has never had power supply.

Next step, large scale adoption

Ovoke Ekrebe, a renewable energy specialist with Vanpoux Global Synergy Limited opines that renewables are low-hanging fruit source of energy for the agricultural sector.

"Most agricultural locations are in off-grid or under-served communities. It is easier for renewable energy to provide immediate relief than having to wait for grid extension. Also renewable energy, it can be localised for a specific project or group projects scaling it to size and budget."

"It is important to note that any form of policies and interventions that do not consider the entire value chain (from seedlings to the market - in the case of crops) will at best address a symptom from a range of symptoms in a complex illness," Ekrebe avers.

According to Ekrebe, renewable energy can provide water for irrigation, drinking and cooling purposes, provide hot water for diary and livestock and provide drying and preservation of farm produce.

"With the desire of the country to be self-sufficient in food and agricultural production we cannot wish away our present power situation. However, we can use our God given abundant & natural renewable sources to achieve that goal," Ekrebe says.

Odebunmi said Arnergy is developing solar heating solutions for poultry and many of these innovations will be driven by private initiatives and scale can be achieved through better regulations. With the success of the solar dryer, communities are seeking access to additional innovations.

The opportunities for increased post-harvest processing are leading farming communities to seek creative solutions that includes solar irrigation pumps and solar refrigeration.

Solar irrigation could allow for out of season farming while solar refrigeration would allow crops to be better preserved and sold at higher prices. The combined impact of these innovations is expected to reduce crop waste and increase farmers' incomes by an additional 30 percent says Power Africa.



In Charwa/Chakun, Markarfi LGA, Kaduna State, electricity is a cause for cheer



Ajima Farms, Biogas plant, Rije, Abuja