1.3 Action Plan for the Solar Dryer Technology

1.3.1 General Description of Solar Dryer Technology

Direct solar drying has traditionally been used for processing and preserving cereals, legumes, vegetable, fruits and other products by laying products out in the sun to dry.

In many countries of the world, the use of solar thermal systems in the agricultural area to conserve cereals, legumes, vegetables, fruits, coffee, tea leaves and other crops has shown to be a practical, economical and acceptable approach environmentally. Solar heating systems to dry foods and other crops can improve the quality of the product, while reducing waste and use of traditional fuels; thus improving the quality of life.

In Kenya the National Cereals and Produce Board is responsible for drying cereals especially wheat, rice, maize and beans. The main source of energy used is diesel.

In the tea estates of Kericho, one company has installed machines that use solar energy to wither the tea leaves as part of the processing. Personal communication with the Kenya Cleaner Production Centre in 2012 revealed that adoption of this technology has been able to reduce the costs of energy by 50%.

There are different categories of solar dryer systems according to the intended use of each type of system. Individual family units are those systems designed to dehydrate small quantities of units, vegetables or herbs for purpose of extending the availability of those products at the family level.

Medium scale systems are meant to meet the need of individual and groups, cooperatives or associations to supply a greater quantity of product to reach more markets. Large scale commercial applications require greater capitalization, and are designed to dry very large quantities of product for village cooperatives as well as large commercial farming operations.

So far in Kenya some of the examples which use solar dryer include:

i) Network for Ecofarming in Africa, Kenya Chapter. NECOFA Kenya necofakenya.wordpress.com/tag/solar-dryer
ii) FARM-Africa MATF Maendeleo Agricultural Technology Fund matf maendeleo-atf.org
iii) Solar Drying Technology www.scode.co.ke
iv) Muranga farmers preserve fresh produce with Solar Dryer farmbizafrica.com

Characteristics

The solar dryer technology entails conversion of light to heat which then is trapped and absorbs moisture from the product and thus making it dry. This prevents especially food from decay and spoilage.

Economic Benefits

- Although it has not been calculated the running cost will be low compared to use of fossil fuel and electricity
- Employment creation and earnings to the community
- Improved food security as a result of reduced post harvest loss

Environmental Benefits

- Quality and hygiene ensured as opposed to drying cereals on tarmac roads
- Reduced GHG emission
- No air-pollution hence good health

If solar dryers replace the use of fuel wood, fossil fuel and thermal electricity, there would result in reduced GHG emissions. However there is lack of baseline data on the levels of GHG emissions.

Social Benefits

- Improved health conditions of the workers and farmers
- Improved nutritional conditions

1.3.2 Targets for Technology transfer and Diffusion

The targets for solar dryer technology include small scale family units (50,000) and commercial farmers and companies (1000), cooperative societies and associations (100), vegetable processers and tea factories (65). It is estimated that the number of commercial farmers and family units using this technology will double (i.e. 2000 and 100,000 respectively by 2030). All the 65 tea factories will also be using solar dryer technology by 2030.

1.3.3 Identification of Barriers for Solar dryer technology

The process of barrier identification was based on:

- Consultant's own knowledge
- Adesk study and literature review
- Stakeholder workshops and individual consultations (see Annex 2)
- Guidance from the TNA Guidebook series: Overcoming Barriers to the Transfer and Diffusion of Climate Technologies
- Logical problem analysis tool (problem tree)
- Market chain actors and links

1.3.3.1 Economic and Financial Barriers

i) Cost of the Systems (High Up-front Cost).

This is the central barrier to transfer and diffusion of solar dryers technology. The costs of the different categories of the Solar Dryers range from $50 to $1,500. This amount may not be readily available to the ordinary farmer in the rural area. The farmer in the rural area has limited access to financial institutions and to credits.

ii) High Interest Rates

Local banks charge between 15% and 30% interest rates for those who take loans. Borrowers need collateral before they can get loans. The interest rates are a disincentive to those willing to borrow money from banks to buy solar dryers since they cannot afford loan repayments.

1.3.3.2 Non-Financial Barriers

i) Inadequate Skilled personnel

There are no skilled personnel to install and operate the technology. The farmers are largely not familiar with the technology and cannot therefore readily use it.

ii) Inadequate Awareness

Generally there is an absence of good information about solar dryer technology despite the fact that solar food processing is most needed in the country. The farmers do not have information on the product, benefits, costs, financing sources and market potential. The civil societies should be encouraged to popularize this technology.

iii) Inadequate Policy, Legal and Regulatory Framework

The Government has not shown commitment in promoting Solar Dryers by formulating the necessary policies and legislations especially in the Agricultural Sector with a view to ensure food security.

1.3.4 Action Plan for Solar Dryer System

1. 3.4.1 Proposal for Enabling Framework

i) Revision of the Energy Act 2006 to focus on solar energy particularly solar dryer.
ii) Implementation of the National Climate Change Response Strategy.
iii) Ensure the Green Energy Fund is established and operationalised.

1.3.4.2 Measures

- Setting up of local assembling industries for solar dryer parts and components and enhancing R& D for Solar Dryer
- Land funds to viable renewable energy projects on concessional rates under the future Green Energy Fund facility
- Conduct adequate information and awareness campaigns through print and electronic media Establish critical mass of locally trained personnel
- Formulate enabling Policy, Legal and regulatory framework for solar dryer technology

Table 1.5: The proposed Action Plan for Solar Dryers

Measure	Why the Measure	Main Actors	Time-frame	Cost (US Dollar)	Indicators	Risks
Public Awareness Campaigns	Educate and sensitize farmers and others in the industry	Media; civil society ;Departments of Agriculture and Information	5-10 years	2,400,000	Knowledgeable farmers	Farmers will accept to be sensitized
Training of manpower	To enable farmers and technicians use the technology	Ministry of Agriculture; private sector and civil society	5-10 years	14,880,000	Trained manpower	Willingness of the people to be trained
Provision of financial incentives to enable farmers access credit	To enable poor farmers access credit	Cooperative societies County Budget	5-10 years	9,600,000	Availability of credit from County Budgets Banks Cooperative Societies	Cooperative societies and banks will be ready to give credit
Marketing Campaigns	To provide markets to the farmers	Farmers, cooperative societies, private sector and civil societies	5-10 years	2,400,000	Markets established and used	Farmers will use the markets
Review of Policy Legal and Regulatory Instruments	To guide and regulate the use of solar dryers	Attorney General farmers civil society	1-2 years	50,000	Revised policy laws and regulations Guidelines	Goodwill from the Government
Research and Development	To get requisite data and information	Research institutions academia farmers	1-2 years	50,000	Reliable data and information in place	Willingness and ability to undertake research