POLICY DIALOGUE WORKSHOP PROCEEDINGS

Opportunities and Challenges for Enhancing the Market for Quality, Low-cost Solar Drying Technology in Kenya- A Policy Dialogue on Standards, and Capacity Needs

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REPUBLIC OF KENYA

Kirdi

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1. Background and Context of the Workshop

The policy dialogue was organized by the African Centre for Technology Studies (ACTS) in collaboration with Kenya Industrial Research Institute (KIRDI, and the United Nations Environment Programme (UNEP). The dialogue is part of a project implemented by ACTS, KIRDI and UNEP, funded by the Institute of Food Technologists (IFT) through the Seeding the Future Global Food System Challenge. The project has developed and optimized a protype hybrid solar dryer that provides a platform for training and promoting quality and standards in the market. The policy dialogue aimed at providing an opportunity for the stakeholders in the solar dryers' space to deliberate issues related to solar drying technology, quality, standards and capacity in the sector, strategies for creating an enabling policy and financial environment that can support upscaling of solar dryers in Kenya.

1.1. Objectives of the workshop

The main objective of the policy dialogue was to provide a platform for stakeholders in the solar dryers' space to deliberate on strategies for creating an enabling policy and financial environment that can support upscaling of solar dryers in Kenya.

The specific objectives were to:

1. Present results from the optimization and performance parameters assessment of the prototype dryer as the entry point for discussing the need for solar dryer technology standards in Kenya.
2. Explore the policy, legal and regulatory frameworks for anchoring the establishment of quality standards for solar dryers' technology in the Kenya's market building on experiences from other contexts.
3. Explore potential for leveraging developments in East Africa towards having KEBS push for an East African solar dryer standard, building in work done in the region,
4. Discuss capacity issues related to technology development and delivery of quality solar dryers in the market.
5. Explore prospective financial and business models for enhancing uptake of scaling between policymakers, manufacturers, and private sector actors that can help address the related challenges.

1.2. Participants

The workshop brought together participants drawn from various actors and stakeholders in the solar drying ecosystem including National government ministries and regulators, County government representatives, private sector enterprises, financial institutions, and cooperatives (*Refer to list of stakeholders'- annexes 2*). The participants stimulated the discussions through active participation in the different sessions and a well thought out plenary session.

2. Workshop Structure

The workshop was structured into sessions which are as described below:

2.1 Welcome and Introductions

Eng Isaiah Omolo, Research Fellow at ACTS set the stage by welcoming and thanking all the participants for attending the policy dialogue workshop. He stated that the discuss was paramount to share knowledge, learn from one another, especially on critical issues in the development of solar dryers' standards. All the participants were requested to self-introduce indicating their respective backgrounds, expertise and organizational affiliations.

2.2 Opening remarks

The workshop's opening remarks were facilitated by the African Centre for Technology Studies (ACTS) Executive Director, Prof. Tom Ogada. Prof. Ogada commenced by thanking all the organizers of the workshop and participants for their commitment out of their busy schedule to attend the policy dialogue. He gave a brief background of ACTS by highlighting more on the organization's mandate and the different programmes within her portfolio. He emphasized on the importance of disseminating research findings and innovations to the public through such forums which have the potential of effectively contributing to national development as well as ensuring increased adoption of these technologies.

Prof. Ogada recognized key representatives from government ministries and invited them to make some opening remarks. These included Mr. Wesley Kipyego (State department of Energy); Eng. Laban Kiplagat (Ministry of Agriculture Livestock, Fisheries and Cooperatives (MOALFC), Eng. Dennis Onyango (Kenya Bureau of Standards) and Mr. Kinguru Wahome (Ministry of Investments, Trade and Industry). Prof. Ogada thanked them for their commitment in attending the workshop and emphasized the importance of the public, private and research institutions working together to deliver viable technological solutions. He concluded by welcoming everybody to join ACTS and the consortia to deliberate on the opportunities at stake in enhancing universal standards of low-cost Solar drying technology not only in Kenya but across East Africa.

