

# Transportation of Agricultural Produce and Constraints on Value-Addition in Parts of Rural Nigeria

Usman, D. D.<sup>1</sup>, Mohammed, B.<sup>2</sup>, Haque, M. A.<sup>3</sup> and Adanu, E.<sup>4</sup>

<sup>1</sup>Department of Agricultural and Bioresource Engineering, Abubakar Tafawa Balewa University Bauchi, Nigeria.

<sup>23</sup>Department of Agricultural and Environmental Resources Engineering, University of Maiduguri, P. M. B. 1069 Maiduguri, Nigeria

<sup>4</sup>School of Vocational Education, Federal College of Education (Technical), Gombe, P. M. B. 60, Gombe, Nigeria

*Corresponding Author: Email: drambiusman@gmail.com*

## ABSTRACT

Transportation of agricultural produce from the farm to the house, processing centre, storage point and/or the market is a very important aspect in the overall foot chain, and it is a major thing that cannot be overlooked. A study was conducted to identify, among other things, the means of transportation, types of route used, cost of transportation, and losses during transportation of agricultural produce by farmers in 5 selected Local Government Areas of Adamawa State, Nigeria. A total of 100 households were considered in the study. Findings show that 47.21% of the households used four-wheel vehicles as the means of transportation, 17.98% used motor-cycles, 12.36% used bicycles, 10.11% used human portage, 7.85% used ox-drawn cart and 4.49% used wheel barrow in the transportation of their agricultural produce. 51.68% of the households interviewed used untarred route while transporting their produce, 17.98% used tarred route while 30.34% used both. As regards transportation cost, 35.89% paid the highest amount of more than five hundred Naira,

₦500 (US\$3.21) on transportation of their produce while 23.8% paid the least amount of ₦1 – ₦100 (US\$0.006 – US\$0.64). Regarding losses during transportation, 32.86% lost more than 10kg, 30% lost 1-2 kg, and 20% lost 1-4 kg. It was concluded that the main problem of transportation of agricultural produce was untarred and poor road conditions and this had consequences, and majority of the farmers used four-wheel vehicles to transport their produce – the reason been the high-carrying capacity. The study recommends some ways of improving the transportation of produce more especially at the rural level so as to ensure that value-addition and economic well-being are achieved.

**Keywords: Rural Transportation, Agricultural Produce, Value- Addition, Road Network, Transportation Cost.**

## 1. INTRODUCTION

Transportation of agricultural produce from one place to another is a very laborious but unavailable task, and it is a very important aspect (Adeoti and Kaul, 1988; Doran, 1994; Mijinyawa and Adetunji, 2005; Pretty et al, 2005; Higgins, 2006; Meisterling et al, 2009). The movement of goods is a major problem for rural households and it involves a significant proportion of farm labour, just as the transportation of agricultural and related goods has increased steadily in the recent decades (Gebresenbet and Ljungberg, 2001). Dannis and Anderson (1994) reported that up to 90% of travel

in rural areas involves transportation of goods and a large portion of this is done by hand, back or shoulder carrying. Road network and vehicles are the two major components of transportation system. Mohammed et al. (1996) and Abbott and Makeham (1978) observed that lack of good network linking rural areas with the urban market remains one of the major causes of shortage of agricultural produce. This could have effect on the price of agricultural produce (Kilkenny, 1998). It was opined that agriculture by its nature must be or remain widely scattered over a large area, which implies the need for a good transport network (Upton, 1976). Omamo (1998) put it that improved rural road networks could help meet food needs through domestic production and promote specialization that raises farm incomes. On the

basis of a number of surveys in different countries it was observed that low-cost traditional methods of moving goods meet a much greater proportion of transport requirements than do conventional vehicles (Mohammed et al, 1996; Carruthers and Rodriguez, 1992). However low-cost vehicles have their own disadvantage in terms of load carrying capacity (tonne-km/hour). Typically, the load carrying capacity of a human being is 0.1, donkey (pack-load) - 0.25, bicycle - 0.8, motor cycle - 6, ox cart - 4 and single axle tractor - 10 tonne-km/hours. On the other hand, the load carrying capacity of a tractor/trailer is 60 and that of a truck is 500 tonne-km/hours (Dennis and Underson, 1994). Clearly there is a very significant difference between these and the need to have good roads to transport agricultural produce efficiently is very important in the food chain.

