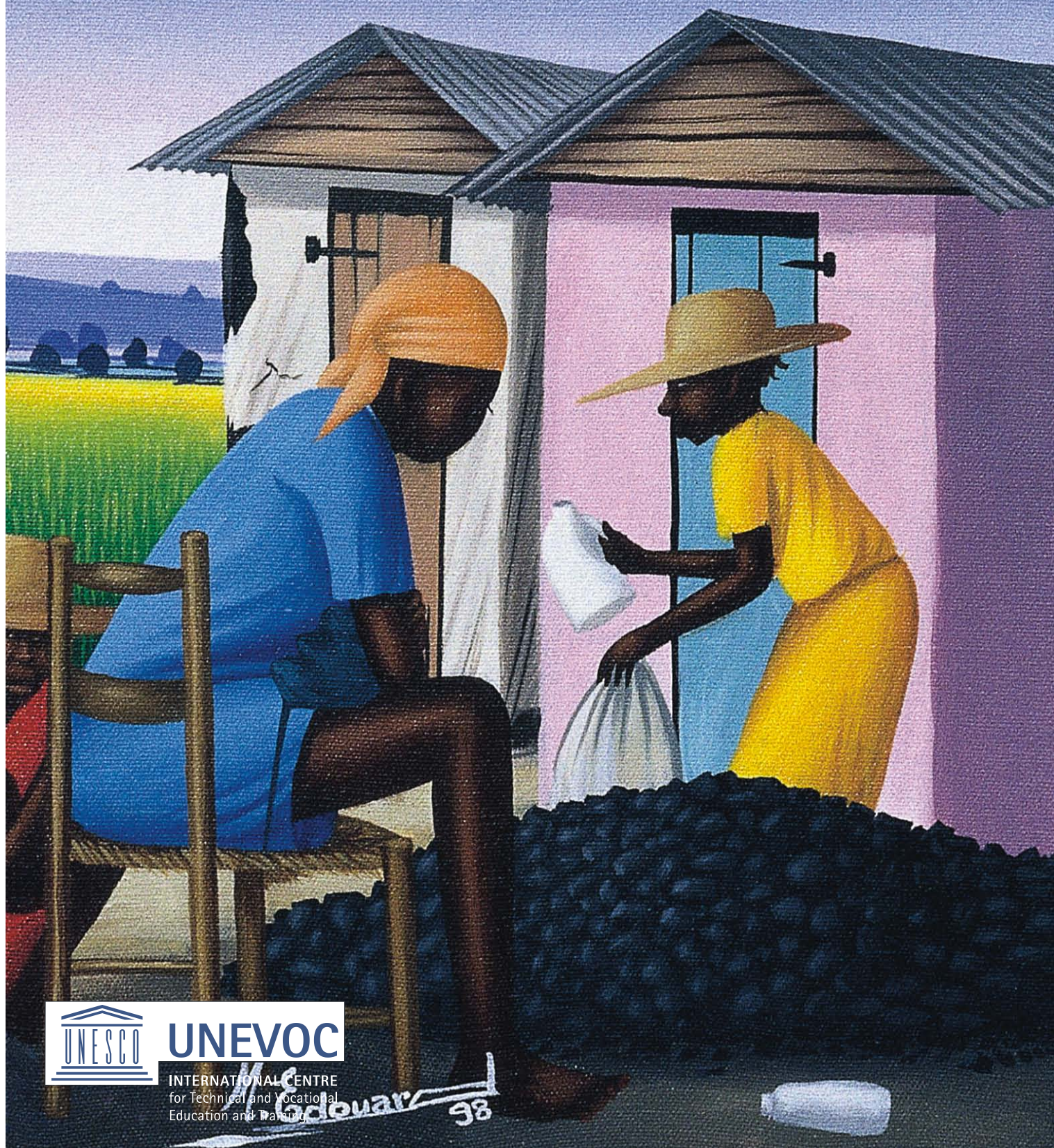


Global Action Programme on Education for All Youth Project

Charcoal Dust



UNEVOC

INTERNATIONAL CENTRE
for Technical and Vocational
Education and Training

98

Learning and Working

Motivating for Skills Development: A Campaign Package

Version February 2006

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Booklet 7.10 – CHARCOAL DUST

This booklet complements the video clip on “Charcoal Dust” on DVD 2. It gives a short summary of the content of the video and contains illustrations followed by technical texts, which will make it easier to understand and recall the activities shown in the video. The booklet can be copied and handed out to participants, so that they can make notes on them or use them as a reference for later.

