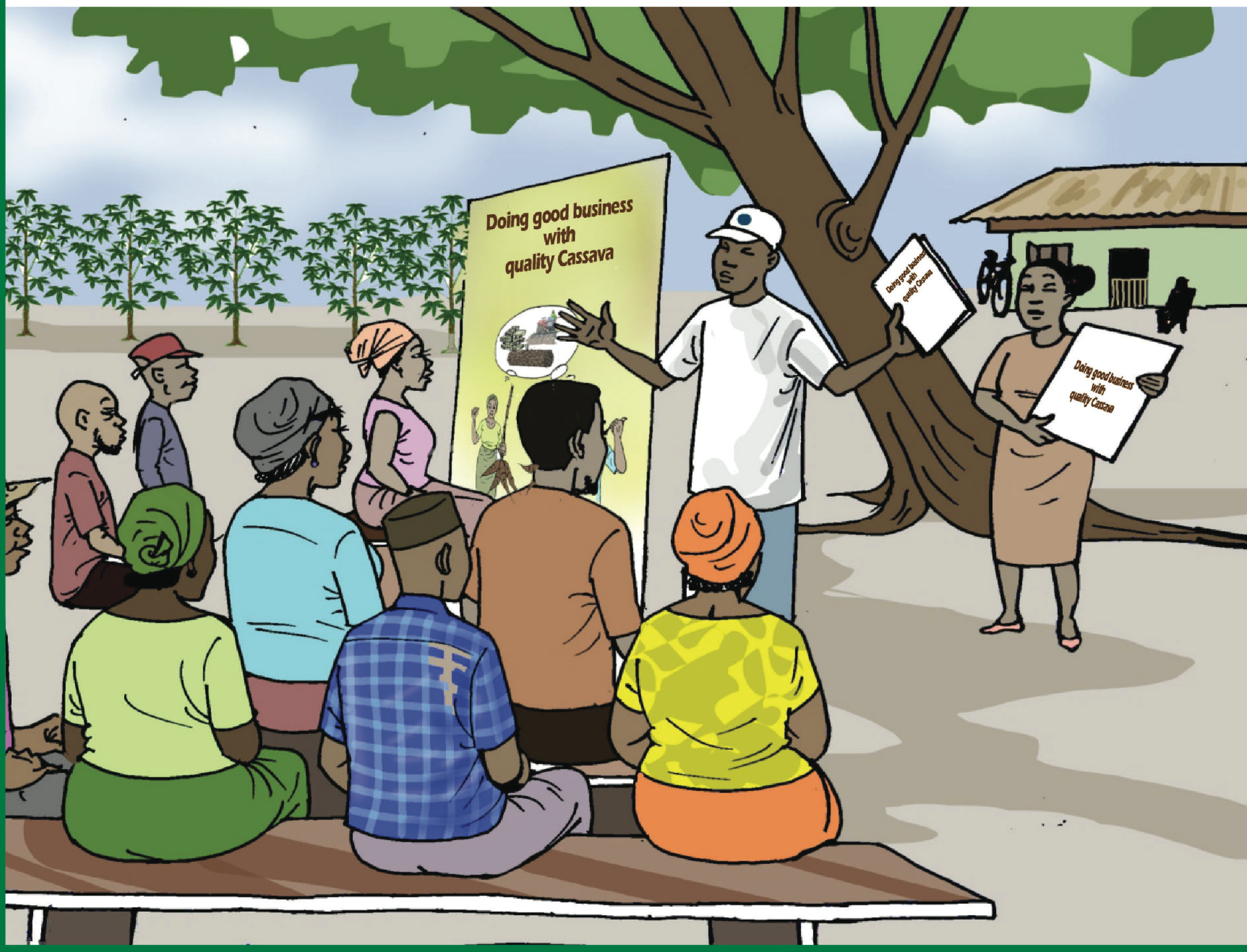
DOING GOOD BUSINESS WITH QUALITY CASSAVA (PRODUCER MANUAL)

german cooperation
DEUTSCHE ZUSAMMENARBEIT



DOING GOOD BUSINESS WITH QUALITY CASSAVA

Farmer Field and Business School Producers Reference in Nigeria

1st Edition, 2023

Implemented by

giz Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

NAME:	
COMMUNITY/ VILLAGE:	
PHONE NUMBER:	

PARTICIPATION IN EXTENSION SESSIONS

Sessions	Date	Approved by extension agent
Units to know Measuring the farmland Cropping calendar Land choice and preparation		
Choice of planting materials and planting		
Fertilizer application and field maintenance		
Plant protection and safe use of pesticides		
Harvesting and selling cassava Group sales and loan repayment		

CONTENT

LIST OF TABLES

MODULE 1

PLANNING IS KEY TO SUCCESS

Hello!

We are Bunmi and Tunde, cassava farmers from Nigeria.

Our objective is to have a good yield and high-quality cassava for our families and to earn good income.

To achieve this objective, we adopt Good Agricultural Practices (GAP) and ensure good market for our cassava products with buyers before planting.

For us, farming is a business therefore we organize ourselves to have the land, inputs, tools, labour and money necessary for the cultivation of our farms.

Table 1: Examples of businesses

Examples of businesses	Start and end of activities	Money-Out	Money-In
Cassava production	One needs to start the agricultural work at the beginning of the season One cannot stop the fieldwork before the harvest	For tools, equipment, pesticides, fertilizer, quality seed, services (tractor), and hired labour force	After harvest at the moment of sales
Cassava processing	One can start the processing at any time if one has the equipment and raw materials One stops the processing when the raw material is no longer available	To buy raw materials, and equipment and to pay employees	All year long as long as you have the raw material
Commerce	One can start and stop commerce at any time	To buy merchandise and to pay employees	All year long

NOTE: *There are other businesses too*

To succeed, we plan our farm work with the cropping calendar.

In this booklet, we share our secrets on how to do-good business with quality cassava. Follow us on the next pages to learn.

MAIN LESSONS:

- The agricultural entrepreneur plans and organizes to have land, inputs, tools, labour and money necessary for production ready at the right time.
- To achieve high yield, an agripreneur needs to adopt Good Agricultural Practices.
- To do successful business, the agripreneur finds out the prices (of inputs and produce) at different markets. This allows the farmer to plan production and make decisions on the purchase of inputs and the sale of produce.

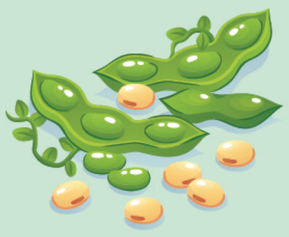
MANAGING OUR FARMS FOR ENOUGH FOOD

We consider our families nutritional needs in our production system. We manage our farms in a way that allows us to incorporate other farming systems that would provide the nutritional needs of families. Our families require food products that would give energy and physical and mental strength. Such food products are shown in the box below.

These products give us energy and physical strength to work and to grow	These products give us physical strength and mental force

Maize

Rice



Beans

Poultry

Yam

Cassava

Groundnut

Meat

Sorghum

Eggs

Fish

Oils gives us energy and makes the meal tasty	Fruites gives us energy (sugar) & Health	Vegitable gives us health and makes the meal tasty	Clean drinking water gives us health

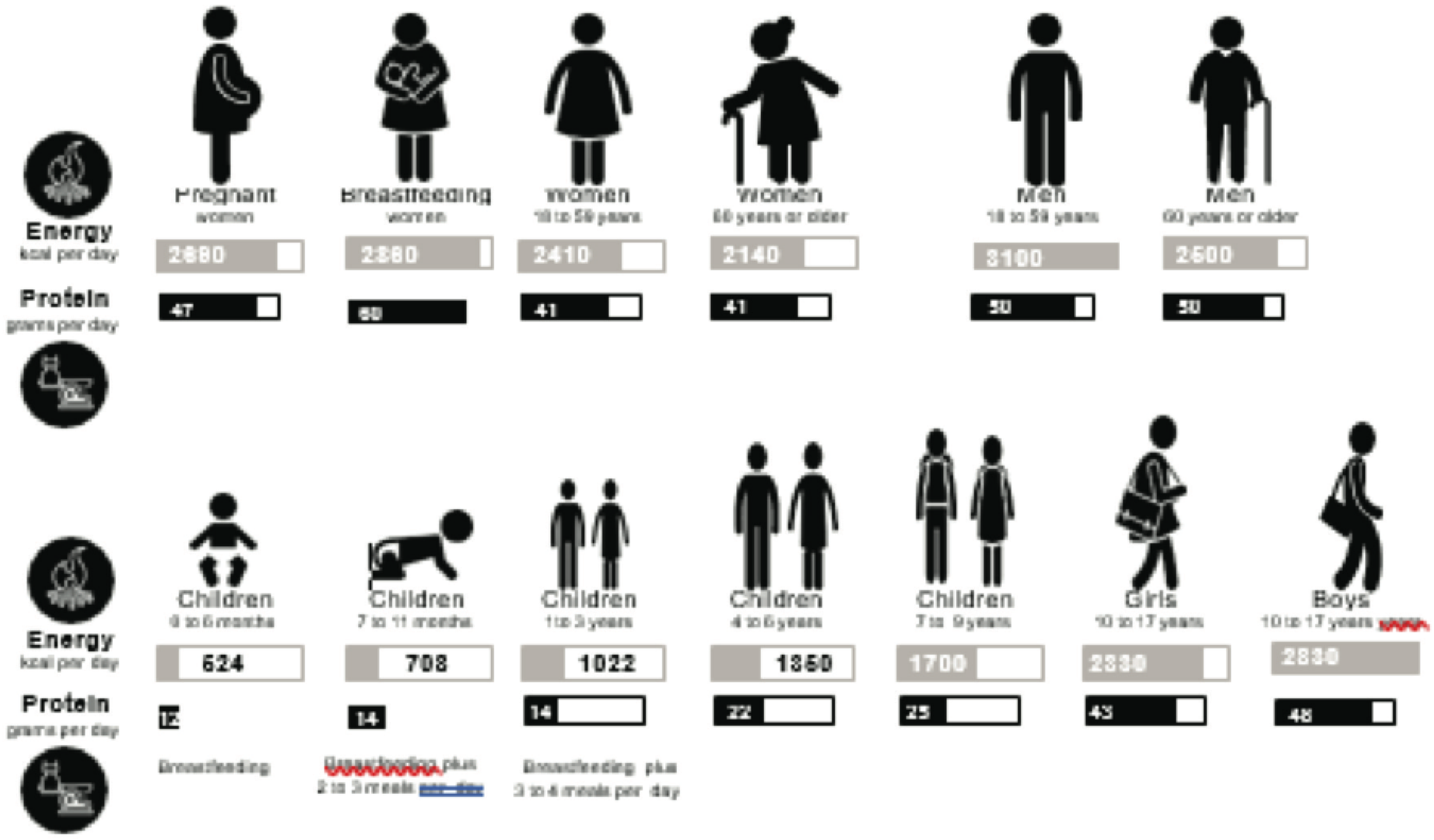
Adapted from FAQ 2014. Family Nutrition Guide, illustrations : Freepik.com

