

RESEARCH ARTICLE

EFFECTIVENESS OF PUBLIC AGRICULTURE EXTENSION SERVICE DELIVERY IN THE CONTEXT OF LOCAL MUNICIPALITIES, NEPAL

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ABSTRACT

Nepal's agriculture extension service delivery has been restructured in accordance with federal constitutional provisions. The constitutional provisions promise good governance and service delivery to the people, ensuring equal and easy access to services and to make public administration clean, competent, impartial, transparent, responsible, and participative. In this context, this research was design to study cereal growing farmers' perception on effectiveness of local public agriculture extension service in three municipalities of Rupandehi district selecting 120 respondents. Non-experimental survey research design was employed using Likert scale to measure perception of farmers. The overall effectiveness index of selected extension service was assessed using five parameters. Public extension services in the study site were viewed as being effective with relative index value of 0.71. Participation of farmer in decision making, involving them in planning was found to be satisfactory. Although, there appeared the issue of affordability of service with index value (0.51), timeliness (0.53), and long documentation procedure (0.54) with the obtained extension services. However, frequency of extension officials on visiting farmers field, farmers education and their household size have positive and significant impact on cereal production at study site. Moreover, there is need of restructuring service delivery in local level considering these underlying factors.

KEYWORDS

Cereal, Effectiveness, Participation, Productivity, Quality Service

1. INTRODUCTION

Agriculture is Nepal's most essential sector for sustaining prosperity and alleviating poverty. Agriculture's share of national GDP (Gross Domestic Product) in 2021 is 26.98 percent, with agriculture growth rate of 2.4 percent (Jha et al., 2021). Nepal's agricultural biodiversity is rich due to its high degree of variety in altitudinal, topographical, and temporal features. Cereal crops being the major AGDP (Agriculture GDP) contributor not only have the highest percentage of land and production, but they also have the highest level of interest among the agricultural stakeholders (Dahal et al., 2022). Likewise, Cereal accounts for 65 and 60 percent of total food energy and protein consumption in Nepal respectively (Acharya et al., 2018). Since the 1960s, the government has been investing in cereal production, and there has been a slow and steady increase in area, production, and yield. In this scenario, there is a scarcity of research studies that provide an overview of cereal crop growth and instability, and it is also necessary to identify the causes of production growth. The country's self-sufficiency in food grain production has not been achieved because its growth has not kept up with rising food demand (Gairhe et al., 2018).

Various periodic plans since 1950s have focused cereal as the prime crop to enhance productivity and overall contribution to national economy. Nepal has used a variety of extension tactics and initiatives to equip cereal farmers with relevant agricultural information and appropriate technologies that could boost production and household income. In Nepal, government-sponsored agricultural extension services have primarily dominated the system, with little representation and contribution from the private and nonprofit sectors (Ghimire et al., 2021). The Ministry of Agriculture and Cooperatives, as well as two of its technical divisions, the

Department of Agriculture (DoA) and the Department of Livestock Services (DLS), Tribhuvan University, and other universities and research institutions across the country represent the public sector for delivering services at different level.

Nepal's agriculture sector has been restructured in accordance with federal constitutional provisions. The new Constitution of Nepal was promulgated in 2015 to create a new mechanism of governance in the country. The constitutional provisions promise good governance and service delivery to the people, promising to ensure equal and easy access to services and to make public administration clean, competent, impartial, transparent, responsible, and participative (Acharya and Zafarullah, 2020). There is an increasing role of effective extension service delivery for overall prosperous of farmer and country's economy.

Effective public extension services are critical to a country's agricultural sustainability and food security. The effectiveness of extension services has been studied extensively around the world using a variety of methodologies. Most researchers have evaluated the effectiveness of extension services using methods as farmer trainings, farm/home visits, office calls, field demonstrations, field/farmers days, and workshops/open discussions (Somanje et al., 2021). Similarly, extension personnel's capacity to manage orientation, expose farmers to mass media, provide scientific orientation, and innovate farmers could be utilized to assess whether extension services are effective (Ramesh et al., 2019).

