

Online Catalogue:

LOCAL SUSTAINABLE SOLUTIONS IN EAST AFRICA – Solar Heat & Others

www.localsolutions.inforse.org

Collection of Successful Cases of Sustainable Energy and Climate Solutions in Kenya, Uganda, and Tanzania.

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ESFRITA Solar Dryer





Why to choose this solution?

Fresh fruits are highly perishable and bulky commodities because they contain high moisture. Solar drying of fruits and vegetables enhance the shelf life of fruits and vegetables.

Savings per day or production:

"Drying of crop produces to a form which has a longer shelf life and adding value to the original fruit helps the farmer not only to overcome the spoilage and losses, but also fetches good price due to the newly added value and to achieve the multiple benefits of crop drying."

Cost in money and in own time to construct:

"The solar dryer of 2.5m height and 1.5m width cost Tsh 1,700,000/= (UDS 737)"

Lifetime:

It has been used for more than 5 years without any repair.

Maintenance needed:

"After 5 years, repair of plastic nylon is needed."

Resources needed in use:

Just good solar radiation

Problems and limits:

"During rainy season, the product cannot be dried quickly"

Where and how can you get it or make it?

It is available at ESFRITA Group in Moshi Kilimanjaro- Tanzania and other parts of Tanzania

Skills needed to produce, install. maintenance, use:

" Repair and fabrication of the solar dryer requires short training

How to use it:

" https://youtu.be/PRq2R81cA0E

How to maintain it:

" https://youtu.be/PRq2R81cA0E

Climate effect (if any):

Solar energy which is the input required for drying crops in the dryer is a renewable energy thus no GHG emissions.

Why is it successful?

It is easy to use the technology and it has potential for income generation. Solar drying systems have low operation and maintenance costs. Also, with changing lifestyles and growing preference for ready to cook food

items, there is immense potential in this line of business.

If you can make it, a short description, typical problems, materials needed:

Need a qualifies technician for repairing.

How to make it (if possible):

N/A

How is it delivered and by whom?

Awareness raising on use of solar drier produces. Packing of produce in different quantities including 1kg for selling

Successful financial model

The initial cost for solar dryer was sorted out through Bank credit. Operational cost are covered from selling of dried solar products

What policies and strategies helped the success?

The leaders of the councillors in Tanzania help us by seminars, education and study tour in a different place in the Region.

More info:

esterina@yahoo.com, +255 755 869146

Sources:

ESFRITA Group

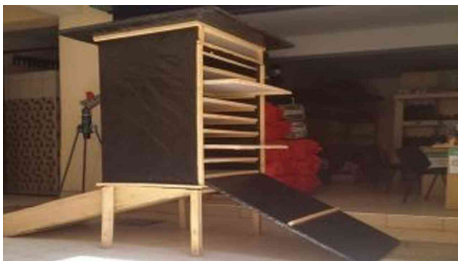
Case uploaded:

2022-05-02

Grekkon Limited Solar Dryer







Why to choose this solution?

These ventilated but enclosed dryers use solar energy to dry fruits, vegetables, significantly faster than would be possible drying produce unprotected and subject to the weather in the open air. A batch, which might take seven days to dry in the open air, would dry cleanly in just two days with a dryer. The sun UV rays do not reach the drying food, so its color, taste, scent, and nutritional value are unaffected. For all of these reasons, solar-dried foods are better for the health of the family. These solar drying systems are an effective means of food preservation, a good value to preserve highly perishable, nutritious foods.

Savings per day or production:

(1) Loss of quantity of food during drying is greatly reduced due to the owner ability to control the process. (2) Nutrition delivered per unit of dried food produced is greater. (3) Likelihood of illness from eating spoiled or contaminated food that was dried in these solar dryers is very low compared with that associated with open-air drying. (4) They reduce the drying period. For instance, a solar dryer will take two days to dry a batch if drying in the open takes seven days. (5) By stacking the layers of food and by excluding many undesirable factors that must be monitored in open-air drying, these dryers reduce the attention, time, and footprint required for the task, enabling owners to apply the saved time and space to other uses.

