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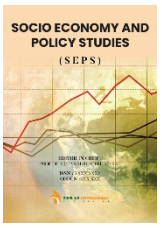

RESEARCH ARTICLE

UNDERSTANDING THE COST OF CULTIVATION OF POTATO FROM THE PERSPECTIVE OF HOUSEHOLD HEAD (MALE OR FEMALE) IN PANAUTI VILLAGE OF KAVRE DISTRICT, NEPAL

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ABSTRACT

In this study, the total 30 respondents were grouped into two categories on the basis of household head (male or female). The average cost of cultivation of one kilogram potato was calculated to be NRs. 14.64 in Panauti municipality of Kavre district, Nepal. The average cost of cultivation in male headed houses (NRs.15.40) was significantly higher to that of female headed houses (NRs.12.53). The major inputs contributing towards the cultivation of potatoes were fertilizers, potato seed and labor respectively. The socio-demographic analysis of the study area demonstrated the overall average age of respondents to be 47.90 years. Moreover, the average household size was 4.73 with average 2.46 male members and 2.27 female members. Also, the study depicted that out of total respondents, 53.33% were Brahmin, 23.33% were Chhetri and remaining 23.33% Janajati. The overall benefit-cost ratio observed was 1.39 where the benefit- cost ratio obtained in male headed house (1.19) was depicted to be significantly lower to that obtained in female headed house (1.93).

KEYWORDS

Analysis, Benefit-cost ratio, Brahmin, Fertilizers, Inputs, Labor

1. INTRODUCTION

Potato (Solanum tuberosum L.) is one of the most important food crops grown in more than 100 countries in the world. Because of the dry matter, edible energy and edible protein content, potato is considered, nutritionally, a superior vegetable as well as a versatile food item not only in Nepal but also throughout the world (CPRI, 1992). In Nepal, it is one of the important food crops which is cultivated in 1, 85,879 ha (AITC, 2018). It is the second most important cash crop of Nepal after oilseed (2, 07,978 ha.), in terms of area. Moreover, it is the fourth most important staple crop after rice, maize, and wheat in Nepal (MOAD, 2018). The production and productivity of potatoes in Nepal in the year 2016/17 has been reported to be 2591686 ton and 13943 kg/ ha, respectively.

In Kavre, farmers harvest potatoes thrice a year in January/February, May/June and in October/November. During October/November season, potato is sold at the rate of Rs 25-35 a kg, but in other seasons, the price is around Rs 10 per kg. The District Agriculture Development Office (DADO), Kavre has stated that the annual potato harvest of the district amounts to 81,000 metric tonnes which worth the amount that is around five per cent of the total national potato production (thehimalayantimes.com). The Potato Development Programme (PDP) under the Department of Agriculture in 2016 recorded that the average costs of production of a kilogram of potato in terai, hills and Kathmandu valley were Rs 11, 14 and 16 respectively. This study is based on the PDP report and specifically has assessed the cost of potato production in the Panauti municipality of Kavre. The average cost per 0.05ha was found Rs.9530 including the household cost and direct cost investment (Economic Analysis of Commercial Potato Cultivation in Kushadevi, Kavre, 2011). In Nepal, many isolated studies have been done to assess the cost of potato production.

72.8% of women were employed in Nepalese Agriculture (MOAC, 2008). The Nepalese survey of 2001 reports that 73% of the economically active women of Nepal were involved in agriculture in comparison to only 60% of economically active men (CBS, 2004). Feminization of agriculture is rapidly accelerating with the outmigration of men (Bhawana and Race, 2020). There are many assumptions regarding the productivity, resource use efficiency and economics of production associated with the female headed household that ranges from increase in productivity to even productivity when both male and female have equal access to the resources. Thus, with this research we aim to assess the economics of potato production in regards to the gender of the household.

2. METHOD AND METHODOLOGY

2.1 Study Site

The research survey was carried out in the Kavrepalanchowk district of Province number 3. The district was purposefully selected because it is one of the major potato producing districts with identifiable potato growing farmers. It lies in the Bagmati zone with the coordinates of 27.5259° N to 85.5612° E. The study was carried out in the command area of Prime Minister Agriculture Modernization Project (PMAMP), Project Implementation Unit (PIU), Potato Super Zone i.e. Panauti municipality which comprises Khwopasi, Ryale, and Balthali villages and are the major potato growing domains in the district.

