Towards Attainment of Sustainable Rural Livelihoods and Poverty Reduction among Rural Farmers: Whither Farm Waste Utilization?

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Abstract— *The study investigated potential of farm wastes' utilization for attaining sustainable livelihoods and reducing poverty among rural dwellers in Osun state, Nigeria. Specifically, socioeconomic attributes of the respondents were described and significant determinants of farm waste utilization identified. Primary data were collected using interview schedule collected from 364 respondents sampled for the study through multi stage procedure. Frequency counts, percentages, mean and standard deviation were used to describe data collected. Rational choice theory and theory of planned behaviour were used to provide theoretical underpinning for the study. Multiple linear regression analysis was used to identify significant determinants of farm waste utilization. Result showed that cassava and yam peels, maize stalks and cobs, cowpea husk, palm kernel shell, empty palm fruit bunch, cocoa pods, poultry droppings, sheep and goat faeces were amongst farm wastes with economic potentials in the study area. Result of regression analysis showed that income (t = 2.401), perception about farm waste items (t = 4.458), perceived behavioral control (t = 2.534) and attitude towards farm waste utilization (t = 2.732) positively and significantly contributed to extent of farm waste utilization, while total farm size (t = 1.988) and years spent on formal education (t = 2.024) positively and significantly contributed to extent of farm waste utilization at $p \leq 0.05$. However, information sources (t = -2.732) and knowledge about farm waste utilization potentials (t = -2.314) significantly but negatively influenced farm waste utilization $p \leq 0.05$, respectively. It was concluded that varieties of farm waste items with good economic potentials for utilization abound in the study area. In order to empower rural dwellers economically thereby enhancing their livelihoods and ameliorating their poverty condition, paying attention to the significant determinants of waste utilization identified is recommended.*

Keywords—Farm wastes, Theory of Planned Behaviour, Sustainable livelihoods, Economic empowerment.

I. INTRODUCTION

Agricultural activities are generally known to generate waste materials during crop growth and harvest. Similarly, livestock farming experiences a large volume of by-products in terms of urines and faeces. Wastes are also generated during the extraction of raw materials, the processing of raw materials into intermediate and final products and the consumption of final products. According to Afolayan *et al*. (2012), various scientists estimated waste generation in Nigeria at 0.58 kg/person/day, which is further breakdown as follows: municipal solid waste – 4,075 million tons, fuel wood - 38.1million tons, agro waste-11.24 million tons with sawdust at 1.8 million tons. The above estimations is with little or no consideration for the rural dwellers that constitute more than 53% of over 170 million population of the country, whom farming is their primary occupation.

Many rural farm families make a living from a variety of livelihood choices ranging from cultivation of arable and tree crops and rearing of livestock to trading and agro-processing amongst others. Several farm residues generated in the process, in conventional practices, are generally treated in uncontrolled manner, by either burning in open-air fires or thrown away to decay. This burning or decomposition, apart from amounting to a colossal waste of resources, contributes to environmental degradation and pollution which is hazardous to both human and ecology. So, many rural dwellers conventionally made their livelihood choices without considering a full utilization of these items, despite the invaluable potentials and availability of these items. Rather, they often focus more on major produce/product of their cultivation/processing, with the farm residue often regarded as waste items and discarded with their vast potentials left untapped or underutilized (Yusuf, 2014).

The notions of discarding waste, simply through burning or decomposition, are now changing. There is current spate of transformation which presents new choices and opportunities, and provides lessons and pointers for industrial, social and environmental policy in the new post-industrial landscape. Three basic drivers of this change which are now turning waste and waste management into a dynamic, fast-changing, international economic sector include: growing concern about the hazards of waste disposal; broader environmental concerns, especially global warming and resource depletion; and economic opportunities created by new waste regulations and technological innovation (Murray, 1999).So the concept of waste as a

material "which has no use" is changing to that of "a resource" by converting into useful materials with necessary modifications (Kumar and Grover, 2007).

