1ST EASTERN AFRICA AGROECOLOGY CONFERENCE

TRANSFORMING FOOD SYSTEMS FOR RESPONSIBLE PRODUCTION, CONSUMPTION AND SOCIAL WELLBEING

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Strengthening Resilience and Sustainability in Food Systems for Environmental and Socioeconomic Development

The effects of Cow dung and poultry manure in crop yield: Observations from farmer-led research

Introduction

> *Farmer-led research refers to an approach of empowering community to engage in the research tasks (Fioret et al., 2018; Sieglinde et al., 2019).*

This study focused on farmer-led research of agro-ecological practices, particularly cow dung and poultry manure

Introduction Cont……..

- Agro ecological practices are natural resources based which can be applied in livestock keeping, forestry and cropping systems (FAO, 2014).

- Cow dung and poultry manure are among of agro ecological practices which have high nutrient and organic matter contents (Eleduma *et al.*, 2020)

- Most previous studies looked on the effects of many issues including soil ph, soil acidity, plant heights, increasing of nutrients, organic carbon and yield (Zaman *et al.* 2017; Eleduma *et al.*, 2020).

Introduction Cont……..

- They ended up on recommending high application rates ranging from 5t/ha to 20t/ha (Usman, 2015; Zaman *et al.* 2017; Eleduma *et al.*, 2020).

- In practice, rates are too high to most of Tanzanian smallholder farmers (URT, 2021).

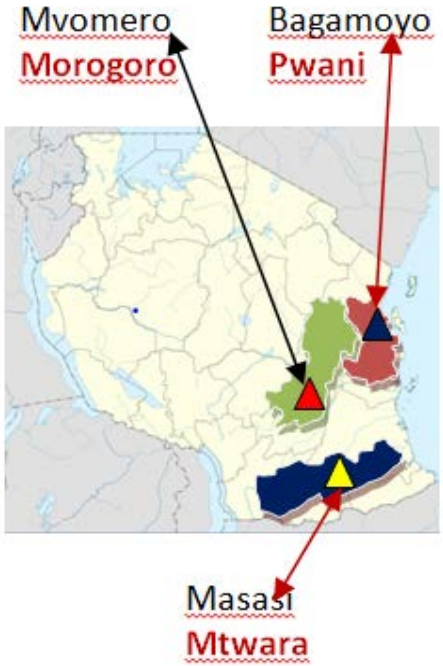
- Therefore, the aim of this study was capture farmers' manageable rates to investigate single element (yield)

Farmer-led research of agro ecological practices

The approach keeps farmers free to investigate what they want for what they can

Methodology

Study area



Research design

Time series research method was used **(2019, 2020, 2021)**

Farmer develop their own research plots

Data collection

Field visit

Individual Interview

Focus group discussion

Data Analysis:- Statistical package of Social Sciences (SPSS), Microsoft excel, Analysis of Variance (ANOVA) R-Software. **Quantitative** Content analysis. **Qualitative**

Results

Findings from the field

Year	Study area	Participants	Number of plots				Average rates in t/ha		Plot size in m^2	
			Cow	Poultry	Control	Total	Cow	Poultry	Max	Min
2019	Masasi	16	8	11	16	32	2.4180	1.6999	2000	80
	Mvomero	15	14	7	15	36	3.0662	3.0067	1300	80
	Bagamoyo	16	14	9	16	39	3.5957	3.8874	1000	100
	Total	**47**	**36**	**27**	**47**	**107**				
2020	Masasi	20	10	10	20	40	2.6799	2.9131	2000	80
	Mvomero	18	17	6	18	41	3.2076	4.3206	1300	80
	Bagamoyo	18	15	7	18	40	3.6899	3.7397	1000	100
	Total	**56**	**42**	**23**	**56**	**121**				
2021	Masasi	18	12	6	18	36	2.6130	2.5858	2000	80
	Mvomero	16	11	7	16	34	3.6080	4.7141	1300	80
	Bagamoyo	16	13	5	16	34	4.1156	3.7049	1000	100
	Total	**50**	**36**	**18**	**50**	**104**				

Results Cont…

Table 2: Yield results per participant in kg

Year	Masasi			Mvomero			Bagamoyo		
	Control	Cow	Poultry	Control	Cow	Poultry	Control	Cow	Poultry
2019	36.00	-	54.00	14.00	15.00	-	19.00	25.00	29.00
	12.00	-	25.00	120.00	250.00	-	18.00	30.00	22.00
	51.00	62.00	-	7.00	-	10.00	26.00	31.00	20.00
	8.00	13.00	15.00	5.00	7.90	-	16.00	26.00	23.00
	3.00	-	5.00	14.00	25.00	20.00	10.00	12.00	16.00
	3.00	-	1.50	5.00	5.00	-	4.00	6.00	7.00
	26.00	32.00	-	340.00	720.00	-	16.00	25.00	-
	36.00	-	65.00	40.00	60.00	100.00	25.00	-	35.00
	160.00	320.00	-	80.00	70.00	-	8.00	12.00	-
	45.00	85.00	-	6.50	14.00	8.00	90.00	180.00	-
	.50	1.50	2.00	2.00	5.00	-	20.00	32.00	-
	36.00	-	72.00	25.00	32.00	28.00	8.00	12.00	-
	1.00	1.50	2.00	30.00	45.00	32.00	24.00	36.00	26.00
	32.00	46.00	-	12.00	20.00	18.00	12.00	21.00	-
	60.00	-	125.00	7.00	12.00	10.00	20.00	28.00	-
	18.00	-	27.00				9.00	12.00	10.00

