

# Analyzing the Economic Dynamics of Mustard Farming in Eastern Chitwan, Nepal

<sup>1</sup>Diwas Dhital; <sup>2</sup>Dr. Raj Kumar Adhikari; <sup>3</sup>Aarati Ghimire; <sup>4</sup>Ayam Poudel; <sup>5</sup>Manasha Dahal; <sup>6</sup>Ashmit Thapa

<sup>1</sup>Himalayan College of Agricultural Sciences and Technology, Purbanchal University

<sup>2</sup>Adjunct Professor of Agricultural Economics at Himalayan College of Agricultural Sciences and Technology

<sup>3</sup>Himalayan College of Agricultural Sciences and Technology, Purbanchal University

<sup>4</sup>Nepal Polytechnic Institute, Purbanchal University

<sup>5</sup>Himalayan College of Agricultural Sciences and Technology, Purbanchal University

<sup>6</sup>Himalayan College of Agricultural Sciences and Technology, Purbanchal University

Correspondence: [diwasdhital2801@gmail.com](mailto:diwasdhital2801@gmail.com)

**DOI: 10.47760/cognizance.2023.v03i11.011**

**Abstract:** Mustard cultivation boasts a rich historical legacy in Nepal, dating back to prehistoric times. Chitwan, a district located in Bagmati province, is one of major mustard producing districts of Nepal. The study entitled "Analyzing the Economic Dynamics of Mustard Farming in Eastern Chitwan, Nepal" was conducted from March 2022 to July 2022. The major objective of the study was to conduct a comprehensive economic appraisal of mustard production in Eastern Chitwan, Nepal. A total of 123 samples were taken from four municipalities of Eastern Chitwan using semi-structured questionnaire. Descriptive and statistical tools including Cobb-Douglas production function were used to analyze the collected data. Farmers were found to be cultivating mustard on an average land of 0.47 hectare with an average production of 14,283 kg per hectare. The average cost of production per hectare was calculated to be NPR 12, 01,452. Mustard production business in the study area was observed to be a profitable business enterprise with a B/C ratio of 1.78 yielding an average return of NPR 21,42,440 and net profit of NPR 9,40,988. The major identified market areas were Tandi, Khairahani bazar, Bhandara, Kholesimal and Bakulahar. The most preferred marketing channel was observed to be from producers directly to consumers. The study revealed that higher costs of fertilizer, plant protection, and labor were associated with increased gross income in mustard farming, supported by statistical significance.

**Keywords:** Benefit cost ratio, marketing channel, mustard, productivity

## Introduction

Oilseeds represent a diverse category of crops renowned for their high oil content. Oilseeds are produced in the area of 259,101 hectares with the production of 287,038 MT in Nepal (MoALD, 2022). Among the oilseeds, mustard, with a 77% share in production holds the first position in terms of both production and cultivated area in Nepal (MoALD, 2022). The term "must" is derived from the Latin word "mustum," which refers to "mustum ordents," which unique Romanian condiments are made by combining mustard seeds and fluids from ripe fruits and grapes. The three primary species of mustard: Pale yellow or white mustard (*Sinapsis alba* syn. *Brassica hirta* Moench /*Brassica alba*.), Brown or oriental mustard (*Brassica juncea*) and Black or

dark brown mustard (*Brassica nigra*). These are the popular condiments species of mustard from Brassicaceae family (Hrideek et al., 2004).

Mustard oil, beneficial for heart health and with multiple health advantages, traditionally graces Nepalese kitchens due to its aromatic qualities. However, the popularity of pure mustard oil is waning as imported and adulterated options flood the market. Imports have surged by 70%, amounting to 7.85 billion rupees, impacting various industries, including food products (Rajopadhaya, 2022).

Mustard is a nutritious food that offers various health benefits. Mustard is a notable energy-dense source which provides 1,964 KJ (469 k Cal) per serving. Furthermore, it is rich in numerous minerals like calcium, magnesium, iron, phosphorus, potassium and selenium. Moreover, mustard contains dietary carbohydrates dietary fiber, fats, protein and a well-balanced macronutrients. It aids metabolism and an overall wellbeing of an individual through the supply of vitamins such as Vitamins. Mustard, a good source of polyunsaturated fatty acids and antioxidants, not only promotes health but also protect against various diseases. Minerals such as calcium, iron, manganese, phosphorus and zinc are abundantly present in mustard which furnishes its micronutrient profile and evidently makes it suitable to those with sodium restrict diets. In conclusion, mustard, along with its diverse nutritional profile, fulfills energy demands, nutrient intake and an overall health. (Raikwar, 2019).

