AN ASSESSMENT OF, AND MODELLING INDIGENOUS LAND MANAGEMENT SYSTEMS IN BANKANU, SOKOTO STATE OF NIGERIA

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ABSTRACT:

In this paper an assessment of the 1969 Food and Agricultural Organization (FAO) report on the conventional Sokoto- Rima Basin Agricultural Land capability Classification which span Bankanu Village was made towards judicious Land Management. The Land Capability Classes that span Bankanu village are only two out of the ten classes identified by the FAO across the Basin. Attempt to model indigenous land Capability Classes from the conventional was made through the use of Participatory Rural Appraisal. Consequently, Transect walk was made by the researcher together with the Bankanu Farmers across the village diagonally from North East to South west and North West to the South East of the Village. The two conventional classes three and six end up to five Classes by the indigenous farmers. Therefore, this work has shown that information derived from the Indigenous farmers is more detailed than the conventional and that facilitate the empowerment of the indigenous farmers.

KEY WORDS: Land Capability Classification, Indigenous Knowledge.

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1.0 INTRODUCTION

The rural people's knowledge is an enormous and underutilized national resource in most of the third world countries (Dahlberg, 1979, Chambers, 1983; Reyna, 1994;Kasanga and Kotey, 2001). This view has long been established as according to Hatch John that, "the small scale farmer's expertise represents the single largest knowledge resource not yet mobilized in the development enterprise; furthermore, we simply cannot afford to ignore it any longer" (Hatch, 1976; p17; Zigta, 2002). Consequently, Canahua, (2002) considered that indigenous Knowledge system should be regarded as part of national resources. However, the scientists in every nation have continued to look at problems solely in scientific terms (Mwesigye, 1996; Abdulrahim, 2004).

As a rider to the fore going, the internationally recognized knowledge of Land Management Practices is the conventional method which is otherwise referred to as scientific. To recognize the indigenous knowledge otherwise called ethno - science as the conventional knowledge would be by documenting it and harmonizing it with the modern knowledge. If that is achieved, it would surely be a great asset for sustainable agricultural production strongly because of the synergistic effects that the dual knowledge in one will provide in propelling development. This would therefore, mean that scientists must stop looking at the problem of land management through the scientific prism only and learn from the "non scientific" source. In turn, people at the grassroots can learn from the scientists (Mwesigye, 1996). Indeed the view about interpreting and assessing indigenous knowledge alongside scientific criteria has been coined "hybrid" studies (Latour, 1993, Murdoch and Clark, 1994; Papastergiadis, 1995 and Forsyth, 1996). Others have called it "knowledge interface" (Jiggins, 1989 and Blaikie, 1990).

Against this background, this study attempted to indigenously model the conventional 1969 FAO Generalized Land Capability Classification of the Sokoto - Rima Valley modified after the recognized concept of Generalized Land Capability Classification Systems developed by the USDA after the USA dustbowl of 1930s (Hockensmith and Steele, 1943; Hockensmith, 1947; USBR, 1953; and Klingebiel, 1958; Klingebiel and Montgomery, 1961) towards judicious Land management in to the Indigenous Land Capability Classification of the study area.

Consequently, a model for indigenous land classification, coding and intensities of land use in the study area is put forward in this paper which is divided into five sections. Besides the introduction, section two is about the study area and the methods. The conventionally recommended land management practices by the F.A.O. criteria and those adopted by the respondents are explained in section three. In the fourth section, a model of indigenous land classification in Bankanu is presented; while the concluding remarks is provided in section five.

2.00 STUDY AREA AND METHODS

The Bankanu Village almost 23km to the palace and its immediate surrounding are within Latitudes 13^{o} $13^{/}$ $45^{//}$N and 13^{o} $15^{/}$ $00^{//}$N; and Longitudes 05^{o} $15^{/}00^{//}$E and 05^{o} $17^{/}$ $07^{//}$E. The land mass is 889.07 Ha. The village falls in Kware Local Government Area of Sokoto State at the North western part of Nigeria, West Africa. The climate of the study area is Tropical Continental, Characterized with a semi arid environment with less than or equal 560mm annual total rainfall (Arnborg, 1988, Abdulrahim, 2004). The area has a severe water deficit from October to May or June. The diurnal temperature reaches 44^{o} C in the month of May. The harmattan occurs in November and December with average speed of 15km /hr which exacerbates soil erosion.

