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Paix – Travail – Patrie

MINISTERE DE L'AGRICULTURE
ET DU DEVELOPPEMENT RURAL

SECRETARIAT GENERAL

DIRECTION DES ORGANISATIONS
PROFESSIONNELLES AGRICOLES ET
DE L'APPUI AUX EXPLOITATIONS AGRICOLES

SOUS-DIRECTION DE LA VULGARISATION
AGRICOLE



REPUBLIC OF CAMEROON

Peace-Work-Fatherland

MINISTRY OF AGRICULTURE
AND RURAL DEVELOPMENT

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DEPARTMENT OF PROFESSIONAL
AGRICULTURAL ORGANISATIONS
AND SUPPORT TO AGRICULTURAL FARMS

SUB-DEPARTMENT OF AGRICULTURAL
EXTENSION

Technical and Economic and data sheet for Rain-fed upland rice production and post-production



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OBJECTIVE

The aim of this sheet is to boost the productivity and production of rain fed upland rice by providing producers with an up-to-date compendium of good agricultural practices. At national level, this sheet will help to mitigate the effects of food crisis and reduce imports. This guide is a support tool for extension workers and rural advisers in the context of capacity building for producers, and is also a reference document for farmers.

I. OVERVIEW

Rice is one of the most widely consumed cereals in the world in general and in Cameroon in particular. It can produce numerous stems or stalks from the germination of a single grain, and can be grown in all the agro-ecological zones of Cameroon. A distinction is made between:

- Rain fed upland rice cultivation;
- Rain fed lowland rice cultivation;
- Irrigated rice cultivation.

The production cycle for rain fed upland rice varies from 3 to 4 months.

Rice by-products include paddy rice, white rice (whole and broken), brown/wholegrain rice, rice bran and rice husks.

II. TECHNICAL ITINERARY

II.1. Site Selection

Rain fed upland rice grows on firm soil, and grows best on fertile land (loamy-clayey soil, less sandy soil), virgin land or old fallow land. Avoid continuous cultivation on the same plot, paying attention to previous crops (avoid cassava or any other plants that exhaust the soil), or on barren land (soil that is white due to salt). It is important to preferably choose unshaded plots.

II.2. Soil preparation

This phase involves:

- Clearing, removing stumps and weeds;
- Ploughing the soil (15 to 20 cm deep);

- Potting (breaking up clods of earth) and levelling the soil as soon as the first rains fall in order to improve the rate of root emergence and development and to bury organic matter to prevent excessive weed cover;
- Staking the farm in blocks with a spacing of 1m between blocks for easy movements in the farm.

It is recommended to use small agricultural equipment (brush cutters, mini power tillers, etc.), to reduce the arduousness of the work.

II.3. Choice of variety

Choose the appropriate variety for your agro-ecological zone (table 1). Use seeds certified by MINADER's seed and seedling control and certification services.

Table 1: Presentation of some Rice varieties

Varieties	Suitable agro-ecological zone	Remarks
NERICA 3	All agro-ecological zones	
NERICA 8	All agro-ecological zones	Very short growth cycle and can be produced in areas with low rainfall.

II.4. Sowing

Seeds

It is advisable to use good quality seeds, i.e. pure, healthy seed with a good germination rate (80% and more). Seeds should be treated with registered insecticides and fungicides during or shortly before sowing. Good quality seeds produce healthy, vigorous seedlings with more roots.

The sowing date should be chosen so that flowering occurs during the period of regular rainfall and harvesting takes place during a period of low rainfall, taking into account climate changes.

Sowing methods

There are 03 different sowing methods:

- **Sowing by spreading:** this is done by hand or with a centrifugal seeder. It is quick but requires a lot of seed (about 80 to 120 kg/ha). Maintaining the plot is difficult with this method;
- **Continuous row seeding:** Quantity of seed 50 to 60 kg/ha. Use 15g for a 10m line, i.e. one cap of a five-litre oil container along the line and close slightly. Spacing between lines 30cm. This method makes maintenance easier;
- **Sowing in stacks:** Use a seed quantity of 35 to 40 kg/ha. Place 4 to 6 grains of seed in each hole (stacks) spaced 20cm apart on the line and 30cm apart between the lines, or 20x20cm, 25x25cm, then close them up slightly (this method can be done without ploughing and levelling).

If there is a risk of seed leaching by heavy rain, seeds should be sown to a depth of 3-4cm.

II.5 CROP MAINTENANCE

a. Fertilisation

In upland rain fed rice production, fertilisation should be applied only when necessary. The quantity of fertiliser depends on several factors: soil analysis results, climate factors and even the impact of the slope.