However, the mustard industry faces production, processing, and marketing constraints. Challenges include outdated agricultural practices, weather risks, lack of knowledge about modern techniques, and insufficient marketing access. Changing preferences for cash crops, pest infestations, and quality issues contribute to decline in mustard production. The financial year 2018/2019 records indicate that Nepal imported about 18,000 tons of mustard seed (Rai, 2022). The pure mustard oil sold at higher price points is not as popular with consumers as the adulterated mustard oil sold at low prices in shopping markets (Rai, 2022)

Nepal has a huge potential for producing mustard at its best. Hence, the production may be sufficient for both domestic consumption and international trade. (Devkota, 2016). The study's beneficiaries encompass a diverse range of stakeholders deeply involved in mustard's production, processing, and marketing in eastern Chitwan. These include the government, non-governmental organizations (NGOs and INGOs), researchers traders, extension agents, students, consumers, suppliers, and most crucially, Nepalese farmers. These findings are indispensable for refining strategies, policies, and plans within their respective domains. Nepalese farmers will gain a more comprehensive understanding of the economic aspects of mustard production, enabling them to initiate their own mustard farming endeavors using the economic insights derived from this research.

The overarching objective of this study is to comprehensively examine the economics of mustard production in Eastern Chitwan, Nepal, encompassing an analysis of socio-demographic characteristics, marketing channels, production costs, and a SWOT analysis for the mustard production sector.

## Materials and Methods

### Study Area and Sample Size Determination

Study was conducted in Eastern Chitwan of Nepal owing to the popularity of mustard production in the region. Chitwan covers an expanse of 2,238.39 square kilometers and serves as the home to a population of 279,087 males and 300,897 females. Located at coordinates 27° 34' 59.99"N latitude and 84° 30' 59.99" E longitude, Chitwan boasts abundant vegetation and holds great promise for both the tourism and agricultural sectors (Subedi, 2022)

Random sampling procedure was used to select the respondents. From the study site, four municipalities were chosen: Kalika, Ratnanagar, Rapti and Khairahani. Each municipality is big in its area, and mustard growers live all over these municipalities. In order to narrow down the selection procedure, 2-3 wards from each municipality were considered. Before carrying out the study survey, a pilot survey was performed in Kalika municipality to analyze the questionnaire relevancy and improvise the questionnaires as per requirements. A total of 123 samples of mustard growers were collected from Eastern Chitwan, 30 samples from

each municipality. Also, 5 wholesalers, 10 millers and 10 retailers were purposely selected and interviewed from each municipality to know about the market prospects of the study area.

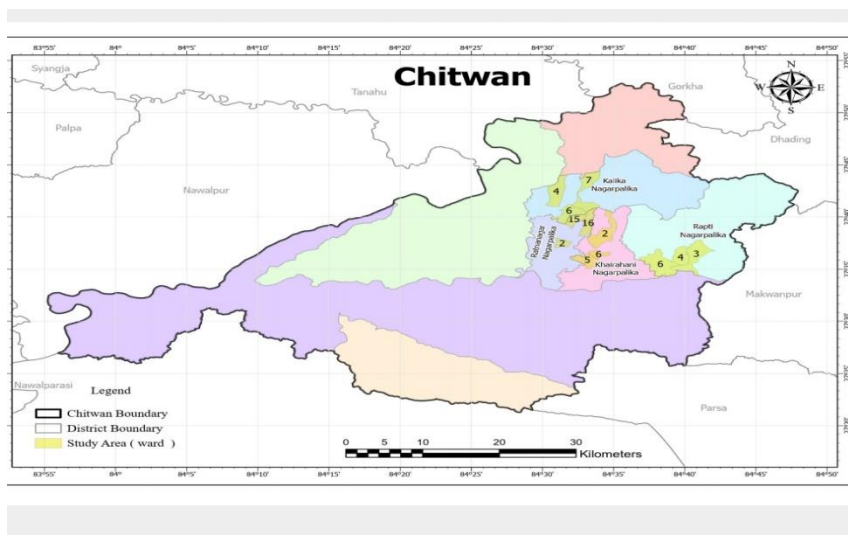


Fig 1: Map of study area

Table 1: Sample size details for the study

Municipalities	Wards	Sample size
Kalika municipality	6, 7, 4	30
Ratnanagar municipality	15,16, 2	33
Rapti municipality	6, 4, 3	30
Khairahani municipality	6, 5, 2	30
<b>Total</b>		<b>123</b>

