



The Tanzanian Solar Oven Program

Never doubt that a small group of thoughtful, committed citizens can change the world; indeed it is the only thing that ever has.

– Margaret Meade (1901-1978)

A society grows when old men plant trees in whose shade they will never sit.

– Greek proverb

*Morogoro, Tanzania
16th-18th September, 2007*



W.O.S.O.T. 2007
Workshop on Solar Oven
Technologies for Educators,
Policy Makers and
Entrepreneurs

Morogoro, Tanzania
 16th-18th September, 2007



Workshop organizers

-  Shell Oil
-  Solar Circle
-  Sokoine University of Agriculture
-  Michigan State University:
Department of
Mechanical Engineering

Our commitment!

Never doubt that a small group of thoughtful, committed citizens can change the world; indeed it is the only thing that ever has.

Margaret Mead (1901-1978)

What is a solar oven?

A device that uses the sun's energy to cook food. The simplest form of solar oven is an insulated box with a transparent top that permits solar radiation to enter and heat the cavity. On a sunny day, a black baking tray or a black cooking pot can reach temperatures over 200°F.

This is a solar oven!



Cooking with a solar oven



The benefits of using solar ovens

1. *Superior health and human nutrition*
2. *Children are not as absent from school because of illnesses*
3. *Reduced child mortality*
4. *Less damage to the ecosystems*
5. *Reduced deforestation*
6. *Reduction in the physically demanding lifestyle*
7. *Improved adult health*
8. *Establishment of a new industry*
9. *Improved dignity and self-worth of people employed to make ovens*
10. *Increased export of manufactured goods*
11. *Establishment of secondary industries*

People helping people

The sole meaning of life is to serve humanity.

Leo Tolstoy
(1828 – 1910)

Solar energy is free!

- *Solar ovens easily harvest an abundant universally available source of free energy: sunshine!*
- *Moreover, they are easy to use.*

...solar ovens can help!

A woman's toil

- *Women walk an average of 90 minutes to reach a source of fire-wood, they harvest this natural fuel, and then they carry it home for 90 minutes.*
- *This is a major investment of time and energy each day.*
- *Excursions to gather fuel can cause injuries and expose women to unsafe surroundings.*

...solar ovens can help!

Seeking solutions

Usipopata taabu hujawa mtu. (Swahili)

Suffering is prior to attaining success or perfection. (English)

Smoke from the domestic cooking fire is dangerous to your health

Smoke from domestic wood fires cause upper respiratory diseases that are the second leading cause of death in Tanzania after AIDS.

...solar ovens can help!

Collecting firewood can be ecologically damaging

The relentless harvesting of wood for domestic cooking is responsible for the decimation of forests, soil erosion, and dramatic changes in ecosystems.

...solar ovens can help!

Reduce the number of cooking fires

If solar ovens are used to augment a family's cooking practices, this permits the consumption of firewood to be reduced by more than 50 percent

...solar ovens can help!

Tenacity!

Where there's a will, there's a way!

Anonymous

Average distribution of fires during 24 Hours



Nutrition and harvesting wood

- *Families are often malnourished because protein-based foods are not consumed because they require large amounts of wood to cook them on a fire.*
- *Prospecting for, and harvesting wood fuel, takes considerable time and energy.*

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Health and schooling

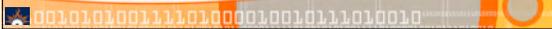
- *Malnourished children are in poor health and they are often unable to attend school regularly.*
- *Consequently they do not receive a high quality education. Their future is compromised.*

...solar ovens can help!

Reducing a family's fuel expenses

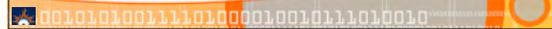
- *Studies have shown that the poorest families typically spend one-quarter of their income on cooking fuels ...paraffin, gas and charcoal.*
- *Money saved by harvesting sunshine can be used beneficially for education, food, healthcare etc.*

...solar ovens can help!



Variety of Solar Oven designs

- *Some ovens displayed at the workshop are designed for mass-production using sophisticated machinery.*
- *Other ovens are designed for manufacture using labor-intensive methods involving hand tools and with minimal capital investment.*



A new industry!

- *The basis now exists for establishing a new industry in Tanzania that manufactures solar ovens fabricated from indigenous materials.*
- *People would be gainfully employed and the product could be exported.*

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The Government's vision

The Government recognises the need for a robust high growth to fight the nation-wide poverty. Higher and sustained growth is necessary. While growth is necessary, it is important that it is broad-based and centred on improving the livelihoods of the poor.

National website
<http://www.tanzania.go.tz/profilef.html>

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Leadership with vision

Do not go where the path may lead, go instead where there is no path and leave a trail.

Ralph Emerson
(1803 - 1882)



Solar oven businesses

- *Manufacture of parts for solar ovens*
- *Assembly of parts to create ovens*
- *Sales and distribution of solar ovens*
- *Repair of solar ovens*
- *Refinement and enhancement of ovens*
- *Marketing solar ovens*
- *Management and finance of ovens*

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Other industries utilizing solar ovens

- *Community bakeries*
- *Commercial drying of grain*
- *Restaurants*
- *Commercial drying of sliced fruit for export*
- *Catering supplies*
- *Commercial drying of fish*
- *School kitchens*
- *Commercial drying of crops*

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The Government's vision

Spreading income-earning opportunities is a priority by making technical information available to small entrepreneurs in rural and urban Tanzania.

