

WAHARA MONITORING - 2015

SILENGA WAMUNYIMA

AGRONOMIST (BSc AGRIC)

GART/ZAMBIA

PRESENTATION OVERVIEW

- ✖ Selection Criteria
- ✖ Factors considered in technology selection
- ✖ Selected Technologies
- ✖ Objectives of the technology tests
- ✖ Soil Characterisation
- ✖ Rainfall Season 2013-2015
- ✖ Results 2013-2015 Farming Season

SELECTION CRITERIA

- ✘ Distinguished between ex-situ water harvesting technologies and in-situ soil water conservation.
- ✘ Eliminated ex-situ and selected in-situ water conservation after considering several factors.

FACTORS CONSIDERED IN TECHNOLOGY SELECTION

- ✗ Supplementary irrigation is not feasible;
 - + Small scale farmers can not afford irrigation infrastructure.
 - + Maize production is extensive and not profitable enough.
 - + Market for high value crops small or too far from rural areas.
- ✗ For dry season irrigation, alternative water sources need to be considered.
- ✗ Large surface and ground water resources not utilized. Beyond scope of the project.

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- ✘ Agronomic measures critical in improving soil water storage hence mitigating dry spells.
 - ✘ There was need to document the recently developed CA planter.

TECHNOLOGIES SELECTED

- ✖ Four CA technologies pre-selected for WOCAT
- ✖ Animal draft-Ripping
- ✖ Animal draft-Strip tillage (new)
- ✖ Animal draft-Zero tillage (new)
- ✖ Hand hoe Planting basins

RIPPING



STRIP TILLAGE



ZERO TILLAGE



OBJECTIVES OF TECHNOLOGY TESTS

- ✘ Verify and quantify the relative contribution of various factors to soil water conservation.
 - + Ripped furrows/basins harvesting water
 - + Soil cover
 - + Root development due to tillage system
- ✘ Document the suitability, benefits and weaknesses of the new strip planter.
- ✘ Evaluate the acceptability of the new technology.

SOIL PROPERTIES

Soil physical and chemical properties were determined using various methods

Soil Properties;

- ✗ Soil Bulk Density
- ✗ Soil pH
- ✗ Soil Organic Matter (SOM) Content
- ✗ soil respiration

SOIL ANALYSIS RESULTS

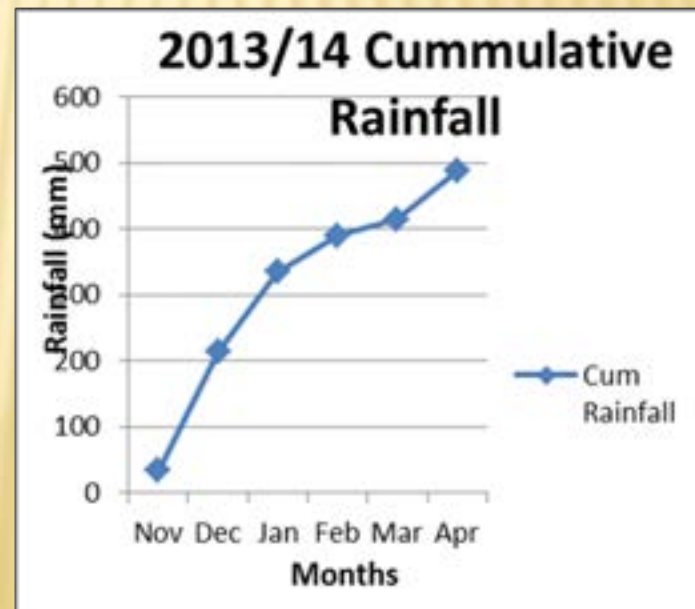
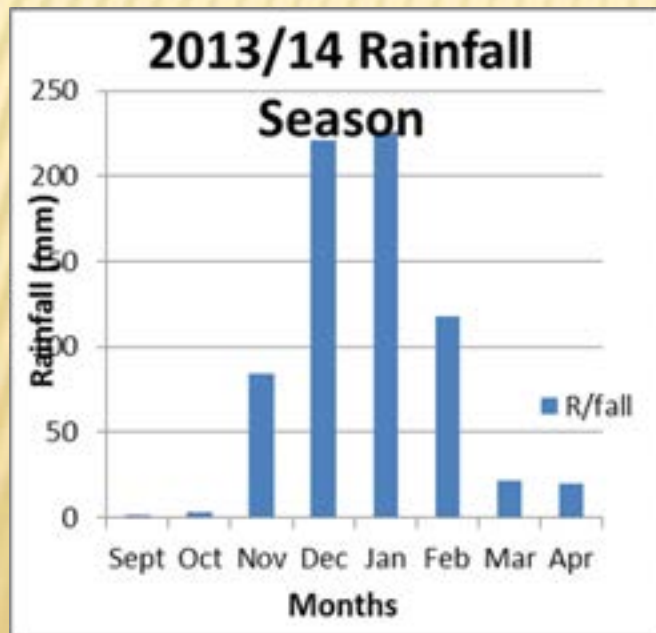
Name	Type	Sampl e	Soil	Org. Matter	CO ₂ C	Bulk	Sand	Clay	Silt	USDA
		depth	pH	Walkley and Black	Soil Respiration	Density	Hydrometer Method			Textural
		(cm)		%	mgCO ₂ C/Kg soil/day	g/cm ³	%			Class
Conventional	Non									
Method	WHT	0-20	4.01	0.64	4.80	1.721	72	18	10	SL
Basin	WHT 1	0-20	5.12	3.52	5.83	1.691	44	32	24	CL
CA-Ripping	WHT 2	0-20	5.42	1.44	4.97	1.742	62	26	12	SCL
CA-Strip Tillage										
(new)	WHT 3	0-20	4.68	2.32	5.31	1.832	46	36	18	CL
CA-Zero Tillage	WHT 4	0-20	4.79	1.52	6.00	1.809	64	20	16	SL

