



COLLECTION  
**PRO-AGRO**

# **Rattan**

**production and processing**

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# General information

Rattan is a vine-like, thorny palm that can climb trees by using a form of flagellum at the end of its leaves called a cirrus (short, curved thorns).

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Despite some common characteristics, there is a great degree of variety in terms of form and growth, resulting in roughly 600 different species of rattan. Although the majority of species currently identified are of Asian origin, 20 of them are endemic in Africa. The diameter of the stems varies between 3 mm to more than 20 cm, and the length ranges from a few metres to more than 200 m.

In general, rattan can be divided into two main groups, based on how it is used and the diameter of the cane: large diameter rattan such as *Laccosperma secundiflorum*, and small diameter species, also known as lianas, such as *Eremospatha macrocarpa*. Rattan can be grown and harvested in a sustainable manner due to its rapid growth and its ability to adapt to a very wide variety of ecological conditions. In addition, its use in furniture production provides an alternative to timber logging and thereby contributes to the protection of forest resources.

# 1

## RATTAN SELECTION, PRODUCTION AND MANAGEMENT

**Rattans are grown almost exclusively in the wild.** Today, they are threatened with overexploitation as a result of poor management practices. It is therefore important to promote cultivation. To achieve this, it is necessary to find land that possesses similar characteristics to those of tropical and swamp forests. Although rattan germinates best in partial shade, it grows most favourably in sunlight after transplanting.

Rattan can be cultivated in mixed cropping with other plants, or sown on land recently cleared by fire.

### 1.1 Rattan in mixed cropping

#### **Two to three months before the cropping season:**

- Weed the land and cut down certain trees;
- Immediately after that, sow with mature rattan seed, or plant seedlings or plantlets. A planting density of 50 to 170 plants per hectare is recommended. Seeds should be planted before burning the land as the heat can aid germination;
- After one to two months, burn the field;
- After that, plant food crops such as rice, maize, cassava, etc. In the first year, the young plants in the rattan crop require little maintenance;
- One or two years later, leave the cultivated land for a new plot. In the meantime, the rattan will continue to grow amid this secondary forest growth. In this way, the rattan crop is incorporated into the cycles of shifting cultivation.

Once growth is established, the rattans can remain in the fields for long periods. Cane harvesting can begin eight years after planting and may be extended over several years. Peak harvesting occurs between 24 and 36 years after planting, and declines as of 37 to 43 years.

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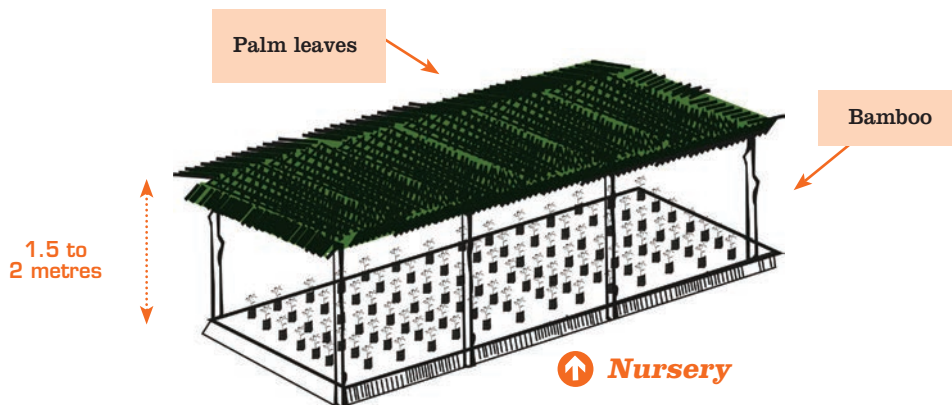
## 1.2 Rattan as a single crop

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**Rattan can be easily cultivated from seed by using the following steps:**

### >>> Making a nursery

The nursery can be built from local materials such as bamboo, palm leaves, etc. It is best to use humus-rich soil (a mix of black earth and sand or sawdust) when preparing the seedbeds. Adding sand or sawdust improves drainage and prevents the roots of the seedlings being damaged during transplanting.



### >>> Seed collection, preparation, storing and sowing

Collect ripe fruit that has recently fallen, with a bright red or orange colour because this means the seeds are mature and ready to germinate.

In order to speed up the germination process, first remove the seeds from the skin and pulp of the fruit by crushing it with your hand or foot. To remove the pulp, soak the seeds in water for two days and then rub them between your hands. After washing, sow them as soon as possible.

