



Adoption of Management Tools by Farmers in the Context of Agricultural Extension and Advisory Services in Menoua Division, West Cameroon

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Authors' contributions

This work was carried out in collaboration among all authors. Author FFGH designed the study, All the authors performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. All the authors managed the analyses of the study. Authors MMF and MNM managed the literature searches. All authors read and approved the final manuscript.

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ABSTRACT

Aims: This study aims to analyze the challenges under the adoption of management tools provided by the Programme for the Consolidation and Sustainability of Agro-pastoral Counselling (PCP-ACEFA) to farmers in the Menoua Division.

Methodology: 60 farmers were surveyed using a stratified random sampling technic and 5 advisors were interviewed. The data were processed and analyzed with Excel 2013 and SPSS software version 20.

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Results: Results shows that a variety of management tools are available to farmers in the Menoua division. The calculation of gross margin (utilization rate 62.96%), Balance sheet (utilization rate 60%) are the most widely used, especially for farms generating large financial flows. Concerning the factors influencing the adoption of management tools, the study revealed several categories: social, economic and institutional. Social factors, for example with the level of education, show that those who adopt the most (50%) have at least secondary education. Furthermore, with the help of the advisors, farmers who adopted these tools have been experiencing changes in their activities as they can now evaluate their activities to know their economic performances which will further permit them to make better decisions. The study also shows that farmers faced difficulties in adopting the use of management tools and it is mostly (33, 33%) due to a lack of finance to expand their exploitation and Implementation difficulties (20.8%). Concerning strategies for a better adoption of tools, farmers mostly propose that the program help increasing their farm size by financing their activities and simplification of tools to the least level that everyone can use.

Conclusion: The recommendations formulated at the end of this study are to increase farmers' awareness and training in the use of management tools to guarantee good yields on their farms.

Keywords: Adoption; management tools; agropastoral family farms; menoua.

1. INTRODUCTION

In Africa, about 70% to 80% of the poor live in rural areas and depend on agriculture for their livelihood (Economic Commission for Africa [1]. Agriculture is the main source of income for 90% of rural populations in Africa [2]. In addition, the agricultural sector is responsible for providing food security, contributing in external revenue generation, reducing unemployment and providing raw materials for the industrial sector. According to [3], this agriculture is mostly practiced at small scale level, and it is considered as a vital development tool for achieving Millennium Development Goals, one of which is to help the people suffering from extreme poverty and hunger by 2015.

In Cameroon, agriculture is dominated by small scale farm producers and about 60% are mainly subsistence; with low levels of production and low outputs which have increased poverty in rural areas resulting from a fall in revenue of most producers [4]. While there is significant uptake of cost-recovery approaches among commercially-oriented farmers, many smallholder farmers still depended on donor-funded services. [5]. According to [6] The extension systems have several goals, such as conveying new technologies, facilitating and implementing policies and programs, providing information and guiding the management of new farming methods, and developing capacity through training and exposure visits. The literature emphasizes the crucial role of agricultural extension services in educational and skill development programs that enhance the capacity of farmers. Agricultural extension

services are increasingly expected to provide knowledge brokering services and facilitate interactions among actors and stakeholders. Moreover, [1] relate that these low levels of production and productivity are a result of; poor use of management tools, inadequate capital and limited access to credit, aging plantations especially with regard to cocoa and coffee, limited knowledge concerning the technical management of their farming system, small farm sizes and rudimentary equipment, low use of inputs, inadequate storage facilities, limited processing equipment and poor access to agricultural information [1]. Agricultural information needs for the rural people, especially rural farmers, cannot be taken for granted as it is one of the most important resources in agricultural and rural development that assists the farmers in making decisions and take appropriate actions for further farming-related development. Despite its importance, [7] opines that the vital role played by scientific and technical information for agricultural and industrial development in developing countries is still neglected and accorded a lower status than other sectors. This view is also supported by [8] who argue that most of the farmers in rural areas still lack information and modern agricultural knowledge.

