Results from Cassava Weed Management Project

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Presentation by
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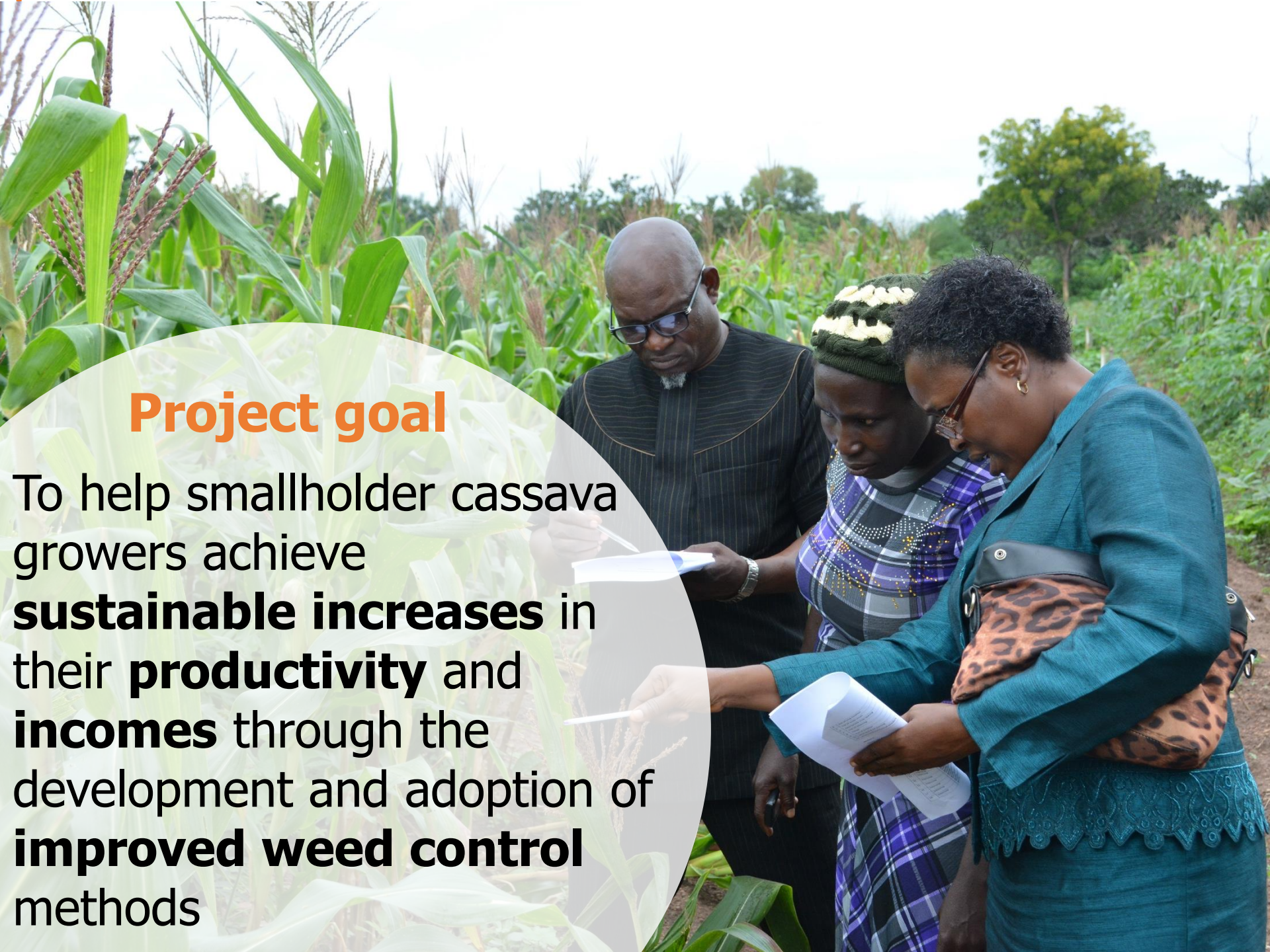
Presentation of Digital Tools: Disruptive innovations in Cassava/Maize farming systems to policy makers

Cassava: current situation in Nigeria

- World's largest cassava producer (59 million tonnes/year)
- Cultivation dominated by smallholder farmers (4.5 million)
- Often intercropped with yams, maize, melons or legumes
- Lifecycle encourages perennial weeds
- Poor/no weed control reduces potential yields by 40–80%
- Weeding is highly labor intensive



Project goal

To help smallholder cassava growers achieve **sustainable increases** in their **productivity** and **incomes** through the development and adoption of **improved weed control** methods

R4D

P4D

Research:
IITA, FUNAAB, NRCRI and UAM jointly screened best weed control options

Innovation package

Development: Dissemination platform

60,000 farmers reached 2016
60,000 farmers to be reached in 2017
60,000 farmers to be reached in 2018

Agronomy
Plant Density: 12,500 plants/ha
Tillage: Ridge
Fertilizer: Yes

Herbicides
Merlin Total
Sencor Plus
Gardoprim Plus Gold
Primextra Gold
Movon
Lagon.
Fierce
→ Pre-emergence

Maister 61 WG
Maister Power
Select Max = Cobra
Fusilade Forte
Cobra
Touchdown Forte at 4L/ha
→ Post-emergence

Mechanical
Long hoe
Mantis rotary weeder

- **State extension Service providers:**
  Abia ADP
  Benue ADP
  Ogun ADP
  Oyo ADP
- **Private extension service providers:** (JDPM, Kolping)
- **Chemical companies**
- **Federal and State Agriculture Development Programs**
- **Spray service providers**
- **IITA**
- **FUNAAB**
- **UAM**
- **NRCRI**

Thanks for helping in solving weed problems

Agronomic measures

- **Tillage:** Ridging reduces weed biomass and has consistently positive effects on root yields.

- **Cropping system:** Sole cropping maximizes cassava yield but inter-cropping can maximize economic returns when maize is sold as green vegetable and not grain.

- **Fertilizer application:** Use generally increases yields but effects vary depending on site; economic return variable.

- **Variety:** The high-branching variety TME419 produces higher root yields in first season. In the second season the variety did not matter.

- **Density:** 12500 plants/ha is recommended for TME 419 (high branching type) and 14286 plants/ha for TMS 30572 (low branching type) to maximize yield.