We seek knowledge and obtain information on our energy and protein need per day as shown in the boxes below

Food	Energy kcal per kg	Protein Grams per kg	Fat Grams per kg
Rice	3610	65	10
Maize	3530	93	38
Sorghum	3450	100	30
Cassava	1490	12	2
Yam	1180	15	2
Groundnut	5670	258	450
Beans	3330	226	8
Fish (dried)	2550	470	74
Eggs	1580	120	112
Meat	1610	195	79

Based on FAO 2004.Family Nutrition Guide; http://www.nutritiondata.com/facts/fats-and-oils/575/2

How much energy and protein do we need per day?



MAIN LESSONS:

- The agripreneur knows that each type of food is necessary for good and balanced nutrition of his/her family
- The agripreneur knows that the different types of food need to be combined to ensure good nutrition for his/her family.
- The agripreneur knows that the members of his or her family have different needs for food.
- Very good food for pregnant and breastfeeding women ensures good health and growth of young children. Children of a certain age need almost as much food as adult persons

Before the season, we familiarize ourselves with the standard units of measurement as in Table 2.

Table 2: Standard units of measurements

Distance	Kilometre (km): 1 km is 1,000 meters (m)
Length or width of a field	Meter (m): 1 m is 100 centimeters (cm).
Surface area	Meter squared (m2) Hectare (ha): 1 ha is 10,000 m2 1 hectare = 2.5 acres 1 Acre: 4,000 m2
Yield per unit area Volume	Yield per hectare: Yield per acre e.g 400 kg cassava roots/ha: 160 kg cassava roots/acre
Volume	Litres (L) Mililitre (Ml)
Weight	Grams (g) Kilograms (kg): 1kg is 1,000 g Tonne (T): 1 Tonne is 1,000 kg
Time	Minutes (min) Hour (h)= 1 hour has 60 minutes Day (D) = 1 day has 24 hours
Agricultural work	Persons-day (PD): The work of an adult in one day. Example: Work on one hectare requires 10 persons-days (10 PD/ha). The work can be done by 1 person in 10 days or by 10 persons in 1 day. It is important to specify the number of hours in a work day.

We also learn how to use the calculator to do addition, subtraction, multiplication and division.

What is a calculator?

A calculator is a tool you can use to do addition, subtraction, multiplication and division.

To put on the calculator
Press the **ON/AC**

To clear a wrong number
Press **C - CE**

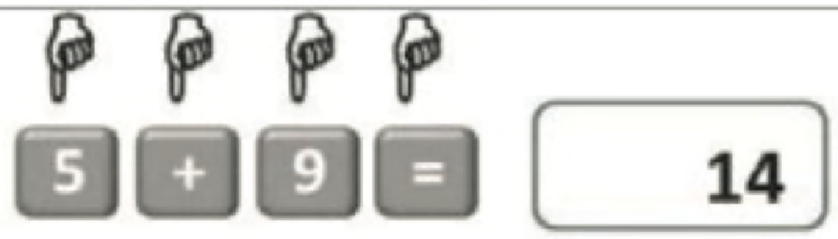
To start a new calculation
Press the **ON/AC** to clear

Addition (plus)

Type

Example:

5 + 9 = 14

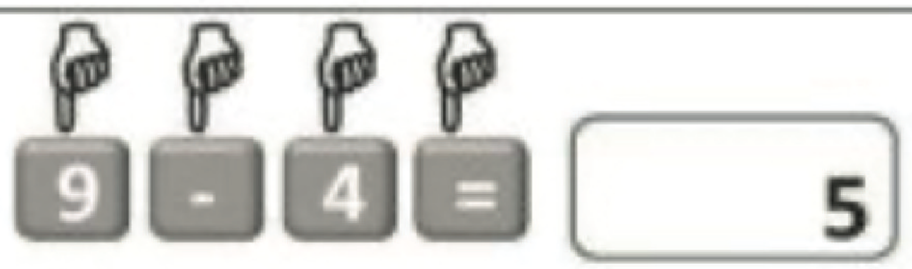


Subtraction (take away)

Type

Example:

9 - 4= 5



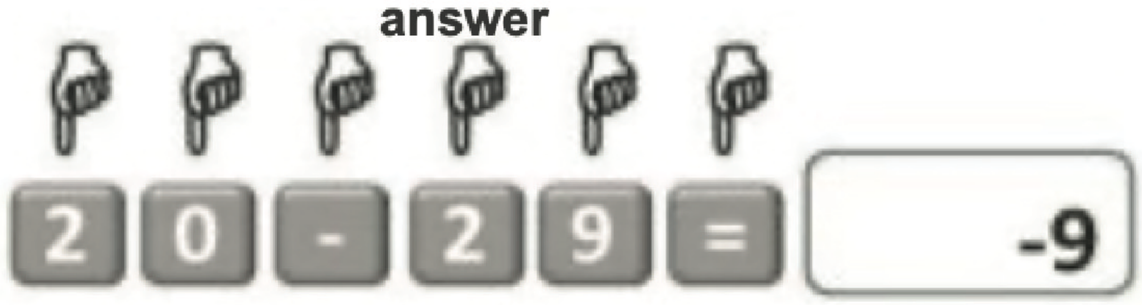
Example

20 – 29 = - 9

Type

If you take away a bigger number from a smaller number, the calculator will give you a take away number as in this example.

You will know that by the small dash "-" in front of the answer



Multiplication (times)

Example:

25 x 12 = 300

Type

Division (divide)

Example:

26 / 2 = 13

Type

Example:

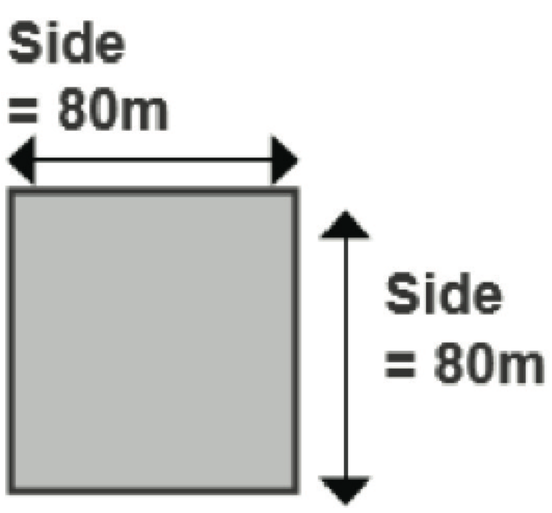
123 / 3 = 41

Type

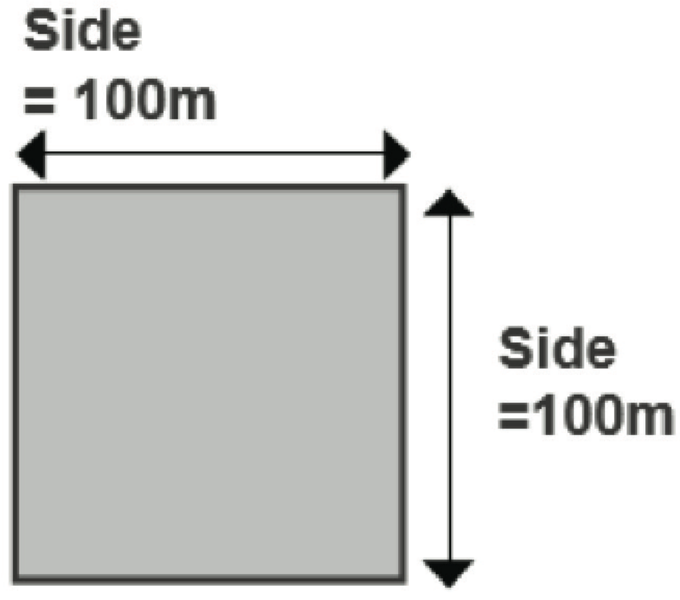
To know the size of your farmland:

1. Measure the length of your farmland in meters
2. Measure the width of your farmland in meters
3. Multiply length with width to obtain the size in m^2. For example, if the length is 100 m and the width is 100 m, this is equal to 10,000 square meters (m^2) or 1 hectare (ha).