After the disengagement of the state from public interventions in the 1980s to 2000 about structural adjustment programs, a multitude of new actors emerged: non-governmental organisations and producers' organisations [9]. This led to a gradual recomposition of services to rural people, favouring the emergence of public-private initiatives [10] and giving rise to a

pluralism that involves the use of several public or non-public organisations for the provision of agricultural services [11]. For [9], the provision of these services (advice, training and education) facilitates the productive, efficient and sustainable use of land by and for farmers. Prior to advice, [12] note that it is equally easier to understand the various but related roles that advice can play in serving the needs of its different clientele groups, especially in providing the necessary technical and management skills for them to diversify into new crops, livestock or other enterprises. Extension officers were slightly above moderate level of competency in 10 of the 21 agricultural competencies and at moderate level in 1 of the 21 agricultural competencies. Regarding the required level of agricultural competencies needed by extension worker.

Thus, in Cameroon, to enable farmers, to achieve innovation and improve their technical, organizational and economic management, PCP-ACEFA has set up on behalf of ministries of agriculture and livestock a permanent support counselling device. For the past 15 years, PCP-ACEFA has been promoting the adoption and implementation of some management tools to farmers such as: cash flow, registers, balance sheets, income statements, etc, which have been helping them to improve the management of their farms. In Menoua, the adoption and implementation of these management tools remain a grand challenge and thus call for concern on the implementation of these tools made available to farmers by PCP-ACEFA to increase their production and productivity.

2. METHODOLOGY

The study was carried out in Menoua division West region of Cameroon for two main reasons. Firstly, because Menoua Division is one of the pioneer (pilot) zones to host PCP-ACEFA program and so, much has been done in the course of accompanying the farmers from the first phase till date (third phase). Secondly, Menoua division is an agriculture intensive production basin due to its fertile lands and farmers there are mostly organized as producers' organizations or as family agro-pastoral farm enterprises which are prerequisites for PCP-ACEFA's support.

The study population is made up of farmers trained in management tools within second phase of PCP-ACEFA, in the Menoua division. The stratified sampling technic was used to select the common initiative groups to which

farmers belong, and the purposive sampling was used to select farmers that have been receiving advice on management tools by grouping them into two categories of Agropastoral family farms (EFAs) (EFAs in the observatory and the simple EFAs). A total number of 60 farmers benefiting from PCP-ACEFA were surveyed together with 5 advisors from PCP-ACEFA. Farmers were administered a questionnaire for quantitative data whereas interviews were organized with advisors for qualitative data. Both primary and secondary data were mobilized for the realization of this work. The data were processed and analyzed with Excel 2013 and SPSS 20 to make descriptive and comparative analysis. The dependent variable in this study is the total number of agropastoral family farms, management tools are the independent variables.

3. RESULTS AND DISCUSSION

3.1 Socio-economic Characteristics of the Farmers Involved in the Adoption of Management Tools Provided by PCP-ACEFA

The socio-economic characteristics of the farmers are described based on some indicators such as gender, age, marital status, level of education, main activity and secondary activity.

3.1.1 Age of the farmers involved

The result in Table 1 shows that 59% of the farmers interviewed fall between the ages group 41-50 years.

These results could be attributed to the fact that the youthful population is more interested in rapid income generating activities such as "motobike", small commerce, and education as compared to the aged group who in this context mainly depends on agriculture. This result is similar to that of [13] which showed that 77.7% of farmers surveyed in the Mbam and Inoubou divisions had ages above 40 years.

3.1.2 Gender of the farmers involved

The analysis of farmers based on gender clearly shows that, men are mostly involved with about 65% of them as shown in Fig. 1.

This result can be explained by the fact that men own most of the lands on which the agricultural activities are being carried out and as such

considered as head of the Family agro-pastoral farm enterprises (FAFs) even though women are highly engaged in the realisation of these activities on the field. This result is similar to that [13] which showed that 70% of the family agro-pastoral farm heads surveyed were men.

3.1.3 Marital Status of the farmers involved

Marital status plays a very important role in the adoption process as it shows the level of commitment of farmers to adopt and master the use of management tools.

Table 1. Distribution of age of farmers adopting management tools provided by PCP-ACEFA in Menoua

Age	Frequency	Percentage
20-30	2	4,3
31-40	17	27,9
41-50	36	59,0
plus de 50	5	8,8
Total	60	100,0

Table 2. Distribution of farmers according to marital status

Marital statuses	Frequency	Percentage
Single	2	4,3
Married	40	65,6
Divorced	7	11,5
Widow	11	18,6
Total	60	100,0

Table 3. The distribution of farmers according to their Level of education

Education	Frequency	Percentage
No education	2	3,3
Primary education	9	14,8
Secondary education	44	72,7
Higher education	5	9,2
Total	60	100,0