Cost in money and in own time to construct:

The price varies according to the design of the dryer. The smallest dryer is 3.4 cubic m in size and is priced at KSh 48,000 (USD 480), while a two-ton per session fruit dryer costs KSh 1,500,000 (USD 15,000). No owner time is required for construction or installation. Brief instruction is provided in the use and maintenance of the installed dryer.

Lifetime:

To be added.

Maintenance needed:

Cleaning the shelves and, occasionally, the enclosures as necessary to ensure free air circulation and to keep them contaminant-free.

Resources needed in use:

Placement that receives full sunlight, and that provides sufficient, empty open space around the enclosure to allow good air circulation within the dryer. Utilizes sunshine to heat up air that dries enclosed food products (including drying fruits, vegetables, meat, and cereals).

Problems and limits:

The dryers are expensive; hence, few farmers can afford them. Cloudy or rainy days may slow the process somewhat due to reduced input of sunlight.

Where and how can you get it or make it?

Solar dryers by Grekkon Limited are available from stores in Nairobi, Eldoret, Kisumu and Nyeri. They also

offer online shopping which is a convenient and fulfilling experience with easy and quick delivery.

Skills needed to produce, install. maintenance, use:

Construction and installation is done by skilled personnel from Grekkon Limited on site according to the food material and volume to be dried per drying session. Use and maintenance require only a short introduction.

How to use it:

To be added.

How to maintain it:

Not relevant.

Climate effect (if any):

They are environment-friendly, energy-conserving, and nearly four times as fast as open-air drying.

Why is it successful?

Once installed, these solar dryers need only sunlight and space slightly greater than their own footprints to produce more dried foods that deliver greater nutrition with less risk of contamination, all much more quickly and with less oversight than can be achieved with open-air drying.

If you can make it, a short description, typical problems, materials needed:

The dryers are constructed from food-grade materials from their structural systems to their covers. This is achieved by the use of UV-resistant cover and floor material, with food-grade zinc or aluminum galvanized structures. Dryers designs vary according to crop and desired quality output.

How to make it (if possible):

To be added.

How is it delivered and by whom?

Solar dryers by Grekkon Limited are available from stores in Nairobi, Eldoret, Kisumu, and Nyeri. They also offer online shopping which is a convenient and fulfilling experience with easy and quick delivery. The technical and agronomy teams of Grekkon Limited will design the dryer according to the crop and desired quality output. They will also offer support and can advise farmers on crop value addition.

Successful financial model

To be added.

What policies and strategies helped the success?

To be added .

More info:

https://grekkon.com/solar-dryers/

Sources:

Grekkon Limited Amrash Business Park, Utawala. +254 715 157 132 | +254 777 157 132 E: info@grekkon.com

Case uploaded:

2021-02-22

JEEP Solar Dryer





Why to choose this solution?

In comparison to the traditional ways of drying outside on open field, solar dryers prevent contamination and loss of produce from air pollution, rain, and dew, as well as from dust, molds, bacteria, insects, rodents, birds, and other pests, thereby ensuring quality. They allow small-scale farmers to overcome some post harvest losses by transforming their produce into storable and tradeable goods, which they can sell off-season at higher prices.

Savings per day or production:

The dryer can dry up to 500 kgs when built for home use, which is about 1000 shillings per kg, varying on the material in the dryer.

Cost in money and in own time to construct:

It costs about USh 200,000 (approximately USD 55) to construct for home and even less depending on the materials used. It can be constructed within 24 hours.

Lifetime:

It can stay to up to 5 years depending on the materials used during construction.

Maintenance needed:

Regular cleaning of glass material or polyethylene film; fixing polyethylene if torn.

Resources needed in use:

Drying trays.

Problems and limits:

It can be eaten by termites if not treated thoroughly during manufacturing. Cloudy or rainy days may slow the process somewhat due to reduced input of sunlight.

Where and how can you get it or make it?

The solar dryers are sold at JEEP offices in Kyanja and online shopping platforms.

Skills needed to produce, install. maintenance, use:

Installation requires trained technical personnel. There are no specific skills required to maintain or use the solar dryer. All you need is to be careful while handling it and always keep it clean.

