

# Climate Action

## DIGEST

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### UGANDA LEVERAGING CLIMATE ACTION SOLUTION OF SOLAR DRYERS TO DRIVE ADAPTATION NDCS IMPLEMENTATION : THE CASE OF UGANDA

Given the dominance of agriculture as a source of livelihood, agro-industrialization driven using climate action solutions offers a great opportunity for Uganda and Africa to embark on its long-term aspiration of transitioning into a modern industrial economy. Uganda National Development Plan 3 goal of Agro-Industrialization is to increase commercialization and competitiveness of agricultural production and agro processing. Uganda's NDCs commit to a 22% emission cuts on a business as usual basis by 2030 through leveraging on a series of policies and measures in the energy, forestry and wetland sectors and complimented by additional measures in climate smart agriculture and transport. In its NDC, Uganda puts strong emphasis on adaptation actions, to ensure all people and communities are resilient to climate impacts.

*A demonstration of the traditional cassava drying technique which used to take longer and less efficient in cassava drying. Through training ,new techniques which are more climate action oriented have since been introduced.*

# UGANDA LEVERAGING CLIMATE ACTION SOLUTION OF SOLAR DRYERS TO DRIVE ADAPTATION NDCs IMPLEMENTATION



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*An exhibition where women are cutting cassava into strips to be used for other different purposes. The UNEP EBAFOSA climate action solutions led training assisted the local communities gain new skills in driving adaptation resilience uptake.*

Uganda losses huge amount of food as a result of post-harvest losses. Reducing these post-harvest losses among cassava farming communities is crucial. Studies show that commercialization of the cassava value chain, has potential to recoup up to \$300million in import substitution with wheat. Cassava is the second most important staple crop in Uganda farmed by over 70% of the population – making it economically inclusive. Adding value to this through leveraging accessible technologies like solar dryers - is recorded as capable of increasing incomes by 50 – 80% at the farm gate level. Beyond the farm-gate, solar-dryer powered value addition is an opportunity to increase production of quality value added products like cassava flour up to 200 times.

Value addition is recorded capable of creating livelihoods for over 6 million of Uganda's youth under 25years, who can tap income opportunities through creating market, supply and production opportunities along the value chain. Against this backdrop, UNEP EBAFOSA Uganda initiated the drive to showcase how climate resilience can be implemented in a continuum leveraging on mitigation actions to power

adaptation resilience where both socio-economic and biophysical resilience is achieved simultaneously. Five solar drying centers have been established in cassava farmers groups in the Buganda Kingdom of Nakisunga, Ggera, Nakifuma, Nagojje and Kawolo in Kyaggwe county benefiting 300 cassava farmers to engage cassava value chain. Those farmers are distributed in five VSLAs with 60 farmers per VSLA, 12 members are clustered per village and among receiving EBA training, briquettes training, currently they are planting one acre of cassava disease resistant variety of NAROCAS 1 per village using EBA approaches supplied by EBAFOSA Uganda. The decentralisation of solar dryers to power preservation and primary processing of cassava into varied products is the key ground action that we have undertaken. Accordingly, youth have been structurally guided and mentored under the EBAFOSA Uganda incubation structure to develop and improve solar dryer designs. Solar dryers are proving to be 48times faster at drying raw cassava to the recommended Uganda National Bureau of Standards (UNBS) moisture content of 12% or less.

**To drive climate adaptation in a continuum, skills are a prime premium. Against this backdrop youth were engaged through the process of EBAFOSA Innovative Volunteerism and the willing youth skills were retooled to fabricate solar dryers as local climate action solution to drive adaptation resilience**

**Youth skills have been retooled to fabricate solar dryers adaptation:** To drive climate action in a continuum, skills are a prime premium. Against this backdrop youth were engaged through the process of EBAFOSA Innovative Volunteerism and the willing youth skills were retooled to fabricate solar dryers as local climate action solutions to bring impact to scale. Against this backdrop, through this work 58 youth skills have been retooled and adapted to fabricate solar dryers in Uganda to help in reduction of post-harvest losses in villages. Youth have been trained on how to innovate and fabricate portable and durable metallic solar dryers.

**Establishment of Solar Drying Centers;** this work set up Village Savings and Loans Association (VSLAs) anchored within the traditional structures of the Buganda Kingdom Cooperative known as the PEWOSA to help farmers access credit to get climate action solution inputs like bio-fertilisers, solar dryers, cassava cutting and training to use solar drying centres in their villages. This is very crucial in that it allows many members of the community to have access to a climate action solution of solar drying which helps to reduce their postharvest losses and helps brings impact to scale. This work has so far managed to fabricate five (5) drying Centre in Kyaggwe county of the Buganda Kingdom for example Nakisunga, Ggera, Nakifuma, Nagojje, Lugazi all those are solar drying centres ready in use by farmers.