MEASURING SURFACE AREA WITH A MEASURING TAPE



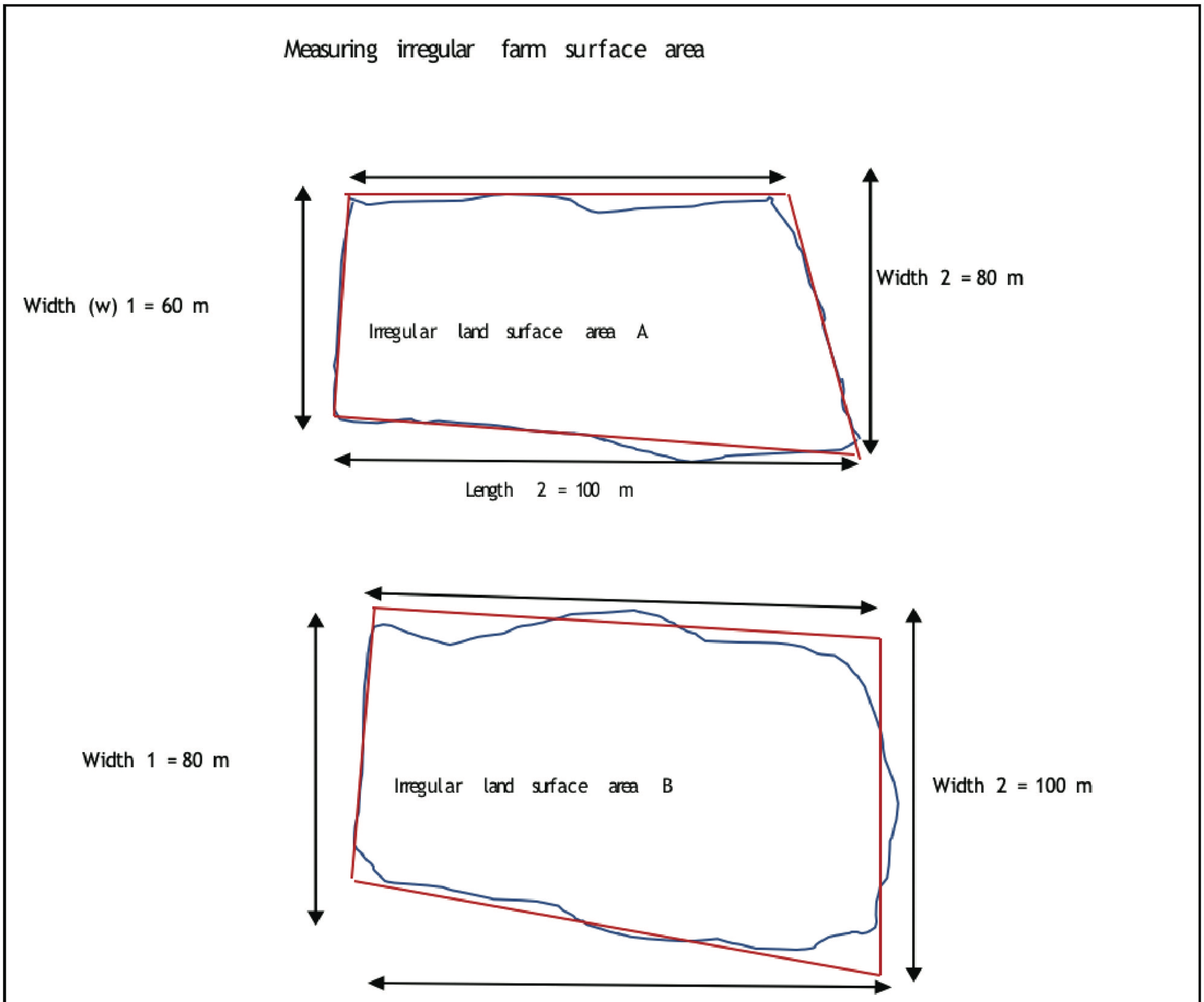
Surface Area calculation
= 80m x 80m
= 6,400 square meters (m^2)
= 0.64 ha



Surface Area calculation
= 100m x 100m
= 10,000 square meters (m^2)
= 1 ha

When my farmland is irregular in shape:

1. We measure the lengths of the two sides of the farmland in meters, add them up and divide the number obtained from the addition by 2. This will give us the average length (see box below),
2. We also measure the widths of the two ends of the farmland in meters, add them up and divide the number obtained from the addition by 2. This will give us the average width,
3. We then multiply the average length by the average width to obtain the size in m^2. For example, if the first length is 80 m and the second length is 100 m, the average length is 90 m. If the first width is 60 m and the second width is 80 m, the average width is 70 m. Then this is equal to 6,300 square meters (m^2).



Calculating Surface area A

= 80 m + 100 m ÷ 2 = 90 m

= 60 m + 80 m ÷ 2 = 70 m

= 90 m x 70 m

= 6,300 square meters (m^2)

= 0.63 ha

Calculating Surface area B

= 120 m + 104 m ÷ 2 = 130 m

= 80 m + 100 m ÷ 2 = 90 m

= 130 m x 90 m

= 11,700 square meters (m^2)

= 1.2 ha

We divide the size in m^2 by 10,000 to know the size in hectare.

A field in the shape of a rectangle or square is easy to measure. On such a field, it is easier to sow or plant in lines respecting the correct spacing distances.

Attention:

All the quantities of seeds, fertilizer and pesticide, which I give you, are for one hectare

If your farmland has	Multiply the quantities by
500 m^2	0.05
1000 m^2	0.10
2000 m^2	0.20
3000 m^2	0.30
4000 m^2	0.40
5000 m^2	0.50
6000 m^2	0.60
7000 m^2	0.70
8000 m^2	0.80
9000 m^2	0.90

MAIN LESSONS:

- Measures and units are key to doing good business in agriculture.
- Measuring the size of the field by using walking steps is not always accurate.
- The agripreneur who underestimates field size risks using too little fertilizer and fewer seeds. This can lead to reduced yields. Overestimates of field size risk using too much fertilizer and planting too close together. This can lead to reduced yields and unnecessary spending.
- Accurate knowledge of the size of the farm is essential to plan production, correctly apply inputs, and correctly space plants and seeds.

MANAGING MONEY THROUGH RECORD KEEPING

To know if we make a profit or loss after harvest, we always record in the workbook for our cassava farms:

1. The Money-Out for inputs and labour cost;
2. The Money-In from selling cassava roots/ stems.
3. Profit or loss (money in – money out)

We plan our family's expenditure, the farm and the children's education.

Money is spent (Money-Out) for the farm and the household each month, but the revenue (Money-In) comes only during the months of harvest or sale of produce. Therefore, there are months of the year where the expenditures are greater than the revenues. These months are called "deficit months." Therefore, we plan and budget production and household needs using the following steps:

Steps:

1. We look at the expenditure of the household and production activities.
2. We consider if these expenses can be predetermined
3. We also consider when and how often are they needed
4. Finally, we consider what is the specific cost by month and by year?

Table 3: Estimated farmer household money needs and expenditures

Money needs of the household	Can be foreseen	Period	Expenditures	
			NAIRA per month	NAIRA per year
Food items	Yes	Each month	100	1,200
Energy needs	Yes	Each month	200	2,400
Soap and detergents	Yes	Each month	700	8,400
Personal items	Yes	Each month	1,000	12,000
Transportation Medical expenses	Yes	Each month	8,000	96,000
Sub-total	**Yes**	**Each month**	**10,000**	**120,000**
School fees (500 Naira per child, 2 children, 3 times a year)	Yes	January, April, September		3,000
Clothing	Yes	Once a year (December)	15,000	15,000
Ceremonies and festivals				
Religious festivals	Yes	Once a year (March)	8,000	8,000
Social events (weddings, chieftaincy, etc.)	Yes	Once a year (December)	16,000	16,000

MAIN LESSONS:

- For this reason, the good agripreneur plans with the spouse(s) the expenditures for production and household needs.
- To cover the expenditures in deficit months, the good agripreneur saves money from the sales of produce ("surplus months").

Year 1												Year 2						
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July

To decide whether our farming business is profitable, we need to estimate the "money in" and "money out" from the different farming operations and sales of products based on the current market information.