So, materials often regarded as wastes by rural inhabitants could constitute part of natural asset base within the rural environment that can be convertible to important local resources. They should be regarded as by-products which exploitation could enhance sustainable livelihood diversification and facilitate economic empowerment of the rural populace. For instance, biomass briquettes, mostly made of green waste and other organic materials, such as rice husk, ground nut shells, could be used for electricity generation, heat and cooking fuel in the rural areas. Sadly, however, big trees, protecting the ecosystem, are massively cut down in order to make coal to meet energy needs, thereby worsening environmental degradation. The dependence on traditional charcoal and firewood, Sabiiti (2011) noted, contributes to the prevailing deforestation and soil degradation, the effects of which have manifested in irregular rainfall, floods and violent storms.

There is inadequate knowledge about waste generation and composition in rural areas globally because these types of studies have been conducted mainly in big cities, noted Taboada-González *et al*. (2010). Also, many scholarly writings on waste materials emphasize mainly the environmental and hardware-technological aspects of wastes, with less attention to the affective domain (Jekayinfa and Omisakin, 2005; Oyeleke and Jibrin, 2009; Oladeji, 2011). It is also important to note that what a society regards as 'waste' is intensely socially construed. People in different cultures or even in different tribes within the same culture may value same things differently. In essence, what may be covert-waste to some may be deemed overt-resource to others. These thus underscore the necessity for sociological inquiry about farm waste generation and utilization. On this premise, the authors draw on rational choice theory and theory of planned behavior to provide theoretical underpinning for the study.

II. PURPOSE OF THE STUDY

The general objective of the study was to examine the roles of farm waste utilization towards attainment of sustainable livelihoods and poverty reduction amongst rural dwellers in Osun State, Nigeria. The specific objective was to describe key socio-demographic attributes of respondents and identify significant determinants of farm waste utilization among the respondents.

III. THEORETICAL FRAMEWORK

3.1 Rational choice theory

Sociologists have tried to build theories around the idea that all action is fundamentally 'rational' in character and that people calculate the likely costs and benefits of any action before deciding what to do. This approach to theory is known as rational choice theory (Scott, 2000). There are two main elements in the theory – actors and resources. Actors are seen as being purposive, or as having intentionality. That is actors have ends or goals towards which their actions are aimed. Actors are also seen as having preferences (values), and of importance to rational choice theory is that actions are taken to achieve objectives that are consistent with actors' preference hierarchy. Resources are those things over which actors have control and in which they have some interest (Ritzer and Stepnisky, 2014).

According to Heckathorn (1997), two other ideas that are basic to rational choice theory as mentioned by Friedman and Hechter are aggregation mechanism and importance of information. Aggregation mechanism is the process by which "separate individual actions are combined to produce the social outcome". The second idea, which has more relevance and bearing to this study, is the importance of information in making rational choices. At one time, it was assumed that actors had perfect, or at least sufficient, information to make purposive choices among the alternatives courses of actions open to them. However there is growing recognition that the quantity or quality of information is highly variable and that that variability has profound effect on actors' choices (Heckathorn, 1997).

Following the premise of the rational choice theory, rural dwellers who are the 'actors' (subject of focus) in this study would 'rationally' seek to utilize farm waste items given that there is assurance of a profitable economic outcome as a result. As such whether an individual within the rural environment would regard a particular farm waste item as important local resource and subsequently make use of it would depend largely on what he stands to gain in terms of economic benefit derivable there from. In addition, the availability of 'qualitative information' about farm wastes utilizations' potentials could significantly influence and sustain rural dwellers' decision to engage in farm waste utilization.

3.2 Theory of planned behavior

The theory of planned behavior developed by Ajzen in 1985 posits that human behavior is largely influenced by the very intention to carry out the behavior. Intentions reflect the motivational factors that influence that behavior. They are

indications of how much people are willing to try, and how much effort they are planning to invest in order to carry out the behavior in question (Ajzen, 1991). Furthermore, the theory posits that intentions themselves are determined by 'perceived behavioral control (PBC), 'attitude' and the 'subjective norm'. PBC refers to people's confidence in their ability to perform the behavior, as well as to their perception of how easy or difficult it is to carry it out. Attitude refers to a person's disposition to respond favorably or unfavorably towards behaviour. It is a hypothetical construct, that being inaccessible to direct observation, must be inferred from measurable responses. SN refers to the person's perceived social pressure to perform the behavior or not. In other words, it reflects whether the individual perceives that a significant number of people endorse/disapprove the behavior of interest. Overall, the more favorable the attitude and subjective norm and the higher the PBC, the greater the willingness (intention) to perform that behavior of interest (Ajzen, 1991).

