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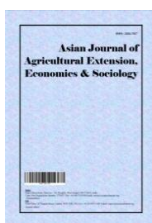
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Appraisal of Agricultural Extension Delivery Approaches among Mbororo Fulani Women in the North West Region of Cameroon

Loveline Enjoh Forbang¹, Tonian Nobert Lengha^{2*} and Fonteh Athanasius Amungwa³

¹*Department of Rural Socio-Economics and Agricultural Extension, University of Dschang, Cameroon.*

²*Department of Integrated Rural Development and Agricultural Extension, University of Dschang, Cameroon.*

³*Department of Sociology and Anthropology, University of Buea, Republic of Cameroon.*

Authors' contributions

All authors coordinated the writing of this work and contributed ideas that led to the realization of the paper. Author LEF did the full write up of the work from conception and research design. Authors TNL and FAA are my current supervisors and both contributed to literature review and data analysis. All authors read and approved the final manuscript.

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ABSTRACT

The focus to this study is to make an appraisal on the different agricultural extension delivery approaches that are used to disseminate agricultural innovations to Mbororo Fulani women in the North West region of Cameroon. The study was done between January 2018 to May 2020 and involved only Mbororo Fulani women between the ages of 21-60 years. Primary data was collected through the use of structured questionnaires, observations, focus groups and Interview guides. While secondary data was collected through the study of books, journals, research projects and scientific articles. Multistage sampling techniques were used to select the female farmers for the study. 400 questionnaires were administered randomly to Mbororo women in Mezam, Momo, Boyo, and Donga-Mantung Divisions of the North West Region of Cameroon. Statistical package for social science (SPSS) was used for data analysis and the spearman correlation coefficient test was equally used to verify the hypothesis. Results from the study revealed that farmer field school

*Corresponding author: E-mail: tohnole@yahoo.com, tohnolecneminrest@yahoo.co.uk;

(37%) and participatory approach (47%) are the most common extension approaches used to provide agricultural innovations to the Mbororo Fulani women in the North West region of Cameroon. Also, the study noted that Mbororo Fulani women in the North West region have limited knowledge about extension delivery approaches needed to bring about innovations in the agricultural sector which they are greatly involved. It is therefore recommended that Policy makers in agricultural extension related issues, should develop gender sensitive measures to increase Mbororo Fulani women in education and training that can create awareness on the application of extension delivery approaches in the agricultural sector which they find themselves as active participants and this can be done through the creation of Mbororo Fulani female farmer's cooperatives.

Keywords: Appraisal; agriculture; extension approaches.

1. INTRODUCTION

Agricultural extension and advisory services are powerful tools to help smallholders break the cycle of low productivity, vulnerability and poverty [1]. By providing farmers with knowledge and skills about modern agricultural practices, linking them to new technology, and providing them greater access to finances and market solutions, extension can be a critical force for change (Boo, 2009) as cited in [2]. However, agricultural extension strategies in developing countries have been built on traditional, top-down approaches that rely on transfer of technological models which are inflexible packages of recommended inputs and practices and learning methods that lack full understanding of how farmers learn and innovate [3]. As such, linkages between extension services and farmers are as weak as linkages between extension agents and those providing services to farmers [4]. The agriculture sector (crops, livestock, fisheries, and forestry) plays a significant role in Cameroon's socio-economic development, as a food and feed provider, employer and income earner. Cameroon's agriculture contributes about 20% to GDP and employs about 60% of the active population. Agriculture accounts for 40% of total exports, excluding oil (Republic of Cameroon, 2006). Food crops contribute 64% to the agricultural GDP, followed by livestock 13%, forestry 9%, industrial and export crops 8%, and fisheries 6% [5-7]. The country is endowed with abundant natural resources suitable for producing a wide array of agricultural commodities within its diverse agro-ecological landscapes. In addition, the aim of the 2014-2020 National Agricultural Investment Programme (NAIP) was to transform agriculture into a core economic drive that creates decent jobs and wealth to meet domestic and foreign demand, through the improvement of food and nutrition security in a sustainable development context. NAIP targets a rural growth standing

over 10% in 2020 and a livestock growth of 9.3% between 2010 and 2020 while the growth of the sector has increased from 2.6% in 2010 to 5.7% by 2014 (National Institute of Statistics, 2015). The Government's priorities for the agriculture and livestock sectors are to improve productivity and competitiveness of the different segments of the sector, have the sector undergo a more pronounced commercialization process, secure farm and pastureland, and create agriculture and livestock growth poles to attract young entrepreneurs [8,9]. To meet up with the demand for quality nutritious food will mean that both men and women living in rural and urban areas should be active participant with no ethnical or racial segregation. But most often the Mbororo Fulani women in the North West region have limited or no knowledge on the use of agricultural extension approaches that can be applied to improve on their agricultural productions including livestock farming which they are highly involved. This study of appraisal of agricultural extension approaches is aimed at creation awareness on the availability of the different types of extension approaches available to the Mbororo Fulani women in the North West region that will improve or provide them with modern innovations in the different agricultural sectors in Cameroon.