How to use it:

Not relevant.

How to maintain it:

Not relevant.

Climate effect (if any):

This solution uses sunlight as a source of heat generation, reducing the use of biomass as a source of heat generation. The greenhouse-gas emissions of the food-drying process are cut by 90%. Solar food dryers also reduce the loss of trees to firewood as well as time spent harvesting it.

Why is it successful?

JEEP promotes use of renewable energy solutions for cooking. It has promoted this solution and has marketed it all over the country. JEEP conducts training programs. It also encourages youth to be creative and to start producing these boxes as a green enterprise, with a goal of and making the solution cheaper and available to people in all kinds of financial situations. Support from development partners has also contributed to the success of the solution, along with government policies encouraging solar use.

If you can make it, a short description, typical problems, materials needed:

Installation requires trained technical personnel. Materials needed include wood, nails, a board, and paint, as well as either a glass pane or transparent polyethylene sheet.

How to make it (if possible):

Not relevant.

How is it delivered and by whom?

Successful financial model

JEEP sells the solar dryer at a fair price plus it trains people on how to make them locally.

What policies and strategies helped the success?

The government offers tax exemptions on solar installations.

More info:

contact info@jeepfolkecenter.org

Sources:

JEEP folkecenter. JEEP, 7 Miles, Gayaza Rd, Kyanja, Kampala, P. O. Box 4264, Uganda. Tel: +256 414 578 316. Email: info@jeepfolkecenter.org https://jeepfolkecenter.org/

Case uploaded:

2021-03-12

Kawanda Solar Dryer





Why to choose this solution?

Preservation of agricultural produce is one of the central problems faced by small-scale farmers in Tanzania. Most frequently, horticultural crops in the markets spoil; some also remain unharvested, left in the fields due to inadequate market. Poor infrastructure also increases time to get crops to markets and often results in crops being damaged. At the end of the growing season, the supply of produce diminishes until the next harvest. Solar dryers allow small-scale farmers to transform their harvests into storable, tradable goods, which they can sell off-season at higher prices.

Savings per day or production:

Avoids loss and wastage of crops, particularly of vegetables and fruits. The Kawanda solar dryer can reduce wastage of a harvest surplus, allow storage for food shortages, and in some cases facilitate export to high-value markets.

Cost in money and in own time to construct:

Investment costs of solar dryers vary highly depending on the size of the solar dryer. Construction costs for a solar dryer of 4-12 trays range from 1.3 to 4 million Tanzanian Shillings, equivalent to US$ 565 to 1,740. The payback period for such dryers ranges from 2 to 4 years depending on the rate of utilization. Roughly two to five days are needed to construct a Kawanda solar dryer of 12 trays, using wooden materials.

Lifetime:

Usable for 8-10 years, unless â€˜Visqueneâ€™ polyethylene plastic is punctured with sharp edges or damaged by sun after some time.

Maintenance needed:

Replacement of â€œVisqueneâ€• polyethylene plastic whenever it is damaged.

Resources needed in use:

Raw materials such as fresh vegetables, fresh fruits, etc can be dried. Materials should be well cleaned and chopped before being dried. Otherwise, it just requires full sunlight and good air circulation.

Problems and limits:

Cloudy or rainy days may slow the process somewhat due to reduced input of sunlight, unless the system is integrated with a conventional energy-based system. Many people are still unfamiliar with solar-dried products, which makes market promotion important.

Where and how can you get it or make it?

In Tanzania, TaTEDO and other stakeholders have trained more than 50 local carpenters to construct and to maintain the solar dryer as well as to use the dryer and dried products.

Skills needed to produce, install. maintenance, use:

Short training needed on how to construct and maintain the solar dryer. Users of solar dryers need a short

introduction on how to use it.

How to use it:

https://www.youtube.com/watch?v=Un-1X4vu_YY

How to maintain it:

Keep shelves and enclosure clean, monitor for termites, repair torn film or broken glass.