However, there have been certain challenges that has been encountered while delivering extension service at local level. Poor productivity, low

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competitiveness, and low profitability are among the challenges that Nepalese agriculture is facing (ADS, 2014). Lack of motivation among rural youth, outmigration, high production cost, limited access to land are some issues seen among service seekers (Dhital, 2017). Furthermore, service program primarily focused on larger or progressive farmer and inequality on subsidy distribution are some of the challenges that has been encountered on local level (Kyle and Resnick, 2016). Undoubtedly these issues will affect small and marginalized farmer who has less land holding. In addition, there is weak human resource capacity, lack of quality trained staff at local level (Devkota and Thapa, 2019).

Similarly, low service coverage at the ground level, negative perception of public extension, failure to adapt to increasing globalization, poor infrastructure, weak supply system, poor database, and lack of monitoring and evaluation are some of the issues that have been observed in service provider institution (Ghimire et al., 2021). Inconsistent institutional structure with poor communication mechanism, overlapping powers, authority and jurisdiction are some of the constraints seen under current restructuring of agriculture service (Devkota and Thapa, 2019). This shows a gap between policy intention and outcomes in the field of agricultural services delivered by the local government (Adhikari, 2021).

1.1 Objectives of the study

To assess the effectiveness of public agriculture extension service delivery in Rupandehi district, Nepal as the broad objective of the study. However, the specific objective includes:

- a) To investigate the extent of effectiveness of proposed extension service.

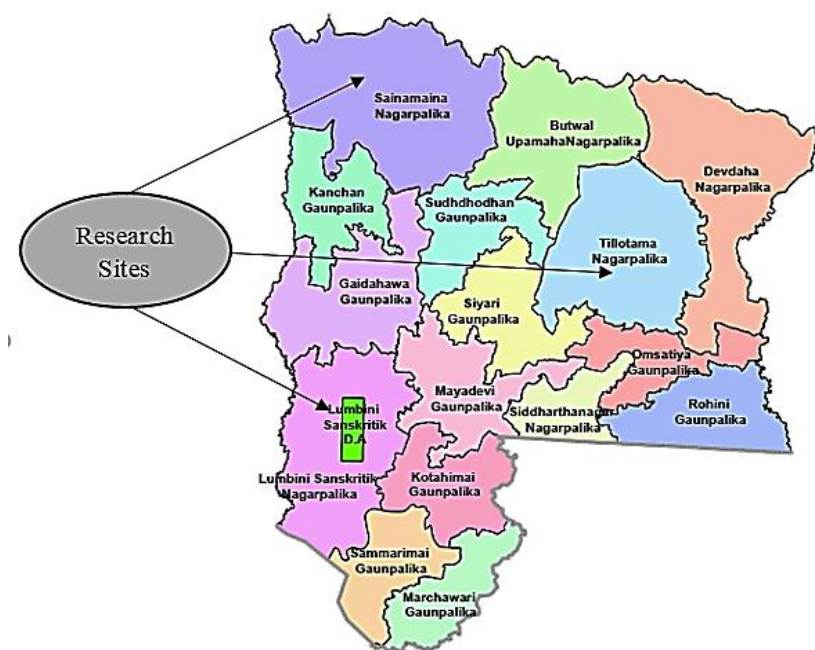


Figure 1: Rupandehi district as study area, 2022

2.2 Research Design and Method

Nonexperimental survey research design was used in the study. The survey research design examines a sample of a population to produce a quantitative description of trends, attitudes, or opinions. Quantitative method was used for research method. For perception study, Likert scale was employed.

2.3 Sampling Technique and Data Collection

The population or household receiving public extension service on the study site was found to be 170. Using Yamane formula for sample size calculation at 5% margin of error, the sample size would be 119.29 ~ 120 sample size. The survey was done in 2022.

