PROMOTIONAL ACTIVITIES OF SOLAR COOKING IN COSTA RICA AND OTHER LATIN AMERICAN COUNTRIES- ITS NECESSARY BUT WITH PROPER ACTIONS.

SHYAM S. NANDWANI, Ph.D.

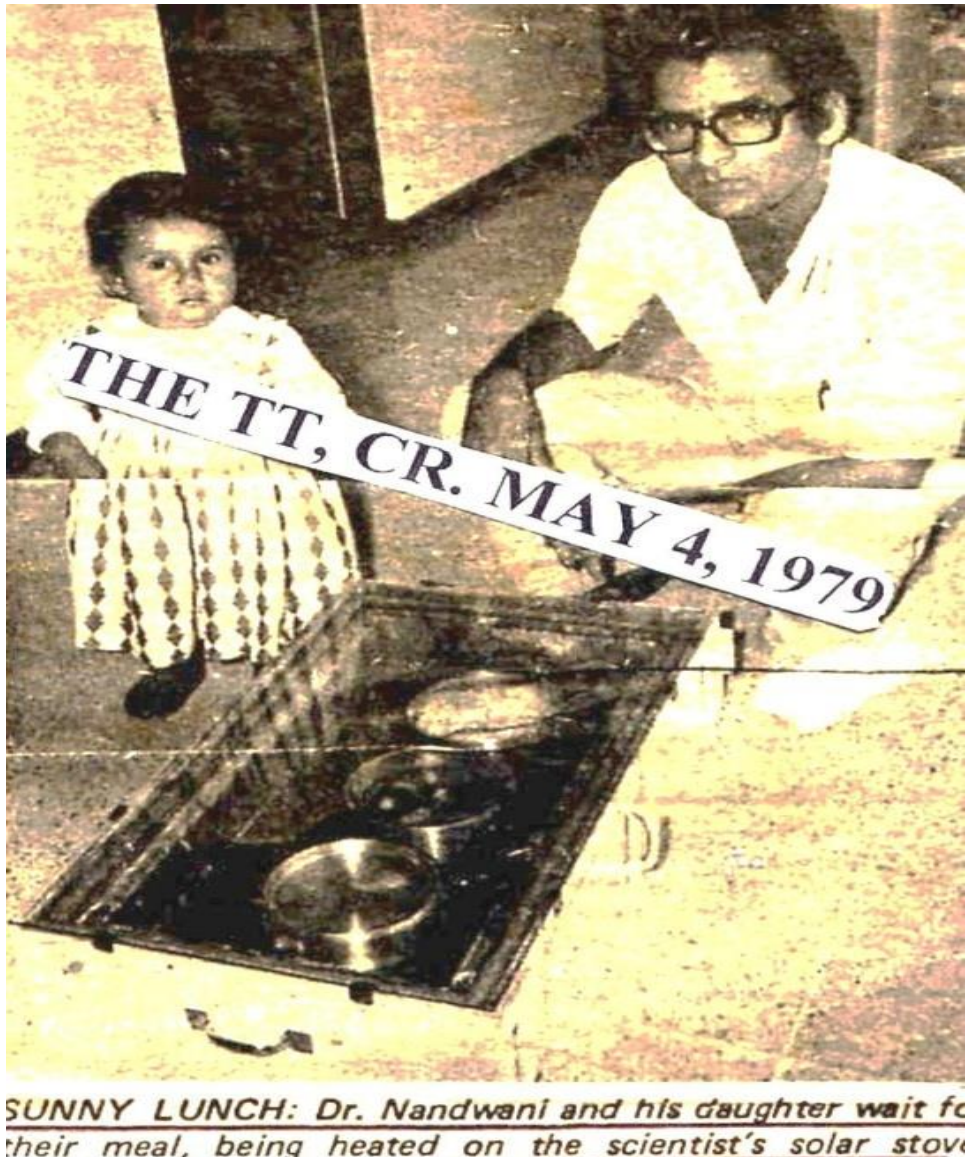
RETIRED PROFESSOR, UNIVERSIDAD NACIONAL, HEREDIA, COSTA RICA

PROMOTOR, CONSULTANT AND USER OF SOLAR ENERGY
MEMBER: SOLAR COOKERS INTERNATIONAL SINCE 1992.

