

RÉPUBLIQUE DU CAMEROUN
Paix – Travail – Patrie

MINISTÈRE DE L'AGRICULTURE
ET DU DÉVELOPPEMENT RURAL

SECRÉTARIAT GÉNÉRAL

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

SECRETARIAT GENERAL

DEPARTMENT OF PROFESSIONAL
AGRICULTURAL ORGANISATIONS
AND SUPPORT TO FARM ENTERPRISES

SUB-DEPARTMENT OF AGRICULTURAL
EXTENSION

TECHNICAL AND ECONOMIC DATA SHEET FOR GRAIN MAIZE PRODUCTION AND POST-PRODUCTION



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OBJECTIVE.....	3
I –GENERAL INFORMATION	3
II - TECHNICAL ITINERARY	3
II.1. Land or plot selection.....	3
II.2. Soil preparation	3
b. Clearing.....	4
c. Ploughing.....	4
II.3. Sowing	4
II.4. Crop maintenance	4
II.4.1. Weed control.....	4
II.4.2. Ridging	5
II.4.3. Fertilisation	5
II.4.4. Insect pest control treatments	6
II.5. Harvesting.....	6
II.6. Post-harvest operations.....	6
III-PROVISIONAL OPERATING ACCOUNT (01 HA).....	7

OBJECTIVE

This technical data sheet is designed to help producers master the technical procedures needed to increase maize productivity and production. At national level, this tool will help to mitigate the effects of food crisis and limit imports. It is also a support and reference tool for extension workers and rural advisers in their efforts to build producers' capacities.

I –GENERAL INFORMATION

Maize (*Zea mays*) is one of the most widely grown cereals in all regions of Cameroon and is the main staple food for the population. The West, North-West, Adamawa and North regions are the major production basins. It is grown for human and animal consumption, and as a raw material for brewing, chemical and biochemical, textile, and other industries.). Good maize yields can only be achieved by following the proper technical itinerary. In general, maize should be grown in an area where there is not at least 500 mm of rainfall during the production cycle, with temperature ranging between 18 and 30°C, and a soil pH is between 4.3 and 8.5.

II - TECHNICAL ITINERARY

The technical itinerary include each of the steps below. The use of personal protective equipment (PPE) is recommended for each stage.

II.1. Land or plot selection

The plot intended for maize production should meet appropriate conditions. Globally, the plot should be easily accessible.

Maize can be produced on all soils except those that are too sandy or poorly drained. Preference should be given to silt-clay, sandy-clay or gravel soils.

From an agronomic point of view, maize is a demanding plant and shady, flood-prone and steeply sloping areas should be avoided. The soil must be fertile and naturally well drained. It requires minerals (nitrogen, phosphorus and potassium).

However, for an optimal use of inputs, it is advisable to carry out a soil analysis beforehand in order to draw up a better fertilisation plan.

II.2. Soil preparation

Land preparation is carried out carefully to ensure optimal quantity and quality of the final product. This comprises three stages:

a. Logging

This operation only applies to the first use of the land. It is advisable to cut down the trees and remove the stumps.

b. Clearing

Clearing can be mechanical, manual or chemical. This operation consists of cutting the brushwood flush with the ground. The resulting residue may be buried during ploughing or used for composting.

c. Ploughing

Ploughing is an important stage in preparing the land because it sets the right conditions for planting the crop by ensuring a good bed for the seed to be sown. However, some agro-ecological zones are favourable for direct sowing without ploughing. If the land is suitable and mechanisation is available, flat ploughing is strongly recommended. The best ploughing procedure is that which does not leave large clods of earth, but which pulverises them to create a good seedbed and removes all large plant debris from the surface of the plot to be sown.

II.3. Sowing

There must be enough rainfall prior to sowing (at least 20 mm) to allow the seeds to germinate properly (i.e. two to three regular rains). Maize is sown either manually or mechanically. The sowing density varies. The spacing is 75 to 80 cm between rows and 25 to 50 cm along the row, with 2 to 3 seeds per cluster, giving a sowing density of 53,000 plants/ha. This requires between 20 and 25 kg of seed per hectare.

It is advisable to use certified seed available from approved organisations.

II.4. Crop maintenance

There are several stages in the maintenance of a grain maize production plot:

II.4.1. Weed control

Weed control consists of removing any weeds or other crops that would interfere with the proper development of maize. Weed control can be chemical or mechanical. It is carried out once or twice a cycle, depending on the weed cover.