The Theory of Planned Behavior (TPB) (Ajzen, 1991) provides a theoretical framework for systematically investigating factors which influence behavioral choices. Several studies have applied the TPB to investigate waste recycling and reuse behaviors. These include: Tonglet *et al.* (2004), which investigated determinants of recycling behavior in Brisworth, UK; Zhou (2010) which sought to determine sustainable waste management practices in College and University dining services in Kansas, and Ho (2002) where Singaporean's household waste recycling behavior was understudied, with a view to ascertaining recycling as a sustainable waste management strategy for Singapore. So, the TPB is found suitable for use in this study because of its perceived adequateness and applicability in encapsulating the key variables that are significant determinant of farm waste utilization.

IV. METHODOLOGY

The study was conducted in Osun State, Nigeria. There are three agro-ecological zones of the state Agricultural Development Project (ADP), namely: Osogbo (derived savannah) zone, Ife/Ijesha (rainforest) zone and Iwo (savannah) zones which have 13 Local Government Areas (LGAs), 10 LGAs and 7 LGAs, respectively. A multistage sampling procedure was used to select the respondents sampled for the study. At the first stage, 20 per cent of the total number of LGAs in each zone was used to select three, two and one rural LGAs, respectively, from the three zones. These were: Odo-otin, Egbedore, Orolu LGAs, from Osogbo zone; Atakumosa west and Ife south LGAs from Ife/Ijesha zone and Ayedade LGA from Iwo zone. At second stage, using proportionate sampling, five per cent of the total number of communities in each LGA was used to select 28 communities. Finally, 13 respondents involved in farm waste utilization were purposively chosen from each of the selected communities, giving a sample size of 364 respondents.

The dependent variable of the study was 'extent of farm waste utilization' and was measured on a four-point response scale. Respondents were required to indicate how many of the identified farm wastes they make use or have ever made use of for the purpose indicated as compiled during preliminary survey and from literature. Each of the waste identified by the respondent was scored 1 point each. Then, on a 4 point response scale, they were required to indicate the extent of their utilization of these farm wastes, and were scored as follows: never utilized (0 point), rarely utilized (1 point), sometime utilized (2 points), and always utilized (3 points). Key independent variables are measured as follows: attitude towards utilization of farm waste was measured by requesting respondents to respond to some 20 statements using a 5 point Likert scale. The responses strongly agreed, agreed, undecided were scored 5, 4 and 3 points respectively, while disagree and strongly disagree were scored 2 and 1, respectively.

Perceived Behavioral Control (PBC) refers to respondents' confidence in their ability to utilize farm waste and perception of how easy or difficult it is to do this (i.e. utilize these farm wastes). It was measured on a 5 point scale. They were requested to react to some statements and their responses were scored as follows: Extremely difficult (5 points), somewhat difficult (4 points), Not sure (3 point points), somewhat easy (2 points), and extremely easy (1 point).Subjective norm seeks to measure how likely or otherwise, the concern or consideration for other people (like relatives, friends, etc) might influence farm waste utilization behavior of respondents, they were requested to respond to statements on a 5 point scale with the following options: Extremely likely (5 points), most likely (4 points), not sure (3 points), most unlikely (2 points), and extremely unlikely (1).Perception about farm waste items' economic potentials: respondents were asked to indicate their perception about the usefulness (i.e. potential for utilization) of each of the identified items listed as farm wastes. The options were scored thus: 5 very valuable, 4 somewhat valuable, 3 not sure, 2 somewhat worthless, 1 very worthless.

