

FACTORS AFFECTING FARMERS' ACCESS TO AGRICULTURAL SUBSIDY IN MAKWANPUR AND DHADING DISTRICTS OF NEPAL

S. Thapa^{1*}, H.K. Panta¹, S. Poudel¹, Arun GC², K. Regmi¹ and M. Basnet¹

¹Institute of Agriculture and Animal Science, Tribhuvan University, Nepal

²Central Department of Economics, Tribhuvan University, Nepal

ABSTRACT

The government of Nepal has been providing high priority to subsidy programs to support farmers and boost the national economy. Increasing access to and effectiveness of the subsidy program is important to enhance growth of agricultural sector. However, there has always been a concern about access to and effectiveness of the subsidy programs to address the problem of farmers in Nepal. This study was carried out to determine the factors affecting farmers' access to the agricultural subsidy. For this, a multi-stage sampling method was employed, and altogether 120 commercial vegetable growers from Dhading and Makwanpur districts of Nepal were selected using simple random technique. Descriptive statistical tools and binary logistic regression were used to analyze the data. Out of the total sampled households, 55.83% had accessed at least one agricultural subsidy program, and the highest number of sampled households (39.17%) received the subsidy for agricultural tools. The result of binary logistic regression revealed that factors like ethnicity, membership in agricultural groups or co-operatives, farm visit by extension agents, and participation in agricultural training were significantly ($p < 0.01$) influencing farmers' access to agricultural subsidy. Hence, the farmers are suggested to operate through agricultural groups or co-operatives, and the concerned authorities and policymakers should emphasize agricultural extension services and agricultural subsidy simultaneously for synergistic effects.

Keywords: Access to subsidy, Agricultural, Binary logistic regression, Government, Vegetable

INTRODUCTION

The agriculture sector has been a major focus for the policy makers in Nepal in almost all the plan periods, as the economy of the country is highly dependent on this

* Corresponding author: sulo.thapa123@gmail.com

sector, contributing 23.9 % to the national gross domestic product (GDP) and providing employment to 60.4 % of the total labor force (Ministry of Finance, 2022). This figure indicates that agricultural sector has a significant impact on the national economy.

Despite the significant contribution of the agriculture sector to GDP, this sector has a sluggish growth rate of only 2.3% against 6.6% growth in the service sector and a considerably higher growth rate of 8.1% in the industrial sector (MoF, 2022). The agricultural production is low in Nepal, and the country is positioned as a net importer of agricultural commodities. Timely and adequate access to agricultural inputs is a prerequisite for increased production and productivity. However, the majority of Nepalese farmers are small and marginal holders (GC and Hall, 2020), having low purchasing power of inputs (Bista et al., 2018). This followed by the higher price of the inputs is a major constraint for intensifying input use (Takeshima et al., 2017) to increase productivity and contribute to farm income. In such a situation, farmer support programs from the government have great importance in developing the agriculture sector.

The government of Nepal has been providing high priority for the development of the agriculture sector believing that it can raise farm household income and contribute to the growth of the national economy (Chaudhary, 2018). Hence, it has formulated different agricultural policies and implemented them as farmer support programs. Although agricultural subsidy is controversial in the global context, the agricultural policies of Nepal prioritize subsidy programs (Paudel and Crago, 2017). In recent years, the growth in the agricultural budget can be seen to provide production input, extension services, financial support in the form of matching grants from the government and subsidized loans from banks to farmers. Farmers are receiving support in the form of subsidized inputs (chemical fertilizers, improved seeds, machinery, equipment, etc.), technical backstopping, subsidized agricultural credit, and subsidy in insurance premium (MoF, 2023).

