



THE CURRENT STATE OF PRECISION AGRICULTURE IN BURKINA FASO, OPPORTUNITIES AND CHALLENGES

SERME Idriss
Senior Agronomist / Soil Scientist

[*sermeidriss@yahoo.fr*](mailto:sermeidriss@yahoo.fr)

00226 70232198

PRESENTATION PLAN

- ✓ **Challenges of agriculture in Burkina Faso**
- ✓ **Definition of precision Agriculture**
- ✓ **Precision agriculture practices in Burkina Faso**
- ✓ **Opportunities for precision agriculture in Burkina Faso**
- ✓ **Challenges of precision agriculture**
- ✓ **Conclusion**

CHALLENGES OF AGRICULTURE IN BURKINA FASO

Burkina Faso is largely dependent on **agriculture** as the main economic activity, with about 80-90 % of the population actively engaged in **agriculture**

'Growth rate for cereal grain yield =1 %, while population =3 %'

- Very poor and degraded soil (mostly sandy)
- Low external inputs
- Erratic rainfall (amount and distribution)
- on going land degradation
- Limited potential for expanded cropped area
- Limited irrigation potential (only 2 % of arable land)
- Resources limited farmers

THE YIELD GAP IN BURKINA FASO

**Potential
yield**
(Experimentation)



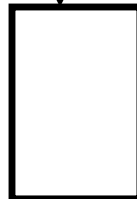
Biophysical limitations

- Soil fertility
- Water
- Variety, etc

Which inputs are lacking?

Yield gap

**Actual
yield**



DEFINITION OF PRECISION AGRICULTURE

- **Precision agriculture** is an approach to farm management that uses information technology to ensure that the crops and soil receive exactly what they need for optimum health and productivity

***PRECISION AGRICULTURE PRACTICES IN
BURKINA FASO***

SEED TREATMENT

- Seed priming has been shown to be effective in improving early crop establishment
- Soaking the seeds of pearl millet and sorghum for 8 h in water prior to sowing can shorten the germination time by 1 to 2 days and ensure a more uniform plant establishment
- seed priming increased yields by 107 kg ha⁻¹ (32%) for sorghum, 71 kg ha⁻¹ (30%) for pearl millet, 135 kg ha⁻¹ (18%) for groundnut and 86 kg ha⁻¹ (26%) for cowpea (Aune and Ousman 2011; Ousman and Aune 2011).

FERTILIZER MICRO-DOSING

- applying a small rate of fertilizer within the planting pocket or in its close vicinity