2.3 Overview of the IFT Project

Dr. Catherine Kilelu, The Agriculture Food and Nutrition Security programme lead at ACTS provided an overview the project '*Scaling-up Solar Drying to Reduce Post-harvest Losses (PHL) In Kenya–Opportunities for Inclusive Climate-action Enterprises*'. She indicated that the project has been under implementation over the last one year by ACTS, KIRDI and UNEP and was Funded by the Institute of Food Technologists (IFT) through the Seeding the Future Global Food System Challenge Growth Fund. She indicated that the project motivation was guided by three components which are i) optimizing solar drying technologies for PHL reduction ii) expanding youth and women-led solar drying business models ii) Establish a business and knowledge hub to broker linkages and generate evidence to inform policies and investments.

Dr. Kilelu further stated that solar drying technology is key for enhancing food and nutrition security. This is supported by the virtue of solar dryers offering cost-effective solutions for reducing PHLs and unlocking several opportunities including: growing the demand for dried food products; the ability of dried fruits and vegetables bridging the low intake gaps for poor and marginalized communities; renewing interests in local food (dried) products and dried ingredients for a health-conscious consumers; and expanding space for inclusive entrepreneurship and jobs especially for youth and women through agro-processing SMEs through competitive quality products.

Dr. Kilelu: Agriculture Food and Nutrition Security programme lead at ACTS.

Dr. Kilelu stated that despite the potential for solar drying technologies, they are faced with several challenges which affect the quality of the final products. These include limited knowledge/awareness related to technology options, financial constraints, sub-optimal performance linked to gaps in standards and technical capacities among technology providers. Dr. Kilelu noted that to harness benefits from these innovations, there is an urgent need to drive wide-scale market adoption as a strategy to scale impact of these benefits. As an organization, Dr. Kilelu indicated that ACTS envisions to deploy 500 affordable quality solar dryers across Kenya over 5 years.

3. Presentations

3.1 Presentation 1: Optimization of solar dryers for quality: Insights from the prototype hybrid solar dryer

The presentation was facilitated by KIRDI team comprising of Eng. Jackis Auka, Dr. Fred Ogutu and Winston Nyaguti (KIRDI)

Design Improvement and Evaluation of Solar Hybrid Dryer in Arresting PHLs In Fruits- Eng. Jackis Auka

To introduce the presentation, Eng. Aukah indicated that most of the PHLs in Sub-Saharan Africa (SSA) were due to poor harvesting, drying processes, and storage. He stated that solar drying inhibits the growth of bacteria, yeast, and mold through the removal of water and that its main advantages over open sun drying is that it facilitates a faster drying rate, protects the products better from insects, flies and dust particles, reduces the risk of prolonged drying, has lesser risk of product spoilage and improved product quality Eng. Aukah indicated that one of the key focuses in the solar designs is optimization of the dryer for ensured quality.

Classification of Solar dryers

Eng. Aukah gave an overview of the different classifications of solar dryers. He indicated that solar dryers can be classified into two types based on the mode of air circulation (forced conventional or natural conventional) and the construction type (Tunnel dryer, Chimney type, Greenhouse type, Cabinet type).