FINAL SOIL ANALYSIS RESULTS

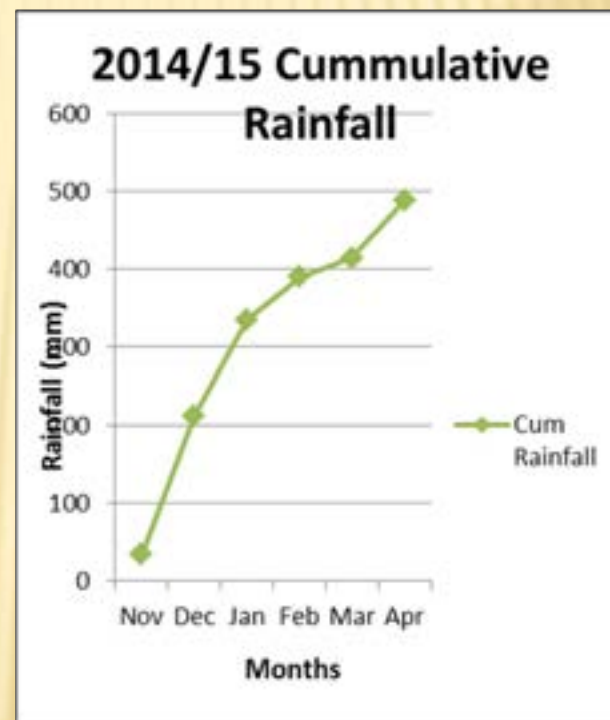
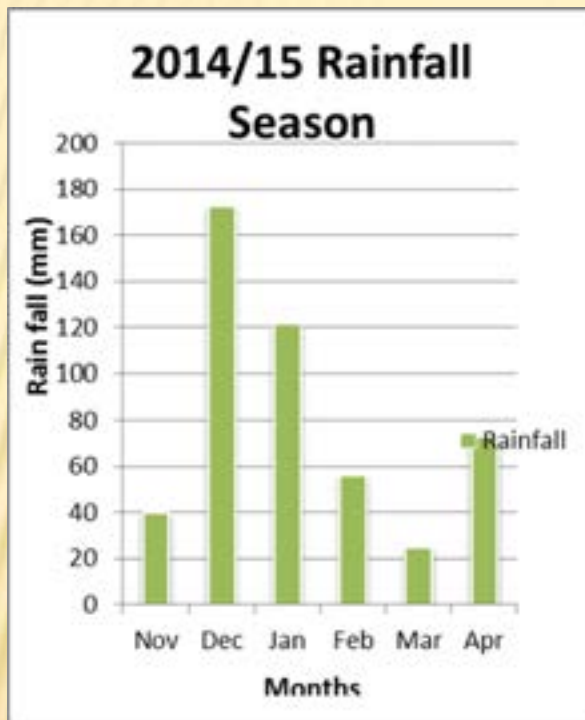
- ✖ WE AWAIT RESULTS FROM THE UNIVERSITY OF ZAMBIA, Soil Science Department.