Weed chemical control

There are two types of weed chemical control, namely pre-emergence weed control and post-emergence weed control.

Pre-emergence weed control is carried out before the weed grows. In most cases, only selected herbicides should be used because they are applied immediately after sowing and before germination on well-wetted soil. The recommended dose, which is sprayed on bare and wet soil (not dry soil), depends on the herbicide.

The average dose ranges between 200 and 300 ml/sprayer, depending on the approved products used.

Post-emergence weed control is carried out after the maize has already grown. Currently, nicosulfuron (herbimaïs, nicomaïs, plantomaïs, eargrow) and 2-4D (stripper) are selective post-emergence molecules that are recommended for maize weed control.

Spraying should be carried out by trained and experienced people in calm (no wind) and dry weather. Avoid spraying on wet grass or when it may rain before the end of the operation. Here, doses are generally lower 4-5 ml/litre of water. Weed control with these products should be carried out when the weed is still young, preferably 3 weeks after maize emergence.

Mechanical weed control

This consists of destroying the weed using manpower or any other tool. It can also be done with a tractor.

II.4.2. Ridging

Ridging consist of gathering the soil around the maize stems to support them against damages caused by strong winds. It is normally done 6 weeks after sowing, when the 2nd dose of fertiliser is applied, and generally concomitantly with weeding. Hence, the term “weeding-ridging”.

II.4.3. Fertilisation

Fertilisation depends on several factors, namely: (i) soil analysis results; (ii) climate factors; (iii) and relief. A mixed fertilisation is recommended as follows:

- A large amount of organic fertiliser: chicken manure, cow dung, compost, etc. should be added at the time of ploughing.
- Chemical fertilisation

1st application: 3 weeks after sowing, apply 2 bags of NPK (14-23-14, 14-24-14+5.5(S)+3.5MgO or 20-10-10) and 1 bag of urea/ha.

2nd application: 4 weeks after the first application, apply 2 bags of urea/ha.

A total of 2 x 50kg bags of NPK (14-23-14, 14-24-14+5.5(S)+3.5MgO or 20-10-10) /ha and 3 x 50kg bags of urea/ha.

It is not advisable to apply fertilisers in dry weather.

II.4.4. Insect pest control treatments

The death of the growing point (dry central leaves) may indicate the presence of borers. A dozen plants showing these symptoms are sufficient grounds for treatment. The most efficient product is **bastion**, a few granules of which are dropped onto the central leaves of each healthy plant, preferably early in the morning or late in the evening around sunset. Insecticides such as **cypermethrin** can also be applied. However, it is important to be very careful about the dose of the product used.

Borers can also cause brittle stems, drying male panicles and whole plants.

As a preventive measure, bastion or cypermethrin can be mixed with fertiliser and applied in the same way and at the same time.

Other pests of grain maize include armyworms and defoliator caterpillars.

II.5. Harvesting

Harvesting can take place as soon as the leaves surrounding the spikes (spathes) change naturally from green to yellow, then dry out depending on the variety. It is important to harvest in dry weather.

II.6. Post-harvest operations

These aim to reduce post-harvest losses, which are around 17.7%.

Preservation and storage

Generally after harvesting, the cobs are stored in cribs or attics with or without spathes. This is to reduce the moisture content of the grain to 12%-14%.

Processing

The main by-products include maize flour, starch, grits, semolina and maize oil.

Residues include cakes, cobs, spathe and stems.

