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**Indigenous Knowledge on Soil Conservation for Crop Production in Yua Community,  
Northern Ghana**

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**Abstract**

In this paper, the author sheds light on existing local knowledge systems on soil conservation for crop production in Yua, a rural community located in the 'Atankwidi' Basin of northeastern Ghana. The 'Atankwidi' Basin is part of the larger Volta Basin in West Africa and specifically spans through four administrative districts of the Upper East Region of Ghana. These districts mainly include the Kassena-Nankana West and East districts, and to a lesser extent the Bongo and Bolgatanga districts. This area is largely part of the Guinea Savannah Zone in northern Ghana undergoing environmental degradation due to a combination of factors – agricultural and construction activities, desertification and changing rainfall patterns. This situation has negatively impacted on soil fertility and agricultural production so that food poverty is widespread. In response, households have become more committed to indigenous knowledge practices on soil conservation for sustaining food crop production. Drawing on qualitative empirical research and data, the author argues that there is intensification and adaptation of indigenous soil conservation knowledge systems for sustaining crop production in the phase of environmental and soil degradation. In this domain of indigenous knowledge systems, the author reports on preparation and application of various forms of traditional farm yard and organic manure locally called 'Nandene Pu'usegɔ' and 'Tampugere Pu'usegɔ'. The author also examines emerging new forms of organic manure preparation which essentially include 'Na'ambɛa' and 'Tandɔkɔ' Pu'usegɔ'.

**Key Words:** Ghana, indigenous knowledge, soil conservation

**Introduction**

This paper discusses indigenous knowledge on organic manure for soil conservation in crop production in Yua within the framework of endogenous development. Endogenous development as an alternative approach to development emphasizes genuine community participation and utilization of local resources for addressing local development problems. Given that endogenous development is "development from within, or development based on local initiatives, knowledge, institutions and resources" (Harverkot, 2004:8), indigenous knowledge is central to the process of sustainable development. There has been growing recognition of the role of indigenous knowledge in the search for sustainable development in Developing Countries. Chambers (1999) stress on the successes of farmers and local peoples as the sources of local solutions in the search for sustainable livelihoods. He identifies three respects for which the contribution of local farmers are key to finding solutions – their knowledge, their time horizons and analytical capabilities. For

the purpose of this paper, indigenous knowledge is the "...the unique, traditional, local knowledge existing within and developed around the specific conditions of women and men indigenous to a particular geographic area" (Nuffic and UNESCO, 1999:10). They stress that indigenous knowledge is embedded in the community and is unique to a given culture, location or society. Some authors also describe indigenous knowledge as accumulated knowledge, skill and technology of the local people derived from systems of production and consumption. It is said to be dynamic and respond to challenges through local adaptations, experimentation, and innovation under diverse and heterogeneous conditions. These successful adaptations are preserved and passed on from one generation to another through oral and /or experimental means (Altieri 1988; Warren et al, 1996). Thus, in the opinion of Niarmir, indigenous knowledge is ever changing and very often borrows selectively from outsiders (Niarmir, 1990; Warren et al, 1996). Since indigenous knowledge is closely, related to survival and subsistence, it is said to provide a suitable basis for local-level decision-making on issues relating to food security and natural resource management (Nuffic and UNESCO, 1999:10-11). In this respect, the question that is explored in this paper is thus: 'what forms of indigenous organic manure soil conservation knowledge, materials and methods are explored by farm households for enhancing soil fertility for food crop production in 'Yua'?'

### **Research Methods**

This paper draws on data from a larger study in the '*Atankwidi*' Basin, of which '*Yua*' was one of the sample communities from April 2008 to April, 2009. Hence, part of the qualitative data (descriptive) generated from a combination of in-depth interviews among ten local farmers and their households and observation of practices in the community was used for preparing this paper.

### **Results and Discussion**

The results are presented to highlight firstly, the forms of organic manure and materials, secondly, effort and methods in material mobilization and thirdly, the method of manure application. In respect of the first issue, the results show that there are four main forms of indigenous organic manure soil conservation practices in food crop production. These are namely '*Nandene*', '*Tampugere*', '*Na'ambea*' and '*Tandɔkɔ*' forms of organic manure. The '*Nandene*' form of manure is produced mainly through the decomposition of cow dung and plant residue. At harvest, plant residues including groundnut and early millet stocks (Naara) are deposited in the kraal. The cattle lie, urinate and deposit their dung on the residue and over time decomposition of the organic materials takes place. The Kraal, called '*Nandeene*' in the local parlance is usually located within a homestead. Household members are encouraged to bath and pour waste water in the '*Nandene*' in order to provide moisture for aiding decomposition of the organic materials. The decomposed organic material, locally called '*Nandene Pu'usegɔ*' is usually scooped out at the beginning of the farming season for application on compound farms. The '*Tampugere*' form of organic manure is produced through the decomposition of a wide range of organic materials from a refuse dump located within the immediate surrounding of the homestead. Since this kind of manure is produced from a refuse dump, a wide range of organic materials including kitchen wastes, ashes, plants residues, animal droppings, tree stumps or branches are deposited and preserved for decomposition. Some amount of waste water is also poured into the '*Tampugere*' occasionally as has been the practice in the past but conscious regimes of watering is emerging among farmers drawing on some external knowledge. This highlights what Niarmir (1990) describes as dynamic and selective borrowing in indigenous knowledge systems. In the '*Na'ambea*' form of organic manure, farmers hand pick cow dung from grazing fields and stock pile the dung directly on portions of the farm during the off farm season with the intention of increasing soil fertility in those portions of the farm. The onset of rains help break down the dung and this is mixed with the soil during plough and weeding to enrich soils. This is a new and emerging form of organic manure that is particularly useful and practiced by non cattle owning