To do this, we follow the following steps and estimate the "Money-Out" and "Money-In" in Table 4:

1. Multiply the quantity by the price in each line.
2. Sum the money spent ("Money-Out") on inputs, services and labour
3. Multiply the yield by the price of the sale ("Money-In")
4. Subtract the sum of "Money-Out" from the "Money-In"
5. Determine if there was a profit or a loss

Table 4: Example of estimated profit or loss in cassava production

	Unit	Quantity	Price (Naira)	Total (Naira)
1. Money-Out				
Inputs and Services				
Planting material	bundles	60	500	30,000
Transport of planting materials	bundles	60	100	6,000
Appropriate insecticides &fungicides	Litre	2	3500	7,000
Fertilizer (NPK 15:15:15)	50 kg bag	7.5	30,000	225,000
Pre land preparation herbicide	Litre	4	4,000	16,000
Pre-emergence herbicide	Litre	4	4,200	16,800
Post-emergence herbicide	Litre	4	4,000	16,000
Ploughing	ha	1	37,500	37,500
Harrowing	ha	1	30,000	30,000
Ridging	ha	1	37,500	37,500
Transport of Harvest	Naira/ton	30	5,000	150,000
Cost of inputs and services	Naira			**571,800**
Labour				
Clearing	ha	1	50,000	50,000
Pegging	PD	2	2,000	4,000
Planting	ha	1	20,000	20,000
Herbicide application	ha	2	6,000	12,000
Fertilizer application	bags/ha	7.5	1,700	12,750
Harvesting	ton/ha	30	4,000	120,000
Labour needs and cost				218,750
Money-Out	Naira			790,550
2. Money-In				
Production X Sales Price	ton	35	30,000	1,050,000
3. Profit				
Money-In minus Money-Out	Naira			**259,450**

MAIN LESSONS:

- To know if you are doing successful business with cassava, you need to know the “Money-In” and “Money-Out” with precision before production.
- The agripreneur tracks the inputs, services and labour used in a field and calculates the “Money-In” and “Money-Out”.
- The agripreneur makes a profit if the “Money-In” is greater than the “Money-Out”. In that case, he/she does good business.
- The agripreneur makes a loss if the “Money-Out” is greater than the “Money-In.” In that case, he/she does bad business.
- A good agripreneur will use good agricultural practices to make profit.
- After the harvest and sales, the good agripreneur evaluates the profit and identifies what changes are needed to improve the planning and profit for the next production season.

Here is my neighbour Iyabo with her harvest.
Iyabo does not use improved varieties nor Good Agricultural Practices (GAP).
She neither used mineral fertilizer nor did she protect her field against pests.
She harvests 10 tons per hectare Iyabo's profit is 46,000 Naira

This is me, Bumni, with my harvest. I used improved varieties, Good Agricultural Practices (GAP), mineral fertilizer, and I protect my field against pests.

I harvest 30 tons per hectare.
My roots are big, and I get a better price.
My profit is 259,450 Naira

Iyabo's field 1 hectare	Unit	Quantity	Price (Naira)	Total (Naira)
1. Money-Out				
Inputs and Services				
Planting Material	Bundles	40	300	12000
Transport of planting materials	Bundles	40	50	2000
Cost of inputs and services				14,000
Labour				
Clearing		1	50,000	50,000
Heaping				40,000
Planting		1	20,000	20,000
First weeding				40,000
Second weeding				40,000
Harvesting		10	5000	50,000
Labour needs and cost				240,000
Money-Out	Naira		**254,000**	
2. Money-In				
Production X Sales Price	Tons	10	30,000	300,000
3. Profit				
Money-In minus Money-Out	Naira		**46,000**	

Bunmi's Field 1 hectare	Unit	Quantity	Price (Naira)	Total (Naira)
1. Money-Out				
Inputs and Services				
Planting material	bundles	60	500	30,000
Transport of planting materials	bundles	60	100	6,000
Appropriate insecticides &fungicides	Litre	2	3500	7,000
Fertilizer (NPK 15:15:15)	50 kg bag	7.5	30,000	225,000
Pre-land preparation herbicide	Litre	4	4,000	16,000
Pre-emergence herbicide	Litre	4	4,200	16,800
Post-emergence herbicide	Litre	4	4,000	16,000
Ploughing	ha	1	37,500	37,500
Harrowing	ha	1	30,000	30,000
Ridging	ha	1	37,500	37,500
Transport of Harvest	Naira/ton	30	5,000	150,000
Cost of inputs and services	Naira		571,800	
Labour				
Clearing	ha	1	50,000	50,000
Pegging	PD	2	2,000	4,000
Planting	ha	1	20,000	20,000
Herbicide application	ha	2	6,000	12,000
Fertilizer application	bags/ha	7.5	1,700	12,750
Harvesting	ton/ha	30	4,000	120,000
Labour needs and cost				218,750
Money-Out	Naira			790,550
2. Money-In				
Production X Sales Price	ton	35	30,000	1,050,000
3. Profit				
Money-In minus Money-Out	Naira		259,450	

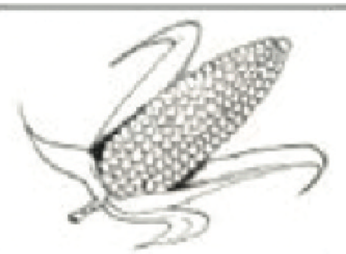
MAIN LESSONS:

- Improved techniques can improve the profit of the agripreneur.
- The need for inputs can be identified with calculations of Money-out. This information can be used to make savings in a targeted way or to request an input credit.

OPPORTUNITIES TO DIVERSIFY PRODUCTION AND MANAGE MORE MONEY FOR MORE INCOME THROUGHOUT THE YEAR.

To reduce possible risks in farming, especially with market variations and climate change, we sometimes diversify crop production by planting other crops such as maize and egusi melon. This can bring in extra income, as shown in Table 5

OPPORTUNITIES TO DIVERSIFY PRODUCTION FOR INCOME THROUGHOUT THE YEAR

We will determine the best opportunities as follows Rank crops based on Profit or Loss What crops and techniques will you choose?		 Cassava current	Cassava improved	 Maize current	Maize improved	 Egusi current	Egusi improved
Land Area	Hectares	1 ha	1 ha	1 ha	1 ha	1 ha	1 ha
1. Money Out = input costs+labour costs	NAIRA	**84,000**	**256,650**	**66,300**	**150,790**	**65,200**	**165,300**
2. Money-In = production x price of sales	NAIRA	**100,000**	**375,000**	**66,000**	**325,000**	**103,500**	**322,000**
3. Profit or Loss? Without Risk = Money-In minus Money-Out	NAIRA/Ha	**16,000**	**118,350**	**-300**	**174,210**	**38,300**	**156,700**
	Rank						
3. Profit or Loss? With Risk = Money-In minus Money-Out	NAIRA/Ha			**-300**	**174,210**	**38,300**	**156,700**
	Rank						

Risk is the possibility of something bad happening at some time in the future; or a situation that could be dangerous or have a bad result. So, we are mindful of the risks that can occur in agricultural production. The agripreneur does not like risks because they are difficult to predict. However, one can determine during the planning what the impact of risks could be on revenues.

We can learn this from the example in Table 5.

Table 5: Examples of agricultural risks.

Market Risk	Production Risks
The market price of fresh roots, due to glut may fall, from 30,000 naira per ton to 15,000 naira.	An outbreak of disease or drought may reduce cassava root yield from 30 tons/ha to 8 tons/ha:

Table 6: Estimation of the impact of risks on crop production

		Unit	Old practice	Improved practice
1.	Land area cultivated	Ha	1	1
2.	Money-out	Naira	254,000	790,550
3.	Money-In			
	a. Yield (low)	tons/ha	10	35
	b. Price (low)	Naira/ton	30,000	30,000
	c. Yield x Price of sale	Naira/ha	300,00	1,050,000
4.	Profit or Loss? ("Money-In"Minus "Money-Out")	Naira/ha	46,000	259,450

We would like you to answer these questions:

a. Are the two risks acceptable?
b. What can you do to avoid the risk?

MAIN LESSONS:

- The good agripreneur knows that change in prices and climate constitutes a risk to the revenue. Risks are a concern for traditional as well as improved varieties and techniques.

- To evaluate the impacts of market risk, the entrepreneur calculates the Money-in with a much lower price ("pessimistic") than the current price (or last season's price). The risk is acceptable if the "pessimistic" profit can still satisfy the income objectives.

BENEFITS OF MEMBERSHIP IN FARMER ORGANIZATIONS AND COOPERATIVES

The following basic questions are important for members of farmer organizations to understand:

a. Why should I join a farmer organization?
b. What are the problems and risks of an organization you know?
c. How do you avoid these problems?
d. What is your conclusion?

How can one know if a farmer's organization works well?