**Source of information**

Primary data was collected by using semi-structured survey questionnaires from farmers and Key Informants Interview. The source of secondary data was published and unpublished books, journals, newspapers, research papers, magazines, annual publications, reports, related documents published by NARC, NGOs/INGOs, universities etc.

**Data Analysis**

Data Analysis was performed using MS Excel and IBM SPSS. Data analysis performed was:

**I. Cost of mustard production**

Cost of production is the sum total of all the variable cost and fixed cost incurred during the production process.

Cost of production= Total Fixed Cost (TFC) + Total Variable Cost (TVC)

TVC =  $\sum C_i$ , where:

$C_i$  represents the individual cost components, such as:  $C_{Laborers}$  for labor costs,  $C_{Protection}$  for protection costs,  $C_{Threshing}$  for threshing costs,  $C_{CFertilizer}$  for chemical fertilizer costs  $C_{OFertilizer}$  for organic fertilizer costs,  $C_{Storage}$  for storage costs, and  $C_{Irrigation}$  for irrigation costs.

TFC =  $\sum C_j$ , where:

$C_j$  represents the individual cost components, such as:  $C_{Equipments}$  for equipment costs, Land Tax for land tax expenses,  $C_{Lease}$  for lease costs, and  $C_{Machinery}$  for machinery-related expenses.

2. **Production Function Analysis**

Cobb-Douglas regression model was used in SPSS to estimate the production function and determine the factor affecting mustard production in eastern Chitwan. The general form of Cobb-Douglas production function used was:

$$Y=X_1^{b_1} X_2^{b_2} X_3^{b_3} X_4^{b_4} X_5^{b_5}$$

Where, Y= Gross return (NPR/kattha), X1=Cost on seed (NPR/kattha), X2=Cost on Fertilizer (NPR/kattha), X3= Cost on plant protection (NPR/kattha), X4= Cost on labor (NPR/kattha), X5=cost on machinery use (NPR/kattha) and b1, b2...b5 are coefficient of respective variable. (Cobb & Douglas, 1928).

3. **Problem Ranking**

Production problem rankings were carried out using a forced ranking method.

$$I_{imp} = \frac{\sum S_i F_i}{N}$$

Where,

$I_{imp}$  = Index of Importance

$\sum$  = Summation

$S_i$  =  $i^{th}$  scale value

$F_i$  = Frequency of  $i^{th}$  importance given by respondents

N= Total number of respondents

4. **Benefit Cost Ratio:** Benefit cost ratio (BCR) was calculated by using the following formula as mentioned in (Tunde, et.al., 2015) i.e.

$$B/C \text{ ratio} = \frac{\text{Gross return}}{\text{Total cost}}$$

5. **Profitability analysis**

Gross return = Total average production  $\times$  average cost

Net profit = Total revenue – Total Cost

Gross Margin= Gross farm income – Total variable cost (Olukosi et al., 2006)

6. **Price spread**

Price spread for a particular product or market can be calculated by subtracting the cost at one stage of the supply chain from the price at another stage. The general formula:

Price Spread = Price at Retail (Consumer Price) – Price at Producer (or Wholesale Price)

**Results and Discussions**

**Socio-demographic Attributes**

In the study area, 67% of the people surveyed were male, and 33% were female. The literacy rate was 74.79%, which means that most mustard farmers had basic education. However, about 25.21% of the farmers didn't have basic academic knowledge but had gained experience over the years in mustard farming. In context with community, primarily, the Brahmin community dominates among the respondents with (55%), followed by Janajati community with (28%). Finally, the Chhetri and Dalit community contributes to (17%) and (8%) respectively.

