RE4FOOD STAKEHOLDERS WORKSHOP REPORT





JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY

AND

PRACTICAL ACTION CONSULTING-KENYA

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EXECUTIVE SUMMARY

RE4Food project (Kenya) organized a one day stakeholders' consultative forum on March 20, 2014. The forum was held at the African Institute for Capacity Development (AICAD), JKUAT and officially opened by Prof. E. M. Kahangi, EBS, Deputy Vice Chancellor (Research, Production and Extension) JKUAT. The participatory workshop was jointly organised by JKUAT and PAC with the general objective being to develop a stakeholder network for RE4Food (Kenya). The specific objectives were: (i) to develop stakeholder network for the RE4Food project in Kenya; (ii) to collect information on the status of post-harvest food wastage and strategies currently used to reduce this; (iii) to gather information on the status of using renewable energy to reduce post-harvest food losses and wastage; (iv) to select priority crops with huge post-harvest wastage, and at the same time with greatest possible impacts on improving rural livelihoods.

The thirty-six (36) participants who attended the workshop included representatives from academic and research organizations, policy and regulatory agencies/associations, farmer organizations, non-governmental organizations/civil society, cooperatives and financial institutions.

It was noted that appropriate small-scale postharvest technologies can reduce fruit and vegetable crops waste, improve incomes by at least 30% for smallholder farmers and marketers and hence enhance food and nutritional security through: (i) use of improved containers to reduce mechanical damage of horticultural crops (plastic crates, liners in rough containers, smaller packages); (ii) use of shade to reduce water loss (cloth, woven net or thatch shade structures, market umbrellas); (iii) low cost cold storage structures for successful longer term storage of potatoes and onions, and solar drying to transform perishables into more stable processed food products through use of renewable energy, among others.

In addition, it was noted that there are no specific funding opportunities for renewable energy and value addition of agricultural processing. However, a lot of funding opportunities exist for general agricultural production. On the regulatory and policy front the government priorities renewable energy as a critical energy source in Kenya and also encourages energy efficiency and conservation in all sectors of the economy. However, there is no specific mention of the use of renewable for agro-processing. This can be seen from the current regulatory framework on renewable energy sources which do not considered food processing.

The following were suggested, among others, as the way forward on renewable energy use in agro-processing: (i) need for market linkages for horticultural produce-fresh and processed (use of information technology); (ii) capacity building of stakeholders on proper postharvest handling/processing along the horticultural value chains; (iii) improve access to postharvest tools, equipment, packages, supplies; and lastly, (iv) in Kenya most interventions have been around domestic use of renewable energy with little use in agro-processing. The focus therefore should be on encouraging use of renewable energy for agro-processing.

1. Introduction

1.1 RE4Food Project Background (Prof. Christopher Kanali, JKUAT)[1]

1.1.1 Introduction

The RE4Food project that is hosted at https://research.ncl.ac.uk/re4food is a collaborative three year project addressing research challenges associated with increasing food security and reducing reliability on fossil fuels. The project which commenced on 1st July 2013 has an international focus and involves academics from Newcastle University and academic institutions in Germany, Ghana, Kenya, Sierra Leone and South Africa as well as British Non-governmental Organisations (NGOs) based in Sub Saharan Africa. RE4Food partners include:

i) Newcastle University, United Kingdom http://www.ncl.ac.uk/energy/
ii) PAC http://practicalaction.org/
iii) Environmental Foundation for Africa (EFA) http://www.efasl.org.uk/
iv) Njala University, Sierra Leone http://njalauniversity.edu.sl/
v) JKUAT, Biomechanical and Environmental Engineering Department, Kenya http://www.jkuat.ac.ke/
vi) Stellebosch University, South Africa http://www.sun.ac.za/Home.aspx
vii) Kwame Nkrumah University of Science and Technology (KNUST) http://www.knust.edu.gh/
viii) University of Kassel, Germany http://www.uni-kassel.de/fb11agrar/en/sections/agrartechnik/home.html

1.1.2 RE4Food Objectives

The general objective of the RE4Food project is to provide research which will support rural community business models for low and renewable energy input into optimized food processing which minimize loss and waste in selected food value chains. The project's specific focus is:

1. To investigate the opportunities and barriers to the use of renewable energy for rural food processing as well as optimization of the processes to:
    i) minimize losses along the value chain while at the same time aiming for improved product quality, and
    ii) increase local value addition by small and medium enterprises and organized community groups.
2. To assess the losses in the food value chain for the products chosen, in Kenya, Sierra Leone and Ghana, and identify low carbon and energy efficient storage and processing technologies and practices which can be de-centrally applied, reduce these losses and take advantage of RE sources in a cost-effective way.
3. To deliver focused support to stakeholders through a network facilitating engagement, dissemination and knowledge transfer to reduce postharvest losses and energy demand.