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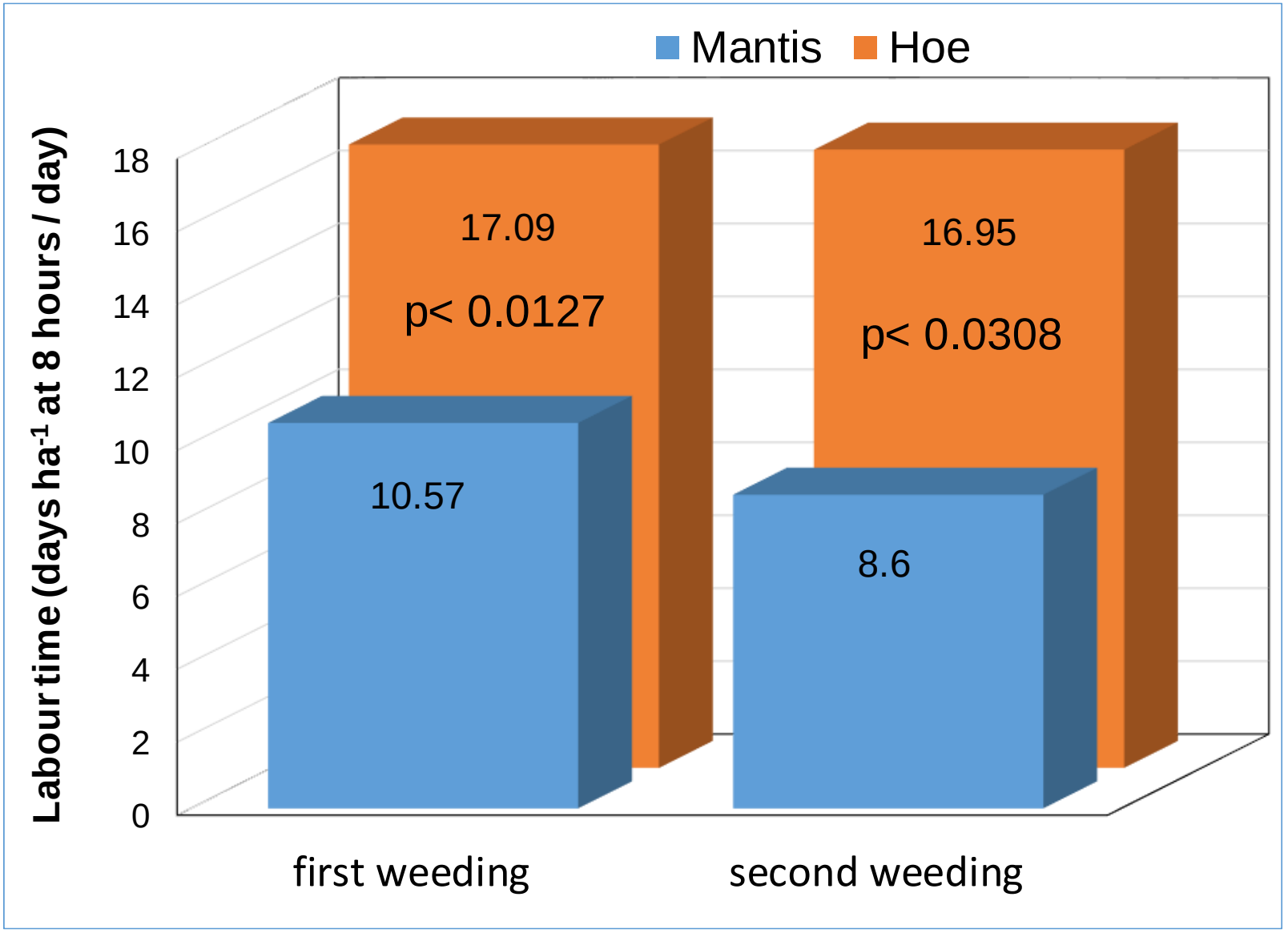
Thanks for helping in solving weed problems

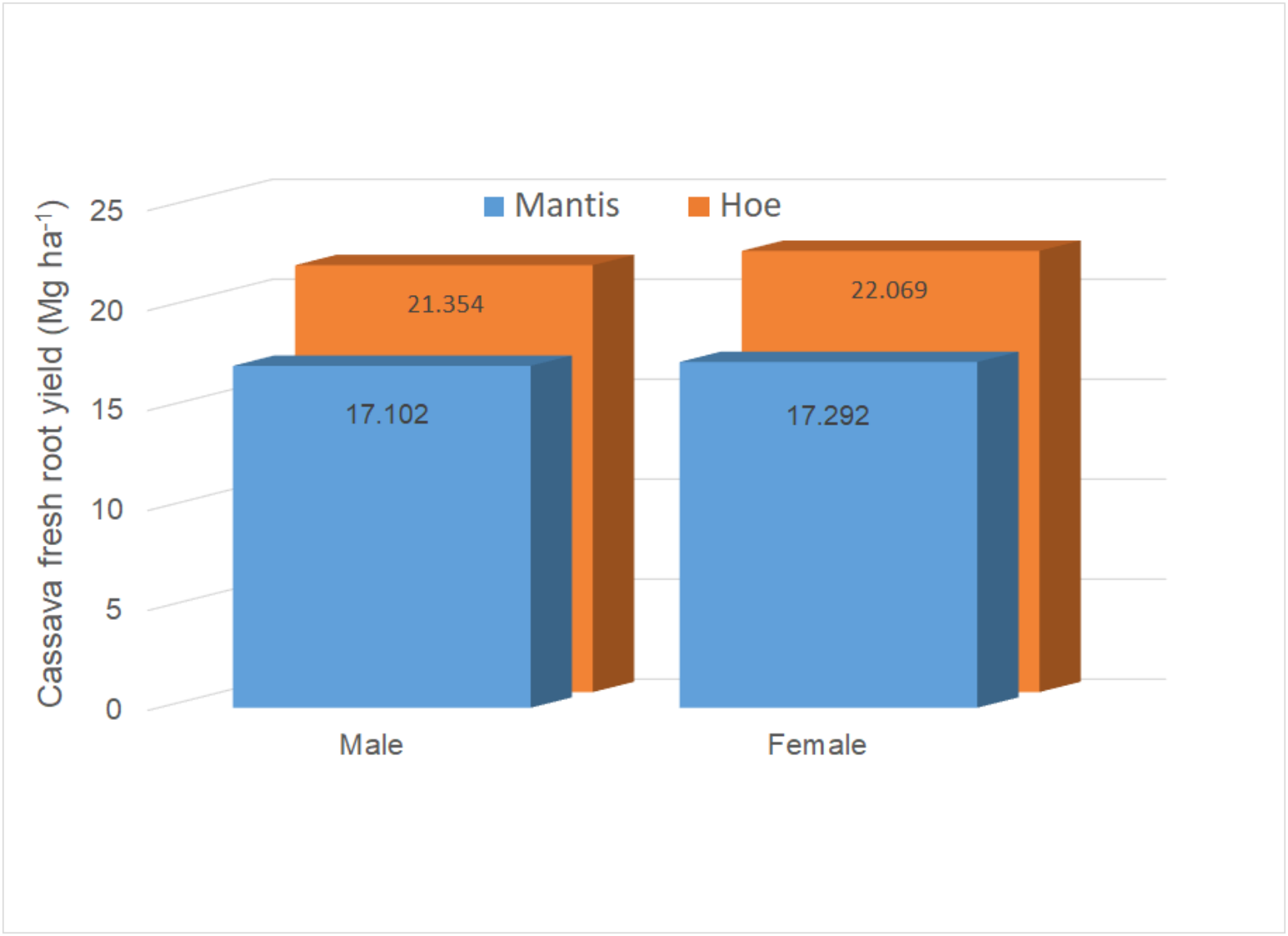
Assessment of mechanical weeding options

- Short handled hoe (control)
- Long handled hoe (control)
- Brush cutter (weed whacker)
- Motorized rotary weeder (Mantis)

Labour requirement: Average of 4 sites



Root yield: Average of 4 sites



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Thanks for helping in solving weed problems

- **Most cassava farmers don’t use, but those who do…**
- **Often not spraying correctly or safely**
- **Often not spraying the best and safest chemicals**

Two Categories of Herbicides

Pre-emergent spray

Post-emergent spray

Herbicide screening

Screening new pre- and post-emergence herbicides for efficacy and safety on cassava

	2014	2015	2016	2017	2018
No. of pre-emergence herbicides screened	22	12	6	6	5
No. of post-emergence herbicides screened	19	6	6	6	8

Herbicides selected: Provided 80 to 90% control of major weeds and no chemical residues

Pre-emergence herbicides	Post-emergence herbicides
Lagon 575 SC	Fusilade Forte
Primextra Gold	Select Max
Fierce	Cobra
Gardoprim Plus Gold	Glyphosate
Vigor	MaisTer 61 WG
	MaisTer Power OD
	LifeLine
	Monsoon Active