The aim of these support programs is to increase production and productivity of the agricultural sector. Fertilizer and seed subsidies lead to higher agricultural yields and increased income among farm households (Hemming et al., 2018). Agricultural credit helps farmers to acquire agricultural inputs (seed, fertilizer, pesticide, equipment, etc) in time, enhances farm productivity, and thus boosts income (Jan and Khan, 2012). However, there has always been a concern about access to and effectiveness of the subsidy programs to address the problem of farmers in Nepal. According to Shrestha (2021), the agricultural subsidy has not been utilized properly in practice and small and needy farmers are not being benefitted, but majority of the beneficiaries are those who could exercise power. Agricultural subsidy policies have achieved failure as

well as success in achieving their goals depending on their modality, their targeting, and their delivery mechanism (Wang et al., 2019).

Hence, this study attempts to analyze the factors that affect farmers' access to subsidy programs. The knowledge on the significant socio-economic, demographic factors affecting farmers' access to agricultural subsidy will help the policy-makers, practitioners, and the concerned stakeholders to focus on the respective determinants during the discussion, policymaking, and program implementation. Furthermore, the government is going to formulate a new agricultural policy and this and similar research findings may generate valuable information.

MATERIALS AND METHODS

Study site, sampling process and data collection procedure

The study was conducted in Makwanpur and Dhading districts of Bagmati Province of Nepal. A four-stage sampling method was used in the research. At first, Dhading and Makwanpur districts were selected purposively because these are major areas of commercial vegetable farming. In the second stage, one rural/municipality from each district with the highest number of commercial vegetable growers was selected purposively. Then, one ward from each rural/municipality was selected purposively using the same criteria as per the information obtained from the agriculture section of each rural/municipality. In the last stage, sample households were selected through simple random sampling technique. In this way, the study area were ward number seven of Benighat Rorang Rural Municipality of Dhading district and ward number two of Thaha Municipality of Makwanpur district (Fig.1).

In this study, farming households that grow vegetables for at least two seasons within a year, covering area of at least 0.1 hectare are defined as the commercial vegetable farmers. The total number of commercial vegetable farming households in Thaha-2, Makwanpur and Benighat Rorang-7, Dhading were 208 and 195, respectively. Sixty samples from each ward were selected using simple random sampling technique, constituting 120 samples altogether.

The survey was done between June and August of 2022. Both primary and secondary data were collected. The primary sources of information were the sample farmers and the key informants (agriculture officers, leader farmers, and leaders of co-operatives and farmers' groups) and secondary information was obtained by reviewing different government and academics' publications and their study reports. A pre-tested, semi-structured questionnaire was used for the household survey.

