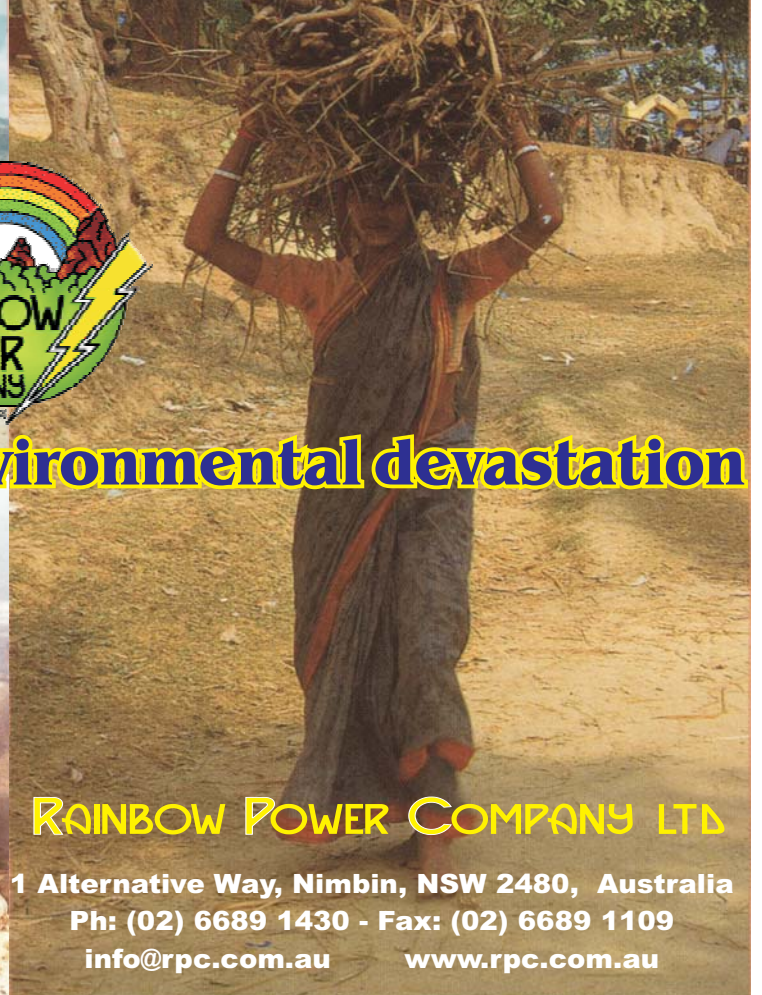


# the Parabolic Dish Cooker



**... is here to address environmental devastation**



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# Table of contents

Preface . . . . .	Pg. 2
Welcome to solar cooking . . . . .	Pg. 3
Prejudices about solar cooking . . . . .	Pg. 3
The hay basket . . . . .	Pg. 3
Safety rules in handling the solar cooker . . . . .	Pg. 4
How to prevent being dazzled / blinded by the solar cooker . . . . .	Pg. 4
Rules for maintaining the solar cooker . . . . .	Pg. 4
Basic rules for enjoying cooking, baking, frying and deep-frying with the solar cooker . . . . .	Pg. 4
• First attempts: boiling water . . . . .	Pg. 5
• When cooking takes too long . . . . .	Pg. 5
• Preservation of food . . . . .	Pg. 6
• Maize porridge . . . . .	Pg. 6
• Vegetable soups, stews and bouillon . . . . .	Pg. 6
• Potatoes . . . . .	Pg. 6
• Rice and noodles / pasta . . . . .	Pg. 6
• Pan-fried dishes . . . . .	Pg. 6
• Tortilla . . . . .	Pg. 7
• Meat, fish, small sausages . . . . .	Pg. 7
• Chicken . . . . .	Pg. 7
• Deep-fried baking . . . . .	Pg. 7
• Bread and cakes . . . . .	Pg. 7
• Round flat bread . . . . .	Pg. 7
• Pizza . . . . .	Pg. 7
• Heating in a water bath; Desserts . . . . .	Pg. 7
• What I am very concerned about . . . . .	Pg. 7

## Preface

This manual is intended to fill you with enthusiasm for solar cooking. The book is based on more than 17 years of practical experience of cooking using solar energy. I was told again and again that solar cooking is not something to be taken seriously. However, a demonstration in our garden has usually been enough to show that the solar cooker is a proper oven / cooker with astonishing performance and incredible potential. It needs sun to work and when the sun is shining, we should leave our kitchen and enjoy cooking with the sun.

