Types of Solar Cookers

Basically, there are 3 types of solar cookers available on the market:

1. Box cookers
2. Panel cookers
3. Parabolic cookers

1 Box Cookers

Solar box cookers (sometimes called solar ovens) are the most common and inexpensive type of solar cookers . These box cookers have a very simple construction and they are made of low cost materials. The outer box is often made of wood. The inner box is made of insulating material, which is covered with clear glass or with plastic, and often has a reflector of aluminum .

According to Solar Cooker International, solar box cookers cook at moderate temperatures and often can accommodate multiple pots. It can reach a temperature of 140° C.

The solar box cooker, like other solar cookers, needs direct sunshine to operate and produces zero emission. However, the temperature is low and it cannot store and save solar heat for later use. Many nonprofit organizations promote these cookers worldwide in order to help reduce fuel costs and to slow down deforestation caused by firewood collection and charcoal production.

2 Panel Cookers

Panel cookers have a flat panel which reflects and focuses sunlight for cooking and heating. According to Solar Cooker International, panel cookers incorporate elements of box and curved concentrator cookers. They are simple and relatively inexpensive to buy or to produce. The "CooKit" of Solar Cookers International is the most widely used solar cooker so far.

The CooKit is a cheap solar cooker in which rice, pasta, lentils, vegetables, chicken, goat, baby food and pasteurised water can be prepared. In bright sunlight the food is ready within 2-3 hours. The CooKit is made of cardboard, lined with aluminium foil. A lightweight 4-litre, flat black painted pan is placed in the CooKit, in a heat resistant plastic bag.

The panel cooker is quite similar in operation to the solar box cooker. The same principles are employed but instead of an insulated box, panel cookers typically rely on a large (often multi-faceted) reflective panel.

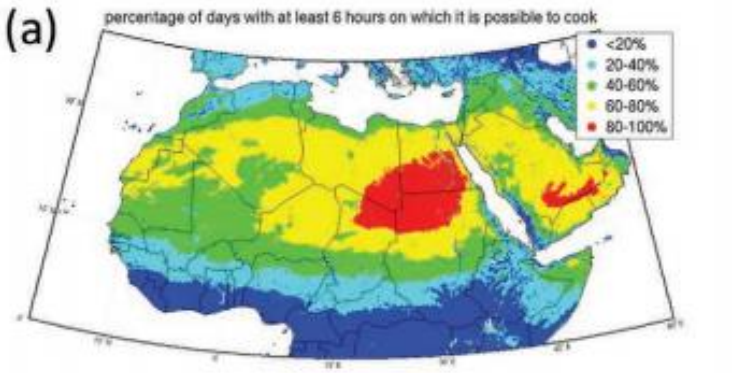
Panel cookers are unable to collect and store sunlight for later use and they are unstable in high winds. Also it cannot retain much heat when the sun is hidden behind the clouds.

3 Parabolic Solar Cookers

In comparison to solar box and panel cookers, parabolic cookers (sometimes called curved concentrator cookers) can reach much higher temperatures and can cook more quickly, but require frequent adjustment and supervision for safe operation, according to Solar Cooker International. It needs more precision to focus the sunlight on the food in the pan. If the sunlight is not correctly focused on the food in the pan, the food will not be cooked well.

There are many designs for parabolic solar cooking appliances. Because of the parabolic shapes and with the aid of reflecting material quite a lot of solar energy is concentrated in the focal point. A very high temperature of between 200 and 300ºC can be reached because of a combination of the circular design, the size and the polished aluminium. It is suitable for baking, roasting and grilling.

Parabolic solar cookers function well if they are used correctly. However, they are not easy to make and need much care to use. Like other solar cookers, parabolic cookers also need direct sunshine and they cannot store and keep sunlight for later use. If the parabolic collector is too small in size, it will not produce sufficient heat for the most effective cooking results. The opposite is true if it is too large; the heat would be too intense.



Percentage of days with more than 6 hours with direct solar irradiance >120 W/ m2 (“solar cooking days”) in the Sahel zone of Africa. (Source: Newton et a,l 2014)

References

Krishnan et al., (2012). Residential Solar Cooker. *International Journal of Scientific & Research Publication*, *2*(1), 3.

Newton et al, 2014: Solar cooking in the Sahel. American meteorological society, September 2014: 1325-1328.

Relevant websites

http://www.solarcookers.org/ website of Solar Coookers International

http://solarcooking.wikia.com/wiki/Solar_Cookers_International_Network_%28Home%29

http://www. solarcookerproject.org/

http://www.jww.org/projects/ontheground/sudan/solar-cooker-project

http://www.solarcooking.nl/?p=178&t=3&/What_is_the_CooKit_/

https://vimeo.com/16067318