2. MATERIALS AND METHODS

This study was done in North West region of Cameroon which is situated in Central Africa, at the juncture of the Gulf of Guinea, the North West region is one of the ten regions in Cameroon. It is found between Latitudes 5-40' and 7° North of the prime Meridian, with a surface area of 17 300 km² (Manu, 2008). This study was carryout in four out of the seven divisions of the North West region of Cameroon namely Donga-Mantung, Boyo, Momo, and Mezam divisions as shown on the maps below.

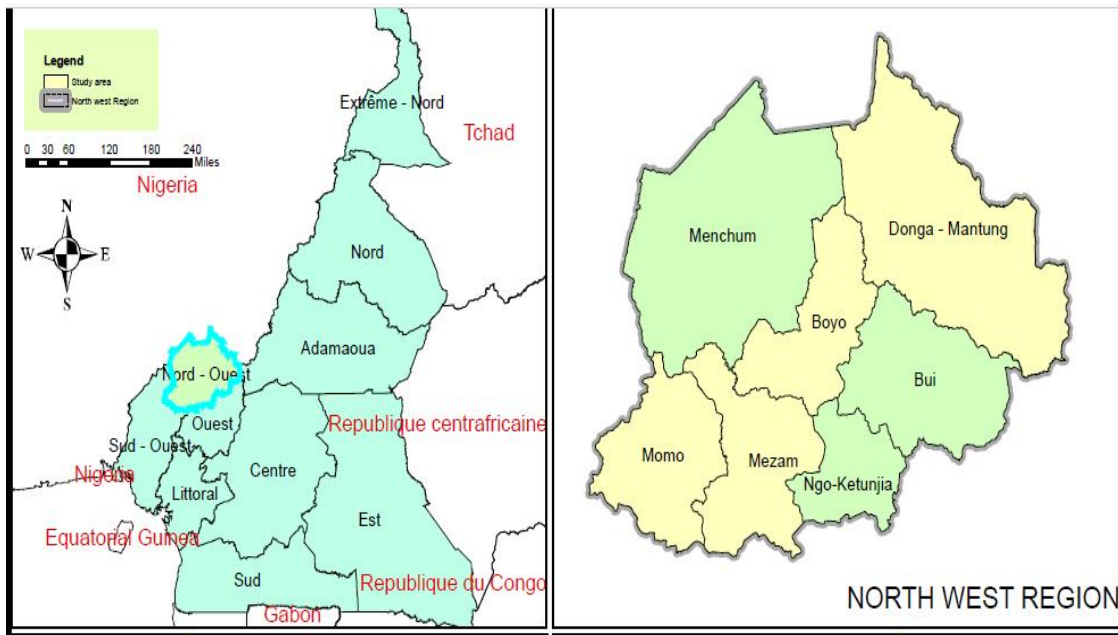


Fig. 1. Maps of Cameroon showing North West and divisions of the study

The area is filled with abundant rainfall that contributes to the development of agriculture. In addition, it has big water catchments, large rivers, waterfalls and artificial lakes which have a high potential to generate hydroelectricity and equally enhance economic activities.

2.1 Procedure for Sampling Size

Sampling size was calculated using the Yamane [10]. Formula for Calculating a Sample size to ensure maximum variability in the study. The formula is assumed to be;

$p=.5$ which is maximum variability which states that if a population is greater than one hundred thousand (<100,000) the sample size is taken at four hundred (400) which will give a degree of confidence level which could be $\pm 5\%$ precision.

In this case the formula is;

$$n = \frac{N}{1 + N(e)^2}$$

Where

n = the sample size

N = the size of population and

e = the margin of error (0.05) when the confidence level is 95%

$$n = \frac{<100000}{1+100000(0.05)^2} = 400$$

2.2 Sampling Techniques

A multistage sampling technique was used in the selection of sampling size. This is a technique where in sampling was carried out in several stages to get the sample size reduced at each stage. The multistage sampling technique was used because the research was done in several areas and in each of the areas one or more sampling techniques was applied to select the population of study. The purposive sampling techniques was used because after the literature review, it was realized that Mbororo Fulanis are represented in almost all the divisions of the north west region of Cameroon but some divisions are highly populated with the mbororo than others. Thus the purposive sampling was deliberately chosen by the researcher based on her judgment.