1. Existence of the group
a. Members pay annual contributions without pressure
b. Members accept the costs (deductions on sales) without complaining

2. Operation of the group
a. Existence of rules
b. Existence of rules on the control of accounts
c. Regular reporting for the cooperative
d. The evolution of group activities (tonnage production, sales volumes of expenditure, group purchasing of inputs) is positive

We show calculations of profits of group sales from improved farm production in Table 7 and Table 8 profits from group purchase inputs in the case of improved farming techniques

Table 7: The calculation of additional profits obtained through group sales – in the case of improved farm production

			Improved cassava variety withfertilizer	
		Units	**Individual sales**	**Group sales**
	Land area cultivated	ha	1	1
1.	Money-Out	Naira	790,550	790,550
	Production	ton	35	35
	Price	Naira/ton	28,000	30,000
2.	Money-In	Naira	980,000	1,050,000
3.	Profit of group sales	Naira		
The total benefit of group sales			**70,000**	

Table 8: The calculation of the profit group purchase of inputs – in the case of improved farming techniques

		Improved cassava variety with fertilizer	
	Units	**Individual sales**	**Group sales**
Land area cultivated	ha	1	1
Cost of inputs & services	Naira	620,000	571,800
Profit of group purchase	Naira	0	
The total benefit of the group purchase of inputs			**48,200**

Note: *Inputs can be provided less 10% less expensive through the grouped purchase*

ADVANTAGES OF MEMBERSHIP IN FARMERS' ORGANIZATIONS AND COOPERATIVES

We are members of farmers' organizations and cooperatives, which help us do things we cannot do individually. The benefits that we have derived from being members include the following:

1. Groups or associations of agripreneurs have a common business objective. To achieve their common goal, the members learn from each other and support each another.
2. It is easier and cheaper for farmer groups and associations to access agro-services and inputs than for individual farmers.
3. A group of agripreneurs can more easily seek information (financial services) on production from extension service providers.
4. A group of agripreneurs can organize bulk purchases of agricultural inputs and get better prices from the input suppliers.
5. A group of agripreneurs can organize sales of cassava products.
6. Agripreneurs that are members of well-functioning associations or groups do better business.

Associations or groups of agripreneurs that function well have clear rules that are respected. When members break the rules, sanctions are applied.

CASSAVA CROPPING CALENDAR

Work to do	Year 1												Year 2					
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J
Get market information																		
Choose a good farmland and conduct soil test																		
Land measurement																		
Clearing the land																		
Applying pre-planting herbicide			A	A				B										
Sourcing good quality cassava stems																		
Land preparation (ploughing, harrowing, pegging andmaking ridges or heaps)			A	A				B										
Collecting good quality cassava stems			A	A	A			B	B									
Planting cassava cuttings (A and B)																		
Application of pre-emergence herbicide (latest 3 days afterplanting)																		
Replace non-germinated cuttings (3 weeks after planting)																		
Weeding																		
Fertilizer application (8 weeks after planting)																		
Check for pests and diseases																		
Apply insecticide when necessary																		
Harvesting and selling cassava roots																		

A = Cycle 1 **B = Cycle 2**

We have observed that the climate around us has changed. This climate change is affecting our cassava production negatively. We can no longer plant our cassava crop as we used to do without considering this change. For example, the weather patterns are becoming more unpredictable; rains are erratic, growing seasons are becoming shorter, and droughts, pests, and diseases are increasing.

Therefore, we do our farming in a climate-smart way to minimize the impacts of climate change on our farming business. We also keep seeking new information on how to adapt and combat the effects of climate change on our production systems. The information we gather on climate change enables us to build resilience and improve our productivity and income.

As climate-smart farmers, we do our planning timely following the cropping calendar and make use of recommendations on weather and nutrient utilization. We adapt our crop calendar to new temperatures and rainfall patterns.

We avoid burning our farmlands and allow the plant residue/cover to help keep moisture in the soil and decompose gradually to improve soil nutrients.

As much as possible, we use simple mechanization equipment to reduce the negative impact of heavy machines on the soil and loosen only the topsoil. We plant quality disease-resistant cassava varieties.

We ask our ADP and other extension service providers for all necessary information and recommendations.

For soil cover and to improve soil fertility, we practice crop rotation with legume such as cowpea, soybean and groundnut (i.e., nitrogen-fixing crops). This implies planting the legumes after cassava is harvested. The legumes will add nutrients and organic matter to the soil.

We spread our crop residue in the field after harvest to provide additional nutrients to the soil. By doing this, we are also able to diversify our production.

We adopt integrated pest and weed management practices to reduce the excessive use of agrochemicals. We use a simple motorized backpack weeder to control weeds in our crop in place of herbicides. As much as possible, we use manure. We always bury fertilizer in the soil.

After harvesting our crop, we ensure that most of the plant residue remains on the soil surface to provide adequate cover for the soil and subsequent decomposition. We avoid burning the plant residue because of its negative effect on the climate and soil micro-organisms.

If we continue with this practice, our soil will get better in water retention and nutrients in a few years, and this will boost our yield and income in cassava production.

MODULE 11

GETTING MARKET INFORMATION

Cassava roots is highly perishable. For this reason, we identify buyers, their prices, quality and quantity requirements before planting.

We obtain past and current information on cassava prices from cassava buyers and other farmers. We also get prices of inputs from agro-dealers and other service providers.

Any small reduction in the selling price or increase in the cost of inputs could negatively affect our profit.

We get updates from other farmers, ADP agricultural extension officers and other extension service providers, radio programmes and other cassava farmers and marketers on the prices each week to decide how many hectares we will cultivate.

We also register with cassava farmers' association for market information.

MODULE 12

CHOOSING A GOOD FARMLAND

We choose our farmlands between January and August. We select suitable sites with loamy soil that is not on a slope, waterlogged, stony, or very shallow. The presence of worm casts is an indication of good soil.

We take care not to choose low-lying areas to avoid flooding due to climate change.
We can use fields where we grew beans, soybeans, cowpeas or groundnuts the season before. This will help prevent land degradation.

We avoid using land on which cassava was grown in the previous season because cassava depletes the nutrients from the soil. Secondly, we do this to stop the spread of cassava disease.

Women may have more difficulty in getting access to land but through group or cooperative farming, they can secure the use of quality land.

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

MODULE 13

SOME IMPROVED CASSAVA VARIETIES IN NIGERIA

Variety	Potential yield (Tons/ha)	Months until harvest	Use	Institution responsiblefor breeding
TME 419 (TMEB 419)	36	12	Flour, Gari, chips	IITA and NRCRI
Dixon (TMS IBA980581)	35	12	Gari	
Ayava (CR-36-5)	35	12	Flour and starch	
Sunshine (TMS-IBA070593)	30	12	VitaminA Gari	
Fine Face (IBA980505)	34	12	Gari	
Game Changer TMS13F1160P0004	38	12	HQCF and starch	IITA and NRCRI
Poundable (TMEB693)	32	12	Gari, Lafun,	
Farmers Pride (TMS-IBA961632)	35	12	HQCF, Starch	
Baba-70 (TMS-IBA000070)	37.5	12	Gari and Fufu	IITA and NRCRI
Obasanjo-2 (TMS13F1343P0022)	30	12	Starch, Flour	
Hope (NR130124)	40.1	12	Gari, Fufu	

MODULE 14

SOURCING AND PAYMENT FOR GOOD QUALITY CASSAVA CUTTINGS

We buy improved cassava stems from certified seed entrepreneurs.

The varieties are recommended by the Agricultural Development Programme (ADP), Root and Tuber Expansion Programme (RTEP) and research institutions such as the International Institute of Tropical Agriculture (IITA), National Root Crops Research Institute (NRCRI), Ministries of Agriculture (see list of some improved cassava varieties in Nigeria and the addresses of seed dealers in pages 63 and 64, respectively).

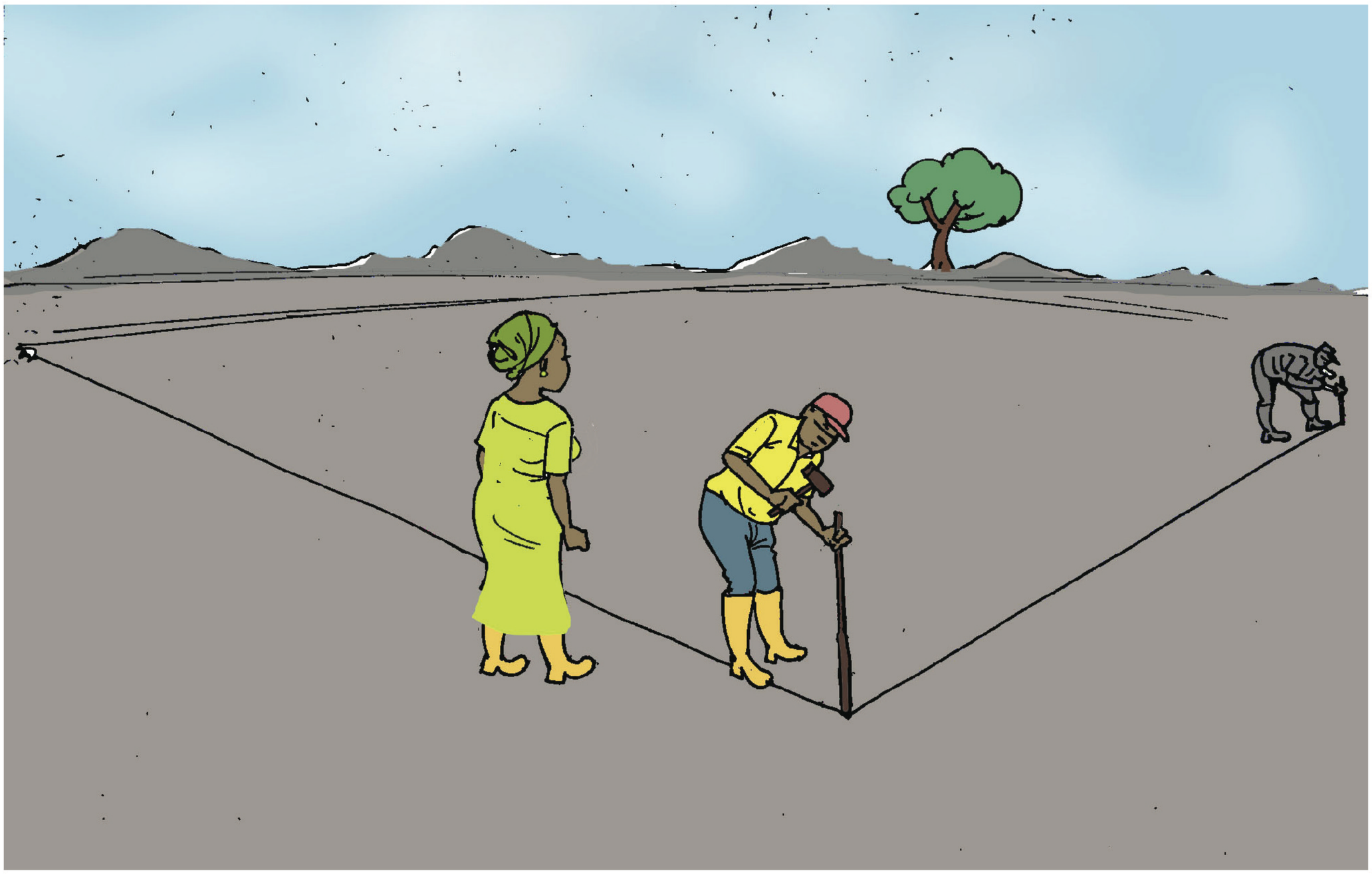
We source our cassava stems between January and July so that they will be delivered on time when we need them for planting between March and September.