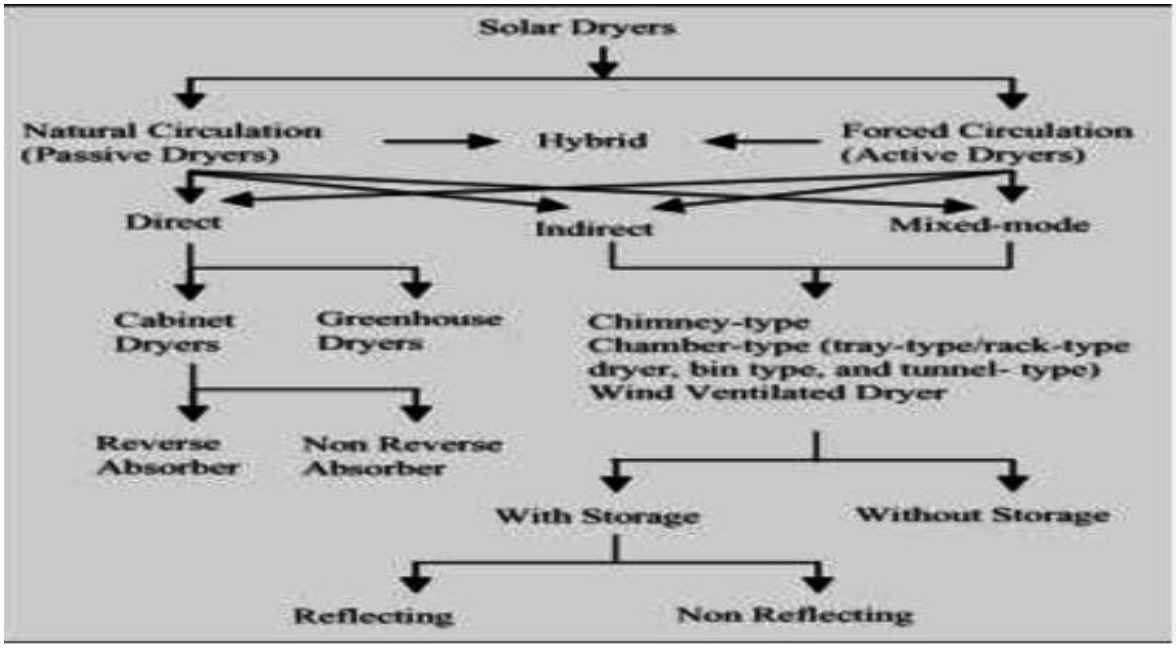

Figure 1: Classifications of Solar Dryers (presentation by Eng. Jack Aukah)

Eng. Aukah noted that **Direct solar dryers** expose the substances to be dehydrated to direct sunlight. They have a black absorbing surface which collects the light and converts it to heat; the substance to be dried is placed directly on this surface. **In direct solar dryers**, the black surface heats incoming air, rather than directly heating the substance to be dried. This heated air is then passed over the substance and exists through a chimney, taking moisture from the substance with it. **Mixed mode drying (solar tunnel dryer) comprise of** Hybrid solar biomass dryer, Hybrid solar biogas dryer, Hybrid solar electric dryer.

Greenhouse solar dryer – This is a direct solar dryer considered as the best means to harness solar energy for space heating and drying. The dryer works on the principle of greenhouse effect that implies that the cover of greenhouse dryer allows the short wavelength solar radiation through it while the long wavelength radiation coming from inside remains trapped inside the dryer.

It has the following characteristics:

- It works on a mixed mode whereby there is a direct exposure of the product and drying through direct hot air.
- The floor is painted black to convert solar radiation to heat to dry products, there is also direct heat absorbed through a transparent sheet to enhance double heating.
- It has a biomass part that is engaged when the solar radiation is low whereby Biomass funs is connected to the heat exchanger to produce a gas that passes through the heat exchanger. The air then gets heated through conduction, convection and channelled through a pipe, the air therefore passes through a perforated pipes under the drying trays and exits through the top of the dryer.

Eng. Aukah stressed that when designing a greenhouse solar dryer it is important to take into consideration:

i) The greenhouse geometry and orientation which play an important role in determining the performance of the dryer
ii) The choice of shape and orientation of the solar greenhouse dryer which is critical to maximize the capturing of the solar

Steps in designing solar dryers include the following:

a) Understanding the need to be addressed by the dryer
b) Reviewing the existing dryers and related literature
c) Generating different conceptual designs
d) Sizing/designing of the system components
e) Generation of drawings: orthographic, isometric and working drawings
f) Fabrication of the prototype dryer
g) Test results/analysis
h) Recommendations on which aspect works or need improvement