[1]Presented on behave of:

- **JKUAT team:** Prof. D. Shitanda, Prof. J. Mailutha, Dr. U. Mutwiwa, Dr. G. Kituu, Dr. J. Mung'atu, Mr. F. Njoka and Prof. C. Kanali.
- **PAC/Kenya team:** Ms T. wa Gathui and Mr. V. Esendi

4. To explore the opportunities for rural livelihoods in reducing post-harvest losses and adding value (through initial produce preparation, storage, washing, packing and common process unit operations, such as sterilization, pasteurization, drying, and evaporating).

1.1.3 Project Workpackages

At the end of the project is envisaged that the following workpackages would have been accomplished, namely:

1. WP1: Post-harvest food chain, loses, wastage and current energy demand analysis (Lead JKUAT, Kenya) - to establish where the most promising opportunities exist to reduce loses and waste and to reduce energy demand and integrate RE it is necessary to assess and evaluate these selected food chains.
2. WP2: Existing rural food processing and renewable energy use (Lead Njala University, Sierra Leone) - a move towards more effective and energy efficient rural food processing will require the adoption of successful business models, the integration and use of renewable energy and the use of appropriate technology in food processing which builds on existing regional rural structures and best practice.
3. WP3: Innovative post-harvest food processing approaches utilizing renewable energy (Lead KNUST, Ghana) - investigate the feasibility of integrating renewable energy, and evaluate the economic implications of adopting post-harvest food processing approaches utilizing renewable energy.
4. WP4: Multi-stakeholder engagement, dissemination and knowledge transfer (Lead EFA, Sierra Leone) - key to the success of the project is the gathering of post-harvest food chain and processing data and information and this will require input from all relevant stakeholders. Any subsequent adoption of recommendations and guidance as a result of the research to reduce post-harvest losses and the integration of renewable energy sources will need proactive dissemination and knowledge transfer.

So far a progress report on selected food products has been forwarded to Newcastle University. Kenya proposed to focus on vegetables (specifically cabbages, kales, cowpeas, amaranth, and stinging nettle) while Ghana and Sierra Leone on cassava and fish, respectively. In addition, the team in Kenya is finalizing writing a report on SMEs that deal with agro-processing and renewable energy.

1.2 RE4Food Stakeholders' Workshop: Objectives, Participants and Process

1.2.1 Objectives

The overall objective of the stakeholder's workshop was to develop a stakeholder network for RE4Food (Kenya). The specific objectives were as follows:

1. To develop stakeholder network for the RE4Food project in Kenya.
2. To collect information on the status of post-harvest food wastage and strategies currently used to reduce this.
3. To gather information on the status of using renewable energy to reduce post-harvest food losses and wastage.
4. To select priority crops with huge post-harvest wastage, and at the same time with greatest possible impacts on improving rural livelihoods.

1.2.2 Participants

Thirty-six (36) participants attended the workshop and they included representatives from academic and research organizations, policy and regulatory agencies/associations, farmer organizations, NGOs/civil society, cooperatives and financial institutions (Table 1).