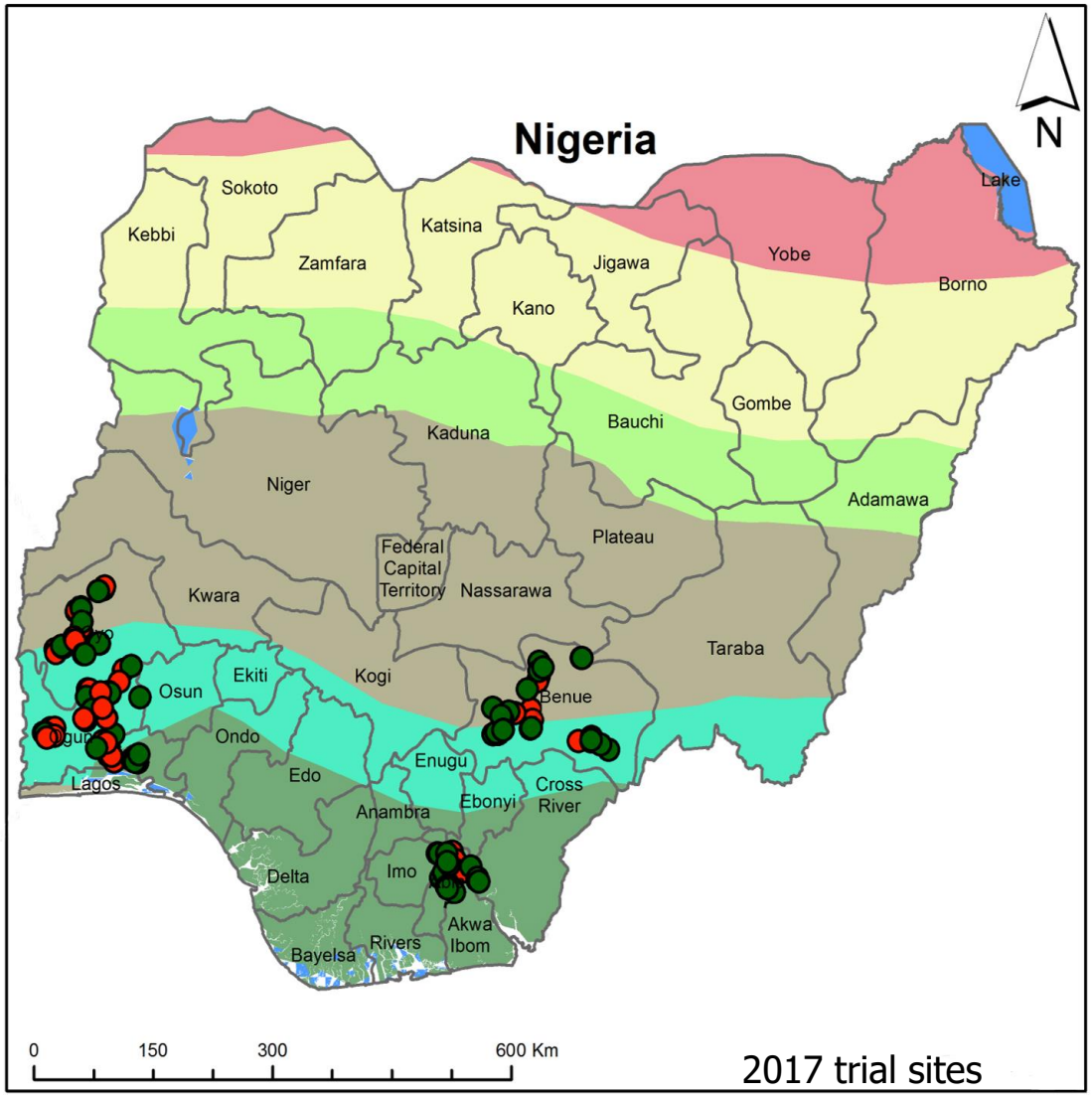

UNTREATED


UNTREATED


PENDIMETHALIN + METRIBUZIN: 0 WAP
+
LIFELINE @ 3L/ha : 6 WAP
+
LIFELINE @ 3L/ha : 6 MAP


METRIBUZIN + S-METOLACHLOR: 0 WAP
+
LIFELINE @ 1.6L/ha : 6 WAP
+
LIFELINE @ 3L/ha : 6 MAP

On-farm demonstrations were conducted in four states in Nigeria in 2016 and 2017, 2018



Weed control: on-farm trial sites

- Cassava
- Cassava/maize

Agroecological zones

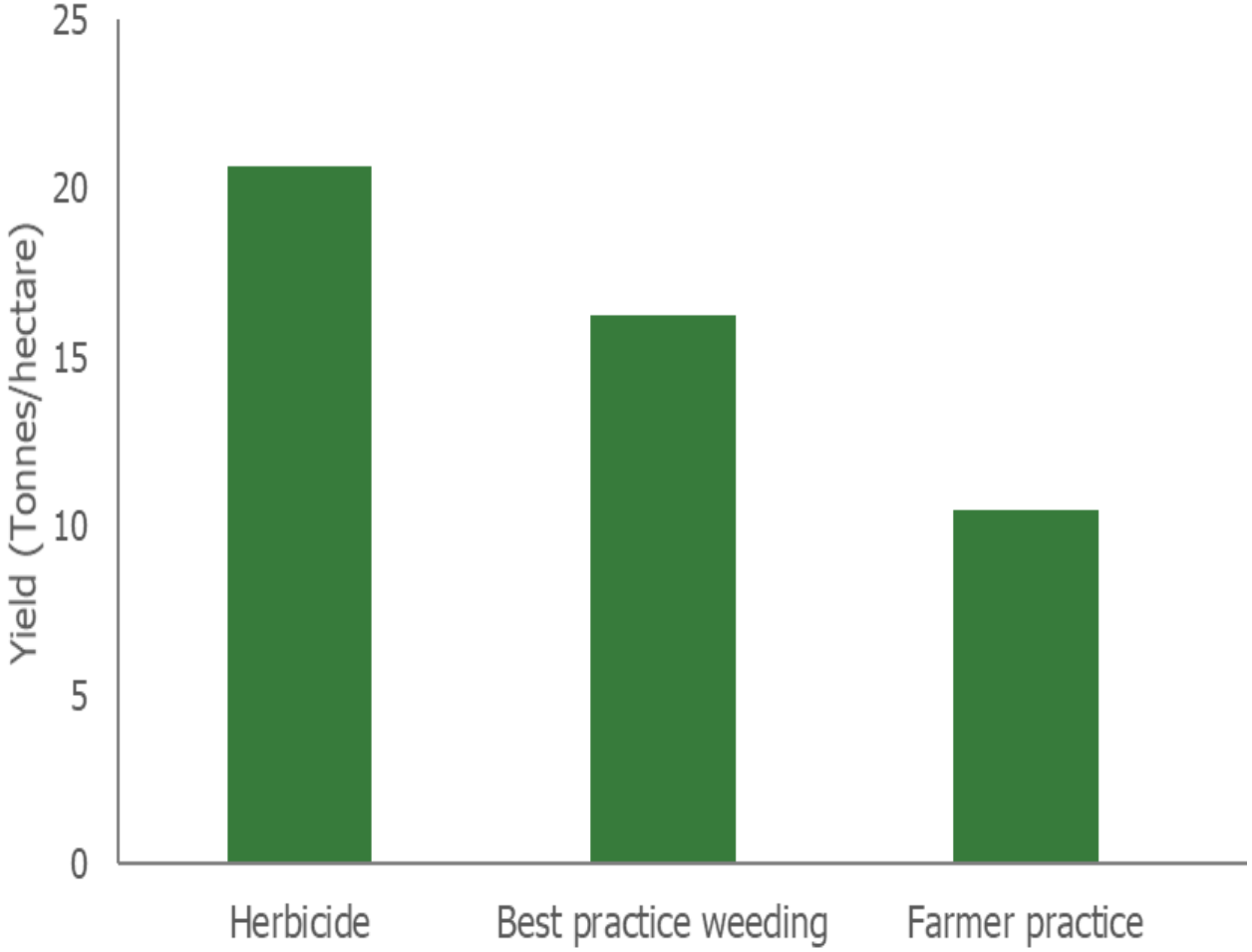
- Arid/Sahel
- Semi-arid/Sudan Savanna
- Northern Guinea Savanna
- Southern Guinea Savanna
- Derived Savanna
- Humid Forest
- Water bodies

On-farm trials: 3 years of data

Treatments	Definition
Farmer practice	Farmers carried out their usual farm activities without interference.
Best hoe weeding practice	Thorough weeding was carried out in a regu manner by either a long- or short-handed ho
Herbicide use	Herbicide was applied either pre-emergence, post-emergence or both.