Bankanu is on approximately 278.4 mtrs above mean sea level relief. Located at the South West of Bankanu is Hadiza hill barely 283 meters above sea level. The topography is generally flat to gentle rolling broken occasionally by Mesas, Buttes and laterites strewn residual hills typical of the Hadiza residual hill. The Geology is Sokoto group being a product of Sedimentary formation. The major water system of the village is river Shela, a tributary to river Rima. The river is rich in alluvial deposit by its flood plain indigenously known as fadama and is defined as a flooded depression cultivated all year round by the farmers. The Soils are greatly influenced by the geology and the nature of the superficial deposits which mantles sediments. The soils by the edge of the river are the most fertile. The uplan soils are deeply weathered parent material of low fertility. The soil profile show a sandy topsols and a clayey subsoils. Bankanu is within the Northern Sudan Savannah. The present vegetation is quite impoverished secondary vegetation

which is an indication of population pressure on the agricultural lands. During the dry season the surroundings looks brown with dotted trees such as desert dates, Neem trees along the avenues of the village, Acacia Arabica, Acacia Arabica, Bauhinia reticulate amongst others. Along the river Shela are all year round irrigation farming are Magnifera Indica, Shela grasses within the river channel. Economically agriculture contribute significantly to the economy. It is dominantly a grain economy.The population is barely 3,283 with population pressure of almost 131 persons/ ha indicating there is population pressure

The secondary material used for this study is the existing conventional 1969 FAO Generalized Land Capability Classification of the Sokoto - Rima Valley modeled after the recognized concept of Generalized Land Capability Classification Systems by Hockensmith and Steele, 1943 and Hockensmith, 1947 which is modeled / domesticated in the light of indigenous knowledge of the rural people of the local environment of Bankanu, Sokoto State. The primary data was collected through the use of participatory Rural Appraisal and Focused Group Discussion. The Participatory Rural Appraisal Sampling method used is the TRANSECT WALK: This is a systematic walk with local guides through a local area, so that by talking to each other, travelling and asking, listening, observing and doing things together effectively learning from one another could be achieved (Conway, 1985; Chambers, 1994; Guijt and Veldhuizen 1998; Leak, 2002; Abdulrahim, 2004 and Mohammed, 2010). Thus, transect walk was organized in order to observe, by talking to each other, travelling through the landscape and asking, listening, and doing things together so that the researcher and the respondents most effectively learn from one another.

By asking questions, listening to, discuss and learn about different features of the study area. The features of the study area discussed at intervals were soil types, land uses, vegetation, crops and livestocks; local technologies were understood by the researcher. This tool has been used to identify the general physical condition of the area. In so doing, information was collected on the land use type, soil type, vegetation type and composition. The qualitative method used has indeed facilitated the empowerment of the indigenous people.

3.00 THE CONVENTIONAL RECOMMENDED LAND MANAGEMENT PRACTICES BY THE F.A.O CRITERIA AND THOSE ADOPTED BY THE RESPONDENTS.

The aforementioned 1969 FAO General Land Capability Classification map scale of 1: 500,000 of the Sokoto valley comprise of the present Sokoto, Zamfara and Kebbi States. The land has ten land capability classes, out of which Bankanu village and its immediate surroundings fall on classes three and six as follows;

Class 3: Irrigable lands at present annually flooded but which can be much improved for agriculture by flood control measures.

Class 6: Uplands with water holding capacity too low for gravity irrigation but with good potential for wet season cropping, forestry and grazing.

Based on these classes, it could be seen that the land use dictated by the land capability classification has readily presented the land management strategies required in the study area. The class three for instance, is the land characterized as a depression adjacent to river Sheila bank partly falls under class three being a Fadama land. This indicates that the agricultural land use is meant for irrigation agriculture. In other words, "Fadama" farming, which include market gardening and horticultural crops. The fact that it is susceptible to flooding therefore means a considerably conventional land management practices are necessary as already dictated by the F.A.O. consultants. These include construction of bunds across the slope, construction of contour ploughing, grassed water ways, diversionary channels, and addition of lime because of very tendency of acidity which could be toxic to crops due to excessive leaching as a result of prolong flooding. Therefore, addition of lime is imperative in order to upgrade the pH scale to a natural level from acidic medium, which is toxic to crops. And of course, the addition of inorganic fertilizer is also relevant.

