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The role of agricultural extension service on agricultural development: The case of Walayta Sodo Zuria District, Ethiopia

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Abstract

Most of agricultural producers in the study area still use the traditional approach in crop production with technological change very slow. In view of this, Agricultural Extension Services have been adopted by the government as a major agricultural transformation strategy. Nevertheless, the expected impact from the intervention has not been realized due to inadequate funding, lack of logistics, insufficient field Staffs and non-participatory modes of technology transfer. This is the problem which the study investigated taking in the study District as a case study. A case study method was adopted in which Wolayta Sodo Zuria Woreda (District) was chosen to facilitate the ease of data collection. Respondents were selected through a simple random sampling technique to gather data from the farmers using structured questionnaires from a total of 50 respondents of which 25 were extension service users and 25 were non-users purposively. It was also revealed that the complete survey of the study was administered on 50 respondents for the major data collection through questionnaire. To strengthen the study personal observation was also employed and then the respondents were selected by using both purposive and simple random sampling techniques from the list available at each local office. In addition to this there were 10 Development Agents, 6 woreda agriculture office experts and 5 local administrative councils. The data analysis method was qualitative approach. Recommendations were made to help provide solutions to the challenges of extension services provision in the country. Some of these include disseminating technology to farmers in manageable groups of a maximum of twenty, increasing logistical and motivating.

Keywords: Agriculture, extension services, development, wolayta sodo zuria district, Ethiopia

1. Introduction

The major purpose of this study is to assess the role and impact of agricultural extension service and extension package in solving the major agricultural development problems of the study area. It will also done to find out factors which affect the implementation of extension of package in the area. The data for study will be obtained through interviews, questionnaire, and discussion with local people and field observation by the researcher. The result of the study was expected to show the production of crops (Maize and sweet potato) using extension package farming system as compared to traditional method of farming. Though the MOA office of the woreda showed that the use of new agricultural innovations had advantage over traditional method of farming, the analysis reached based on the response of the extension package user peasants is that the use of the new agriculture innovations leads them to crisis and bankruptcy. For the problems, which will identified in the study, the researcher was given some recommendations, which were important and attainable by the ministry of agriculture and to a lesser extent by the farmers of the woreda.

2. Review of Literature

2.1 Objective of agricultural extension service and package

Event though, the quality, method of implementation and effective use of extension service is different in different

countries of the world, the objective is similar. The main objective of agricultural extension service and extension package is to increase crop production, to enable peasants' food self-sufficiency, ensure food security, and eradicate poverty. However, the economic activity especially in the study area is still subsistence (FPR/E, 2000:22) ^[19].

2.2 Strong sides of agriculture extension service and package

By the research and experiment projects of agricultural extension package good seed varieties and good quality crops are invented. Dr. Norman, president of sasakkawa Africa association and noble launcher of the green revolution in Japan, reported that among the lot cereal crops such as maize, wheat, rice, barely etc. maize is the leading food grain and resistant to insects in the majority of Africa. Indeed, by now a special type of maize called quality protein maize (QPM) is found in Africa including Ethiopia (SG-2009:9). In the study District the common type of crops area maize, Sorghum, sugar beet and potato. Therefore, the strong side of agricultural extension in the study area is the provision of fertilizer, selected seed, credit services and advices.

2.3 Weak sides of agriculture extension service and package

In much of Ethiopian country side areas a lack of dealers in fertilizers, improved seeds, and other critical farm inputs is

the major barrier to sustained agricultural advances (SG-2000:11). Lack of continuous research on soil type, climate of areas before implemented extension package is also the weak side of agricultural extension policies. In addition to these problems, the time of return back credits of farmers on fixed months when the market price cheap is also the weak side of agricultural extension program in Ethiopia in general and in the study area in particular.

2.4 Components of agricultural extension service and extension package

As the objective of agricultural extension is to increase crop production then it consists much more decisive components. The most components of agricultural extension service and extension package includes; area of land, modern technology, machinery (if the scale is commercial farms), advisory service, method of farming, improved seed, infrastructure (road and irrigation), credit and loan service and market accessibility to sale farm puts. (MOA, 1995:8).

2.5 Price of modern agricultural inputs in the study area

Price of modern agricultural farm inputs refers to the price of fertilizer, improved seed varieties, weed killer and pesticide chemicals. Price of farm inputs is the main factor which affects the implementation of agricultural extension service in the study area. In the case of sampled study area the price of improved seed for the years 2007, 2008 and 2009 was almost the same 576 birr/kuntal for each year. Whereas the price of crop out puts for the same years was 90, 110 and 120 birr/kuntal respectively. This date shows that the price of farm inputs is very high but the price for out puts for sale is extremely low. This indicates that there is a wide gap between the two prices that became one of the many obstacles to implement extension service program in the study area.