2.4 Data Collection and Analysis

Before analysis, the data generated/collected from 120 farmers was tested for internal validity and reliability. The extent, influences, and

- b) To analyze socioeconomic factor associated with production of cereal.

1.2 Scope and Delimitation of The Study

Scope will be confined within the stakeholder of Rupandehi district in Lumbini province. This study is limited to personal information, social information, farming experiences, contact with extension, existing knowledge, training needs, and preferences of different aspects of demand and their perception of stakeholders towards policy and implementation practices of service delivery. The investigation had to be completed in a limited amount of time and with a constrained budget. This may limit the information sources and in-depth examination of the facts. The primary household survey was limited to a small number of carefully chosen families. It may not have been able to access the impact of the existing extension system, but it did provide a logical explanation of the data and parameters recorded.

2. MATERIALS AND METHODS

2.1 Description of Study Area

Sainamaina Municipality, Tilotamma Municipality, and Lumbini Cultural Municipality of Rupandehi district were purposively selected as a research site for the study. Later, the selection of farmer receiving service are randomly selected. So, the overall sampling method is multistage sampling. The existence of agriculture activities, easy physical accessibility of the municipality to researcher, availability of sufficient number of farmers and easy receptivity on present study are rationales behind the selection of study site.

effectiveness of extension service delivery were assessed using descriptive and inferential approaches. Extent of effectiveness was measured through relative indexing method. Each parameter contained variables which are to be rated in 5-point scale ranging from 0.2 to 1 (1 for highest rating) by the respondent from which effectiveness index was generated. Likewise, the range for defining effectiveness was done as: 0-0.2 - highly ineffective, 0.2-0.4- ineffective, 0.4-0.6- moderate, 0.6-0.8- effective, 0.8-1 - highly effective.

Relative Index = $\sum W / (A \times N)$ Where,

W= weight given to each item by respondent from 1 to 5 (1 for strongly disagree to 5 for Strongly agree), A= It is the highest weight (5 in 5-point Likert scale), N= Total number of respondents.

Likewise, Multiple linear regression was employed to assess relation among socioeconomic factors and production of cereal crop. Multiple variables in this study include ethnicity, gender, education, household size

and extension frequency. These socioeconomic determinants were computed with collinearity check for tolerance and variance inflation factor is performed. Regression model was used as follows:

$$Y = B_0 + B_1X_1 + B_2X_2 + B_3X_3 + B_4X_4 + B_5X_5$$

Where,

Dependent variable (Y) = Total production of cereal crop

Independent variables:

X₁ = Ethnicity, X₂ = Gender, X₃ = Year of schooling, X₄ = Household size, X₅ = Extension officials' frequency

B₀ is the constant and B₁, B₂, B₃, B₄, B₅, are the coefficients of the independent variables

3. RESULTS AND DISCUSSION

3.1 Socioeconomic Characteristics of The Respondent with Municipality

Table 1: Cross Tabulation of Socioeconomic Attributes						
Variables	Study Sites			Total	Chi square	
	Sainamaina Municipality	Lumbini Cultural Municipality	Tilotomma Municipality			
Sex						
	Male	28 (30.1)	34 (36.6)	31 (33.3)	93	
	Female	12 (44.4)	6(22.2)	9(33.3)	27	
					2.5	
Education						
	Illiterate	8(72.7)	2(18.2)	1(9.1)	11	
	Literate	5(45.5)	5(45.5)	1(9.1)	11	
	Primary	4(18.2)	13(59.1)	5(22.7)	22	
	Secondary	12(35.3)	11(32.4)	11(32.4)	34	
	Intermediate	7(26.9)	9(34.6)	10(38.5)	26	
	Bachelor and above	4(25.0)	0	12(75.0)	16	
Occupation						
	Farming	36(44.4)	28(34.6)	17(21.0)	81	
	Nonfarming	1	0	0	1	
	Both	3(7.9)	12(31.6)	23(60.5)	38	
					24.5**	
Ethnicity						
	Brahmin/ Chhetri	23(50.0)	0	23(50.0)	46	
	Janjati	9(52.9)	2(11.8)	6(35.3)	17	
	Madhesi	4(44.4)	0	5(55.6)	9	
	Dalit	3(7.9)	30(78.9)	5(13.2)	38	
	Muslim	1(10.0)	8(80.0)	1(10.0)	10	