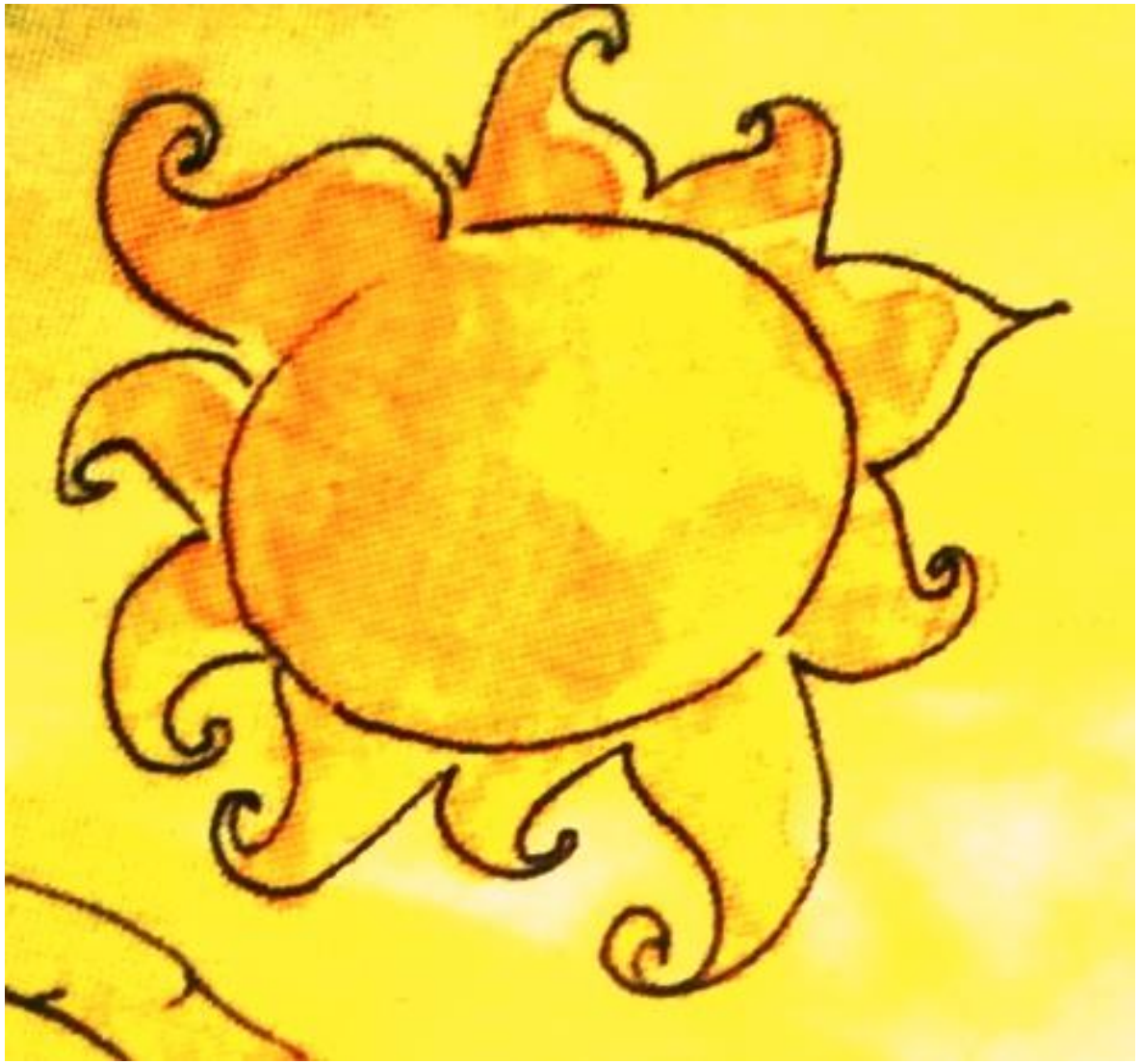
MEMBER: WORLD RENEWABLE ENERGY NETWORK, ENGLAND

July 30, 1978.
Moved From
CES
IITDelhi, India

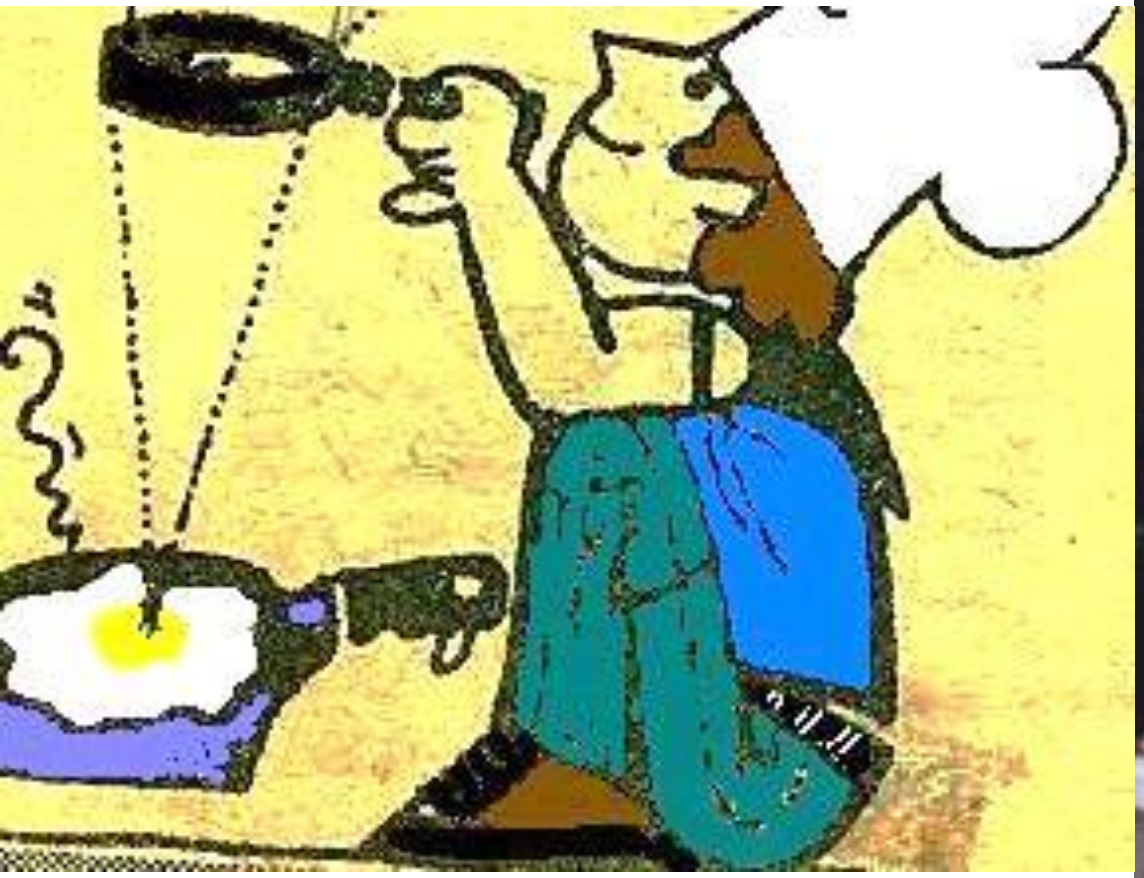
FIRST SOLAR FOOD WARMER (1979), DUE TO ELECTRIC RATIONING 2 DAYS PER WEEK (7 AM / 5 PM)