2.2 Sample and Sampling Technique

A list of potato growers was collected from the PMAMP, PIU Potato superzone who have been actively growing potatoes for the past two years

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which was used as the sampling frame to select the respondents for the survey. Thirty respondents were selected using simple random sampling from the Panauti Village of Kavrepalanchowk district of which 10 respondents each were from Khwopasi, Ryale, and Balthali villages.

Respondents were categorized into two groups based on the gender of household head that is; male and female.

Category (Gender of Household Head)	Number of samples
Male	22
Female	8

2.3. Research instruments/design

Face to face personal interview was done for data collection. The questions were asked based on the interview schedule and checklist. Key Informant Interview (KII) and Focus Group Discussion (FGD) were done to further triangulate the data and obtain additional qualitative information. Potato farmers were the source of primary data while the secondary data were collected from various books, national reports, and publications, reports of different NGOs and INGOs, web, published articles, etc.

2.4. Data analysis

All the collected information from the field survey was coded and tabulated on Statistical Package for the Social Sciences (SPSS). Further analysis was done through SPSS, STATA, and MS Excel.

The following analysis was performed;

2.4.1 Descriptive Analysis

The socio-demographic characteristics were analyzed using simple descriptive statistics like frequency count, percentage, mean, standard deviation, etc. and categorical variables among male and female household heads were analyzed using chi-square test and continuous variable by t-test.

2.4.2 Economic Analysis

Cost Analysis Parameters

Both fixed cost and the variable cost were considered for the calculation of total costs for potato cultivation.

Fixed costs: Fixed costs were the repair and maintenance cost of implements and tools, land lease costs and land tax

Variable costs: Variable costs were the cost of seed, fertilizers, plant protection cost, irrigation cost, postharvest cost and labor cost

The sum of fixed costs and variable costs gives the total cost. By deducting the total expenditure in total cost, Net profit was calculated.

Total cost is the relationship between production, quantity and costs, expressed as:

Total cost = Fixed Cost + Variable Cost

Gross Revenue: Gross revenue is the total amount of revenue earned without taking into account any expenses of potato cultivation.

Gross Profit/Returns: Gross profit is the profit made after deducting the total cost from the gross revenue.

Benefit-cost analysis

The benefit-cost analysis was carried out after calculating the total variable cost and gross returns which was carried out by using the formula:

B: C Ratio = Gross Returns / Total Cost

A study also used a similar formula to calculate the benefit-cost ratio for assessing the BC Ratio (Adhikari, 2011; Amgai et al., 2016).

3. Results and Discussions

Table 1: Socio-demographic Characteristics of Respondents by the category of Household head (Male or Female), Field Survey 2020, Panauti, Kavre

Particulars	Overall (n=30)	Gender		Mean Difference	t-value
		Male (n=22)	Female (n=8)		
Age	47.90 (11.76)	48.59 (11.50)	46.00 (13.08)	2.59	0.527^{NS} (df= 0.603)
Household size	4.73 (1.08)	4.90 (1.10)	4.25 (0.88)	0.65	1.509^{NS} (df=0.142)
Male member	2.46 (0.77)	2.54 (0.80)	2.25 (0.70)	0.29	0.920^{NS} (df=0.366)
Female Member	2.27 (0.907)	2.36 (1.00)	2.00 (0.53)	0.36	0.970^{NS} (df=0.340)

Note: The figures in parenthesis resemble standard deviation NS= Non-significant

Table 1 presents the socio-demographic characteristics of respondents by the category of Household head; male headed and female headed family. The overall average age of respondents was recorded to be 47.90 years. The average age of male and female respondents was 48.59 and 46 years respectively without any statistically significant difference between the means. Similarly, the average household size of the sampled respondents was found to be 4.73 where there was no statistical difference between the averages household size of male household head (4.90) and female household head (4.25).

Moreover, the average number of male and female members in the sampled households was found to be 2.46 and 2.27 respectively with no statistical significant difference between them. It means that the number of male and female members in both the male and female household head was almost equal.

Table 2: Ethnicity of Respondents by the category of Household head (Male or Female), Field Survey 2020, Panauti, Kavre

Particulars	Overall (n=30)	Gender		Chi square value
		Male (n=22)	Female (n=8)	
Ethnicity				
1. Brahmin	16 (53.33)	10 (45.45)	6 (75.00)	260.735***(df=6, p=0.000)
2. Chhetri	7 (23.33)	6 (27.27)	1 (12.50)	
3. Janajati	7 (23.33)	6 (27.27)	1 (12.50)	

Note: The figures in parenthesis resemble percentage

***indicate 1% level of significance df=degree of freedom

Among the total respondents sampled, 53.33% were Brahmin, 23.33% were Chhetri and remaining 23.33% Janajati (Table 2). From the table, it can be observed that there was a significant difference in the ethnicity in the family of male and female household heads at the significance level of 1%.