**Table 2: Demographic characteristics of respondents in study area**

S.N	Particulars	Units	Minimum	Maximum	Average	Mode
1.	Age	Years	21	77	49.30	50
2.	Family size	Number	3	11	5	5
3.	Education	Years	0	18	7	10
4.	Experience in mustard production	Years	4	45	18.43	10
5.	Own land for mustard production	Kattha	0	9	12.341	20
6.	Leased land for mustard production	Kattha	0	30	1.621	0
7.	Total land for mustard production	Kattha	4	96	14.264	20

### Cultivation Information

Good-quality seeds are vital for getting the best crop yield, and this is true for mustard farming too. In the study on mustard production, it was found that more than half of the farmers, which is 55%, use seeds they've acquired themselves. Some farmers, about 23%, buy seeds from agricultural supply stores, while approximately 18% get their seeds from neighbors at a fair price. Only a small percentage, just 4%, obtains seeds from other sources like cooperatives and local government offices. In the eastern part of Chitwan, where mustard is grown, farmers are fortunate to have good irrigation facilities, mainly thanks to the Rapti River. Most farmers use deep wells for irrigation, with only 25% relying solely on rain. Another 20% use deep wells along with rain, and a majority of 55% use furrows to water their fields in addition to rain. This helps them grow mustard more effectively.

### Land possessions

Nepalese farmers have small and scattered areas of farmland. They own enough land for their basic farming needs, but when it comes to growing mustard and other crops for business, they often lease additional land. Most of the respondent farmers in the study, around 96%, cultivate on their own land. However, 20% of them also lease land in addition to their own. Only 4% of the respondents were found to rely entirely on leased land. The leasing rates for this land vary. In the study, it was found that 12% of farmers paid higher rates between NRs. 4000 and NRs. 5000 per Kattha annually, while 20% paid NRs. 3500 per Kattha each year. Another 56% paid rates between NRs. 3000 and NRs. 2500 per Kattha per year. The lowest rate, at NRs. 2000 per Kattha annually, was paid by 12% of the farmers of the survey. These leasing practices play a significant role in mustard and agricultural production in the region.

### Institutional Attributes

Almost 100% of respondents acquired cultivation information, crop pest and management, fertilizers and harvesting information from agro-vets within a 5 km radius.

Out of the marginalized respondents, a significant 76% were observed to be deprived of government subsidies. Only 24% of the total sample population received government subsidies in the form of cash, subsidized pesticide sprayer tanks, grass cutters, and subsidized fertilizer.

### Economics of mustard production

#### Fixed cost of production

Fixed costs incurred were identified as per hectare land lease cost, land tax per hectare and depreciation of sprayer, weighing machine, irrigation pipe, electric motor, sickle and spade per hectare. The various fixed costs incurred in production of mustard per hectare was calculated as NRs. 65201.28.

**Table 3: Fixed cost incurred in mustard production**

Fixed Cost	Amount (NRs. /ha)	Percentage
Land tax	4500	7.19%
Land lease amount	17243.9	27.58%
Depreciation	40757.38	65.21%
<b>Total Fixed Cost (TFC)</b>	<b>NRs. 62501.28</b>	<b>100%</b>

**Variable cost of production**

The various variable inputs needed in mustard cultivation were seeds, Farm Yard Manure (FYM), Fertilizers such as Urea, DAP and potash, pesticides and vitamins, sack, laborers and application cost, threshing cost and intercultural operation cost. The average fixed cost incurred in production of mustard per hectare was calculated as NRs. 1,138, 951.

**Table 4: Variable cost incurred in mustard production**

Particulars	Amount (NPR /ha)	Percentage of Total cost (TC)
<b><u>I. Material cost</u></b>		
Seed	84985	8%
FYM	170488	15%
Urea	28794	3%
DAP	45606	4%
Potash	15541	1%
Pesticides and vitamins	26821	2%
Sack	4131	0.4%
<b><u>II. Labor cost</u></b>		
Field plough	219537	18.6%
Irrigation	21329	2%
FYM application	73902	7%
Seed application	27439	3%
Fertilizer application	32634	3%
Intercultural operation	97268	7%
Pesticide and vitamin application	29268	3%
Harvesting	180146	16%
Threshing	81062	7%
<b>Total Variable Cost (TVC)</b>	<b>NPR 1,138,951</b>	<b>100%</b>



**Total cost of production**

Total Cost was found to be NPR 1,201,452/hectare.