On the part of indigenous land management practices the indigenous people are already using the land for highly moisture requiring food crops ranging from root crops (cassava and potatoes), to cereals (rice), Horticultural (mangoes, Guava) and vegetable (tomatoes, pepper,

sugar cane) to mention but a few. This fadama land is however, classified into two by the indigenous farmers as black clay soils Bakin laka and white clay soils farin laka. The farmers currently use animal dung and ashes as organic fertilizer with heap of ridges that acts as bunds. However, they do not use any grassed water way and diversionary channel and they have never complained of any toxicity of their soil. This could be due to their predominant use of organic fertilizer.

On the part of the class six, it is conventionally defined as the relatively dry upland surface it is for only rain fed agriculture; suitable for forestry and grazing as well. The soils on this topography are lighter in weight, sandy with low water holding capacity; hence, easily susceptible to wind erosion. Consequently, the land management requirement for this land class according to the conventional method include; mulching with crop residue, mechanical land clearing and ploughing before ridging to save labor cost and time, strip cropping and addition of inorganic fertilizer and strip cropping. On the part of indigenous land management practice, these light soils are classified into two; one is the Sandy soils (Yashi) . The use of organic manure and minimum tillage practice are offered as management practices by the indigenous knowledge method. The other soil is the heavier type loamy sand known as Baringo by the indigenous people; it contains relatively higher clay content than the latter. The relative content of clay makes it not easily susceptible to wind erosion but water erosion.

On the basis of the listed conventional land management practices, for land class six, nine (13.5%) members of the Focused Group farmers claimed to know and use contour bund to check erosion from their farmlands to check physical degradation of agricultural land by water agent of erosion especially. Others claimed, as also observed empirically that, their land is sandy with very scanty clay content. Hence, it lacks sufficient cohesion or matrix for bonding. Few farmers with “Baringo” soils adopt contour bund to check water erosion. Some of them even claimed that it is not their traditional farming method. 16 (24%) members of the Focused Group practice mulching. This highest number of participation is not unconnected with the fact that the method blends with indigenous way of land management practices by the Zabarmawas and the few Hausas in the community.

As regards the application of inorganic fertilizer, this is low, because only two (3%) members of the Focused Group confirmed that they use it. The Group indicated that inorganic fertilizers are scarce and too costly for them to buy. These points to the fact that there is high level of poverty among the indigenes. The respondents further emphasis that they lack money to purchase the imported agricultural goods for raising the soil fertility level.

With regards to contour ploughing method, only three (5%) members of the Focused Group apply the technique on their farm land. Most of them claimed that it is not convenient for them because of the cumbersome way of spotting points of equal height on the ground along which the bund would pass through. In respect of mechanical land clearance of the agricultural land, they claimed to practice it when the Sokoto Agricultural Project was active. Nobody responded as to have ever participated in managing his farmland that way after the end of the Agricultural Project funding. The non sustenance of the method by the indigenous people was borne out of the alien nature of the technology which does not blend with the peoples' culture and paucity of fund to engage the tractor operators on the part of the farmers to continue the management practice and lack of fund to purchase spare parts on the part of Agriculture project. The grassed waterways are not utilized by any of member of the Group as well. According to the Group, they do not know the grassed waterways at all. Those who knew about it claimed they could not finance it because of their perceived enormous cost to rent any dozer.

Furthermore, the recorded zero percent response on the use of lime on the farmlands, indicate non-adoption. of lime addition as their land management strategies. As regard the practice of crop rotation and strip cropping, three (4.5%) and two (3%) members respectively make use of the strategy. The low usage of these land management practices according to them is due to being unfamiliar with sole-cropping system of shifting from one edge of their farm to another as regards the practice of crop rotation. The strip cropping is seen as alien to them and that is why it has recorded low patronage. In tree planting, 33% member of the Focused Group were involved. This method is observed to have indigenous component as well and that is why it has high level of practice, while two of the members adopted planting of cover crops.

On the overall, the Group claimed they would have appreciated the patronage in the use of inorganic fertilizer after the end of the funding of Sokoto Agricultural Project, which used to supply the inorganic fertilizer through the Farmers Agricultural Supply Company (FASCO).