Both content and construct validity techniques were employed to validate the research instrument. For content validity, academic experts with specialization in Rural Development were requested to critically examine and review the research instrument in relation to the objectives of the study. Suggestions and recommendations given were employed in restructuring of the research instrument prior to field survey. For construct validity, the instrument was considered alongside key variables derived from both theories on which the study was based to ensure that conformity. Furthermore, test-retest reliability was carried out on the research instrument to determine the degree of consistency to which it measures the variables it was

designed to measure. The interview schedule was administered on ten individuals in two communities from Ife-East and Atakumosa East Local Government Areas, which were not included amongst Local Government Areas sampled for the study. At two weeks interval, it was re-administered on these same set of respondents. The two test scores were correlated using Spearman's Ranked Order Correlation (SROC) analysis. With correlation coefficient (r = 0.80) obtained from the analysis, the research instrument was adjudged reliable since the correlation value of 0.7 and above are considered as satisfactory or good for a test-retest reliability.

V. RESULTS AND DISCUSSION

5.1 Socio-demographic attributes of respondents

Results in Table 1 show that about half (50.8 %) of the respondents were male while 49.2 per cent were female. The results indicated that almost equal proportion of male and female respondents were sampled for the study. This implied that the study equally focused on both male and female those are major components of rural farm family and extension clientele; therefore gender implications of farm waste utilization for enhancing rural dwellers' livelihood would be documented.

TABLE 1
DISTRIBUTION OF RESPONDENTS BY SOCIO-DEMOGRAPHIC CHARACTERISTICS

Variable	Frequency	Percentage(n = 364)	
Sex			
Male	185	50.8	
Female	179	49.2	
Age (Years)			
20 – 34	41	11.3	
35 – 49	108	29.7	Mean = 52.73
50 – 64	104	28.6	SD = 14.74
65 – 79	86	23.6	
80 and above	25	6.8	
Years of formal education			
Below 6	140	38.5	
7 – 12	114	31.3	Mean = 7.24
Above 12	25	6.9	SD = 4.83
Had no formal education	85	23.4	
Level of educational attainment			
Koranic education	15	4.1	
Adult education	32	8.8	
Primary school incomplete	25	6.9	
Primary school completed	112	30.8	
Secondary school incomplete	46	12.6	
Secondary school completed	42	11.5	
Tertiary education completed	7	1.9	
Not applicable	85	23.4	
***Major occupation**			
Farming	296	81.3	
Agro-processing	124	34.1	
Petty trading	108	29.7	
Livestock rearing	85	23.4	
Hunting	57	15.7	
***Minor occupation**			
Farming	36	9.9	
Agro-processing	39	10.7	
Petty trading	32	8.8	
Livestock rearing	49	13.5	
Hunting	6	1.6	

Multiple response possible
SD = Standard deviation

About 30 per cent and 29 per cent of the respondents were aged between 35 – 49 years and 50 – 64 years, respectively. While, 23.6 per cent were within 65 – 79 years age range, few (11.3 %) were within 20 – 34 years range, and very few (6.8 %) were aged above 80 years. Mean age of respondent was 52.73 years with a standard deviation of 14.74. These results indicated that the respondents were vibrant and within their productive age range. The findings which agreed with Jibowo's

(2003) assertion that the rural areas in most countries have higher proportion of its population aged above 45 years, implied that respondents could still actively engage in waste utilization and should be encouraged to derive economic benefit from waste items emanating from their daily livelihood pursuits in order to improving their standard of living.

About 30.8 per cent and 11.5 per cent of the respondents completed primary and senior secondary education, respectively, while very few (1.9 %) completed tertiary education. About 8 per cent and 4 per cent had only adult education and Quranic education, respectively. Also, while 38.5 per cent spent up to 6 years to obtain formal education, 31.3 per cent spent between 7 and 12 years. Average number of year spent by respondent on attaining formal education was about 7 years with a standard deviation of 4.8. In addition, 65.4 per cent of the respondents indicated they could read and write, implying their literacy in English Language. The findings aligned with the submissions of Soyebo (2005) and Alao (2010) that rural dwellers in the study area were literate. The implication of this submission is that respondents are likely to be more receptive of innovations and improved practices and new ideas introduced to them.