Results: 2016

2016 Results



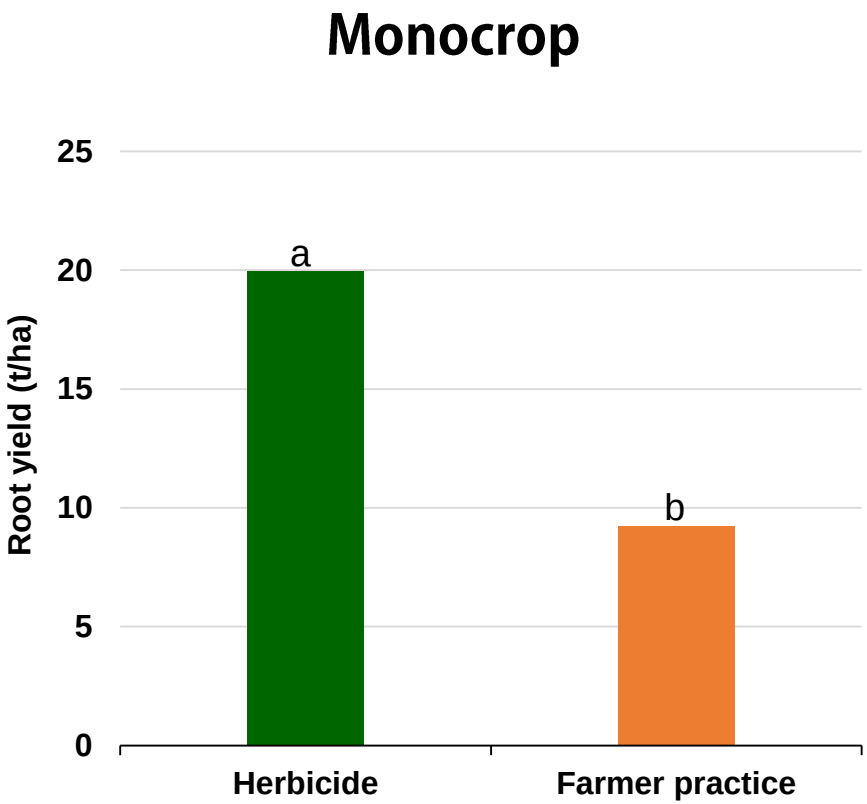
- 27% increase compared to best hand weeding techniques
- 102% increase compared to typical farmer weeding practice

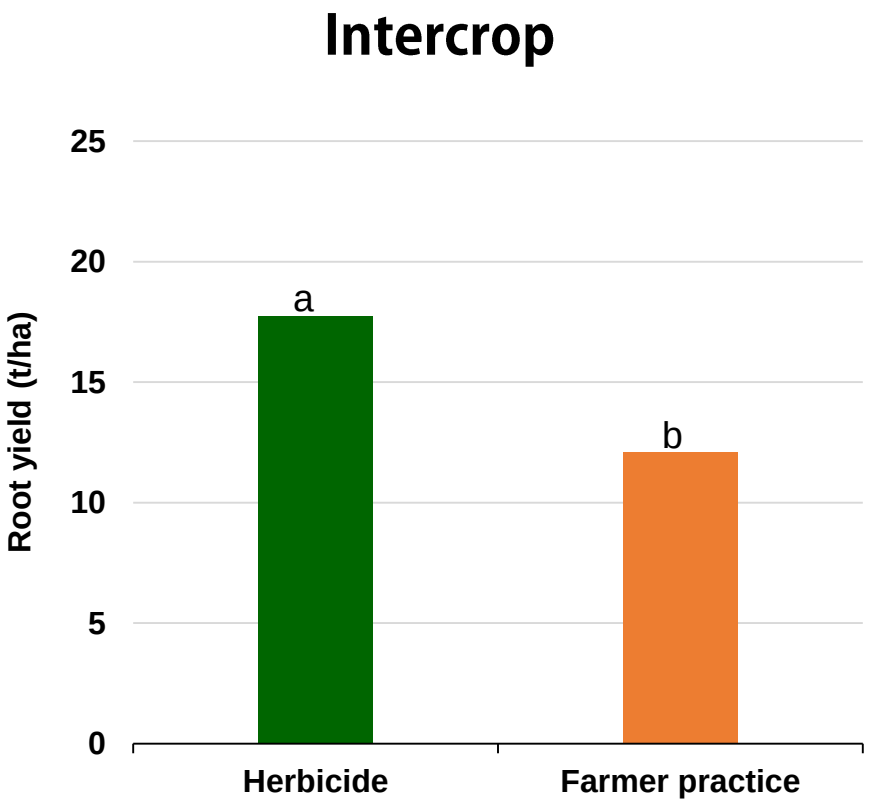
Results: Yield in 2017 & 2018

Cassava Monocrop

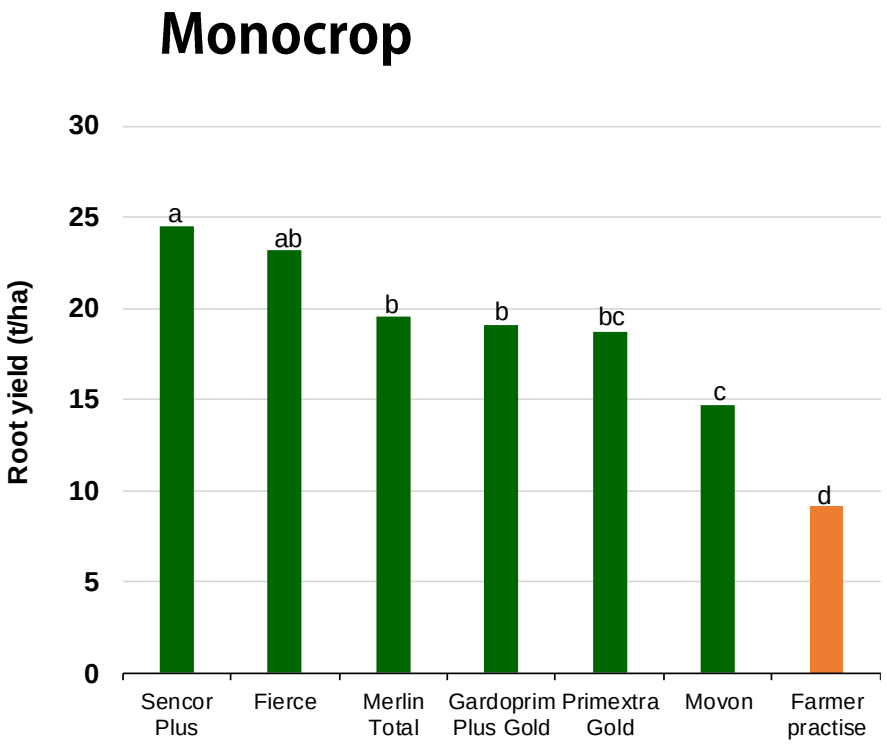
Cassava/Maize Intercrop

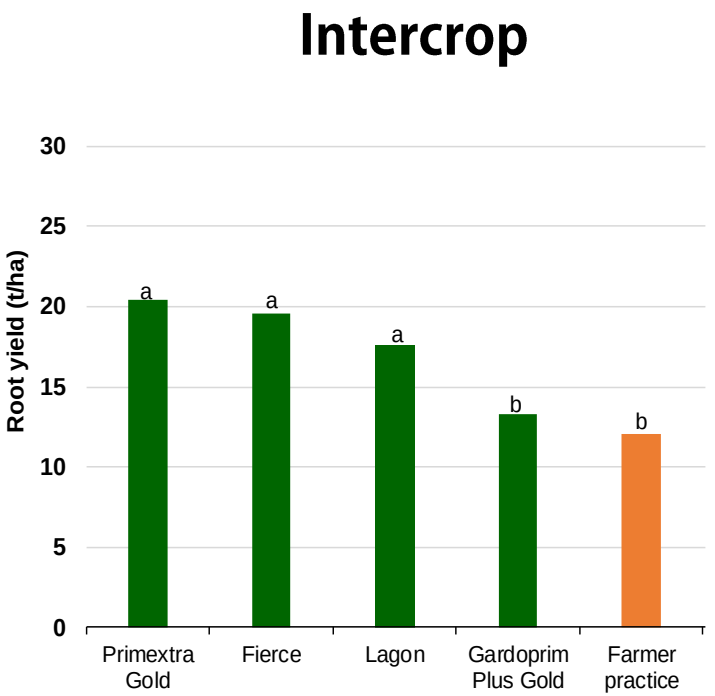
Cassava Yield 2017: Herbicide vs Farmer Practice