2.3 Methods of Data Collection

Both Quantitative as well as qualitative methods were used in data collection. The quantitative method used was the sample survey. The qualitative methods used were the in-depth interview, focus group discussion (F.G.) and participant observation. The quantitative and the qualitative methods were used because the two

methods match each other that is; while the quantitative approach enable the measurement of the situation based on numeric numbers, with this method one is able to count the numbers of frequencies using modalities like "how many" and "how often". The qualitative research answered the question "why" which provided an in- depth understanding of situations which are not base on numeric counting of observations. For the quantitative method the main tool used for data collection was the questionnaire and interview guides were used to get qualitative data.

2.4 Statistical Instruments and Data Analysis

The statistical instrument used for data analyses was the Statistical Package for Social Science (SPSS) version 20. This gave the room to codify treat and analyse variables and also the possibility to test the hypotheses. Some items about effectiveness, efficiency, and farmers perceptions were given on a Likert scale where A= "high" B="low" C="very high" D="very low" E="not at all or A= "agree" B="strongly agree" C="disagree" D "strongly disagree". Questions were provided with codes for each modality that allowed easy inputs of data into the SPSS. For example, "1=very often" "2=often" and "3=Not at all". The purpose was to help identify the frequency of responses for each category of question asked to the farmers. The qualitative method of analysis was implored by the study. This method gave the possibility to codify, categorise field data and to test the hypothesis between two variables (dependent and independent variables). A Bivariate Correlation analysis was used to measures the strengths of association between two variables (dependent and independent variables).

3. RESULTS AND DISCUSSION

3.1 Socio Demographic Characteristics of Livestock Famers

Technologies now support the modernization of many day-to-day activities. This growing technological development is occurring alongside the aging populations of the world thus creating opportunities to assist older people in everyday tasks and activities. There exist varieties of factors that determine the adoption of agricultural technology. According to Loevinsohn et al. [11], the decision of farmers on how to adopt new

technology are conditioned by the dynamic interaction between characteristics of the technology itself and the range of conditions and circumstances like their values and their believe about the technology.

New technology also has the possibility to provide appropriate and timely interventions to assist older adults in producing healthy agricultural products that are sustainable (Geraedts et al. 2014). It is noted that Older adults are slower to adopt new technologies than younger adults (Czaja et al. 2006), but will do so if those technologies appear to be valuable to them, like in maintaining their quality of life (Heinz et al. 2013). Ages of farmers range from 21-60 years. The age range were classified into four categories as follows: young farmers 21-30 years; middle lower age 31-40 years; middle upper age range 41-50 years; and old age from 51-60years and above. These results are indicated in Fig. 3. The results on age group of this study revealed that: 2% of the women are from the age of 60 and above; 9% are between 21-30; 10% are those from 51-60; for 23% of the women fall between 41-50; and 56% of the women are between 31-40 years. From these statistics the age group that is greatly involved in livestock farming are the ages between 31-50 that makes 79% of total age participants in active livestock farming and this age group is consider in this study as middle age.

This finding is in line with Ayoade et al. [12] who in a related study on women in livestock production in Nigeria reported that majority of the women doing livestock farming were middle aged women and the proportion of younger women in livestock production was relatively small when compared with that of the middle ages in Cameroon. These group of Mbororo Fulani women are considered to be at their prime ages and more active and productive to learn and handle any assistance provided by the extension agents. The results have an influence to the study because in any growing population this age group 31-50 is the most active. This further indicates that most women at the middle age are more productive than at old and lower ages. Consequently, there is need to empower the mbororo women in their opportunities for income generating activities through livestock faming. Composition of household members in terms of their age distribution has implications on the household ability to meet its food requirements (Sango, 2003 cited by Kayumbu, 2008).