Majority (81.3 %) of the respondents engaged in farming as major occupation. While 34.1 per cent and 29.7 per cent engaged in agro-processing and petty trading as major occupation; 23.4 per cent and 15.7 per cent primarily engaged in livestock rearing and hunting, respectively. Also, few proportions amongst the respondents engaged in these various occupational activities as minor means of livelihood. The results, which concurred with the findings of Yusuf (2011), indicated that rural dwellers engaged in a variety of activities as occupation with agriculture usually the prime. They engaged in these varieties of activities including non-farm in order to make ends meet and spread their risks better. The implication of the findings is that rural inhabitants are multi-tasked people and are likely to engage in supplementary activities that will fetch them additional income. This situation may be explored and exploited through sensitizing rural dwellers and drawing their attention to potentials and opportunities that abound in utilization of farm waste items available within the rural environment as useful resources. Extension has a great role to play in the promotion of acknowledging various farm waste items as part of natural assets base which rural dwellers can benefit from.

Majority (88.5 %) and 84.1 per cent of the respondents cultivated cassava and maize crops, respectively, using 2.65 and 1.87 acres of land. Also, 72 per cent, 64.6 per cent, 62 per cent and 59.1 per cent cultivated yam, vegetable, cowpea and cocoyam, respectively, on 3.4, 1.49, 1.75 and 1.77 acres of land. Few (18.7 % and 19.5 %) cultivated soybean and rice, using 1.8 and 1.7 acres of land, while 51 per cent cultivated sweet potatoes on 0.5 acres of land. The results indicated that respondents cultivated a variety of arable crops, amongst which cassava and maize were most prominent, followed by vegetable, yam and cocoyam. The implication of the findings is that farm waste items generated from these crops after harvest, such as cassava peels, maize husk, cob, and shaft, cocoyam corm, cowpea and soybean husk and vine, etc, which have economic potentials for utilization that may be judiciously put to use by the rural dwellers were available in the study area.

Results in that 71.2 per cent and 67 per cent of the respondents cultivated oil palm and cocoa, on 4.97 and 8.5 acres of land, respectively. Furthermore, 52.7 per cent and 53 per cent cultivated citrus and banana/plantain crops, using 2.23 and 1.8 acres of land, while 39 per cent cultivated cashew crop on 2.82 acres of land. Others (48 % and 43 %) cultivated coconut and kola nut on 1.5 acres and 0.8 acres of land, respectively. The results indicated that respondents cultivated a variety of field crops amongst which oil palm and cocoa were prominent. The implication of the findings is that farm waste items generated from these crops after harvest or during processing such as palm kernel shell, empty palm fruit bunch, cocoa pods, etc, which have economic potentials for utilization are available in the study area that could be harnessed for economic empowerment of the rural inhabitants.

More than half (58.5 %) of the respondents raised poultry birds. Also, 28.8 per cent, 50 per cent and 22.5 per cent reared sheep, goat and cattle, respectively, while about 21 per cent each reared fish and rabbit. Average number of poultry bird raised was 12, while average number of sheep, goat and cow reared was 6, 8 and 4 respectively. Furthermore, about 25 per cent of the respondents are involved in piggery with average number of pig as 12. The results indicated that respondents engaged in rearing of livestock too, apart from crop cultivation, and poultry birds and goats were most prominent amongst these livestock. However, scale of production of livestock was low.

It may be inferred from the findings that farm waste items generated from rearing of livestock such as poultry droppings, goat and sheep faeces, and cow dung which have economic potentials for utilization might, although available within the study area, might be inadequate for utilization. The implication of the findings is that respondents may be encouraged to increase their scale of livestock production and with adequate training opportunities they may be empowered on various ways of converting the livestock wastes into useful resources that can generate wealth and translate to additional income for them.

Results show that, on an annual basis, 39 per cent of the respondent earned below ₦ 200, 000 while 15.1 per cent and 16.2 per cent earned between ₦ 200,000 and ₦ 400,000 and ₦ 400,000 and ₦ 600,000, respectively. Mean annual income was ₦ 382,500. This value represents annual income of respondents from crop cultivation (arable and permanent crops), livestock rearing and agro-processing pulled together which translated to ₦31,875 monthly. This is still a meagre amount considering the degree of drudgery involved in the various activities rural inhabitants go through before earning this amount. In fact, findings during field survey further reveal that, most times, respondents' earnings were used to settle debts often incurred beforehand as soon as earning them. The implication of the findings is that rural inhabitants could be empowered economically through judicious use of farm waste items available at their disposal, through which they could increase their earnings and be better enabled to meet their financial obligations.