Table 4. The categories of EFAs

Category of EFAs	Frequency	Percentage
EFA in the observatory	25	41,6
EFA simple	35	58,4
Total	60	100,0

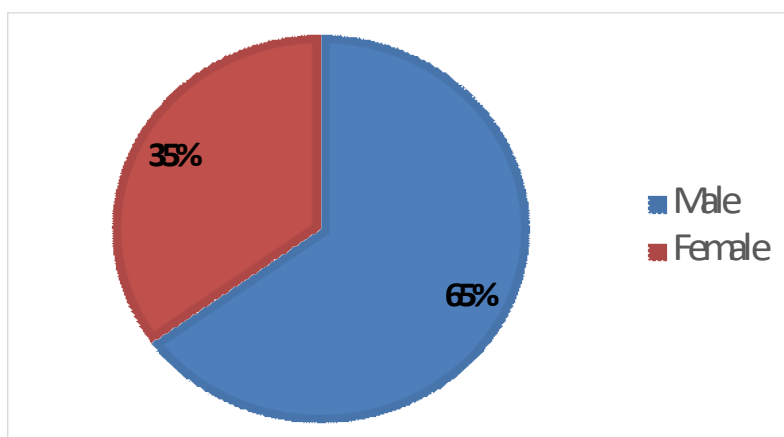


Fig. 1. Gender distribution of respondents

The results in Table 2 shows that, more than half of the sampled population (65.6%), are married. It can be said that most farmers who adopt are responsible since they have children to care for and thus need to improve the management of their FAFs to earn more income. This result goes in the same line with that of [13] which showed that 65% of farmers surveyed in the Mbam and Inoubou divisions were married.

3.1.4 Level of education of the farmers involved

As shown in Table 3 72.7% of the farmers interviewed in this study are of secondary education level. Only 3.3% of farmers have not been to school.

In general, results show that 96.7% of farmers in this study have been to school. This high level of educated farmers in Menoua division can be explained by the presence of several schools including universities in the locality. Results also clearly bring out the fact that there is a basic need for trained farmer to at least know how to read and write so as to be able to understand and use the diffused management tools proposed by PCP-ACEFA.

3.1.5 Categories of agropastoral family farms involved

The 72.7% of the farmers interviewed in this study are of secondary education level. Only 3.3% of farmers have not been to school.

The result shows that 41.6% of farmers are EFAs in the observatory and 58.4% of the farmers are simple EFAs. This result is associated with the fact that PCP-ACEFA provides management tools mostly to the heads of the family agropastoral farms enterprises being it those in the observatory or the simple ones. The family agropastoral farms enterprises in the observatory are followed up individually at their homes to make sure that they master the tools as compared to the simple family agro-pastoral farms enterprises who are just followed up at the level of the group.

3.1.6 Year of being accompanied by PCP-ACEFA

38.3% of the farmers provided with management tools became members of PCP-ACEFA program in 2010. This result corresponds to the year in which PCP-ACEFA initiated its activities in the Menoua division.

The Table 5 also show that as years go by, the number of beneficiaries tends to reduce. This result can be explained by the entering into play of other agricultural projects who for most of the cases work with the same farmers.

3.2 Management Services Provided by PCP-ACEFA Program to Farmers in Menoua Division

Management services provided by PCP-ACEFA to farmers in Menoua Division could be classified into four categories which are: production management; financial management; marketing management and accounting management. Their objectives are as follows: Production management consists of providing the farmers with services that could better help them with the type of agricultural activities to be involved in, the quality of seed to use, the quantity of chemicals to use when and how to apply the chemical for those involve in agriculture and the same thing applies for those involved in livestock. Financial management consists of advising the farmers on how they can get finances to invest in their activities and how they can judiciously use the finances so as to attain the required results. Marketing management consists of giving advice to the farmers on how they can better manage the sales of their products. Table 6 shows the different management services used by farmers.

75.4% of the farmers receive services on production management, 13.1% on financial management and 11.5% on marketing management. This result can be explained by the fact that, farmers are more concerned with high yields and are more interested in how to manage their farms to attain this objective. For example, they feel more interested when receiving services on the type of fertilizer to be used on a particular crop, how and when to apply the fertilizer on the crop.