Organic fertiliser

Soils that are strictly rain-fed often lack organic matter. It is important to add manure, organic fertiliser, plant waste and farmyard manure to the soil. Organic fertiliser is applied during ploughing, at a rate of 7 to 10 tonnes per hectare, or approximately (15 to 20 carts).

Mineral fertiliser

At sowing, NPK 20-10-10 or 14-23-14 is applied at a rate of 200 kg/ha. After the first weeding (around 6 weeks after sowing or at tillering), apply urea at a rate of 50 kg/ha.

While ensuring the field is clean, apply a second dose of 50 kg/ha of urea at bolting (about 2 months after sowing). These different application stages must be scrupulously respected for good results.

b. Weeding

Weeding is an essential operation to ensure good rain fed rice production. There are two types of weeding commonly used in rice cultivation: manual weeding and chemical weeding.

Manual weeding

Manual weeding is the most commonly used and most effective way of controlling weeds in rain fed rice cultivation. It is therefore advisable to do the first weeding before weeds take over rice plants. The first weeding should be done 10 to 15 days after emergence (depending on how fast weeds grow) and the second about 30 to 45 days after emergence. In areas with strong weed growth, up to three manual weeding operations can be carried out.

Chemical weeding

There are generally two types of herbicides: pre-emergence rice herbicides and post-emergence rice herbicides (selective herbicides). Application of post-emergence rice herbicides followed by manual weeding generally gives satisfactory results.

II.6 Protection against birds

This very important operation is carried out in two stages: First, after sowing (about one week after sowing) to protect the seeds. To avoid long periods of guarding, avoid sowing over long periods. Then after flowering, from heading to harvest, to protect maturing seeds. You need to alternate the different control techniques including noise, slingshots, scarecrows, human surveillance, etc.

Plant protection:

One of the recurring diseases is “brown spot disease”, caused by dense sowing, poor and toxic soil. In the event of attacks by insect pests, which can seriously damage or destroy rice, it is advisable to use registered phytosanitary products and seek support from relevant technical services. In order to combat rodents, it is important to clean up around the farm and avoid using sites that are close to tuber farms.

II.7 HARVESTING

Harvesting is carried out in two phases: cutting and threshing:

- **Cutting**

The right time to harvest is when the colour of kernels changes from green to golden yellow or when the colour of 1/3 of the main stem (of the panicle) turns brown.

Harvesting is carried out using a sickle, small harvesters or other suitable equipment. Harvesting is best from 9-10am to avoid dew and rotting of grains. Cut plants 10-15cm from

the ground to avoid soil mixing with grains and to make threshing easier. Delayed harvesting can result in yield losses due to pests and lodging.

- **Threshing**

It is important to thresh the rice immediately after cutting. Threshing can be done manually on a cemented area, on a tarpaulin, in a mortar, or mechanically. It should be done immediately after cutting, to avoid mould. Mixing varieties during threshing should be avoided, as mixing leads to poor quality rice after milling.

II.8 POST-HARVEST OPERATIONS

a. Drying

After threshing, seeds must be dried to reduce the moisture content to 12 - 14%. If drying is not done properly, mould and bacteria will develop, grains will be contaminated and their quality will be poor. It is advisable to dry the rice in an airy and shaded place for 2-3 days; or spread the grains out 4-5cm thick on a tarpaulin, stirring every 1-2 hours for 2-3 days if the grains are dried in the sun.

b. Winnowing

Winnowing removes impurities from Paddy. It can be carried out while drying the grains, when it is windy.

c. Storage (Conservation)

Paddy can be stored in bags, in bulk or through hermetic storage systems. Paddy should be stored in a clean, well-ventilated area. Spray the area with insecticides and fungicides or any other suitable product. Leave to dry before putting the paddy in. Put the dried paddy in jute bags (preferably new ones) to allow good ventilation of the stored product. It is not advisable to put these bags on the floor or stuck to the wall if they are to be kept for a long time. Avoid storing paddy for long periods in conditions that are too dry and hot before processing. For long-term storage, bags should be taken out about once a month to prevent mould.

d. Milling

The milling yield and the quality of milled rice depend on the drying and storage method, and the moisture rate, which should be between 12 and 14%. If these conditions are met, the milling rate can vary from 60 to 65% (100kg of paddy yields 63 to 65kg of white rice).

e. Packaging and marketing

Package products well to ensure a good presentation before marketing. Given that local rice is not fumigated, it is advisable to mill gradually, and preferably to store paddy.

III. Risks and Constraints

Risks associated with the project mainly concern the instability of certain unfavourable trade and financial policies.

The following aspects have also been identified as potential risks:

- Failure to master cultivation practices. To reduce this risk, training is needed to build producers' capacities.
- Poor climatic conditions, particularly lack of rain during the implementation period, may hamper the achievement of expected results. With the assistance of various structures (MINADER, IRAD, etc.), choose the planting period carefully and get a motor pump;
- Destruction of the plantation by birds and other pests. Provide protection against birds just after sowing, and from flowering to harvesting.

