

# Pack 106, Item 1

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**Dried and delicious: Solar dryers help growers store fruits and vegetables longer**

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**Notes to broadcaster**

Post-harvest loss and food waste is a major problem. The UN Food and Agriculture Organization estimates that as much as 32% of food rots in farmers’ fields, is spoiled in delivery, or wasted when it not consumed or used in other ways.

Good post-harvest practices can ensure farmers make the most of their harvest. By drying fruits and vegetables, farmers can store their harvest longer—for up to a year. Dried fruits and vegetables also earn farmers more money, as they can be sold for a higher price when fresh fruits and vegetables are no longer available in the market. They also help families eat a varied diet throughout the year.

In this script, we speak with Ngoni Nenguwo, a post-harvest specialist at the World Vegetable Center, about how to dry vegetables—and how a solar dryer makes this practice quicker and safer. It keeps dust, debris, and pests away from the product. And a solar dryer can get 15 to 35 degrees hotter than the outside temperature, meaning fruit and vegetable slices dry much quicker.

We also hear from the chairwoman and the manager of the Kilimanjaro Natural Foods Cooperative. Members of this co-operative make a good income selling dried fruits and vegetables to grocery stores, hotels, and tourism companies in northern Tanzania.

You might choose to present this script as part of your regular farming program, using voice actors to represent the speakers. If so, please make sure to tell your audience at the beginning of the program that the voices are those of actors, not the original people involved in the interviews.

You could also use the script as research material or inspiration for creating your own programming on solar dryers. Visit farmer groups or co-operatives in your area that have a solar dryer. You might ask them:

* How did they build the solar dryer?
* What fruits or vegetables are they drying? How do they prepare the product before drying it?
* Why are they drying fruits or vegetables? Do they sell them? Or simply store them for later use?

You could also ask your listeners to discuss how they process fruits and vegetables to consume weeks or months after harvest. This could be the topic of a phone-in or text-in program.

Estimated running time for the script: 20 minutes, with intro and outro music.

**HOST:** Welcome, listeners, to our farmer program. In this segment, we are going to talk about drying fruits and vegetables—a great practice for your health and for profits.

We know that vegetables are important for a healthy diet. Not just because they add colour to our meal. But green leafy vegetables, or carrots, or tomatoes—they are all nutritious. They have important vitamins and minerals.

But how can you eat vegetables all year round if there is only one growing season? Even if you can grow vegetables year-round, it can be difficult to store them for very long after harvest.

Well, in many areas of Tanzania, and elsewhere across Africa, farmers dry their vegetables. Dried vegetables can be stored longer—and as I learned, they are easy to cook with.

So how do you dry vegetables? I learned that there are several important techniques for making the most delicious dried vegetables. And there’s an interesting technology to dry vegetables faster and more safely: solar dryers. Stay tuned as I talk to farmers in northern Tanzania about solar drying.

MUSIC, THEN FADE UNDER HOST

**HOST:** On my way to visit farmers at Kilimanjaro Natural Foods Cooperative in Moshi, I stop at the World Vegetable Center to find out what kinds of vegetables farmers are drying. Here, they are experimenting with different drying technologies. Ngoni Nenguwo is a post-harvest specialist. He talks about solar dryers and how to get the best quality dried vegetables.

 Hello. Thank you for meeting with me.

**NGONI NENGUWO:** Thank you for coming. We are very excited about the solar drying technology.

**HOST:** Perhaps you can start by explaining the drying tradition. Are many farmers drying vegetables?

**NGONI NENGUWO:** In some areas of Tanzania, farmers dry vegetables, but the traditional method is to leave them out in the sun. Unfortunately, these vegetables can be contaminated by dust or debris. A solar dryer keeps the product cleaner—and it dries the vegetables faster because it gets hotter.

In Singida, Dodoma, and the central regions of Tanzania—where it’s drier—it’s more popular to dry vegetables. In Arusha and the northern regions, drying is less popular because fruits and vegetables can be grown throughout the year. But as people move to different regions and take their traditional recipes with them, more people across the country are drying vegetables.

And there are some groups in this area who are drying fruits and vegetables to sell. Kilimanjaro Natural Foods Cooperative in Moshi is one group doing this.

