

Rethinking the Solar Box Oven

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In many developing world settings, the meal consists of a basic starch like rice or ugali and a “soup” which is whatever might be available to supplement and flavor. These are cooked separately and combined before eating.

The trouble is, a lot of solar cookers only cook one thing at a time. There have been reports of women who solar cook one ingredient while using combustibles for the other. The advantages of using solar energy are thus largely defeated. There is need for a solar cooker capable of cooking two dishes simultaneously. Such is the box oven.

Box ovens have enjoyed acceptance in a number of places including India, Bolivia, Senegal and Madagascar. However, they present two significant problems. The first is the complexity of construction. The second is the consequent high cost.

The classic box oven is comprised of an exterior chassis, then insulation, then an inner oven, plus a transparent lid and reflector(s). Maximum efficiency requires a precise interface of lid to chassis; double glazing can reduce heat loss by around 33%.

It may be possible to simplify the construction of the four sides and bottom of a chassis by using a material which does not conduct heat – something with the properties of Styrofoam, for example, but more durable. (The use of compressed coconut fiber has been suggested.) This would

obviate the need for insulation and an inner oven. Fashioning and assembly of the sides and bottom of such a box could certainly be accomplished by local labor in-country.

Manufacture of the top frame, glass window, gaskets and reflector(s) could occur in the closest place where the resources are available to insure high precision and durability. The top frame could then be shipped to the host country for attachment to the chassis.

Although such a solution seems complicated, it provides important advantages:

- Manufacture of the chassis in-country reduces shipping cost. It also provides jobs which would be welcomed by the host government.
- Assembling the top in a place where precision manufacturing is assured will guarantee the high efficiency and durability of the product.

The ability to solar cook two or more dishes at once is one important requirement. Capacity is another. Most current solar box ovens cook for five or six people. However, we have encountered families of 20 or more being fed together. We know that parabolic cookers can be constructed to cook large quantities of food one caldron at a time.

A question: to what extent can a box oven be sized to the needs of big families? (I saw one in use in Dakar that was designed to cook a whole goat.

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