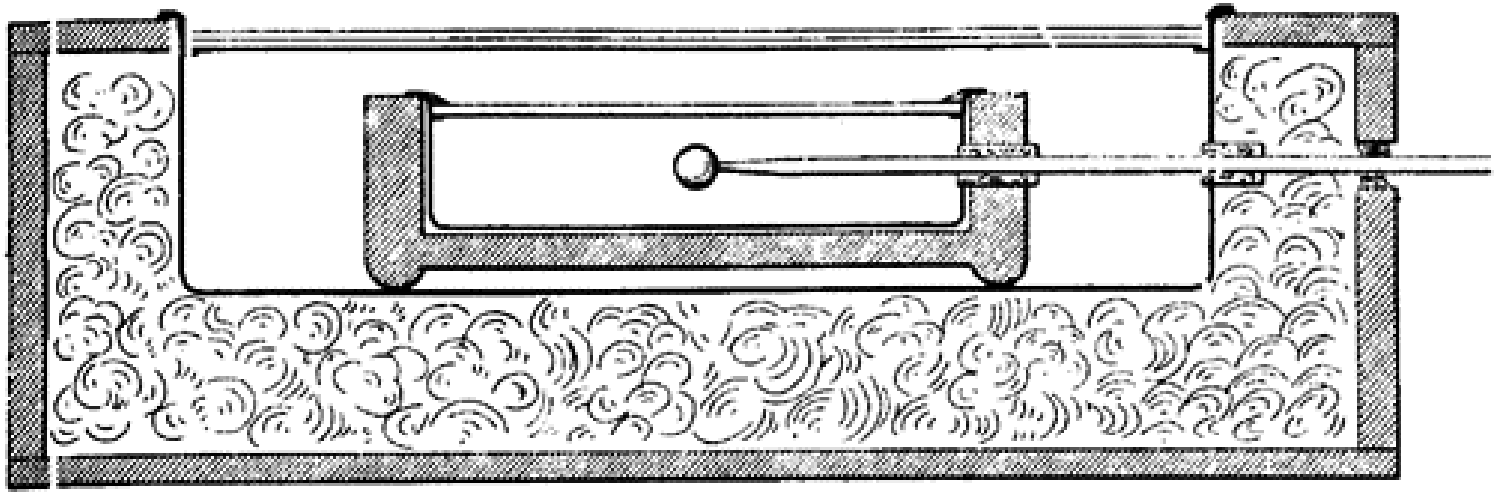

THERE'S NO KEROSENE, NO STOVES, NO CHARCOAL– WE'LL HAVE TO USE SOLAR ENERGY



HYBRID SOL/ELECT. OVEN



SWISS INVENTOR (HOT BOX CONCEPT, 1776, SWISS ALPINIST, BENEDICT DE SAUSSURE)



Cross-section of Langley's hot box, which was similar to de Saussure's later models. A thermomether penetrating the walls at right was used to

ONE OF THE PRACTICAL SOLAR OVEN WITH HEAT STORAGE, 1955-1960

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American Technological University
P. O. Box 1416
Killeen, Texas 76541

Solar Cooking Ovens*

By Maria Telkes

Solar Energy Laboratory,

This report summarizes experimental work sponsored by a grant from the Ford Foundation. The purpose of this work was to develop low-cost solar cooking ovens using sunshine as a cooking "fuel," primarily for arid tropical countries, where most of the fuel is supplied by burning dried cow dung or other refuse. This age-old practice deprives the land of its natural fertilizer. It has been estimated that if the land were supplied by animal fertilizer, the agricultural yields could be nearly doubled. The introduction of an inexpensive solar cooking oven would, therefore, result in a major improvement in food supplies.

This report summarizes the technical part of the solar stove project.

HISTORY OF SOLAR COOKERS

Numerous attempts have been made in the past to

M. L. Ghai of the National Physical Laboratory of India attempted to solve the solar cooking problem.[9-12] He used a parabolic reflector, with a pot supported at the focus. The Devidayal Industries manufactured this device for a limited time.[13] Most of the cookers were used for testing purposes.[14]

A. L. Gardner at New Delhi, India, used a cooking pot resting on a stand made of stones. Solar energy was collected by mirrors arranged on a curved frame, reflecting sunshine to the pot.[15]

Several additional solar devices were exhibited at the UNESCO Conference on Wind Power and Solar Energy in New Delhi during October, 1954.[16] Manually adjustable mirrors were mounted in a frame, reflecting solar energy to the uninsulated pot. It was necessary to adjust each mirror individually and frequently, to reflect solar radiation to the pot.

During the first World Symposium on Solar Energy at Tucson and Phoenix in 1955, several solar cookers and ovens were exhibited. Lectures were presented by

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ShowStyle
15/07/200

HOW MANY MADE, DISTRIBUTED ETC.

ABOUT 3 MILLIONS SOLAR OVENS COMPARED

MICROWAVE OVENS- ALMOST ALL ELECTRIFIED HOUSES, AND

CELL PHONES- ALMOST ALL THE HOUSES (about 7.2 billion phones worldwide).

AEC Research Institute

HIGHWAY 190 WEST
BELL-CORYELL COUNTIES
KILLEEN, TEXAS 76541

January 9, 1980

Dr. S. S. Nandwani
Dept. De. Fisica.
Universidad Nacional
Heredia, Costa Rica,
Central America

Dear Dr. Nandwani:

In your letter of December 11, 1979, you wrote that you received my previous letter and copies of my two papers on solar cooking. I believe that the most important features of my work with cookers are all compiled in my previous papers. I have developed more recent models that permit easier handling and simplify fabrication.

Frankly, there is no interest in the United States at all in solar cookers for the obvious reason that they are buying millions of microwave ovens, which are the most sophisticated and most rapid cooking method. This indicates that the SOCIAL ACCEPTANCE of solar cookers is the key feature, rather than any price or any mechanical/technical features.

You are completing a study in another three to four months. I would be delighted to receive a copy.