### 1.1 Study Objective

The objective of this study was to investigate the various means of transportation of agricultural produce,

the types of routes used and the cost/losses incurred during transportation in some parts of Adamawa State, Nigeria. The study was necessary because very little information was available on the subject for this area and that farming is a major occupation in the area.

### 1.2 The Study Area

Adamawa is one of the 36 States in the Federal Republic of Nigeria (Fig. 1). It is located in the north-eastern part of the country and occupies about 36,917 km<sup>2</sup> of land with an estimated population of 3,168,101 according to the 2006 Nigeria national census. It is bordered by Borno, Gombe and Taraba States. Its eastern border forms the national border with Cameroon. Topographically, it is a mountainous land crossed by the large valleys of rivers Benue, Gongola and Yedsarem. The valleys of Cameroon, Mandara and Adamawa mountains form part of the vast landscape. The State has network of roads linking all parts of the country in addition to air and water routes which make the State accessible in all seasons.

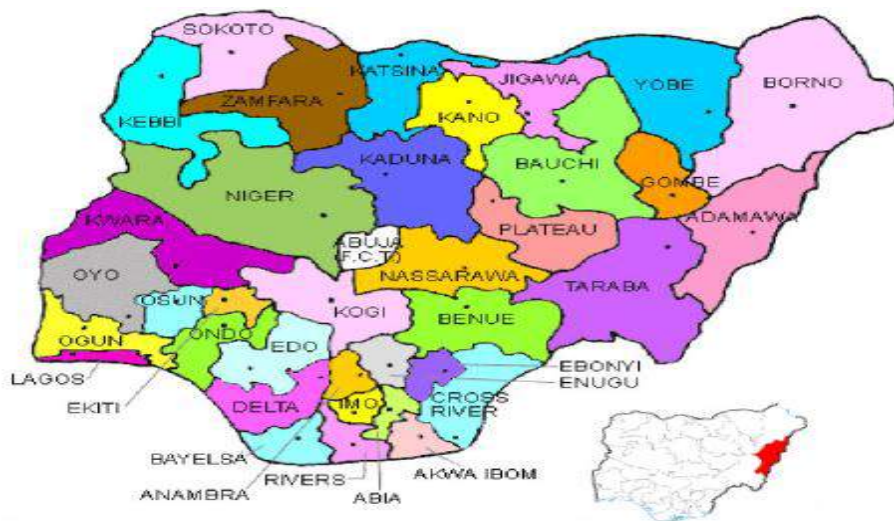


Fig. 1: Map of Nigeria showing Adamawa State (inset as well) and the other 35 States and the Federal Capital Territory, Abuja

The major occupation of the people is farming as reflected in their two notable vegetational zones - Sub-Saharan and Northern Guinea Savannah. The major cash crops grown are cotton, groundnuts, sugarcane and tea while food crops grown include maize, yam, cassava, guinea corn, millet and rice. Adamawa State is well known for cattle rearing and animal husbandry and possesses one of the largest populations of livestock in the country. Additionally, fishing activities are carried out on the banks of the rivers by nearby communities.

## 2. METHODOLOGY

The study was conducted in five selected Local Government Areas (LGAs) of Adamawa State, Nigeria (Fig. 1). These LGAs cover about one-third of the entire land area of the State. The LGAs were selected as being representatives of the region/State and they virtually practice similar agricultural activities having same soil type and climatic as well as topographic features. The major crops grown in these LGAs included maize, rice, sorghum, millet, cowpea and groundnut. Two districts were chosen from each of the selected LGAs and ten rural households were considered randomly in each of the districts. Thus, a total of 100 households were surveyed during this study. The information was collected through personal contacts and direct

interviews of farmers as well as administering of structured questionnaires. The information collected during the survey included means of transportation of agricultural produce, types of routes used, cost of transportation and losses occurring during transportation.

### 3. RESULTS AND DISCUSSIONS

Generally, it was found that agricultural produce are transported between farm, house, processing centre and markets. Oftentimes the transportation may not be systematic. Fig. 2 gives a schematic overview of the summary of the transportation of agricultural produce between various locations and the associated activities involved in the study area.