2.6. Challenges of agricultural extension service and package

The major challenges of current agricultural extension service delivery in Ethiopia and the study area are: absence of the national framework of agricultural extension policy that has been developed in a participatory manner, top down, unclear extension approach lack of suitable adaptation of technology packages to local conditions, frequent restructuring of the extension institutions, high turnover of staff-limitation in the quality of field and technical staff, inadequate budget for the implementation of the extension system, limited private sector involvement in service delivery, administrators unnecessary interferences on technical matters, lack of monitoring and evaluation of the extension system, weak system of agricultural inputs supply and distribution (seeds, fertilized, credit, subsidies etc.) systems, involvement of experts on duties other than extension responsibility, weak market linkage and information system (IFPRI, 2009; Belay *et al.* and Belay, 2002; Birhanu *et al.* 2016; Tilahun, 2008 and Belay, 2014). Moreover according to Mengistie and Belete (2015) current extension service challenge in Ethiopia has top-down approach, non-participatory, supply driven not demand driven, gender bias extension services, lack of staff morale, capacity and capability of staff, development agents involvement in non-extension activates, lack of qualified

extension supervisors, insufficient appropriate and relevant technology options both for on crops and livestock sector and inadequate public funding. According to Belay (2014) the challenges are categorized as technical, financial, institutional and administrative.

3. Materials and research methods

3.1 Location, topography and climate of the study area

Soddo zuria District (Woreda) is one of rural Woreda administration in Wolaita zone, Southern Nations Nationalities Peoples' Region, Ethiopia. The study District is located at a distance of 390 km (to the south) from Addis Ababa.

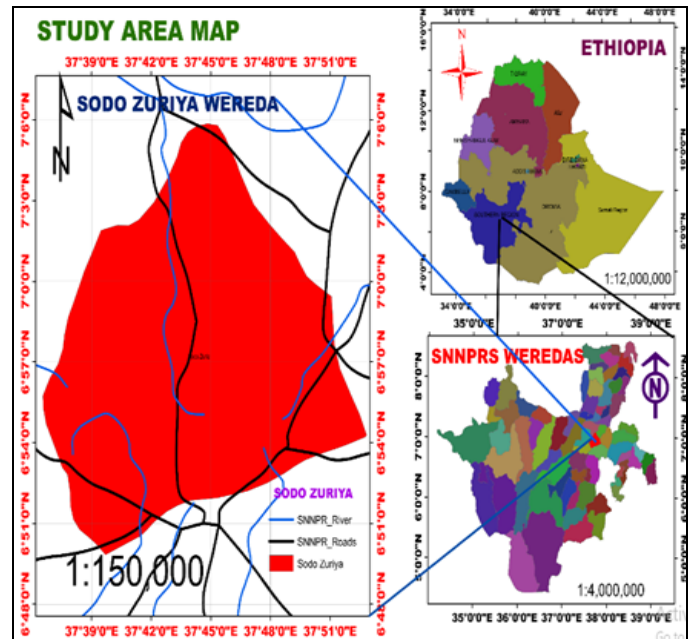


Fig 1: map of the study area (Sodo Zuria Woreda)

The Woreda has 31 rural Kebele administrative. The total land coverage of the woreda was 40805 hectares, of which 12269 Ha (35.75%) is allocated for crop production, 9067 Ha (19%) for fallow land while 12019 Ha (30.61%) for grazing land and 7450 Ha (15.02%) for forest land (WLUM 2002). The agro-ecology of the Woreda is dominated by midland that covers about 87% of the total area, and the remaining 13% is highland with rugged mountains and slopes (WFEDO 2005). Damota Mountain is the highest peak (over 2800 M.A.S.L) in the Woreda and is considered as the main water source to the surrounding communities. All the highland Kebeles are located around the mountain. The altitude of the Woreda falls in the range of 1500 to 3200 M.A.S.L. The average annual rainfall of the Woreda is 1200 mm per annum, while the daily temperature varies from 150C to 300C. Soil types on the area are mostly clay and clay loam.

