

Use of Faecal Sludge for Agriculture in Tamale Metropolis: perception of Farmers, Consumers and Relevant Agencies

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ABSTRACT

Use of faecal sludge for agricultural crops is a long term practice in many poor peri-urban communities in Northern Ghana, where high cost of chemical fertiliser as well as poor soil texture make this alternative viable. Most of such farmers in Tamale Municipality do not receive any extension service or health advice on how to handle waste materials. WHO/FAO/IDRC project on ‘Minimising health risks from using excreta and grey water by poor urban and peri-urban farmers in the Tamale Municipality is developing non-treatment options, stemming from 2006 WHO Guidelines, for these marginalised groups. Collaborative effort includes both local partners, such as University for Development Studies, Ministry of Food and Agriculture, Metropolitan Assembly, as well as international partners (International Water Management Institute, WHO, IDRC, and others). Recommended measures include wearing of hand gloves, boots and protective face masks when handling sludge, combined with improved hygienic practices for farmers, brought about by an intensified education campaign. Recommendations for agricultural use of excreta are based on knowledge of the nutrient content of the excreta, the amounts excreted, the composition and plant availability of the fertilizer and the treatment of the excreta, which influences their properties. The work presented in this paper obtained the perceptions of farmers, consumers, as well as policy makers concerning the use of faecal sludge for crop production in the Tamale Metropolis. In order to safely satisfy the demand for sewage sludge and composted bio-waste by farmers, hygiene has to be improved to meet the WHO requirements. Quality control has to be strict to assure the consumer that the use of a composted product will not cause problems. The utilisation of toilet waste is also being hindered by prejudice and lack of information in the local situation. Only efficient information system can influence effectively public opinion. This paper presents the experiences and lessons learned in work with farmers, consumers and relevant agencies during 2008 cultivation season.

Introduction

Human faeces are considered a valuable nutrient source in a number of countries. For example in China, in Japan, in Korea, but also in some countries of Africa and South-America nutrients of faeces are utilised in agriculture.(Steineck *et al.*, 1999). In Ghana, as in

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other developing countries, the state of environmental sanitation derives to a substantial extent from insufficient number of toilet facilities as well as inadequate waste disposal and treatment facilities. Faecal sludge (FS) from on-site sanitation (OSS) installations that is, sludge accumulating in septic tanks, aqua privies, family pit or bucket latrines, and unsewered public toilets is in many cases disposed of untreated and indiscriminately into drainage ditches, inland waters, the sea and on unused plots. This practice contributes to perpetuating the spread of gastro-intestinal infections.

In the early nineties, Owusu-Bennoah and Visker (1994), reported that 90% of collected night soil in Tamale Metropolis was used as fertilizer. This work was aimed at obtaining the perceptions of farmers, consumers, as well as policy makers concerning the use of faecal sludge for crop production in the Tamale Metropolis. The paper further described the ingenuity of small scale farmers in the use of faecal sludge for crop production in the Metropolis.

Materials and Methods

Study area

Tamale is the capital city of the Northern Region of Ghana, which lies mainly in the savannah climatic region of West Africa. Tamale Metropolis is the largest settlement in Northern Ghana and reputed to be one of the fastest growing cities in West Africa. The population of the Tamale Metropolitan Area as of the year 2000 was estimated to be 293 900, equally distributed between the two sexes (Ghana Statistical Service, 2005). This figure showed an increase of 74.8 percent over the 1984 population of 169,000.

The Metropolis lies between the latitudes $9^{\circ} 18'N$ and $9^{\circ} 26'N$ and between longitudes $1^{\circ} 15'E$ and $1^{\circ} 23'W$. The Metropolis covers a total area of about 922km^2 . It has distinct rainy and dry seasons and unimodal rainfall pattern with about 1000mm of rainfall per annum (Ghana Meteorological Service Dept., 2002). Two communities were used for this work, namely Sanerigu and Dungu, both suburbs of Tamale Metropolis.

The people in these areas are predominantly peasant farmers cultivating cereals such as millet sorghum, maize, cowpea, rice. They also cultivate tubers; cassava, yam and some vegetables such as pepper, okra, tomatoes and garden eggs. Land use and crop cultivation of crops in these areas is subjected to seasonal problems such as:

- i. Setting of annual fires causing vegetative cover loss.
- ii. Erratic rainfall pattern.
- iii. Shortened or even elimination of fallow periods, due to increased pressure on land.