The recipes given are only examples to show you the particular points to be kept in mind. You can continue to use your own recipes and your cookbooks and baking recipe books. The ingredients and the preparation remain the same. Only dealing with the pot is different than cooking with conventional stoves.

You will find that solar cooking requires fewer changes in your lifestyle than you may have initially thought. Enjoy cooking in harmony with nature.

In solar cooking, you use the cleanest and most environment-friendly energy: sunbeams are bundled and directed towards the pot by the reflector. The sunbeams are converted to heat on the dark surface of the pot and they can heat the pot to temperatures of more than 200°C (390°F). This makes the solar cooker also suitable for baking as in an oven, and for frying and deep-frying.

The reflector has the shape of a parabola, to concentrate the solar energy efficiently. The deep curvature ensures that the adjustment towards the sun is required only every 20 minutes, and that the hot pot is in a safe position.

I would like to thank all the friends of solar cooking all over the world who have supported me with their recommendations and photographs contained in this cookbook. Although all the instructions in this book have been carefully worked out and tested, no guarantee can be given and liability for damage of whatever kind is excluded.

# Welcome to solar cooking!

You are interested in solar cooking and I want to encourage you. If you enjoy cooking in daily life, you will not have any problems with the solar cooker. The high performance of the solar cooker will enable you to cook almost as quickly as on an electric cooker plate. With solar cooking, you will not be alone in your kitchen; you can prepare meals outside with your family.

You will enjoy cooking. Your family and friends will also be amazed by this wonderful cooking method. The smell of soups, stews, cakes, roasts and perhaps of popcorn and roasted almonds will fascinate them. The sun will heat your pot and you will be amazed how simple it is, and how little attention you have to pay to make your meal a success. The next pages will provide you with the general do's and don'ts of solar cooking. You should have a lot of pleasure in cooking with the sun.

Please follow the rules at all times, and ensure that the solar cooker does not dazzle / blind you. You should therefore read the rules carefully before you attempt cooking for the first time. Defects on the cooker and improper handling may spoil your enjoyment of solar cooking.

**Prejudices and misconceptions about solar cooking.** In the course of the years, I have often encountered prejudices against solar cooking:

- People think that one can hardly use the solar cooker in southern Tasmania;
- The solar cooker can only be used for cooking and only in the hours around midday;
- It is only possible to make stews;
- You have to stand in full sun while you are cooking;
- The reflector cooker will dazzle / blind you when you are using the cooker;
- You will have to supervise the pot constantly;
- Solar cooking is more dangerous than cooking with conventional stoves.
- It is a popular misconception that it is necessary to change eating habits and that you cannot serve hot dishes in the evening if you cook with the sun.

With this cookbook, I would like to make a contribution to refuting these prejudices.

Our motto "Helping People to Help Themselves". The cooker has been called the "Mirror of Hope". This beautifully expresses the ideals that have been the driving force behind the concept from the very beginning. Developing countries experience a firewood deficit of 1 billion cubic metres worldwide each year. The firewood crisis has grown in recent times to affect more than two billion people, which is a third of the earth's population! If one solar cooker is made available each second, this would mean about 30 million solar cookers in one year; but more than 200 million solar cookers are required to stop the firewood crisis! Since solar cookers save the emission of carbon dioxide in regions that are affected by the firewood crisis, there are wonderful opportunities to make solar cooking accessible even to the poorest of the poor by international cooperation projects for reducing greenhouse gases.