Table 3: Cost of cultivation of potato by the category of Household head (Male or Female), Field Survey 2020, Panauti, Kavre

Particulars (NRs./Kg)	Overall (n=30)	Gender		Mean difference	t-value
		Male (n=22)	Female (n=8)		
Fertilizers cost	5.22 (2.00)	5.50 (2.18)	4.46 (1.21)	1.04	1.281^{NS} (p=0.211)
labor cost	1.79 (0.72)	1.88 (0.75)	1.52 (0.60)	0.35	1.204^{NS} (p=0.239)
Potato Seed cost	4.40 (1.63)	4.71 (1.52)	3.52 (1.70)	1.18	1.828* (p=0.078)
Plant protection cost	1.23 (0.69)	1.23 (0.69)	1.22 (0.73)	0.007	0.024^{NS} (p=0.980)
Irrigation cost	0.61 (1.15)	0.75 (1.31)	0.22 (.35)	0.52	1.109^{NS} (p=0.277)
Post harvest cost	0.73 (0.21)	0.74 (0.18)	0.72 (0.28)	0.01	0.150^{NS} (p=0.882)
Total variable cost	14.00 (4.02)	14.84 (3.99)	11.69 (3.33)	3.14	1.984* (p=0.057)
Land lease	0.34 (0.70)	0.27 (0.73)	0.52 (0.61)	-0.24	-0.846^{NS} (p=0.405)
Land tax	0.17 (0.13)	0.16 (0.11)	0.20 (0.16)	-0.044	-0.817^{NS} (p=0.421)
Repair and maintenance cost	0.01 (0.05)	0.12 (0.06)	0.10 (0.04)	0.021	0.911^{NS} (p=0.370)
Total fixed cost	0.63 (0.63)	0.56 (0.66)	0.83 (0.50)	-0.27	1.037^{NS} (p=0.308)
Total cost	14.63 (4.13)	15.40 (4.12)	12.53 (3.58)	2.87	1.741* (p=0.093)

Note: The figures in parenthesis resemble standard deviation

*** indicate significance at 1% level, **indicate significance at 5% level, * indicate significance at 10% level

The computation of the cost of cultivation is necessary to determine the relative profitability of various crops over different crops (Singh et.al, 2019). The overall average cost for the production of one kilogram potato was NRs. 14.63 (Table 4). The average cost of production per kilogram for male household head (NRs.15.40) was significantly higher as compared to average cost of production per kilogram in female household head (NRs.12.53), and the difference was statistically significant at 10% level (Table 4). The cost of cultivation of one kilogram potato in female headed households is lower because of significantly lower variable costs like fertilizers cost, labor cost, irrigation cost etc. than in the male headed household incurred during the cultivation period. The overall average variable cost for the production of a kilogram of potato was NRs. 14. Similarly, the average variable cost was NRs. 14.84 in male household head and NRs.11.69 in female household head and the difference was statistically significant at 10 % level. Contrastingly, there was no significant difference in average fixed cost of male and female household head.

The overall average cost of seed for production of a kilogram of potato was NRs. 4.40 and the data from Table 4 suggest that the average potato seed cost in male household head, NRs. 4.71 was significantly higher than the average seed cost in female household head, NRs.3.52 at 10% level of significance. The lower seed cost in female household head may be due to higher bargaining power as well as efficient seed utilizing capacity of female and the result is in accordance with (Gilligan, Kumar, McNivan, & JV, 2014). In the other hand, the costs like fertilizers cost, labor cost, plant protection cost, post harvest cost, repair and maintenance cost, irrigation cost, land lease and land tax show no statistically significant mean differences.