Climate effect (if any):

The energy input needed in a solar dryer is less than what is needed for freezing or canning. Solar drying prevents food from decaying and spoiling, which would have resulted in methane release to the atmosphere.

Why is it successful?

Support services provided to entrepreneurs, including capacity-building through training and awareness, have contributed to the success. Presence of the Tanzanian Food Processors Association (TAFOPA) that has the objective to promote the development of womenâ€™s entrepreneurship in the food -processing sub- sector through the improvement of existing micro- enterprises managed by women, and to encourage new ventures with a potential to grow into small and medium enterprises.

If you can make it, a short description, typical problems, materials needed:

Materials used for construction include timber/ wood, â€œVisqueeneâ€• polyethylene plastic, mesh- covered drying trays to hold the produce, iron sheet for construction of chimney.

How to make it (if possible):

Short training is needed on how to make it.

How is it delivered and by whom?

Main actors of the solar dryer initiative include suppliers of agricultural produce, agro-processors, sales agents, development partners, and end users. Awareness-raising, product demonstrations, and market promotion of agro-processed foods through exhibitions, radio, newsletters, and other media have been used to popularize and to create demand for solar-dried products.

Successful financial model

In most cases, grants and loans have been used to cover initial investment costs. Operational and maintenance costs are covered from income generated through sales of the solar-dried products.

What policies and strategies helped the success?

Tanzania Horticultural Development Strategy 2012-2021, Agricultural Sector Development Strategy (ASDS), the Agricultural Sector Development Programme (ASDP).

More info:

A manual on how to use solar dryer is available at TaTEDO office, and can be accessed through request to TaTEDO.

Sources:

Address: MbeziJuu, Mpakani Road Goba House No GOB/KZD/883, P. O. Box 32794, Dar es Salaam, Tanzania. Tel: +255 738-201498, E-mail: energy@tatedo.or.tz, http://www.tatedo.or.tz

Case uploaded:

2020-08-11

Semi-industrial Solar Dryer





Why to choose this solution?

Solar dryers prevent destruction of agricultural produce from rain, wind, contamination, dust, insects, etc. and thereby ensure a better quality of produce. It allows small-scale farmers to improve storage conditions and reduces after-harvest losses. The higher quality increases the value of dried products, which may justify higher market prices.

Savings per day or production:

The dryer needs nothing more than solar radiation. The solar dryer can improve food security by allowing longer storage of food after drying compared to food that has not been dried.

Cost in money and in own time to construct:

The initial cost to acquire the semi-industrial solar dryer is high. The total cost of the materials amount to Tsh. 10 millions. A well-managed solar-drying business, however, can realize a payback period of 6-12 months.

Lifetime:

Depending on handling, the dryerâ€™s ultraviolet (UV) resistant plastic (Visqueen) could last for more than two years before changing it. The frame could last longer, especially if treated with anti-corrosion materials.

Maintenance needed:

After some time, it requires replacement of Visqueen papers, plus anti-corrosion material for treating frames.

Resources needed in use:

Solar radiation.

Problems and limits:

Not workable at night, efficiency decreases to a large extent on cloudy days, overheating may occur if regular attention is not paid.

Where and how can you get it or make it?

It is available in Tanzania. SESCOM is involved in construction and marketing. Skills needed to produce, install. maintenance, use.

Skills needed to produce, install. maintenance, use:

Training is needed on how to construct, maintain and use.

How to use it:

How to maintain it:

Climate effect (if any):

Drying food reduces its volume; thus, the amount of fuel which would have been required for transportation is reduced. CO2 emissions decrease as well: if solar drying replaces drying by electricity or fossil fuel, it reduces CO2 emissions.

Why is it successful?

It succeeds due to its potential to increase the ambient air temperature to a considerably high value for faster drying of agricultural crops.

If you can make it, a short description, typical problems, materials needed:

Some of the material needed includes galvanized sheet 2 mm, Visqueen sheet, green plastic wire mesh, square pipe, angle section, etc.

How to make it (if possible):

How is it delivered and by whom?