**Table 5: Total cost of production of mustard**

S. N	Particulars	Amount (NRs. /ha)	Percentage
1	Total fixed cost	62,501	5%
2	Total variable cost	1,138,951	95%
	<b>Total cost (TC)</b>	<b>1,201,452</b>	<b>100%</b>

**Profitability Analysis**

**Return from the mustard cultivation**

The average mustard production of the total sample household per hectare was calculated to be 14282.9 kg. The average per kg rate of mustard seed that period was NPR 150. Hence, the average Gross Return was calculated to be NRs. 2,142,440.

**Table 6: Gross return from the mustard cultivation**

Description	Quantity (kg)	Average rate (NPR/kg)	Gross Return/ha
Average production per hectare	14282.93	150	2,142,440

**Net profit from mustard production**

$$\begin{aligned} \text{Net profit} &= \text{Total average revenue} - \text{Total average cost (TFC + TVC)} \\ &= 2,142,440 - 1,201,452 \\ &= \text{NPR } 940,988/ \text{ hectare} \end{aligned}$$

**Gross Margin from mustard Cultivation**

$$\begin{aligned} \text{Gross Margin} &= \text{Gross Revenue} - \text{Total Variable Cost} \\ &= 2,142,440 - 1,138,951 \\ &= \text{NPR } 1,003,489/ \text{ hectare} \end{aligned}$$

**Benefit cost ratio of mustard cultivation**

Benefit-cost ratio was calculated as:

$$\begin{aligned} \text{B/C Ratio} &= \frac{\text{Gross return}}{\text{Total cost}} \\ &= 2,142,440/1,201,452 \\ &= 1.78 \end{aligned}$$

Based on the study's findings, it was noted that the average benefit-cost ratio (B/C ratio) for mustard farming was 1.78. Thus the finding, BCR, was in line with the 1.43 BCR finding of Dhakal et. Al., 2015 This supports the assertion that mustard farming is a profitable business.

**Production Function Analysis**

The coefficient of multiple determinations R<sup>2</sup> of the model was 0.642. R<sup>2</sup> value indicates that 64.2% of the variation in gross income from mustard was explained by the independent variables which were included in the model.

The F value of the equation was 34.300 which is highly significant at 5 percent level of significance indicating that the variation of gross income mainly depends on the explanatory variable included in the model. The estimated coefficient and related statistics of Cobb-Douglas production function is presented in the table below.

**Table 7: Estimated value of coefficients and related statistics of Cobb-Douglas production function of mustard production**

Explanatory Variables	Coefficient	Std. Error	t-value	Level of Significance
Constant	2.93	0.746	3.927	0.000
Cost of Seed (X1)	0.95	0.097	0.982	0.329
Cost of Fertilizer (X2)	0.080***	0.040	1.981	0.5
Cost of Plant Protection (X3)	0.226***	0.081	2.8	0.006
Labor Cost (X4)	0.549***	0.145	3.771	0.000
Machinery Use Cost( X5)	0.008	0.126	0.066	0.947

\*\*\* significant at 5 percent level

Dependent Variable: logarithmic value of Gross income from Mustard.

$R^2 = 0.642$ , Adjusted  $R^2 = 0.623$ ,  $F$ -value=34.400, return to scale=1.813

Notably, the cost of fertilizer exhibits a positive relationship with gross income, with each 1% increase in fertilizer costs associated with a 0.08% increase in gross income, a relationship deemed reliable at a 5% significance level. Similarly, the cost of plant protection and labor costs also demonstrate positive correlations with income, with increases in these costs leading to higher income levels. The constant term represents the baseline income, signifying the minimum income even when all other factors are zero. These findings offer valuable insights into resource allocation and investment decisions for mustard cultivation, as they highlight the significant impact of these cost factors on overall income, bolstered by their statistical significance. Returns to scale value of 1.813 suggest that an increase in the scale of production leads to a proportionally larger increase in output.