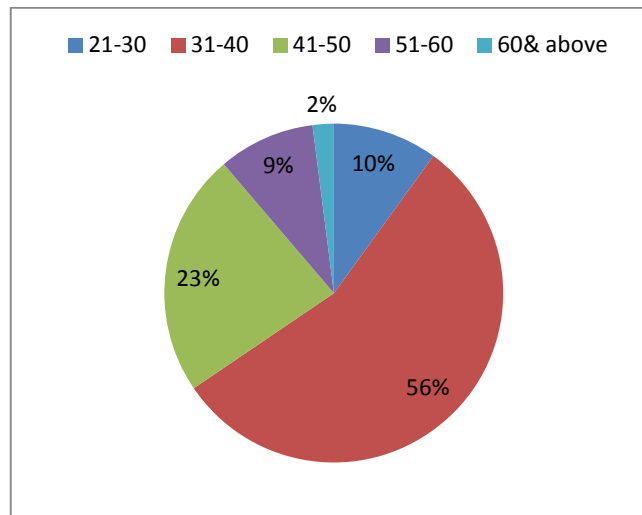


Fig. 2. Age group of Mbororo Fulani Women doing livestock farmers

3.2 Identification of Agricultural Extension Delivery Approaches

At the focus of international debates, agriculture is recognized as an important driver of economic growth and poverty reduction for many developing countries and a priority area for investment. A typical area of revival of the agriculture sector has been the recognition that past efforts have failed. Part of the failure is because women's roles are being ignored in the sector and the role of gender inequalities in reducing agricultural productivity. According to the report of FAO (2010-11), the State of Food and Agriculture, "Women comprise an average, 43 percent of the agricultural labor force in developing countries, ranging from 20 percent in Latin America to 50 percent in Eastern Asia and Sub-Saharan Africa" (FAO, 2011). The report argues that reducing gender inequalities in access to productive resources and services could produce an increase in yields on women's farms of between 20 percent and 30 percent, which could raise agricultural output in developing countries by 2.5 percent to 4 percent (FAO, 2011). Realizing these gains requires men and women farmers to have access to the information, skills, and tools they need to improve their yields. This, in turn requires reforming the institutions involved in the delivery of those services. A fundamental aspect of this process is recognizing that agriculture command large extension services, and specifically, the processes of providing effective extension and advisory services (EAS), involve much more than technical solutions. For this to be effective it was

important to identify the categories of extension services that are available to female livestock farmers in the North West region of Cameroon.

It is important that farmers have up-to-date knowledge about new technology available to influence agricultural production. This will help them improve on the quality of agricultural production. From the study, it is clear that the women are aware of a variety of agricultural extension approaches available to promote livestock farming in the North West region of Cameroon. Table 1 shows the different extension approaches that are available which the women were able to identify. They are; Farmer Field School (27.9), Participatory Approach (19.3%), the Training and Visit (18.0%) approach and the cost sharing approach (16.8%). We can therefore conclude that Mbororo Fulani women who in livestock farming are open to a number of extension approaches as indicated by the study. Although small proportions (2.5%) of Mbororo Fulani women are not aware of any agricultural extension approaches, 13.1% of the women are aware of a wide range of agricultural extension approaches that are available to them. Awareness of existing technologies generates effective demand which consequently provides a critical indicator to input dissemination methods. There is need to reinforce extension approaches and distribution of inputs to contribute to agricultural productivity of female livestock farmers. Growth in livestock production depends on functioning input distribution. In addition, if farmers are aware of appropriate extension techniques they will be able to provide feedback

to researcher. These results are different from the one that was published by FAO (1993) on women's role in agriculture and agricultural extension programs which saw that out of 24 agricultural extension program studied in Africa, Asia, and Latin America, rural women's awareness of agricultural extension approaches was still very poor and the number of women extension personnel was also extremely low.

The success of any agricultural extension delivery process depend largely on approaches selected thus it was important to identify what works for the famers in other to ensure effectiveness in the delivery of services. From the Fig. 3, the most common extension approach used in the North West region are; the Farmer Field School (36.8%), the participatory approach (22.1%), Cost sharing approach (19.3%) and the Training T&V (18%).

There is no doubt about these results because a number of private and public sectors are using most of the above extension approaches to disseminate new technologies to farmers. Some of these approaches are used to facilitate training among women. The FFS and participatory approach have been used by extension agents in the North West region since 2005 till date to

reach the farmers. The participatory approach replaced the T&V approach which was an old approach that was used by government to reach their farmers but failed due to its top-down approach which was accompanied by high operational costs and lack of findings. The approach was non-responsive to farmers' needs of economic, social and institutional [13]. However, the FFS is was introduced to the farmers in north west region through the Ministry of Agriculture(MINADER) with the aim of improving the weaknesses of the T&V thus empowering farmers through diverse participatory activities, ranging from analysis of farmer needs, selection of agricultural practices and technologies to experimentation by farmers [14].

Despite the increasing number of actors offering diversified options for extension delivery services substantial challenges remain in terms of adopting the full potential of agricultural extension systems (Christoplos, 2010). Mbororo Fulani women continue to face multiple challenges like low literacy level and family challenges. Government agencies are therefore faced with the challenge to regulate and effectively coordinate extension services to make sure that the women should benefit.