A transcript of the soundtrack of the video is included at the back of the booklet. Whenever the locally spoken language is different from the language used in the video, the facilitator may wish to use this text transcript as a basis for comments and explanations in the local language.

Comments and Observations

This video shows how to make briquettes by using charcoal dust. Charcoal dust recovers an important raw material and also contributes to the protection of the environment. It can even be used as fertilizer or added to compost.

Video CHARCOAL DUST: Summary

Every day, charcoal that is used for cooking, is sold in Haiti. The dust that escapes from the charcoal has accumulated all over the country. What to do with this “forgotten charcoal”, with this precious energy that is not used and leads to pollution?

This video shows that you can mix the charcoal dust with molasses or other natural binders like cassava paste to make briquettes that cost 40% less than the conventional charcoal for the same heating power.

You can learn how to make briquettes, both mechanically and manually. This activity allows on the one hand for recycling unused resources and on the other hand for contributing to the protection of the environment.



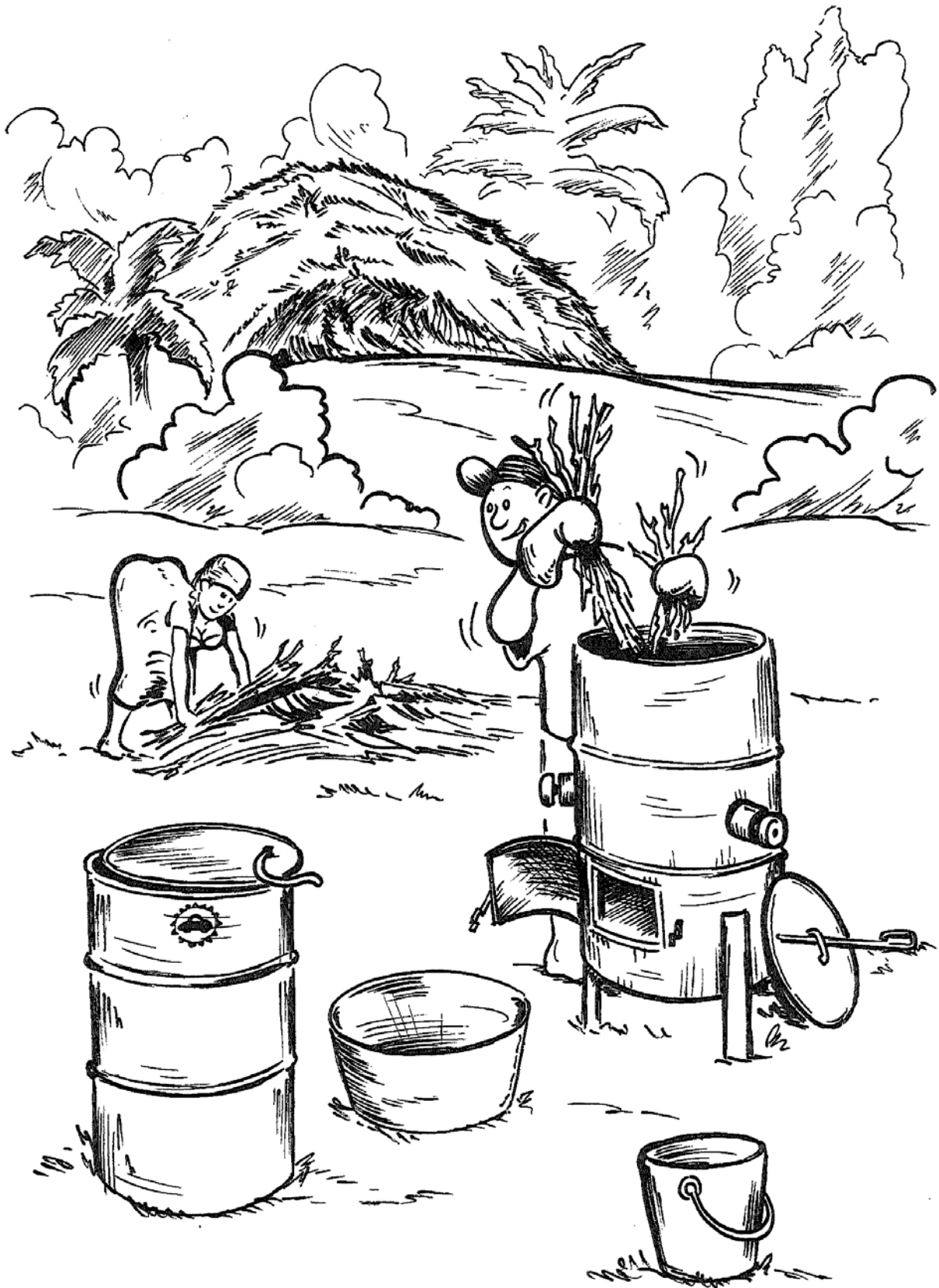
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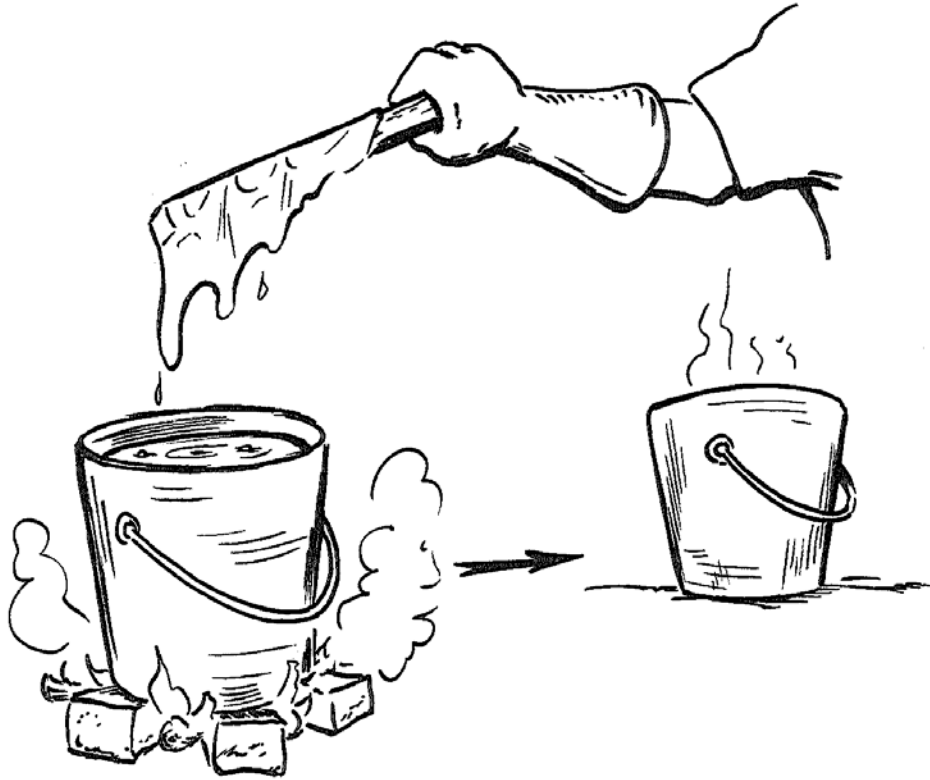
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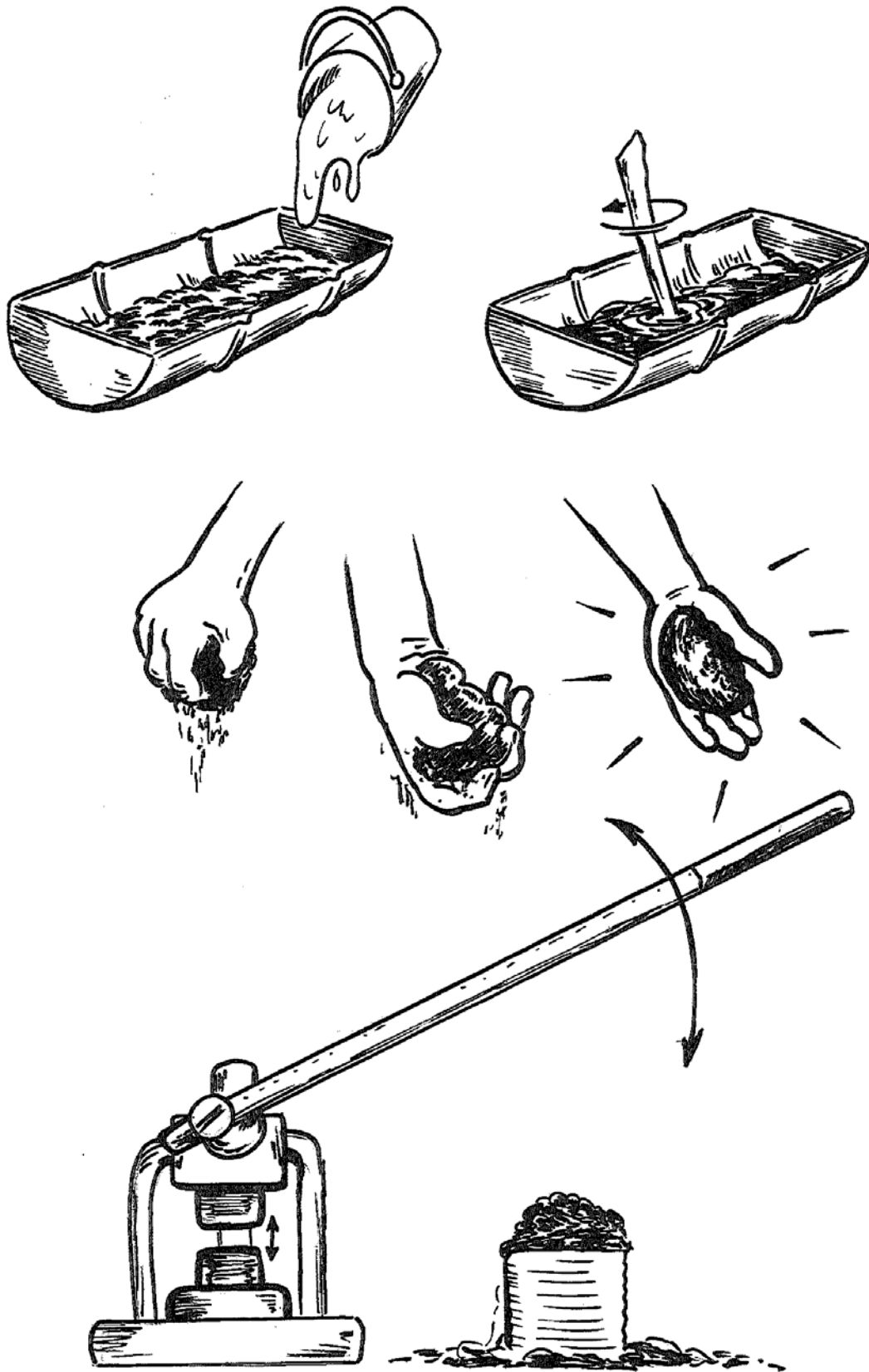
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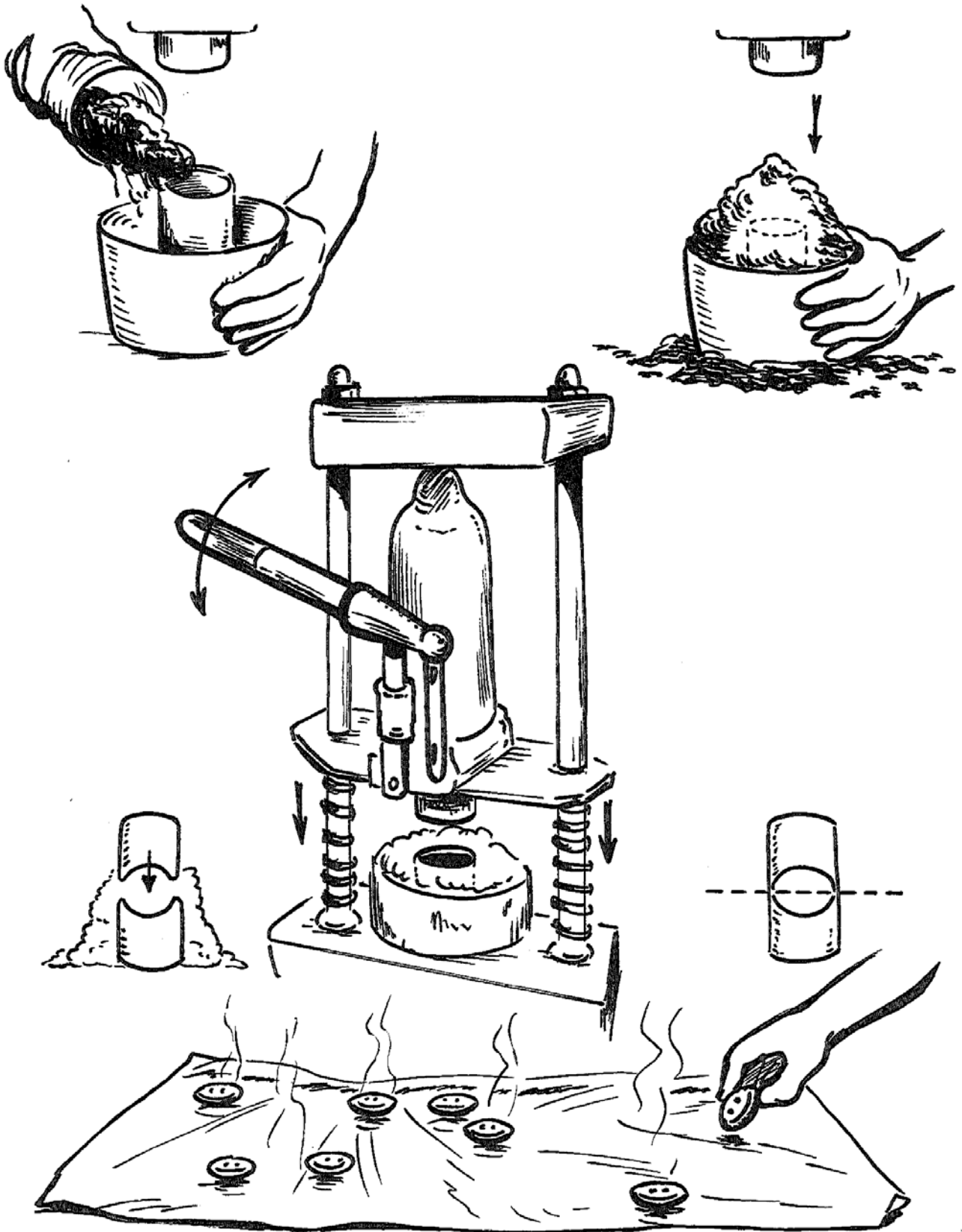
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Video CHARCOAL DUST: Technical Information