**Training of cassava farmers to use solar dryers;** leveraging on the cooperative communal structures and applying the VSLA models, this work has conducted mapping and selection of farmers with cassava and trained to add value on the cassava to produce quality cassava chip without foreign matter. This work has promoted reduction of cassava losses by providing technical guidance to cassava farmers and value addition to actors.



*Youth using metal to fabricate solar dryers instead of wood, the move is to avoid cutting down of trees which make wood and enhance forest ecosystems thus also preserves the environment.*

“ Cassava is the second most important staple crop in Uganda farmed by over 70% of the population - making it economically inclusive. ”



*Women in Uganda displaying cassava in an open ground, they traditional used to dry their cassava in the open before introduction of solar dryers*



*The innovativeness of using alternate fuel made from wastes not only does it provide a climate solution but also creates an income generating opportunity for the women of Nakisunga in Uganda who were trained under the EBAFOSA initiative to drive briquettes using the solar drying climate action solutions.*

**Executing the Climate action market incentives for agro-industrialization compliance guideline;** the guide intends to inspire and mobilize climate actions in a way that drives low emissions development. This Climate Action Market Incentive Guide informs the optimal implementation of UNBS standards in a way that leverages climate action solutions to achieve compliance. And the focus of the guide in the agro-value chain further enhances this complementarity with the UNBS strategy. The Climate Action Market Incentives Guide guides on how climate solutions of EBA and clean energy plus ICT can be used to achieve a cascade of standards benchmarks critical to achieve market competitiveness - for example food safety, health, organic, climate action solutions and also informs on efficient market linkages.

**Decentralization of solar dryers;** fabrication of five (5) Giant community solar dryers along Village savings and Loans Association (VSLA) in Kyaggwe county. Cassava farmers within a five kilometers radius can access the center to dry their cassava as well as meet at the Village Savings and Loan Association (VSLA) meeting point on a regular basis as will be determined by the group members. This may be weekly so as to enable updating of plans and activities as well as to carry out activities related to the Savings and loans association.

**Linking cassava farmers to community solar drying centres,**

cassava farmers in the Buganda Kingdom region have been suffering from post-harvest losses and the cause of these post-harvest losses include limited availability of suitable varieties for processing, lack of appropriate processing technologies, inadequate commercialization of new technologies and lack of basic infrastructure, inadequate facilities and infrastructure, and insufficient promotion of processed to dry their food fast, this work introduced a game changer of community solar drying centers.

**Linking different value chains to solar dryers;** this work has enhanced innovation of youth who have started developing the mushroom value chain by using solar dryers to increase its value by drying in a way that enhances quality and hygiene.

**Establishing of Innovative Financing facility to drive climate solution actions of solar dryers;** this work is mapping cassava farmers, value addition actors and clustering them into Village Savings and Loan Association to access credit from PEWOSA Uganda SACCO which is within the traditional structures of the Buganda Kingdom. The aim of this facility is to de-risk financing of operations along the entire cassava chain where climate action solutions from farming to drying using the solar dryer and adding value is applied. Micro -finance institutions have been identified to help farmers and value addition dealers. The solar dryers will form part of the collateral.

### **Impacts of UNEP EBAFOSA intervention in the Uganda Cassava value chain through climate action solutions**

#### **Adoption of solar drying technology among cassava farmers;**

All farmers surveyed dry the cassava in direct sunshine after peeling and slicing into chips. This work mapped and identified cassava farmers in Kyaggwe county to help them dry their cassava in a solar dryer.

Cassava farmers in Kyaggwe and Busiro county dry cassava in open sunshine, and the drying process is sometimes interrupted by rainfall during the day or made inefficient by cloudy weather not to talk of the contamination that occurs from dust and other flying particles.

#### **Promotion of Climate Action Driven Agribusiness Enterprises;**

youth trained to fabricate solar dryers utilized the free training offered to them by EBAFOSA Uganda to cascade this climate action solutions of solar dryers technology to villages and women agribusiness groups.

**Ready market for the cassava flour;** this work has trained farmers to clean cassava, chip it into smaller sizes for drying in a solar dryer for 3 to 4 sunny days.

**Gender mainstreaming:** women were trained on how to operate solar dryers, use the solar dryers to dry their cassava chips. This work has encouraged cassava farmers engage in value addition for example Safe space for Girls Initiative in Buloba village, Busiro county women were trained to add value on cassava.

**Employment opportunity among youth in rural areas.** According to (UBOS, 2019) report, the overall unemployment rate (UR) was 9.2 percent in 2016/17 with the females experiencing higher unemployment rate (14%) than males (6%).

There were differentials by residence with the levels of unemployment being higher among rural residents (10%) than urban residents (8%). In this work, youth were trained to fabricate solar dryers acquired employment opportunities in rural farming communities.