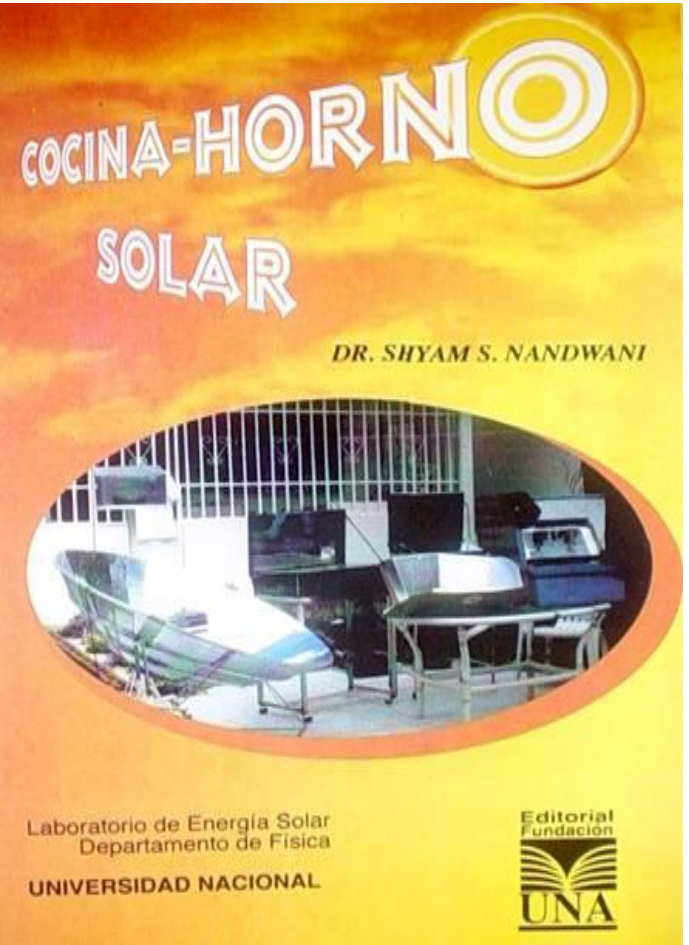
Sincerely,

Maria Telkes

Dr. Maria Telkes, Director

I HOPE WE PRESENT AND FUTURE SOLAR CHEFS ARE NOT EXPECTING SAME NUMBERS HOWEVER WE WANT TO INCREASE THE USE OF SOLAR COOKING FOR

SAVING CONVENTIONAL FUELS, FOR MONEY SAVING AND/OR HAVING OUR ENVIRONMENT CLEANER (INSIDE OR OUTSIDE THE HOUSE,,,)



Thirty Five years of Experience with Research, Promotion and Use of Solar Cookers to Save Conventional Fuels and Reduce Carbon Emission, Shyam S. Nandwani, Renewable Energy in the service of mankind.(Springer), Vol.II, Chapter, 81, pp.851-858, 2016), Ed. A Sayigh.

SOME STEPS FOR ENHANCE USES (TWO TYPES OF USERS- DOMESTIC, INSTITUTIONAL, MAINLY EDUCATION SECTORS):

1. GET THE REQUEST OR INTEREST
2. GIVE MOTIVATION LECTURE
3. SEE POSSIBLE INSTALLATION PLACE

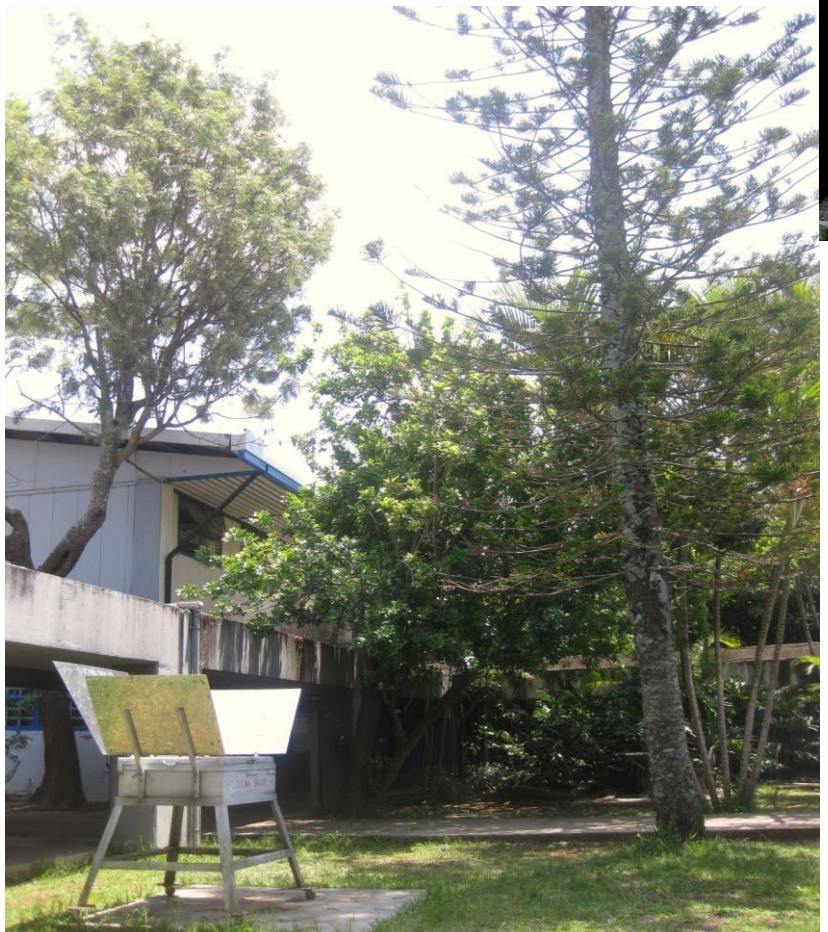
4. WELL AND FRIENDLY CONSTRUCTRED
5. EXPLAIN PROPER USE FOR WORKING
6. EXPLAIN PROPER USE FOR COOKING/ HEATING
7. EXPLAIN MAINTENCE

WHEN POSSIBLE USER/INSTITUTE- SEND ME AN E MAIL, ASKING FOR POSSIBLE INSTALLATION OF SOLAR OVENS FOR HEATING LUNCH, I OFFER THEM FIRSTLY MOTIVATION LECTURE- TO EXPLAIN WHAT IS SOLAR OVEN, WHAT IT CAN DO, WHAT IT CANNOT, ADVANTAGES, LIMITATIONS, COST AND POSSIBLE ENERGY (AND $) SAVING ETC.