The different types of transportations used by the rural households in the study area are illustrated in Fig. 3. Majority of the farmers (47.21%) used four-wheel vehicles for transporting their agricultural produce probably due to the high-carrying capacity of these vehicles. The vehicles include pick-up vans, trucks, cars, Land-Rovers and tractors with trailers. Some of these vehicles were hired by the farmers while a reasonable

number were owned by them. The additional considerations in the choice of this means of transportation were fastness, shorter time required for transportation and minimum loss/damage to the produce during transportation. It was observed that a considerable number of the vehicles were old, an indication that they have been used and maintained for a long time. However, if these vehicles are not in absolutely good conditions, there is the worry of supplementary greenhouse gas emissions associated with agricultural produce transportation as shown in a recent study (Meisterling et al, 2009). Indeed, over a period of time, this cannot be overlooked because of increasing global concerns about climate change and its associated consequences.

Motor-cycle, bicycle, human portorage, ox-drawn cart and wheel barrow were used by 17.98, 12.36, 10.11, 7.85 and 4.49% of the farmers respectively. It was observed that these means of transportation were easier to own than the earlier category because they were cheaper to buy and often easier to maintain.

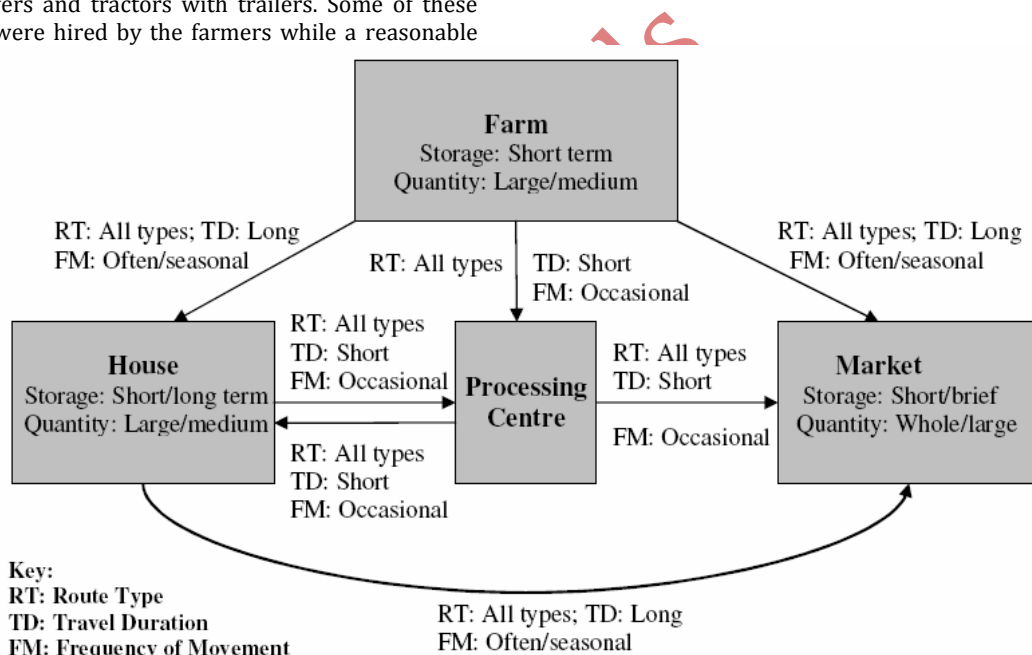


Fig. 2: Schematic of agricultural produce transportation between farm, house, processing centre and market with associated activities in the study area.