**Marketing Attributes**

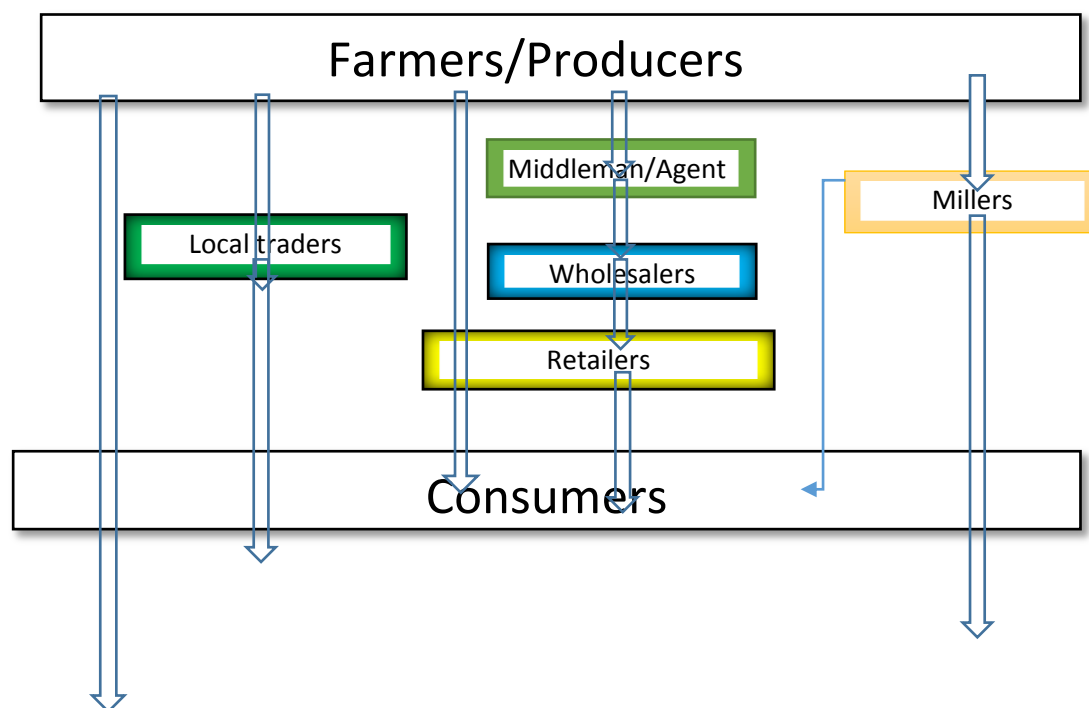
The study shows 57% of the respondents visit directly to their nearest market to inquire about the market scenario. 31% of the respondents in the study site gained market information from their neighbor .Other sources such as relatives, co-operatives, television, radio, internet etc. contributes a vital information source to 12% of the respondents in the study area. Maximum farmers lived within 1 km distance of their nearest major markets. In the study area, there were mainly six marketing channels that were predominantly involved in linking producers and consumers gaps.

The prevailing marketing channels were:

**Table 8: Marketing channels prevailing in the study area**

Channels	Channel description	Channel adoption
Channel 1	Producers to Consumers	This channel was seen adopted by 25% respondents
Channel 2	Producers to Local traders to Consumers	Approximately 10% respondents adopted this channel
Channel 3	Producers to Middleman to Wholesalers to Retailers to Consumers	Only 7% respondents were observed performing their business in this channel
Channel 4	Producers to Wholesalers to Retailers to Consumers	This marketing channel was adopted by 20% respondents in the study site.
Channel 5	Producers to Millers to Consumers	This channel was seen popular among 17% respondents in the site





**Fig 2: Marketing channels prevailing in the study area**

**Major markets**

The primary markets in the study area are situated in Tadi, Khaireni Bazaar, Kholesimal, Bakulahar, and Bhandara. Additionally, there are numerous smaller local markets actively engaged in buying and selling mustard at the local level. Tadi stands out as the most popular major market in eastern Chitwan, where 29% of the respondents reside. Bhandara offers various wholesale and retail markets, as well as milling establishments, attracting 24% of the respondents. Kholesimal serves as a significant market hub in Kalika Municipality, with 20% of the respondents conducting their mustard-related economic activities there. Khaireni Bazaar, located past Tandi Bazaar, serves as a major market location for 21% of the sampled population in Khaireni Municipality. Finally, a smaller proportion of 6% of the respondents were observed to be residing in the Bakulahar markets.