3.3 Identification and Characterization of Management Tools

The management tools identified and provided by PCP-ACEFA to farmers in Menoua division are: the profit and loss account, gross margin, cash flow, balance sheet, action plan, net income statement, income booklet and expenses booklets. In this study, the indicators that are used to characterize the adoption of management tools are: training, profile of the trainers, year of being trained, type of training, duration of the training, access to the training and frequency of using the tool.

Table 5. Distribution of farmers according to the year of being accompanied

Years	Frequency	Percentage
2010	23	38,3
2011	12	20,0
2012	11	18,3
2013	2	3,3
2014	5	8,3
2015	5	8,3
2016	2	3,3
Total	60	100,0

Table 6. Management services provided by PCP-ACEFA in Menoua

Management services	Frequency	Percentage
Production management	46	75,4
Financial management	8	13,1
Marketing management	7	11,5
Total	60	100,0

3.3.1 Gross margin

Gross margin, refers to the evaluation of an activity (farm activity) to know if it is profitable or not so as to enable them to make decisions in relation to the activity. Gross margin is not profit; it does not include all costs but it is an indication of the profitability of an enterprise. Gross margin is made up of two major parts. That is, the gross income and the variable cost. The basic calculation for gross margin according to farmers is: $\text{Gross margin} = \text{gross income} - \text{variable costs}$.

3.3.2 Income statement

Generally, an income statement is defined as a document that presents the income and the expenditures of a business organization. It is presented in two types: the forecasted income statement and the net income statement. The forecasted income statement is a document that presents the income and expenditures before the activity while the net income statement is a document that presents the income and expenditures after the activity.

3.3.3 Plan of action

In this study, a plan of action is a document that presents what the producers intend to do within a given period of time. This plan might contain activities such as farmland preparation, planting of crops, weeding, harvesting and commercialization. This tool is important as it gives the producers an idea of what they are supposed to do within a particular time.

3.3.4 Balance sheet

In this study, a balance sheet refers to a table or a document that presents the patrimonial situation of the farmers. It is presented in two parts; the assets side on the left and the liability side on the right. The assets represent what the farmer owns for example; machinery, buildings and others; while the liability side represents what the enterprise or the farmer owes to third parties for example; capital, suppliers etc.

3.3.5 The income booklet

In the context of agriculture and farmer's perception within PCP-ACEFA, an income booklet is a management tool that presents the income from sales of farm products, loans from the bank and other sources. This book is not complicated as much is not needed and can be used even by farmers with the least level of education. Despite its simple nature, some farmers still prefer to keep their records in their memory especially those who are not operating on a large scale.

3.3.6 The expenditure booklet

This is a book in which all the expenses are registered. It has a similar role as the income booklet with the only difference being that it registers expenses (purchases, payment of labour and payment of salary) while the income booklet registers income.

3.3.7 Cash flow statement

In the context of this work, cash flow statement is a table that shows the entry of cash, the exit of

cash and cash balance of a producer. For a producer to use this tool effectively, he must be produced on a large scale and for commercial purposes. Thus, a farmer who produces on a small piece of land for a family basis should not be expected to present a cash flow statement.

3.3.8 The net income statement

The net income statement is a document that presents what the farmer realizes in his/her activities. Here, the farmer is comparing what he forecasted to spend and what he spent.

3.4 Level of Adoption of Each Tool

This part analyzes the level of adoption of four management tools: Gross Margin, income statement, plan of action and balance sheet

3.4.1 Mechanisms of training

The co-management approach of PCP-ACEFA involved the use of management tools by farmers which appeared as a new concept to them. PCP-ACEFA then, developed mechanisms to orient and train farmers on how to adopt these management tools. These mechanisms take into account: the content of the farmers, the profile of the trainers and the duration of the training. The content of the training consists of introducing the tools to the farmers, and informing the farmers on the importance of the tools and on how to use the tools. The profile of the trainers here consists of the type and qualification of the counselors in charge of training the farmers. In this study we identify two types of counselors in charge of carrying out these tasks i.e., the farm management counselor (34.12%) and the producer group counselor (76.87%). For duration of training the farmers on each tool, we realized that, those who were trained on the calculation of gross margin took a period of 3 to 6 months, income statement 1 to 3 months, plan of action took less than one month and balance sheet was 3 to 6 months. The difference in the duration of training for each tool depended on the understanding of the farmers. Table 7 shows the level of adoption of four main management tools provided by PCP-ACEFA to farmers in the Menoua division.