ALSO WHEN I GO FOR LECTURE I SEE THE PLACE FOR POSSIBLE INSTALLATION OF OVENS AND RELATED ASPECTS.

EDUCATIONAL INSTITUTES MAINLY FOR HEATING LUNCH

CARE WHILE INSTALLING– SHADE/ OBSTACLE



COSTA RICA HAS LATITUDE OF 10 N,

SUN 7 MONTHS TOWARDS SOUTH AND 5 MONTHS NORTH

(CARE SHADING BOTH SIDES).

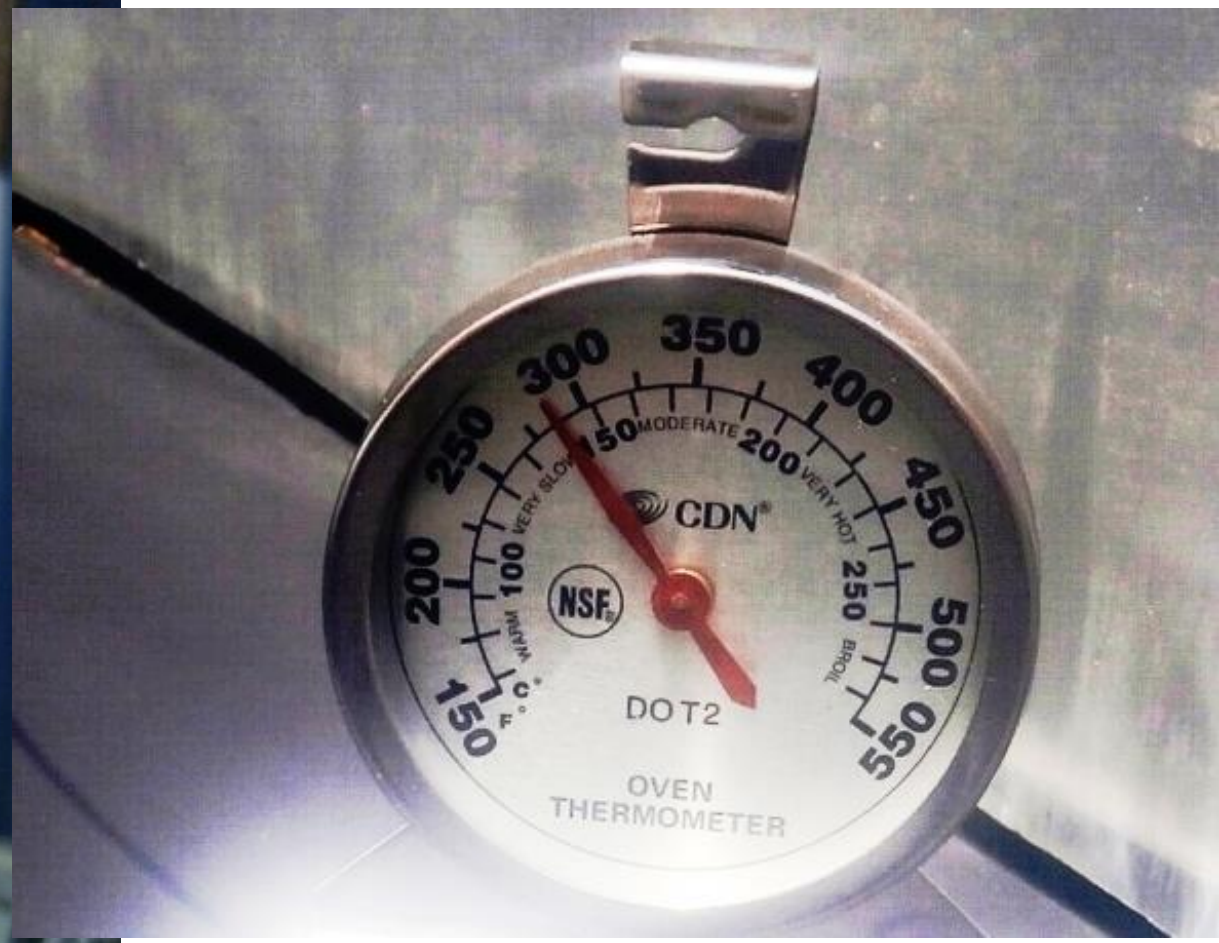
A2. SOME SUPPORT DUE TO WIND ETC.

B. WHILE USING -B1.ADJUSTING OVEN EAST WEST

B2. N- S ADJUSTMENT

B3. CARE WHILE TAKING FOOD OUT (SINGLE HAND).