Rattan seeds can be stored in a damp condition for several weeks by wrapping them first in paper (toilet paper is recommended), then in a plastic bag. However, the seeds will gradually lose their germination potential. To store them for long periods, wash the seeds every three to four days and change the wrapping paper.

Large diameter seeds can be sowed 5 cm apart; small diameter seeds 2.5 cm apart.

Sow the seeds in the seedbed following the recommended spacing, and then push them 10 cm into the ground, cover with soil and water lightly.



### **Rattan seeds**

After sowing, weed and water the seedbeds regularly, and make sure that the seeds remain covered with soil at all times. Germination occurs mostly two to three months after sowing. When they first appear, the leaves look like needles.

Besides using seeds, rattan can also be cultivated by vegetative propagation, using suckers or rhizomes. However, it can be problematic to collect enough suckers or rhizomes for large-scale cultivation because they are larger and more time-consuming than seeds.

### >>> Transplanting seedlings in polythene bags

After two months, several leaves will already be open, and the young plant can be transplanted. This is done with polythene bags 12.5 cm wide and 20 cm deep, two thirds full with the same soil mix as in the seedbeds. In order to avoid damaging the roots, a mix of sand or sawdust can be added to the soil mix.

Before beginning, water the seedbed abundantly, remove the plant carefully and place it in the bag. Then fill the bag with soil, press down gently to steady the plant in the pot, and water lightly.

Place the pots with transplanted seedlings in the nursery, in blocks of four pots with walkways between the blocks. This will allow easy access to each seedling when weeding and watering.

The seedlings need regular weeding and watering. Keep the nursery clean and ordered at all times, and make sure the seedlings are in the shade. Remove sick or infested plants. After five to six months, the seedlings can be replanted.

### >>> Replanting in the field

In order to grow well, rattan requires sunlight and a climbing support. It is therefore a good idea to replant on uncultivated land. Planting should take place during the rainy season.

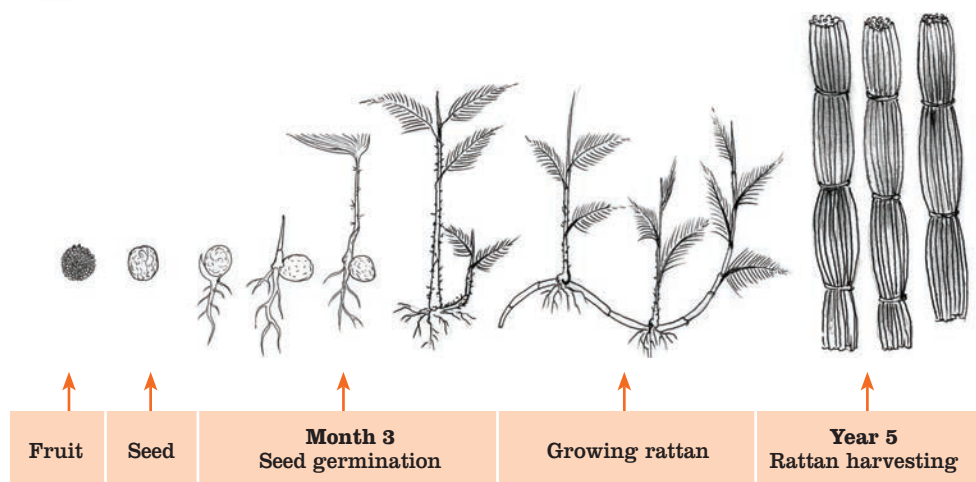




Avoid damaging the young plants while transporting them to the field. For example, do not cut their leaves or roots; otherwise they could dry out. The cropping pattern is 7 m x 3 m, or 476 plants per hectare.

**Do not damage  
the young  
plants during  
transportation**

The planting holes should be 20 cm wide and 30 cm deep. Fill one third with humus-rich soil or compost, then remove the plant from the bag and place it, together with the soil clod, in the hole and fill with earth.



### **Development of rattan**

In the first three years, water during the dry season and weed the plots regularly. As of the fourth year, guide the stems towards the support trees.

If conditions are good, rattan can reach maturity within five years.

# 2

## SUSTAINABLE HARVESTING OF RATTAN

**Harvesting rattan requires strength, intelligence, courage and endurance,** to avoid both the thorns and hooks of the climbing stems as well as insect stings.