Table 1: Contact details of participants for the stakeholders workkshopp

Organization/Institution		Name	E-mail Address	Tel. No.
Academic and Research Institutions				
1.	KARI –Thika	Dr. Margaret Muchui	margaretmuchui@yahoo.com	0722 615590
2.	KARI –Thika	C. Gathambiri	cgathambiri@yahoo.com	-
3.	KIRDI	Joseph K. Kamau	dir@kirdi.go.ke/jkkamau@kirdi.go.ke	0722 704410
4.	UoN	Dr. Fridah W. Mugo	fridahmugo@yahoo.com	0710 806139
5.	Egerton University	Musa Njue	musanjue@yahoo.com	0726 128779
6.	JKUAT	Prof. E. M. Kahangi, EBS DVC (RPE)	estherkahangi@yahoo.com	-
7.	JKUAT	Hesborn Ondiba	hondiba@gmail.com	0725 942305
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9.	JKUAT	L.O. Mulamu	livingstonemulamu@yahoo.com	0722 385948
10.	JKUAT	Prof. F. D. Shitanda	shitandad@yahoo.co.uk	0722272265
11.	JKUAT	Dr. J. Mung'atu	kmungatu@yahoo.com	0720824708
12.	JKUAT	Eng. S. Njuguna	snjuguna@yahoo.com	0727 436412
13.	JKUAT	Prof. C. Kanali	c_kanali@yahoo.com	0721 351700
14.	JKUAT	Dr. Garth M. Kituu	mgmkituu@yahoo.com	0727 495380
15.	JKUAT	Jane N. Luswet	jluswet@gmail.com	0725 130415
16.	JKUAT	Christine W. Kituku	cwanza@yahoo.com	0710 357140
17.	JKUAT	Clifford Obiero	cliffordobiero@yahoo.co.uk	0722 631512
18.	JKUAT	Michael Kamwere	kamwere2006@yahoo.com	0722 621042
Farmer Organizations, NGOs/Civil Society, cooperatives and financial institutions				
19.	KENFAP	Roda Kilonzi	roda@kenfapbiogas.org	0721 203344
20.	GIZ – EnDev	Pauline Wanjohi	pwanjohi@endev-kenya.co.ke	0722 775419
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22.	Practical Action Consulting EA	Tameezan wa Gathui	tameezan.gathui@practicalaction.or.ke	0729 401 079
23.	Practical Action	Victor Esendi	esendiv@gmail.com	0723 346 726

Organization/Institution		Name	E-mail Address	Tel. No.
24.	SoMCODI	Sister Veronica Thiga	srverothiga@yahoo.com info@somcodi.or.ke	0722 780 092
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31.	Farm Concern	Silas Langat	info.kenya@farmconcern.org	0720 342 315
32.	PELUM – Kenya	Jeff Kahuho	kahuho@pelum.net	0721 778939
Policy and Regulatory Agencies/Associations				
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34.	MoALF	John Njoroge	irungu.njoroge@yahoo.com	0726 088502
Others				
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36.	Assist. Rapporteur	Breda Gutu	brendagutu@rocketmail.com	0707 154099

1.2.3 Process

The workshop process was participatory and included plenary presentations and discussions, group discussions/feedback. The workshop programme included an opening ceremony and four sessions: i) overview of current status of renewable energy use in agro-processing; ii) experiences in the renewable energy for enhancing food security; iii) stakeholder feedback on project activities; iv) way forward and closing remarks.

1.3 Opening Speech (Prof. E. M. Kahangi, EBS, Deputy Vice Chancellor, RPE, JKUAT)

Prof. Kahangi expressed her gratitude for having been invited to open the RE4 food stakeholders' workshop. She noted that one of the most limiting factors for rural agribusiness is power. Therefore, RE4FOOD which focuses on utilizing renewable energy to improve rural livelihoods through efficient food processing is a noble and timely project that should have been done yesterday.

Prof. Kahangi also noted that RE4Food addresses local processing of food which yields better results. Fortunately in Kenya has many examples on the use of renewable energy so we can learn from them and save time in delivering the project. As the project is implemented you should ask what is in it for the rural community so that you can make it better for them. You must deliver on

budget, time and quality. The budget must be well accounted for and we must have something tangible to show. The project's value-chain approach is going to be a good example since quality of food is very important and nutrients should be retained to prevent malnutrition. The professor also urged the Kenya team to observe processing of fish as it is a very important commodity in Kenya. Rural communities have a lot of fish and we need to connect communities to markets.

"I wish you all the best as you address this vital area that can make a big difference to our rural community. Congratulations for being part of this great team." The detailed speech is presented in Appendix 1).

2. Overview of Current Status of Renewable Energy Use in Agro-Processing

2.1. Key Findings

Only one key note address on "Post-harvest challenges in horticultural crops and impact on food security in Kenya" was presented in this session. It was noted that appropriate small-scale postharvest technologies can reduce fruit and vegetable crops waste, improve incomes by at least 30% for smallholder farmers and marketers and hence enhance food and nutritional security through:

i). Use of improved containers to reduce mechanical damage of horticultural crops (plastic crates, liners in rough containers, smaller packages);
ii). Use of shade to reduce water loss (cloth, woven net or thatch shade structures, market umbrellas);
iii). Field packing to improve quality (sorting, trimming, quality grading and packing in the field);
iv). Use of low cost cooling practices to maintain quality and extend postharvest life;
v). Field curing to extend storage life and maintain quality of root, tuber and bulb crops;
vi). Low cost cold storage structures for successful longer term storage of potatoes and onions;
vii). Solar drying to transform perishables into more stable processed food products through use of renewable energy; and
viii). Village scale canning, bottling and pickling to transform perishables into more stable products.