3.2 Research design

The main research approach adopted for the study is qualitative research Design. This research design is a nonexperimental approach concerned with the understanding of social phenomenon from the actor's perspective through participation and qualitative analysis (Cohen *et al.*, 2007). However, a case study research method was used. This method was

adopted because it guided the investigator to observe a group of farmers at a single point in time, subsequent to the intervention of agricultural extension services that produced change in farm yields and living standards. According to Kumekpor (2002), the case study brings the investigator and the case being investigated into direct contact. This leads to a better conversance with the circumstances of a case and helps to assess the reactions of a group to questions and issues raised in the course of the investigation. The case study is an explanatory method that enabled the investigator to ask and seek answers to the “how” and “why” questions associated with the research

3.3 Data sources

Both primary and secondary data sources were used for the study. The primary data were gathered through the use of questionnaires, interviews and direct observation techniques. The secondary data have been collected from various sources, such as document, newspapers, Journals and the District’s agricultural office reports.

3.4 Target population, Sampling sizes and sampling technique

Target population refers to those populations from which the sample sizes were drawn. Thus, the target population of the study District were about 3000 farmers of which 1000 farmers were Extension service user and 2000 farmers were Non-Extension service users. Finally, the sample size was

determined based on the formula proposed by Glenn (1992) as cited by Joas (2015).

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

Where

n = sample size
 N = Total target population
 e = error limit (0.14) with confidence level (86%)

$$n = \frac{3000}{1+3000(0.14)^2}$$

$$n = \frac{3000}{1+58.8} = 50$$

Therefore, the complete survey of the study was administered on 50 respondents for the major data collection through questionnaire. To strengthen the study personal observation was also employed and then the respondents were selected by using both purposive and simple random sampling techniques from the list available at each local office. In addition to this there were 10 Development Agents, 6 woreda agriculture office experts and 5 local administrative councils

Table 1: Sample sizes and sampling techniques

Ro. No	Background of respondents	Total population	Sample size	Sampling technique
1	Extension service user farmers	1000	25	Random sampling
2	Non-Extension service user farmers	2000	25	Random sampling
	Total	3000	50	

3.5 Data collection tools

This study was mainly employed questionnaires, interview (to generate in-depth information from interviewees), focus group discussion and document analysis, document and reports was employed to collect necessary information regarding the study issues.

3.6. Data analysis approach

Data were processed and analyzed based on the understanding of the key concepts of the study, namely; farmers’ their s

ocioeconomic characteristics, nature of the extension services, credit, institutional and arrangements, mode of extension services dissemination and the extension services provision. The data collected were processed through editing, coding and tabulation. Analysis of the data was done mainly using quantitative techniques. Tables, charts, percentages and graphs were used.

4. Results and Discussion

Table 2: No of plots and hectare sizes covered by extension service in the study District (2013-2017).

Year	Type of improved seed	No of plots	Size in hectare
2013	Maize	844	422
	potatoes	2	0.5
2014	Maize	615	153.75
	potatoes	5	1.25
2015	Maize	862	431
	potatoes	11	2.75
2016	Maize	392	196
2017	Maize	710	355

Source: Sodo-Zuria Woreda (District) agricultural office (2017)

As we can see from table2, some crop plants are grown dominantly in the woreda and in the study area in addition to Enset and cattle production. Maize is the dominant cereal crop in the study area followed by potatoes. The size of plot

is different for each crops in the area. Based on Wolayta zone Agricultural office (WWAO) source, one plot for sweet potato means 0.5 hectare, and one plot for maize means 422 hectare. So, from the table2, concept we can

conclude that 844 plot for maize means 844 x 0.5=422 hectare was covered by maize in the year 2013, and the same calculation works for the rest plot sizes. From table2,

it can be concluded that farmers cultivate improved seeds of Maize than other types of crops.

Table 3: Price of modern, inputs (fertilizers Improved seed) (Q/Birr/years) (2015-2017)

Year	Price of fertilizers		Price of improved seed	Price of crop produced
	Dap	Urea	Maize	Maize
2015	250	250	576	55
2016	250	250	576	110
2017	302	302	576	80

Source: SZWAO (compiled from field survey 2019).

Price of crops refers to the price of maize output in the study area. The price of crops was taken based on the market price of crops in November and December months for each year. This was because of the fact that by these months peasants are required to sell their crops and pay their loan that they borrowed from the Ministry of Agriculture (MOA) for agricultural inputs. According to WZAO annual report (2017), there are two types of improved seed maizes. Before 2015 the type of improved seed maize used was called CG-41-41. It was cheaper to buy and expensive to sell but it easily attacks by pest. The other type of improved seed maize which is already on use nowadays is called BH-660.