We store our stems under a shade with the stems upright so they will not quickly dry up and lose viability.

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

MODULE 15

MEASURING THE FARMLAND



Before we prepare our land, we employ someone to measure our farmlands using a measurement tape or GPS. Knowing the size of our farmlands helps us to calculate the right quantity of cuttings, fertilizer and pesticides. We can manage the money we need throughout the year much better.

We measure our farmlands with the help of our neighbours.

To measure our farmlands, we use a measuring tape or cord with knots. We measure along straight lines and make sure that the field is not slopy because this will lead to inaccurate results. We do not measure our fields with walking steps.

We can also measure our farmlands using GPS (contact ADP Agriculture Extension officers and other extension service providers in our community) for more accurate measurement.

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

MODULE 16

SAFE APPLICATION OF PESTICIDES AND PERSONAL PROTECTIVE EQUIPMENT

Pesticides (insecticides, herbicides and fungicides) are hazardous to human health and the environment.

For the safe use of pesticides, our service provider and we respect the following rules:

1. Only use pesticides approved by National Agency for Food and Drugs Administration and Control (NAFDAC) and recommended by the ADP extension agents.
2. Keep and use pesticides out of children's reach.
3. Read the label of the pesticides to know the correct dosage and utilization.
4. Wear appropriate personal protective equipment (mask, coverall or trousers, long sleeve, gloves, cap, and rain boots).
5. People without personal protective equipment must stay away from spraying. In case of contamination by ingestion, eye or skin contact, the person should be taken to the hospital after skin and eyes are thoroughly doused with water. Take the pesticide container along to the doctor.
6. Always spray in the direction of the wind; We toss dust or ash to know the direction of the wind.
7. Spray when we do not expect rain and when the wind is not strong.
8. During spraying, do not eat, drink or smoke.
9. Calibrate the sprayer well to ensure that the sprayed quantity is correct. Use appropriate nozzles for calibration and pesticide application.
10. Spraying is work for adult professionals only. Children should not touch pesticides and must stay away from spraying. Pregnant and nursing mothers should not be involved in spraying
11. Put a red banner at the entrance of the field to indicate that this field is being sprayed. Observe the re-entry period after spraying as recommended on the pesticide label.
12. Clean up, destroy by cutting and dispose/bury empty containers far away from water points in designated places. Don't reuse packing material.
13. Wash the knapsack sprayer before and after spraying. Do not wash sprayers and other equipment used in streams or rivers.
14. After spraying, we wash ourselves and change clothes before eating. We do not wash your body with soap immediately after spraying to avoid a possible negative reaction

PERSONAL PROTECTIVE EQUIPMENT

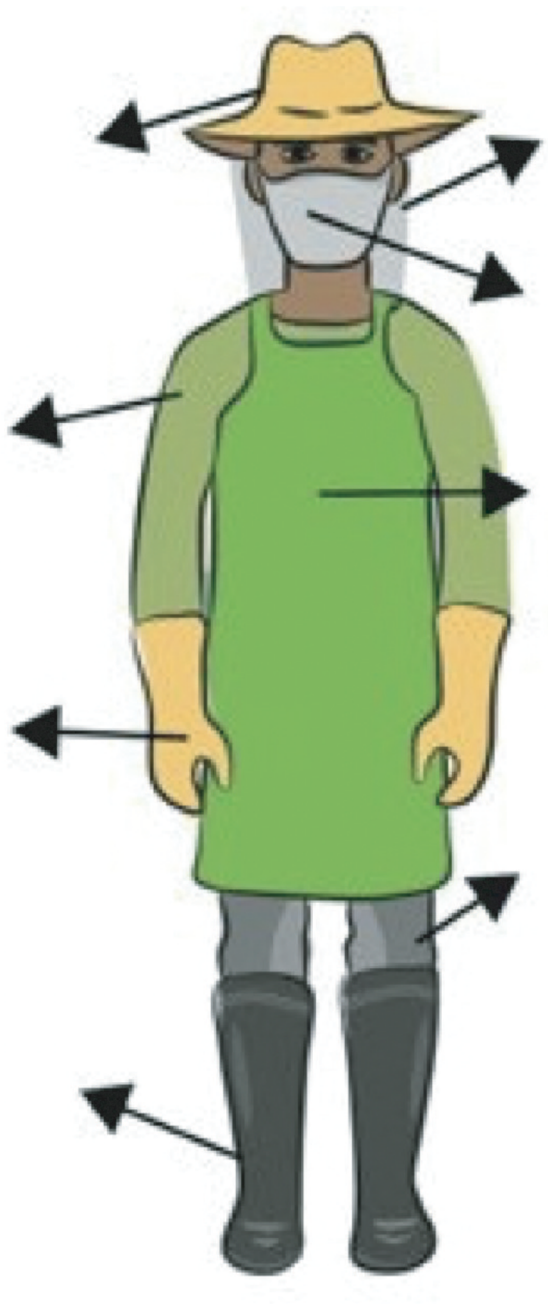
ATTENTION!

ALWAYS WEAR PROTECTIVE CLOTHES AND EQUIPMENT WHEN SPRAYING PESTICIDES

ADVANTAGES:

Our plants are healthy and give a good harvest. We and our workers do not poison ourselves during and after the spraying.

There is no danger for the environment, our families, our children or those who will eat our products.



MODULE 17

CLEARING THE FARMLAND

Between January and August, we clear the land for planting using family and hired labour, especially men and male youth. Sometimes we engage tractor hiring services. We consult extension agents to ensure that appropriate machinery is used.

We employ someone to spray pre-planting herbicide (contact the extension agent in your community for more information) 14 days after clearing for grass-dominated vegetation.

The plant debris is ploughed back to the soil if herbicides are not applied. Sometimes we practice controlled burning on the side of the field. We also ensure proper calibration of the knapsack sprayer using the IITA herbicide calculator to apply the correct quantity of herbicide to avoid environmental pollution

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

MODULE 18 LAND PREPARATION (PLOUGHING, HARROWING AND RIDGING)

Usually, the men and male youth in our families or communities carry out our land preparation tasks.

However, we prefer to employ a mechanization service provider to plough, harrow and ridge our farmlands.

This increases the yield and reduces the cost of production and weed management.

We ensure our ridges run across the slope to prevent soil erosion. We consult extension agents to ensure that appropriate machinery is used.

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

LAYOUT OPERATIONS (PEGGING THE FARMLAND)

Planting cassava cuttings in lines makes all other work easier. For this reason, we peg our fields.

We start pegging in March after we have cleaned the field. We put pegs in the following distances:

1. 0.8 m between the planting lines.
2. 1 m between the pegs on each planting line.
3. When preparing our land manually, we peg before heaping. When done mechanically, we peg after ridging.

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

MODULE 20 HEAPING

When preparing our land manually, we make heaps on our fields when the rain starts between March and May. Like this, the soil gets more air, and the roots of our cassava develop well.

We bury any plant residue when we make heaps to enrich the soil. We make heaps of 30 to 40 cm at the place of each peg.

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

MODULE 21

TRANSPORTATION OF GOOD QUALITY CASSAVA CUTTINGS

We monitor weather forecasts from NIMET (Nigerian Meteorological Agency) and extension agents before scheduling our planting to prevent crop failure.