2.2. Way Forward

The following were suggested as the way forward on renewable energy use in agro-processing:

i) Need for market linkages for horticultural produce-fresh and processed (use of information technology);
ii) Farmers to concentrate on horticultural varieties on demand for both fresh and for processing;
iii) Incentives to investors to set up processing plants (land, waivers);
iv) Capacity building of stakeholders on proper postharvest handling/processing along the horticultural value chains. For example, train farmers to harvest properly and at the

right time and reduce negative effects during marketing – for instance produce like bananas spoil quickly when placed/stored next to kales and cabbages;

v) Improve access to postharvest tools, equipment, packages, supplies;
vi) Government of Kenya, County Governments - improve infrastructure, irrigated agriculture, improve produce distribution; and
vii) Use of renewable energy in processing.

Further, the plenary discussions noted that there is little documentation on the extent of usage of renewable energy in agro-production in Kenya. It was also observed that there is no much research on commercial dryers for processing in Kenya.

3. Experiences in Renewable Energy for Enhancing Food Security

3.1. Key Findings

The six articles that were presented during this session covered: (i) renewable energy in agro-processing; (ii) funding opportunities for renewable energy and value addition of agricultural products; (iii) regulatory framework on renewable energy for food processing; (iv) product market opportunities for value added products; (v) experiences with value addition among small-holder farmers; and (vi) practical experiences in renewable energy in food processing.

As regards the potential of renewable energy in agro-processing it was noted several organizations promote the use of renewable energy such as biogas at farm and domestic level. The interventions produce clean energy which offers various opportunities for agro-processing (e.g., drying, processing and refrigeration). However, the challenges in ensuring wider use of renewable energy at farm level include:

i) Ensuring quality of installation and maintenance of the systems.
ii) Lack of national standards, which are, however, currently being developed.
iii) Increasing costs/prices of construction materials.
iv) High cost of credit.
v) High cost of renewable energy appliances due to unfavorable tax regime.
vi) High labour costs.

There are no specific funding opportunities for renewable energy and value addition of agricultural processing. However, a lot of funding opportunities exist for general agricultural production. One qualifies to be funded based on the following conditions:

i) Active farmers who are either members of a group registered by the Ministry of Social Services or individual farm owners currently engaged in fruit farming and export vegetables; either contracted to a marketing agent or not.
ii) Guarantee and Security – Security must be provided and the loan/equipment should be insured where possible.

Some funders (e.g., KWFT) offer innovative renewable energy products. For these funders to reach the farmers they have established partnerships with organizations that work with farmers directly. However, the available funding opportunities are mainly for domestic use such as improved cook stoves rather than food processing.

On the regulatory and policy front the government priorities renewable energy as a critical energy source in Kenya and also encourages energy efficiency and conservation in all sectors of the economy. However, there is no specific mention of the use of renewable for agro-processing. This can be seen from the current regulatory framework on renewable energy sources which do not considered food processing. The current policy frameworks under review or preparation include:

i) Biogas standards preparation – at final stages.
ii) Small hydro standards development – on-going.
iii) Cook stoves standards development -testing has been going on and preliminary results are ready.
iv) Small hydro (SH) resource mapping – national SH Atlas aimed at displaying potential for SH programmes in the country on the basis of a Geographical Information System platform almost complete.
v) Solar/wind resource survey and analysis – on- going
vi) Study on renewable energy technologies in three counties to commence soon.

The use of renewable energy in food processing improves the value of agricultural products. However, household cooking seems to get more attention than development of food processing technologies, especially at farm level. Several concepts have been developed and tested, which indicate that huge potential exists to improve the postharvest treatment of agricultural produce by using renewable energy. The various applications of renewable energy for food processing include:

i) Drying agricultural products using solar - various designs of solar dryers have been developed.
ii) Drying using hybrid systems that use a secondary energy source, such as biomass and biogas, as backup for gloomy days and at night.
iii) Grain milling using water powered systems.
iv) Drying using air current.
v) Water treatment using solar energy.
vi) Desalination of water for irrigation and domestic use.
vii) Solar water pumping for irrigation and domestic use.
viii) Generation of electricity from agricultural wastes to run processing plants - Olivado EPZ Ltd., Murang'a extracting avocado oil - plans to use biogas for electricity generation for processing.
ix) Controlled cooking using improved cook stoves coupled with fireless cookers.