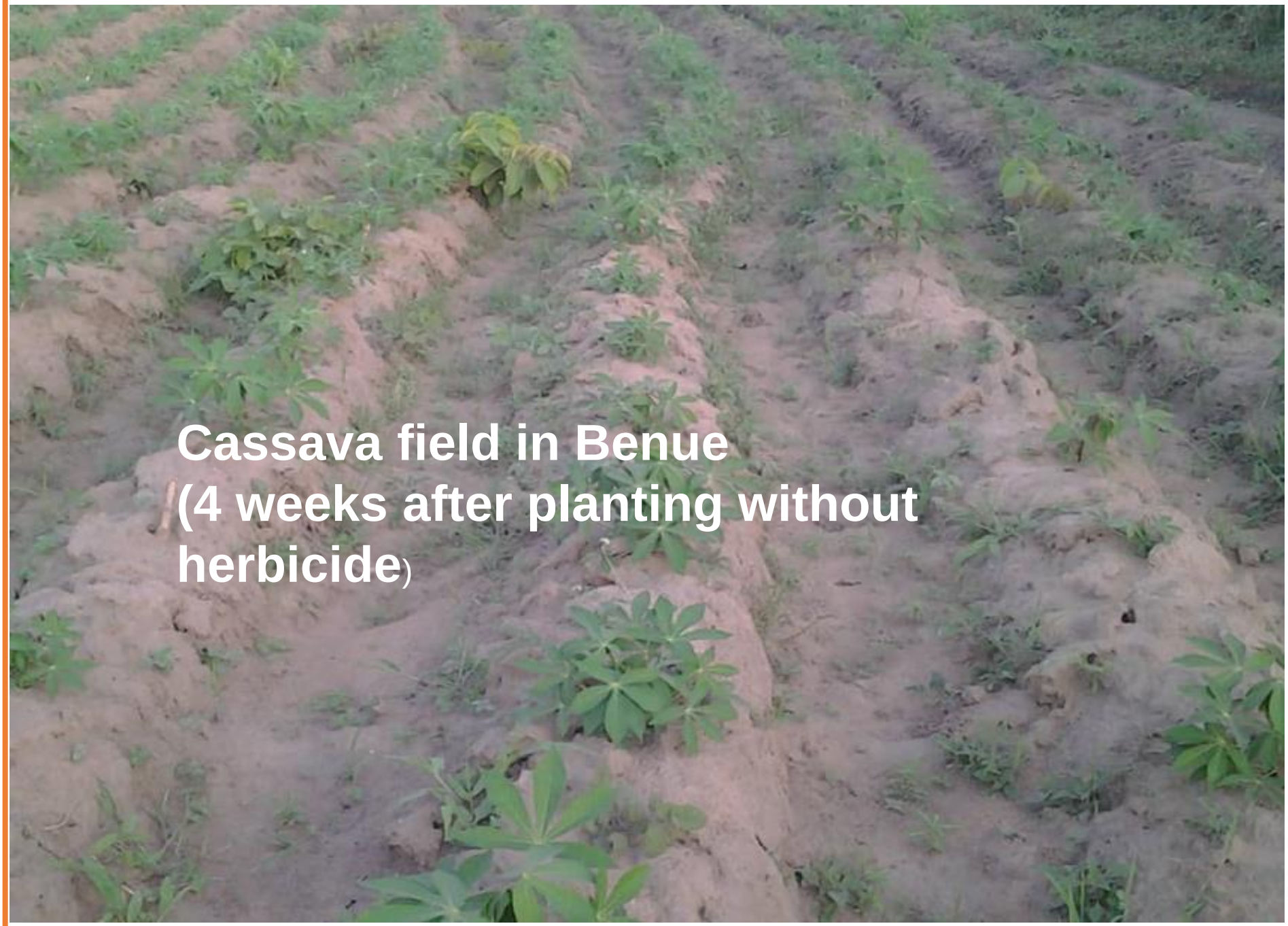




Cassava yield: Average of 4 states






Cassava field in Benue
(4 weeks after planting without herbicide)

Cassava field in Benue
(4 weeks after planting with Lagon)