Figures in parenthesis indicate percent

Source: Field survey, 2022

*Significant at 5 percent level of significance

**Significant at 1 percent level of significance

Table 1 represents the socioeconomic characteristics of the respondent. Various socioeconomic attributes were cross tabulated with studied site (Sainamaina municipality, Tilotamma municipality and Lumbini Cultural municipality). Sex, education, occupation and ethnicity was cross tabulated with respective municipality.

From the given table 1, it is found that most of the farmer on the study site were men 93 (77.5 %), while only 27 (22.5 %) were women. Likewise, percentage of men was found to be more in Lumbini cultural municipality as compared with other municipality i.e., 34.6 %. Also, it has lowest amount of women engagement in farming occupation. The distribution of resources between men and women is impacted by gender differences, which result from the socially constructed connection between the two, and this leads to several inequalities in development results. The fact that there are more men in the study site may be because they have more access to resources and technology.

On the education level of the household heads, about 22 (18.33%) respondents hadn't attended any adult literacy education. Whereas the majority of population has secondary level of education. Since a big proportion of the household heads had some formal education, it implies that most farmers would benefit from information and service delivered. On ethnicity, majority of portion (40 %) were covered by Dalit and Muslim community with significant chi-square value. The data obtained suggest that there is majority of population who are marginalized and disadvantage population on research site. These are the people who face prejudice and impediments of any kind (e.g., racial, ethnic, gender, sexual orientation, economic, cultural, and/or linguistic). Due to patriarchal institutions, sociocultural beliefs, and behaviors, there is widespread discrimination and social exclusion which makes people more vulnerable.

Linking with the theoretical assumption from the structural functionalism

approach or theory, people and institutions are intertwined; as a result, when one changes, either in the institutions or the people the other must adjust or make up for it to maintain balance. A macro theory or structural functionalism examines how each structure or institution in society interacts with one another. Education, healthcare, families, the legal system, the economy, and religion are a few social structures or institutions.

3.2 Information About Extension Program:

Farmer obtained information about extension program through varied source.

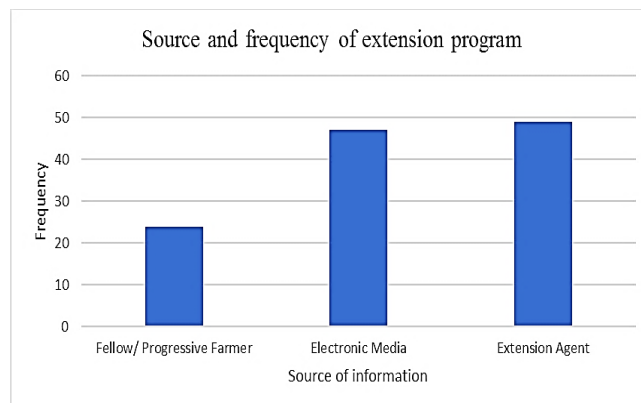


Figure 2: The farmers' source of information about extension program on the study site.

From Figure 2 showed, the majority of farmers get information about extension program through extension agent (40.8%) and electronic media (39.2%). Fellow or progressive farmer has comparatively less impact on source of information about extension program. Likewise, radio, television, and internet as electronic media have a lot of potential for influencing farmers and promoting agricultural growth.

3.3 Extent of Effectiveness

The study's primary concern was determining whether the proposed agriculture extension service was successful from the respondents' point of view in the study site. To do this, the effectiveness index was generated using the five parameters listed in table 3.