However, because it is too expensive and scarce, the appropriate time of its application to soils is often belated with attendant low yield. Otherwise, the inorganic fertilizer is recognized as aiding the crops to grow faster than indigenous method of fertilizing the soil with organic fertilizer. However, the argument against the inorganic fertilizer in favor of the organic is that the former needs to be applied annually because once applied into the soils its nutrient depleted, whereas the organic fertilizer can sustain tri-annual cropping with once application. This weakness on the part of the inorganic fertilizer made some members of the respondents to say, "We don't like it".

4.00 A MODEL OF INDIGENOUS LAND CLASSIFICATION IN BANKANU.

Table 1.00 succinctly highlights the indigenous land classification, the coding and the intensities of the land uses in Bankanu.

The codes C1, C2, C3, C4, and C5 signify the different land classes in sequences of increased limitations and hazards or what could be referred to as decreased adaptability and freedom of choice of uses. For example, code C1 is more adaptable to the different land use than C2 so is C2 more than C3 while C3 is more than C4 and C4 is more adaptable and flexible to the different land uses than C5.

The land uses assigned with the different land coding in Bankanu are wildlife, forestry grazing and cultivation. Cultivation is however subdivided into limited, moderate, intense and very intense uses.

Putting the codes and the land uses together, from the table 7.30, it could be observed as follows:

Code C1 is associated with very intensively cultivated land use. C2 is assigned to intensively cultivated land area while; C3 is associated with moderately cultivated agricultural land. C4 is however assigned to limited cultivation. Code C5 is associated with either grazing, forestry or wildlife land uses.

It is pertinent to further elucidate that those land uses and their intensities associated with the different codes have relationships with the different land types/qualities. Thus, C1 is assigned to the highest intensity of land use because it is cultivable indefinitely without fertility depletion. Sandy loam texture known as Bakar laka in the indigenous terminology of Bankanu respondent farmers and has been observed to have higher silt content than C2. C2 is meant for intensively cultivated agricultural land use because it can be cultivated for ten years before fertility depletion sets in if not fertilized. It is associated with the land type of sandy loam texture known as Farin Laka by the respondents. Code C3 represents land use intensities of moderate cultivation because it can withstand four years continuous cultivation before total fertility sets in. It is associated with sand / loamy sand texture regarded as Baringo in Bankanu indigenous knowledge of land classification. The code C4 is meant for limited cultivation because it can tolerate maximum of two years before fertility depletion sets in and it is associated with sandy texture land quality known as Yashi in Bankanu. Lastly the code C5 meant for grazing, forestry and wildlife is associated with laterized/gravely texture land quality known as Fako in the Bankanu indigenous knowledge of land classification.

Table 1.00 Bankanu Indigenous Knowledge of agricultural land management and intensities of use based on their capabilities.

Increase in intensity of Land use

					Cultivation		
Bankanu Indigenous Land Class Code	**Wildlife**	**Forestry**	**Grazing**	**Limited**	**Moderate**	**Intense**	**Very Intense**
C1	√	√	√	√	√	√	√
C2	√	√	√	√	√	√	
C3	√	√	√	√	√		
C4	√	√	√	√			
C5	√	√	√				

NB:Key;

C1= Bakin Laka (Black clay) Sandy loam texture

C2= Farm Laka (White clay) Sandy loam texture

C3= Baringo Sandy I Loamy sand texture

C4= Yashi Sandy texture

C5= Fako Hard pan clay/lateritized gravelly/sandy texture

√ = Indigenous land capability for particular use as indicated in the Figure 7.30.

This classification is based on water status, nutrient capacity, ease of cultivation amongst others.

Source: Author's Field work, (2001).

5.00 CONCLUDING REMARKS

This study has affirmed that the rural people's knowledge is an enormous and underutilized national resource in most of the third world countries as the case of Bankanu village in Kware Local Government Area of Sokoto State, North West of Nigeria.

The small scale farmer's expertise has been explored in relation to the land capability Classification model that fits properly.

It is therefore recommended that the knowledge should be mobilized in to the agricultural development enterprise by the Rural land use Planners. More so that it is an enormous knowledge in rural resource management. We simply cannot ignore it.

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