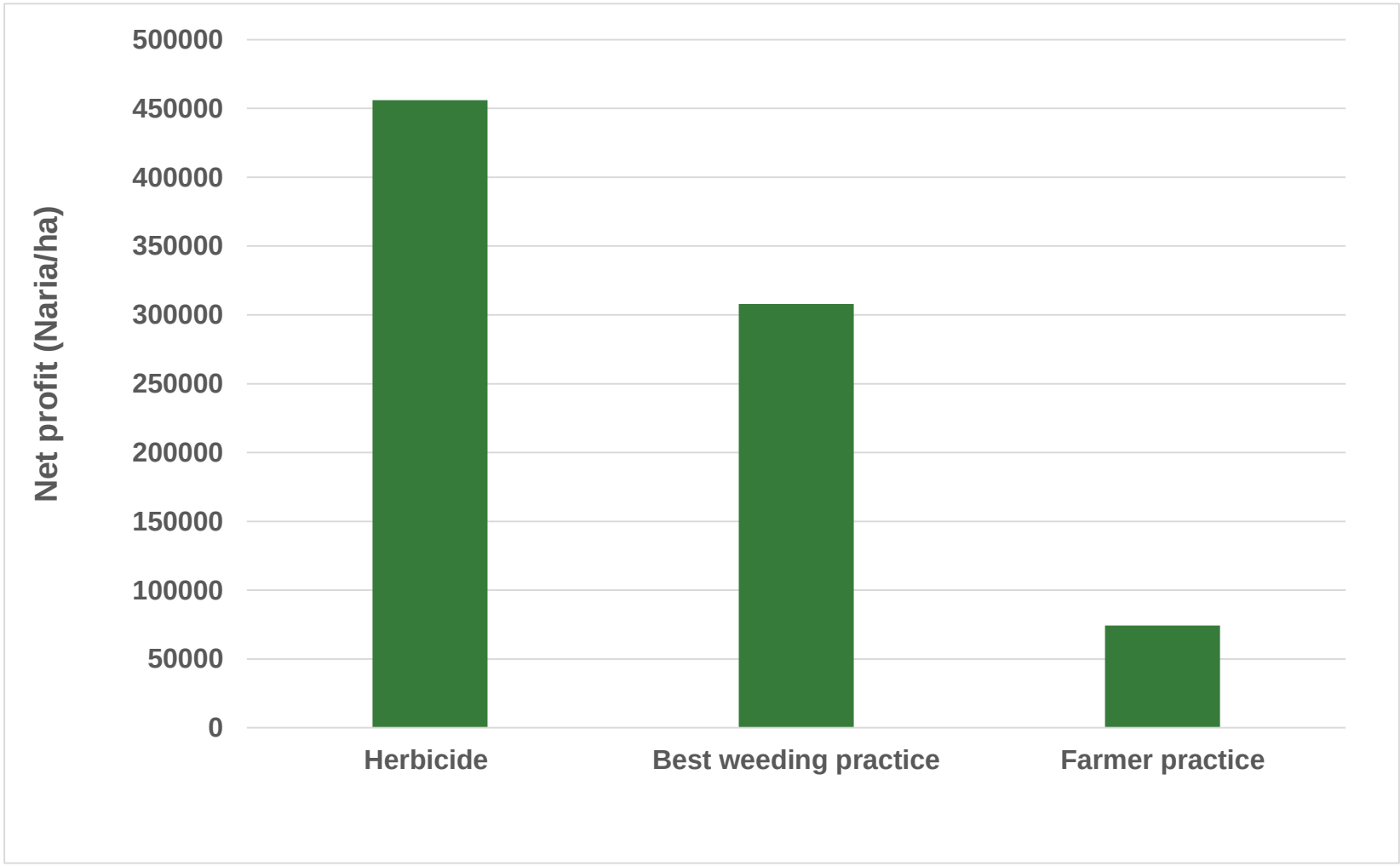
Cassava treated with LAGON 16 WAP

Results: Net profit

Costs

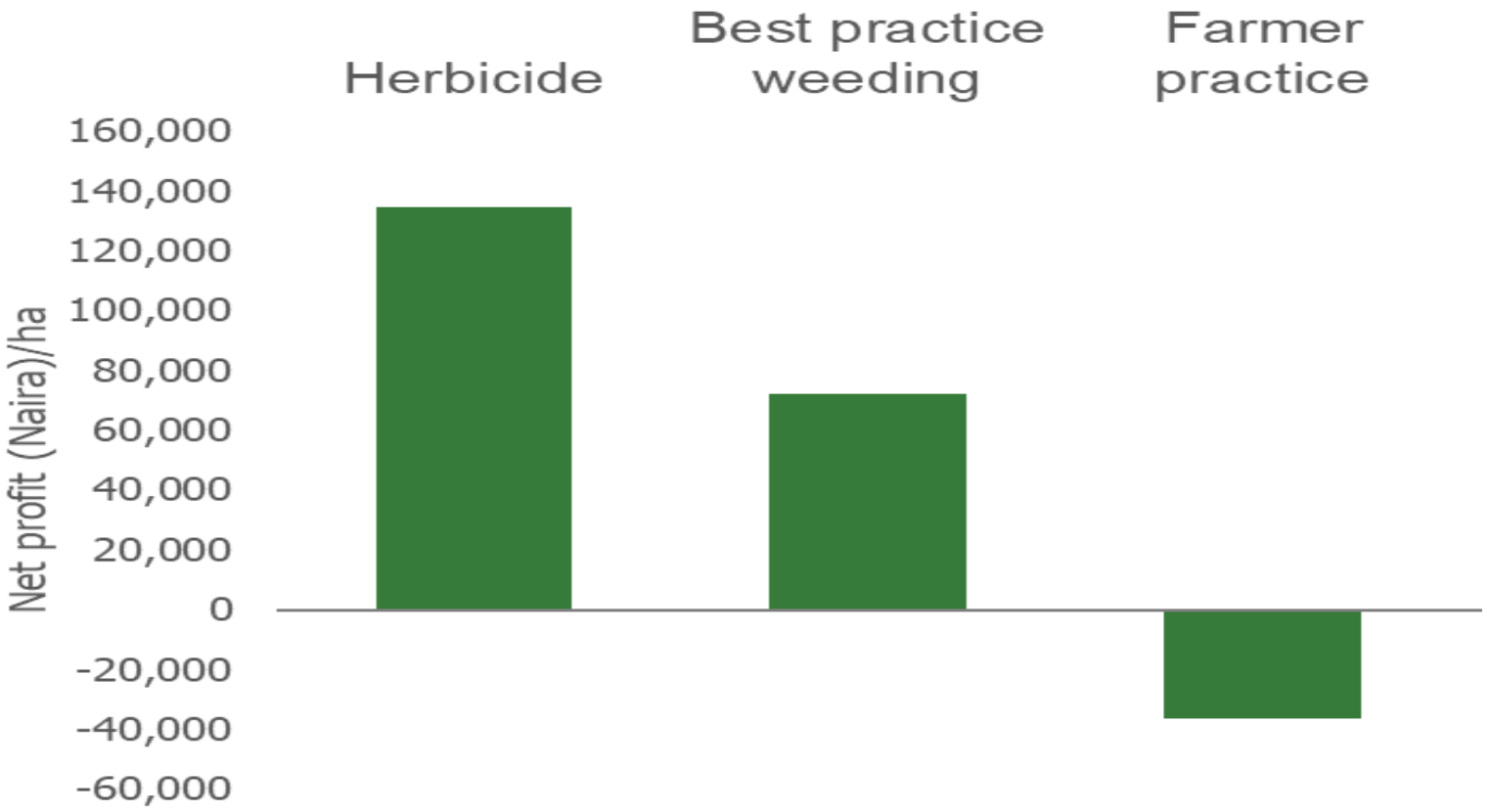
- Should one pay laborers to hand weed a field or pay for herbicide?
- Which is more expensive for the farmer?
- Cost of one manual weeding: 10,000 – 25,000 Naira per acre ($28 - $69) plus cost of feeding workers.
- Cost of herbicide: 2,400 – 8,000 Naira per acre ($7 - $22)
- Cost of paying spray applicator per acre: 2,000 Naira ($6)

Profitability Intercrop Results



Farmers found average net profits increased by **48%** when using herbicides on cassava/maize intercrop compared to best hoe weeding practice.

Profitability Monocrop Results



Farmers found average net profits increased by **83%** when using herbicides on monocrop cassava compared to best practice weeding.

Commercialization of herbicides

Pre-emergence	Status
Lagon	Available & registered [Bayer]
Vigor	Available & registered [SARO]
Primextra Gold	Available & registered [Syngenta]
Gardoprim Plus Gold	Could be made available [Syngenta]
Fierce	Could be made available [Valent] SARO is discussing registration with Kumia

Post-emergence	
Fusilade Forte	Available & registered [Syngenta]
Select	Could be made available [UPL]
Glyphosate	Available & registered [multiple]
Monsoon Active	Could be made available [Bayer]
Lifeline	Available & registered [UPL]