This type of improved maize seed is drought, temperature and pest resistant and gives high yield.

Regarding the two types of improved seeds of maize the response of the sampled farmers is quite different from that of WZAO experts. That is, among the 25 sampled extension package user peasants of the study area, twenty farmers (80 percent) said that the former improved seed maize called CG-41-41 was better than the present one called BH-660 to them. This is because (According to them) CG-41-41 needs short rain fall season to harvest whereas BH-660 needs long rain fall season and also this is risky when the rainfall is insufficient.

Table 4: Amount of cultivated land, fertilizer used (Qt), improved seed used (Qt), production of crop per/h/Q by extension service in the study District (2015-2017).

Year	Cultivated land (he)	Fertilizer used (Qt)		Improved seed used (Qt)	Production of crop output h/Qt
		Dap	Urea	Maize	Maize
2015	431	430	395	87.5	5028
2016	196	200	215	37.5	9000
2017	355	365	370	75	6000

Source: SZ Woreda Agricultural office 2017.

Table 5: estimated cultivated land, total crop production (Qt), net gain output and net gain output per hectare of land by traditional farming system in the woreda.

Year	Cultivated land (ha)	Total crop production output (Qt)	Net gain output	Net gain output per hectare of land
		Maize		
2015	5342.5	2000255	19980095	374
2016	10749.25	5338400	53423772	497
2017	7734.5	4100000	4099285	530
Total				1401

Source: Field survey, 2019

- Net gain output= total crop production output minus total price of inputs
- Net gain output p/he/land= net gain output divided by cultivated land
- Total= sum of all net gain output/hectare of land.
- Average= sum of all net gain output divided by number of years.

Accordingly, in 2015 from the total of 431 hectare of cultivated land by extension package, the total net gain output was 22225 birr. When we calculate the ratio of cultivated land and the money gained it was 1:52. This means from a hectare of land 52 birr was gained and in the year 2015, from hectare of land 4409 birr was gained and then in the year 2016 from a Hecate of land 604 birr was gained. On the other hand in the year 2015 form the total of 5342.5 hectare of cultivated land by traditional farming system, the total net gain output was 1998095 birr. When we calculate the ration of cultivated land and the money gained it was 1:374. This means from a hectare of land by traditional system 374 birr was gained. Where as in the

same year by extension package only 53 birr was gained. So, in this year traditional farming system was good and profitable. In the years 2015 and 2016, 497 and 530 birr was gained from one hectare respectively. In these years using package farming system was very profitable as compared to the traditional farming system because there was a difference of 3912 birr in 2015 and 74 birr in 2016. Form this data we can conclude that using extension package is more profitable on agricultural development than using traditional farming system and also this indicates that the role of extension service and extension package on agriculture is more significant.

Table 6: Number of times peasants eat food per day before and after the engagement in the package

Before/after	No of times farmers eat per day		
	2 times	3 times	4 times
Before engaged in the package	0	11	0
After engaged in the package	0	14	0
Total	0	25	0

Source: field survey result, 2019.

As we can observe from table 6, that there is no major difference between the numbers of times farmers eat food before and after the engagement in the extension service package. This data shows that the extension package program in the study area does not brought any change on the improvement of the farmers in that given production years. But this does not mean that extension package has not role in production.

Table 7: Means of production

Means of cultivation	No of respondent	%
Oxen	9	36%
Hoe	15	60%
Tractor	1	4%
Total	25	100%

Source: field survey result, 2019.

As we can see from table 7, there were 9 (36%) respondent farmers who plough their farmlands by oxen. There was also 15 (60%) farmer who ploughs their farmland-using hoe in the form of labour force cooperation. There was only 1 (4%) respondent who uses Tractor in the study area. According to the response of this 1 farmer, he has got the tractor from NGOs in the form of rent to pay 80 birr per hour. However, the rest large portion 60% of the total sampled farmers use Hoe to plough their farmlands in a traditional way. This condition indicates that unavailability of oxen to all respondents and other modern means of production could influence the implementation of agricultural extension service and even could reduce the amount of production.

Table 8: Status and livelihood conditions of the peasants before and after using the extension service package in the study area.

Status and their livelihood	No of extension user peasants	%
Better before using the package	0	0%
Better after using the package	17	68%
The same before and after using the package	8	32%
Total	25	100%

Source: field survey result, 2019.

