Factors Influencing the Choice of Value Addition Among Kiwi Growers in Ilam, Nepal

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Abstract

Value addition helps farmer to overcome financial difficulties during market crises. Production of value-added product is the best possible alternative to diversify income sources for farmers in developing countries like Nepal. However, the choice of value addition is low among kiwi growers in Nepal. An investigation was carried out to identify existing value-added products and factors influencing the choice of value addition among kiwi growers in Ilam district, Nepal. Primary data were gathered using a pretested semi-structured questionnaire with 39 randomly selected kiwi growers from the study area during 2023, followed by Focus Group Discussion and Key Informant Interview with selected individuals. Descriptive statistics and a logit model were used to analyze the findings of the study. The results revealed that juice was the commonly produced product. Farm size was statistically significant in production of value-added products. Thus, extension agencies of government and non-governmental organizations should primarily focus on large farms for better adoption of value addition. Similarly, provisions to increase farm sizes can be made by providing cost-effective lease in options or even subsidies to lease in land. Group based farming enterprises should be promoted to increase the adoption.

Keywords: Farm size, lease, product, subsidy

Introduction

Kiwi holds significant economic importance in Nepal, serving as a lucrative crop with high returns per unit area and serving as a primary source of livelihood for marginal farmers (Tiwari & Bhandari, 2020). The crop has witnessed increased demand, leading to expansion in both the number of farmers and farm sizes. However, in the past 2-3 years, the demand for kiwi has fallen below the production rate, primarily due to challenges such as unstable prices, narrow profit

margins, and inefficient market channels (Giri et al., 2021; Sharma et al., 2020). One of the major obstacles faced by kiwi farmers is the rapid post-harvest spoilage attributed to the fruit's perishable nature. Additionally, underdeveloped market chains and the inherent bulkiness of the crop result in costly transportation over long distances, impacting the net returns for farmers (Orinda et al., 2017). The economic disparity between what farmers earn and what consumers pay has widened, mainly due to intermediary agents. This issue is more pronounced in the fresh fruit market compared to value-added products (Tiwari & Bhandari, 2020). Consequently, farmers are experiencing a significant economic downturn; receiving prices 3-5 times lower than those of five years ago. In the current scenario, it appears that adopting measures for value addition is essential to ensure the sustainability of this sub-sector. Kiwi fruits possess considerable potential for the production of processed value-added items such as jam, jelly, candy, marmalade, wine, juice, and more (Sharma et al., 2020).

Value addition in agriculture is a transformative process that focuses on improving and enhancing existing products (USDA, 2010). The primary goal of this process is to prepare commodities for storage, ensuring preservation for future consumption, and facilitating immediate marketing. Recently, there has been a notable rise in the adoption of value addition practices, contributing to the improvement and stabilization of farm revenues (Roy et al., 2013). This, in turn, revitalizes primary production in farming and fostering positive changes in rural economies. The emphasis on value addition encourages rural communities to invest in land and inputs to enhance productivity, creating new job opportunities and a better quality of life. Additionally, it contributes to the expansion of the manufacturing structure within agricultural businesses, ultimately enhancing farmers' economic stability. This not only enables farmers to enter niche markets but also plays a crucial role in the overall growth of agricultural enterprises (Evans, 2006; Bisht et al., 2020). The Food and Agriculture Organization of the United Nations (FAO) highlighted that for an agricultural system to undergo structural transformation, it needs to enhance productivity and incorporate more capital-intensive approaches, fostering improved integration with other economic sectors through market mechanisms (FAO, 2015).

The agribusiness sector is currently in its nascent stage, leading to the majority of produce being sold in its primary form (Mkandawire & Gathungu, 2018). Various organizations stress the importance of a multi-sectoral intervention to facilitate local development, encouraging value

addition, and fostering entrepreneurship capabilities (AfDB, 2008). Farmers stand to benefit by diversifying into product-related businesses that involve value addition, as this shifts the focus from fluctuating farm gate prices to more stable retail prices (Joan, 2003). Value addition offers several advantages, including enhanced short-term storage for fresh produce, preservation of seasonal crop surpluses that would otherwise go to waste, and improved health and nutrition through prolonged consumption of crops (Datta, 2015; Fellows, 2012).

Nepal has implemented various significant plans and policies for agricultural development, including the Agriculture Perspective Plan (APP), National Agriculture Policy (NAP), Agri-business Promotion Policy, Agriculture Commercialization Policy, Agriculture Development Strategy (ADS), and Prime Minister Agriculture Modernization Project (PMAMP), all of which emphasize on value addition (Khanal et al., 2020). Additionally, Asian Development Bank (ADB) is strengthening the value addition of horticultural produce in Nepal. Despite these efforts, minimal impacts on enhancing the value of existing primary agricultural products have been achieved. The concerning issue is that kiwi farmers are facing marginalization and struggling to sustain them through the marketing of fresh produce (Mapiye et al., 2007; Mmbengwa et al., 2012). This underscores a gap in understanding the factors influencing the production of value-added products, types of value-added products produced and the extent of such production. The findings of this study hold significance for policymakers, providing insights to tailor strategies and policies aimed at maximizing farmer participation in value addition.