Charcoal and charcoal dust

In Haiti, each year more or less around 300,000 tons of charcoal are sold. In each sack of charcoal, there are between 5 and 10% charcoal dust. In one year there are between 12,000 and 20,000 tons of unused charcoal that disappear, not as smoke, but with the wind.

These are millions of tons of charcoal in form of dust that can be used to make precious briquettes.

In collecting the charcoal dust, you recover an important raw material to recycle and to contribute in an effective way to the protection of the environment.

Produce your own charcoal dust – continuous carbonization

If you do not have charcoal dust at your disposal, it is also possible to produce some with various natural materials to make later briquettes of it.

The bagasse, the residue of the sugar cane after producing the sugar or molasses, once dry, lends itself to carbonisation. But you can also use shells of coconuts, stems of dried corn or branches of the cotton tree.

All these natural materials can be converted into charcoal dust by continuous carbonisation. For that, you need a boiler which you can make yourself from an old barrel. This boiler must have a lid, a door and openings on its sides to adjust the air supply.

In fact, once the bagasse is put into the boiler, it must not burn lightly, but only carbonize slowly. It is easy to control that: you just have to watch the smoke. If it is yellow, there is still humidity escaping. If it is white, the carbonization is perfect. On the other hand, if it is blue, there is too much heat – you must reduce the air supply to slow down the combustion.

The result is that the bagasse has not burned, but is converted into coal.

Once out of the boiler, the coal of bagasse is put into a hermetically closed container so that it does

not continue to waste away. You can obtain an absolutely airtight closure with a lid and damp soil.

Making the binder

To convert the charcoal dust into briquettes, it has to be mixed with a binder, some glue that is responsible for the dust getting flexible and dense enough once it is compressed.

The best binder is made of molasses. In regions without sugar cane, and therefore without molasses, you can also produce the glue from cassava flour. Mix the flour with water and heat it, while you move it around until you get a thick, translucent and slightly brownish blend.

The mixture that has to be respected in making the cassava binder: With 1000g of charcoal dust, you need around 100 to 150g of cassava flour, mixed with ten times more water.

Mixing the binder and the charcoal dust

Before mixing everything, the binder has to be cooled down, and the charcoal absolutely dry. It is advisable to crush the charcoal with a sieve to obtain spots of more or less the same size (ideally 3mm).

Add glue (the binder) to this dust until you get a blend that stays dense when you compress it. The proportions are usually about 30% of binder and 70% of charcoal dust.

Making the briquettes

Of course, communities, associations or businesses that have the money can buy a machine that automatically makes briquettes. You can find them new or second hand (the price for a second hand machine is around 60,000\$US and for a new one around 250,000\$US). Such a machine produces 700 to 1400 lumps a minute.

But you can also shape charcoal in a traditional way. The traditional press is made of two hollow metallic forms that are fixed at a car jack (which can develop a pressure of up to 8 tons!). You can use a manual press, too, whose lever must however be long enough to develop enough power.

The most important thing is the size of the metallic mould: the diameter of the lumps should not exceed 30 to 40 cm, which is the ideal size of this briquettes type.

Drying the briquettes

Once compressed, the lumps must dry. According to the ambient temperature, it can last one to three days. You can watch them change colour from black to grey. For a faster drying of the charcoal, you can use a plastic hothouse or strew the briquettes on an aluminium sheet. Of course, you can also put them directly on the ground or onto a wooden support – which requires more time for the drying.

The advantages of compressed coal

The first big advantage of these lumps is the fact that they cost 40% less than charcoal of the same heating capacity.

Second, the lumps are ideal for ironing. Different from charcoal, they do not produce sparks. Thus, you do not risk burning the clothing.

The third big advantage is seen in the fact that the compressed coal constitutes a recycled product of a very high value. If it is not recovered, the charcoal dust is a polluting residue. And above all, it represents lost energy. To remember this "forgotten charcoal" and to use it, means to contribute to the fight against the deforestation that also constitutes a serious threat to the environment.

Video CHARCOAL DUST: Text of Soundtrack

Charcoal is a part of everyday life in Haitian kitchen. But what about the charcoal dust that makes up five to ten percent of an every bag? In the Port of Arcahaie alone, where the charcoal ships dock, constant unloading has left a huge black doom. These millions of tons of charcoal dust could be used to make valuable little briquettes.

All over Haiti, even in towns and cities, these mountains of lost dust can be seen. It is like throwing money away. Two bothers, Blanco and Fresnel, could not stand to see such waste. So they decided to gather up the dust in bags and sell it.