Table 2: Effectiveness Perceived by Respondent

Effectiveness	Strongly Agree (1)	Agree (0.8)	Neutral (0.6)	Dis-agree (0.4)	Strongly Disagree (0.2)	Weight	Index value	Effectiveness Index
Quality of Service							0.66	
Affordable	10	18	9	75	8	61.4	.51	
Timeliness	3	36	12	62	1	64	.53	
Fair And justly	9	66	20	24	1	83.6	.69	
Access	16	66	14	22	2	86.4	.72	
Relevancy	15	66	22	14	3	87.2	.73	
Efficient and organized	17	61	22	17	3	86.4	.72	
Availability	13	61	18	27	1	83.6	.69	
Accurate	21	49	20	28	2	83.8	.69	
Participation							.73	
Meaningful presence in meeting	26	59	16	18	1	90.2	.75	
Involved in making plan	20	61	14	19	6	86	.71	
Implementation	18	57	27	15	3	86.4	.72	
Decision making	26	51	24	15	4	88	.73	0.71
Managing conflict	28	53	14	22	3	88.2	.73	
Service appropriateness							.71	
Need based	18	64	21	15	2	88.2	.73	
Community based	16	69	21	14	0	89.4	.74	
Market based	27	58	25	9	1	92.2	.76	
Solving farm problem	17	65	26	11	1	89.2	.74	
Accountability and trust	12	70	21	17	0	87.4	.72	
Documentation procedure	16	31	7	33	33	64.8	.54	
Ease of understanding and support							.74	
Clear and understandable language	14	67	22	15	2	87.2	.72	
Technical term	13	69	25	13	0	88.4	.74	
Content	33	49	21	15	2	91.2	.76	
Decision making	20	64	19	16	1	89.2	.74	
Supportive	21	64	17	15	3	89	.74	
Friendly	22	63	16	17	2	89.2	.74	
Economic return							.68	
Production increment	12	69	27	10	2	87.8	.73	
Need and requirement	14	72	22	12	0	89.6	.75	
Farmer income	27	55	25	13	0	91.2	.76	
Family income	15	68	23	13	1	88.6	.74	
Family welfare support	19	59	31	10	1	89	.74	
Saving	22	69	9	9	0	86.2	.72	
Self-sufficient in food	14	76	18	12	0	90.4	.75	
Discontinuation of service	3	5	0	32	80	35.8	.29	

Quality of service has index value of 0.66, which has lowest index value as compared with other parameters discussed in the study site. The affordability rate, timeliness supply of agriculture service has low index value as compared to other parameters in quality of service. It suggests that farmers were not satisfied with the affordability and timeliness of provided extension materials and services. On the other hand, provided extension service was accessible and relevant to the farmers. Likewise,

participation in various extension service program has shown positive response from respondent. From the above-mentioned data, it is believed that there was meaningful and active engagement of farmers in various decision making, implementation and conflict management aspect of proposed program. Similarly, the farmers trusted that the technical terms used by extension officials, as well as their presented content and material, were easy to comprehend and supported.

Besides this, in terms of need-based, demand-based, and market-based responses, farmers were found to have accepted the extension services which contributed service as appropriate. Accountability and trust among farmers have been increased which created group cohesion and we-feeling in the farming community. However, farmers were not satisfied with the documentation procedure for acquiring extension services in the study site. Farmers have seen an increase in productivity with a general improvement in their farm and family income with the aid of extension programs. In the line with the findings, saving and self-sufficient in food has also positively been evaluated by farmers in the study site. It suggests that farmers are satisfied with the overall approach of extension service and are not willing to stop it on near future.

Despite some commonality in particular situations, the effectiveness of extension services varies from one region to another. Effectiveness in terms covers different region to be measured and parameters varies with scholars. A group researchers used similar indexing method to measure overall extent of effectiveness from proposed agriculture extension service (Baral et al., 2018). Farmers' ability to receive extension services is influenced by the performance of extension staff, their proposed program, quality of service, farmers centric approach etc. Similarly, farmers' evaluations of the effectiveness of extension services are significantly predicted by their access to these services (Oluwasusi and Akanni, 2014). Finding from supports that quality of extension services is crucial aspect for obtaining overall effectiveness (Zwane and Groenewald, 2014).

