Economics of production and marketing of Cucumber in Nawalpur district of Nepal

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Article Info

ABSTRACT

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This study was carried out during February to March in 2020 to analyze the production and marketing of cucumber in the Nawalpur district of Nepal. The study was designed to perform cost-benefit analysis, assess the current marketing situation, and perform the SWOT (strengths, weaknesses, opportunities, and threats) analysis. Both primary and secondary data were collected for this study. A total sample size of 120 farmers from two rural municipalities (Binayee Tribeni and Bungdikali) was selected using a simple random sampling technique. Similarly, 25 traders, 10 consumers, 5 agrovets and 3 middlemen were also surveyed. Secondary data were collected from municipalities, Agriculture Knowledge Centre, MOAD (Ministry of Agriculture Development), online websites, and library sources. Results revealed that the benefit-cost ratio was 3.22 in the study area. The market margin and net profit were NRs. 37 kg⁻¹ and NRs. 674560.4 ha⁻¹, respectively. The producer's share in the consumer's price was 38.33%. This study showed the unavailability of inputs in time was the most serious problem during production followed by disease and insect outbreak. The major problem associated with marketing was the perishable nature of the product followed by a low price.

INTRODUCTION

Cucumber (*Cucumis sativus* L.), an extensively cultivated vegetable plant, belongs to the "Cucurbitaceae" family. It is native to Southern Asia. In Nepal, it is cultivated from Terai to high hills; altitude ranging from 100 masl to 1800 masl. Three main forms of cucumber: slicing, pickling, and burpless have been cultivated across the globe and within these varieties, numerous other cultivars have been introduced in the market (Reddy 2015). It is grown as subsistence as well as a commercial crop. It is considered to be a high potential crop for processing in the future (Shrestha and Ghimire 1996). Cucumber has medicinal values. It is widely consumed in salads, pickle, or most frequently eaten in the preserved form (Mukherjee et al. 2013). This cash crop can generate large remuneration and can help

alleviating the poverty and strengthening the food security situation of the country as well.

With almost 65.1% country's denizens engrossed in farming (Khanal and Shrestha, 2019), Horticulture sector contributes 21.42% of the National AGDP (Agricultural Gross Domestic Product) (MOAD 2015). Vegetable production solely contributes about 9.71% to Agricultural Gross Domestic Product (MoF 2015). The area, production, and productivity of cucumber in Nepal is 9396.80 ha, 159041.80 ton (t), and 16.9 t ha⁻¹ respectively (MOALD 2019). The area, production, and productivity of cucumber in Nawalpur are 90 hectares, 1099.8 mt, and 12.22 t ha⁻¹ respectively (MOAD 2016). Despite being high-value cash crops, Nepalese farmers continue to experience low returns from cucumber cultivation; this might be due to fluctuation in price, marketing problems, and intervention of middlemen in price fixing and being perishable in nature as well and import of large quantity of vegetables from India. Concerning agricultural marketing in Nepal, a broad remark had been such that the traders mostly tried transferring all kinds of price risks to farmers offering them a low price by making the

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monopsonistic situation (Ghimire et al. 2018). Furthermore, diseases and pests, high price of inputs, irrigation problems, climatic uncertainty, insufficiency of needed inputs are the major bottlenecks for cucumber production. Meanwhile, lack of marketing information, uncertainty in selling price, unmanaged marketing extension services during marketing. Value chain actors do not have good coordination because of paucity of knowledge about the market information system. Though having many constraints and challenges in production, the situation of cucumber is still progressing (Shrestha 2008). The demand is high in comparison to the supply. The import of cucumber is very high, especially from India. There is a huge scope of producing the cucumber. In Nepal, to date, very little research works have been performed on the value chain of cucumber in central Terai, due to which very few farmers are known about the supply chain, value chain, and marketing of cucumber (Karki 2002). The current study aimed to assess the cost and return of cucumber production in addition to its marketing system in Nawalpur district of Nepal.

MATERIALS AND METHODS

Description of Study Area

Two rural municipalities; Binayee Tribeni and Bungdikali of Nawalpur district of central Terai, the southernmost part of Gandaki province of the Federal Republic of Nepal (Previously known as Western region), with latitude 27.8149° N and longitude 85.6281° E was selected for this study. The selection was based on the identifiable number of cucumber cultivating peasants, field coverage under cucumber production, and access to market facilities. The study area almost shared the border with India in the south. The climate of this region favored the optimum production of cucumber. For that reason, the majority of the farmers were engaged in commercial cucumber production. The location of study was given in Figure 1.

Figure 1. Map of Nepal showing the studied area

Data collection and Sampling techniques

The study was conducted during February-March 2020. A total of 120 farmers were selected randomly, 25 traders (wholesalers and retailers), 10

consumers, 5 agro vets, and 3 middlemen were selected and interviewed from the two rural municipalities of the study areas. The data was collected through both primary and secondary methods using different sources of techniques. Primary data was collected to obtain the farming data through Key Informant Survey (KIS), questionnaire survey and Focus Group Discussion (FGD). Similarly the municipalities working papers, Ministry of Agriculture Development (MoAD) profile, annual reports, journals, Center Bureau of Statistics (CBS), Nepal Agriculture Research Council (NARC), etc. are the sources of secondary data.

Data Analysis

Data analysis was performed for evaluation of the economics of production, producer's share, and mode category by employing Microsoft Excel 2010 and SPSS 25.0. Also, the value chain mapping and SWOT analysis were also evaluated.

Analytical approaches

Socio-demographic analysis

Statistical variables like frequency, percentages, and means were used as various variables for the evaluation of different components like family size, occupation, educational level, size of landholding, and so on.