**Harvesting equipment:** machete, gloves and a file. Wear long trousers, a long-sleeved shirt and boots.

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### 2.1 Harvest period

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**Adult canes can be identified by a lack of leaves at their base.** A rattan stem should be harvested when it meets the majority of the following criteria:

- The skin colour has turned brown;
- The thorns on the stem and the leaves are drying out and beginning to fall;
- Flowers or fruits have already appeared;
- The stem is more than 20-25 cm long.

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### 2.2 Harvesting procedure

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- Determine beforehand the species of rattan desired, according to its subsequent use. In this way, one can avoid pointless cutting of inappropriate species. Identify the mature stems of the desired species.



### **Identifying mature rattan stems**

- Cut the mature stems 10 cm above the ground, taking care to avoid young shoots. Throughout the operation, avoid damaging surrounding trees and bushes.
- Detach the cut stem from the crown of the bush by pulling it downwards, preferably with the help of one or two other people, and if necessary, climb into the trees in order to untangle the parts of the stem that are wrapped around branches.
- After having detached the main part of the stem, cut it into canes of various lengths, depending on the species, the size of the rattan, its intended use or the specifications of the buyer. In cases where the whole length of the stem is detached, cut off the last three metres, as they are unfit for processing, but may be useful for tying the rattan bundles.
- Stems are typically cut into lengths of 4 m for large diameter rattan, and 10 m for small diameter rattan.
- Sort through the canes in order to reject substandard quality canes.
- After harvesting, the rattan should be tied in bundles and transported for local use or to transformation centres.

**Always cut the mature stems 10 cm above the ground, avoiding young shoots**



### **Rattan bundles**

If any fruit is present, collect it for possible future cultivation.

## **2.3 Post-harvest treatment**

**The leaf sheaths adhering to the cane and the hard, shiny silicified epidermis should ideally be removed within 24 hours of harvesting.** This can be carried out by twisting the cane by hand and rubbing it with fine sand, steel wool, coconut or sack cloth. Smooth over the bumps made from the sprouting points by burning the canes, which will close any cuts and prevent any sap still in the stem from forming drops on the surface. The canes have a dull colour in their natural condition, but a sulphur treatment will remove any remaining roughness and give the canes a smooth, shiny appearance.

After this, the canes are dried for about one week to prevent any deterioration.

# 3

## RATTAN PROCESSING

**Ideally, rattan should be processed as soon as it has been harvested.**

Processing comprises a number of treatments applied to raw rattan in preparation for its subsequent transformation into finished products. Processing improves the quality of the finished product and the preservation of the raw rattan, and its by-products, by reducing post-harvest losses. There are two methods of processing: the traditional and the modern.

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### 3.1 Traditional method

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**This is a low-cost solution;** the only tools required being a tape measure, some brushes, a knife and a file. It is a good idea to wear long trousers, a long-sleeved shirt and plastic sandals or boots.

#### **The three steps of the traditional method**

- Scrape the skin of the rattan as soon as it arrives at the transformation workshop;
- Leave to dry for three to seven days in order to reduce the water content; as a result, the rattan can be preserved for up to a month and a half. Large diameter rattan can then already be used to make frames for furniture;
- Small diameter rattans are bent and split in order to produce strips that can later be used as bindings or in weaving.

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## 3.2 Modern method

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**Although more expensive, this method produces higher quality products.** In addition to the tools required in the traditional method, it is also necessary to have two chains, a curing tank, face masks and a pair of gloves..

### The five steps of the modern method

**1 Sort the rattan canes.** This is often done during harvesting, but it is useful to check that it has been done correctly. After the initial selection, the artisan should sort the canes according to their diameter, an important job before the next step.

**2 Cure the canes in boiling diesel oil** in order to rid them of insects and larvae, reduce fungal disease and increase durability from 1.5 months to at least six months. In addition, curing gives a better colour to large rattans, reveals internal flaws in the canes and eliminates the need to scrape the rattan before it can be used.



↑ **Curing tank**

### The curing process

- Light a fire beneath the curing tank filled with diesel oil and wait until it comes to the boil. Wrap a chain around the rattan bundle. Put on a face mask and gloves before placing the rattan in the diesel oil. The duration of the curing process depends on the species, the diameter and the water content of the canes. Freshly harvested rattan will take 15 to 30 minutes; rattan harvested more than three days previously will take only 12 to 20 minutes. Likewise, freshly cut lianas will take 8 to 10 minutes of boiling, and only 6 to 8 minutes if they were cut more than three days previously.
- Lift the rattan out and hold it on the edge of the tank for 30 seconds in order to remove excess oil. During this procedure, it is extremely important to avoid spilling diesel oil on the ground. It is therefore recommended to install the curing tank on a concrete surface. Large diameter rattan will have a golden colour and a varnished appearance. After removal from the curing tank, clean the canes with a cloth and sawdust to remove excess oil.