**HOST:** So, why do farmers dry vegetables?

**NGONI NENGUWO:** Soon after the rains, there will be lots of vegetables. But they decrease in availability later. There can be two or three months without vegetables in the market—there’s what we call a nutritional desert in that period. Maize and other foods will be available, so families can still get the calories they need, but they will get less nutritional content.

 Dried vegetables can help remedy that. They can be stored for months—even up to a year—and then used in the same way as fresh vegetables.

**HOST:** So which vegetables can be dried?

**NGONI NENGUWO:** Lots of vegetables. We see dried tomatoes, onions, carrots, peppers, African eggplant, and amaranth. In Zimbabwe, where I’m from, dried cowpea leaves are popular. Here in Tanzania, I think dried sweet potato leaves are popular. And in Singida, they have a vegetable called jute mallow which they dry.

**HOST:** How do you cook with dried vegetables?

**NGONI NENGUWO:** When you want to use them, you just soak them in

water for 15 to 20 minutes, and then cook with them. You can make all the traditional recipes—just substitute dried vegetables in place of fresh ones. You can also make a nice soup from dried carrots, eggplant, onion, and peppers.

What’s important is blanching the vegetables before you dry them.

**HOST:** Can you explain how to blanch vegetables?

**NGONI NENGUWO:** You should boil water and salt. Put the vegetable into the boiling water for one minute. Then take it out and put it in cold water to stop the cooking process. Then the vegetable can go into the dryer. Blanching will make them taste better, and the green vegetables are much greener when they come out of the solar dryer.

But blanching is not for tomatoes or eggplant. For tomatoes, just cut, add salt, and then put them into the dryer. For eggplant, cut, soak in lime juice for five minutes, and then into the dryer.

 Jute mallow is also not blanched.

**HOST:** Here at the World Vegetable Center, you are experimenting with different types of solar dryers. Why would farmers want to use a solar dryer to dry fruits and vegetables?

**NGONI:** Solar dryers have two main advantages: They get 15 to 35 degrees hotter than simple open air drying. So, vegetables dry more quickly. Also, they keep food from being contaminated by animals or insects, dust or debris, or even fungi—which can grow if the drying process takes too long.



 *Direct solar dryer*

**HOST:** Can you explain how to build a solar dryer?

**NGONI:** The most popular one is called a direct solar dryer. The sun’s rays enter through the plastic on the top of the box to hit the fruit sitting on the trays inside. The frame of the box is made of wood, as are the legs, which keep the box about a metre off the ground. You should make three support legs for a double dryer, which is about three metres long.

Cover all sides of the box with transparent plastic sheeting to let in the sun’s rays. The bottom of the box is metal sheeting to reflect the heat back up inside the box. There is a vent on the sides of the box that is covered with mesh screen to allow air to circulate. It is very important for air to circulate in the dryer, which is why we use screen on the sides. The dryer also has a door or opening for loading and unloading the drying trays.

 These trays should slide in to the dryer. They are made from screen stretched over a wooden frame. It is also good if they slant a little upwards towards the door, as that will help the air circulate.

 This is a direct solar dryer. There are other kinds, but this is the simplest to build.

**HOST:** Thank you very much, Ngoni, for explaining how to build a direct solar dryer.

I will see this type of solar dryer later at the Kilimanjaro Natural Foods Cooperative. While the direct solar dryer is the simplest to build—it is still expensive. In Tanzania, it costs about $400 US to have a solar dryer made.

With a solar dryer, farmers can more quickly dry vegetables to store for later use.

Farmers can also earn more by selling dried vegetables when fresh ones are not available in the market. The farmers at the Kilimanjaro Natural Foods Cooperative dry fruit and vegetables to sell to grocery stores, hotels, and other tourism companies in northern Tanzania, where safaris are popular. Stay tuned, as next I will speak to them about just how profitable it is to build and use a solar dryer.

MUSICAL BREAK

**SFX:** WOMEN TALKING, NOISE OF BEING OUTSIDE

**HOST:** As I arrive at Kilimanjaro Natural Foods Cooperative, it is obvious what type of business they operate. Three large direct solar dryers sit in the yard of the house, where the co-operative is located. And on the drying trays sit bright orange mango slices.