## The hay basket

Hay baskets are extremely important for the success of solar cooking. Hay boxes were already in use in our grandparents' generation. Cooking by retained heat it is one of the simplest and most effective ways of saving energy and simplifying cooking. As your dishes finish cooking and are kept warm in hay baskets, you can cut down the cooking time in the solar cooker. The food can be left to simmer in the basket unattended and, above all, the cooking is independent of the mealtime. If you use more than one basket, you can serve a menu in several pots. I have hay baskets fitted with blankets. But you may also, for example, use a cushion filled with hay on the bottom of the basket, and cushions filled with cotton on the sides and on the lid of the pot. The advantage of a basket in comparison to a wooden box is that the insulation does not become as damp and dries more easily.

## Safety rules in handling the solar cooker

The parabolic reflector solar cooker has considerable energy and generates temperatures high enough for baking and frying. If you hold a newspaper in the focal point of the reflector, it will catch fire. For this reason, some safety guidelines are to be observed.

1. Children must not be left unattended with the cooker.
2. You should not stand in front of the cooker. In order to approach the pot safely, you should turn the reflector in such a way that you will be standing in its shade next to the pot support. If you are sensitive to sun you should use sun-protection cream and wear a sun hat.

3. The pot, the lid and the pot support will become very hot due to the concentrated sunlight. For this reason, please use handling-cloths / oven gloves for touching these parts. But do not leave the cloth on the lid or on the pot support; they may catch fire.
4. Only use pots that fit and hold securely in the pot support. It would be best to always use the large solar pot (for example with a diameter of 28 cm).
5. If not in use the reflector has to be reliably fixed in its resting/safety position (with the rear side up, as shown in the picture). Ensure that the brake is well tightened. If it is not in this resting position, there is the danger that sunlight may be concentrated by the reflector to some object nearby the cooker and may damage it by heat or even cause it to catch fire.
6. If you dismantle the cooker, do not keep the reflector uncovered in the open. One may directly hang the reflector on a wall, in which case there should be no gap between it and the wall, through which sunlight may enter.
7. There is also a risk of injury when cleaning the reflector sheets. Keep this in mind when washing the sheets (page 4).
8. Do avoid getting dazzled/ blinded! You might use sunglasses as precautionary measure, but it is most important to avoid dazzling / blinding your eyes by correct use of the solar cooker! (page 4)

### **How to avoid being dazzled by the solar cooker?**

- a) Always turn the reflector completely away from the sun when you are putting the pot in the cooker or removing it. Then, no solar radiation will fall on the reflector, and you will be able to put in and remove the pot in the shade at a comfortable distance from the pot support.
- b) Adjust the solar cooker towards the sun by using the shadow indicator, and do not look into the reflector.
- c) In the area of concentrated radiation, there must be only dark-colour parts, since bright or reflective parts will reflect the radiation. Shiny parts in the pot area should be blackened.
- d) Do not place small pots in the solar cooker, because they allow part of the reflected radiation to escape out of the reflector. The large solar pot prevents dazzling / blinding, because it absorbs all the reflected radiation. You can cook in a small pot by first placing it in the large pot in a water bath.
- e) The reflector must not be deformed. If the parabola shape is not correct, the sunlight will not be reflected onto the pot, which thus cannot absorb it.
- f) If the above guidelines are followed and the reflector is properly orientated towards the sun, you can approach the pot from the front without being dazzled. The pot will shield you from the concentrated radiation. You may then put seasoning into the pot, for example.
- g) If stirring or tasting the food is necessary during cooking, it is best to turn the reflector so that sunlight does not fall into the reflector and you can comfortably handle the pot.
- h) Do not cook food in the solar cooker that requires constant stirring. However, ways can be found to avoid such laborious stirring, mainly by use of the hay basket.

### **Rules for maintaining the solar cooker**

Our cooker is left outside all year long. When not in use, the reflector is in its resting position (the back is turned up), so that no dirt falls into the reflector. It is very easy to clean the cooker. However, you must only use soft, non-abrasive cloths that do not get frayed. The reflector is first washed with a wet cloth or sponge soaked in water and some washing-up liquid. Afterwards, it is rinsed with water. To ensure that no lime stains are left behind the reflector is dried off with newspaper (or a dry piece of cloth) after washing. More substantial stains such as splashes of grease should be removed as soon as possible. Do not use any metal scourers or cleaners with scouring powder on the reflector, they will scratch the surface of the reflector sheets. Scratches reduce the performance of the cooker.