### Safety precautions during the curing process

- Use superior quality equipment in order to avoid oil leaks, burns and poisoning.
- Have a fire extinguisher ready at all times.
- Ventilate the treatment workshop and make sure the interior and surrounding area are clean and tidy.
- Follow the steps of the process carefully in order to avoid confusion or panicky movements.
- Make sure the oil never comes into contact with the fire.
- Do not heat the oil above 100°C.

#### Alternative process

The canes can be steeped in a mixture of diesel oil and coconut or palm oil in order to rid them of unwanted gums and resins as well as moisture.

There is great diversity in this treatment with mixtures varying in concentration from 50:50 to 90:10 diesel to other oil, temperatures from lukewarm to 100°C, and periods of immersion from 10 to 40 minutes. The rattan is then sundried for 7-12 days.

**3 The canes are placed upright and dried** for 10-14 days.

**4 Once the rattan is dried, any canes showing defects are rejected,** while the remainder are sorted according to the presence or absence of marks on the skin. Large diameter rattan can already be used in the transformation process.

**5 Small rattans are scrubbed then bent** and split in order to produce strips that can be used for binding or weaving. Large immature rattans bend during drying and can be prepared for use as chair seats or mats. Processed rattan can be preserved for several months in a warm and dry environment.

Other chemical treatments can be applied to rattan during the transformation process.

**Reject any canes with defects and sort the good canes into categories.**



# 4

## RATTAN TRANSFORMATION

Rattan has a great variety of uses: house construction, wickerwork, furniture, fishing nets, etc. The transformation process includes all the techniques applied to the raw rattan, treated or partially treated, as part of its transformation into a finished product (furniture, baskets, etc.).

### 4.1 Required equipment

**The first step is to get training and the capital necessary to set up a transformation activity.** Training in wickerwork can be done by working as an apprentice for six months to a year.



↑ *Some work tools*

Traditionally, wickerwork requires the following tools: knife, pencil, set square, tape measure, hacksaw, hammer, pliers, a welding torch and brushes. Additional tools can facilitate work and produce higher quality products, for example, a stapler, hole punch, electric saw, steam box, compressed air spray and a clamp. Finally, the artisan should also have a stock of nails, screws, glue, varnish, gas, Xylamon and stainer.

It is possible to set up a traditional workshop for less than 75 euros for the basic equipment.

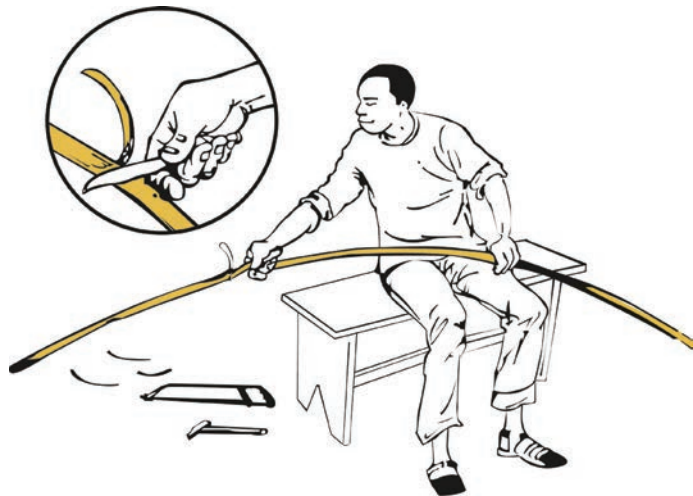
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## 4.2 Transformation process

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### **Note the following steps:**

- First decide on the model to make, then choose the appropriate canes;
- Scrape the small cane using a kitchen knife in order to remove the epidermis and split the cane into strips; scrape the large rattan too, if necessary;