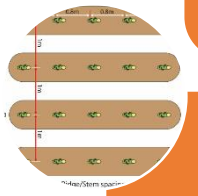
Six steps to cassava weed management

1. Select a suitable site for cultivation

2. Prepare the vegetation for glyphosate application by slashing if too long.

3. Apply glyphosate at label rate to deal with perennial weeds. Wait for 14 days

4. Prepare the field for planting

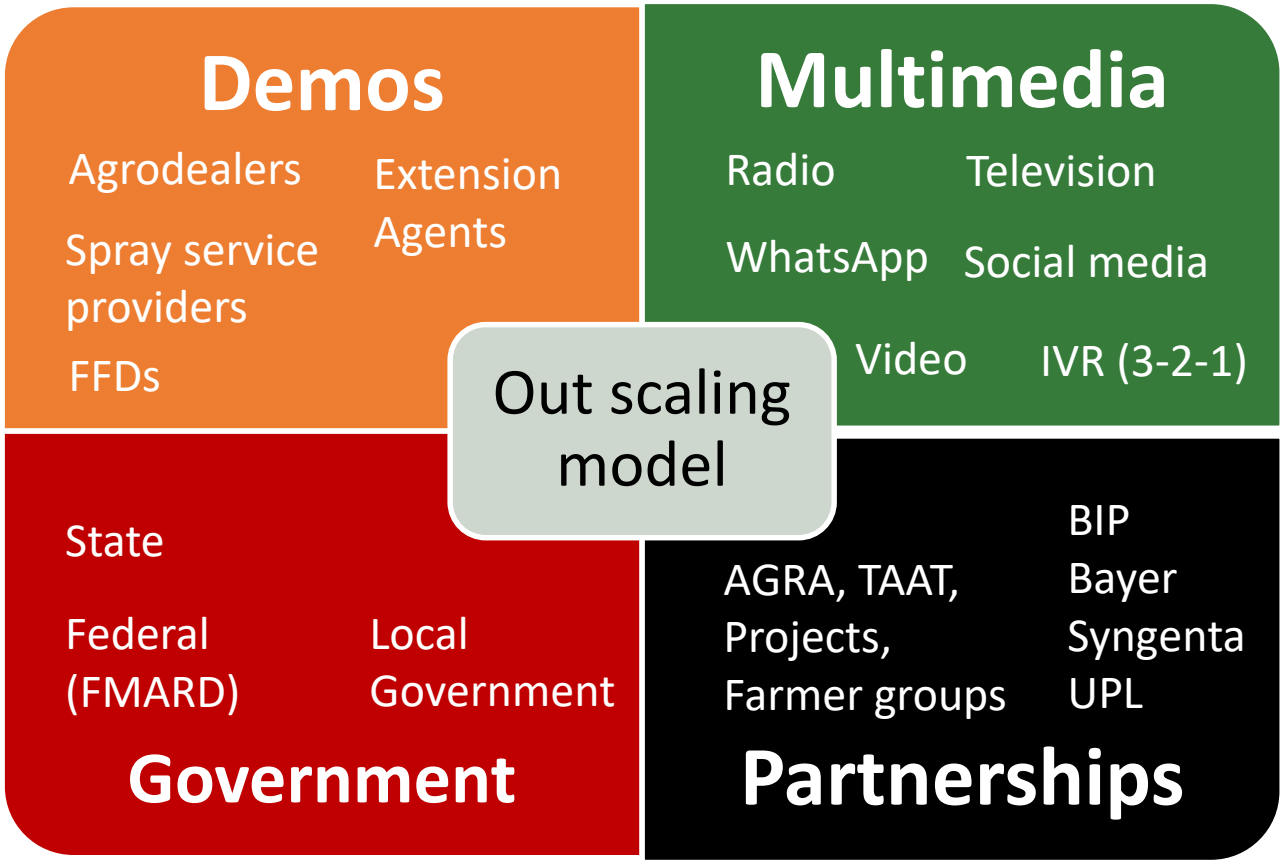


5. Plant the cassava and apply pre-emergence herbicide. Replace cuttings that fail to sprout after 15 – 21 days

6. When weeds cover 30% of field, apply a post-emergence weed control

Getting good practice into use

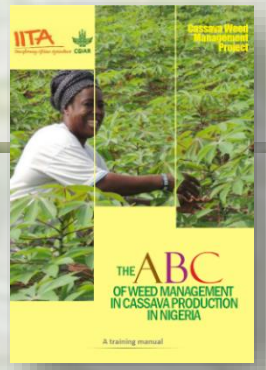
- our out scaling model



Outreach materials

Examples include:

- Extension leaflets
- Village boards
- Social media
- Newspapers
- Video
- Television and radio



Farmer field training

Training on safe use

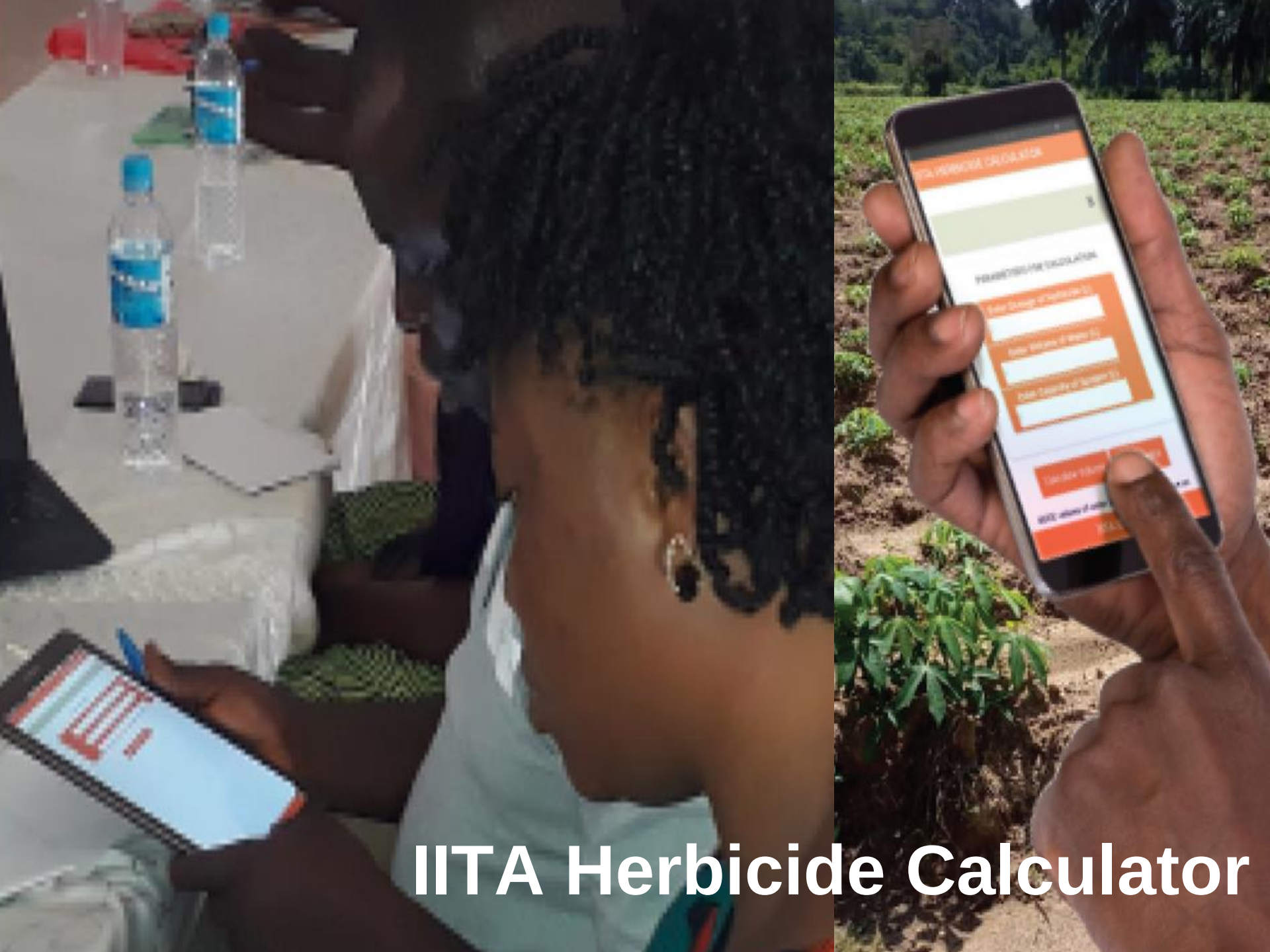
Application and Safety Training

Trained 659 Spray Service Providers (SSPs)*

- Abia 105 SSP participants
- Benue 101 SSP participants
- Ogun 122 SSP participants
- Oyo 331 SSP participants

* Work done in partnership with the National Agency for Food and Drug Administration and Control


