Household energy saving technologies	
Module 2:	**Firewood management**

FACTSHEET

Introduction:

Firewood is a valuable source of energy, whether it is being collected or bought on the market: it involves financial or time resources of the household to obtain it. Even without switching to an improved stove, with the application of firewood management techniques, the amount of firewood needed for the daily cooking requirements of a household can be reduced.
And the best is: these techniques involve no risk and no cost!

Proper firewood management can save approximately 20-30% of the total requirement. If trees are planted around the house, the costs involved in the provision of firewood can be reduced to the small investment for the seedling.
Otherwise, there are no costs involved in the adoption of these recommendations. Therefore the households can spend the money they save for buying food, soap, medical services etc. and time not invested for firewood collection can be used for working in the gardens or family care (e.g. looking after children, sick and elderly people).
The following recommendations address mainly the aspects:

1. The drying and preparation of firewood before use
2. The management of firewood during the cooking process
3. Diversification of the types of biomass fuels used as alternatives to firewood

Firewood sold on the market in small bundles

A small headload of firewood collected.

These recommendations to save fuel are addressed to firewood user. For charcoal users these techniques do apply in another way. Keeping charcoal in a dry place and supplement it with other locally found fuels are techniques also applicable for charcoal users.

1: Practices for better storage and preparation of firewood

One part is to get rid of the water in the fresh firewood before you start using it in your kitchen.
With the change to firewood access through commercial structures or long distance collection, households tend to have no stocks of fuel wood at home. They basically just get today what they need tomorrow or within the coming week. This short term supply system has severe disadvantages:

- **Loss of energy:** freshly collected firewood contains a lot of water. In the burning process, this water first has to get out of the wood before the actual heating process can start. App. 25-35% of the energy is wasted if the firewood is not dried before use.
- **Smoke:** freshly collected firewood develops a lot of smoke when used in a fire. It is a health hazard.

Recommendation 1.1: Use smaller pieces of firewood

How to do it: Cut your firewood in smaller pieces (e.g. 2 fingers thick)

Why does it save firewood?

- Smaller pieces of wood take less time to dry.
- They also dry out more comprehensively than bigger pieces.
- Smaller pieces burn better, because they have a bigger surface and better contact with the air that is necessary for the burning process.
- You can adjust the firewood input to the fire better if you use smaller pieces instead of bigger logs and therefore you can optimize the use and avoid wastage.

Other benefits

- You can use as well other parts of a tree, not only the big branches or the stem. Even smaller twigs can be used.
- This is an advantage for elderly and sick people who have problems transporting big headloads or heavy logs of firewood.

Recommendation 1.2: Dry firewood very well in the bright sun

How to do it

Let the firewood dry in the bright sun or inside your kitchen for at least several days.

Why does it save firewood?

Freshly cut wood contains a lot of water, it is wet. When the firewood gives a hissing sound when burning, it means that there is still water evaporating by the heat generated through the fire. This process consumes energy that is lost to heat up your food. If you let the sun do that work of drying, the full energy content of the firewood can be used to heat what is in the pot. You will make more efficient use of the firewood and therefore use less.

Other benefits

Dry firewood will burn cleaner and cause less smoke.

Smoke is a health hazard! It increases the risk of respiratory infections and eye infections. Smoke of fireplaces can be more dangerous than smoking cigarettes.

Benefit: Less smoke means less (indoor) air pollution. Less air pollution means less health hazards for anybody close to the stove: the person who is cooking, babies on the back of their mothers bending over a stove, or children playing close to the stove.

Recommendation 1.3: Store a stock of firewood in a dry place

How to do it

- Store the dried firewood under a waterproof shelter, guarded from rain and splash water.
- If you have a kitchen, store it inside the kitchen to make use of the heat emitted by the fireplace. The most adequate solution is to hang a simple rack under the roof, as the heat rises upwards. It also has the advantage that it does not take up space in the kitchen.

Why does it save firewood?

Firewood still keeps on losing moisture, even if it feels dry. Ideally firewood should be left at least for three weeks, better for two months to dry out properly before being used. The drying process continues even if the firewood is stacked. The drier the firewood the better the use of the energy contained in the wood. All the energy of the firewood can be used for the cooking process instead of removing surplus moisture in the firewood.

Other benefits

If you store the firewood in your kitchen, it is always at hand when you need it

Many households might have problems to afford buying an amount of firewood at once in order to allow it enough time for proper drying. The solution is to use the firewood saved through the application of the new skills to build up a bigger stock over a certain period of time

Example: If a family normally uses 10 sticks of firewood for a meal and can save two sticks per day, they can increase their stock over a month by two sticks per day.
This means that after one month the family should have a stock of 60 sticks of firewood without spending more money than they did before.
By doing so, they build up a stock of firewood without any additional financial requirements.

2: Better management of firewood in the stove while cooking

You can prepare very different quantities of food with the same amount of dried firewood. It all depends how efficient you manage your fire while you are cooking. Here are some recommended practices compiled that can assist households to improve the use of their firewood.

2.1: Start the fire with 3 sticks of firewood only

How to do it
Use your usual method to light a fire, but try not to put more than 3 sticks of firewood in the stove

Why does it save firewood?

If you use a stove, it will take a bit of time until the stove is hot. During the heat-up phase the stove will absorb heat from the fire. Once it is hot, the fire will burn well and the stove will not 'steal' more heat from the fire, but the heat will go mainly to your pot. For heating up the stove in this initial phase, 3 sticks are enough. By restricting the number of sticks at the beginning, you can avoid wasting surplus firewood.

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This mainly applies to the user of improved stoves, but to a certain degree it also helps the user of the traditional 3 stone stoves.

2.2: Once the fire is going, remove surplus firewood

How to do it

When the fire is well established and the food is boiling, take a stick out of the fire and put it aside next to the stove. Add it only when you need more heat.

Why does it save firewood?

Once the stove is hot and the fire is burning well, the fire does not need so much firewood any longer to maintain the same heat.

When you cook food that takes quite a long time to cook e.g. like beans, during the simmering phase sometimes even one stick of firewood is enough to maintain the slow heat.

By monitoring the fire and 'feed' it with the right amount of firewood, you can minimize the use of firewood and avoid waste.

Other benefits

Slow heat prevents the food from burning and therefore avoids the spoilage of food.

2.3: Keep firewood after cooking for further food preparations

How to do it

When you remove the pot from the fire, take the remaining fire-wood out of the stove, extinguish the flames and keep the firewood for the next time you cook. Make sure it is cool before you put it next to things that might catch fire. The best is if you stick the firewood in a pile of dry sand or ash. It helps to extinguish the fire and reduce the smoke. If the sand is dry, the firewood will light easier next time you need it.

Why does it save firewood?

Normally any remainders of firewood are left in the stove and they end up being burnt and wasted without further use unless you take the stove inside for space heating. Once you have finished cooking and the pot is no longer on the stove, there is no need to keep the fire burning. This firewood can still be used (saved) for the next time you cook. You will then not need so much new firewood.

3: Use other biomass as alternatives to firewood

Especially if you have an improved stove, it is easy to complement the firewood with other biomass fuels that help to reduce the overall firewood needs of a household. That can be small twigs collected from the surroundings of the house, crop residues like stalks, cobs, waste materials from the garden like dry bark or pods from trees, cut-offs after trimming hedges like bamboos.
Just make sure the material is well dried. In the photo below, you can see the difference between the freshly collected pigeon pea stalks (in the front) and the properly dried ones (where the matchbox lies).