5.2 Results of regression analysis

Results in Table 2 show that total herd size (t = 2.711), income (t = 2.401), perception about farm waste items (t = 4.458), perceived behavioral control (t = 2.534) and attitude towards farm waste utilization (t = 2.732) positively and significantly contributed to extent of farm waste utilization at $p \leq 0.01$. Also, total farm size (t = 1.988) and years spent on formal education (t = 2.024) positively and significantly contributed to extent of farm waste utilization at $p \leq 0.05$. However, information source (t = -2.732) while knowledge about farm waste utilization potentials (t = -2.314) also significantly but negatively influenced farm waste utilization at $p \leq 0.05$.

TABLE 2
RESULTS OF MULTIPLE REGRESSION ANALYSIS ESTABLISHING RELATIONSHIP BETWEEN SELECTED VARIABLES AND FARM WASTE UTILIZATION

Variable	Standardized coefficient Beta	t	p - value
Age	-0.042	-0.556	0.580
Household size	-0.006	-0.009	0.992
Residency length	0.072	0.974	0.332
Total farm size	0.267	1.988*	0.049
Total herd size	0.278	2.711**	0.008
Years of formal education	0.139	2.024*	0.045
Income	0.309	2.401**	0.018
Information source	-0.256	-2.732**	0.007
Rivalry/dispute	-0.435	-4.837*	0.000
Subjective norm	0.013	0.183	0.855
PBC	0.343	2.534**	0.013
Attitude towards farm waste Utilization	0.395	2.732**	0.007
Knowledge about farm waste Utilization potentials	-0.497	-2.314*	0.022
Perception about farm waste	0.789	4.458**	0.000

Of the three key variables of TPB, result revealed that perceived behavioral control and attitude towards farm waste utilization were positive and significant determinants of farm waste utilization. Subjective norm did not have significant influence on farm waste utilization. The findings agreed with the submission of Ho (2002) and Tonglet *et al.* (2004) that identified perceived behavioral control and attitude as important determinant of utilization behavior. The results indicated that the more knowledge an individual possess about the utilization potential of a particular farm waste item and the more favorably they perceive the farm waste item, the higher the likelihood that they utilized such farm waste items. The implication of these findings is that strengthening rural dwellers' PBC and influencing their perception about farm waste items could enhance their resolve to judiciously exploit the economic potentials of these farm waste items to enhance their livelihood. Here, extension agents and rural development agencies have a paramount role to play. The non-significance of subjective norm with farm waste utilization could imply that consideration for other people's opinion was not considered enough to discourage an individual from farm waste utilization, perhaps, so long as economic return there from is guaranteed. This is similar to the findings of Niaura (2013) whose study revealed that subjective norm had less impact on youth behavioral intentions when compared to perceived behavioral control.

Plausible explanation for negative contribution of 'knowledge about farm waste utilization potential' to the regression model is necessary. The result apparently indicates that the lesser the knowledge respondents possess about utilization potentials of various farm waste items; the more they utilized such farm waste items. Conceivable explanation is that respondents tend to utilize more of few farm wastes they know about, since reasonably, they may not be able to effectively and efficiently utilize all these farm waste items at a time. The implication is that extension agents and agencies should make concerted efforts to concentrate on fewer farm waste items with economic potentials in order to empower rural dwellers.

The overall regression model summary show that R^2 value of 0.575 was obtained in the analysis. Also F value of 11.002 obtained was significant at $p \leq 0.01$. This indicated 57.5 per cent variation in the dependent variable was accounted for by the independent variables included in the regression analysis. The remaining 42.5 per cent was due to other variables not included in the analysis.