He highlighted that the components of hybrid solar biomass greenhouse dryer include: Drying chamber, Drying trolley and trays, Biomass furnace/ stove, Gas to gas heat exchanger, Air circulation system and Solar Pv system.
Eng. Aukah further gave an overview of the considerations that were made in designing the hybrid solar dryers as follows:
Geographical and metrological data of the location, Solar radiation/ insolation of the location, Sanitary design factor: the construction material must be non-toxic and non-corrosive, Time constraint, Drying characteristics: drying air temp, humidity, air flow rate, Initial and expected final moisture content of the material to be dried, Other material characteristics: loading density, product size, size distribution, Dimension of variables: Length, Width and Height of dryer, and dryer configuration, tray area, Available space for dyer construction, Convenience: in loading, removal, cleaning etc.

Testing and Optimizing drying of fruits – Dr Fred Ogutu (KIRDI)
Dr. Ogutu highlighted that the key food properties and attributes that are acceptable to the customer include appearance, including size, shape, gloss, colour, and consistency, texture, flavour, and nutritional content. He further stated that food safety (absence of disease causing or injurious agents in food) was an important aspect of dried food products which is achieved by proper handling, preparation and storage of food in a manner that prevents food-borne illness. He stated that microorganisms of significance to dried fruits include: *Salmonella* spp, *Bacillius Cereus*, Coliforms, E*ischerchia coli*, *Staphilococcus aureus*, fungi and yeast.

Characterization of the dried products - Dr. Ogutu noted that in an experiment to test the drying rates for fruits in the hybrid prototype installed in Kisumu, the dried fruits were characterized using two parameters i.e.

i) Moisture content - The moisture content of fresh fruits as during drying of the samples was determined by using the rapid moisture analyser
ii) Microbiology Analyses of Dry samples – The microbiology analysis was done by Enumeration (using the prescribed methods) of Aerobic Mesophiles (Total Viable Count), Yeasts and Moulds, Coliform (isolation of total count), Escherichia coli and Staphylococcus aureus. The findings of the enumeration were in tally with KEBS standards. The results indicated that the aerobic plate count was within the specification as per the KS 2786:2018 of 4 log CFU/g in solar dried fruits but higher and above specifications. The yeast (1 log CFU/g) for solar dryer was within the legal limit of 2 log CFU/g, while for open sun drying was marginally within limit for yeast but above for moulds. The project was able to design, fabricate and install an improved solar dryer capable of drying fruits in a reduced time of averagely 6 hours.

Figure 2: Products Under drying in the hybrid solar dryer

Economic Appraisal - Winston Nyaguti (KIRDI)

Mr. Nyaguti indicated that to analyse the financial viability of the dryer, the discounted methods for investment analysis including net present value (NPV) and Benefit Cost Ratio (BCR) were used. Economic analysis was also performed to additionally highlight the potential for job creation for the youths in the area that the dryer would be installed. The financial assessment indicated that the business of Solar Hybrid dryer using the capacity installed at KIRDI would be a viable venture compared to other investments. The financial result NPV was found to be positive and higher. The higher the BCR, the more attractive the risk-return profile of the project/asset.

Mr. Winston Nyaguti (KIRDI)

Questions that emanated from the presentation

Q1. Has the dryer been experimented in different regions of Kenya?

The first dryer was installed and studied at KIRDI, Kisumu Centre, we are yet to install and study dryers in other localities, but soon installing in more parts of the country.

Q2. What components of smartness are being considered?

Temperature and humidity monitoring parts, but we are looking forward to having parts like heat control into the drying chamber, using weight change to predict, more probes like moisture content to estimate drying level.

Q3. Why did you opt for the biomass and not battery?

Biomass is cheaper than battery, you need more panels and space to install fully solar system. Biomass comes from agro process wastes like bagasse, market wastes which are easily dried and compressed to be biomass fuel.

Q4. What plastics are you using for the net?

