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Farmers' Perception on the Use of Urine for Growing Vegetables in Ibadan

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ABSTRACT The study investigated the perception of farmers about the use of urine for growing vegetables in Ibadan. A sample of 60 vegetable farmers that participated in the practical demonstration of the method was taken and data were analysed with descriptive and Logit regression. Results show that majority of the farmers were young adults. Willingness to grow vegetable crop with urine is significantly influenced by soil fertility, farmers' religion, and ownership of degraded farm plots. It was recommended that cultural and religious issues bordering on contacts with urines should be addressed with proper orientation and awareness creation among the farmers.

INTRODUCTION

The economic development of Africa, more than any other region, depends on development of the agricultural sector which is presented marred by low resource productivity. Agricultural production in many African countries is also hampered by the predominance of fragile ecosystems, low inherited soil fertility, and low use of modern inputs such as mineral fertilizers and improved crops varieties (Julio and Carlos 2006). There is now persistent decline in crop yields and per capita food production with some long term implications for land degradation and environmental damages.

African countries today not only face the challenge of increasing agricultural production with scarce resources but must raise productivity in a way that conserves the natural resource base and prevent further degradation. Geist et al. (2008) argued that it is now widely accepted that multiple factors in synergetic interactions dominate the processes of land use change with some regional and temporal variations. Although, these changes have been found to be more profound in developing countries, they have also led to widespread environmental damages with rural communities forced to cultivate fragile and marginal areas (UNEP 2002).

Nigeria is one of the most rapidly urbanized countries in Africa and the challenges that come with this in terms of provision of adequate housing and basic services are enormous for government to bear (FMH and UD 2003). The growing problems of land use and the design of effective and efficient management systems to combat crisis and degradation accompany uncontrolled and unguided use of land has attracted international, national and local attentions. The most serious problems confronting cities and towns and their inhabitants as enumerated by the habitat II Agenda (2002) include improper land use, insecure tenure, among others. Mismanagement of arable areas by farmers and/or grazing areas by livestock owners is one of the major causes of soil degradation which can result from natural hazards, unsuitable land use and inappropriate land management practices (FAO 1999).

The consequences of soil degradation have made policy makers to suggest low-cost ecological suitable alternative fertilizer such as human wastes. Although, Africans generally regard human wastes as useless products, but biophysical concerns such as land degradation, declining soil fertility and limited nutrients resources have made it necessary to determine means of changing this perception to one that views human wastes (urine) as a valuable and useful resource (Rosemarin 2005). In the absence of inorganic fertilizer, the only option available to farmers for enhancing the nutrient content of their farm is to use organic materials. Oyekale (2008) suggested the use of soil conservation practices like crop rotation, planting of cover

crops, addition of organic manure in order to improve the people's standard of living. Adunni and Werner (2007) also noted that high cost of inorganic fertilizer, low capital base of rural farmers coupled with long term adverse effect of chemical fertilizers on soils, necessitate development of strategies that will integrates all possible options towards sustainable soil fertility management.

Therefore, this study intends to examine the perception of farmers on the use of urine for growing vegetables in Ibadan. The researchers seek to determine the various soil nutrient management practices being presently used by the vegetable crops farmers and their views on urine usage for soil nutrient replenishment in relation culture, religion and economic viability and social acceptability.

MATERIAL AND METHODS

Study Area and Sampling Procedures

The study was carried out in Mokola-Army Barrack of Ibadan North West Local Government which was created in 1991 with its headquarter at Onireke. It is bound in the North by Ido local Government, in the East by Ibadan North East and in the South by Ibadan South East Local government. Its geographical coordinates lie between latitude $7^0 22^{'}$ N to $7^0 26^{'}$ N and between longitude $3^0 51^{'}$ E to $3^0 54^{'}$ E. The climate of the study area is a microcosm of West African monsoonal climate, marked by distinct seasonal shift in the wind pattern because of its latitude location between March and October. The mean daily value of sunshine is highest in February reaching a mean value of 7.3 hours of the possible sunshine.

The study area was purposively chosen because it has many farmers who grow vegetables. Because using urine to grow vegetable is new in the area, the researchers had a demonstration plot where some of the farmers were trained and undergone the whole processes. This demonstration served to familiarize the farmers with what the processes look like so that they can properly gauge their willingness to continue with the practice. Out of the vegetable farmers, only 60 participated in the demonstrations and these were interviewed with structured questionnaires. The interview was conducted after the demonstrated farm where the vegetables were planted had been harvested and the farmers already evaluated what it takes to use urine to grow vegetables.