Table 4: Revenue, profit and benefit cost ratio analysis of potato by the category of Household head (Male or Female), Field Survey 2020, Panauti, Kavre

Particulars	Overall (n=30)	Gender Male(n=22)	Female(n=8)	Mean difference	t-value
Gross Revenue	32.23 (1.54)	31.68 (1.28)	33.75 (1.16)	-2.06	3.984*** (p=0.000)
Gross Profit	17.59 (4.28)	16.27 (3.77)	21.21 (3.58)	-4.94	-3.211*** (p=0.003)
BC ratio	1.39 (0.77)	1.19 (0.57)	1.93 (1.00)	-0.73	-2.521** (p=0.018)

Note: The figures in parenthesis resemble standard deviation

*** indicate significance at 1% level, **indicate significance at 5% level

The overall revenue earned by farmers from a kilogram potato was NRs. 32.23 (Table 4) where the average revenue earned by female household heads, NRs. 33.75 was significantly higher than that of male household head, NRs. 31.68 at 1% significance level. Likewise, the overall average profit earned from one kilogram potato by farmers was NRs.17.59. The average profit earned by male household head was NRs.16.27 which was significantly lower to that of female household head, NRs.21.21 at 1% level. According to the study, the overall average BC ratio was 1.39. Comparatively, the average BC ratio for male household head (1.19) was significantly lower to that of female household head (1.93) at 5 % level of significance. The calculated benefit cost ratio of study area is found to be slightly lower than the BC ratio calculated in the study area of Baglung (1.44) (Bajracharya & Sapkota, 2017) and that of Accham (1.46) (Sapkota, 2019). Moreover, the calculated BC ratio is much lower compared with that in study area of Taplejung (2.9) (Timsina, Kafle, & Sapkota, 2011).

4. Conclusion

This study depicts that the major inputs used were fertilizers, potato seed and labor. The overall average cost for the production of one kilogram potato was reported as NRs. 14.63 with the average cost of production per kilogram for male household head (NRs.15.40) which was significantly higher as compared to average cost of production per kilogram in female household head (NRs.12.53). And the overall average variable cost for the production of a kilogram of potato was calculated to be NRs. 14. From the benefit cost analysis of potato production in the study area, the overall average BC ratio was calculated to be 1.39. Moreover, the average BC ratio for male household head (1.19) was significantly lower to that of female household head (1.93).

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Acronyms

%	: Percentage
^{0}C	: Degree Celsius
NS	: Non-significant
df	: degree of freedom
n	: number
CBS	: Central Bureau of Statistics
BC Ratio	: Benefit- Cost Ratio
FAO	: Food and Agriculture Organization
GDP	: Gross Domestic Product
gm	: gram
Ha	: Hectare
Hr	: hour
kg	: kilogram
m	: meter
Mm	: Milli meter
MoAD	: Ministry of Agriculture Development
MS	: Microsoft
Mt/ ha	: Metric ton per Hectare
Mt	: Metric ton
N	: North
NARC	: Nepal Agriculture and Research Council
PMAMP	: Prime Minister Agriculture Modernization Project
q/ ha	: Quintal per hectare
FYM	: Farm-Yard Manure

References

Adhikari, R.K. 2011. Economics of organic rice production. The Journal of Agriculture and Environment, 12: 97-103, https://doi.org/10.3126/aej.v12i0.7569

AITC. 2019. Kirshi diary. Kathamandu: Ministry of Agriculture and Livestock Development.

Amgai, S., Adhikari, B.K. and Kadariya, M. 2016. Economic analysis of cost of production of apple in mustang district of Nepal. The Journal of Agriculture and Environment, 17: 141-147, http://moad.gov.np/public/uploads/2007128766-Journal% 202016.pdf

Anwar, M., Shabbir, G., Shahid, M. H., & Samreen, W. 2015. Determinants of potato prices and its forecasting: A case study of Punjab, Pakistan. Punjab, Pakistan: Punjab Economic Research Institute.

Kafle, B. P. S. 2012. Adoption of improved potato varieties in Nepal: a case of Bara district. The Journal of Agricultural Sciences.

Bahadely, & Ukeili, A. 2018. Economies Of Potato Production (Baghdad Province As A Case. Iraqi Journal of Agricultural Sciences –1028:49(4).

Bajracharya, M., & Sapkota, M. 2017. Proftability and productivity of potato. Agriculture & Food Security.

Bhawana, K., & Race, D. 2020. Women's approach to farming in the context of feminization of agriculture: A case study from the middle hills of Nepal. World Development Perspectives, 20, 100260. doi:10.1016/j.wdp.2020.100260

CBS, Central Bureau of Statistics. 2004. National Sample Census of Agriculture Nepal 2001/02.

Chaudhari, D. &. (n.d.). Details of cost of cultivation of potato crop per hectare. AGRES-An International e Journal.