RAINFALL 2013/2014

- ✖ Weather: rainfall data was collected for year 1 and 2. This data was analysed and the rain distribution curve over the entire farming seasons were developed.



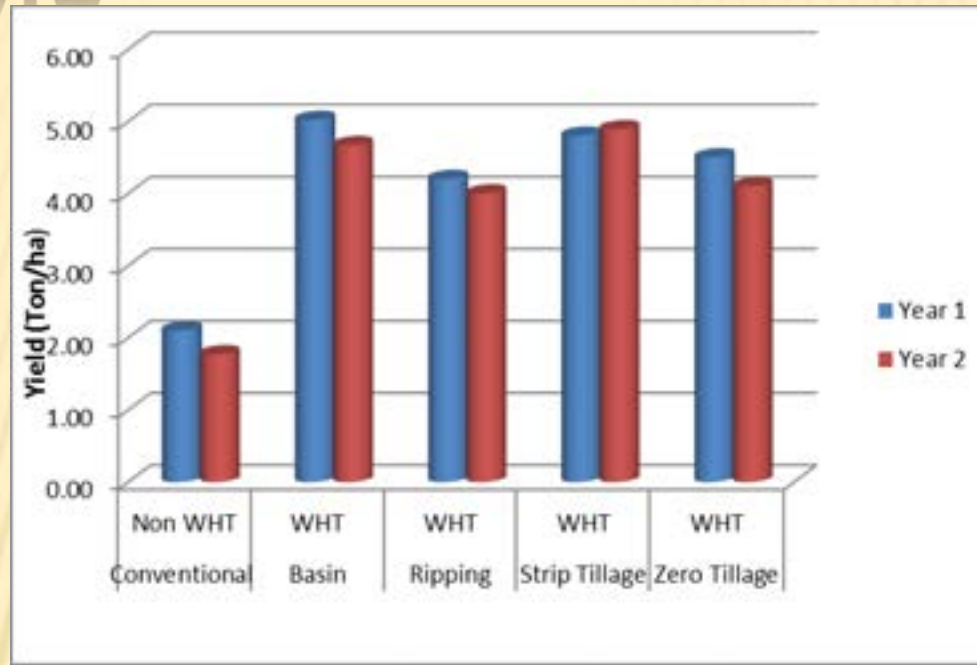
RAINFALL 2014/2015



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- ✘ The total rainfall received for the 2013/14 farming season was 690.70mm while in 2014/15 the amount of rainfall received was 487.8mm this could be classified as a dry year.
 - ✘ The rainfall looks well distributed in 2013/14 compared to the 2014/15.
 - ✘ The rainfall had momentarily stopped in February 2015 this led to moisture stress of many crops during this critical stage of the crops huge losses resulted.
 - ✘ The effective rainfall season is from November/December to March/April each season and the 2014/15 season wasn't like it. The rain season that extends in April is ineffective to most crops in Zambia.
 - ✘ Therefore, the rain and came in April 2015 was ineffective and resulted into major yield losses of most crops.

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- ✘ 2014/15 was a bad rainfall year as rainfall drastically reduced by Feb, most crops suffered moisture stress.
 - ✘ Crop damage due to low rainfall was as high as 80 percent in some parts of Southern Zambia (ZNFU., 2015)
 - ✘ National Maize (*Zea mays*) production has fallen by 18 percent in 2015 due to low rainfall and drought in some instance (MAL., 2015)

YIELD DATA



- ✗ Generally all farming systems recorded lower yields in the second year of monitoring except for WHT Strip Tillage which showed a marginal increase by 1.88%.

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- ✘ The fall in yield in the plots for WHTs was minimal compared to the fall in the Non WHT.
 - ✘ This is because of the water and soil conservative measures employed in the WHTs which enabled the crop to withstand long dry spells experienced during the second year of monitoring.
 - ✘ The reduction in yield could be attributed to the poor rainfall recorded in the second year (2014/15 Farming Season).
 - ✘ The Conventional Method (Non WHT) recorded worst yield losses by a value of 15.77%, this is because the method lacks water harvesting interventions.

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- ✖ Monitoring of the selected farmers started in 2013/14 farming season and continued in 2014/15 farming season
 - ✖ For both periods planting was done in the month of Mid of December
 - ✖ All agronomic operations were carried out and recorded

WHAT NEXT?

- ✖ Stakeholders Analysis - Analysis 2016

PICTURES



END

THANK YOU
(Twalumba)