Logit Model

The Logit model was used to analyse the willingness of the farmers to grow vegetable with urine. Because the dependent variable is qualitative and binary, this model presents the best approach to find the probability of involvement. The estimated equation can be expressed as:

$$Z_i = \beta_o + \beta_i \sum X_i + u_i \quad \text{.....1}$$

Where Z_i is 1 the farmer is willing to use urine to grow vegetables and 0 otherwise. X_i are respondents' exogenous variables suggested to influence perception of urine as a fertilizing agent. These are age of respondents (years), sex (male = 1, 0 otherwise), marital status (married = 1, 0 otherwise), educational level (formal education =1, 0 otherwise), farming experience (years), household size, religion (Christianity = 1, 0 otherwise), market distance (km), soil condition (fertile =1 0 otherwise), degraded soil (yes = 1, 0 otherwise), difficulty in getting land (yes = 1, 0 otherwise), access to extension officers (yes = 1, 0 otherwise), access to new technology (yes = 1, 0 otherwise), awareness (yes = 1, 0 otherwise), cultural norms against urine (yes = 1, 0 otherwise) and religion belief against the use of urine (yes = 1, 0 otherwise) β_i is a vector of the parameters to be estimated and μ is the error term.

RESULTS AND DISCUSSION

Socio-economic Characteristics of the Respondents

As shown in Table 1, the minimum of age of the farmers was 17 years while the maximum age was 60 years. The average age of the farmers was 28.92 that is, 29 years. This shows that the farmers were young and still in their active age. A lot of them were students who will have to fend for themselves by using the money realized from the sales of the vegetable products on their educational pursuit, and coupled with the fact that maturity period of vegetable is short and that it can be grown all the year round, most of these young farmers therefore prefer vegetable production to any other form of crop production.

Table 1: Some socio-economic characteristics of the farmers

Socio-economicc haracteristics	*Mini-mum*	*Maxi-mum*	*Means*	*Std. devia-tion*
Age	17	60	28.92	10.518
Years of experience	1	17	5.98	2.603
Household size	1	9	4.20	2.032
Years of cultivation	1	17	5.44	3.395
Cultivation time/plot	2	14	8.58	3.060
Market distance	1	78	9.821	5.442
Market operating days	1	3	2.82	0.469

The average household size of the farmers is 4.20. Average distance of a major market to the farm was about 10 km as compared. The reason is that the farmers want to take their products to nearby market to ensure reduction of transportation cost. The market operation day as given by the respondents was 3 days interval. This indicates that vegetable must be harvested and taken to the market every 3 days.

The average year of experience in growing vegetables by the farmers was 5.44. Also, the farmers take an average of 9 times to cultivate a piece of vegetable plot in a year. This suggests that the farmers have adopted a continuous cropping system.

Soil Degradation and Improvement Techniques

Table 2 shows that 54.20 percent of the farmer indicated that their vegetable plots of land were fertile. Also, 27.10 percent noted that their vegetable plots were very fertile. However, 16.90 percent were of the opinion that their vegetable plots have been degraded.

Table 2: Categories of plots condition used by the farmers

Soil condition	*Frequency*	*Percentage*
Severely degraded	1	1.70
Degraded	10	16.90
Fertile	32	54.20
Very fertile	16	27.10

The main feature used to perceive that a plot of vegetable land is infertile is vegetable performance. From Table 3, 71.7 percent of the respondents stated that the performance of the vegetable determines whether a soil is fertile or not. This shows that more attention is given to the vegetable crops in determining soil fertility than any other factor that might be present in the crop environment. Also, 50 percent of the farmers indicated that soil fertility could also be gauged from colour of the soil. This is because a soil whose nutrients have been depleted either due to continuous cropping or erosion would have lost the dark colour that characterizes fertile loamy soil in the area.