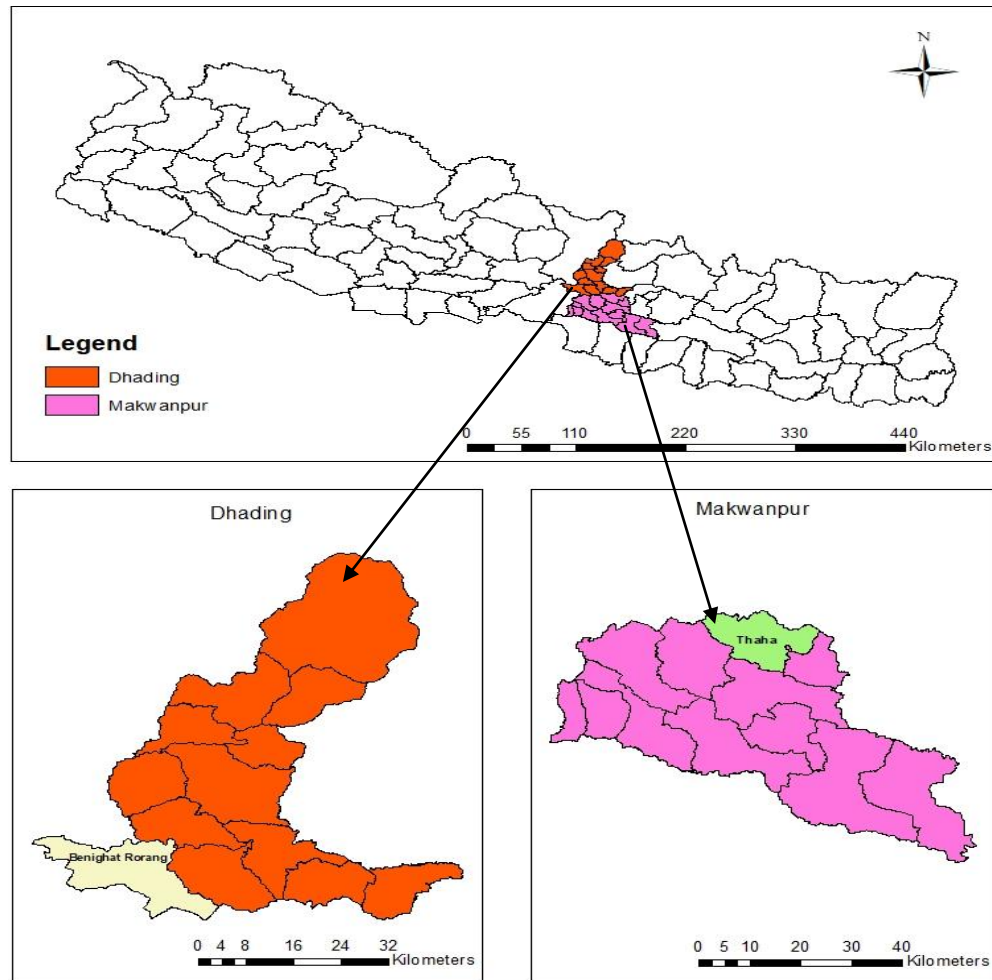


Figure 1. Map of Nepal showing study area

Data analysis techniques

The data was analyzed using MS Excel and Statistical Package for Social Science (SPSS) version 20. Mean, standard deviation, frequency, and percentage have been computed for descriptive statistics. "Access to agricultural subsidy" in this study implies farmers receiving at least one form of agricultural subsidy. The reaction variable for this study is dichotomous. The most utilized way to deal with this assumed model is logit, probit, and linear probability models (Gujarati and Porter, 2009). The binary logistic regression model has been used to analyze the factors affecting farmers' access to agricultural subsidy. Researchers because of its comparative simplicity generally prefer the logit model. According to Sirak and Rice

(1994), the logit model is characterized by flexibility, convenience, and power, and is often preferred when the dependent variables are categorical in nature. Kiplimo et al., (2015) have used this model to determine factors influencing credit financial services. The mathematical representation of the logistic regression model is as follows (Gujarati and Porter, 2009).

$$\frac{\text{Prob}(Y_i=1)}{\text{Prob}(Y_i=0)} = \frac{P_i}{1-P_i} = e^{\beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_i X_i}$$

Where, P_i is the probability that Y_i takes the value of 1 (farmers receiving at least one subsidy program), $1-P_i$ is the probability that Y_i is 0 (farmers not receiving any subsidy), e is the exponential constant, β_0 (intercept term) and β_i (coefficients associated with each independent variables) are parameters to be estimated, X_i represent socio-economic and other factors. Taking natural log of both sides of above equation we get,

$$L_i = \ln\left(\frac{P_i}{1-P_i}\right) = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \dots + \beta_i X_i$$

Where, L_i stands for logit model, which is linear in X_i as well as in β , subscript i denotes the i^{th} observation in the sample. Table 1 shows the description of independent variables used in logistic regression model.

RESULTS AND DISCUSSION

Socio-economic and demographic characteristics of sampled households

The average age of sampled households' head was 50.97 years and the average years of schooling was 6.16. On average, the sampled household has vegetable farming experience of 19.55 years. The average family size of sampled household was found to be 5.17 where the average economically active members per household were 3.51 (Table 2). The average land holding of the sampled household was 0.47 hectares.