From the Table 7, out of the 60 farmers interviewed in this study, 35 were trained on Gross Margin, but only 22 affirmed making use of this tool. Thus, the gross margin is being adopted at 62.9%. On the other hand, the income statement is being adopted at 77.14%. For management tools such as plan of action and

balance sheet, all the farmers who were trained on these tools affirmed making use of them in their day-to-day activities. Thus, giving 100% adoption for both management tools.

3.5 Factors Influencing the Adoption of Management tools in Menoua Division

3.5.1 The social factors

3.5.1.1 Level of education

Education of the farmer has been assumed to influence farmers' decision to adopt a new technology. Education plays an important role in the process of adopting management tools. Results show that most of the trained farmers have been to school of which 73.3% have a secondary education level, 15% with primary education level and 8.3% with higher education level. Only 3.3% have not been to school. The high representation of scholars in this study could be explained by the fact that the use of management tools requires farmers to at least know how to read and write so as to be able to fill the information that is required in each of the tools. This result goes in line with those of [14] who reveal that education level of a farmer increases his ability to obtain, process and use information relevant to the adoption of a new technology. Education influences respondent's attitudes and thoughts making them more open, and rational to analyze the benefits of the new technology.

3.5.1.2 Gender

Gender affects technology adoption since the head of the household is the primary decision maker and, in this study, men have more access to and control over important production resources than women due to socio-cultural values and norms. Focusing on the adoption of management tools by individual farmers, results show that these tools are mostly provided to men who are generally heads of family agro-pastoral farms. Out of the 65% of men surveyed, 41, 67% have a very good mastery of these management tools as compared to 21, 67% of women surveyed. This relatively high proportion of men who adopt management tools can be explained by the fact that in Menoua division, men are already familiar with some managing tools as they have long been engaged in cash crop exploitations such as coffee and cocoa which needed managing techniques whereas women have mostly been engaged in subsistence agriculture which seldomly are been managed.

Table 7. Level of adoption of management tools diffused by PCP-ACEFA

Management tools	Trained	Adopted	% Adoption
Gross Margin	35	22	62.9%
Income statement	35	27	77.14%
Plan of action	22	22	100%
Balance sheet	25	25	100%

Table 8. Difficulties faced by farmers in adopting the management tools

No	Difficulties	Frequency	Percentage
1	Lack of finance.	40	33,3
2	The tools are numerous.	15	12,5
3	Implementation difficulties	25	20,8
4	Strong technical language	05	4,2
5	Lack of time to fill books	05	4,2
6	Limited sheets of papers in the books.	10	8,3
7	Lack of training on how to use the tools.	20	16,7
Total		120	100

Table 9. Strategies on how to better adopt the tools

Strategies	Frequency	Percentage
The number of tools should be reduced to one if possible	10	12,5
PCP-ACEFA should simplify the tools to the least level that everyone can use	20	25
PCP-ACEFA should help farmers increase their farm size by financing their activities.	40	50
Regular monitoring of farmers activities by counselors	05	6,25
Training on the use of management tools.	05	6,25
Total	80	100

3.5.2 The economic factors

3.5.2.1 Income level

Results show that income level tends to affect the adoption of management tools provided by PCP-ACEFA. Farmers with high income level are likely to adopt an innovation which in this case is management tools. Also, farmers who invest much in their activities will likely always evaluate to know what the activity has brought in as income, what he spent to realize the given income, what he has had as profits and also to know its patrimonial position in the business. With modernization in agriculture, some management tools are provided in software and cannot function without a computer. In this case, only those farmers with high-income level will easily adopt the use of these tools. For example, PCP-ACEFA has introduced some new tools to farmers that requires the use of computers and all the farmers have been asked to purchase computers so as to facilitate the training and the adoption of the tool.

3.5.2.2 Farm size

Farm size plays a critical role in adoption process of new technology. According to [15], farm size generally has an effect on the adoption of innovations, farmers with larger farms are more willing to adopt new technologies, spend more time and money in the pursuit of agricultural knowledge. In this study, the effect of farm size on the adoption of management tools seems to be positive as results show that most farmers who adopted and implemented the use of management tools were those with at least three hectares of land. This is associated with the fact that production on large scale is mostly for commercialization purposes and thus farmers engaged in these scales of production will likely adopt management tools since they are essential to assist in decision making.

