

### 3. Target Group for the Solar Dryer and Investment Possibilities

The existing types of solar dryers can be utilised by different target groups:

a. Community organisation:

This group of end-users are usually small scale farmers, who are organised by an NGO or church organisation. They will only be able to invest in a low cost dryer, which is also ideal for their purpose to process their limited harvest for further selling.

b. CO-operative:

This organisation consist usually of many farmers, and often well established farmers, generating a good income from their harvest. Co-operative can also represent a small network representing small scale farmers, as the case of Uganda, where the Gukwatamanzi Farmer Association are a member of co-operative in Kampala. Co-operatives represent the farmers, and are able to support them, with loan to certain activities. Co-operatives are able to invest in PV-powered solar dryer.

Other co-operatives, like the timber dealers co-operatives, are also interested and keen to invest in the dryer technology, if the technology is available and at affordable prices. The timber drying has the following advantages:

- Increase the sales prices
- Minimise the wasted quantity

In Uganda there is a big demand for the timber products, which is used for furniture, buildings, etc. The dealers are not able to store timber for long time, due to their limited capacity and the big demand. Therefore, they need a quick drying. The medium size solar dryer for timber drying (the Barbados type), is the most convenient for their purpose.

c. Private farmer:

This group is the well organised farmers, whom are often processing coffee, tobaccos maize and other crops. Often they are using the old fashion techniques or using the hot air drying technology, which is AC powered technology or firewood fuel, and both are a costly process. To reduce the operation costs and save energy and fuel, the investment in the solar drying technology is the most reliable for this purpose.

#### 3.1 The Availability of Solar Dryer Technology

Often new developed solar drying technology has never introduced to the rural area. For this reason, the farmers keep on, using the old traditional ways<sup>1</sup>.

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<sup>1</sup> the earlier described methods, open air and firewood drying, page 16

### 3.1.1 The Idea behind the Technology Transfer

The idea behind the technology transfer is to introduce already tested and approved techniques to an area. Transferred solar drying technologies should be:

- Simple and flexible
- Benefits must be obvious and immediate, must be responsive to multiple constraints, cost should be low, should be scale neutral and compatible with social norms and traditions.
- Adoptable and could contribute to the improvement of the regions welfare

### 3.2. Production of the Solar Dryers

The ARRED approach offers rural energy entrepreneurs a combination of enterprise development “Hand-holding” and a start-up support.

Entrepreneurs wanting to start a new business venture have to be provided with general information on the legal, accounting and other requirements for starting a business, through brochures, workshops and seminars. In addition, the specific coaching is provided at a cost to all potential entrepreneurs. Therefore, it is important for AREED to identify, consider and select among the followings three types of producers.

#### 3.2.1. One Man Production Unit

This type of production is well known and common in Africa, especially in rural areas. It is often a tradition, that every body has the obligation to create his own job, because of the limited job opportunities in the area. Another category, the highly educated person, who has an ambition and willingness to develop and produce a new techniques, that are seen needed at the region.

A one-man production unit is the most suitable to produce the low cost solar dryer. The commercialisation of this production unit does not require a big investment, which can be an advantage when starting a business and evaluating the business health. By supporting this type, the risks are very limited, due the limited investment.

It is recommended, that one-man production unit is to be established near the end-users (the rural farmers), to provide the required assistance during the implementation and the introduction phase. The innovative business summary of the One-man production unit is an efficient tool to be used for the evaluation of the impact of a new introduced technology to the users.

<b>Innovative Business summary – One-Man Production Unit</b>		
<b>Output</b>	<b>Area of focus</b>	
	<i>Processing technology</i>	<i>Dried agricultural products</i>
1. Relevant objectives	Demonstrate the technology at the farmers locality Attract a number of farmers, within a radius of 15 Km. Assist the farmers to apply the dryers	An improved quality of dried product Increased possibility to store, transport and to marketed the dried product Increased possibility to process of

		various agricultural products available in the area
2. How innovative	Getting small scale farmers in region into viable self help groups (SHG), and addressing them on how to support each other to get the best use of the technology – the creation of new jobs by making of the harvest, increase the income	Attempt to give the farmers more leverage in dealing with exporters, the marketing and the price negotiation is the key for the success. Convince the farmers that the investment and utilisation of the dryer will give profit There is demand for the processed product
3. Performance indicators	The Low Cost Dryer will contribute to improve the wealth Investments is too small compared to the profits The farmers can easily maintain the dryers	farmers are able to generate income from the whole harvest the processed product can be sold any time anywhere
4. Success of relevant interventions <sup>2</sup>	The dryer has given the freedom to the farmers to make use of all harvest The producer may employ more people to demonstrate and maintain the dryer	Can be evaluated The farmers has the freedom to decide the price, compared to before where they are forced to sell because of the lifetime of the product The agricultural production attract more people increased employment and benefit
5. New opportunity	The improvement and further development of the dryer according to the need and demand	Increased production