Year	Masasi			Mvomero			Bagamoyo		
	Control	Cow	Poultry	Control	Cow	Poultry	Control	Cow	Poultry
2020	31.00	-	48.00	6.00	11.00	-	8.25	-	25.32
	23.00	-	32.00	120.00	250.00	-	3.60	1.22	-
	51.00	62.00	-	5.00	-	10.00	20.00	16.00	-
	8.00	13.00	-	5.00	10.00	-	17.05	5.60	15.00
	3.00	-	5.00	14.00	22.00	22.00	12.00	10.00	-
	3.00	2.00	-	22.00	32.00	32.00	6.00	4.00	6.00
	26.00	32.00	-	340.00	720.00	-	25.00	16.00	22.00
	4.00	-	4.00	40.00	60.00	-	25	-	35.00
	160.00	320.00	-	80.00	70.00	-	12.00	8.00	10.00
	45.00	85.00	-	6.50	19.50	-	90	-	180.00
	.50	1.50	-	2.00	5.00	8.00	32.00	20.00	-
	8.00	-	15.00	25.00	25.00	20.00	12.00	8.00	-
	1.00	1.50	-	32.00	45.00	-	36.00	24.00	-
	32.00	46.00	-	12.00	20.00	-	21.00	12.00	-
	3.00	-	1.50	5.00	13.00	-	28.00	20.00	-
	1.00	-	1.00	34.00	50.00	-	70.00	56.00	-
	22.00	-	32.00	16.00	28.00	-	12.00	8.00	-
	16.00	-	22.00	32.00	48.00	48.00	32.00	44.00	-
	14.00	16.00	-						
	37.00	-	45.00						

Year	Masasi			Mvomero			Bagamoyo		
	Control	Cow	Poultry	Control	Cow	Poultry	Control	Cow	Poultry
2021	50.00	80.00	-	8.00	13.00	12.00	20.00	-	34.00
	17.00	-	19.00	80.00	130.00	-	22.00	36.00	-
	30.00	37.00	-	11.00	17.00	-	16.00	20.00	-
	26.00	60.00	-	38.00	50.00	-	6.00	17.05	12.00
	20.00	-	34.00	5.00	8.00	9.00	5.00	8.00	-
	4.00	-	5.00	24.00	28.00	-	7.00	10.00	9.00
	17.00	18.00	-	120.00	220.00	-	1.50	-	3.00
	240.00	400.00	-	8.00	12.00	-	6.30	15.40	-
	3.00	-	4.00	60.00	90.00	-	16.00	19.50	-
	3.00	2.00	-	38.00	65.00	-	20.00	40.00	-
	3.50	5.00	-	32.00	40.00	-	1.00	2.20	-
	32.00	46.00	-	26.00	-	59.00	48.00	60.00	-
	46.00	-	80.00	34.00	-	50.00	12.00	21.00	-
	22.00	-	32.00	113.00	-	154.00	20.00	28.00	-
	4.00	10.00	-	8.00	-	13.00	10.00	25.00	-
	75.00	105.00	-	40.00	-	60.00	26.00	-	59.00
	96.00	152.00	-						
	6.00	8.00	-						

Table 3: Testing hypotheses of the study

Year	Trials	Study area	Average yields in kg		Mean Square	F-value	P-Value
			Treatment	Control			
2019	Cow dung manure	Masasi	70.13	40.44	24083	813.6	0.000 ***
		Mvomero	91.49	50.04	468289	648.2	0.000 ***
		Bagamoyo	32.53	20.00	24083	813.6	0.000 ***
	Poultry manure	Masasi	35.77	19.41	15090	341.8	0.000 ***
		Mvomero	23.33	16.67	881.5	15.48	0.017 *
		Bagamoyo	29.00	21.22	1258.7	108.4	0.000 ***
2020	Cow dung manure	Masasi	57.90	34.05	82041	444.2	0.000 ***
		Mvomero	84.03	46.56	470866	470866	0.000 ***
		Bagamoyo	22.58	16.85	3192	72.6	0.000 ***
	Poultry manure	Masasi	20.45	14.20	3014.1	163.9	0.000 ***
		Mvomero	26.29	14.50	5886	35.15	0.001 **
		Bagamoyo	41.90	22.32	22406	270.3	0.000 ***
2021	Cow dung manure	Masasi	76.92	48.54	136225	1494	0.000 ***
		Mvomero	61.18	38.55	41296	528.3	0.000 ***
		Bagamoyo	23.24	14.53	2479.6	85.05	0.000 ***
	Poultry manure	Masasi	29.00	18.67	3853	185.2	0.000 ***
		Mvomero	51.00	33.43	15091	192.1	0.000 ***
		Bagamoyo	23.40	11.90	2028	58.02	0.004 **

Conclusion

The aim was to investigate if there was any significant effect of cow dung and poultry manure in crop yield for the rates applied by smallholder farmers.

From the findings it was observed that both cow dung and poultry manure have high positive effect in yield, and if were more used, there could be more yields.

It was also observed that there was some difficulties in accessing agro ecological inputs, so if the inputs could be easily acquired, most farmers could be encouraged to apply the practices

Recommendation

Government through ministry and NGOs to promote agro-ecological practices of cow dung and poultry manure

Encouraging investment on agro ecological practices particularly cow dung and poultry manure to easing availability of inputs.

More farmer-led research should be conducted to identify other beneficial agro-ecological practices

Thanks!

ANY QUESTIONS?

You can find me at

- @ Luambano Kihoma
- luambanokihoma@gmail.com

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