III. OPERATING ACCOUNT (For illustration)

BUDGET

Operations	Units	Qty	unit cost	Total	Year1
I.INVESTMENT COST					
Sprayer	U	1	45,000	45,000	45,000
Machete	U	4	4,500	18,000	18,000
Pickaxe	U	2	5,000	10,000	10,000
Hoe	U	4	3,500	14,000	14,000
Tarpaulin	U	5	15,000	75,000	75,000
Shovel Spade	U	2	4,000	8,000	8,000
push truck	U	1	85,000	85,000	85,000
Triple decametre	U	1	10,000	10,000	10,000
Plastic drums	U	1	20,000	20,000	20,000
Sickles	U	4	5,000	20,000	20,000
Buckets	U	3	1,500	4,500	4,500
Boots	U	1	5,000	5,000	5,000
File	U	4	1,000	4,000	4,000
Twine	Roll	1	3,000	3,000	3,000
Tridents	U	4	3,000	12,000	12,000
Harvest bags	U	52	250	13,000	13,000
Sub-total small equipment				346,500	346,500
TOTAL INVESTMENTS				346,500	346,500

2. OPERATING EXPENSES					
Land rental	Ha	1	50,000	50,000	50,000
2.1 Inputs					
Seeds	1 kg bag	50	600	30,000	30,000
Insecticides (Cypermethrin)	Litre	1	5,000	5,000	5,000
Decaplant Herbicide	Litre	2	4,000	8,000	8,000
N-P-K 20-10-10	50 kg bag	4	26,000	104,000	104,000
Urea	50 kg bag	2	22,000	44,000	44,000
Organic fertiliser	50 kg bag	10	2,000	20,000	20,000
Sub-total inputs				261,000	261,000
2.2 Works					
Soil preparation					
Land clearing/cleaning	MD	20	2,500	50,000	50,000
Ploughing	MD	20	2,500	50,000	50,000
Staking and Sowing	MD	30	2,500	75,000	75,000
Guarding and hunting birds	MD	15	2,500	37,500	37,500
Spreading organic manure	MD	2	2,500	5,000	5,000
Spreading mineral fertiliser	MD	2	2,500	5,000	5,000
Fungicide / Insecticide treatment	MD	2	2,500	5,000	5,000
Herbicide treatment	MD	2	2,500	5,000	5,000
Manual weeding	MD	20	2,500	50,000	50,000
Chemical weeding	MD	4	2,500	10,000	10,000
Sub-total Works				292,500	292,500
2.3 Harvesting and post-harvest operations					
Harvesting	MD	10	2,500	25,000	25,000
Threshing and winnowing	MD	15	2,500	37,500	37,500
Drying	MD	4	2,500	10,000	10,000
Husking	FR	1	40,000	40,000	40,000
Packaging	MD	2	2,500	5,000	5,000
Subtotal harvesting and post-harvest operations				117,500	117,500
TOTAL OPERATING EXPENSES				671,000	671,000
TOTAL EXPENSES				1,017,500	1,017,500

DEPRECIATION

Designation		Qty	unit cost	Total cost	Lifespan	Year	1 farm. Seas./Year
Sprayer	U	1	45,000	45,000	3	15,000	7,500
Machete	U	4	4,500	18,000	2	9,000	4,500
Pickaxe	U	2	5,000	10,000	2	5,000	2,500
Hoe	U	4	3,500	14,000	2	7,000	3,500
Tarpaulin	U	5	15,000	75,000	2	37,500	18,750
Shovel Spade	U	2	4,000	8,000	2	4,000	2,000
Push truck	U	1	85,000	85,000	5	17,000	8,500
Triple decametre	U	1	10,000	10,000	2	5,000	2,500
Plastic drum	U	1	20,000	20,000	2	10,000	5,000

Sickle	U	4	5,000	20,000	2	10,000	5,000
Bucket	U	3	1,500	4,500	1	4,500	2,250
Boots	U	1	5,000	5,000	2	2,500	1,250
File	U	4	1,000	4,000	1	4,000	2,000
Twine	Roll	1	3,000	3,000	1	3,000	1,500
Tridents	U	4	3,000	12,000	2	6,000	3,000
Harvest bags	U	52	250	13,000	2	6,500	3,250
TOTAL DEPRECIATION						146,000	73,000

FINANCIAL RESULTS

Designation	Price	Qty	Total	1 farm. Seas./Year
Operating costs				671,000
Depreciation				73,000
Turnover (in White Rice 65% Paddy)	400	2,500	1,000,000	1,000,000
Gross Margin				329,000
Net profit				256,000