*Table 5. Business summary*

### **3.2.2. Production by Order**

This production model is usually situated in urban area, where the security for energy supply and qualified manpower is available. This type of production is the most secure model, as there is no risk investment. That means the investment and production is made according to the orders. The manpower is employed only during the production of the received order. But, it has various disadvantages:

- It force the production company to invest in selling agents or representatives to introduce the product and convince the rural about the suitability and the advantages by using the dryers
- It can be an impossible task, because the farmers will not invest in dryer, unless they are sure about the benefits.
- The qualified manpower will not be available always

This model is suitable and applicable for the production of big size solar dryers, that are customer set/designed<sup>3</sup>. It is a bit risky to produce expensive equipment without having the buyer.

<sup>2</sup> This part should be evaluated during the running of the project

<sup>3</sup> A group of farmers order a dryer, that should be developed according to their need and requirement

### 3.2.3. Series Production and Wholesale

In this case, the entrepreneur tend to pick up a technology idea, that is perceived to be the most suitable to make a break through in a district or country. The desire to form a venture business to commercialise the solar dryer technology, have to be made after the stage of doing a market study. This type of business must have entry point to the market – a secured demand for the dryer by the end users. Presently the market is there, but the end users have to be sensitised and convinced, that solar drying is the proper technology to (1) generate income, (2) combat unemployment, (3) create a food security.

For the commercialisation of the dryers, the producer have to choose the commercialising agent, who most likely can secure the greatest impact on the national economy and international competitiveness. Using the AREED investment and business model, it will be much easier and efficient to introduce the dryer, because the farmers have already an established credit scheme.

### 3.2.4. The Applicable Production Method of the Dryer:

		A	One production Unit	B	Production by Order	C	Series /whole sale production	Comments
1	Low Cost solar dryer		✘		✘		✘	C- requires a good simple technology, not a sophisticated technology
2	Electrical dryer AC powered		✘		✘			
3	Electrical dryer DC powered		✘		✘			

Table. 6. Possible production methods

### 3.3. Solar Dryers Local Environment Impacts:

Utilisation of the solar dryer has the following environment impact, which is depending of the present and the earlier applied drying techniques:

- Reduce the pollution
- Reduce the consumption of biomass fuel
- Reduce the consumption of imported fuel

#### 3.3.1 The Solar Dryer Technology Can Make a Difference

Taking into account the severe climatic conditions, soil, and others natural constraints of African regions, food self-sufficiency and food security for all, could be achievable through the application of processing technology and scientific arrangement. Introducing adoptable processing technologies, will contribute to increasing the production of cash crops, such as coffee, tobaccos, etc.

Utilisation of the solar dryers has the following major advantages:

- Accelerate and ease the drying
- Improve the quality of the output
- Create food security

### 3.4. Solar Dryer Economic Impact

### **3.4. 1. Income Generation**

Uganda is very fertile country, and the majority of the rural farmers are producing high quantity of food crops, such as tomatoes, pineapple, pepper, mangoes, bananas<sup>4</sup>. Big quantity of this good quality food crops, produced in rural areas, were not utilised, consumed or sold, in stead left to rotten.

The availability of industry promoters, who can convert this wasted quantity to income generation activities, will have the following impacts:

- Secured income to the rural farmers
- Better distribution of the produced quantity of food crops to the different part of the country
- Insure the utilisation of the whole quantity of the produced food crops

### **3.4.2. Job Creation**

The relevance of the processing technologies to the end-user's needs is an important determining factor of adoption. The new technologies that will address the real problems, and cerate jobs, are usually well received the end-users. Compatibility of the new technology with the existing public and the private infrastructure, culture and supporting institutions reduces the possibility of bottlenecks in implementation and hence it increases the potential of adoption. The rural areas are still home to the poorest and unemployed people. The most effective policy is the commercialisation and promotion of technologies, that will break the top of the unemployment. The creation of jobs will have the following impact:

- Increased production
- Established healthy society
- Improved wealth among the rural population

The creation of jobs is ensured by the collection of the food crops for the processing centre<sup>5</sup>, that will have increased demand for manpower for quality control and packaging of the products for remote markets.

### **3.4.3. Possibility of Food Storage**

Conservation of food is well known technique in many African countries, especially the northern part of Africa. Tomatoes, papers, onions, fruits (such as figs, and apricots), fish and meat is often dried and conserved to be used during the winter period. This practise is still used in rural areas, due their limited access to freezing facilities, which also require energy.

Investment in the commercialisation of solar drying techniques, will not only create jobs and generate income, it will further solve the problems of the food conservation.

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<sup>4</sup> Apart from the green banana. Which is consumed for own consumption, as Matoke, which is the well known Ugandan national dish

<sup>5</sup> as the case of Uganda, where the mangoes can be collected and processed – see the case study