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Tanzanian manufactured products

Though manufacturing export has been in a declining trend, it earns the country a fifth of the total foreign exchange earnings to become a third important sector coming after agriculture and tourism.

National website
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Reducing the nation's bio-mass dependency

The bio-mass energy resource, which comprises fuel-wood and charcoal, accounts for 93 per cent of the total energy consumption.

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Reduced the nation's dependency on fossil fuels

The utilization of solar ovens for domestic cooking will reduce Tanzania's dependency on imported foreign oil

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We must collaborate

Mikono mingi kazi haba. (Swahili)

Many hands make light work. (English)

A Government vision

Upgrading the technical skills, attitudes, and productivity of the labour force through science and technology education and popularization is a priority.

National website
<http://www.tanzania.go.tz/profilef.html>

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Education and training

- *The dissemination, nationwide, of solar oven technologies would be accelerated if students in VETA classes are instructed to manufacture them as an end-of-semester assignment.*
- *Consequently, students learn their professional trade and also create a profound practical device for their families and their communities.*

...solar ovens can help!

Together we can make a difference

Ask not what your country can do for you - ask what you can do for your country.

U.S. President John F. Kennedy
(1917 – 1963)

We must create a better tomorrow

Necessity is the mother of invention.

Plato
Greek philosopher
427-347 BC

Access to pure drinking water

In the year 1999, only 45 percent of the rural Tanzanian population and 68 percent of the urban population had access to a clean safe water supply.

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Safe drinking water

- *Water-borne diseases are rampant because the water consumed by the Tanzanian population is often unsafe.*
- *Water can be pasteurized by heating in a solar oven prior to drinking.*

...solar ovens can help!

Each person can make a difference!

Sisimizi wawili hawashindwi kuvuta panzi mmoja. (Swahili)

Two ants do not fail to pull one grasshopper. (English)

Water-related illnesses

Existing data on the incidence of water-borne, water-related and water-washed diseases indicate that these are mostly prevalent where people use contaminated water or have little water for daily use. Such diseases account for over half of the diseases affecting the population and more than 80 percent of Tanzania's population living in rural areas.

National website
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...solar ovens can help!

Purifying water

If contaminated water is heated to 65 degrees Centigrade in a solar oven, then this will kill pathogens that cause diarrhea, subsequent dehydration, and frequent death in young children.

...solar ovens can help!

The cost of being very young...

- *Children under the age of five are particularly prone to water-borne diseases and a large percentage die.*
- *Purification of water by using solar ovens can dramatically reduce this statistic.*

...solar ovens can help!

Distribution of fires, August 12th, 2007: a potential export market for Tanzanian solar ovens



Solar Circle's role

- Solar Circle's *artisans manufacture 200 solar ovens each year in Masasi.*
- *In the year 2008, they would like to manufacture and distribute 1000 ovens.*

Solar Circle's role

- *Has funded an education program in the Masasi area through the Anglican Diocese "Mothers Union".*
- *Women educators have demonstrated solar cookers in numerous venues including the Masasi marketplace.*
- *The Benedictine Abbey at Ndanda has been funded to manufacture the ovens.*

Sokoine University of Agriculture

- *Sokoine University of Agriculture began as a agricultural college in 1964 and it evolved into a constituent faculty of the University of Dar-es-Salaam.*
- *It was elevated to university status in 1984.*
- *The university's four faculties, two colleges, two institutes and two centers are dedicated to advancing knowledge in agriculture, forestry, sustainable rural development, the environment, and veterinary medicine.*
- *The university's research motto is to encourage multi-disciplinary research for sustainable development and the alleviation of poverty.*

Michigan State University

- *150 faculty at this 46,000 student university specialize in African affairs*
- *In 2004-2005 more than half of MSU's extensive list of global research and development projects were in Africa.*
- *Graduate students at MSU produced more dissertations on Africa than any other U.S. university from 1988 to 2004.*

Shell Foundation

<http://www.shellfoundation.org/>

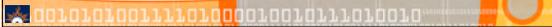
- *Shell Foundation's mission is to develop, scale-up and promote enterprise-based solutions to the challenges arising from the impact of energy and globalisation on poverty and the environment.*
- *Shell Foundation is dedicated to reducing the number of deaths caused by indoor air pollution.*

Shell Foundation



<http://www.shellfoundation.org/>

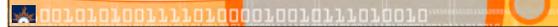
- *Aspire is the Shell Foundation's programme that helps under-served Small and Medium-sized Enterprises (SMEs) in Africa to fulfill their potential – and in turn create much-needed jobs and economic growth. Aspire provides US\$43 million to SMEs in Kenya, Uganda, Tanzania and Rwanda.*
- *In Europe, more than 50% of jobs are created by Small and Medium-sized Enterprises (SMEs). In most African countries, the figure is less than 10%.*



Our future...

*A nation grows when old men plant trees
in whose shade they will never sit.*

Greek proverb






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WOSOT2007