Table7, indicates that the 17 (68%) sampled package user peasants said that there was no quality change in their livelihood after participation in the extension package. About 32% of them said that the status and livelihood condition was better for than after their engagement in the package. None of them said that the quality and status of life was the same before and after using the extension service. Therefore, we can conclude that the quality and status of life of agricultural extension user farmers in the study District was improved after they use extension services.

4.1 Summary

Based on the interview results (2019) the researcher identified that lack of education on the part of peasants is one of the factors that affect the expansion of agricultural extension service in the study area. The organizational arrangement of extension peasant association is found in association with the agricultural development office of the woreda. It does not have its own separate department. Bureaucracy is another factor which hindered the implementation of extension service in the study woreda. There is loose coordination between different branches of agricultural extension. In association with credit, the difficult problem in the study District as well as the peasant association of nearby kebeles is the data to pay back the loan. According to them, there is always paradox concerning credit service. At the beginning credit is provided for all peasants who had interest in participating in the package service. Nevertheless, the farmers are required

to pay back the loan as soon as when they harvest their crops in November and December months. However, in both mentioned months the price of crops reduced at least by tow folds in every year from the previous usual price. So, farmers are expected to sell their crop in cheap price and repay their debt and much of their income benefit of higher productivity may be lost and finally left without any profit. So, they stressed this problem.

Therefore, farmers of the study area did not view this as true credit service system rather they consider it as a crisis or bankruptcy to them. If they refused to repay their debt in November and December months, they would be forced by local soldiers at last without excuse, their properties including their oxen would be taken and sold ant the market by the administrators of the woreda in compensation for their debt.

5. Conclusion and recommendations

5.1 Conclusion

The study was conducted in Wolayta Zone-Sodo Zuria woreda (District). The objective of the study was to assess the significance and role of agricultural extension service on the agricultural development of Sodo Zuria woreda and to find out the factors which affect the implementation of extension package in the area. Since 1995, MOA introduced the new form of agricultural innovation through which information and technology diffused rapidly to the woreda and the number of participant farmers increased from year to year. The new agricultural innovation introduced to the

area were: fertilizers, improved seed varieties, pesticides, chemicals for weed controls and improving farming methods.

The result however shows that agricultural extension service had little role in solving the agricultural problems of the student area. In addition to the high price of the farm inputs and the low price of farm outputs, there are also other factors, which contributed for the low development of extension package in the woreda. These are:-

1. Condition of the credit service; the data of submission of farm inputs loan to farmers is short. During harvest season they are asked to sell their crops in extremely cheap price and repay their loan. This problem seriously affected their income and food shortage problem of the woreda and the study area.
2. Inappropriate content of package, similar package is being applied in all areas of the woreda without considering differences in soil type, climate and topography of the area and economic condition of peasants of the study area.
3. Poor economic condition of peasants is also another factor for the failure of the package in alleviating the food shortage of the area.
4. The absence of oxen in the study area also negatively affected the implementation of the extension package even though it is not the determinant factor.

5.2 Recommendation

According to the objectives intended by MOA, the main purpose of introducing agricultural extension package to the area was to increase the production of crops and thereby to improve the food problem and the living condition of the peasants in the study area. It is clear that the use of agricultural extension package farming system increases production. However, even though the production of crops has increased as compared to traditional methods of farming, due to high price of farm inputs and other factors, the return from farm inputs could not improve the living condition of peasants in the study area. Therefore, to improve the agricultural problems of the woreda (study area) the concerned bodies should give more attention to the following factors.

1. The government should reduce the price of new agricultural farm inputs. In addition, the agricultural development office of the woreda should encourage peasants to use natural manures like animal dung and the like.
2. The currently undergoing extension package is similar in all areas of the woreda as well as the country (study area) without considering the differences in climate, soil type and topography. Therefore, before implementing the package MOA should allocate researchers to the area to conduct of research about the different elements of the area such as soil type, climate etc. to know the type of extension package that suits the area.
3. The date at which submission of farm inputs loan to farmers has to be extended at least by two or three months after harvest until the market price of crops increase somehow.
4. In addition to the above suggestions, the agricultural extension department needs to have its own separate department and offices from notional level up to the

woreda level in order to easily implement the program.

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7. Declaration

I, hereby declare that this article/review work entitled as *"The role of Agricultural Extension service on Agricultural Development: The case of Walayta sodo zuria District, Southern regional state, Ethiopia"* is my own original work and has not been published by/in any other local or international publishers, and that all sources of materials used for the study have been fully acknowledged.

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