The material is HDPE yarn woven mesh fabric. Because it can withstand extreme temperature changes

Q5. What are the examples of heat sensitive products, were you able to compare vitamin levels of fresh and dry fruits?

Vitamin C is the most heat sensitive vitamin in fresh produce. Fruits and vegetables tends to have high levels and the need to preserve it in fruits is key during drying.

Q7. How many hours can you use the solar or the biomass?

Solar can dry fruits for 6 hours, Biomass did 7 hours for Mango and pineapple. One loading of Biomass could burn for three (3) hours

Q8. What preparation do you undertake before taking the products to the dryer to retain the green colour?

For vegetables we do blanching so as to fix colour and clean it. Product is dipped in in hot water, below 100 ℃ for 30 seconds.

3.2 Presentation 2: A Panel Discussion on Stakeholder's Perspective on Quality assurances on solar dryers

Panellists included*: Mr. Geoffrey Nyamota (Bountifield International); Ms. Mary Njuguna, (Savana Circuit); Kennedy Kwithya (Vine Fruits and Vegetables); Mr. Vincent Ogaya (Kenya Climate Innovation Center) and Ms. Steffi Maingi (EBAgro-Pamoja).*

The panel discussion was facilitated by Dr. Kilelu, ACTS. She highlighted that solar drying technology has emerged as a sustainable solution for drying agricultural produce and various materials, offering benefits such as energy efficiency, cost-effectiveness, and reduced environmental impact. She requested the panellists to give a highlight on their views on the subject of quality assurance for solar dryers and how this can be a collaborative effort from all stakeholders.

Panellists: *From Right, Mr. Geoffrey Nyamota (Bountifield International); Kennedy Kwithya (Vine Fruits and Vegetables); Ms. Mary Njuguna, (Savana Circuit); Mr. Vincent Ogaya (Kenya Climate Innovation Center) and Ms. Steffi Maingi (EBAgro-Pamoja)*

Mr. Geoffrey Nyamota, Bountifield International stated that his organization focuses on post-harvest handling practices including establishing business opportunities for solar dryers across several value chains including sorghum, cassava and greengrams. He indicated that there is a ready market for quality dried products which attracts higher prices hence sustainable incomes. Mr. Nyamota stressed the need for solar dryer standards which will come in handy to solve challenges in the sector. He shared out of his own experience when he bought a greenhouse solar dryer but after installation, it proofed to be a different product. He stressed that for the solar drying technologies to effectively meet the market need, there was need for fabricators to be supported with the relevant knowledge including business and financial skills as well as integration of women into the technology development. Regarding affordability, we need to understand that not all small holders can afford to invest in solar dryers and as such we should incorporate financial sector to support the upscaling.

Ms. Mary Njuguna, Savanna Circuit indicated that they had made some steady progress in solar drying business. However, there was still some challenges especially with use of manual temperature controls thus the need to integrate Internet of Things (IoTs) like automation and use of remote controls. She stressed that affordability of the technologies was still a challenge for the smallholder farmers hence the need to focus into possible financing options. She applauded KIRDI for supporting them in growing their enterprise through training on fabrication.

Kennedy Kwithya of Vine Fruits and Vegetables who is working with farmers to aggregate farm produce for export noted that from experience, between 2 to 8 % of farm produced was being lost due to poor quality and lack of capacity of processors to absorb most of the produce for processing. He further stated that despite then efforts to by experts to build the capacity of farmers huge PHLs are still being experienced due to lack of low-cost drying technologies and infrastructure that can support proper

processing of fruits and vegetables to enhance value addition. However, through partnerships with development partners, they have installed solar in their aggregation centre which has reduced PHL leading to higher incomes to farmers. Mr. Kwithya noted that with the current partnership with ACTS, the installation of the solar dryers in Kitui will reduce PHL.