When we are ready to plant, we collect the cassava stems purchased between January and July from cassava seed entrepreneurs. We ensure that the stems are fresh, without bruises and free of pests and diseases.

Jan		Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
			A	A	A	A	A	B	B			

MODULE 22

TREATMENT OF CASSAVA CUTTINGS

We ask our ADP extension agent and other extension service providers for recommended insecticides and fungicides.

We treat our cassava cuttings with fungicides and insecticides before planting.

We treat our cuttings in areas where millipedes, termites and other insects are present by dipping or spraying the recommended insecticide/fungicide.

We wear Personal Protective Equipment (PPE) when treating our cutting with insecticides and fungicides

Jan		Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
			A	A	A	A	A	B	B			

MODULE 23

PLANTING CASSAVA CUTTINGS

We plant our treated cuttings when the rain is established between March and September.
We engage mostly women and female youth in planting.

We plant at a spacing distance of 1m between the planting line and 0.8m along the planting line.
Two-thirds of our cuttings (20 cm to 25 cm; around 5 to 7 nodes) have to be covered by the soil. We make sure that the eyes of the cutting are above the soil and turned upwards.

Following the pegging of 100 x 80 cm spacing, we make 12,500 heaps per hectare and plant one stake at the centre of each heap which is 30 to 40 cm high for root production.

If we are producing for stems, we space the pegging at 100 x 50 cm, which will make 20,000 heaps per hectare, and we will plant one stake at the centre of each heap which is 30 to 40 cm high.

For late-season cropping (August to September), we use drought-tolerant varieties such as DIXON.

Jan		Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
			A	A	A	A	A	B	B			

MODULE 24

APPLICATION OF PRE-EMERGENCE HERBICIDE

The ADP extension agents in my community gave us the contact of spray service providers and the type of herbicide to use.

This will reduce the cost of weed management and increase yield.
We employ a spray service provider to apply pre-emergence herbicide not later than 3 days after
planting.

We ensure that the spray service providers follow the rules and guidelines for pesticide application specified in Module 7 to avoid polluting the environment

Jan		Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec
			A	A	A	A	A	B	B			

MODULE 25

REPLACING NON-SPROUTED CUTTINGS

We replace the cuttings on our field which have not sprouted 15 to 21 days after planting.

In addition, we remove each dead cutting and plant another cutting of the same variety at the same place.

Like this, we keep the number of plants in our fields.

Jan		Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

MODULE 26

WEEDING

Weeds steal the food and water our cassava plants need to grow well. This is why we keep our farms free of weeds.

We remove the weeds on our fields and heap up the soil around the base of our plants. Like this, our fields are clean, and our plants grow well.

Having applied pre-emergence herbicide at planting, we do our weeding at 7 to 8 weeks after planting using post-emergence herbicide with a nozzle shield (or manual weeding if the cassava is less than 8 weeks).

There may be a need for another weeding before harvest.

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

MODULE 27

APPLYING MINERAL FERTILIZER

Fertilizer is expensive, and it is necessary to apply the right type, with the right dose, at the right time and place.

Prior to planting we contact the ADPs and carry out soil testing. We apply mineral fertilizer NPK15:15:15 (or any other recommended fertilizer specific for cassava) 8 weeks after planting (immediately after weeding) before our cassava roots start to grow. This fertilizer gives the plants the food they need and helps them grow, be healthy, and produce big cassava roots.

To know the correct quantity, we measure the fertilizer. We do soil testing to know how much fertilizer we need for our farms

Generally, for one plant, we measure 30 grams of NPK 15:15:15, which is half a small 60 g tomato paste tin. For one hectare with 12,500 plants, we need 375 kg, which is about 7.5 bags of fertilizer.

We apply the fertilizer in a circle around the plant or by side placement on the upper third of each heap, making sure the fertilizer does not touch the stem or leaves. Then we cover the fertilizer with soil to avoid evaporation.

Jan	Feb	Mar	April	May	June	July	Aug	Sept	Oct	Nov	Dec

MODULE 28

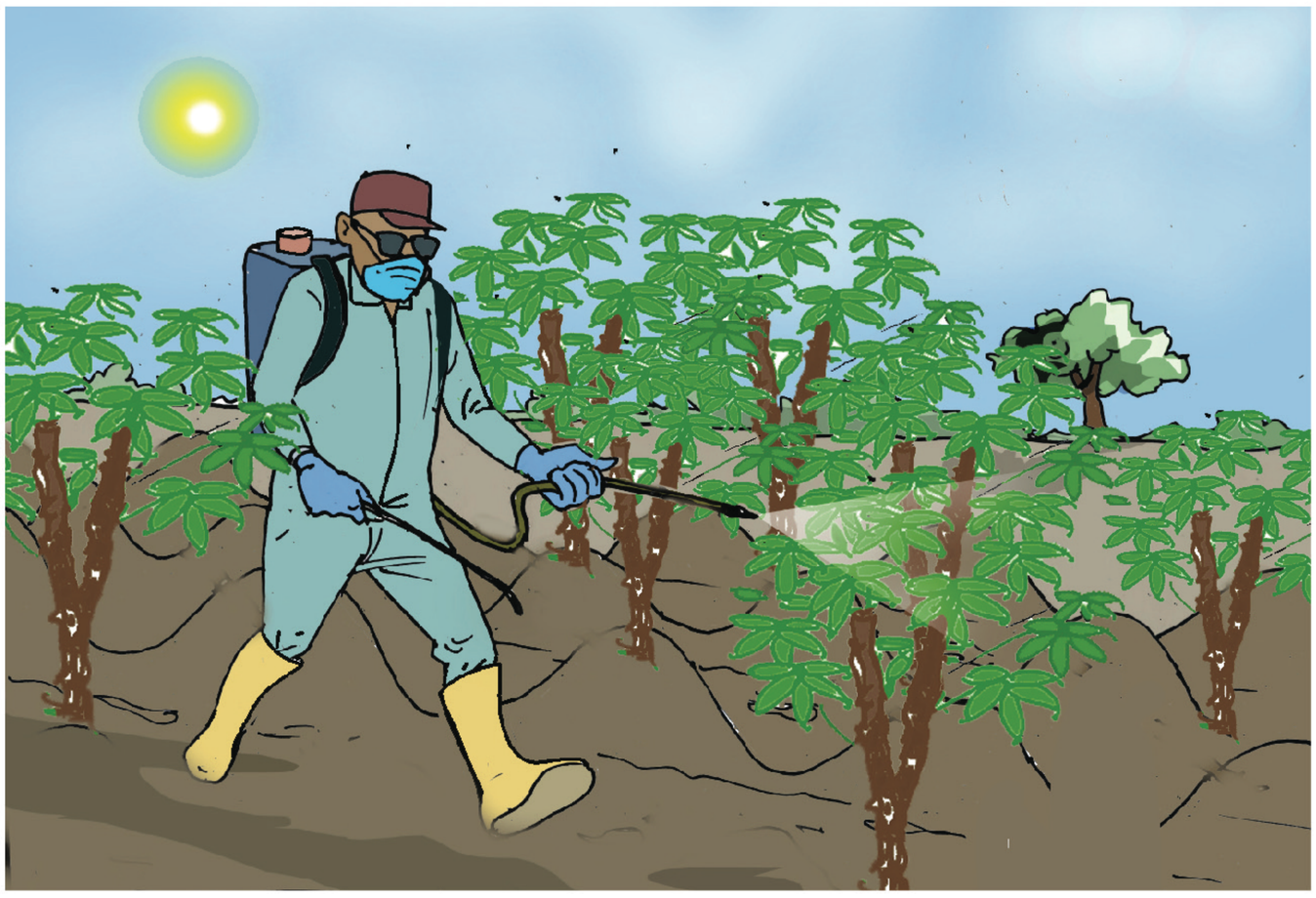
PROTECT THE FIELD AGAINST PESTS AND DISEASES.

We regularly observe our fields between planting and harvest. Grasshoppers, termites and other insects (crickets, mites) attack our cassava plants. If we notice insect infestation on our cassava plants, we spray our fields.
We ask our ADP extension agent or other extension service providers for recommended insecticides.

Source: freepik.com

We spray recommended insecticides when we find a lot of insects. We spray early in the morning or late in the afternoon on a sunny and not windy day. If there are only a few adult insects scattered across our field, we do not spray.

We observe our cassava farms for the presence of diseases such as Cassava Bacteria Blight (CBB), Cassava Mosaic Disease (CMD), and Cassava Anthracnose Disease (CAD)



Three months before the harvest of cassava roots, we stop using insecticides so that our cassava is good for the health of those who will eat it. We observe the rules for the safe use of pesticides in Module 16.

Year 1												Year 2		
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March

MODULE 29

HARVESTING CASSAVA ROOTS

We harvest cassava roots from 10 to 18 months after planting, depending on the variety and availability of the market.

We avoid harvesting cassava roots when the soil is too dry to reduce damage to the roots.

- To harvest our cassava, we cut the stem at the knee's height with a cutlass.
- Afterwards, we pull out the roots from the soil. We engage men or male youths for uprooting cassava and women and female youths for packing.
- To reduce spoilage, we separate the cassava roots without causing many injuries.
- We harvest (30) tons or 30,000 kg per hectare because we use improved seed (stem cuttings) and Good Agricultural Practices.