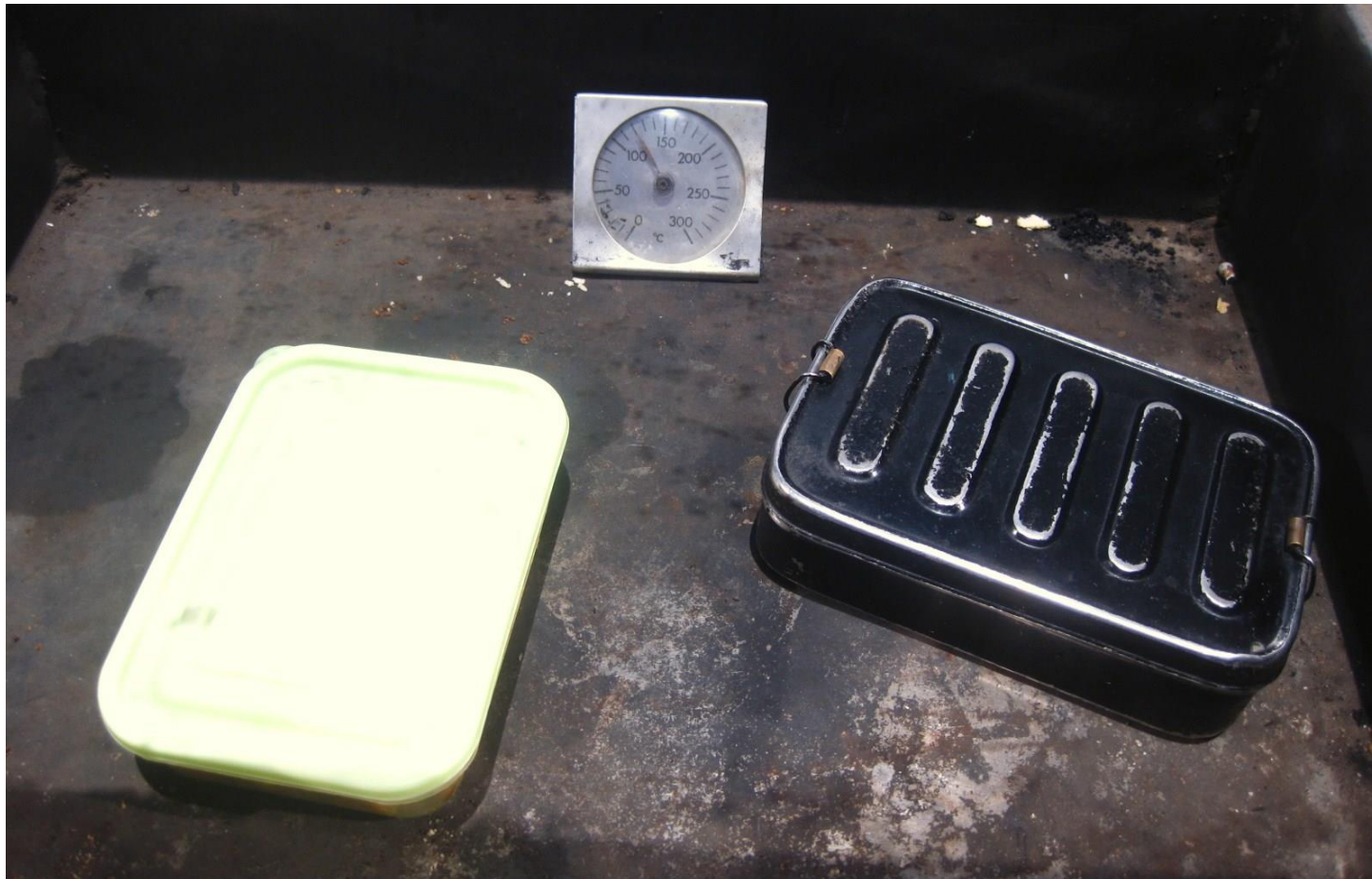
B4. CARE WHILE TAKING HOT FOOD.



B5. USE OF PROPER POTS

MO

METALLIC, CLAY, GLASS, PLASTIC AND SILICON ETC.



MOST COMMON


YELLOW LABEL
TEA
Lipton
Lipton

PLASTIC POTS

MICRO WAVE OVEN POT FOR HIGHER TEMP.

- 

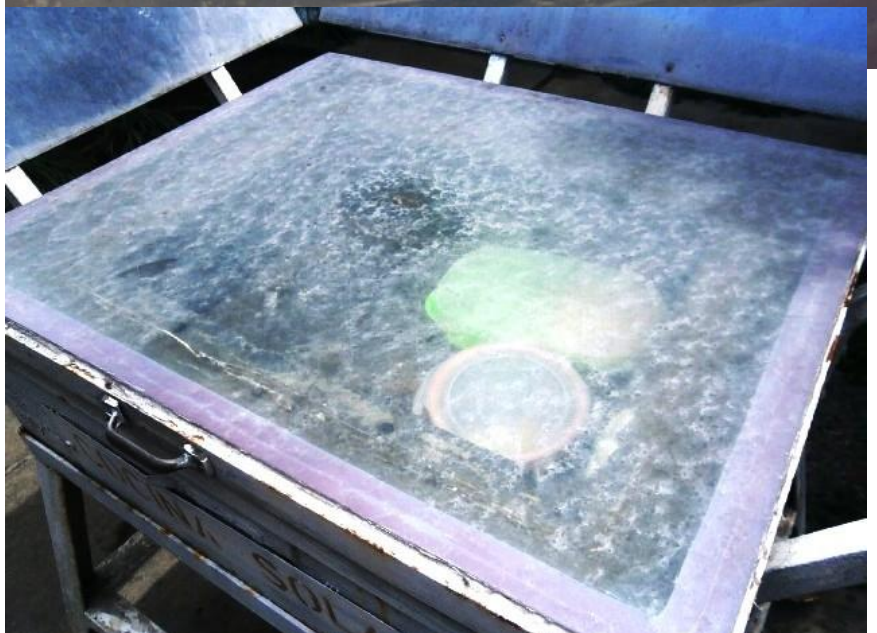
IN 2000 / ITALY

HIGH TEMP AND BPA FREE

B6. IMPROPER ACTIONS.

C. MAINTENANCE

C1. NORMAL DUST, ASH FROM VOLCANOES, ETC.



INCLUDING S, FROM BIRDS


COCINA
SOLAR


the daystar meter
466
Watts/m²
daystar, inc.
www.daystarpv.com


the daystar meter
139
Watts/m²
daystar, inc.
www.daystarpv.com

C2. GLASS BREAKING/ CRACK, DUE TO WIND / PLAYING.

