Adoption of Local Organic Resources for Soil Fertility Improvement in Crop Production: Ghana

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Introduction

Unlike most soils in sub-Saharan Africa, the ones in the coastal arid savannah of the Ada West District of Ghana are deposits of sand, with poor levels of soil organic matter, water holding capacity, low base saturation and high salinity. They have been used for farming without much attention paid to replenishing their nutrient and organic matter content. Rain-fed agriculture is restricted to two rainy seasons with short but heavy rains. Farmers in the region are growing vegetables for the local and urban markets. In the presented study, opportunities for an improved soil management by the use of locally available organic resources are evaluated. The farmers' needs and intentions are taken into consideration while analyzing the experiences and chances for adopting land and crop management options to improve soil fertility, which in the long run helps to improve yields and yield stability. The issues raised here are; What are the locally available organic resources for soil fertility improvement in Ada West district and which factors influence the intensity of their adoption?

Objectives

1. To estimate the proportion of crop farmers using locally available organic resources in improving soil fertility.
2. To determine the intensity of use of organic resources in improving soil fertility.
3. To analyze the factors influencing the intensity of adoption of animal manure or matured cow dung in improving soil fertility.
4. To analyze the constraints of using animal manure or matured cow dung in soil fertility improvement

Methodology

- Random-walk sampling technique was used to locate farming households for interview and in the case of multiple household within a compound the kish grid was used to select the appropriate household head to interview.
- Primary data on household/farm characteristics and the use of local organic resources for soil fertility improvement was collected from 317 vegetable farmers using a semi-structured questionnaire across the upper, middle and lower zones of the district.
- Bar graphs projecting proportions in the case of objectives 1 and 4 and ratio in the case of objective 2 were used in the analyses. The Tobit regression model was used to analyze Objective 3.

Conclusions

- Majority (88.7%) of the crop farmers use animal manure and matured cow dung in soil fertility improvement.
- Matured cow dung is used more intensely than animal manure in soil fertility improvement.
- The intensity of adoption of matured cow dung or animal manure are influenced by factors such as their cost, access to credit by farmers, educational level of farmers, farmers membership of FBOs and farmers ownership of their own lands
- Labor intensive is the most pressing challenge in the use of local organic resources for soil fertility improvement.

Recommendations

- Extension agents are encouraged to intensify farmer education on the use of local organic resources.
- Farmers are encouraged to form Farmer Based Organizations and Cooperatives to enhance their agronomy knowledge, practices and access to financial packages.
- Stakeholders must invest in pastoral farming to help increase availability of cow dung.
- Farmers must be trained in compost preparation.

Table2: Factors Influencing the intensity of adoption of animal manure and matured cow dung

Variables	Animal manure coefficient	Mature cow dung coefficient
Socio-economy		
Household labor size	-0.012	-0.027*
Off-farm income	0.032	0.008
Gender	0.058	0.067
Farming experience	-0.019*	-0.015*
Primary education	0.045	-0.103
Secondary education	-0.153	-0.105
Resource characteristics		
Expensive	-0.152**	-0.103
Non-availability	-0.080	-0.000
Insufficient animal manure	-0.006	-0.037
Lack of equipment	0.183	0.077
Labor intensive	0.170**	0.140
Institutional factors		
Access to extension	-0.066	-0.047
Access to credit	0.002**	0.002***
Member of FBO	0.013	0.119
Family land	0.176	0.237
Freehold	0.142**	0.099*
Rented land	0.120	0.135
Other factors		
Perception of infertility	0.021	0.042
of land	0.281***	0.230*
Vehicle	0.041	0.009
Access to information	-0.004**	-0.000
Confidence to invest	0.066	0.046
Other farmers	0.378	0.446
C		
Mean dependent	0.638	0.658
variable	-6.330	-5.298
LR	316	316
N		