A national agribusiness strategy exists in Kenya for marketing agricultural products. The strategic priorities are:

- Put markets at the centre of all production, processing, product development and packaging.

- Focus research and development and innovation to better catalyze growth of a vibrant agribusiness sector.
- Promote smarter organization of the actors in the sector to enable enterprises to benefit from economies of scale and improved productivity.
- Improve the range and effectiveness of financial and nonfinancial services.
- Attract investment by creating an enabling environment and putting performance above politics.

The main method of reducing post-harvest losses in Kenya is through drying which can be categorized:

i) Plant origin: fruits -pineapples, mangoes, bananas; vegetables-leafy vegetables; roots and tubers- Irish/ sweet potatoes, arrow roots; medicinal; spices- chillies.
ii) Livestock: meat e.g. fish.

However, there are several challenges facing dried agricultural products in Kenya. These include:

i) Strict standards, such as the European Retail Standards for Good Agricultural Practice.
ii) Low market demand.
iii) Lack of access to technology, skills, equipment.
iv) Lack of affordable credit/finance.

Despite the challenges dried agricultural products still have potential to improve the lives of small holder farmers because of the:

i) Rapid urbanization and increasing demand for processed foods (i.e., promotion of utilization of dried agricultural products; improve nutrition and health).
ii) Seasonality of agricultural production (viz., products preservation; reduction of post-harvest losses).
iii) High world food prices.
iv) Large potential to generate export earnings.

3.2. Way Forward

1. In Kenya most interventions have been around domestic use of renewable energy with little use in agro-processing. The focus therefore should be on encouraging use of renewable energy for agro-processing.
2. There is need to encourage commercial funding for renewable energy in agro-processing. However, it was noted that low income groups do not have large assets and most credit institutions do not give loans for renewable energy in cash but in kind. Therefore, there credit institutions should be encouraged to develop credit facilities for the low income groups in cash to invest in renewable energy and food processing. In such cases, financiers should be encouraged to use alternatives such as social collaterals, co-guarantee systems, business and home assets.
3. There is need to encourage development national regulatory and policy frameworks on renewable energy for agricultural processing for smallholder farmers.

4. Stakeholder Feedback on Project Activities

4.1 Group Formation and Assigned Tasks

The plenary was split into four pre-assigned groups to discuss and give feedback on the four RE4Food research questions. Group constitution was carefully designed to ensure that each group had at several representatives with expertise in each area covered by the four research questions. Feedback from group reports was intended to provide critical information to enable RE4Food refine the research questions and to prioritize areas of research on efficient renewable energy for food processing that can empower farmers and improve their livelihoods.

The four groups addressed the following issues drawn from RE4Food research questions:

- Group 1: Potential crops and value chain losses and energy requirements.
  Group 2: Potential SMEs, technology and renewable energy use.
- Group 3: Existing business models and opportunities available.
- Group 4: Developing synergies and identifying practical models for renewable energy and food processing.

4.2 Potential Crops and Value Chain Losses and Energy Requirements

Table 2 presents the crops that were assessed and identified as commodities and products which have potential benefits to rural livelihoods especially if value added.

Table 2: Crops with potential benefits to rural livelihoods

Crop	**Regions in which crop is found in Kenya**
Tomato	Kirinyaga, Loitokitok, Subukia
Cabbage	Nyandarua, Central Rift valley, Nyeri
Mango	Muranga, Makueni (Central and Eastern
Carrots	Nyandarua, C. Rift valley, Nyeri
Sweet potato	Western, Nyanza, Homabay
Bananas	Meru, Kisii, Taveta
Avocado	Muranga/Central Kenya
Stinging nettle/ Managu	Central rift

Subjective analysis and assessment on post-harvest food chain losses and waste during handling, and cleaning indicated that the highest to lowest ranked vegetables were tomatoes, black night shade, stinging nettle and cabbages. Similar ranking on fruits resulted to mangoes, avocado and bananas while on root crops to carrots and sweat potatoes. The various energy inputs across various stages along the food chain are presented in Table 3. The results show that there is more dependence on human energy for processing of agricultural products, hence there is likely to be high wastage and low value addition to the products.