Who are their clients? People like M. Daler and his employees who turn the dust into small briquettes. This small job works well for Blanco and Fresnel, because they can always find takers for their merchandise. And every job deserves a payment.

Thanks in part to their efforts, charcoal dust no longer goes to waste or spoils the environment. It is used for moulding charcoal briquettes. But first it has to be sifted.

Stones and other material must be removed.

For the next step the dust needs to be perfectly dry. The Haitian sun comes in handy here.

Then the conveyor belt takes it to the first machine in the factory, which makes all the bits the same size. Then the charcoal dust is crushed and pressed through the perforated metal.

This powder is taken to the mixer, where a binding agent is added in. This is made from molasses of unrefined sugar cane.

Gustav checks that the mix has the right consistency for moulding.

Once the dust and the molasses have been well blended, the mixture is taken to the press.

The machine makes 700 to 1400 small briquettes a minute. This impressive output justifies the cost of this installation, which can be bought second hand for cooperatives or all village communities.

The small briquettes are spread out to dry on a netting, which is placed in a hothouse to speed up the process.

Thanks to the sun, they are dry in one day. Then they are packaged in plastic bags.

The bags are sealed. A lighter made of cane-pulp, paraffin and wax is also added to the charcoal.

Neatly packaged, this "Charbon Tout Bon" is sold in supermarkets and petrol stations. No one would guess that it was made from charcoal dust from the street.

The first great advantage of these small briquettes is that they cost forty percent less than ordinary charcoal – for the same heating capacity.

The second advantage is that they do not let off sparks when they burn. So there is less chance of burning the laundry.

Charcoal dust can also be made at home, with cane stocks for example. To do that, you need to use a steel drum as a furnace, with a lid, a door, and an opening to regulate the airflow.

The cane-stocks inside must not burn completely, but only char slowly. It is easy to check on this, just keep an eye on the smoke. If it is yellow, then moisture is still escaping. If it is white, then the process has worked perfectly. But if it is blue, it means that the heat is too strong and that the airflow must be reduced to slow down the combustion.

These results are perfect: The stocks did not burn, but they did turn into charcoal.

Ronny can refill his furnace with cane stocks and make as much charcoal as he wants.

Once it is full, the drum must be perfectly sealed, Ronny knows how to get an airtight seal. First, he closes the lid; and then, he makes an airtight seal using clay.

Cassava root flour works well as a binding agent for the charcoal dust. Ronny mixes one part Cassava root flour with ten parts water.

He keeps stirring while the mixture is heated, until it thickens and turns yellow. Then he can take it off the heat, and let it cool.

Big machines are not needed to make your own briquettes. Ronny's cane stock charcoal is his main ingredient.

The charcoal still has some chunks in it; so he starts by crushing it through a sifter or a wire mesh.

so the cane stock charcoal does not go on burning. The result is a dust that is free of lumps. The cold cassava paste is added to the dust to obtain a thick mix that stays in shape when moulded.

Ronny speeds up the drying process by laying his small briquettes on aluminium foil that reflects the sun.

Now the mixture is pressed into a mould made of two hollow shapes.

Ronny has welded his moulds onto a car jack. This gives him enough pressure to mould the small briquettes properly. A job well done.

A cut open plastic bottle makes the job easier.

Of course, making small briquettes at home is more labour intensive than using machines; but for Ronny's family and village, it is more than sufficient. And it has stopped the habit of cutting down trees for charcoal in this region.

Further Notes

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The Campaign Package

This Campaign Package has been developed and provided by the UNESCO-UNEVOC International Centre for Technical and Vocational Education and Training, Bonn, Germany. Its purpose is to facilitate the organisation of campaigns for mobilisation and motivation of young people, and for providing them with vocational orientation and guidance. The focus is on marginalised youth in the informal sector of least developed countries.

The package consists of eight components.

The current pilot version is being provided in English only. It will be evaluated in the field. Depending on the feedback that UNESCO-UNEVOC will receive, the package will be developed further.

The activities presented in this Campaign Package are not a guarantee of monetary success. The content is based on research, examples and advice from experts. Every attempt was made to ensure accuracy, and neither the authors nor the UNESCO-UNEVOC International Centre can be held responsible for incorrect information or changing circumstances.