**Basic rules** for enjoying cooking, baking, frying and deep-frying with the solar cooker:

- A) The solar cooker needs a sunny, level location which is protected from the wind. You can improve the stability of your solar cooker against wind bows by attaching weights on the structure.
- B) Only use dark cooking vessels. The black, enamelled solar pot or a large cast-iron pot is most suitable. A pan with a high rim is useful for fried dishes. You can also use a wok. The poor heat conduction of ceramics is a disadvantage of ceramic pots and they tend to crack. The oval ceramic pot that I put in my solar cooker cracked. But the Tajine, the Moroccan clay pot (see picture on the right), is very suitable for the solar cooker.
- C) Do not use pots with parts, which are not resistant to heat (for example with plastic or wooden handles). If you cannot replace these parts, you should wrap aluminium foil around them.
- D) The large solar pot is best suited for the protected heating of small quantities of food in a water bath (for example milk, pudding, honey).

- E) When baking, a baking tin is placed in the pot. Do not put any water in the pot! Do not place the baking tin directly on the bottom of the pot, but on a stand, for example, a wire rack of a pressure-cooker-insert (tripod) or an aluminium wire-coil. (see page 7)
- F) For baking, the pot is to be closed with the black lid; a glass lid will work like a burning-glass and may cause black spots on the cake. Baking has to be done with the lid closed! You should only move the lid to one side just before the baking is completed, so that the vapours can escape, and a crust can form. While baking, the pot is moved a quarter-turn every 10 to 20 minutes, so that whatever is being in the pot is browned evenly on all sides. I will give you more precise information with the baking recipes. (page 7)
- G) Please always use handling-cloths when removing the baking-tin! The pot and the contents can be very hot. It is recommended that you make a double hook of wire for the baking tin, so that you can remove it easily. A possibility is shown in the picture.
- H) While baking in hot cooking fat / oil, only fill up the pot some (3 to 5) centimetres high! Place the lid on the pot all the time; otherwise the oil will not reach the required temperature.
- I) When frying meat, sausages or eggs, proceed just as with an electrical or gas stove; but preferably fry in the large pot to prevent grease spattering.
- J) You may simultaneously cook with two small pots, but I recommend that you only put one pot in the solar cooker and use a hay basket or several hay baskets to keep the food hot in several pots.
- K) Do not toast bread or anything else in the enamelled pot, because the high temperatures reached at the pot base will split off the enamel surface.

### **First attempts: Boiling water**

At first, I want to describe how I use my solar cooker to boil water. The solar cooker stands in the resting position, i.e. with the bulge of the reflector pointing upwards, in a sunny position, on level ground, protected from wind. I turn the cooker that it is standing in a right angle to the direction of the sun. For this, I observe the shadow cast by its frame. I stand behind the cooker, so that it is positioned between the sun and me. Then I swing the reflector upwards so that I can stand in the shade of the reflector, right next to the pot support. The screws of the brake must be tightened sensitively. Now I place my pot, filled with water, in the pot support (in the shade of the reflector). Only then I turn the reflector towards the sun. While doing this I look at the shadow of the shadow indicator and then at the reflection at the pot.

The concentrated light causes white 'sun flames' on the black pot. These should now encircle the lower part of the pot. With the sun at an angle, you should ensure that the 'sun flames' are not directed too much on the lid of the pot but mainly on the lower part and also a little on the front side of the pot. Hence, you won't have to adjust the reflector exactly, but position it more steeply and, at the same time, pay attention to the 'sun flames'.

You should readjust the cooker towards the sun every 15 to 20 minutes, by turning the cooker and adjust the reflector until the shadow cast by the shadow indicator (screws) is centred again (or until the 'sun flames' again surround the lower part of the pot.) Please ensure that while cooking only your solar cooker is standing in the sunlight.