3.5.2.3 Relative advantage of management tools

A key determinant of the adoption of new technologies is the relative advantage they

confer to the farmer from adoption, inclusive of all costs of using the new technology. This encourages farmers to adopt agricultural technologies regardless of their formal education level [16]. In this study, management tools provided to the farmers by PCP-ACEFA are free of charge. This gives management tools, a certain advantage over relative innovations (new technologies) for which farmers, for their acquisition have to spend something in exchange (generally money).

3.5.2.4 Access to credit

Access to credit is an important factor that determines the adoption of an innovation. This is because, innovation goes with profitability and the farmer needs money to acquire and experiment with new technologies. Access to credit will influence the adoption of management tools in that, farmers need finances to expand their farm sizes and engage in large scale production. This situation tends to facilitate the adoption of management tools that help in decision making. From field observations, 60% of the farmers produce on a small-scale base and thus find no need for using management tools.

3.5.3 The institutional factors

These are factors that determines how the participation of farmers in community-based work influences their ability to adopt agricultural management tools.

3.5.3.1 Social group

Belonging to a social group enhances social capital allowing trust, idea and information exchange. Farmers within a social group learn from each other the benefits and usage of a new technology. Social networks effects are important for individual decisions and in a particular context of agricultural innovations, where farmers share information and learn from each other. From analysis, 58, 33% of farmers who belong to a group adopted the management tools provided by PCP-ACEFA. These results help prove that belonging to a group does not necessarily imply adoption. This could be a result of many problems such as: lack of finances to make use of the tools, conflicts within group members and low level of productivity of farms.

3.5.3.2 Acquisition of information about a new technology

This is another institutional factor that determines the adoption of technology. It enables farmers to

learn about the existence as well as the effective use of technology and this facilitates its adoption. Farmers will only adopt the technology they are aware of or have heard about it. Out of 60 individual farmers interviewed in this study, just 25 of them were really given advice on management by the counselors. This gives them a high probability of adopting more than the other farmers.

3.5.3.3 Access to extension agents

Farmers are usually informed about the existence as well as the effective use and benefit of a new technology through extension agents. Extension agents act as a link between the innovators (researchers) of a given technology and the users of the technology. In this study, PCP-ACEFA counselors act as a link between the project staff promoting management tools and the farmers within the program. The counselors of PCP-ACEFA always provide information to the farmers be it on management tools, new chemicals or on new varieties or improved seed.

3.6 Difficulties Faced by Farmers in Adopting and Implementing the use of Management Tools Provided by PCP-ACEFA

Table 8 presents the difficulties faced by farmers in adopting management tools.

Results show that 33, 33% of the farmers faced difficulties in adopting the use of management tools due to a lack of finance to expand their exploitation. Apart from the lack of finance, farmers also relate that the management tools on which they are been trained are too many for them to master. Also, 16, 7% of farmers complain of a lack of adequate draining by PCP-ACEFAs' counselors on the use of these management tools. Thus, results demonstrate the fact that farmer's needs are more oriented toward financial assistance.

3.7 Strategies on how to Better Adopt the Tools

To overcome the above difficulties mentioned in Table 8, farmers involved in the study have proposed some solutions to handle these problems. Table 9 presents the strategies proposed by the farmers to ameliorate the adoption of management tools.

From the results above, majority of farmers (50%) suggested that PCP-ACEFA should also engage in financing individual farmers and not just groups. This support will help invest in their activities to increase their farm size and thus stimulate the need to use management tools to ease decision making. Apart from financial support, farmers also complain about the difficulties associated with understanding and using the proposed management tools. Also, PCP-ACEFA must emphasize on the monitoring of farmers to ensure effective use of diffused management tools.

4. CONCLUSION

This study seeks to examine the challenges of adoption of management tools provided by PCP-ACEFA to farmers. Results show that PCP-ACEFA promote four main management tools to farmers in the Menoua division: income statement, gross margin, plan of action and balance sheet. Two types of training mechanisms (individual conversation and group seminar) are being used by PCP-ACEFA's counselors for training farmers according to their status (individual farmers of CIGs). Access training is free

The level of adoption of the diffused management tools that PCP-ACEFA propose to farmers in the Menoua division varies from one another. From data analysis, income statements and gross margin are highly adopted (77.14% and 62.9% respectively) and implemented by farmers in the running of their farm enterprises. Whereas the plan action and balance sheet have relatively low levels of adoption.