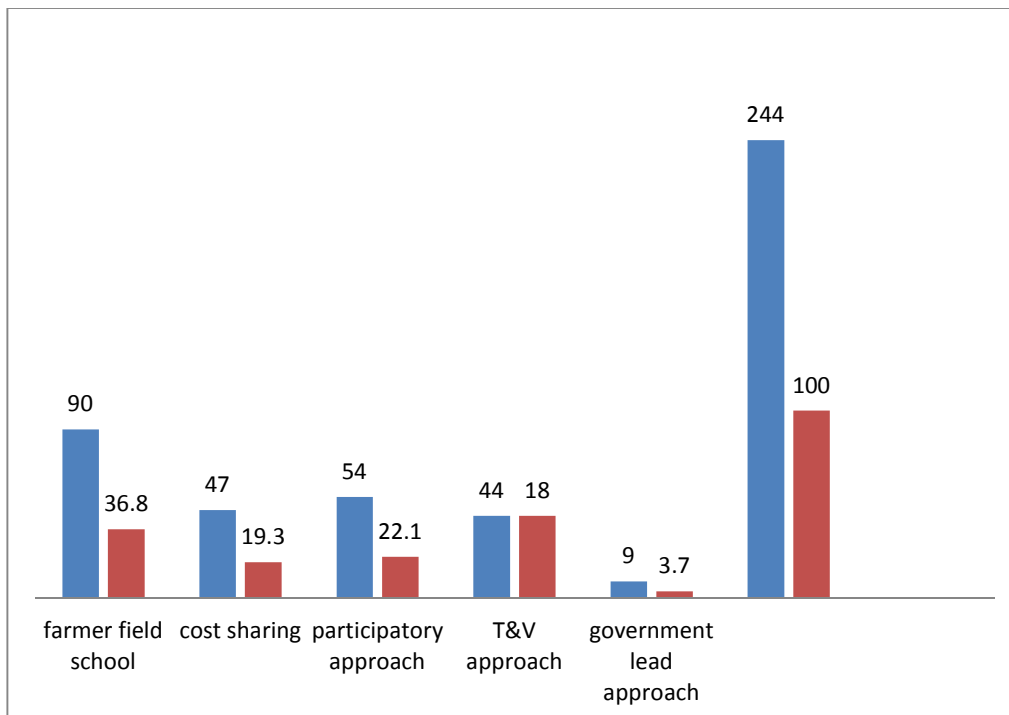


Fig. 3. Most used extension approaches by extension agents

Table 1. Awareness of agricultural extension approaches by Mbororo Fulani women in livestock farmers

Categories of extension approaches	Frequency	Percentage
training & visit	44	18.0
farmer field school	69	27.9
cost sharing	41	16.8
participatory approach	47	19.3
commodity approach	11	4.5
none of the above	6	2.5
all of the above	32	13.1
Total	244	100.0

Source: Field survey 2018

4. CONCLUSION

The study was aimed at examining the importance of agricultural extension services to Mbororo Fulani women in the NorthWest region of Cameroon. The purpose of this study was to evaluate the different categories of agricultural extension delivery approaches implemented or used to provide services to the Mbororo fulani women in the North West region. The results revealed that the Farmers Field School (FFS) and the participatory approaches are the most extension approaches used to deliver services to Mbororo Fulani female doing farming in the North West Region of Cameroon. Failure to provide effective extension services delivery to the Mbororo Fulani women involved in farming will not only affect their agricultural production but will also hinder their socio cultural development. It is expected that for extension services to be effective both extension agent and farmers should spend more time on the field to improve on knowledge and technology. In doing this, more farmers will be able to have technological knowledge that will be helpful to develop the agricultural sector in various communities.

5. RECOMMENDATIONS

An extension agent is seen as a vehicle of knowledge. Therefore, the extension agent should be able to provide the knowledge and information that will enable the mbororo Fulani female farmers to understand and make decisions about particular innovations. This can be achieved through regular organization of meetings with the farmers in their communities. Reliability should be ensured by the extension agent during work to gain the farmers mind during extension activities that is, an extension agent must be able to carry out his job without close supervision, and the local farmers must come to have confidence in his advice and

support. *Humility with farmers.* The agent must be sensitive to the wishes and feelings of the farmers and work with them in a way that respects them as people who have knowledge and ideas to contribute. Be confidence in his own abilities and determination to achieve something. Farmers should devote more time for training meetings so as to ensure efficiency, effectiveness and sustainable production. Technical knowledge acquired should be implemented to improve on quality and quantity of production.

CONSENT

As per international standard or university standard, respondents' written consent has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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