Table 3: Energy inputs across various stages along the food chain

Crop	Percentage energy use		
	Human	Electricity	Solar
Tomato processing	80	20	-
Mango drying	90	10	-
Mango juice making	60	40	
Sweet potato drying	60		40
Banana processing	98	2	-
Indigenous vegetables	50		50

4.3 Potential SMEs, Technology and Renewable Energy Use

It was noted that the existing SMEs and Co-operatives could be grouped into self-help groups (i.e., women and youths), traders, micro-processors, jua kali (informal sector), training centres (e.g., village polytechnics), and farmers' co-operatives, savings co-operatives, relevant SACCOs and training institutions. The identified technical and human resources required for food processing are: engineering workshops, engineers, village polytechnics, Kenya Bureau of Standards (to achieve standard processing), technicians, food technologists, artisans, operators, managers and support staff. It was further reported that most rural food processing operations could be categorized into drying, crashing, boiling, cooling and smoking. It was also noted that processing at this level is very small at a range of approximately 15%, which is mostly done for instant consumption. The technologies used comprised solar drying, pasteurization, milling, crashing, squeezing, charcoal cooling, solar cooling, cool boxes and shades cooling. The use of technology is very low, approximately 10%. The identified potential for various forms of renewable energy are shown in Table 4.

Table 4: Potential for various forms of renewable energy

Form of RE	**Potential [%]**	**Existing [%]**
Solar	30	1.5
Biomass	60	80
Electricity (Hydro)	5	3
Wind Energy	3	0.5
Others	2	15
Total	100	100

4.4 Existing Business Models and Opportunities Available

The identified business models currently used for rural food processing and exploitation of renewable energy are presented in Figure 1. The successes of using the business models for food processing and renewable energy enterprises include: more money from products, increased shelf-life, increased number of uses resulting to increased demand and increased versatility. The limitations are: lack of certification and standardization, high risks of losing the products, low level equipment and facilities and expensive standardized equipment. The identified existing best practice and learning opportunities/barriers for both food processing and renewable energy applications were (i) each party concentrates on their area(s) of expertise, and (ii) use of Kenya Tea

Development Agency model where farmers own product and factory but hire professionals and gain immediate and end season profits.

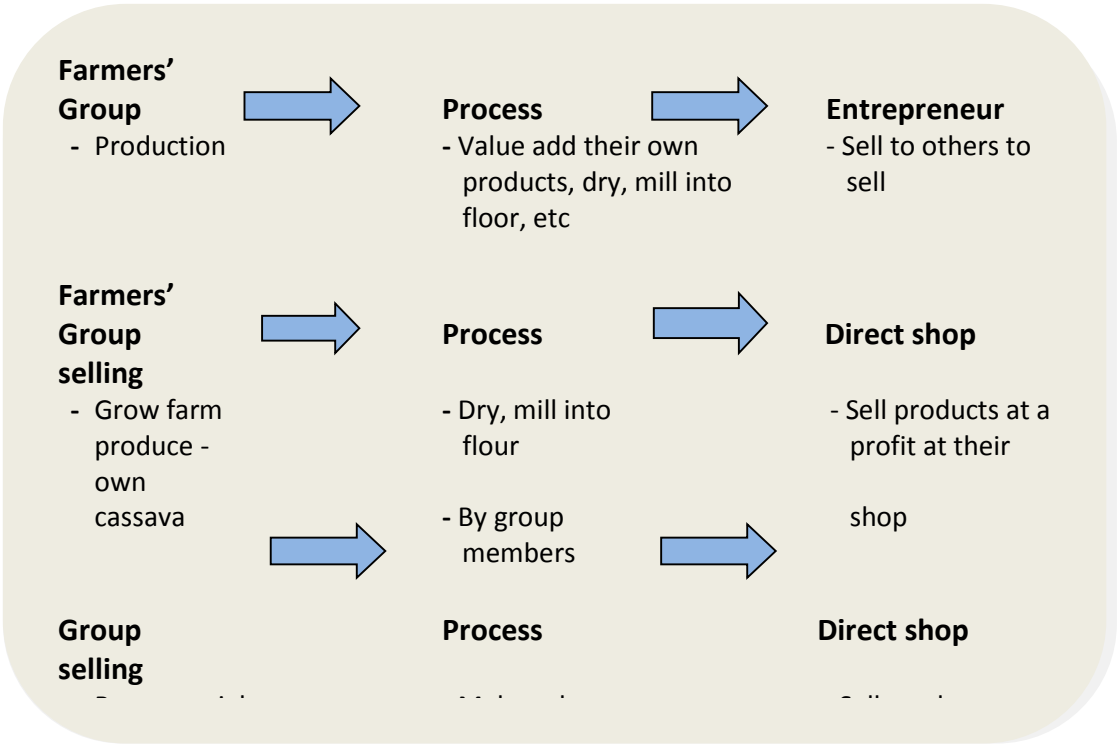

Figure 1: Business model used for rural food processing.