***p<0.05, **p<0.01, ***p<0.001**

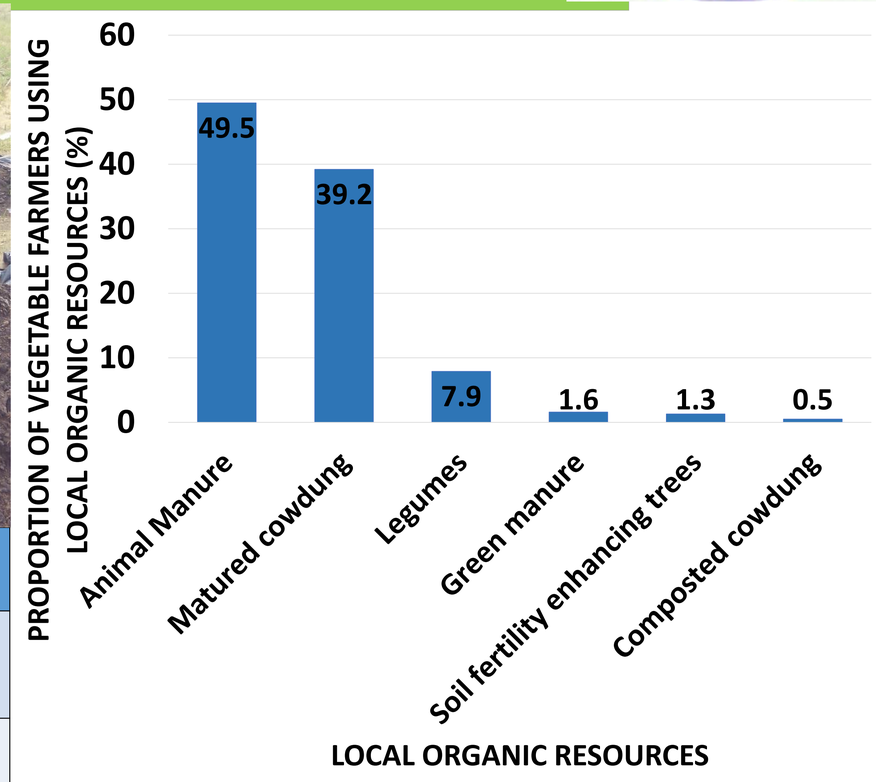

Figure 1. Proportion of vegetable farmers using local organic resources for soil fertility improvement

