**Developing Countries Farm Radio Network**

Pack 13, Item 12

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**Good low-cost fuel made from maize (corn) cobs, part 2: How to make it**

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Information on this subject area was requested by DCFRN participants in Bolivia, Brazil, Colombia, Dominica, Dominican Republic, El Salvador, Fiji, Ghana, Guyana, India, Lesotho,Malawi, Pakistan, Peru, Philippines, Puerto Rico, Sri Lanka, and Uganda.

Presenter: George Atkins

Interviewee: Gerald D. Knight, Technical Advisor, CEDECO Development Centre, Kimpese, Zaire.

**Special notes**

1. Before using the information in this item, please read the notes at the end concerning related DCFRN items.

2. In this item, the word "maize" is used. If your farmers know it as "corn" or by some other name, please use the word that they know.

**Suggested introduction**

We at this radio station are part of a worldwide information network that gathers farming information from developing countries all over the world. It's the Developing Countries Farm Radio Network, sponsored by the Canadian International Development Agency, Massey Ferguson, and the University of Guelph.

Through this Network, we bring you information on ways to increase food supplies for your family, or to help you increase your income—ways that other farmers have used successfully.

Once again today our subject is fuel for cooking. Here's George Atkins.

**ATKINS:** The last time we talked about maize (corn) cobs, I toldyou that you can make very good cooking fuel out of them. In fact, if you had a good supply of old maize cobs for turning into charcoal, you would not have to depend so much on firewood for cooking your food. Also, you might be able to sell charcoal to others in your area.

To make maize cob charcoal, you first will need at least two or three big barrels or sacks of very dry maize cobs.

Second, you'll need a 200 litre (40 gallon) metal barrel (drum) with no top and with two holes cut on opposite sides near the bottom.

Third, you'll need rocks or blocks to hold the barrel (drum) in place and a hoe to move it when it's hot.

Fourth, you'll need quite a lot of water—50 litres (10 gallons) or more and some sprinkler cans, and

Fifth, you must have some quick-burning material in the bottom of the barrel (drum) for starting a fire in it.

One person who has had lots of experience making charcoal out of dry maize cobs is Gerry Knight, the Technical Advisor to the CEDECO Development Centre in Zaire. He told me that, for doing this, youneed to pick a good, open space where it's safe to have a fire. Also do it on a good, sunny day and get started early in the day. That's so you'll have time to complete the job during that same day. He also says you should have someone to help you do this job, and that you should try not to breathe in any gas or smoke whileyou are making charcoal.

Here's what Gerry said to do first:

**KNIGHT:** You should tilt that barrel over on a 45-degree angle(about halfway over onto its side).

**ATKINS:** So that the top end of the barrel might be up perhaps half a metre (1-1/2 feet) off the ground?

**KNIGHT:** Yes, maybe a little more than that.

**ATKINS:** So that it's balancing, not falling over.

**KNIGHT:** You should put a block or something under the leaning side to hold it up. And, George, at the bottom rim, to keep the thing from rolling, also put something on each side. You need three blocks to hold the barrel up. We've used rocks or, preferably, cement blocks—one to hold it up at the proper angle, and two at the base to keep it from rolling.

**ATKINS:** O.K., now you've got the barrel about halfway over onits side. What's the next thing you do?

**KNIGHT:** I would turn it slightly into the wind if you've got abreeze at all. I wouldn't put it directly facing into the wind, but at an angle that would let the wind come in and go out.

**ATKINS:** And what do you do now?

**KNIGHT:** Well, now you should put some dry grass, some woodshavings, paper—something very easy to burn—down in the bottom of the barrel (drum)—just a couple of handfuls of this dry material will get the fire going. The other thing is you want your cobs to be very dry. If you snap (break) them with both hands, you can tell from the sound and from the feel how dry those cobs are.

**ATKINS:** How many would you put in?

**KNIGHT:** Just a handful of cobs at the start and one match to getthe fire going.

**ATKINS:** O.K., so you set fire to this dry material in the bottom.Then what do you do?

**KNIGHT:** Let it burn until you have some good flames—and then, around the edges, throw in some more cobs—you don't want to kill the flame. Just start building your fire up little by little, always maintaining those flames. Those flames are very, very important. Make sure you get a good start on it.

**ATKINS:** O.K. So what you're now doing is building a fire of maize (corn) cobs inside this barrel. You just keep feeding them in, but you mustn't put too many in at a time.

**KNIGHT:** You mustn't put too many in, but always keep that firegoing. You want it to be hot—you don't want to smother it.

Before you throw more cobs in, you must be sure there is no smoke. That's one thing we found out. Make sure that fire is very hot and there are a lot of flames there before you start throwing the next lot of cobs in. Because as soon as you throw cobs in, your fire will go down and you'll start getting smoke. So wait untilthose new cobs have caught fire and are really burning hot. Allow them just to burn! Don't be anxious about it. Just let them sit and burn. Even if it does take a little while to get the fire into the centre of the barrel (drum) of burning cobs.

We found that by using a stick a couple of metres (6 feet) long, if one side is not burning as well as the other, you can sort of push the cobs around.

**ATKINS:** All right. So you get a good fire going and you keepputting maize cobs in—how long do you do this?

**KNIGHT:** Actually, George, you keep doing that until the thing isfull.

**ATKINS:** Until the barrel (drum) is full of burning maize cobs?

**KNIGHT:** Yes. Of course you must remember that your barrel (drum) is tipped over on a 45-degree angle to get a good, even fire going. As you fill it up, the cobs will come up close to the lip and when they start spilling over, it's time to straighten up the barrel (drum) and keep filling as you go. And finally you'll finish up with the barrel straight up and down.