4.4 Developing Synergies and Identifying Practical Models for Renewable Energy and Food Processing

The Identified innovative food processing technologies and practices which increase the food quality decrease the yield gap and maximize the use of renewable energy sources were categorized as follows:

i) Solar drying - traditional solar drying; green-house solar drying for large quantities of produce and those that take longer time to dry e.g. cassava; and box solar drier.
ii) Cooling technology - charcoal cooler; and cooler; and packing shades.
iii) Traditional technologies - smoking; salting; and open air drying.

The techno-economic models that were proposed for integration of renewable energy and food processing consisted of green-house drying; use of solar on drying and use of other sources of energy during bad weather and at night; and traditional use of shades to maintain the quality of produce.

Table 5 shows the potential impact of changes on capital investment, job creation, income generation, decreased post-harvest losses and energy costs while Table 6 presents the identified key stakeholders during the plenary session.

Table 5: Impact of reduction on postharvest losses

1.	Capital investments	Job Creation	Income generation	Energy Cost
2.	Cost of production is reduced	More jobs are created	Increased household income	Reduced energy cost
3.	Cost of food reduced			

Table 6: Key stakeholders

Institutions	**Food processors**	**Financiers**	**Energy Suppliers**	**Educationists**
MoALF	CBOs (Voi)	BIMAS Kenya	MoEP	Universities
MoEP	Meru Herbs	KWFT	KENDBIP	
Ministry of Devolution				
KENFAP	CBOs in Embu county	CISDO	Daima Energy	
KARI	OLivido Ltd.	Fountain Enterprise Programs	Davis and Shirtliff	
KIRDI	Kevian	FAULU	Ramco group of companies	
Universities	Sunny Mango	Small Medium Enterprise Program	SCODE	
	Agri-business Depart (MoALF) to provide names of CBOs in different regions	Jamii Bora	VEP	
	Marungu alovera, Voi	Rafiki		
		Equity Bank		
		VEP		

4.5 Summary of Plenary Session on Stakeholder Feedback on RE4Food Project Activities

4.5.1 Omission of Cassava from List of Crops

Cassava was left out to avoid duplicating what the group in Ghana was doing, however, the stakeholders can still recommend cassava to be included in the list of crops since it is a staple food. Postharvest handling and consumption of cassava is a critical issue due to the risk of exposure to cyanide is a constraint - risk mitigation depends on how the food is processed.

4.5.2 Prioritization of crops

As follow-up to issues emerging on postharvest wastage participants were requested to write down a list of prioritized crops that are most affected by postharvest wastage but have greatest

possible impacts on improving rural livelihoods. The criteria for prioritizing was identified as crops which can be processed using renewable energy, including four vegetables and four fruits from what participants prefer most. Participants recommended that ranking of crops that can be processed should aim for higher levels of value addition. For instance it was noted the value of banana processing is low compared to its usage when it is fresh. The Table 7 shows list of crops identified and prioritized by stakeholders. The ranking in order of priority were as follows:

- Vegetables - tomatoes, traditional vegetables and leafy vegetables (i.e., cabbage, kales).
- Fruits - mangoes, bananas and avocadoes.
- Root crops - cassava, sweet potatoes and arrow roots.

Table 7: Stakeholder prioritization of the preferred crops

		Frequency in each priority class (1 rep most preferred)				
	Crop	**1**	**2**	**3**	**4**	**5**
Vegetables						
1	Tomato	13	2	0	0	0
2	Managu	2	4	2		
3	Amaranthus	2	2			0
4	Stinging Nettle	1	5	1	1	1
5	Carrots	0	1	2	0	0
6	Cabbage	1	1	2	2	0
7	Spinach	0	1	0	0	0
8	Kales	0	1	1	0	0
9	Potatoes	0	1	0	0	1
Fruits						
1	Mangoes	10	5	1	1	0
2	Avocados	0	4	3	0	0
3	Bananas	7	2	2	0	0
4	Guavas	0	0	0	1	0
5	Pawpaws	0	0	0	1	0
6	Oranges	0	1	0	0	0
7	Passion	0	0	0	1	0
Root crops						
1	Cassava	5	0	0	0	0
2	Sweet potatoes	4	4	0	0	0
3	Arrow roots	1	0	1	0	0

4.5.3 RE4Food Baseline

Stakeholders emphasized on the need for RE4Food to do a real baseline. They indicated that the issues, ideas and recommendations emerging from the workshop deliberations will be a good starting point for initiating baseline information collection. Information collection should take into consideration ongoing activities in RE for food processing activities and entrepreneurship that are undertaken in different parts of the country, for example processing of cassava at Matungulu, milk processing in different parts of the county, etc.