Video Showing



IITA Herbicide Calculator

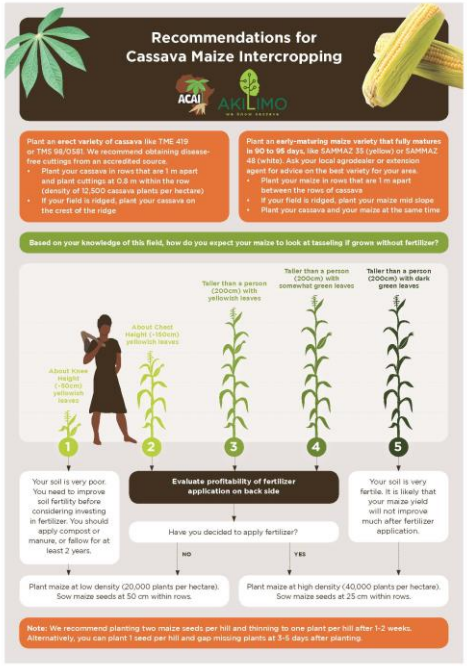
Six Steps & Best Planting Video

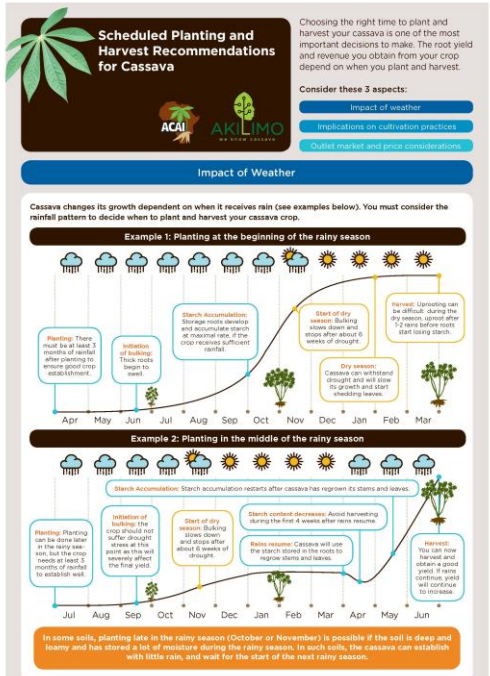
Farming on Radio

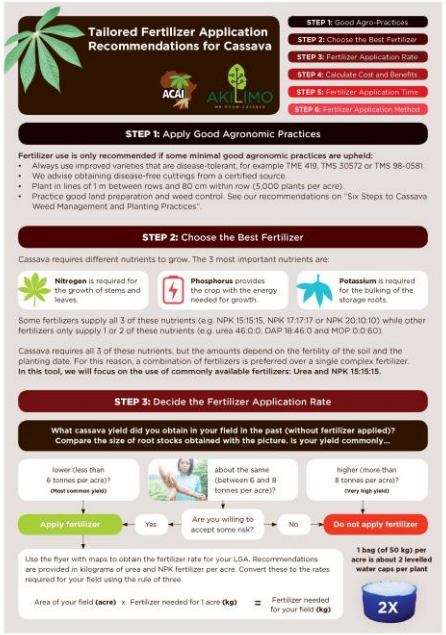
Viamo 3-2-1 IVR

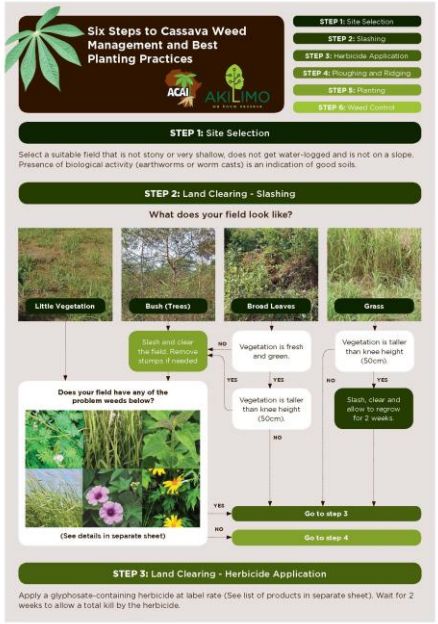
IITA Herbicides Calculator

Paper-based tools









IITA Cassava Matters

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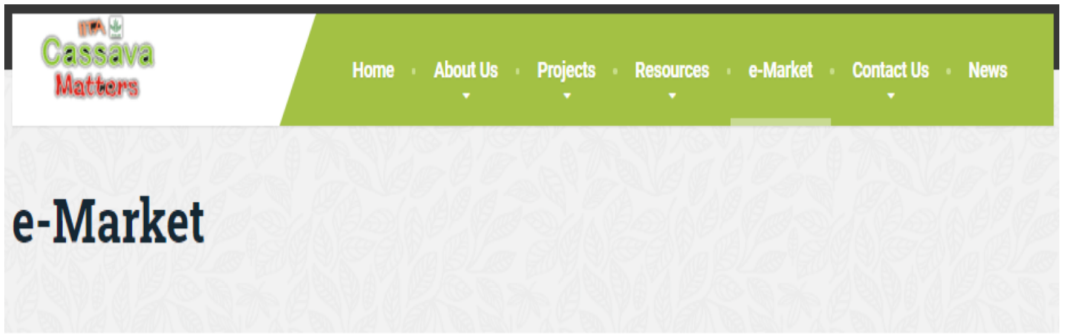
IITA Headquarters, Ibadan
info@cassavamatters.org

How to set up your cassava e-Market store

Cassava Matters • How to set up your cassava e-Market store

Setting up your store on the platform is as easy as ABC

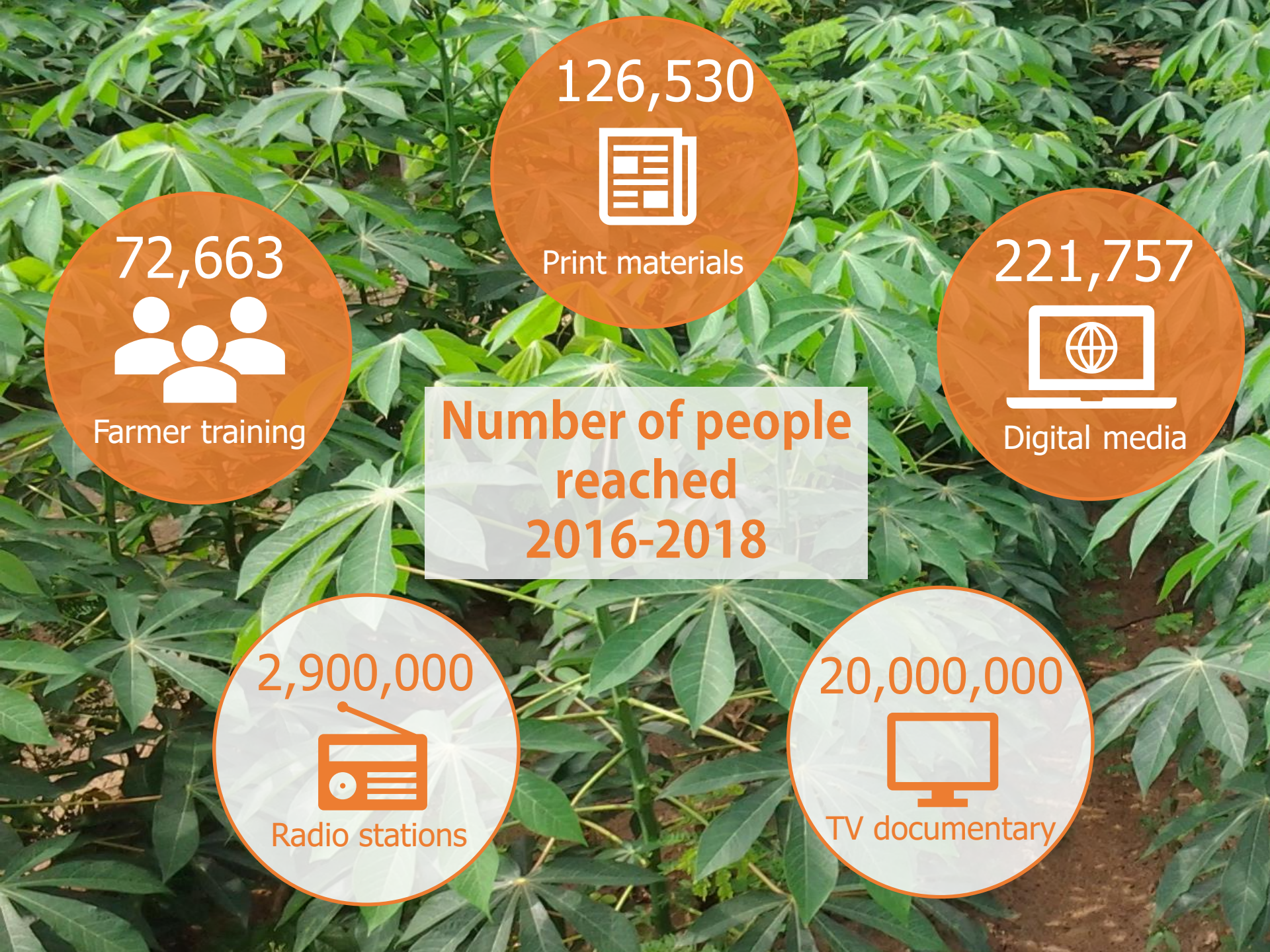
- Simply go to www.cassavamatters.org
- On the menu bar, click **e-Market**
- Scroll down and click on **NEW VENDOR REGISTRATION** and go through the instructions



Advocacy for de-registration of paraquat in Nigeria

By promoting safer, effective alternatives: Monsoon and Lifeline

Result: No more import permits for paraquat!


126,530
Print materials
72,663
Farmer training
221,757
Digital media
Number of people reached 2016-2018
2,900,000
Radio stations
20,000,000
TV documentary

What does this mean for farmers?

- **Improved food security**
- **Less drudgery for families**
- **More money in their pockets**
- **More time and money for other activities**
- **More cassava to serve processing industry**

Acknowledgements

Principal investigator

IITA Transforming African Agriculture 50 1967 - 2017

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Implementing partners

Abia Agricultural Development Programme

Benue Agricultural and Rural Development Authority

Federal Ministry of Agriculture and Rural Development, Nigeria

Justice Peace Development Movement Abeokuta Diocese

Justice Peace Development Movement Oyo Diocese

Kolping Nigeria

Ogun State Agricultural Development Programme

Oyo State Agricultural Programme


Thank You