**ATKINS:** And it'll be just standing perfectly straight up in avertical position. But now, how about those square holes on each side near the bottom of the barrel? Are they still open letting in air down there?

**KNIGHT:** That's a very good point. Those holes permit betterburning at the beginning of the fire, but what you don't want is for that lower one-third to burn up completely, so when we've filled the barrel (drum) past the half-way point, we just shut down those holes; because we don't want the lower half to burn any more while we're finishing up the top half.

**ATKINS:** O.K., then finally you get it absolutely full of burningmaize cobs. Then what do you do?

**KNIGHT:** Just let it burn a few seconds longer to have good quality charcoal. And then, tip it over. Don't use your bare hands, it's red hot. Use a stick with a crook in it (or a hoe) and hook onto the rim. Then stand behind the barrel (drum) and just let it down a little easy—because the charcoal cobs are very fragile and break easily. Any kind of shock can cause them to break. I like having completely intact cobs; they're more useful.

**ATKINS:** O.K., so you've pushed the barrel (drum) over gradually, perhaps with a long stick with a hook on it so it doesn't fall over quickly. And now it's on its side on the ground. Now what?

**KNIGHT:** Now you get the cobs out as quickly as you can. Whatyou want to do is roll the red-hot barrel. Roll it. Thecharcoal cobs will actually spill out in a line. You need to lift the bottom up a little to encourage the cobs to come out.

**ATKINS:** Right. Now you've got them all out on the ground. Arethey still burning?

**KNIGHT:** They're still burning away.

**ATKINS:** Now what do you do?

**KNIGHT:** Take a few seconds to spread the cobs out and then water them down, to put out the flames.

**ATKINS:** But when you're spreading them out, you want to be careful not to break them or destroy the shape of the cobs that have now turned into charcoal but are still on fire.

**KNIGHT:** That's right. You must be gentle but you also must bequick.

**ATKINS:** O.K., so now you have them all spread out. How then do you put water on to put out the flames?

**KNIGHT:** For one barrel (drum) of charcoal, we've found it takes four to five watering cans full of water—40 to 45 litres (10 gallons) of water to do a good job of putting out the flames.

Not everybody has a watering can. An alternative way to do it would be to have a can handy with holes punched in the bottom which you could use to sprinkle water on the cobs.

**ATKINS:** Of course when you put the water on, there'll be steam and smoke rising.

**KNIGHT:** You must get the cobs uniformly wet. It's good if youhave someone else to help you check around for little signs of smoke coming up from a cob underneath that still may be smouldering. You must extinguish all of the burning smoking cobs at once. You also want them to dry fairly quickly so don't put on so much water that they get all soggy.

**ATKINS:** All right, we're getting along fine—the flames areall out and what do you do now?

**KNIGHT:** If it's a nice hot, sunny day and you've taken about twohours to do this burning early in the morning, the cobs can just stay there on the ground in the sun for the rest of the day. By evening, when you come back to put your charcoal away, it should be dry enough for use by that time.

Anyway, the charcoal cobs must be dry before you store them.

**ATKINS:** And how can you tell when they're dry enough?

**KNIGHT:** By feel, George, they have a powdery feel to them on the outside and then they're brittle. With just two fingers you can snap them, and when they're dry they make a nice little crack.

**ATKINS:** O.K. Now you've got them all dried, where and how do you store them?

**KNIGHT:** The best place to store them is in a good solid container,perhaps even in a wooden box, and some dry place where they're not going to be constantly moved around.

**ATKINS:** O.K.—you can store them; and then use them for whatpurpose after that?

**KNIGHT:** In the home—right at home in the kitchen. Just usea piece of paper or a little piece of bamboo to light a fire to get these charcoal cobs going.

If you pile them up in a little triangle (pyramid), within a very short time, you've got a good hot fire there that will boil water in no time.

Perhaps the woman of the family would be very much relieved to have a ready source of charcoal. Because today that same woman or her child may have to walk 7 or 8 or even 10 kilometres (4 or 5 miles) each day to get a few pieces of wood for cooking. And here we have good fuel that comes originally right out of their own field, their back yard and into the kitchen and under the pot. How appropriate!

**ATKINS:** Thank you very much, Gerry Knight, of the CEDECODevelopment Centre, in Kimpese in Zaire.

Serving Agriculture, the Basic Industry, this is George Atkins.

**Notes**

1. This is the second of two items in this package on the subject of making charcoal for cooking from old maize (corn) cobs. Please use Item 11 (Part 1) and Item 12 (Part 2) in the proper sequence.

2. The first published information we saw on this subject originated in Thailand. We gave a copy of it to DCFRN participant Gerald D. Knight in Zaire. He experimented with the method and has perfected a variation of it that is fully described in these two items (Items 11 and 12).

3. Due to the acute problem of a decreasing supply of fuelwood, it is intended that information in these items will assist in easing the problem. Some other DCFRN items so intended also include the following:

Why Plant Trees? - DCFRN Package 9, Item 1D

Planting Trees, Part 1 - First Steps - DCFRN Package 9, Item 2

Planting Trees, Part 2 - Growing Your Own Seedling Trees - DCFRN Package 9, Item 3

Planting Trees, Part 3 - Where and When to Plant - DCFRN Package 10, Item 4

Planting Trees, Part 4 - Transplanting Seedling Trees - DCFRN Package 10, Item 5

4. DCFRN regularly attempts to provide information on income-producing ideas for rural people. Information in these items (Items 11 and 12) may be useful for farmers who are looking for ideas for sideline enterprises from which they could earn extra money.