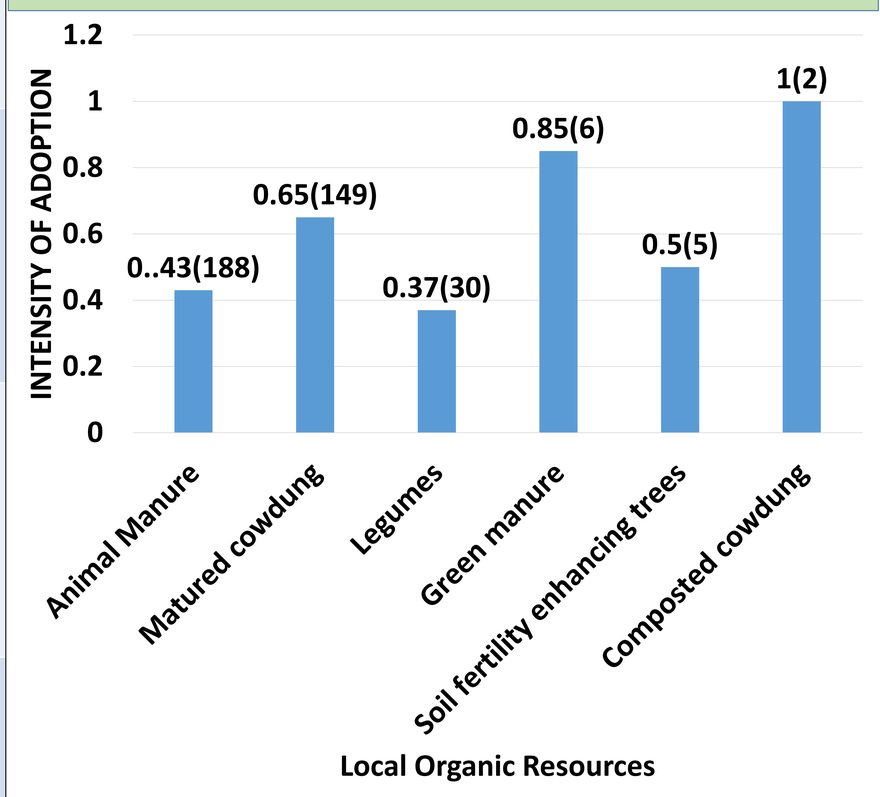

Figure 2: Intensity of Adoption of Local Organic Resources (Proportion of vegetable farmers' total cultivated land committed to application of local organic resource expressed in ratio).

Numbers in bracket represent the number of vegetable farmers subscribed to the allocated intensity of adoption .

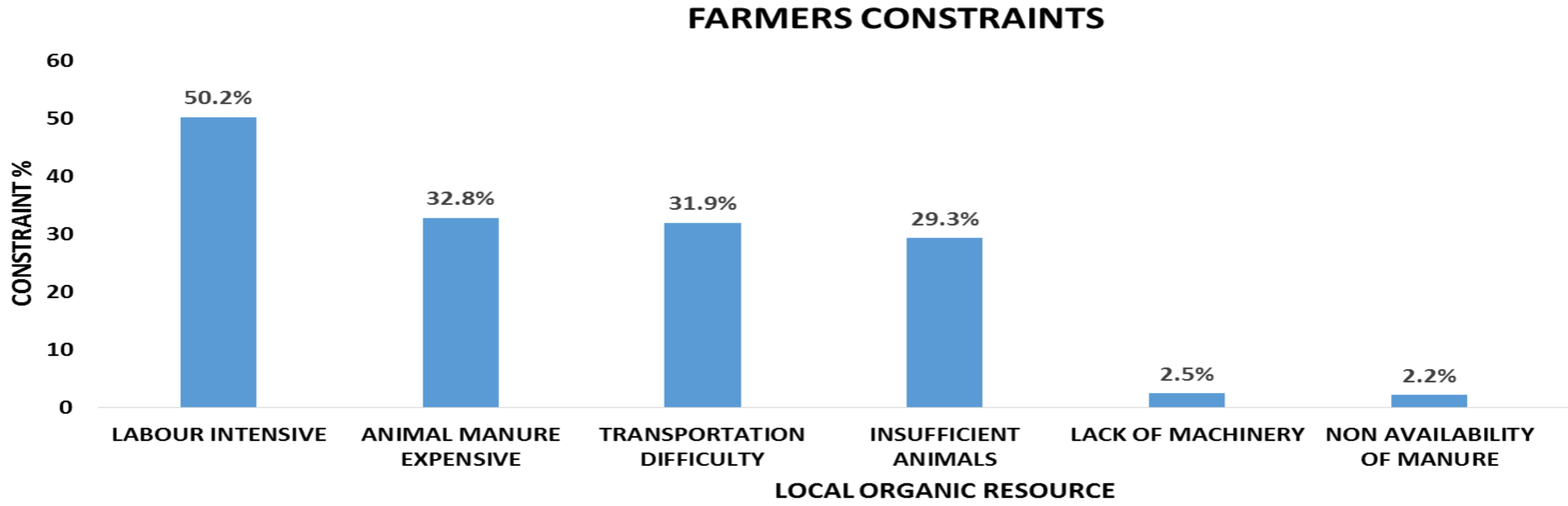

Figure 3: Constraints of using animal manure and matured cow dung in soil fertility improvement

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ORM4Soil
Organic Resource Management for Soil Fertility