Table 1. Variable hypothesized that affect farmers' access to subsidy in the study area

Explanatory variables	Variable type	Description of variables
Age	Continuous	Age of household head in years
Gender	Categorical	Gender of household head, 0= Male, 1= Female
Household head's occupation	Categorical	1 = Agriculture only, 0 = Otherwise
Education	Continuous	Years of schooling of household head
Ethnicity	Categorical	1= Brahmin, 2= Chhetri, 3= Janjati, 4= Others (Dalit and indigenous group)
Economically active population	Continuous	Number of economically active (15-59 years) members in the farmer's HH

Explanatory variables	Variable type	Description of variables
Total land holding (ha)	Continuous	Owned and rented-in land in hectare
Membership in farmer's groups/co-operatives	Categorical	1 = Yes, 0 = No
Participation in training	Categorical	1 = Yes, 0 = No
Farming experience	Continuous	Years of engagement in commercial vegetable production
Loan for farming	Categorical	1 = Yes, 0 = No
Extension agents' visit	Categorical	1= extension agent visited farm at least once in the year, 0= otherwise

Table 2. Socio-economic and demographic characteristics of the sampled household in the study area (continuous variables)

Variables	Dhading (n=60)	Makwanpur (n=60)	Total (n=120)
Age (years)	51.45(11.6)	50.50(9.66)	50.97(10.64)
Education (years)	6.07(3.32)	6.25(3.80)	6.16(3.56)
Economically active members	3.63(1.40)	3.34(1.40)	3.51(1.45)
Farming experience (years)	18.37(9.05)	20.73(9.02)	19.55(9.03)
Total land (hectare)	0.55(0.43)	0.40(0.28)	0.47(0.37)

Note: The figure in the parenthesis represents standard deviation

Source: Field survey, 2022

The study revealed that the majority of the sampled households' head (77.5%) have agriculture as their major occupation. The majority of the sampled households (35%) were Brahmin followed by Janjati (31.67%). Males have headed most of the sampled households (91.67%). About 80% sampled households had membership in agriculture-related groups or co-operatives and 45% of total sampled households had received at least one training related to commercial vegetable farming. Only 22.5% of the total respondents reported that the extension agents visited their farms at least once in a year. Among the sampled households, only 30.83% had received formal agricultural credit from different financial institutions (Table 3).

Table 3. Socio-economic and demographic characteristics of sampled household in the study area (categorical variables)

Variables	Description	Dhading (n=60)	Makwanpur (n=60)	Total (n=120)
Occupation of HHH	Agriculture only	43(71.67)	50(83.33)	93(77.5)
	Otherwise	17(28.33)	10(16.67)	27(22.5)
Ethnicity	Brahmin	35(58.33)	7(11.67)	42(35)
	Chhetri	14(23.33)	21(35)	35(29.16)
	Janajati	7(11.67)	31(51.67)	38(31.67)
	Others	4(6.67)	1(1.67)	5(4.17)
Gender of HHH	Male	53(88.33)	57(95)	110(91.67)
	Female	7(11.67)	3(5)	10(8.33)
Membership in groups/co-operatives	Yes	55(91.67)	40(66.67)	95(79.11)
	No	5(8.33)	20(33.33)	25(20.83)
Training received	Yes	37(61.67)	17(28.33)	54(45.00)
	No	23(38.33)	43(71.67)	66(55)
Extension workers' visits	Yes	16(26.67)	11(18.33)	27(22.5)
	No	44(73.33)	49(81.67)	93(77.5)
Credit received	Yes	24(40)	13(21.67)	37(30.83)
	No	36(60)	47(78.33)	83(69.17)

Note: The figure in parenthesis represents percentage

Source: Field survey, 2022

Status of farmers' access to agricultural subsidy

The findings revealed that 55.83% of the total sampled households had access to at least one agricultural subsidy program while 44.17% did not receive any form of agricultural subsidy. The subsidy recipients were more in the Dhading district (Beninghat Rorang-7) than Makwanpur (Thaha-2). One reason behind this might be activities like Food and Nutrition Security Enhancement Project (FANSEP) providing subsidies to farmers is on-going in Dhading district but not in Makwanpur.