The main actors include the suppliers of construction materials, constructors such as SESCOM, a Small Industry Development Organization (SIDO), NGOs involved in awareness- raising and capacity-building such as TaTEDO, development partners with interest in supporting the initiatives, such as USAID, research institutions such as Sokoine University of Agriculture that are involved in technology improvement and research, and the Ministry of Agriculture and Cooperatives.

Successful financial model

Local capacity-building is one of the aspects that contributed to successful dissemination of semi-industrial solar dryers.

What policies and strategies helped the success?

Tanzania Horticultural Development Strategy 2012- 2021, Agricultural Sector Development Strategy (ASDS), the Agricultural Sector Development Programme (ASDP).

More info:

SESCOM, Tanzania https://sescom.co.tz/. TaTEDO, Tanzania: https://www.tatedo.co.tz/

Sources:

Case uploaded:

2021-06-10

Direct Solar Water Heater





Why to choose this solution?

Installing a solar Water Heater ensures hot water throughout the year, since the system works all year round.

Savings per day or production:

Sunlight is free, so once you have paid the initial installation cost, your hot water costs will be reduced leading to a reduced energy bill.

Cost in money and in own time to construct:

Some systems go for as low as KSh. 60,000 (USD 600). But something will always be faulty leading to eventually having to replace one part of the system or the other. A quality system costs an average of KSh.130,000 (USD 1300).

Lifetime:

The average life expectancy of certified solar water heating systems is 20 years.

Maintenance needed:

Periodic maintenance of solar water heaters is necessary every 3 to 5 years. Check for any kind of leakage in the pipes, tank, panels, etc., as leakage is very common in these areas. Also, you need to check for loose wire connections and wires. Ensure that the panels are kept dust-free.

Resources needed in use:

The solar thermal collectors convert the sunlight to heat energy. The heat transfer fluids (typically water) carry the heat from the solar collectors to water storage tanks. Heat exchangers transfer the heat from the transfer fluid to the home water supply. Storage tanks store hot water when it is not in use.

Problems and limits:

Solar thermal collector panels heat the water compared to solar PV panels, which produces electricity. The thermal collector panels require sufficient roof space to accommodate them. Solar water heaters require direct sunlight to function. The system does not function on cloudy, rainy, or foggy days.

Where and how can you get it or make it?

Solar Water Heating Suppliers in Nairobi Kenya, such as a solar hot water system supplier in View Park Towers. Tel; 0798 372318.

Skills needed to produce, install. maintenance, use:

Installation, maintenance and repair of these solar water heating technologies requires training in Technical and Vocational Education and Training Institutions for solar water heating. Solar heating modules usually can be found in shops.

How to use it:

See video https://www.youtube.com/watch?v=XSMPKAOpdrU

How to maintain it:

See video https://www.youtube.com/watch?v=eNnORkjM1h0

Climate effect (if any):

Solar water systems are sustainable heating systems because they use renewable energy, thus contributing to the reduction of carbon dioxide emissions.

Why is it successful?

They are super efficient, because of their round shape, which allows them to capture sun rays from all angles and makes them more effective in situations of cloudy skies. This characteristic allows them also to heat up water at higher temperatures compared to flat panels.

If you can make it, a short description, typical problems, materials needed:

It cannot be made by users, but must be made by the manufacturers.

How to make it (if possible):

How is it delivered and by whom?

Successful financial model

What policies and strategies helped the success?

The solar water heating systems industry in Kenya possesses the expertise and equipment to provide the merchandise without which the deployment might be less effective. The current Kenya National Energy Policy- Sessional Paper No. 4 strengthens the licensing procedures for practitioners. The success is determined by the number of new connections.

More info:

LES engages activities under the guidance of its CSR Policy through Lean Foundation. Its purview includes solar heaters. https://leansolutions.co.ke/solar-water-heating/. Solar heating training manual: https://www.ke.undp.org/content/kenya/en/home/library/environment_energy/solar-heating-training-manual.html , http://www.kerea.org/renewables/solar-water-heating/ .

Sources:

Lean Energy Solutions (LES), Nairobi, Kenya. Tel: +254 727 597 853, E-mail: info@leansolutions.co.ke.

Case uploaded:

2021-02-23