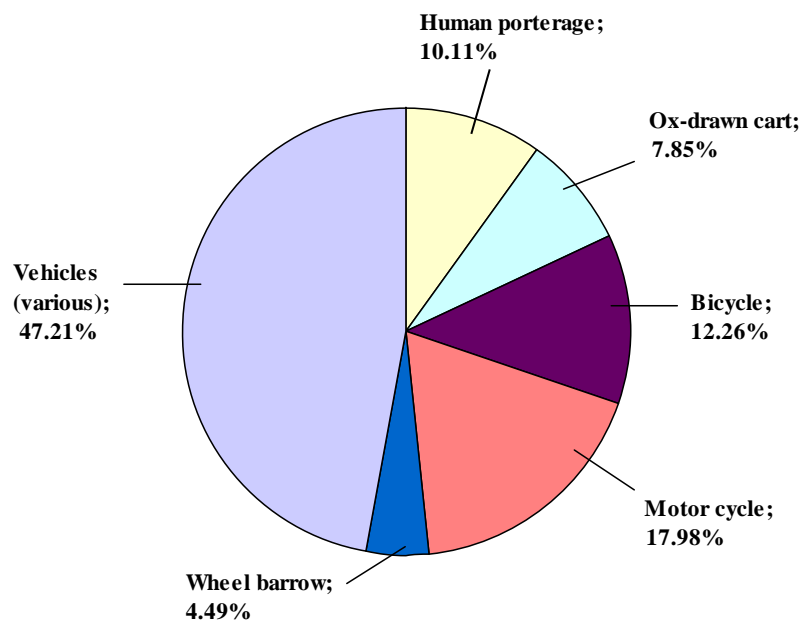


Fig. 3: The different means of transportation used for conveying agricultural produce.

Fig. 4 shows that 51.68% of the farmers used untarred routes, 17.98% used tarred ones while 30.34% of the farmers transported their produce using both types of route. This was an indication of the limitation of tarred routes accessing the produce areas as at the time of the research. This situation had often led to delayed

evacuation of produce from the farms and sometimes contributed to raising the price of produce at the market due to scarcity and also since farmers paid higher than expected to transport them there.

Table 1: Cost of transportation of agricultural produce in the study area

Cost of Transportation (N)*	Respondents (%)
1 – 100	23.08
101 – 200	10.26
201 – 300	10.26
301 – 400	5.13
401 – 500	15.38
501 and above	35.89
<b>Total</b>	<b>100</b>

\* - 1 US\$ = ₦155.76 (Central Bank of Nigeria official rate as at 19-Oct-2012)

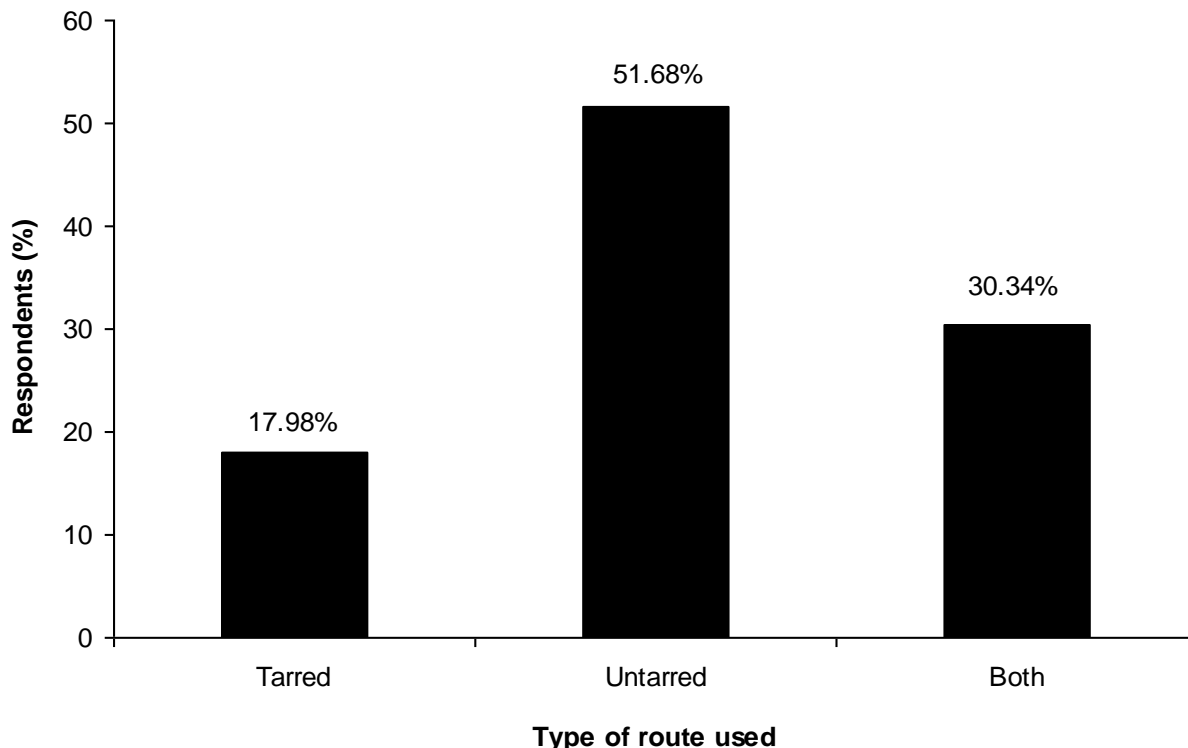


Fig. 4: Availability and use of tarred and untarred transportation routes by the respondents.