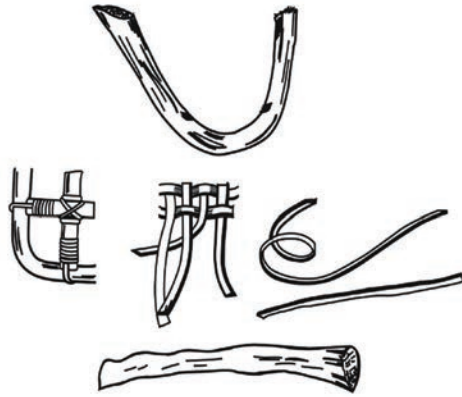
 **Scraping the cane**

- Pull the large diameter rattan until they are straight, then using a pencil, mark the bending or cutting points. The canes will be steamed before being twisted and bent or else used to form the skeleton structure of furniture products;
- Cut the canes to the required dimensions;



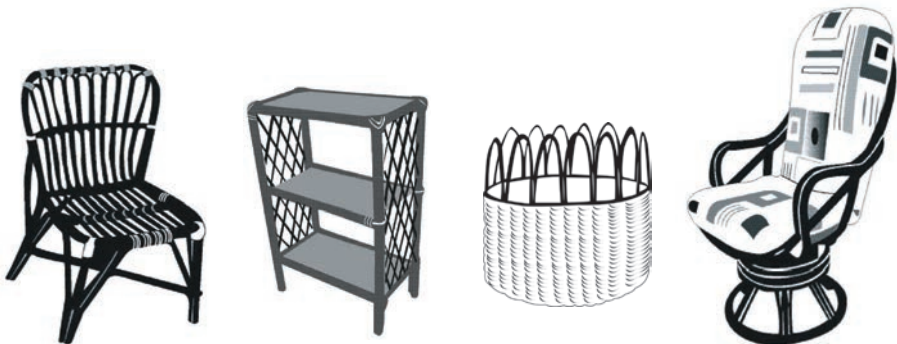
### **Transformation process**

- Heat the canes in a steam box, and then bend them on a work bench using templates. Failing this, use a blowtorch to facilitate bending;
- Construct the desired product using nails, screws and staples;
- Soak the strips of small diameter rattan in water for two to five minutes, and then use them to bind the joints. Make sure the binding looks attractive, and hides as many of the nails as possible;
- Use weaving and decorative techniques to finish the product. Furniture products should be treated with Xylamon in order to protect them from insects and larvae. Other chemical treatments, including staining, varnishing or painting with oil, can also protect products from fungal attack;



### ↑ **Some weaving techniques**

- Burn off any fibres and apply an initial coat of varnish. Leave to dry in the air or in the sun for 4 to 24 hours, and then apply a second coat of varnish;
- Alternatively, after making the basic skeleton structure, the furniture product can be sanded down and stained, using an electrostatic spray gun to apply polyurethane lacquer. This will protect the furniture from the effects of the sun, which is particularly useful for outdoor furniture that will have significant exposure to sunlight. After this, the hard surface is once again sanded down to remove any remaining roughness. To finish off, apply a matt or gloss polyurethane varnish;
- Inspect the finished furniture and carry out a quality control check. If the products meet the desired standards, then they are ready to be sold.



### ↑ **Finished rattan products**

# 5

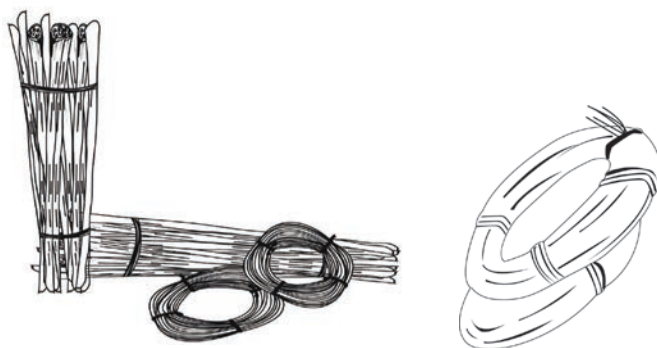
## RATTAN

## COMMERCIALIZATION

**More than 700 million people around the world trade or use rattan for multiple purposes.** Using modern processing and transformation techniques can generate considerable revenue and can improve livelihoods both in rural and urban areas. Rattan is currently commercialized in two ways: as raw material and as finished products.

### 5.1 Commercialization of raw rattan

**The most commonly traded rattans in Africa** are the large diameter *Laccosperma secundiflorum* and the small diameter *Eremospatha hookeri* (*E. macrocarpa*) because they both possess excellent characteristics in terms of pliability (flexible and strong canes) and aesthetic value (evenly shaped canes that are easy to polish).