VI. ATTAINMENT OF SUSTAINABLE LIVELIHOODS AND ECONOMIC EMPOWERMENT OF RURAL DWELLERS: WHITHER FARM WASTE UTILIZATION?

The bane of research problem of this study was that rural dwellers have conventionally limited their quest for livelihood to production of certain crops, raising of few livestock, and engaging in non-farm activities, such as petty trading and agro-processing. While this is a form of livelihood diversification, the full potentials of several waste items emanating from their livelihood choices have not been well harnessed to their advantage. This study emphasized the need for recognition of farm waste items emanating from various livelihood pursuits of the rural dwellers as part of the natural assets which should be judiciously harnessed and utilized as important local resources.

The study's findings also stressed the need for intensification, whereby rural inhabitants increase their scale of production, livestock production, for example; using intensive management system. This will ensure both increase in availability of waste items, like poultry droppings and sheep and goat faeces for use as manure and fish feed, respectively, and also facilitate their easy collection. While recognizing the high cost associated with livestock feeding, the study encouraged judicious utilization of farm wastes (such as maize stalk, cowpea husk, rice husk and bran, maize cob, etc.) as livestock feed. Also, growing of maggots on waste such as poultry droppings, blood of slaughtered animals, etc. could be useful supplement to costly fish feeds. So it is like a cycle: crop residues used as feed for livestock, and animal wastes in turn converted into manure for crop's use.

These submissions, therefore, emphasize 'reuse' and 'recycling' of farm waste items, which represent two of the 3 r's that are important in waste management. The third is 'reduce', that is, to reduce waste generation as much as possible. However, this study would not subscribe to that. Rather, it canvasses for generation of more farm waste as earlier asserted which should be shrewdly harnessed as important local resources. The reason is because the 3 r's are proposed in solid waste management where wastes include non-biodegradable items. On the other hand, farm waste items are biodegradable and where they are not utilized, they readily decompose. So in a typical farm-family farm, it is the submission of this study that such cycle for recycling and reuse of farm waste be encouraged and practiced. This will help to help rural dwellers to spread their risks better, thereby better assured of sustainable rural livelihoods.

It is also the submission of this study that there are several enterprises which primarily depend on utilization of farm waste items through which the rural inhabitants can be economically empowered. Although, these enterprises are not entirely new, however, there is need for revitalization, intensification and introduction of value addition to make the final products more acceptable and more economically rewarding for the rural people. Such enterprise include mushroom production, dye production, intensification in livestock production, black soap production, fish feed production, maggot culturing, bone meal production, intensive broom production, snailery production and organic manure production. These are areas rural dwellers may be economically empowered, and extension, government and university outreach have roles to play. The roles include continuous creation awareness about the utilization potentials of various farm waste items and organization of capacity building and training workshops for rural dwellers in Osun state in order to improve their knowledge level and skills which will better equip them for effective utilization of farm waste items.

VII. CONCLUSION AND RECOMMENDATION

In conclusion, there were several farm waste items that have economic potentials for utilization in the study area. The author's emphasized consideration of these waste items as part of the natural asset base within the rural environment, which if utilized by rural dwellers as important local resources can engender sustainable livelihood diversification and economic empowerment of the rural populace. By way of recommendation, the state Agricultural Development agency, Non-

Governmental Organizations (NGOs), Community Based Organizations (CBOs) and media outfit should explore and exploit the multitask ability of the rural inhabitants through sensitizing them and drawing their attention to vast potentials and opportunities that abound in utilization of farm waste items available within the rural environment as useful local resources.

REFERENCES

[1] Afolayan, S.O., Ogedengbe, K., Saleh, A. Idris, B.A. Yaduma, J.J. Shuaibu, S.M and Muazu, Y.G 2012.Emission Stabilization Using Empirical Evaluation of Some Agricultural Residues as Potential Alternative Energy and Soil Amendment Sources. *International Journal of Advanced Scientific Research and Technology* 1 (2): 1 – 15

[2] Ajzen, I. 1991. The Theory of Planned Behaviour. *Organised Behaviour and Human Decision Processes* 50: 170 – 211

[3] Alao, O. T. 2010. Assessment of Socio-cultural Factors Influencing the Under-cultivation of Selected Locally Available Trees and Spices in Osun State, Nigeria. *An Unpublished Ph.D. Thesis, Obafemi Awolowo University, Ile Ife, Nigeria*