III-PROVISIONAL OPERATING ACCOUNT (01 HA) BUDGET

Operations	Units	Qty	Unit cost	Total	Yr1
I.INVESTMENT COSTS					
Sub-total land and infrastructure				0	0
1.2 Material and equipment					
Sub-total material and equipment				0	0
1.2.1 Small equipment					
Sprayer	U	1	40,000	40,000	40,000
Machete	U	4	4,500	18,000	18,000
Hoe	U	4	3,500	14,000	14,000
All-purpose carrier	U	1	85,000	85,000	85,000
Triple decametre	U	1	10,000	10,000	10,000
File	U	4	1,000	4,000	4,000
Twine	Roll	1	3,000	3,000	3,000
Subtotal Small equipment				174,000	174,000
TOTAL INVESTMENTS				174,000	174,000
2. OPERATION EXPENSES					
Land rental	Ha	1	50,000	50,000	50,000
2.1 Inputs					
Seeds	1 kg sachet	25	1,000	25,000	25,000
Insecticides (Cypermethrin)	Litre	0	5,000	0	0
Herbicide	Litre	1	5,000	5,000	5,000
N-P-K 14-24-14	50 kg bag	4	26,000	104,000	104,000
Urea	50 kg bag	2	22,000	44,000	44,000
Subtotal inputs				228,000	228,000
2.2 Works					
Soil preparation					
Clearing/Cleaning	HJ	20	2,500	50,000	50,000
Ploughing	HJ	28	2,500	70,000	70,000
Staking and sowing	HJ	10	2,500	25,000	25,000
Spreading organic manure	HJ	0	2,500	0	0
Spreading mineral fertiliser	HJ	6	2,500	15,000	15,000
Fungicide / Insecticide treatment	HJ	2	2,500	5,000	5,000
Herbicide treatment	HJ	2	2,500	5,000	5,000
Weeding/Ridging	HJ	20	2,500	50,000	50,000
Subtotal Works				220,000	220,000
2.3 Harvesting and post-harvest operations					
Harvesting	HJ	10	2,500	25,000	25,000
Transport and handling	FF	1	50,000	50,000	50,000
Ginning and Packaging	HJ	10	2,500	25,000	25,000
Subtotal harvesting and post-harvest operations				100,000	100,000
2.4 Service provision					

				0	0
Subtotal Service provision				0	0
TOTAL OPERATION EXPENSES				548,000	548,000
TOTAL EXPENSES				722,000	722,000

DEPRECIATION

Designation		Qty	Unit cost	Total cost	Life span	Year	1 Season/Year	2 Seasons/Year
Sprayer	U	1	40,000	40,000	3	13,333.3333	3,333.33333	6,666.66666
Machete	U	4	4,500	18,000	2	9,000	2,250	4,500
Hoe	U	4	3,500	14,000	2	7,000	1,750	3,500
All-purpose carrier	U	1	85,000	85,000	5	17,000	4,250	8,500
Triple decametre	U	1	10,000	10,000	2	5,000	1,250	2,500
File	U	4	1,000	4,000	1	4,000	1,000	2,000
Twine	Roll	1	3,000	3,000	1	3,000	750	1,500
Gloves	U	0	2,500	0	1	0	0	0
TOTAL DEPRECIATION						58,333.3333	14,583.3333	29,166.6666

FINANCIAL RESULTS

Designation	Price	Qty	Total	1 Season/Year	2 Seasons/Year	3 Seasons/Year
Operating costs				548,000	1,096,000	1,096,000
Depreciation				14,583.33333	29,166.66667	4,3750
Turnover	225	3,000	675,000	675,000	1,350,000	2,025,000
Gross margin				127,000	254,000	929,000
Net profit				112,416.6667	224833.3333	885,250

Appendix: Corn varieties better appropriate to different regions

Regions	Composite varieties (Rdt: 4-6 t/ha)	Hybrid varieties Rdt: 7-10 t/ha)
Adamawa	SHABA; ATP SRY (CHC 202)	
Centre	BENEDICT (CMS 8704) THE CHARLES (8501) AYUK TAKEM (CMS 9015)	ECKEBIL (CLH 103)
East	BENEDICTE (CMS 8704) THE CHARLES (8501) AYUK TAKEM (CMS 9015)	ECKEBIL (CLH 103)
Far North	VROUMSIA TCHINAYE (CMS 8806) AYUK TAKEM (CMS 9015)	ECKEBIL (CLH 103)
Littoral	BENEDICT (CMS 8704) THE CHARLES (CMS 8501) AYUK TAKEM (CMS 9015)	ECKEBIL (CLH 103)
North	BENEDICT (CMS 8704) VROUMSIA TCHINAYE (CMS 8806) THE CHARLES (8501) AYUK TAKEM (CMS 9015)	EKEBIL (CLH 103)
North West	SHABA HOGBE NLEND (CHC 201) COCA SR; ATP SRY (CHC 202)	EKEBIL (CLH 103)
West	SHABA HOGBE NLEND (CHC 201)	EKEBIL (CLH 103)
South	BENEDICT (CMS 8704) THE CHARLES (8501) AYUK TAKEM (CMS 9015) AYUK TAKEM (CMS 9015)	EKEBIL (CLH 103)
South West	BENEDICT (CMS 8704) THE CHARLES (CMS 8501)	EKEBIL (CLH 103)