Table 3: Soil fertility indicators used by the respondents

Features	*%*
Intensity of weed growth	20.00
Vegetable performance	71.70
Water drainage	3.3
Colour of the soil	50.00
Depth of the soil	13.30
Ease of tilling	6.70
Types of weed most common	8.30
soil texture	20.00
Type of soil	10.00
Year of cultivation	10.00

As shown in Table 4, the major technique being used by the respondents to improve their soil infertility is application of poultry dungs (90%). They were using it because of its ability to improve soil's water holding capacity. It also improves the performance of vegetables and at the same time may be considered cheaper. Only 23.30 percent of the farmers were applying fertilizers.

Table 4: Soil improvement techniques by the farmers

Soil improvement techniques	*Frequency*	*%*
Poultry dropping	54	90.00
Animal manure	2	3.30
Fertilizer application	14	23.30
Urine	1	1.70

Farmers' Willingness to Grow Vegetables with Urine

The Logit regression results are presented in Table 5. The model produced a good fit of the data given the statistical significance of the Likelihood Ratio Chi Square ($p<0.01$). The parameter of religion is with positive sign and statistically significant ($p<0.05$). This implies that farmers that being a Christians contributes positively to the odds of using urine. This is expected because Muslims are mandated to wash with water after

urinating to avoid uncleanness of the flesh. Such may consider it religiously forbidden to have contacts with urine, even though it is meant to boost their soil's productivity.

Table 5: Factors influencing farmers decision to grow vegetable with urine

Variable	*Coefficient*	*Z (t-ratio)*	*p>z*
Age	.0089243	0.10	0.922
Sex	2.402874	1.21	0.226
Marital status	.2181705	0.10	0.921
Education level	.5449868	0.28	0.781
Experience	-1.062969***	-2.67	0.008
Household size	.1889628	0.68	0.495
Religion	3.860477**	2.23	0.026
Market distance	.0246724	0.09	0.924
Fertile soil	1.181186***	2.17	0.030
Degraded soil	.9244086*	1.79	0.073
Soil investigation	-.0008691	-0.32	0.748
Difficulty getting manure	-4.11372***	-.266	0.008
Access to extension workers	-1.079248	-0.43	0.669
New technology	-2.203173	-1.36	0.175
Awareness	1.988236	1.52	0.129
Cultural norms	-6.009555***	-2.58	0.010
Religion belief	2.019819	1.31	0.189
Const	-1.713437	-0.49	0.624

Multinomial logistic regression (farmers)
* Significant at 10% level** significant at 5%
*** significant at 1%

The parameter of soil fertility is positive and statistically significant ($p<0.01$). This implies that ownership of fertile plots contributes positively to the odds of probability of using urine to grow vegetables. Also, the parameter of soil degradation is with positive sign and statistically significant ($p<0.10$). This also indicates that ownership of degraded vegetable plots of land contributes positively to the odds of the probability of using urine. This result shows that given high price of inorganic fertilizer and its scarcity, vegetable farmers with degraded plots of land were willing to use urine as an alternative for soil nutrient replenishment.

Parameter of experience in vegetable farming is with negative sign and statistically significant ($p<0.01$). This implies that a unit increase in experience of farmers in growing vegetable reduces the odd of the probability of using urine to grow vegetables. Also, the parameter of difficulty in getting planting materials for improving soil fertility is with negative sign and statistically significant ($p<0.01$). This implies that that not able to get other forms of manure decreases the odd of the probability of using urine to plant vegetables.

Cultural norms parameter also has negative sign and statistically significant ($p<0.01$). This implies that presence of some cultural barriers against the use of using urine to grow crops reduces the odds of the probability of adopting it. This shows that culture is an important issue to be considered in an effort to diffusing the technology of growing crops with urine.

CONCLUSION

The study concludes that urine acceptability as fertilizing agent for vegetable production among the respondents is enhanced by some of their socio-economic characteristics such as religion, culture and the fertility status of the land. Religious and cultural issues are going to stand as real barriers to its diffusion among the farmers. This calls public awareness creation by policy makers and agriculture stakeholders. Also, the use of urine as fertilizing agent serves the goal of government in promoting initiatives that are channelled towards turning wastes to wealth. Specifically, increase in prices of inorganic fertilizer poses serious challenge to increased vegetable production because of rapid depletion of soil nutrients that has been promoted by continuous cropping. Due to its absolute freeness, urine usage as fertilizing agent is not only a way of promoting organic agriculture, it will also increase the farmers' gross margins. This no doubt, is way of reducing poverty among urban farmers that are devoted to growing vegetables.

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