↑ **Raw rattans**

In Africa, the unit of sale is a bundle or a bale. The harvester is usually paid per number of canes, each with a value of 100 to 200 F CFA (0.15 to 0.31 euros) for both species, depending on the quality. The unit price for large diameter canes can sometimes reach 300 F CFA (0.46 euros). A skilled harvester can cut around 140 canes per day, which results in a guaranteed daily income of 14 000 F CFA (21.30 euros).

It is also possible to work as a wholesaler for raw rattan in large urban areas. Quality control is especially important in this scenario: make sure there is no unwanted gum or resin, or any trace of mould. A regular client base depends on providing high quality rattan that is pliable, supple, strong and evenly shaped. The canes should be able to bend without splitting.

Rattan canes can be sold all year round, providing a stable and regular supplementary income.

There is also potential income generation in transforming rattan cane into furniture.

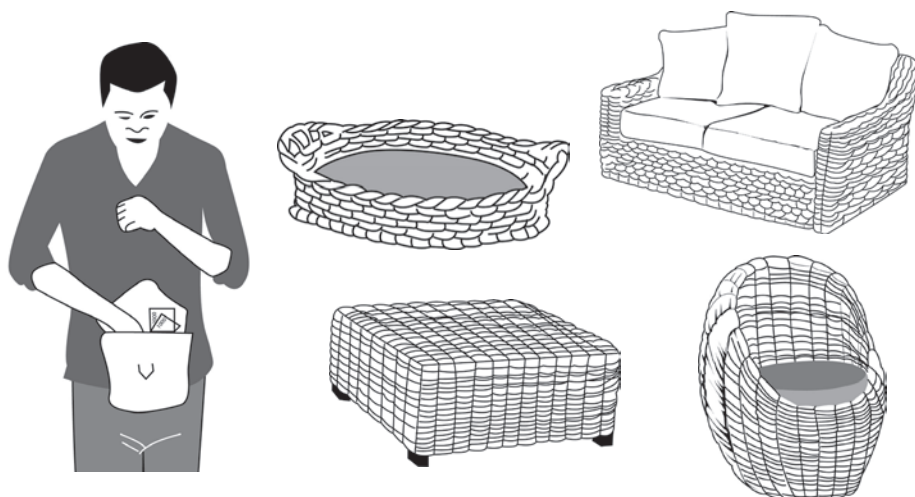
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## 5.2 Commercialization of transformed rattan

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**Rattan products include** kitchen utensils (trays, baskets, etc.), furniture (cupboards, chairs, beds, etc.), decorative objects (flower pots, statues, etc.) and models for hairdressing and tailoring (mannequins, etc.).

The quality of the products depends on the creativity and originality of the design, consistency in production, sturdiness, traces or absence of burn marks, careful use of nails and their appearance, and the style and quality of weaving.



### **Sale of furniture and decorative objects made from rattan**

Simple furniture is the most commonly found product in artisans' displays, and provide a minimum monthly profit of 150 euros. The quantity of cane used can vary from one product to the next.

EXPENSES				RECEIPTS			
Item	Unit	Unit cost (US\$)	Total price (US\$)	Item	Unit	Unit cost (US\$)	Total price (US\$)
Purchase of canes (250)	Bale of canes	8	2000	Sale of pieces of furniture	Piece of furniture	85	5 270
Shop rental	-	Fixes rate	322				
Casual labour	-	Fixes rate	382				
Equipment	-	Fixes rate	783				
Local taxes	Annual	Fixes rate	210				
TOTAL			3 697	Income			1 573

Source: Zoro Bi and Kouakou, 2004

**An artisan's trading account for 250 rattan canes**

# 6

## ADDITIONAL INFORMATION

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## 6.2 Useful contacts

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# Rattan

## production and processing

Pro-Agro is a collection of practical, illustrated guides that are jointly published by CTA and ISF Cameroun. They are an ideal source of information for farmers, rural communities and extension workers in tropical and subtropical regions.

This technical guide gives a general overview of the cultivation, harvesting, treatments, transformation and commercialization of rattan. It aims to promote sustainable and effective rattan cultivation as a reliable alternative to timber exploitation.

• **The Technical Centre for Agricultural and Rural Cooperation (CTA)** is a joint international institution of the African, Caribbean and Pacific (ACP) Group of States and the European Union (EU). Its mission is to advance food and nutritional security, increase prosperity and encourage sound natural resource management in ACP countries. It provides access to information and knowledge, facilitates policy dialogue and strengthens the capacity of agricultural and rural development institutions and communities. CTA operates under the framework of the Cotonou Agreement and is funded by the EU.

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