The adoption of management tools that PCP-ACEFA proposes to farmers are affected by several factors which can be classified into social, economic and institutional. Results show that management tools are mostly adopted by men (41.67%) and scholars (more than 73.3%). Also, economic factors such as income level and farm size tend to have a positive influence on the adoption level of these management tools. In this concern, the more income farmers generate on large scale farms, the higher their propensity to adopt management tools. In line with economic factors, institutional factors such as social group, access to agricultural information and extension agent also tend to have positive influences on the level of adoption of the diffused management tools that PCP-ACEFA propose to farmers in the Menoua division. That is, belonging to a social

group, accessing to agricultural information and extension agents increases the propensity of the farmer to adopt management tools.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Economic commission for Africa (ECA). Extension and advisory services rural extension services for agricultural transformation: Background Technical Paper. Senegal; 2015.
2. Ministry of agriculture and rural development (MINADER). Commemoration of the international year of family farming (IAAF), theme: What public policy supports family farming to meet the challenges of second generation agriculture in Cameroon? Yaoundé, MINADER; 2015.
3. World Bank. ICT in agriculture: Connecting Smallholders to Knowledge, Networks, and Institutions. Updated Edition, Washington, DC; 2017.
4. Azinwie Asongwe G, Yerima BPK and Tening AS.. Vegetable production and livelihood of farmers in Bamenda municipality. Cameroon; Int. J. Curr. Microbiol. Appl. Sc.. 3(12): 682-700. 2014.
5. Nwafor C, Ogundeji, A, & Nwafor, Ifeoma. Review of Agricultural Extension and Advisory Services in sub-Saharan Africa. Journal of Agribusiness and Rural Development. 2021.
6. Tayang W, Lalruatfeli, PC, Hnialum, M & Sahoo, B. Agricultural extension and advisory services: enhancing access to knowledge and technologies for sustainable agriculture. Advances In Agronomy Vol. 2; 2023.
7. Ndassi M, Fongang Fouepe GH, Yemmafouo A. and Melachio Nguedia M. Agricultural services provided by non-governmental organizations (NGOs) and state programs-projects to producers in menoua division, West Region of Cameroon. International Journal of Agriculture Innovations and Research.;10(6):ISSN (Online) 2319-1473. 2022.
8. Djamen P, Havard M, Wey J, Lefèvre D & Djomo S. Farm advisory services, a promising approach put to the test of

- reality: initial lessons from a change of scale experiment in northern Cameroon. Innovation and Sustainable Development in Agriculture and Food. ISDA 2010, Montpellier 28th-30th June. 2010.
9. Temple L, Mathe S, Machicou Ndzesop N, Fongang G, Ndoumbe Nkeng M. National research and innovation system in Africa: the case of Cameroon. Innovations, art14_I-to art14_XXVI; 2017.
 10. Faure GO. Farming in a changing environment: innovation, decision support and support processes. Summary of the work to obtain the Accreditation to Direct Research, University of Bourgogne, June 2007.
 11. Amungwa FA. Appraisal of innovations in agricultural extension and advisory services in Cameroon. J Adv Plant Sci 1: 206. 2018.
 12. Gadzirayi C, Mafuse N, Zivenge E, Veremu R, Sansole W. Agricultural extension needs of frontline extension workers under a pluralistic advisory system: Case of zimbabwe agricultural growth programme. International Journal of Agricultural Science, Research and Technology in Extension and Education Systems (IJASRT in EESs);10(4): 165-172. 2020.
 13. Nfor C. Contribution of advisory services to family agro-pastoral farm enterprises and common initiative groups in Mbam and Inoubou division, center region of Cameroon. A memoir presented in partial fulfillment of the requirements for the award of the degree 'Agronomist Engineer'. Dschang.University of Dschang; 2016.
 14. Mignouna D, Manyong V, Rusike J, Mutabazi K, Senkondo E. Determinants of adopting imazapyr-resistant maize technologies and its impact on household income in Western Kenya; AgBioForum. 14. 158-163. 2011.
 15. Hu Y, Li B, Zhang Z, & Wang, J. Farm size and agricultural technology progress: Evidence from China. *Journal of Rural Studies*, 93, 417-429. 2022.
 16. Mwangi M, Mwaniki S, Ngesa F. To Determine the Influence of Farmer's Educational Level on Adoption of Agricultural Water Management Practices in Rongai Sub-county, Nakuru County, Kenya. Asian Journal of Agricultural Extension, Economics & Sociology. 42. 11-19. 10.9734/ajaees/2024/v42i42391. 2024.

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