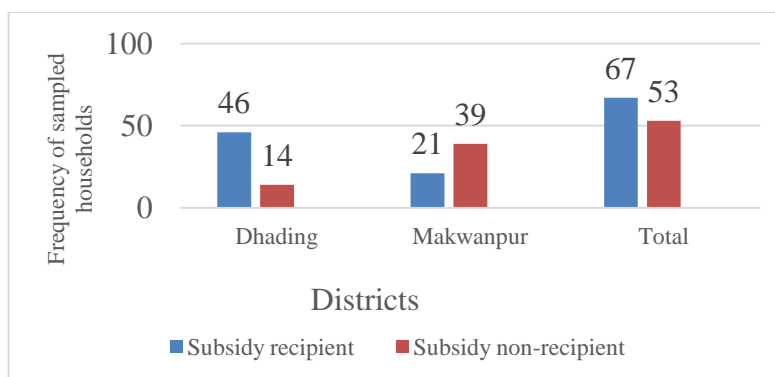


Figure 2. Classification of sampled households based on participation in agricultural subsidy

Participation of farmers in different subsidy programs

Overall, major subsidy programs in the study area included subsidy on seed, tunnel construction, agricultural machinery (hand/mini-tiller, digging machine), agricultural tools (sprayer, mulching plastic), irrigation management (drip irrigation sets and electric water pump), and subsidy on the agricultural loan (Table 4). Beneficiary households have received different combinations of subsidies. Among the total sampled households, 27.5% have participated in the machinery subsidy program. About 40% of the total sampled households have received subsidy for agricultural tools. For subsidy on machinery, farmers have to make a 50 % co-payment in the study area. The participation is less than 50 percent, which might be due to the inability of poor farmers to co-pay (Wang et al., 2019).

Table 4. Distribution of farmers in different subsidy programs

Subsidy programs	Dhading n = 60	Makwanpur n = 60	Total n = 120
Machinery	24(40)	9 (15)	33(27.5)
Agricultural tools	36(60)	11(18.33)	47(39.17)
Tunnel construction	3(5)	6(10)	9(7.5)
Seed	29(48.33)	0(0)	29(24.17)
Irrigation	25(41.67)	6(10)	31(25.83)
Subsidized loan	11(18.33)	4(6.67)	15(12.5)
Insurance premium	0(0)	0(0)	0(0)

Note: The figure in parenthesis represents percentage.

Source: Field survey, 2022

The study revealed that only 7.5% of the total sampled households have received support for tunnel construction. In Dhading district, 48.33% of the total sampled households have received seed subsidy but none of the sampled households have received seed subsidy in Makwanpur district. The ongoing Food and Nutrition Security Enhancement Project (FANSEP) in Dhading district has been found involved in seed subsidy programs. Out of the total sampled household, only 12.5% have received subsidy on the interest rate for agricultural credit. In the study area, none of the sampled households have received subsidy on insurance premium. Sampled households reported that they were unaware about the crop insurance program. Yang et al. (2015) found a significant relationship between the level of farmers' awareness about agricultural insurance and their participation in agricultural insurance. The lack of information about crop insurance programs might be the reason for non-participation.

Intensity of participation on subsidy programs

Among the total sampled households, the highest number of subsidy programs received by an individual household was five by only 5.83%, and the lowest is one by 17.50% of the total sampled households. The result shows that the number of participants decreases as the number of subsidy programs increases (Fig. 3). The percentage of households receiving three and four types of subsidy is relatively low in Makwanpur district and none of the sampled households has received five number of subsidy in Makwanpur.