Mr. Vincent Ogaya of Kenya Climate Innovation Centre (KCIC) indicated that KCIC has been supporting several organizations to commercialize climate technologies aimed at mitigating climate change. This is because, finance has been a problem since these technologies are costly. Mr. Ogaya indicated that they are working with different groups to support them with finance towards productive use of solar energy, however most of the technologies they are supporting are imported from overseas. This has been occasioned by lack of solar standards and the people they support have a say where they want the dryers to be imported from. There is need for us to invest on local technologies and this will be only by coming up with quality standards. One of the key drivers for the uptake of these technologies has been the adoption of sustainable business models. They have been able to provide grant based on proof of concept at a low interest rate with good repayment schedules. There is also need for the government to incentivise the stakeholders to attract more technologies.

Ms. Steffi Maingi of EbAgroPamoja noted since 2018, they have been fabricating low-cost solar drying technology enterprises by working with youths and farmers in Kirinyaga and other partners such as UNEP, KIRDI and KAKI women groups to reduce PHL. When they started, they used to fabricate using local materials such as wood to make them affordable to farmers but now they have learnt over time through KIRDI to fabricate quality standards to the market standards. The key strengths of the design have been the simplicity of the dryers whereby it can be affordably built by artisans from locally available material. However, sometimes cost usually compromises on quality. There is need for more training for fabricators on quality standards and end users on how to use them.

Q. Another question posed to the panellists, was their views on what needed to be done to ensure quality assurance of the products?

Different responses were given as below:

- Installation of the dryers needs to be done by qualified personnel (an engineer)
- There is need for clear specifications on size of the dryer, size of the panel – this may require commissioning by KEBS.
- There is need for an industrial revolution and development of standards to have best quality dryers fabricated that can absorb large quantities of farmers' produce.
- Need to have quality dryers that can even function for more than ten years.
- There is need to have different types of dryers in the market customized to the different products to be dried e.g. fish, vegetables.
- There is need for a close collaboration from the different actors including food industries, manufacturers, fabricators, and end users.

Highlights from the panel discussion

Dr. Temi indicated that technology is key to Kenyan's industrialisation because Agricultural productivity is linked to technology. Dr. Temi noted that according to statistics, the world market for dried food was 3.3 billion and is projected to rise. In Africa, Ghana, Ivory Coast and South Africa were the only countries featuring from Africa. There is need to pick few products and value and commercialize them other than importing technology only.

Eng. Kiplagat noted that drying is part of the innovation in the farming system. In this era of climate change, when there is rain, we need to use it and whatever excess production we have, use technology, and

dry the product but as we do this, Eng. Kiplagat emphasized Dr. Temi's sentiments on the need to focus into one value chain since it's generalized.

The panellists concluded by saying that as we grapple with youth unemployment, industrialization is the solution and we need to bring incubation programs to support these investments and when we provide a level playground, youths can be innovative. On regards to financing, we can only attract financial institutions when we attract quality products. The stakeholders emphasized the need to develop quality standards because most fabricators don't have engineering capacities on installation. We should have a clear structure on sizes, materials etc. To access high market, we need to speak of volumes because industrial revolution will be driven by large value additions.

3.3 Presentation 3: Draft on Solar Dryers standards. Kenya Bureau of Standards

(By Dennis Onyango Okeyo – KEBS)

Mr. Okeyo indicated that KEBS recognizes technology and innovations as a key driver of the Kenya's economy. Additionally, KEBS recognizes the value addition as mechanisms of ensuring food security. Mr. Okeyo noted that standards are required for various reasons including standardization services, accuracy and measurements (including testing and calibration), conformity assessment services (inspections, quality and market assurance), training and education, information services (Library and Enquiry Point). He indicated that certification (e.g. ISO marks) is guided by having a standard in place.

Some of the benefits of using standards include ensuring the quality of products and services, safeguarding the environment, health and safety of the consumer, minimization of wastage, reduction of costs of production, increased productivity in the industry, removal of trade barriers, access of markets, competitiveness, better communication, transfer of technology, better utilization of resources and efficiency.