### **When cooking takes too long ... .. this may be for the following reasons:**

- There is no clear sunshine. This is indicated by the fact that the sun does not cast any sharp shadows.
- The cooker is not standing in a wind-protected position. The wind can take away a lot of heat. (You can cut down heat-losses due to the wind if you place the pot in a heat-resistant glass bowl with a lid or by suspending a black coloured steel bowl in the glass bowl; see illustration).
- The reflector is not correctly adjusted to the sun, in other words, the 'sun flames' are not surrounding the lower area of the pot.
- The lid of the pot is missing or the pot is not black.
- A shadow is falling on the reflector.
- The pot is too small so that part of the concentrated radiation misses the pot. The cooking capacity is also reduced when there are two pots on the support.
- The reflector sheets are matt or are heavily spoiled.

## **Preserving food**

Preserving fruit and vegetables is easy with the solar cooker and the large pot. Several preserving-jars will fit into the pot. Fruits can be bottled or made into jam/marmalade.

For preserving food, preparations are the same as with a gas or electrical stove. But you will find that cooking in the open is much more enjoyable.

Considering the fact that more than one fifth of the foodstuffs produced worldwide gets spoiled, one will appreciate the value of preserving by solar cookers.

## **Maize porridge**

Boil water in the solar cooker. Stir a part of the maize in a bowl of cold water and then pour the mixture into the boiling water, under continuous stirring. Keep on adding maize to the hot paste, stirring all the while to prevent lumping. In order to avoid long stirring periods one should cook the hot paste by the retained heat in the hay basket! The sauce may then be prepared in the solar cooker. Use a similar procedure for preparing other semi-liquid foods (milk pudding, creamed rice, semolina).

## **Vegetable soups, stews and bouillon**

It is very easy to prepare vegetable soups and stews in the solar cooker, because they don't burn and hardly need any supervision. Place the pot in the cooker (in the shade of the reflector) and adjust the cooker to the sun. Cover the base of the pot with cooking oil / fat, braise cleaned vegetables in it and pour in the required quantity of water. Add soup seasoning to the mixture. Boil the soup or the stew and let it simmer until the vegetables are cooked. You may then refine or puree the soup in the usual way. Bouillon should not be allowed to cook too long, because it will become cloudy. You can reduce the heat by shifting the reflector away from the sunlight.

## **Potatoes**

Cooking unpeeled potatoes does not require much supervision. I often place the cooker so that the sunlight only falls vertically onto the reflector after about half an hour. This cooks a large pot full of potatoes within one hour without supervision. For fried potatoes, I recommend the use of a large pot to avoid being dazzled / blinded and to avoid spattering the reflector. The cooker can also beautifully cook unpeeled potatoes without water in a baking tin on a stand. The potatoes should be first thoroughly washed and seasoned with olive oil, salt and pepper. The cooking time may be between 1 and 2 hours. You can also prepare potatoes soufflé in the pot with a mould (on a stand) and the procedure is the same as baking.

## **Rice**

You can prepare rice as on a conventional stove. However, rice is particularly suited for cooking by the retained heat in the hay basket. After boiling it for 10 minutes in the pot, you can put the pot with the rice in the basket. There is no need for further supervision, and it will be hot and ready to serve by mealtime. The cooking time in the basket is about 1 hour. The cooking by retained heat depends on the insulation of your basket and on the nature and quantity of the food to be cooked. Cooking in the hay basket is also recommended in combination with conventional stoves. So you can save energy in a simple way.

## **Noodles / Pasta**

One cannot cook noodles / pasta in the hay basket by retained heat (they become sticky). They are cooked until they are ready, the water is poured away and they are enhanced with butter and seasonings. Then you can place the pot with the finished noodles / pasta in the hay basket.

## **Fried dishes**

Although these are dishes that you prepare in a pan at the stove, I would recommend to use the solar pot or at least a pan with a high rim. Then, the reflector will not dazzle you and you will not have any problems with fat spitting.

## **Vegetable Pancakes**

Wash, clean and grate carrots, celery, and cauliflower; add eggs, semolina and cheese; make small patties and fry on both sides in a little oil. A herb sauce with cottage cheese and fresh herbs goes well with these.