Year 1												Year 2						
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July

Producer Reference in Nigeria

MODULE 30

MARKETING OF CASSAVA ROOTS AND STEM CUTTINGS

To get a better price for our cassava roots and stems, we organize the selling with our farmer group.

Our farmer group has contracts with buyers of cassava roots and stems, and we sell as a group.

We sell our cassava roots by weight rather than by volume. Stems are sold in bundles. A bundle comprises 50 stems of one meter each.
If the off-takers fail, we make alternative transport arrangements to convey our cassava roots to the market or processing centre.

The raw roots can also be processed to add value for more profit. It is more profitable to sell cassava roots and stems. To be able to sell stems, we cultivate improved diseased free planting materials from either IITA GoSeed or Umudike Seeds or other Foundation Seed Producers. We ensure that the National Agricultural Seed Council (NASC) supervises and certifies our cassava seed farms.

Year 1												Year 2						
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July

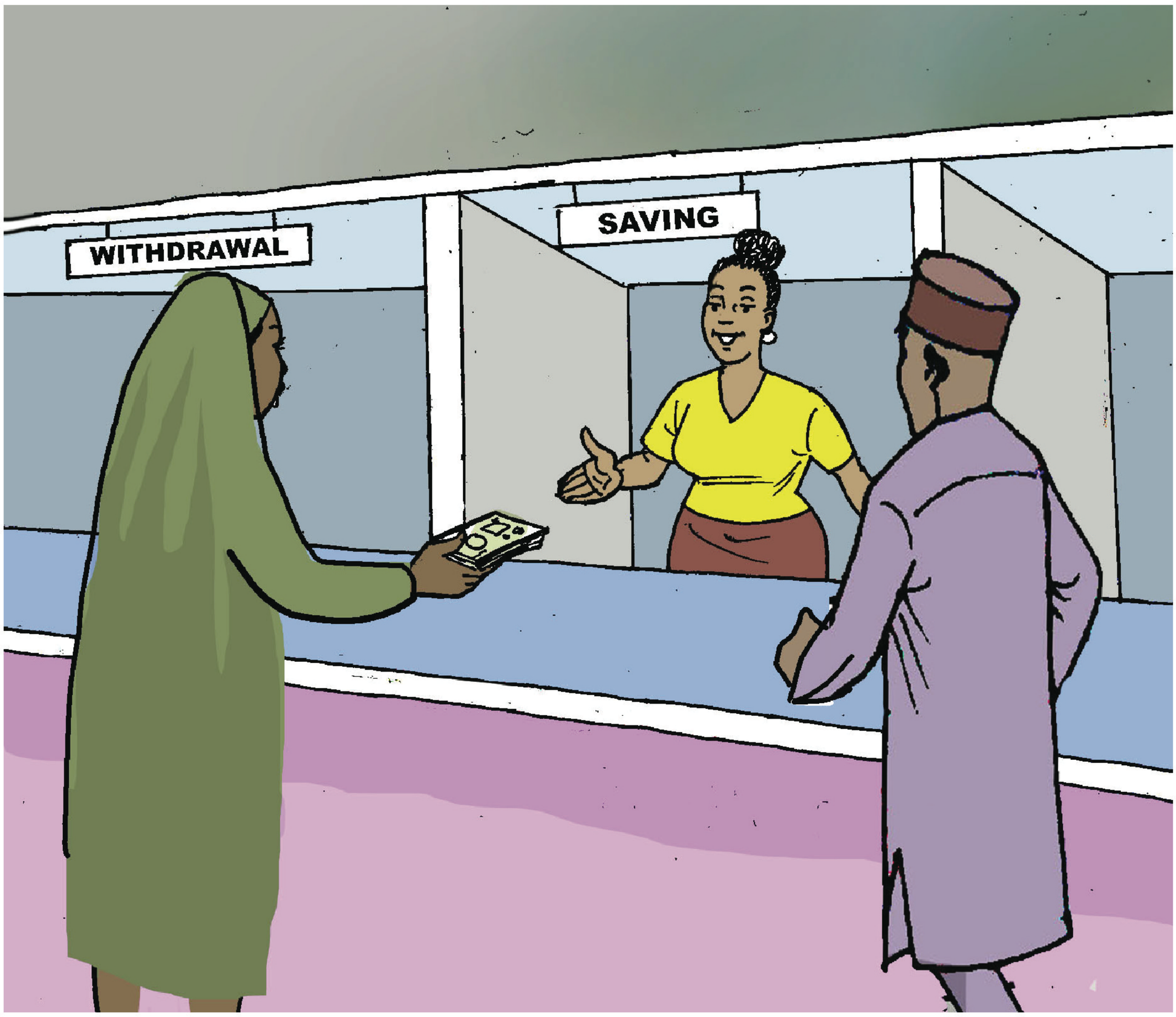
Table 9: Growing cassava as a root producer versus a seed producer

Items/Activities	Seed Entrepreneur	Root Producer
	Cost (NGN)	Cost (NGN)
Land Preparation		
Land Rent	10,000	10000
Ploughing (1st and 2nd)	40,000	40000
Harrowing (1st and 2nd)	30,000	30000
Planting Operation		
Planting materials	100,000	60000
Cost of loading stems	5,000	5,000
Transportation of stems	15,000	15000
Cost of offloading stem	5,000	5000
Labour cost for planting	20,000	10000
Field maintenance		
Pre-emergence herbicide	60,000	60,000
Labour for spraying	15,000	15000
Fertilizer (at 4bag/ha + transport, assumesgood soil conditions)	80,000	80000
Labour for fertilizer application	10,000	10000
1st weeding operation (pre ratooning)	20,000	20000
Seed Harvesting (7-9 months fromplanting)		
Labour for first stem ratooning/harvesting	60,000	
Harvesting (After additional 7-9 months)		
2nd weeding operation (after ratooning)	20,000	20000
Labour for second Stem ratooning/harvesting	60,000	
Root harvesting	50,000	50000
Misc. (transport, rope for bundling,certification fees, etc.)	25,000	12500

Items/Activities	Seed Entrepreneur	Root Producer
	Cost (NGN)	Cost (NGN)
Grand Total Cost of Production (“Money Out”)	625,000	442,500
Estimated yield of cassava roots and stems		
Output from first ratooning (Bundles)	400	
Output from second ratooning (Bundles)	600	
Yield of cassava roots (tons/ha)	30	30
Money in		
Revenue from first Ratooning @N1000 per bundle	400000	
Revenue from second Ratooning @N1000 per bundle	600000	
Revenue from cassava roots @N20,000 per ton	600000	600000
Total “Money in”	1600000	600000
Profit= ‘Money in’ minus ‘Money out’	975,000	157,500

SAVING AFTER SALES OF CASSAVA ROOTS AND PRODUCTS

We immediately put the major part of the money we received from the sale of cassava products in our bank account or cooperative savings to keep our money safe. There are different benefits that come from a bank or cooperative savings. Banks provide information and advice to their customers.



We think it is important to save money because:

1. With savings, we can invest in our enterprises and thereby make greater revenue. For example. by buying fertilizer or improved cassava stems,
2. If we save in a bank account, our money is safe,
3. Savings on an account are often necessary to obtain a loan.
4. Saving at the bank helps to control spending because money is not immediately available, and
5. With a bank account, we have mobile access to our money.

By doing so, we have money for household expenses, the expenditure for production and the school fees during the next season.

If we have taken a loan, we pay it back because it is our responsibility to do so and to avoid the penalties.

We know the different types of banks, such as:

a. Commercial Banks
b. Micro Finance Banks
c. Savings & Loans Companies
d. Bank of Agriculture (BOA)

When we open a bank account, we also know the different types of accounts, such as:

a. Current Account – it is an account for business people like us using cheques. It attracts charges
b. Savings Account – is used to save money to get loans. It attracts interests
c. Fixed Deposit Account – This helps us keep our money saved for an agreed period, and we will earn more money

Sometimes we borrow money for our agricultural business as a credit (lending). Credit is money borrowed from a person or bank, promising to pay back the money. We get this service, and we pay a fee for it.

Sometimes instead of taking credit, we take a business loan. Business loans are given to farmers to make their farming business better. The business loan can come as (i) an Input loan, (ii) an Expansion loan and (iii) other investment loans. There are other types of loans, such as Personal loans. This type of loan is not for business. It is used to buy things that are needed for the home, like a fridge or to pay school fees.

MAIN LESSONS:

- A good agripreneur inquiries about the possibilities and conditions for savings and loans before making a decision. One should choose the type of credit that offers a convenient service fee and delay for reimbursement.

- Once a loan is received, the good agripreneur sticks to the objective of the investment. Otherwise, the agripreneur is likely to have repayment problems.

Year 1												Year 2						
Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec	Jan	Feb	March	April	May	June	July

MODULE 32

PAY SCHOOL FESS

Our children do not do harmful work on the cassava farm. We also do not use children of other people for hard and dangerous work.

As wise cassava farmers, we send our children to school. When our children come home after school, they do their homework to get good results.

We save money and pay their school fees and school material on time.

Jan	Feb	March	April	May	June	July	Aug	Sept	Oct	Nov	Dec

SOURCES OF INFORMATION

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