The guiding principles for effective extension services are demand-driven services, equity promotion, adaptability to changing needs, monitoring and evaluation, participatory approaches, prioritization of farmers' needs, development of social and human capital, strengthening of structural partnerships, facilitation of skill development and access to technology, better planning and decision-making, and sustainable income generation (DoA, 2005). Likewise, from the finding it is found that quality of service and active participation of farmers in extension services has increased production and income in South Africa (Maake and Antwi, 2022). Similarly, Extension service effectiveness was assessed by looking at how well extension staff manage orientation, expose farmers to the media. It shows that more competent the extension staff more effective would be the service (Ramesh et al., 2019)

3.4 Socioeconomic Characteristics Associated with Productivity

The primary goal of agriculture extension is to increase farmers' understanding of crops, cropping patterns and overall productivity (Feder et al., 1987). A group researchers discovered that socioeconomic characteristics have varying effects on the use of various farming practices ultimately effecting productivity (Kassie et al., 2013). So, to know the factor association with production, multiple linear regression test with socioeconomic characteristics was done.

Table 3: Results of Multiple Linear Regression Among Socioeconomic Factor with Production of Cereal				
Variables	Unstandardized Coefficient	Standardized Coefficient	t-value	Sig
Constant	-1247.542		-2.556	.012
Ethnicity	-4.972	-.006	-.079	.937
Gender	-164.236	-.054	-.794	.429
Education	256.807	.296	3.754	.000**
Household Size	85.609	.225	3.100	.002*
Extension officials' frequency	604.578	.405	5.231	.000**
R square	.511			
Adjusted R square	.489			

Source: Field survey, 2022

*Significant at 5 percent level of significance

**Significant at 1 percent level of significance

From the regression analysis, variables like ethnicity, gender, education, household size and extension officials' frequency were computed against production of cereal crop. Education, household size and extension

officials' frequency were statistically significant ($p > 0.05$) to production of cereal crop in the study site. Adjusted R square 0.489 implies that 48.9 percent variation in dependent variable that is production of cereal crop are explained by independent variables considered in the study. From the research output, it was found that there was a strong link between the frequency of extension and crop production. It shows that the production would increase if extension officials visited farmers' fields more frequently. But the availability of extension staff on local level is still challenging. Under the federal restructuring Nepal has devolved its power and authority to local body. For performing service delivery effective at local level, enough staff and infrastructure is most. For extension officials to execute services in a way that achieves results, it is necessary to invest in their human resources through training, development, and incentive.

Likewise, education (formal and informal) had positive relation with productivity too. The study concluded that education is crucial to raising agricultural productivity. Similarly, number of years in schooling has positive and significant impact on overall production of cereal crop. However, ethnicity and gender have insignificant value with production. Similar finding was obtained relating that there was positive relation of production with education and household size (Oduro-ofori and Anokye, 2014). Likewise, research found that there was a positive link between extension staff visit frequency and greenhouse technology performance, with an increase extension staff farm visit resulting in improved output performance (Omoro et al., 2015).

4. CONCLUSION

The study suggests that the majority of population are marginalized and disadvantaged population on research who are prone to vulnerability and crisis. They need a special package program to overcome these difficulties. In the same vein, there is gender difference in resource access at local level. Gender disparities, which result from the socially created relationship between men and women, have an impact on the distribution of resources between them. However, provided extension service in the study site was effective. But timeliness of input, affordability of material service, and documentation procedure for getting extension services was found to be less effective as compared to other index values at local level. The major source of information about extension program at local level was through extension agent and electronic media. Extension officials frequent visit, farmers education level and their family size had positive impact on overall production of cereal.

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