The high cost of transportation resulting from poor roads also increased the cost of production (as labour cost). Oftentimes farmers needed to hire extra labour to accomplish certain tasks, and poor road conditions meant increased transport cost to the hired-labours which were ultimately borne by the farmer. Table 1 shows the distribution of cost of transportation in the study area, with majority of the farmers (35.89%) paying high price. Again, this cannot be unconnected with the nature of the roads and difficulties associated with accessing the produce areas. It is easy to understand the correlation between produce loss and

poor road condition. However, losses during transportation were generally less compared to losses occurring on the farm during storage often because of infestation and attack by rodents. Fig. 5 shows the losses that occurred during transportation. Though losses occur as a result of poor roads, lack of good packaging or poor handling of produce were also identified as possible causes. However, a considerable number of farmers responded that they experienced minimal or no losses during transportation particularly when they used suitable packaging and good roads.

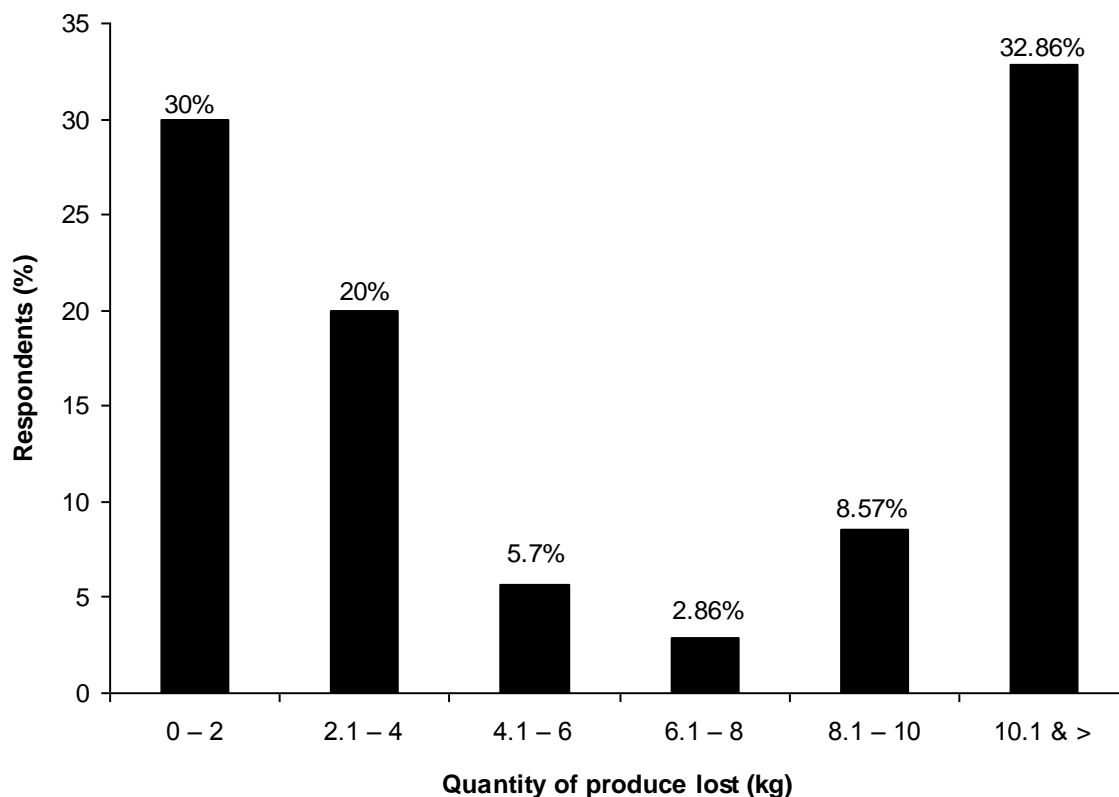


Fig. 5: The effect of type of route used on loss of agricultural produce during transportation.

#### 4. CONCLUSIONS

On the basis of the results from this study, it can be concluded that the main problem associated with the transportation of agricultural produce was poor road conditions and that most of the transportation occurred on the untarred roads. This situation had been identified as the primary cause of delay in produce evacuation. This often led to scarcity at markets and in this context the poor condition of roads was the main driver in raising the price of produce. It could also be said that the inability to evacuate the produce to the market could affect value-addition and it would be a major constraint to economic well-being to all concerned.