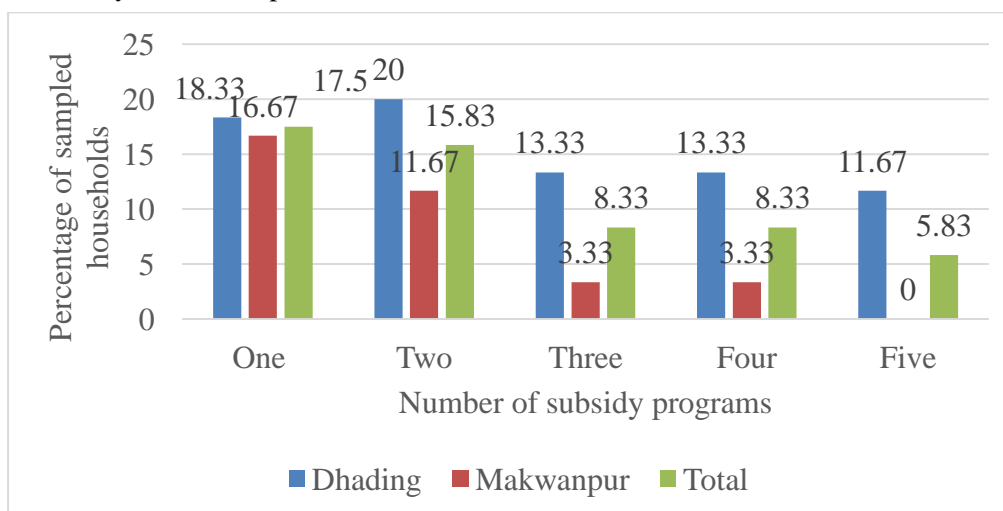


Figure 3. Distribution of sampled households based upon their participation on different number of subsidy programs

Factors affecting farmers' access to agricultural subsidy

The influence of socio-economic, demographic and extension related factors on access of farmers to agricultural subsidy programs was determined by logistic regression. Before performing the regression, diagnostic test was carried out to check the multi-collinearity among independent variables. None of the independent variables was found to have a significant correlation (Mean Variance Inflation Factor = 1.28), suggesting no problem of multi-collinearity. The model was statistically significant ($p < 0.01$). The pseudo R-square value was 0.623 that indicates that 62.3% of variation in dependent variable is explained by the independent variables included in this model. The results show that membership in agricultural groups or co-operatives, participation in agricultural training programs, extension agents' visits, and ethnicity were statistically significant factors that influences the households' access to subsidy programs.

The membership in agricultural groups/co-operatives was positive and significant ($p < 0.01$) which reveals that the farming households having membership in agricultural organizations are more likely to receive subsidy than those who don't have the membership. When the farming households have membership in agricultural organization, the odds of receiving subsidy is predicted to be about 11.40 times larger than otherwise. The result is in line with Neupane et al., (2015) who reported that the farmers who are members of cooperatives enjoyed higher accessibility to inputs, subsidies, technical information, and commercialization. Membership in a farmer organization provides an opportunity for farmers to know more about new interventions (Timilsina et al., 2022). Therefore, farmers involved in the organization are expected to avail subsidy more compared to those who were not engaged as they are better informed about subsidy sources and have a better understanding of the application procedure.

In addition, Key informant interview revealed that the government organizations prefer agricultural groups/co-operatives to individual farmers while providing agricultural subsidies, believing that the subsidies are less likely to be misused. Also, in the study area, subsidy programs like some community based irrigation project of larger budget are provisioned only for group and co-operatives. Farmer organizations are seen as a cost-effective tool for channeling development benefits such as subsidies (Bernard and Taffesse, 2012), that can reduce unnecessary program costs that would otherwise occur when working with individual and widely dispersed farmers. Therefore, the government seeks to promote farmers' organizations. In addition, smallholders have rarely been found to organize formally, when they do, their organizations usually operate in a challenging and competitive environment (Shiferaw et al., 2011).

Similarly, the participation of farming households in agricultural training was statistically significant and positive ($p < 0.01$). When the farming households have participated in agricultural training program, the odds of receiving subsidy is

predicted to increase by 7.42 times. Training programs might have empowered farmers through the information about subsidy. Similarly, the odds of receiving subsidy are predicted to increase by 8.61 times when the farms have been visited by extension agents than otherwise. The extension primarily targets information gaps through the transfer of knowledge (Leuveld et al., 2016), so direct contact of farmers with extension agents might have provided information about the subsidy to farmers. Hemming et al. (2018) also stated that for input subsidy programs to be effective, they must be adequate, targeted to reach the most constrained farmers, and linked with agricultural extension to ensure that farmers have enough information to use them effectively.