COL. MA. AUXILIADORA (05/2014)

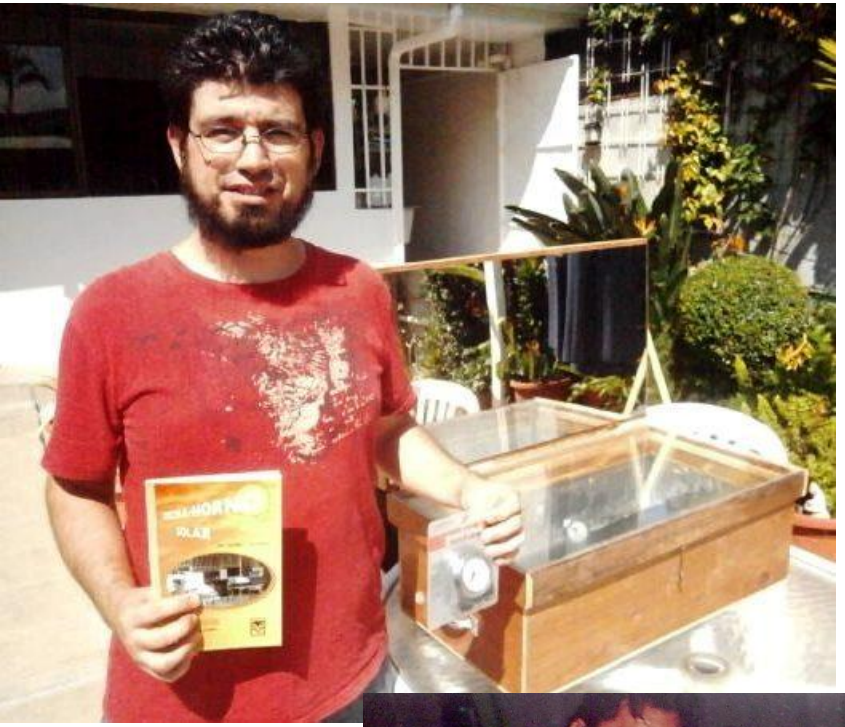
C3. SPILLING OF LIQUID. ABSORBING PLATE.

RESULTS/ ACHIEVEMENTS
(NO SUBSIDY)

A. GENERAL PUBLIC
B. ONG/ RESTAURANTS/OFFICE
C. EDUCATIONAL SECTOR

IN COSTA RICA, WITH A POPULATION OF 1 MILLION FAMILIES, 90-95% OF ELECTRICITY IS GENERATED FROM RENEWABLE SOURCES AND 99 % OF POPULATION IS CONNECTED WITH ELECTRIC GRID, SOME INDIVIDUAL PERSONS (MAINLY FROM URBAN AREAS) AND 2 RESTAURANTS USE SOLAR OVENS FOR COOKING. ABOUT 20-25 SCHOOLS/ COLLEGES USE LARGER SOLAR OVENS FOR WARMING LUNCH FOR STUDENTS TO SAVE ELECTRICITY AND SHORTEN THE QUEUE FOR HEATING LUNCH.

PUBLIC COOKERS (400-500)



NGO AND TWO RESTAURANTS

New Solar Cookers Slow Roast Low-fat Delights

By Federico Vanegas
Special to The Tico Times

ANCIENT cultures such as the Inca and Maya knew how to use the sun's energy in ways we are just starting to discover.

Today a company called Sol Verde – a Guanacaste-based cooperative for development of healthy energy – is picking up on that ancient tradition and spreading the word through two types of solar-powered stoves.

The cooperative is introducing two models of the ovens to Costa Rica: the Proceso Solar Box Cookers and the SK-14. Currently, the company's efforts are focused on the Pacific province of Guanacaste because of the sunny climate the region enjoys year-round.

Currently, some 75 Proceso Solar Box Cookers are in use in six Guanacaste communities, among them Santa Barbara de Santa Cruz.

THE Proceso model, created by a group of Central American scientists, is built with plywood, aluminum paper, a sheet of black metal and glass. It can reach 150°C.

For two years, Sol Verde has put its efforts into teaching Costa Ricans how the solar oven is made and ways in which they can use solar energy at home.

But the new product means those interested in solar cooking will no longer have to build their own cookers.

ACCORDING to Sol Verde's coordinator, Juan Ariaga, the Proceso Cooker is a healthier, low-fat way of preparing food that does not strip it of its nutrients.

In addition, solar cooking helps to reduce the risk of lung cancer that could be incurred by cooking with wood, a method Ariaga asserts releases more than 300 different toxins.

Ariaga also pointed out that avoiding using wood helps to cut down on deforestation. In an experiment, cooperative representatives tallied up all the wood that 15 families used to make one kilogram of beans; the end result was that they needed 65 kilograms of wood to cook the beans.

ONE of Sol Verde's objectives is to hold different community workshops on the use and benefits of solar energy for people and for the environment. The workshops, specifically geared for women, will also focus on health, nutrition and human and women rights issues.

Aside from the Proceso cooker, Sol Verde is also promoting the use of the more elaborate SK14, constructed of special materials including aluminum imported from Germany.

The cost of the cooperative's SK14, model runs about $175. Ariaga said that it cooks faster than the Proceso because it can reach 200°C and is able to fry foods also.

However, the SK14 does have some drawbacks compared to the Proceso. For example, it needs to be moved out of the sun every thirty minutes, while the Proceso needs to be moved every hour-and-a-half.

SOL VERDE Cooperative received the National Energy Prize in 1999 from the Ministry of Health and Environment (MINAE), which seeks to reward companies that are trying to use alternative sources of energy.

The cooperative also holds what it calls its annual 'Sun Party' every February, when people from throughout Central America meet in Santa Barbara, Guanacaste, to learn and teach the latest in the solar energy technology. Call the cooperative at 445-8127

(Lauren Wolkoff contributed to this report).