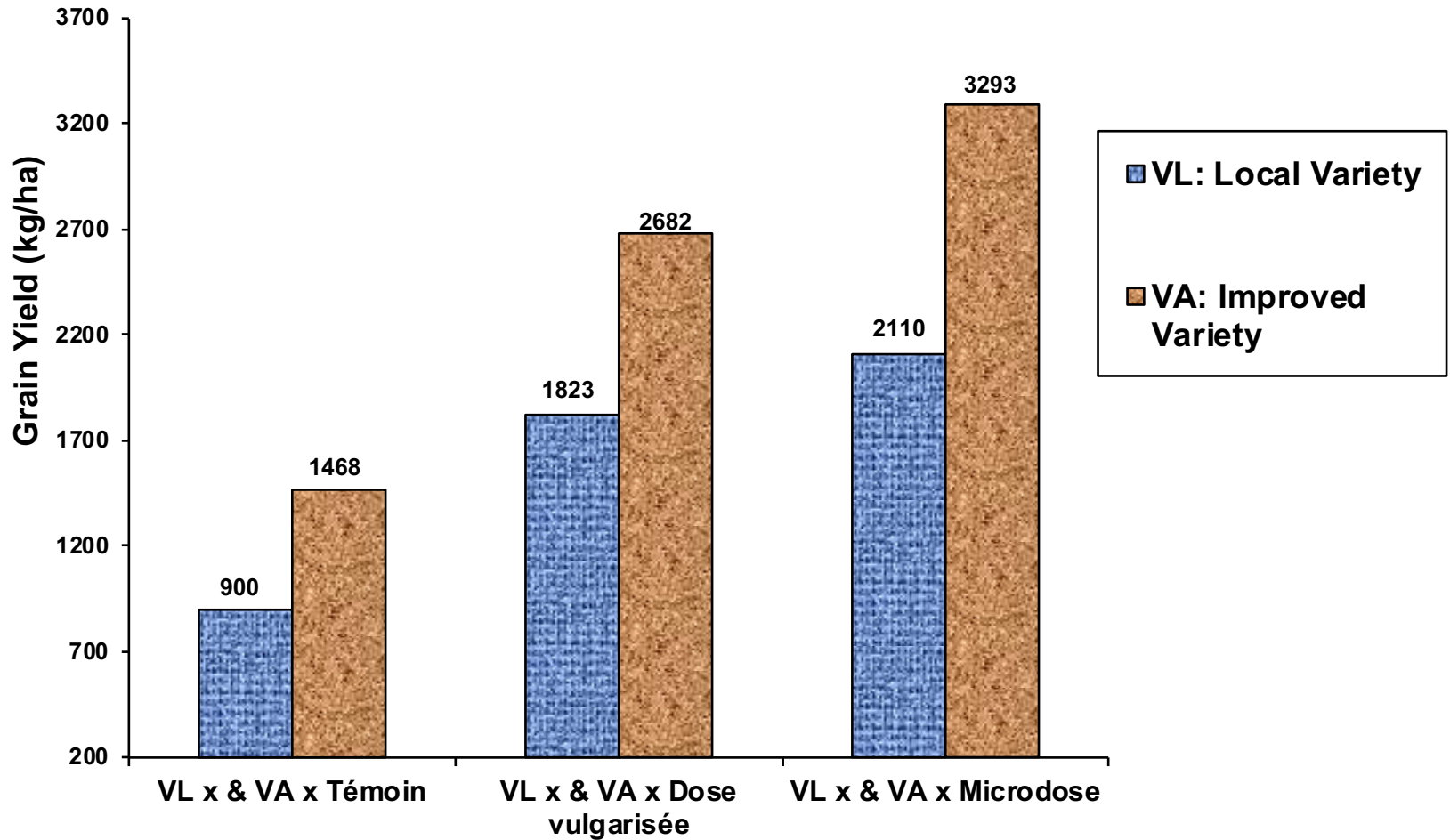
- 4 g of NPK(14-23-14) per poquet for maize
- 2 g of NPK(14-23-14) per poquet for sorghum and millet

- **Manual fertilizer micro dosing is time consuming**

FERILIZER APPLICATOR (MICRO DOSER)



Maize response to fertilizer micro dosing



FERTILIZER DEEP PLACEMENT

- It has been introduced by IFDC in Burkina in 2009
- As a consequence, more N is available to the crop throughout its growth cycle. Therefore, losses to the atmosphere, groundwater and waterways are drastically reduced
- Rice yields with FDP (compared with broadcasting) average 30 percent more (an additional 1.2 metric tons per hectare).
- farmers are realizing about \$400 in additional annual income per hectare than farmers using traditional practices
- It is being promoted in irrigation scheme (Bama, Bagre, Sourou etc)



ZAI

- A zai is a planting basin (pit) with a diameter of 20 to 40 cm and a depth of 10 to 20 cm
- Manure and compost are often put inside the zai, in order to create a water- and nutrient-rich micro-environment



- In the Yatenga region in Burkina Faso, the zai basin alone increased yield of sorghum compared with flat planting by 90 kg ha⁻¹ over 2 years
- Zai with 3 t of manure per hectare gave an increase of 474 kg ha⁻¹ and zai with NPK (10 kg N ha⁻¹ and 20 kg P ha⁻¹) an increase of 619 kg ha⁻¹ (Roose et al. 2008).