**Table 9: Major markets in the study area**

Markets	Percentage
Tadi	29
Bhandara	24
Khaireni bazaar	21
Kholesimal	20
Bakulahar	6

**Price spread**

$$\begin{aligned} \text{Price Spread} &= \text{Price at Retail (Consumer Price)} - \text{Price at Producer (Farm gate price)} \\ &= \text{NPR.170} - \text{NPR150} \end{aligned}$$

= NPR 20

Producer’s share is the proportion of the consumer’s payment received by the producers.

$$\begin{aligned} \text{Producer's share} &= \frac{\text{Farm gate price}}{\text{Consumer's price}} \\ &= \frac{150}{170} \\ &= 88.23\% \end{aligned}$$

**Table 10: Marketing margin and producers share of mustard production**

Average Farm gate price (NRs/kg)	Average Retail Price (NRs/kg)	Average Marketing margin (NRs/kg)	Producer’s share in consumers price
150	170	20	88.23%

**Ranking production problems of study area on the basis of their severity (Forced Ranking Method)**

In, order to identify the problems of the mustard production scaling method was used. The formula goes by;

$$I_{\text{prob}} = \sum SiFi / N$$

Where,

$I_{\text{prob}}$ = Index value for intensity of problem (0 to 1,)

$S_i$ = scale value at  $i^{\text{th}}$  severity,

$F_i$ = frequency of the  $i^{\text{th}}$  severity,

$N$ = Respondents total number

$\sum$  = Summation

This technique for ranking the problems in the production process was also used by Pandey et al., in 2021 for ranking production problems in cauliflower in Dhading district of Nepal. (Pandey, et al., 2021)

**Table 11 Ranking problems of study area on the basis of their severity**

Major problems	Severity	Rank
Expensive and insufficient availability of fertilizers	0.88	I
Biased government subsidy	0.7	II
Weather unpredictability	0.38	VI
Lack of related policies	0.47	V
Lack of financial support	0.51	IV
Diseases and pest infestation	0.56	III

The study highlighted that the lack of adequate and affordable fertilizers is the most critical issue, with the government subsidy favoring privileged farmers being the next significant challenge. There was a noticeable shortage of necessary chemical fertilizers, and this gap in supply and demand was bridged by traders selling them at elevated prices. Diseases and pest attacks, insufficient financial backing, absence of relevant policies, and unpredictable weather were ranked in increasing order of severity as additional challenges.

### SWOT Analysis

Strengths	Weakness
<p>High value cash crop                      Easy marketing of the crop                      Evergreen demand for oil and mustard cake; a byproduct                      Easy access to agro-vet services                      Good transportation facility for marketing                      No need of intensive irrigation                      Readily availability of cheap laborers for cultivation practices.                      Suitable topography for use of FPM technology during field preparation and threshing facility after harvest                      Very low maintenance needed for the crop field                      Ensures good quality of self-produced mustard oil for consumption                      Proximity to major markets                      Increasing demand for pure mustard oil for various purposes                      Easy access of FYM for field preparation</p>	<p>High input cost of fertilizers and pesticides                      Black market of fertilizers and unavailability in sufficient quantity                      Lack of varietal extension knowledge and their seeds                      High cost for use of FPM in field preparation and threshing.                      Inadequate scientific research, mustard laboratories and research center                      Access of subsidy facility only to privileged but marginalized farmers are unaware of it.                      Unrecognized value of mustard cake                      Insufficient technical advice on mustard enterprises                      Poor farm management practices                      Fragmented cultivation leading to its subsistence use                      Mustard production popular among old generations and less involvement of progressive youths in the field</p>
Opportunities	Threats
<p>A huge gap in demand and supply in the market                      Increasing awareness about the health benefits of pure oil                      Growing fish farming practices and need of mustard cake in the enterprise                      Government emphasis on use of national product instead of importing                      Recognition of mustard as high value cash crop                      Consumers inclination towards health post COVID-19 period                      Readily available extension service throughout district                      Government subsidy plans and policy to enhance production</p>	<p>Unpredictable weather conditions                      Increasing trend of import and competitors outside the country                      Consumers lured to adulterated imported product owing to its intensive marketing                      Brain drain of educated entrepreneurs                      Banana farming substituting the mustard cultivation trend.</p>