Table 5. Logistic estimates of the factors affecting famers' access to agricultural subsidy

Variables	Coefficient (B)	Std. Err.	Exp(B)	P-value
Age of HHH	0.049	0.034	1.051	0.148
Gender of HHH (1)	-0.361	1.077	0.697	0.737
Years of schooling of HHH	-0.015	0.094	0.985	0.871
Land holding (ha)	-0.570	0.877	0.566	0.516
Farming experience (years)	0.031	0.035	1.032	0.373
Membership in groups/co-operatives (1)	2.434***	0.913	11.406	0.008
Participation in training (1)	2.004***	0.667	7.421	0.003
Economically active members	0.005	0.188	1.005	0.978
Loan for farming (1)	0.348	0.655	1.416	0.596
Extension agents' visit (1)	2.153***	0.823	8.611	0.009
Ethnicity (Brahmin)				0.004
Chhetri	-2.653***	0.815	0.070	0.001
Janjati	-2.644***	0.787	0.071	0.001
Others	-1.986	1.582	0.137	0.209
Constant	-4.550*	2.590	0.011	0.079
Number of observations	120			
Prob>chi ²	0.000			
Pseudo R ²	0.623			
Log likelihood	-44.35			

Note: *, *** denotes significance at 10% and 1% level, respectively Source: Field survey (2022)

The ethnicity of households was also found significant and negative, indicating so-called lower ethnic communities are less likely to have access to the agricultural

subsidy. The odds of receiving subsidy is predicted to be about 0.07 times larger (i. e. decrease) among Chhetri and Janjati than among Brahmin. The finding is consistent with Kafle et al. (2022) who reported that marginal farmers including ethnic minorities could not apply for subsidized solar-powered irrigation pumps due to significant asymmetry in information dissemination.

CONCLUSION

At present, farmers in the study area are receiving subsidy for seeds, machinery, agricultural tools, irrigation, plastic tunnel construction, and agricultural loan. The access of farmers to subsidy programs is affected by factors like membership in agricultural groups/co-operatives, participation in training, extension agents' farm visits, and ethnicity of farming households. The findings of the study carry significant policy implications for meeting national policy objectives of agricultural subsidy programs. Based on the findings of the study farmers are suggested to operate through agricultural groups/co-operatives to have greater access to subsidy programs. In addition, the three tiers of government providing different agricultural subsidies are suggested to establish a proper information dissemination system about the subsidies among the farmers and policymakers should emphasize agricultural extension services and agricultural subsidies simultaneously for synergistic effects. Future study about whether large or small access is indifferent and the impact of access to subsidy on productivity and income is suggested.

ACKNOWLEDGEMENTS

The authors are grateful to University Grant Commission, Nepal for the research fund (FRG 077/78), and to the respondents of Dhading and Makwanpur districts for providing valuable information during the field survey.

REFERENCES

- Bista, D.R., Dhungel, S. and Adhikari, S. (2018). Status of fertilizer and seed subsidy in Nepal: Review and recommendation. *Journal of Agriculture and Environment*, 17:1-10. DOI: 10.3126/aej.v17i0.19854
- Bernard, T. and Taffesse, A. (2012). Returns to Scope? Smallholders' commercialisation through multipurpose co-operatives in Ethiopia. *Journal of African Economies*, 21: 440-464.
- Chaudhary, D. (2018). Agricultural policies and rural development in Nepal: An overview. *Research Nepal Journal of Development Studies*, 1(2): 34-46.
- GC, R.K. and Hall, R.P. (2020). The Commercialization of smallholder farming-A case study from the rural western middle hills of Nepal. *Agriculture*, 10(5):143p.
- Gujarati, D. and Porter, D. (2009). Basic econometrics. 5th ed. The McGraw-Hill Companies, New York, USA.

