Practice Note 5:
Conserving and preparing of sun-dried vegetables

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Education and Training for Sustainable Agriculture and Nutrition in East Africa

Research on the acceptance of sun-dried vegetables

Households in Kenya and Uganda regularly face periods of scarcity of a variety of different vegetables. Focus group discussions and trials of improved practices (TIPs) in the study sites revealed that especially during lean season vegetables are too low in quality and quantity. Therefore, researchers from universities in Kenya, Uganda and Germany tested the feasibility of sun-drying vegetables and its acceptance in terms of consumption with local households. In TIPs sessions, the researchers visited the households, discussed the principles and techniques of sun-drying, the proper storage and how to soak and cook the dried vegetables in order to prepare a meal. The participants were challenged to try sun-drying vegetables, storing and cooking them, and reported on their experiences two weeks later. To enable the participants to improve the quality of the sun-dried vegetables, a simple portable low cost solar-dryer was introduced and constructed in participatory workshops.

Participants from Kenya and Uganda reported hindrances such as the time-consuming preparations and drying procedure competing with other important farm activities. On the other hand, they acknowledged that dried vegetables can be easily prepared, and once readily available dried vegetables save time at later periods. The availability of dried vegetables at times prices for fresh ones are high also save funds. In workshops with participatory cooking sessions, the study participants prepared and tasted dishes prepared with dried vegetables. Overall, they liked these dishes and were pleased about the easy preparation and the good taste.

Use of improved solar dryers

In comparison to drying vegetables on sacks or rooftops, as it was previously done in the study sites, researchers of the EaTSANE project promoted the use of an improved solar dryer that protects the vegetables from contamination or carrying-away through wind. Furthermore, it also speeded up the drying process. However, the procurement of the needed materials was a major challenge in the construction of their own dryer. The research team therefore emphasises on cooperation among neighbours to build and use solar-dryers together. Since dried food needs to be stored in airtight containers, participants experimented with different locally available options such as tins, pots, bottles or banana fibres. They all worked well as long as they had an airtight seal and the vegetables were dried well.

Principles for sun-drying vegetables

Sun-drying of vegetables needs some preparation work which differs depending on whether you dry leafy or fruity vegetables. The recipes introduced in this practice note are based on recommendations given in the guideline for drying vegetables developed at the Egerton University[1] and a recipe booklet from the World Vegetable Center[2].

Prior to the actual sun-drying process you need to:

- ✓ Sort the vegetables; only use disease-free vegetables of high quality.
- ✓ Wash vegetables with clean water.

Green leafy vegetables:

1. Blanch: Add 5 grams (approximately 1 teaspoon) of salt to 1 litre of boiling water and immerse the vegetables into the boiling water for about 3 minutes
2. Remove the vegetables immediately after 3 minutes to avoid further softening of the tissues

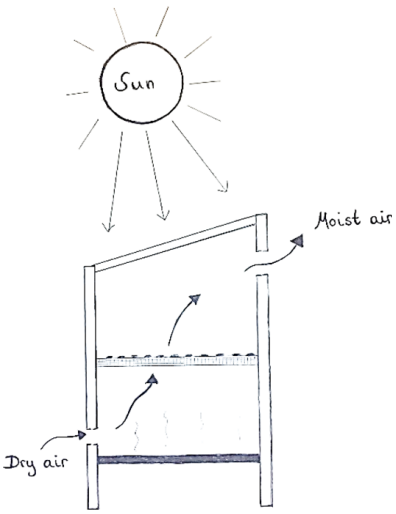
Fruity vegetables:

1. Cut into thin slices (approx. 0.5 cm thickness)
2. Optional: Sprinkle with lime juice

- ✓ Spread the vegetables evenly in one layer thickness on the drying material (best: solar-dryer).
- ✓ Dry the vegetables until they are brittle or crispy.
- ✓ Cool the dried vegetables before storing in airtight containers; pack vegetables in small amounts that can be used at once.

Guide for Constructing a Simple Solar-Dryer

The research team promoted the construction of a simple, non-expensive solar-dryer in reference to one dryer published by the World Vegetable Center[3]. The basic design of the solar-dryer is a wood-framed box covered with transparent plastic. A black surface on the bottom heats up the air inside which dries the vegetables on the drying net (e.g. a curtain).



Material	Amount
Timber (alternative: wooden sticks)	7 metres
Black Polythene	1 metre (as double foil)
Transparent Polythene	4.5 metres
Net	1.5 metres
Nails long (alternative: ropes/strings)	250 grams
Nails short	250 grams

The approximate costs of a solar dryer are 15 USD. Costs can be reduced by using locally available materials.

Guide for Cooking Dried Vegetables

How to prepare a meal with dried vegetables:

- ✓ Soak the vegetables in a small amount of water (enough only to cover)
  - about 30 minutes for green leafy vegetables
  - about 60-120 minutes for fruity vegetables
- ✓ Cook the vegetables in the soaking water because it contains the water-soluble nutrients. If needed add small amounts of water during cooking. Cook until tender.
- ✓ Continue your meal preparation as you would with fresh vegetables.

How to include dried vegetables into complementary feeding:

- ✓ Grind dried green leafy vegetables into powder.
- ✓ Add it to children's porridge during the last 10 minutes of cooking.

Green grams (mung beans) with dried eggplants

Ingredients (about 7 servings)

- 2 cups of dried eggplants
- 1 ½ cups of dried beans/cow peas/ green grams
- 2 small onions
- 3 tomatoes
- 3 tablespoons of cooking oil
- A pinch of salt

Procedure:

- Soak the dried eggplants for at least 1 hour (preferably in warm water).
- Sort the green grams and roast shortly in a dry pan.
- Cover the green grams with water to soak them for ½ hour and remove the floating green grams from the surface (these are the hard ones).
- Discard the soaking water and wash the green grams.
- In a clean pan, put the green grams, add water and bring it to boil.
- Add the soaked eggplants (including the soaking water) after ½ hour to the boiling green grams and cook all until soft.
- Add salt to taste.
- In a dry saucepan, add the oil, add the onions and tomatoes and stir until cooked.
- Add the green grams and eggplant mixture.
- Using a wooden spoon stir continuously.
- Simmer for 5 minutes.
- Serve with potatoes, matooke or posho/ugali.

Literature References

1. Kamuru SM Household Food Preservation for Food Security in a Changing Climate. Climate Adaption Project (CAPro) of Egerton and Laikipia Universities, Kenya. Available at: http://farmup.egerton.ac.ke/images/pdf/house_holds.pdf [Accessed January 19, 2021].
2. Marealle R, Fortanus R, Nordey T, et al. (2017) Dried Vegetable Recipes Taiwan: World Vegetable Center. Available at: https://avrdc.org/wpfb-file/dried-vegetable-recipes-pdf/ [Accessed January 20, 2021].
3. Fortunatus R, Marealle R, Nenguwo N, et al. (2017) Solar Dryers: Principles and Basics. World Vegetable Center. Shanhua, Taiwan, 17(827).

About the EaTSANE project

The EaTSANE project is an interdisciplinary research project on diversified agriculture, nutrition, and value chains, implemented by research and development institutions from Kenya, Uganda, Germany and the Netherlands in the period from 2018 until 2021. The main objectives are to develop more sustainable farming practices and improve diets of households in Teso South, Kenya and Kapchorwa, Uganda by diversifying the food system with a participatory action research approach. The research teams identified practical implications across the project activities, which led to a set of practice notes.

Further reading and training materials can be found: https://www.eatsane.info/publications

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