[4] Heckathorn, D. D. 1997. Overview: The paradoxical relationship between sociology and rational choice. *The American Sociologist* 28: 6 – 15

[5] Ho, Yan Yin 2002. Recycling as a Sustainable Waste Management Strategy for Singapore: An Investigation to Find Ways to Promote Singaporean's Household Waste Recycling Behaviour. A thesis submitted to the Lund University, Sweden

[6] Murray, R. 1999. Creating wealth from waste. Online document accessed on 15th July 2012 from: http://www.demos.co.uk/files/Creatingwealthfromwaste.pdf

[7] Jekayinfa, S. and O. Omisakin 2005. The Energy Potentials of some Agricultural Wastes as Local Fuel Materials in Nigeria. *Agricultural Engineering International: the CIGR E journal. Vol.VII. Manuscript EE 05 003.* May, 2005.

[8] Kumar, R. and Grover, I. 2007. Waste Generated and Adoption of Waste Management Practices among Rural Households in Haryana. *Journal of Human Ecology* 22 (4): 355-360

[9] Oladeji, J. T. 2011.Agricultural and Forestry Wastes and Opportunities for their use as an Energy Source in Nigeria- An Overview. *World Rural Observations*. 3 (4): 1 – 6

[10] Oyeleke, S. B. and Jibrin, N. M. 2009. Production of Bio-ethanol from Guinea Cornhusk and Millet Husk *African Journal of Microbiology Research* 3 (4): 147-152

[11] Ritzer, G. and Stepnisky, J. 2014.*Sociological Theories* 9th Ed. McGraw Hill International Edition pg 402 - 434

[12] Sabiiti, E. N. 2011. Utilising Agricultural Waste to Enhance Food Security and Conserve the Environment *African Journal of Food, Agriculture, Nutrition and Development Short Communication* 11(6): 1 – 9

[13] Scott, J. 2000. Rational Choice Theory In: G. Browning, A. Halcli, and F. Webster (eds.), *From Understanding Contemporary Society: Theories of The Present.* Sage Publications.

[14] Taboada-González, P., Armijo-de-Vega, C., Aguilar-Virgen Q. and Ojeda-Benítez S. 2010.Household Solid Waste Characteristics and Management in Rural Communities *The Open Waste Management Journal*3: 167-173

[15] Tonglet, M., Phillips, P. S. and Bates, M. P. 2004. Determining the drivers for householder Pro-environmental behaviour: waste minimisation compared to recycling. *Resources, Conservation and Recycling* 42: 27 – 48

[16] Jekayinfa, S. and O. Omisakin 2005. The Energy Potentials of some Agricultural Wastes as Local Fuel Materials in Nigeria. *Agricultural Engineering International: the CIGR E journal. Vol.VII. Manuscript EE 05 003.* May, 2005.

[17] Jibowo, A.A2003.*Essentials of Rural Sociology.* Nigeria, Abeokuta, GbemiSodipo press

[18] Niaura, A 2013. Using the Theory of Planned Behaviour to Investigate the Determinants of Enviromental Behaviour Among Youth. *Environmental Research, Engineering and Management* 1 (63): 74 – 81

[19] Soyebo, K. O. 2005. Rural Households Resources Management in Osun State, Nigeria. *Unpublished Ph. D. Thesis, Obafemi Awolowo University, Ile Ife, Nigeria*

[20] Yusuf, O.J. 2011. Gender analysis of livelihood strategies of household heads in rural areas of Osun state, Nigeria. *Unpublished M.Phil. Thesis of the Obafemi Awolowo University, Ile-Ife, Nigeria*

[21] Yusuf, O.J. 2014. Assessment of farm waste utilization among rural dwellers in Osun State Nigeria. *Unpublished PhD Thesis of the Obafemi Awolowo University, Ile-Ife, Nigeria*

[22] Zhou,Y. 2010. Determining Sustainable Waste Management Practices in College and University Dining Services Using the Theory of Planned Behaviour. M.Sc. Thesis Submitted to the Department of Hospitality Management and Dietetics College of Human Ecology. Kansas State University. 124pp