- Hemming, D.J., Chirwa, E.W., Dorward, A., Ruffhead, H.J., Hill, R., Osborn, J., Langer, L., Harman, L., Asaoka, H., Coffey, C. and Phillips, D. (2018). Agricultural input subsidies for improving productivity, farm income, consumer welfare and wider growth in low- and lower-middle-income countries: A systematic review. *Campbell Systematic Reviews*, 14(1): 1-153. DOI: <https://doi.org/10.4073/csr.2018.4>
- Jan, I. and Khan, H. (2012). Factors responsible for rural household participation in institutional credit programs in Pakistan. *African Journal of Business Management*, 6(3):1186-1190.
- Kafle, K., Uprety, L., Shrestha, G., Pandey, V. and Mukherji, A. (2022). Are climate finance subsidies equitably distributed among farmers? Assessing socio-demographics of solar irrigation in Nepal. *Energy Research & Social Science*, 91:102756p.
- Kiplimo, J., Ngenoh, E. and Bett, J. (2015). Evaluation of factors influencing access to credit financial services: Evidences from small holders farmers in Eastern Region of Kenya. *Journal of Economics and Sustainable Development*, 6:97-106.
- Leuvel, K., Nillesen, E., Pieters, J., Ross, M., Voors, M. and Sonne, W. (2016). The impact of agricultural extension and input subsidies on knowledge, input use and food security in Eastern DRC. Foreign, Commonwealth and Development Office, Congo. Working Paper.
- Ministry of Finance. (2022). Economic Survey-2021/22. Ministry of Finance, Government of Nepal, Singhadhubar, Kathmandu, Nepal.
- MoF. (2023). Economic Survey-2022/23. Ministry of Finance, Government of Nepal. Singhadhubar, Kathmandu, Nepal.
- Neupane, H., Adhikari, M. and Rauniyar, P. (2018). Farmers' perception on role of cooperatives in agriculture practices of major cereal crops in western terai of Nepal. *Journal of the Institute of Agriculture and Animal Sciences*, 33: 177-186.
- Paudel, J. and Cargo, L. (2017). Subsidy and agricultural productivity in Nepal. A paper originally presented at the Annual Meeting of Agricultural and Applied Economics Association, Chicago, Illinois, 31 July - 1 August. University of Massachusetts Amherst, USA.
- Shiferaw, B., Hellin, J. and Muricho, G. (2011). Improving market access and agricultural productivity growth in Africa: what role for producer organizations and collective action institutions? *Food Security*, 3:475-489.
- Shrestha, M.K. (2021). Agricultural support policy of Nepal: Cases of subsidies. *International Multidisciplinary Research Journal*, 1:16-22.
- Sirak, M. and Rice, J. (1994). Logistic regression: An introduction. In: B. Thompson. *Advances in social science methodology*. JAI Press, Greenwich, CT. Pp. 191-245.
- Takeshima, H., Adhikari, R.P., Shivakoti, S., Kaphle, B. D. and Kumar, A. (2017). Heterogeneous returns to chemical fertilizer at the intensive margins: Insights from Nepal. *Food Policy*, 69: 97-109. DOI: <http://dx.doi.org/10.1016/j.foodpol.2017.03.007>
- Timilsina, S., Khanal, M., Pradhan, R., Bhattarai A. and Sapkota, M. (2022). Determinants of farmers' perception in banana insurance in Chitwan district, Nepal. *Journal of Agriculture and Environment*, 23:1-13.

- Wang, S., Manjur, B., Kim, J. and Lee, W. (2019). Assessing socioeconomic impacts of agricultural subsidies: A case study from Bhutan. *Sustainability*, 11:3266. DOI: <https://doi.org/10.3390/su11123266>
- Yang, X., Liu, Y., Bai W. and Liu, B. (2015). Evaluation of the crop insurance management for soybean risk of natural disasters in Jilin Province, China. *Natural Hazards*, 76:587-59.