### Conclusion and Recommendations

Mustard cultivation proves profitable for a diverse range of individuals in terms of age, gender, socio-demographics, academics, and finances, with an average benefit-cost ratio of 1.78. Despite agricultural limitations, there's strong demand for labor throughout the production process. The SWOT analysis highlights constraints but underscores mustard production's potential due to credit facilities, increasing demand for mustard oil, and its versatile uses. In addition to its commercial value, domestic production is driven by its health, medicinal, and aesthetic benefits, with a dominant marketing channel being Producer-to-Consumer. Mustard is emerging as a highly lucrative cash crop among Nepalese farmers.

Based on the findings and conclusions, the key recommendations are:

- I. Promote Equitable Subsidy Distribution: Ensure fair distribution of government subsidies to all farmers involved in production, regardless of their privileges, to support inclusive agricultural development.
- II. Enhance Input Accessibility: Encourage input suppliers to make essential resources like seeds, fertilizers, and pesticides readily available in sufficient quantities to all mustard growers, facilitating increased production.
- III. Optimize Marketing and Protection: Encourage farmers to expand their cultivation areas, find suitable marketing channels for their produce, and urge the government to provide efficient extension services for plant protection to mitigate economic losses.

## References

1. Cobb, C.W., & Douglas, P.H. (1928). *A theory of Production*. American Economic Review, 139-165.
2. Devkota, K., Dhakal, S.C. and Thapa, R.B, 2016. *Economics of beekeeping as pollination management practices adopted by farmers in Chiwan district of Nepal*. Agric and Food Secur 5,6
3. Dhakal, S., Regmi, P., Thapa, R., Sah, S. and Khatri-Chhetri, D., 2015. *Resource Use Efficiency of Mustard Production in Chitwan District of Nepal*. International Journal of Applied Sciences and Biotechnology, 3(4), pp.604-608.
4. Hrideek T.K , Thomas J, Kuruvilla K.M. (2004), *Mustard, hand book of herbs and species, chapter 12*, Wood Head Publishing Limited, Abington Hall, Abington.
5. MOALD. (2022). *Statistical Information on Nepalese Agriculture 2078/79* , Singha Durbar, Kathmandu, Nepal: Ministry of Agriculture and Livestock Development.
6. Olukosi, J.O., Isitor, S.U., & Ode M.O. (2006). *Introduction to agricultural marketing and prices: principle and application*. American J. Agri and Forestry, 199-205
7. Pandeya, A., Jhaa, N., Gaireb, K.R., Thapaa, G. and Karkib, R., *ECONOMICS OF EARLY-SEASON CAULIFLOWER PRODUCTION AND MARKETING IN DHADING DISTRICT OF NEPAL*.
8. Rai, S. 2022. *Mustard oil, once king of the kitchen, sees fewer buyers*[online] Available at: <<https://kathmandupost.com/21/2019/10/01/mustard-oil-once-king-of-the-kitchen-sees-fewer-buyers>>
9. Raikwar, R. (2019), *Rapeseed and Mustard 978-3-659-91833-9*, Retrieved from [https://www.researchgate.net/publication/333207502\\_Rapeseed\\_and\\_Mustardf\\_978-3-659-91833-9](https://www.researchgate.net/publication/333207502_Rapeseed_and_Mustardf_978-3-659-91833-9)
10. Rajopadhaya, A. (2022). *Khokana hasn't stopped producing mustard oil, but the mode of production has changed* – OnlineKhabar English news [online] Available at; <<https://english.onlinekhabar.com/khokana-hasnt-stopped-producing-mustard-oil-but-the-mode-of-production-has-changed.html>>
11. Tunde, A.B., Kuton, M.P., Oladipo, A.A., & Olasunkanmi, L.R. (2015). *Economic Analyze of Costs and Return of Fish Farming in Saki-East Local Government Area of Oyo State, Nigeria*. Journal of Aquaculture Research & Development, 6(2). Retrieved from <https://doi.org/10.4172/2155-9546.1000306>.
12. Subedi, N. 2022. *Chitwan District Information: Chitwan Tourism*. [online] Available at: <<https://www.chitwantourism.com/articles-and-information/chitwan-district-information.php>>