DRIP IRRIGATION

Drip irrigation is very used in Burkina Faso
It reduces water losses and increases productivity by 1/3



IRRIGATION CONTROL SYSTEMS

Not yet used in Burkina Faso but could be promoted on big irrigation scheme (Bagre, Sourou and Samandeni)

By adopting centralized command-and-control tools, farming teams will be able to tell precisely when to irrigate a given field

USE OF DECISION-MAKING TOOLS

- **Rice advice**



Fertilizer Optimizer



Apps on google playstore

Excel version of de fertilizer Optimizer

AEZ Eastern
Elevation >1200

Producer Name:

Prepared By:

Date Prepared:

Crop Selection and Prices		
Crop	Area Planted (Ac)*	Expected Grain Value/kg †
Banana	1	
Irish Potato	1	40
Maize HP >4t	1	25
Maize LP <4t	1	25
Maize-Bean	1	0
Rice lowland	1	60
Bean	1	30
Total	7	

Enter area of land (ac/ha) to be planted for each crop and the expected grain value

Fertilizer Selection and Prices				
Fertilizer Product	N	P2O5	K2O	Price/50 kg bag ₱*
Urea	46%	0%	0%	2850
Triple super phosphate, TSP	0%	46%	0%	4000
Diammonium phosphate, DAP	18%	46%	0%	3600
Murate of potash, KCL	0%	0%	60%	3600
P-ma zao	10%	26%	10%	

enter the price of 50kg plus transport, and application costs for each fertilizer of interest. Another fertilizer can be added e.g. NPK (17-17-17) after the P Mazao

Budget Constraint	
Amount available to invest in fertilizer	50,000

Enter amount that the farmer is willing /ready to put into fertilizer use this season (Constraint)

To optimize, left click the optimizer button

USE OF SOIL TEST INFORMATION FOR FERTILIZER RECOMMENDATION

- The use of soil test information is not popular
- We have some private Laboratories
- Soil fertility map is being prepared with the support of OCP foundation
- The accuracy of fertilizer recommendation will be improved

USE OF WEATHER INFORMATION FOR AGRICULTURAL DECISION MAKING

- With the pilote project of CCAFS, Farmers in Burkina Faso are using weather information for decision making (sowing; fertilizer application etc)
- More than 20% have access to climate information
- Several projects are working to make climate information available to farmers

USE OF DRONES

- In Burkina Faso, drones are mostly considered as recreational equipment, used to take photos and videos
- Their professional usage remains underdeveloped, while the market has potential for significant growth for suppliers of drone services who focus on agricultural and rural development projects

- Image capture and the gathering of key information for agronomists, researchers, farmers, environmentalists and decision makers, position drones as a truly innovative service and approach
- Multiple internal and external training projects are being created to help raise awareness amongst stakeholders and to promote the usage of drones.

Fasodrone

Its solutions in precision agriculture include

- Mapping of the farm
- Crop health monitoring
- Plant counting and yield estimation
- Farm area estimation

OPPORTUNITIES FOR PRECISION AGRICULTURE IN BURKINA FASO

- About 80-90% of the population in Burkina Faso is engaged in the agricultural sector
- There is a urgent need to improve food production to meet the demand of a growing population
- Agriculture labour is becoming very expensive (PA technologies are labour saving)
- Smartphone are very used in rural area
- Thanks to the growth of agribusinesses and the influence of associations and agricultural groups, farmers are more aware of, and open to new technologies

CHALLENGES OF PRECISION AGRICULTURE

- In precision agriculture, the issue has never been technologies, but rather the business model behind them.
- The technologies are always working, which is a remarkable thing, but only in a few areas where farmers can really pay for them.
- The sophistication of precision agriculture does not allow it to come at very affordable prices.
- Lower literacy rates in rural areas mean the delivery of apps and services must be accompanied by extra time-consuming training

CONCLUSION

- Despite the research advances on technologies relevant for precision farming, the need remains for research on how to efficiently allocate farm resources in time and space and how best to combine technologies that are both yield enhancing and labour saving
- We need to think about low cost precision agriculture technologies for small scale farmers



Thank you