Data Collection

Questionnaires were administered to access the perception of farmers, consumers as well as policy makers on the use faecal sludge for crop production in the Tamale Metropolitan Area. In total, 200 individuals were interviewed, comprising 80 farmers using faecal sludge, 100 consumers and 20 policy makers from various institutions such as Environmental Protection Agency (EPA), Metropolitan Assembly (MA), UNICEF (Sanitation Unit), Ministry of Local Government, MLGRDE (Environmental Health Dpt.), Ministry of Health (MoH), Public Health Dpt., and the community members.

Data collection for all groups was carried out in March and April, 2008.

Results and discussion

Basic demographic data

Farmers engaged in the application of faecal sludge in the study area were 41-50 of age, and represents active working population Children and very old are not involved during the application of the faecal matter, as presented in Figure 1. All the 80 farmers interviewed were males. This is due to the fact that the farming is generally done by the men in the study area, who are the heads of households in traditional society and owners of lands because they are heirs of family properties.

Majority of the farmers did not have any form of formal education and they represented 70% of the sample, while 26% had a primary school education. Only 4% had education to the level of the Junior High School (JHS). None of the interviewed farmers had education above J.H.S.

Farming practices

Subsistent farmers who cultivate 1 to 3 acres of land to feed themselves and their families were the main respondents. Details are presented in Table 1. About 76% respondents were solely farming, while 24% were engaged both in farming and trading as secondary occupation.

All the farmers sampled for this study use faecal sludge. Supplementing this resource with cow dung, poultry manure or chemical fertilizer only becomes necessary when the supply of faecal sludge is low. Table 2 shows the various combinations of faecal sludge with other fertilizers used on the respondents farms.

None of the farmers use the FS for leafy vegetable production. They mostly use it for cereal and leguminous crop production, as presented in Table 3.

According to the farmers, apart from giving high yield, and consequently profit, faecal sludge application also maintains soil structure and texture; and improves its water holding ability. Also the faecal sludge is readily available to them and cost of obtaining is relatively low as compared with mineral fertilizer.

Treatment of faecal sludge

Faecal sludge in the study area is treated by exposure to solar radiation. According to the farmers, the treatment is primarily aimed at killing pathogens and reducing the odour that emanates from the sludge. It was realized from the interviews that 90% of farmers not wear any protective clothing during work with the FS, while 10% protect themselves against by any available means, such as long sleeved cloths, wearing shoes, boots, etc.

There is a social stigma attached to the use of faecal sludge in the Tamale Metropolis. However, farmers use it because majority of them cannot afford chemical fertilizer and other sources of fertilizer are not readily available. Interviews revealed that FS farmers are often looked down to by the society and therefore they feel uncomfortable working with the FS, but still use it because it gives them maximum profit.

Marketing of produce

According to the farmers, they do not face any marketing problems as their produce is accepted by the middlemen. They had not received any complaints about the quality of their produce as at the time the study was carried out.

Consumer Perception analysis

Of the 100 consumers interviewed, 29 confirmed that they did know the source of most of the food crops they buy from the market, while 61 said they were not sure of where these produce come from.

Awareness of the Use of Faecal Sludge as Fertilizer

Most of the consumers interviewed were knowledgeable on the fact that farmers in the Metropolis use FS in crop production, especially in production of cereals and legumes. Consequently, 77 out of 100 consumers interviewed, said they have heard of the use of FS for crop production, with the remaining 33 respondents claiming ignorance. None of them had any idea if FS was being used for vegetable or cereal production.

Perception on Wholesomeness

Though majority of the consumers interviewed confirmed that they know that farmers use FS, they did not believe that crops produced with FS are wholesome. 54% of the consumers interviewed said that crops produced with FS are not wholesome, since it is a hazardous waste product and should not be associated with food production. Some of the respondents said that the fact that FS increases yield does not mean the food produced is of the best quality; 46% of the consumers interviewed said that they believe crops produced with FS are wholesome and better than those produced with chemical fertilizers as the chemicals in them can have health implications on consumers.

Acceptability of Crops Produced with Faecal Sludge

Consumers were also interviewed on their readiness to accept crops produced using FS as fertilizer; 44% of the consumers interviewed said they would buy the crops even if they are made aware that FS was used, as FS only serves as a good source of fertilizer and has no effect on the crops produced; 56% said they would not buy once they get to know the crop was produced using FS as fertilizer.