**Reduction in losses during storage of dried chips:** Loss of dried chips under storage was minimized by adequate drying of chips through the use of community solar dryers, and individual solar dryers, farmers interviewed by EBAFOSA Uganda outreach department said that they can now store and sell quality pure quality cassava flour and chips to the market.

#### **Establishment of Africa Youth Agro-Industrialization Academy (AYAI Academy);**

this academy has managed to mentor and retool youth from Buganda kingdom, 13 youths in Kenya. "Youth were trained to develop the dryers and are now the lead designers and fabricators of quality dryers made from locally available material, to make them affordable to local cassava farmers" says Peter Ssekadde

The academy has invested in continuous climate Action Product development and improvement, the solar dryer design is being improved to ensure moisture reduction thresholds of 12%, ensure faster drying and further lower development costs.

#### **Reduced losses of cassava during storage of dried cassava chips;**

According to the farmers, mold/rotting, development of abnormal smell and spillage, contribute to loss of the cassava. This work has helped farmers dry their cassava in three days and stored for future consumption and sale.



**An image showing the traditional drying methods of drying cassava in the sun, EBAFOSA has empowered local women and youth to tap into climate action solutions for the benefit of their production.**

### Impacts to upscaling EBA approaches

The work in Uganda demonstrated how key enablers of sustainability – especially, willing people, policy anchors and operational level incentives - can be leveraged to upscale application of EBA

a) Decentralization of solar dryers to cassava growing areas, provided an accessible means by which cassava farmers using EBA could preserve their harvest. Through this preservation, postharvest losses were reduced providing an incentive for farmers to increase their area under EBA produced cassava. As a result, 300 more farmers took up cassava farming and were trained in using EBA approaches.

b) Human capital is one of the key enablers for upscaling EBA. In Africa, the youth are the majority of the population including in Uganda. These youth were structurally guided and trained to adapt and apply their skills in an area of their interest that can be aligned to buttress upscaling of EBA – which is the fabrication of solar dryers applied in cassava preservation. Up to 58 youths were trained and they produced dryers capable of dehydrating cassava to the threshold of below 12% needed to prevent cassava spoilage.

These accessible technologies were what was applied to cut cassava PHLs and encourage the cultivation of more cassava using EBA approaches.

c) The structure of local cooperatives, popularly known as “village savings and loan associations (VSLAs)”, was leveraged to convene & cluster cassava farmers using EBA approaches so they can co-operate and learn from each other on optimal application of EBA as well as use of solar dryers.

Through this approach, 300 farmers were able to share 5 solar dryers, reduce their PHLs and enhance their application of EBA.

d) The Uganda National Bureau of Standards (UNBS) integrated into its codes, use of EBA as a critical tool to enable affordable and accessible way by which actors can drive realization of health & organic standards codes.

EBA was integrated into UNBS standards US 2241: 2020 as an endorsed approach for stakeholders to use to achieve health and organic compliance.

e) EBA produced cassava, dried using solar dryers, was processed into finished goods – cassava flour. The trade of the flour resulted in an up to 200% increase in income, providing a financial incentive for increased application of EBA at the farm level.

### Next steps to be undertaken with EBAFOSA guidance

- Consolidating the VSLA to function optimally in Kyaggwe so they can become learning centers for other counties.
- Collate and record more solar dryer development data and analyses for trends in efficiency, safety, quality, and

production cost.

- Data collection to inform UNBS Climate action Market incentive guide.
- Clear additional measurements of the solar dryers’ performance in moisture content as benchmark by UNBS standards.
- Scaling out of the programme to other cassava growing areas in Buganda kingdom counties beyond Kyaggwe and Busiro. Using the VSLA approach.
- Introduction of environmentally friendly storage bags which can protect cassava chips for more than one year like air tight super grain storage bags
- Training of more youth innovative volunteers to fabricate solar dryers in villages.
- Drying items other than cassava. We propose to include other viable enterprise value addition chains such as pineapples, mushrooms and vegetables.
- Conducting research study on the applicable and impacts of solar dryers in the farming system with a reputable university like Makerere university Strengthen the institutional capacities for the delivery of agro-industrialization. Increase the mobilization, access and utilization of innovative agricultural finance.
- Increase market access and competitiveness of agricultural products in domestic and international markets using the existing UNBS approved Standards Markets Compliance Guide education and awareness campaigns using various channels on the work we are executing.
- Supporting Africa Youth Agro industrialization Academy innovation and invention work.



*EBAFOSA trained women cutting cassava into strips before putting them into the solar dryers for drying.*



Strengthening the institutional capacities for the delivery of agro-industrialization increases the mobilization, access and utilization of innovative agricultural finance. Increase market access and competitiveness of agricultural products in domestic and international markets using the existing UNBS approved Standards Markets Compliance Guide education and awareness campaigns using various available channels. UNEP-EBAFOSA has enhanced capacity building of institutions necessary to spearhead sustainable production and climate action enterprises in Uganda.

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