households although the practice is not exclusive to them alone. In the 'Tandɔkɔ' form of organic manure preparation, a simple pitch mostly dug for construction and maintenance of houses (bricks and mortar) and usually located within the immediate surrounding of the compound is used. Early millet stocks and grass generated from weeding compound farms are deposited into the pitch. Since early millet is harvested early in the rainy season, the deposited stocks are watered by rain water for at least a month and this aids decomposition of the organic materials. While every house is involved in the 'Tampugere' form of organic manure preparation, 9 out of every 10 households use the 'Nandene' form commonly associated with cattle owning homes but not exclusively. In reality, most households combine these two forms of organic manure and in many instances also practice a third form – either the 'Na'ambɛa' or 'Tandɔkɔ' forms of organic manure. The 'Na'ambɛa' and 'Tandɔkɔ' forms of organic manure are relatively practiced by few farmers and inspired by local circumstances and external knowledge gained from neighboring Burkina Faso.

Secondly, widespread consciousness and effort in mobilizing and managing organic materials relative to the practice in the past is phenomenal. Unlike the past where organic material was generally available, farmers now have to make strenuous efforts to obtain organic materials for compost making. Whereas in the past, most plant residues (stocks and vines) were left on the farms to decompose and enrich soils even after animals had grazed on such fields, same is not done today. An interviewee remarked that, *'if you leave your stocks on the farm after harvest, not even a single stock will be allowed to decompose for enriching soils. Livestock will consume all of them because they lack enough grass for grazing during the dry season'*. In response farmers now harvest all plant residues and carefully manage it for many purposes including preparation of organic manure. In addition to this and as a departure from the past, farmers now harvest rice straws from rice fields located in valleys and along river banks, import rice straws from neighboring communities in Burkina Faso and also harvest grass from the bush for purposes of preparing organic manure. Another new practice is that farmers routinely compete on communal grazing fields in picking cow dung for compost purposes. This practice is a direct response to scarcity of cow dung among the present generation of farm households. Firstly, all cattle owning households report of far less cattle holdings compared to what their parents had owing to the lack of vegetative feed, water and diseases that inhibit livestock production. Aside, there is an increasing incidence of households that have been stripped of their cattle either due to sales to purchase foodstuff or diseases. Since cow dung is an important resource in indigenous organic manure preparation, and since cattle owning households can not control the movement of their cattle during the day when they are out and grazing on communal fields, the dung that grazing cattle drop has become a 'communal resource' that both cattle and non cattle owning households compete to pick for purposes of organic manure preparation.

The third phenomenon is that farmers have adopted an incremental approach to the application of organic manure. The quantities of organic manure produced are often not adequate to go round the whole farm. As such farmers are now adopting an incremental approach to manure application in soil conservation practices. A small portion of the farm requiring soil fertility enhancement is identified and the application of organic manure is exclusively concentrated in this area in order to significantly impact on soil fertility. In the next farming season, the farmer identifies a different portion of the farm and applies the same soil conservation technique and the cycle continuous. Farmers recognize that in the past organic manure was spread widely and thinly over the farm. This accordingly makes insignificant impact on crop output currently because of the extent of soil fertility decline although it may have worked well in the past. Farmers acknowledge that the incremental approach which they have evolved makes the best impact in terms of improving soils and increasing crop yields. Farmers oral accounts show that with the incremental approach, crops do very well on applied sites – they grow very fast, look healthy,

show better resistance to draught, produce better seeds and above all lead to higher output levels as compared to past experiences of spreading organic manure widely and thinly.

The evidence points to intensification in the use of indigenous organic manure in soil conservation practices. This is evidenced in: (a) preparation of multiple and new forms of indigenous organic manure; (b) conscious and increased effort in mobilizing and managing organic materials for compost making; and (c) adoption of an incremental approach to organic manure application on farms. This shift towards intensification represents a significant change and corroborates the assertions that indigenous knowledge is innovative, dynamic and relevant for development (Niarmir, 1995; Warren et al, 1996, Aluma, 2004). The evidence also underscore the point that innovation in indigenous knowledge is driven by the need for sustaining livelihoods (Nuffic and UNESCO, 1999), and thus that, the contribution of local farmers to solving the problem of poor soils reflects their knowledge, time horizon and analytical capabilities as espoused by Robert Chambers (Chambers, 1999). It is also in this context that the works of Paul Sillitoe is relevant to the discourse on indigenous knowledge and development. He argues that indigenous knowledge is holistic and can therefore facilitate interdisciplinary research towards accelerating development and addressing poverty in the Developing World (Sillitoe, 2004).

## **Conclusion**

Drawing on the results, the author concludes that local farmers have shifted towards intensification in the use of indigenous organic knowledge systems of soil conservation for addressing the problem of poor soil fertility in crop production in 'Yua'. Intensification is used as a strategy in the preparation and application of indigenous organic manure for securing farming as a major source of livelihood in the light of limited organic materials and inadequate manure produced relative to larger farms requiring soil fertility improvement.

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