Methodology

Study area

The study was carried in Ilam district of Nepal, which is the major kiwi producing district in the country, with stats during FY 2020/21 (total cover area-700ha, productive area-200ha, production-1840mt, yield-9.20mt/ha) as reported by MoALD (2022). Kiwi zone under PMAMP is implementing at Sandakpur rural municipality (ward 1-5) and Ilam municipality (ward 1-4) of the district. We purposively selected PMAMP command area of Sandakpur rural municipality as it is the Nepal-India border area and is termed as most potential destination, thus have space for market expansion. In the study area, within 3 years, market price of kiwi has fallen from NPR 800 per kg to NPR 100 per kg. Hence, this study will benefit the farming communities of the area to diversify

the production practices. Besides, availability of both producers (adopters) of value-added products and non-producers (non-adopters) favored the study in this area.

Sampling technique and sample size

We employed multistage, purposive and random sampling in 2023 to select district, respective rural municipality and kiwi farmers. The district and survey site were selected purposively. Population for this study was kiwi farmers. Through discussion with PMAMP Ilam, a total of 285 farmers in survey site were identified. To calculate sample size, we used the formula (Daniel, 1999);

$$n = N*X / (X + N - 1),$$

Where,

$$X = Z_{\alpha/2}^2 *p*(1-p) / MOE^2,$$

and $Z_{\alpha/2}$ is the critical value of the Normal distribution at $\alpha/2$, MOE is the margin of error, p is the sample proportion, and N is the population size.

Thirty-nine kiwi farmers were selected randomly. This satisfies sample size with more than 10% of total population. This sample size was further divided into two categories of producers and non-producers. Non-producers were not engaged in production of value-added products from the beginning. Primary data was collected from the direct household interviews with household head using semi structured interview schedule, followed by **Focus** Group Discussion (FGD) and Key Informant Interview (KII) with selected individuals among farmers, executive members of farmer's group, actors of marketing channel, governmental agencies and international agencies. Secondary data was obtained from reports of government bodies and institutions, and I/NGOs.

Empirical model

Descriptive analysis and *t*-test was done using IBM SPSS Statistics 25. Logit model was employed using Stata/SE 12.1 to determine the factors determining the choice of value addition. Further, to assess the effect of each independent variable on the farmers' choice to value addition, marginal effect on those variables was estimated in the logit model.

Model specification

$$Zi = \ln [Pi/(1-Pi)] = a+b_1X_1+b_2X_2+b_3X_3+b_4X_4+b_5X_5+b_6X_6+b_7X_7+b_8X_8+b_9X_9 +U$$

Where,

Where: Pi = Is the probability of adoption and non-adoption of value addition

Pi = 1 indicates adoption

Pi = 0 indicates non-adoption

Dependent variable:

Zi = Probability of adoption of value addition

Independent variables:

X_1 = Gender (dummy)

X_2 = Age (continuous)

X_3= Education (continuous)

X_4 = Farming experience (continuous)

X_5 = Farm size (continuous)

X_6= Family size (continuous)

X_7= Off- farm income (dummy)

X_8 = Access to subsidy (dummy)

X_9 = Training (dummy)

a = Intercept

$b_1$to b_9= Regression coefficients of the dependent variables

U = Error term

The marginal probability of the factors influencing the adoption of value addition was estimated based on expressions derived from the marginal effect of the logit model.

$$dZ/dQ = \beta_i \lfloor Pi(1 - Pi) \rfloor$$

Where,

βi = Estimated logit regression coefficient with respect to the i^{th} factor

Pi = Estimated probability of using value addition by farmers

The description of the variables is presented in Table 1.

Results and discussion

Descriptive Statistics

Descriptive statistics and explanation of the variables are presented in Table 1. Result revealed that 28% of the respondents were involved in value addition. Also, 69% of the respondents were male. The average age of the respondents was 50.51 years. Respondents, on average, had 9.21 years of formal schooling. Also, average family size was 4.85. The average farming experience and farm size of respondents was 7.69 years and 6.23 Ropani respectively. Only 31% of the respondents had off farm income. Similarly, 23% of the respondents received training on value addition and 36% of the respondents had access to subsidy.