He indicated that KEBS has already initiated development of a solar dryers standard in Kenya, following a request received in January from UNEP. After the receipt of the request KEBS conducted a review of the need to determine the economic importance of the solar industry and the scale of production of the dryers. He indicated that a preliminary draft had already been developed based on the parameters specified in the request which will be taken to a technical committee (TC) for review, then stakeholders will be invited to join the TC and be invited to review and propose what is missing, thereafter the standard will be taken to the TC for balloting and adoption.

Questions and Answers

i) ***Will the standard take care of only the dryer or will also include final products (dried food products)?***
   A standard gives minimum requirements hence it will cater for different categories of products associated with it including installation, materials, solar dryers' specifications etc. The standard will also integrate the final products and KEBS will ensure integration of technical experts on nutrition and will also include solar dryers' materials – these categories will be specified as part 2 of the standard.

ii) ***What is the process for adoption of Kenyan Standard in other countries?***
   There is already a framework in the East Africa Community (EAC)which creates an opportunity to introduce some of the areas of the standard into EAC countries.

iii) ***Will the standard be voluntary of mandatory?***

There are two options in this – the standard can be gazetted thus making it a mandatory or can be converted to Kenya National Stakeholders' Agreement with a life span of 5 years after which sensitization will be done and thereafter become a standard.

3.4 Presentation 4: Equity Bank

(*By Ms. Charity Munyori, Equity bank*)

Ms. Munyori stated that Equity bank has been supporting farmers to acquire several skills and access to low-interest financing incentives to support farmers to purchase equipment and fund the capital expenditures to boost productivity. Also, they have been able to support traceability of export products and E-commerce through integration into website in collaboration with MasterCard Foundation.

3.5 Presentation 5: Linking capacity and quality: Results from a capacity assessment Study

(*By Dr. Dorcas Kalele, ACTS*)

Dr. Kalele gave an overview of a rapid capacity and needs assessment for solar dryers fabricating enterprises that was conducted in Kenya. She indicated that the data for the assessment was collected from 6 solar dryers' fabricators (SMEs), who were then invited for a 2-day training workshop at KIRDI, Kisumu. The type of data obtained included business overview, skills and capacities in relation to design and fabrication, challenges, gaps and the opportunities, partnerships and financing models. The assessment established that some of the skills that the fabricators possess included design and installation (including mechanical design, forming and shaping), fabrication (including blueprint reading, and welding), assembly and installation, business development, structural engineering & design, material selection, marketing and customer service. On the other hand, fabricators had several gaps/limitations in skills and capacity. These include design and installation especially of modern cost-effective dryers, automation of fabrication processes, trouble shooting, implementation of mass production lines an identification and selection of material used in fabrication. Other identified gaps include limited sources of funds for implementation of outreach programs.

4. Closing and Way Forward

The following key issues emanated from closing remarks:

1) The interested stakeholders to participate in the solar standard development process were requested to register so that they cab ne invited to join the KEBS technical committee as the standard development process moves forward.
2) There is need to fast-track addressing the identified capacity and skills gaps together with partners who have the capacity and can support the process.
3) There was need to ignite demand for the dried food products, even as the industry pushes for the solar dryers' standard to enhance functionality of the standard.
4) There was need for more sensitization to consumers on the dried food products which will enhance success for the adoption of solar dryers and market sustainability.