4.5.4 Gender Issues

Stakeholders emphasized on the need to include gender issues, to address the needs and priories of different age groups, i.e. youth, women and men, and to equip the groups with different types

of skills. When groups are being trained, it is important to mix genders and ages. Young people are more active, but older people can keep budgets and encourage the young people as they themselves keep accounts. Empowering of youths through training is hence a vital component.

4.5.5 Use of Existing Structures to Empower Farmers

Since there are many existing structures and farmers are already involved in different types of crop processing and marketing is it possible to empower farmers to engage in processing of indigenous vegetables and other crops.

4.5.6 Strengthening RE4Food Partnerships

Participants noted the need for all stakeholders at the workshop to avail themselves to contribute to the project. They noted the need to partner with other organizations and to use these and other existing partnerships as leverage for accessing existing structures. They identified the need to bring in other critical stakeholders to enhance the quality of project activities, including: Ministry of Devolution, KEBS, Techno Serve, Farm Concern, Ministry of Industry, Ministry of Gender, Sola Yetu and Span Technical Enterprises Kenya.

Stakeholders also urged RE4Food to consider eliciting the participation of middlemen since they play a critical role in getting crops to the market and the farmers need them. Although farmers also market their own products in some cases the only outlet to the market is middlemen – the situation is often such that farmers specialize on production while middlemen are agents linking them to distant markets.

5. Way Forward

The following were proposed as the way forward for the project:

i) Formation of a stakeholder taskforce that can assist in developing more ideas and marketing of RE4Food.
ii) Collection of RE4Food baseline information with particular focus on the list of prioritized crops, establishment of the network and refining of the list of prioritized crops; promoting of renewable energy for processing as a cheaper and environmentally friendly alternative. A quality baseline will also ensure that RE4Food data and information is authenticated with reality on the ground.
iii) Mapping out technologies, how and by whom they are used and addressing crosscutting issues such as gender and vetting of suppliers and other vendors.
iv) Identification and/or development of efficient and affordable renewable energy technologies and coming up with good equipment that can help us to do value addition and commercialize.
v) Identification of market linkages, and learning from those who are already involved in similar activities – for example Farm Concern is already effectively involved in markets and linkages.
vi) Eliciting support from the government in areas such as power generation and distribution, irrigation for all year round production, training on post-harvest technologies, economic analysis for best pricing.
vii) Capacity building of farmers, e.g., in areas such as what to produce (based on demand) for fresh consumption and for processing. The process of capacity building can begin by

eliciting participation of community groups, starting with groups that are already formed and which are active and have been working together – such groups pick ideas and activities very quickly and know what they want to do. However, there is need to train farmers on what to produce based on demand. Capacity building will ensure that farmers' produce can be sold anywhere in the world, hence the need for partnering with agencies such as KEBS.

viii) Identification of financiers - this is a gap that needs to be addressed. Financial inclusiveness is very critical and we need to continue working together.

6. Closing Remarks

Prof. Kanali said: "We are humbled that so many of you came today. We got support to implement RE4Food after undergoing a rigorous vetting process. We did EOI and were one of the 400 groups that responded. Out of these groups 80 were selected for interviewing. After three days 40 proposals were submitted. After this we had to prove the project is worth supporting; proposals from Newcastle, Ghana, Sierra Leone and Kenya received support - our proposal was one of the ones sponsored and we appreciate and are happy that we can bring people together like this. This workshop has demonstrated that there is a lot we can do together and this creates synergy. We thank you for the collaboration and we will continue to consult you in the process of project implementation. Thank you."

Thanking the workshop organizers on behalf participants, Ms. Karoki said: "Quite a lot has been said but since you must deliver, you need to prioritize. We also learned some tips on how to bring together all the stakeholders. Thank you for this opportunity and we look forward to project activities and to continue partnering with you all."

Prof. Shitanda said: "We appreciate your participation. Attendance was eighty five percent which is very impressive. As we implement RE4Food project let us look out for what will brings a difference. The battles we have are not just technical but there are other unknown factors. Let us have a wide scope in spiritual, social and economic aspects. I trust this group will lead us into a project with an impact to utilise the few technologies we have for the benefit our people. We thank you all and wish you all the very best."