Courtesy Sol Verde

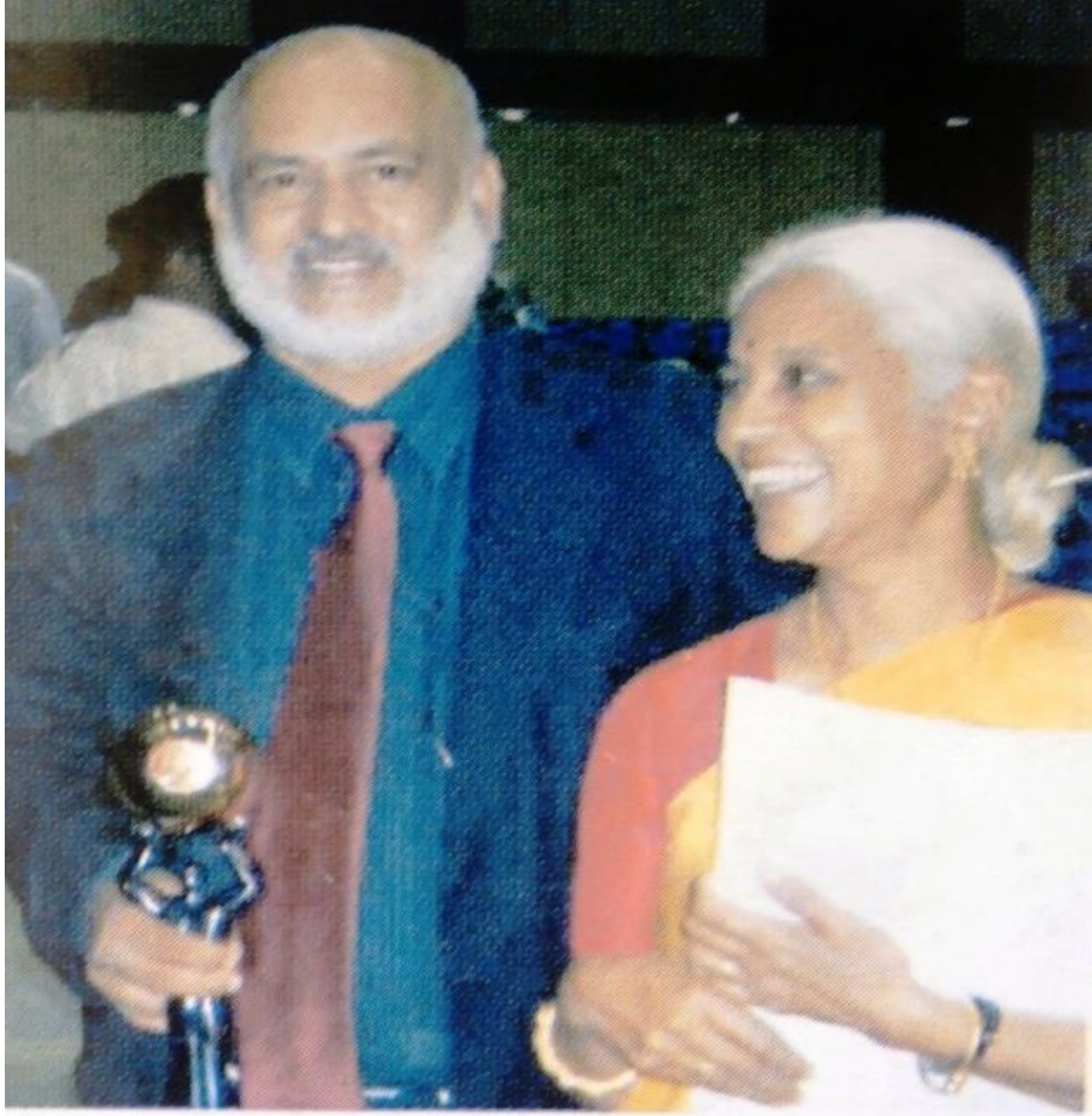
COOKING made easy: The days of having to build your own solar oven are history, thanks to Sol Verde, a cooperative which is selling two models of sun-powered cookers.

EDUCATIONAL CENTRES


Universidad Nacional, Heredia Costa Rica

Calientan sus alimentos **Estudiantes aprovechan energía solar**

COLEGIO MA. AUXILIADORA SJ (05/2014)



Gadhia Solar is Recipient of
Business Leadership Award
(Solar Thermal) 2005 from
Solar Energy Society of India (SESI)


COCINA SOLAR
COCINA SOL

COLLEFE St. PAUL, (10 SOLAR OVENS), 2010

WITH THIS WE COULD REDUCE THE USE OF 10 MICROWAVE OVENS.

ENERGY GLOBE AWARD (AUSTRIA) 2014

SAINT PAUL gces green

COL. MA. AUXILIADORA (05/2014)

Tecnología apropiada

Hace unos días, instalé una cocina solar a las 10:45 a.m. en el Colegio María Auxiliadora en San José. A las 11:45 a. m., 36 estudiantes ya habían calentado sus almuerzos- sin usar electricidad y sin hacer fila en los hornos de microondas, como hacían regularmente. Muy pronto, otros 64 estudiantes van a tener este beneficio para ellos, colegio, el país y el planeta. Felicito la directora de este centro educativo por tener esta visión.

Shyam S. Nandwani

CONCLUSIONS:

IN ORDER THAT MORE PERSONS AND INSTITUTIONS EVEN IN URBAN AREAS CAN USE SOLAR ENERGY FOR COOKING/HEATING MEALS, THE PROPER DISSEMINATION AND NOT EXAGGERATING CLAIMS ARE REQUIRED.

ONLY WITH HEATING LUNCH AT EDUCATIONAL INSTITUTES THE INITIAL INVESTMENT CAN BE RECOVERED IN TWO YEARS. IN ADDITION, IF MORE INSTITUTIONS USE SOLAR OVENS, INDIRECTLY THEY ARE CONTRIBUTING FOR THE PLANET HEALTH AND WILL HELP COSTA RICA IN ACHIEVING THE GOAL OF CARBON NEUTRAL BY 2021.

CONCLUSIONS:

WITH ALL THESE STEPS AND EXCELLENT PROMOTIONAL WORK DONE MAINLY BY SOLAR COOKERS INTERNATIONAL,MORE CONVENTIONAL COOKS WILL BE CONVERTED INTO SOLAR CHEF EITHER FOR SAVING CONVENTIONAL FUELS OR TO HAVE HEALTHY PLANET.

ACKNOWLEDGEMENT:

AUTHOR IS THANKFUL TO SOLAR COOKERS INTERNATIONAL, CA (USA) FOR ORGANIZING THIS VI WORLD CONFERENCE WITH LOCAL INDIAN PARTNERS AND PROVIDING PARTIAL FINANCIAL SUPPORT WHICH ENABLE ME TO ASSIST THE CONFERENCE AND SHARE THE INFORMATION.

THANKS (NAMASTE) FOR YOUR KIND ATTENTION-

SHYAM S. NANDWANI
RETIRED PROFESSOR,COSTA RICA
USER AND PROMOTOR OF
SOLAR ENERGY
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