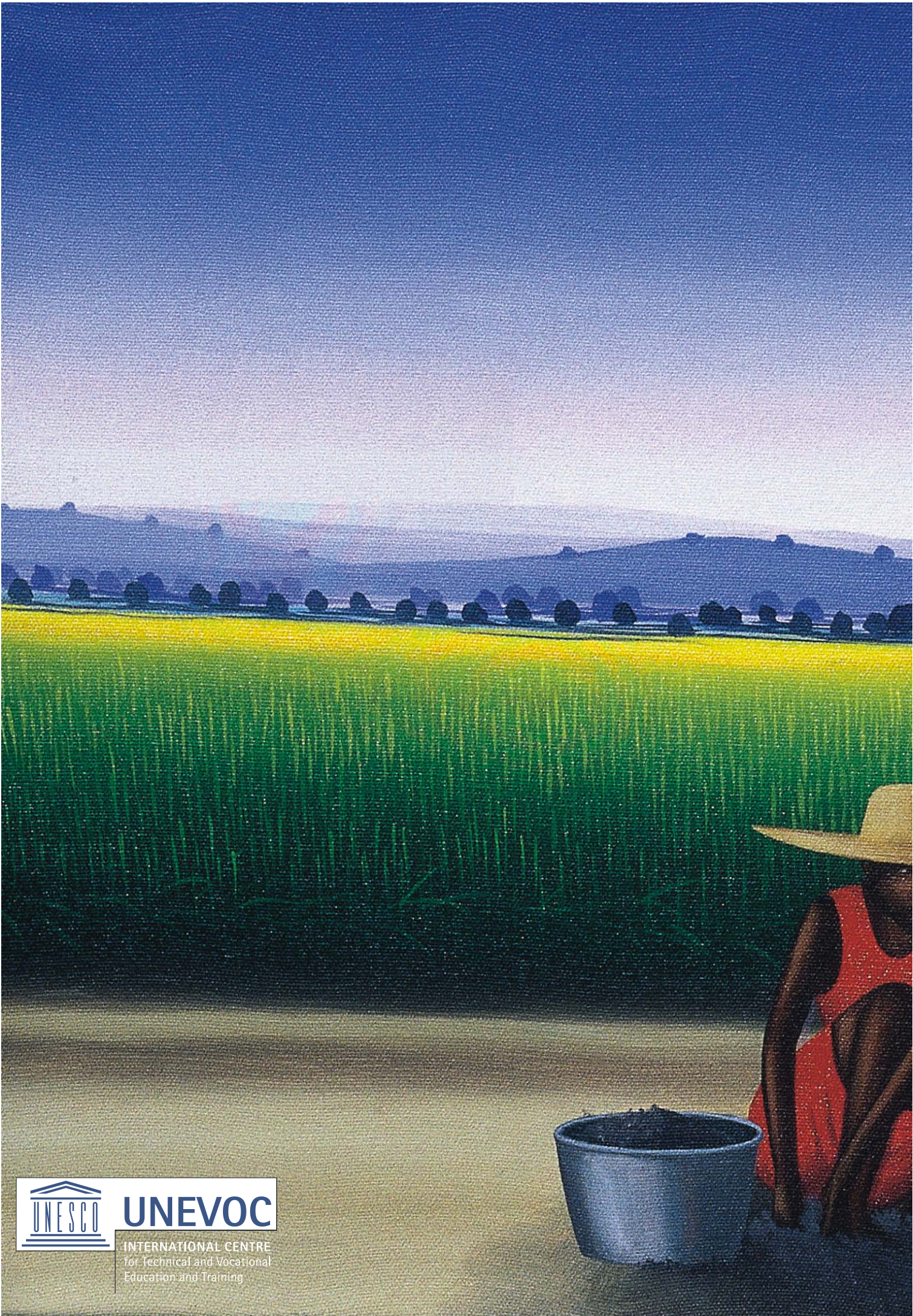
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Booklets accompanying the Video Series "Learning and Working"

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