Chaudhary, D. 2016. Agricultural Policies and Rural Development in Nepal: An Overview.

CIP. An inspired dryland potato harvest in India. Lima, Peru: International Potato Center.

Dahal, B. R., & Rijal, S. 2019. Production Economics and Determinants of Potato Production in Nuwakot, Nepal.

Bista, DR L. A. 2013. Food security scenario, challenges, and agronomic research directions of Nepal. Agronomy Journal of Nepal.

Ezeta, F.N. RAP. 2008. An overview of potato production in Asia and the Pacific region: Markets, Development and Constraints. RAP Publication (FAO).

FAO. 2013. FAOSTAT. FAOSTAT retrived from https://www.potatopro.com/nepal/potato-statistics.

Iqbal, M. A. 2015. An Economic Analysis Of Potato Production In Okara District, Pakistan. International Journal of Economics, Commerce and Management.

K.C., H. B. 2016. Present Status of Potato Production and its Potentiality in Nepal. In Proceedings of the National Workshop onPotato Technologies Development and Delivery in Nepal (p. 5). Khumaltar, Lalitpur, Nepal: MoAD, DoA, National Potato Development Program.

Sathiamoorthy, K. Prange, R., Mapplebeck, L., & Halliburton, T. 1985. Potato Production In Sri Lanka. American Journal of Potato Research.

Timsina, KP K. K. 2010. Economics of potato (Solanum tuberosum L) production in Taplejung district of Nepal. Agronomy Journal of Nepal.

Luis A. Maldonado, J. E. 1998. Constraints to production and use of potato in Asia. American Journal of Potato Research.

Mahima Bajracharya, M. S. (n.d.). Profitability and productivity of potato (Solanum tuberosum) in Baglung district, Nepal. Agriculture & Food Security.

MOAC (Ministry of Agriculture and Co-operatives), 2008. Krishi diary. Agriculture Information and Communication Centre, Hariharbhawan, Lalitpur, Nepal.

MoAD. 2016. Statistical Information on Nepalese Agriculture. Kathmandu: Ministry of Agricultural Development.

Neupane, R. S. 2002. Adoption of agroforestry in the hills of Nepal: a logistic regression analysis. Journal of Agricultural Systems.

Noonari, S., Wagon, H., Memon, I. N., & Ahmed, F. 2016. Economic Analysis of Potato Production in. Journal of Biology, Agriculture and Healthcare.

NPDP. 2007. National Potato Research Program. Khumaltar, Lalitpur: National Potato Research Program, National Agriculture Research Council.

Potatopro. 2019, January 5. Retrieved from https://www.potatopro.com/nepal/potato-statistics.

Sanjiv Subedi, Y. N. 2019. Economics of potato (Solanum tuberosum L.) production in terai region of Nepal. Archives of Agriculture and Environmental Science.

Sapkota et al., 2019. An Economic Analysis of Potato Production in. International Journal of Horticulture & Agriculture.

Sapkota, S. C. 2019. An Economic Analysis of Potato Production in Achham District of Nepal. International Journal of Horticulture & Agriculture.

Scott, G., & V, S. 2012. The rise of Asia as the centre of global potato production and some implications for industry. Potato Journal.

Sharma, G. P., Gautam, T., Dhakal, S. P., & Dhakal, S. P. 2011. Economic analysis of commercial potato cultivation in Kusadevi, Kavre.

Singh, A., Singh, R., Anurag, & Ranjana. 2019. Economic Management and Analysis os Potato Cultivation: A case study od Agra district (U.P), India. International Journal of Current Microbiology and Applied Sciences, 525-530.

Singh, D. K., Pandey, N. K., & Kharumnuid, P. 2018. An Economic Analysis of Marketing of Potato from Shimla Hills of Himachal Pradesh. Economic Affairs.

Srinivas, T., & Ramanathan, S. 2007. Economic Analysis of Chinese Potato Cultivation in Tamil Nadu. Journal of Root Crops, 33, 1, 57-61.

Subedi, S., Ghimire, Y. N., Gautam, S., Poudel, H. K., & Shrestha, J. 2019. Economics of potato (Solanum tuberosum L.) production in terai region of Nepal.

Timsina, K. P., Kafle, K., & Sapkota, S. 2011. Economics of potato (Solanum tuberosum L) production in Taplejung district of Nepal. Agronomy Journal of Nepal (Agron JN) Vol. 2.