5. Annexes

5.1 Annex 1: Workshop Agenda

Time	Activity	Persons in charge/involved
8.00 - 9:00	Arrival and registration	Josephat Okemwa and Margaret Mwalughu- African Centre for Technology Studies (ACTS)
9.00 - 9.15	Welcome & Introductions	Eng. Isaiah Omolo - ACTS
9:15 - 9.45	Welcome remarks/ Workshop objectives -Opening remarks	1. Prof. Tom Ogada & Dr. Catherine Kilelu - ACTS -Wesley Kipyego -State Department of Energy 2. Eng. Laban Kiplagat - Ministy of Agriculture Livestock, Fisheries and Cooperatives (MOALFC) 3. Mr. King'uru Wahome -Ministry of Investments, Trade, and Industry
9.45 - 10:15	Optimization of solar dryers for quality: Insights from the prototype hybrid solar dryer +Q&A	1. Eng Jackis Auka, Dr Fred Ogutu and Winston Nyaguti - Kenya Industrial Research Institute (KIRDI)
10.15 - 11:00	Panel Discussion: Quality assurances on solar dryers- Experiences from stakeholders	1. Emma Stella -Savana Circuit 2. Kennedy Kwithya -Vine Fruits and Vegetables 3. Geoffrey Nyamota- Bountifield International 4. Vincent Ogaya - Kenya Climate Innovation Center 5. Steffi Maingi -EBAgroPamoja
11.15 - 11.45	Draft Solar Dryers standards	Eng. Bonface Juma -Kenya Bureau of Standards (KeBS)
11:45 - 12: 40	1. Reflection on fabricator training and quality standards 2. Linking capacity and quality: Results from a capacity assessment Study 3. Need for minimum performance standards-Insights from other solar appliances	1. Eng Jackis Auka - KIRDI 2. Dr. Dorcas Kalele -ACTS 3. Sam Grant -CLASP
12.40 - 1.05	Group discussions – Moving from dialogue to action (with guiding questions)	All
1.05 - 1.15	Key points from group discussions	Dr. Catherine Kilelu -ACTS
1.15 - 1.30	1. Presentation of Solar dryer knowledge and business Hub 2. Conclusions and way forward	Moses Owidhi -ACTS Eng. Isaiah Omolo -ACTS
1:30	Lunch and departure	All

5.2 Annex 2: List of Participants

No.	Name	Organization
1	Prof. Tom Ogada	ACTS
2	Dr. Catherine Kilelu	ACTS
3	Eng. Isaiah Omolo	ACTS
4	Dr. Dorcas Kalele	ACTS
5	Josephat Okemwa	ACTS
6	Alfred Oduor	ACTS
7	Margaret Mwalughu	ACTS
8	Moses Owidhi	ACTS
9	Dr. Everlyn Okoth	JKUAT
10	Anne Njoroge	Strathmore University
11	Banjara Gupta	SNV-Kenya
12	Catherine Matete	Grekkon Limited
13	Charity Munyori	Equity Bank
14	Pauline Kairu	Nation Media Group
15	Doreen Ochieng	Bio Afrique Energy
16	Dr. Fredrick Ogutu	KIRDI
17	Eng. Jackis Aukah	KIRDI
18	Winstone Nyaguti	KIRDI
19	Dr. Temi Mutia	Private Sector
20	Mary Njuguna	Savanna Circuit Technologies
21	Eng. Dennis Okeyo	KEBS
22	Eng. Laban Kiplagat	Ministry of Agriculture
23	Eunice Wainaina	Kiambu County
24	Geoffrey Nyamota	Bountifield International
25	Jared Omiso	Nyangorora Banana Processors
26	Linda Akwabi	Standard Media Group
27	Jonah Rutoh	Abosi Tophill Farmers' Cooperative Society
28	Kennedy Kwithya	Vine Fresh Fruits & Vegetables
29	Kevin Agaziva	Bountifield International
30	John Wambua	KCIC
31	Vincent Ogaya	KCIC
32	Mike Ofuya	CLASP
33	Moses Matui	Trade Care Africa Limited
34	Mr. Wahome	Ministry of Industry
35	Engineer Musungu	MOALD
36	Rachel Kwamboka	Nyamira Young Miners
37	Sam Grant	CLASP
38	George Okuthe	Acumen Fund
39	Irene Mutisya	SNV
40	Selelah Okoth	NEMA
41	Solomon Kasina	Luthekam Solutions
42	Steffi Maingi	EbAgroPamoja Africa
43	Cecil Odongo	Daily Nation