I meet with Njarita Mbaga, the manager of the co-operative, and Albina Mkiwara, the chairwoman.

**HOST:** Hello. Thank you for welcoming me today. I am interested in learning more about your co-operative.

**Mrs. Mkiwara:** Thank you for visiting us. We are happy to share our experience. We have about 90 members, most of whom are women. Members attend our annual meeting, can be elected to the co-operative, can save and borrow with the co-operative, can receive training, and can sell to the co-operative.

**HOST:** Do your members sell dried fruit to the co-operative?

**Mrs. Mkiwara:** Yes. Our members dry many fruits, including roselle [hibiscus], mango, pineapple, and banana, as well as lemon grass, tomato, and mushroom. They grow and dry the foods themselves. Last year, about 35 members sold to the co-operative, and they earned about 18 million Tanzanian shillings [about $8,000 US]. They can make a good income selling to the co-operative.

**HOST:** And who does the co-operative sell the dried fruit and vegetables to?

**Mr. Mbaga:** We have many clients who want dried fruits and vegetables. We sell to many grocery stores in Moshi and Arusha. Many hotels also want dried fruit to place in their rooms as a snack for tourists. Hotels also want dried mushrooms for making soups and sauces. And some safari companies want dried fruits or vegetables when their clients go on long safaris.

**HOST:** I’ve learned a bit about drying vegetables, but can you explain how to dry fruit?

**Mrs. Mkiwara:** For mango, you pick the fruit when it is half-ripe. You pick most fruits at this stage. Then you save it for one to two days so it gets a bit ripe. Then you wash it. You must use all hygienic practices.

You peel the mango with a sharp knife and slice it into small pieces, like chips. Then put it on the trays and push them into the solar dryer. It can take three to four days when the sun is strong. You should check the moisture content to know when it is done.

It’s the same process for pineapple and banana.

**HOST:** Can you explain the hygienic measures you mentioned? They must be important, because you are eating or selling the dried fruit.

**Mrs. Mkiwara:** All our members are trained on drying and quality control. Our officers also visit members to check their process and to ensure that the dryer is clean. Our members are all small farmers and they do the drying in their homes.

To process anything, you have to be clean. We wear white coats and caps. We clean utensils—like knives— with soap. You must use soap. It is also important to cut your nails, not have any skin wounds or bandages, and cover your hair.

The trays and the dryer should be clean. And you should always wash the product before processing.

When the product is dry, the farmers put it in a container and bring it to the co-operative. We put them into bags to be sold.

**HOST:** Your members do the drying themselves, after being trained. Do they build their own solar dryer?

**Mrs. Mkiwara:** Yes. They can buy the materials from the co-operative. It’s a bit expensive. About eight hundred thousand to one million Tanzanian shillings for a big, double dryer [$350-440 US]. About 75% of the cost is the wood.

The reward is that these women make enough income to send their children to school and assist their husbands with supporting the family.

**HOST:** Thank you for speaking to me.

MUSIC UP, FADE UNDER HOST, THEN UP, HOLD. AND OUT.

**HOST:** Well, I learned a lot from both Mr. Ngoni at the World Vegetable Center and Mrs. Mkiwara at Kilimanjaro Natural Foods Cooperative. We have heard some new recipes for drying fruits and vegetables and we have heard a few good tips on hygiene.

Drying vegetables is a good practice if you can’t buy fresh vegetables throughout the year. And you can earn a good profit selling dried fruits and vegetables as well.

 Thanks for tuning in.

## Acknowledgements

Contributed by: Kathryn Burnham, Barza Wire Advisor, Farm Radio International

Reviewed by: Ngoni Nenguwo, post-harvest specialist, World Vegetable Center, Dec. 14, 2016

**Sources of information**

Interviews:

Ngoni Nenguwo, post-harvest specialist, World Vegetable Center, Dec. 14, 2016

Njarita Mbaga, manager, Kilimanjaro Natural Foods Cooperative, Dec. 20, 2016

Albina Mkiwara, chairwoman, Kilimanjaro Natural Foods Cooperative, Dec. 20, 2016

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