Majority of the farmers used four-wheel vehicles to convey their produce because of the high-carrying capacity although other means of transportation were more affordable in terms of purchase. Clearly, the main driver here was the carrying capacity.

#### 5. RECOMMENDATIONS

From the study, the following recommendations for the improvement of transportation of agricultural produce are made.

1. Rural and farming areas should be provided with good roads for easy access and timely evacuation of produce.
2. Government should put in a place a transportation mechanism that would assist farmers and ensure faster and safer flow of produce to intended destinations.
3. It is necessary to explore the potential role of small scale motorcycle-drawn carts with good carrying capacity over short distances in order to improve rural produce transportation. This would have the advantage of comparatively low purchasing price and good carrying capacity.



## 6. REFERENCES

- [1] Adeoti, J. S. and Kaul, R. N. 1988. Assessment of Available Vehicles for Small farmers in Rural Areas of Nigeria. In *Proc. CIGR Inter-Sections Symposium*, ed. Oni, K. C. Nigerian Society of Agricultural Engineers. Ilorin, Nigeria, 5 – 10 September.
- [2] Doran, J. 1994. Transportation by Women, and their Access to Animal-Carts in Zimbabwe. In *Improving Animal Traction Technology*, eds. Starkey, P., Mwenya, E. and Stares, J. Proc. First Workshop of Animal Traction New work for Eastern and Southern Africa (ATNESA) in collaboration with Technical center for Agriculture and Rural Cooperation (CTA, Wageningen, the Netherlands). Lusaka, Zambia. 18-23 January, 1992.
- [3] Mijinyawa, Y. and Adetunji, J. A. 2005. Evaluation of farm transportation system in Osun and Oyo states of Nigeria. *Agricultural Engineering International Ejournal*, Vol. 7, Manuscript LW 05 004.
- [4] Pretty, J. N., Ball, A. S., Lang, T. and Morison, J.I.L. 2005. Farm costs and food miles: An assessment of the full cost of the UK weekly food basket. *Food Policy*, 30: 1–19.
- [5] Higgins, A. 2006. Scheduling of road vehicles in sugarcane transport: A case study at an Australian sugar mill. *European Journal of Operational Research*, 170: 987–1000.
- [6] Meisterling, K., Samaras, C. and Schweizer, V. 2009. Decisions to reduce greenhouse gases from agriculture and product transport: LCA case study of organic and conventional wheat. *Journal of Cleaner Production*, 17: 222–230.
- [7] Gebresenbet, G. and Ljungberg, D. 2001. Coordination and route optimization of agricultural goods transport to attenuate Environmental Impact. *J. agric. Engng Res.*, 80 (4): 329-342.
- [8] Dennis, R. and Anderson, M. 1994. Improving animal based transport: technical aspects of Cart design. In *Improving animal traction technology*, eds. Sharkey, P., Mwenya, E. and Shares, J. Proc. First Workshop of Animal Traction New work for Eastern and Southern Africa (ATNESA) in collaboration with Technical center for Agriculture and Rural Cooperation (CTA, Wageningen, the Netherlands), 255-259. Lusaka, Zambia. 18-23 January, 1992.
- [9] Mohammed, B., Haque, M. A. and Mustapha, A. 1996. Transportation of agricultural produce by farmers in North-East Nigeria. In *Proc. Maiden National Engineering Conference*, 22-28. Bauchi, Nigeria. 17-19 April.
- [10] Abbott, J.C. and Makehem, J.P. 1978. *Agricultural Economics and Marketing in the Tropics*. England: ELBS.
- [11] Kilkenny, M. 1998. Transportation cost and rural development. *Journal of Regional Science*, 38(2): 293–312.
- [12] Upton, M. 1976. *Agricultural Production Economics and Resources Use*. London: Oxford University Press.
- [13] Omamo, S. W. 1998. Transport costs and smallholder cropping choices: An application to Siaya District, Kenya. *American Journal of Agricultural Economics*, 80(1): 116-123.
- [14] Carruthers, I. And Rodriguez, M. 1992. *Tools for Agriculture: A Guide to Appropriate Equipment for Small Holder Farmers*. London: Intermediate Technology Publications Ltd.