## **Tortilla**

Cook the potatoes and let them cool. In the meantime, cut onions and garlic and fry the same until light brown. Break the eggs in a bowl and beat them until foamy. Then mix the peeled and chopped potatoes with the onions into the beaten eggs. Add seasoning and pour it into a pan with a high rim. (An iron pan is most suitable for this). Allow the tortilla to thicken and release it from the edge of the pan with a spatula. When the tortilla baked from below, shift it onto a plate. Slide the turned tortilla back into the pan. Brown it lightly from below again and then serve it hot or cold. Tomato salad goes particularly well with this.

## **Frying meat, fish, small sausages...**

Pour cooking oil / fat into the pot (or pan with high rim) and place it in the pot support in the shade of the reflector. Then adjust the reflector to the sun. (Always first adjust the whole cooker according to its shadow; then adjust the reflector with the shadow indicator.) You can prepare fish, thin meat slices, scrambled eggs, fried eggs or tofu in only a few minutes. In such cases, the cooking is done without a lid, but protection against spatter is recommended.

## **Fried chicken legs**

Wash, dry-off and season the chicken legs. Place the solar pot in the pot support in the shadow, pour olive oil into the pot, adjust the reflector to the sun, and heat the oil briefly. Then put in the chicken legs. Close the lid. Check after 10 to 15 minutes. When one side is well browned, turn it over and fry until crisp. With good sunlight, you will need 30 to 40 minutes.

## **Dishes fried/baked in cooking oil**

For frying in cooking oil, it is necessary to have temperatures above 160°C (320 °F), For this reason you should be sure that the sun will shine from a clear sky for more than 1 hour. Fill the pot only up to some centimetres. The lid of the pot must be closed while the oil is heating; otherwise the heat loss will be too great and the required temperature will not be reached. This application of the cooker may be extremely useful in some countries. Many people could earn their livelihood with it by offering fried food.

## **Pizza**

While the pizza dough rises under a cloth, you can lightly braise the ingredients of the pizza topping in the solar cooker. The baking procedure is the same as for baking cakes. Keep the black lid closed; only open it slightly at the end, to remove the vapour. The pizza requires approximately 30 to 45 minutes baking time.

## **Heating in a water bath: Desserts**

While heating in a water bath, the contents get heated safely and cannot burn. This method is especially suitable for heating milk and to melt honey. For preparing milk based desserts boil water in the solar pot. Then heat the small pot with the milk in the solar pot. When the milk is hot, add the stirred pudding mass and stir until the mass thickens. It will take longer than when directly heating the milk pot, but your dessert will not get burnt.

## **What I am very concerned about**

When I stand at the side of my solar cooker in the garden and watch the dishes cooked with the sun's energy, I wish with all my heart that all women, particularly women in developing countries, should have the same opportunity. How labourious and dangerous it is to collect wood for cooking in the regions suffering from the firewood crisis. In some places, only brushwood is available, or grass is burned, giving off clouds of thick smoke. At present, two billion people in the world no longer have enough firewood for cooking, and for many people, the fuel under the pot is more expensive than the food being cooked. Years ago, they were able to collect wood at no cost. Today the only fuel that they have in excess is the energy of the sun.

I always feel deeply affected when I see pictures showing women cooking on the ground in dust and smoke. They also deserve a decent workplace, and how easy it would be to help these people. A friend from South America who saw our solar cooker, shouted enthusiastically: "Father Sun now cooks for us, because Mother Earth does not have enough firewood for us".

Fortunately, solar cooking is spreading with increasing speed. More and more people are committing themselves to it. Part of the success is also due to the various advantages of the parabolic solar cooker, among others, its high performance from the morning to the evening, which makes solar cooking possible even under changing weather conditions. Solar cooking offers wonderful opportunities: Everyone will certainly experience that solar cooking brings us closer to nature, strengthens our environmental awareness and makes us more independent. I wish you the pleasant experience of a simple cooking method, which saves resources and needs no supply networks, that is in harmony with nature and will help to enable better living conditions for our children and grandchildren. So, I wish you a lot of sunny success!