Institutional Perceptions

Awareness and Prevention

In all, 20 respondents from TAMA, EPA, UNICEF, MLGRDE, MoH and community were interviewed. According to discussions, they do not help the farmers to acquire the FS. Farmers link up with the cesspit tanker drivers to deposit the material on their farms instead at the allocated landfill built by the Assembly. The drivers are paid a token by the farmers, which goes into their own pockets.

Out of the 20 respondents, about 60% believed that the farmers can be made to stop using FS through awareness creation and education on the health hazards of raw FS. About 40% think this can be achieved by regulating the activities of the cesspit tanker drivers, whilst the assembly enforces bye-laws.

Benefits of faecal sludge

Notwithstanding the potentially devastating health and environmental effect such as outbreak of diseases, air pollution and contamination of nearby water bodies, 60% of the policy makers admit FS is a good source of fertilizer since it gives high production and also serves as an

excellent material for soil amendment; 30% of the policy makers are of the view that FS can be used by excavating the soil, pouring the sludge and covering it to decompose before planting. By this practice, they believe the full extent of nutrients in FS could be assessed with minimum health and environmental effects, whilst 10% believe that faecal sludge is a very dangerous material, and as such should not be used as fertilizer at all.

Government Policy

All the local public and civil servants interviewed maintain that they are not aware that there is governmental policy that supports or bans the use of faecal sludge for agriculture as of the time the study was conducted. However, EPA, UNICEF and MWMD have met with farmers using faecal sludge to warn them about the environmental and health risks associated with this practice.

Preventive Measures

According to the Public Health Unit of MoH, the only way the farmers can keep safe and ensure wholesome produce for consumption is by using treated and sterilized faecal sludge and wearing protective clothing when working on the farm. They mentioned diseases such as cholera, diarrhea, dysentery, and typhoid and hookworm infection as some of the health risks associated with faecal sludge application on farmlands. Some of the preventive measures as mentioned by the policy makers are outlined below;

- ✓ Faecal sludge should be treated before use.
- ✓ Education on safety and on farm behaviour when using FS.
- ✓ Regular treatment of farmers and their families with drugs to prevent worm infections.
- ✓ Wearing of shoes and gloves while working on the faecal sludge applied farmlands.

Is faecal sludge the best fertilizer?

When the policy makers were asked as to whether faecal sludge is the best fertilizer, 80% responded negatively, with the reason that its negative effects outweigh the benefits. The 20% thinks FS is the best if treated appropriately before use.

Conclusions

For the farmers in the study areas of Dungu and Sagnerigu, the spreading of the faecal sludge in the field makes sense as its advantages exceed the problems and the use causes no harm to his health as far as they can perceive it. Majority of farmers using faecal sludge ignore the stigma as well as the health risks involved in its use and considers only the increased profit it brings. They also indicate that faecal sludge is an organic fertilizer suitable for improving and restoring soil nutrients and structure. It is also convenient as cost of obtaining it is relatively low for farmers as compared to mineral fertilizers.

Consumers' response indicates that they are aware that some farmers in the Metropolis use faecal sludge. They mostly see the practice as being unhealthy and unacceptable. Faecal sludge would have been the best fertilizer and most accepted by consumers if treated appropriately before use to ensure safety.

Though policy makers maintain the view that faecal sludge application on farmlands is a bad practice and a threat to human health and the environment, they have done very little to

ensure that the faecal matter does not get to the farmlands, hence its continuous use in the Metropolis. Moreover, their efforts to educate farmers on the dangers associated with the use of faecal sludge are minimal and must be stepped up.

References

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Table 1. Farm sizes of respondents' farms

Farm Size (ha)	Frequency	Percentage (%)
0.4-1.2	42	52.5
1.6-2.4	17	21.25
2.8-3.6	9	11.25
4-4.8	8	10.0
5.2-6.0	4	5.0
Total	80	100

(Source: Field Survey, March 2008)

Table 2. Combination of organic fertilizers used on respondents' farms

Source of fertilizer	Frequency	Percentage (%)
Faecal sludge only	63	78.75
Faecal sludge/Cow dung	7	8.75
Faecal sludge/Poultry manure	1	1.25
Faecal sludge/Chemical fertilizer	9	11.25
Total	80	100

(Source: Field Survey, March 2008)

Table 3 Types of crops fertilized by Faecal sludge

Maize	68	85
Sorghum	8	10
Groundnut	3	3.75
Pepper	1	1.25
Total	80	100

(Source: Field Survey,
March 2008)