Table 1. Descriptive statistics of the dependent and independent variables used in the study

Variable	Description	Mean	SD
Dependent variable			
Value addition	=1 if respondent is producer of value-added product, 0 otherwise	0.28	0.456
Independent variable			
Gender	Gender of the respondent (=1 if male, 0 female)	0.69	0.468
Age	Age of the respondent (year)	50.51	9.352
Education	Years of formal education of the respondent (year)	9.21	2.839
Farming experience	Kiwi farming experience of respondent (year)	7.69	3.435
Farm size	Land under kiwi farming (ropani)	6.23	9.538

Family size	Respondent's household member (number)	4.85	1.424
Off-farm income	=1 if household receive off-farm income,0 otherwise	0.31	0.468
Subsidy	=1if respondent has access to subsidy,0 otherwise	0.36	0.486
Training	=1 if respondent has training on value addition,0 otherwise	0.23	0.427

Source: Field survey (2023)

Characteristics of adopters and non-adopters of value addition

Table 2. Adopter and non-adopter of value addition among the kiwi farmers

Variable	Adopter	Non-adopter	Mean difference	*t*-value
Gender	0.64	0.71	-0.078	-0.463
Age	46.45	52.11	-5.653	-1.744*
Education	11.09	8.46	2.627	2.829***
Farming experience	8.45	7.39	1.062	0.866
Farm size	13.73	3.29	10.442	3.503***
Family size	5.00	4.79	0.214	0.418
Off-farm income	0.36	0.29	0.078	0.463
Subsidy	0.64	0.25	0.386	2.365**
Training	0.64	0.07	0.565	4.602***

Source: Field Survey (2023**)**

Note: *, **, *** indicate significant at 10%, 5%, 1% level of significance, respectively.

Table 2 presents the results of differences between means of characteristics describing adopters and non-adopters of value addition. There appeared to be a significant difference in age, education,

farm size, access to subsidy and training between adopters and non-adopters. All these significant variables were significantly higher for adopters compared with non-adopter counterparts except age which was higher among non-adopters.

Production of value-added products

Table 3. Value added products in the study area

Products	Frequency (n=11)
Wine	3
Pickle	6
Jam	3
Juice	7

Source: Field survey (2023)

Note: Multiple responses were noted.

Table 3 presents the value-added products produced by the respondents in the study area. Juice was manufactured by 7 of the respondents and least manufactured products were wine and jam.

Factors influencing choice of value addition among kiwi farmers

Table 4. Logit regression analysis on estimation of factors influencing choice of value addition in the study area

Adoption	Coef.	SE	P value	dy/dx	SE (dy/dx)
Gender	1.361	2.756	0.621	0.225	0.381
Age	-0.0003	0.095	0.997	-0.00006	0.018
Education	0.310	0.592	0.600	0.059	0.103
Farming experience	-0.021	0.244	0.930	-0.004	0.047
Farm size	0.691*	0.372	0.089	0.120	0.105
Family size	0.029	0.663	0.964	0.005	0.124
Off-farm income	0.691	1.817	0.704	0.139	0.359
Subsidy	1.277	1.610	0.427	0.259	0.312
Training	2.414	1.713	0.159	0.523	0.343

Constant	-10.003	11.932	0.402		
Summary statistics					
No of observations = 39					
LR chi^2 = 29.81					
Prob>chi^2 = 0.0005					
Pseudo R^2 = 0.6425					
Log likelihood = -8.2936					

Source: Field Survey (2023)

Note: * indicate significant at 10% level of significance.

Table 4 shows the logit regression estimation on the factors influencing the choice of value addition among kiwi farmers in the study area. Results revealed that farm size was statistically significant in the adoption of value addition. Keeping other variables constant, probability of adoption of value addition increases by 12 percent with increase in farm size by one unit. Value addition often requires technology and processing infrastructure, which may require significant upfront investment. Larger farms typically have more resources available to invest in the necessary technology and equipment. A large farm has the capacity to consistently supply products over an extended period, thereby enhancing the appeal of both retailers and consumers towards choosing them, as compared to smaller farms. Similarly, larger farms have better access to governments provide incentives or subsidies due to their scale of operations to encourage value addition in agriculture. Previous studies (Khoza et al., 2019; Melembe et al., 2021) reported positive correlation between the size of farms and their inclination towards diversification using value addition technology. As with surplus production, large farms have the opportunity to explore value addition strategies. Korir et al. (2020) reported increasing farm size leads to higher yields and lower production costs, thus providing financial resources for farmers to invest in value addition activities. Result is in line with previous studies (Omitti et al., 2007; Okello et al., 2009).

Conclusion

Value addition is seen as the best alternative to safeguard kiwi growers from the low market price of fresh product. However, the adoption of value addition is low among kiwi growers. Juice was mostly produced value added product. Farm size was positive and significant in the adoption of value addition among kiwi growers. This implies that the extension agencies should primarily focus on farmers with larger farm size for better adoption. Similarly, provision to increase the farm size of the kiwi growers can be done by providing cost effective lease in options or even subsidies to lease in land. Further, group-based farming enterprises can be encouraged as joint investments, sharing of resources, and collective marketing strategies increases the adoption of value addition.

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