Cost of production

All sorts of the cost incurred during cucumber production like land cost, cost of inputs (Farm Yard Manure, pesticides, seed cost, labor wages, weeding cost, fertilizer cost, etc.), harvesting, and other costs were calculated. Only variable cost items were assumed during the analysis of the cost of production. The total variable cost was calculated by adding the cost incurred while paying for variable inputs.

Value chain mapping

Mapping was done on the basis of data collected from interviews through the farmers. It represents the graphic chain of activities and services from production to the consumption process and the actors involved in them (Monteiro et al. 2017). The linkages are represented vertically from the bottom to the top of the value chain. The left-hand block places the major function of the chain.

Benefit-cost analysis

It was done to find out the better way of obtaining optimum returns from sales. The average price of cucumber for both the municipalities was calculated. Benefit-cost ratio (B/C ratio) was calculated using the following formula (Subedi et al. 2019).

$$B/C = \text{Gross returns} / \text{Total variable costs}$$

Where, Gross returns = Total cucumber production (kg) × Price of cucumber, Total variable costs = sum total of all variable costs.

Producer's share (Ps)

The price which the producers received (farm-gate price) as the percentage of retail price is calculated which means the price paid by the consumers in purchasing the cucumber. It is calculated as:

$$Ps = (Pf / Pr) \times 100$$

Where, Pf = Producer's price, Pr = Retailer's price, Ps = Producer's share

Scaling technique

Scaling technique, with five-point scale (0.2, 0.4, 0.6, 0.8, and 1.0) was applied to find out the seriousness of the production and marketing problems during cucumber farming. Farmers were asked to choose different categories signifying different strengths of agreement and disagreement. This category was scored and the sum of the scores measures farmer's attitudes towards certain problems. The index of importance was calculated through the following formula;

$$I_{imp} = \sum (Si \cdot fi / N)$$

Where I_{imp} = Index of importance

$\sum$ = summation

Si = Scale value

fi = frequency of importance given by farmers

N = Total number of farmers

SWOT analysis

SWOT analysis as a scanning tool was used to identify the strength, weaknesses, opportunities, and threats related to the cucumber production. SWOT analysis was effective to determine changes which can be usefully made. This tool provides a framework for understanding controllable internal and external factors that the interventions should address for the entire value chain (Shrestha and Shrestha 2018).

RESULTS AND DISCUSSION

Socio-demographic and farm characteristics

The majority (38%) of the respondents had 6-10 years of experience. Out of the total respondents, 12.5% was illiterate, 19.16% had primary, 24.16% had secondary and 44.18 had higher education levels. Most of the respondent's income was relied on agriculture only (60%) followed by services with agriculture (20.33%); Abroad and agriculture occupied 10.88% and ultimately business with agriculture by 8.33%.

Green long variety of cucumber was most widely grown (29.96%) among the farmers followed by Bhaktapur Local (28.63%), Karma (23.12%), and Malini (18.29%). The farmers were classified based on the cucumber cultivation area. The 65% of farmers were categorized as small landholders (<0.5 ha) and 35% as large landholders (> 0.5 ha) (Table 1).

Trend of cucumber production

The trend analysis of the area, production, and yield of cucumber production since a few years in Nawalpur was analyzed (Figure 2) that showed a fluctuation. Green long, Bhaktapur Local, Malini F1, Raja F1; Karma F1, etc. were the most widely cultivated varieties of cucumber throughout the low hills of Terai.

Figure 2. Area, production and yield of cucumber in Nawalpur district of Nepal.

Major actors in the value chain and their functions

The major actors involved were producers, traders, wholesalers, retailers, consumers, input suppliers, and enablers and facilitators. The price varied with the chain; from producers to consumers (Table 2).

Table 3 showed that there was a large profit (47.83%) for the traders who acted as the middlemen in the supply chain. However, the producers were compelled to sell the cucumber at low prices (NRs. 23 kg⁻¹). Consumers purchased the cucumber from retailers in NRs. 60 kg⁻¹. There was variation in prices with the seasons and accessibility to the market area. There were not fixed policies for selling prices of the products in the study area. The wholesalers were often the big mart owner with many storage units. The retailers were the small mart holder, usually the street vendor.

Actors involved in cucumber production

Input suppliers:

Agricultural inputs, FYM/manure, chemical fertilizer, pesticides, seeds, and farm equipment were the inputs required for cucumber production; inputs traders (agro-vet) were the major supplier in Nawalpur district. Very often, NGOs, farmers groups, and cooperatives also distributed the

Table 1. Socio-demographic and farm characteristics of the study area

Characteristics	Frequency (N=120)	Percentage (%)	Mode category
Gender			
Male	48	40	Female
Female	72	60	
Educational level			
Illiterate	15	12.5	Under graduate
Primary	23	19.16	
Secondary	29	24.16	
Higher secondary	53	44.18	
Source of income			
Agriculture only	72	60	Agriculture and services
Services with agriculture	25	20.33	
Abroad and agriculture	13	10.88	
Business with agriculture	10	8.33	
Years of experience of respondents on farming			
0-5 years	22	18.33	7 years
6-10 years	45	37.5	
11-15 years	21	17.5	
16-20 years	9	7.5	
20+ years	23	19.16	
Varieties of cucumber cultivated			
Bhaktapure local	34	28.33	Green long
Green long	36	30	
Malini	22	18.33	
Karma	28	23.33	
Cucumber cultivated land			
Small (< 0.5 ha)	78	65	0.35 ha
Large (> 0.5 ha)	42	35	

necessary inputs to farmers. Generally, farmers depend on locally available inputs and information. In this manner, there was no impediment to farm equipment availability. The majority (72%) of the farmers applied FYM/ organic manure instead of chemical fertilizers. The dominant group (68%) of the farmers had to rely on the informal sector to obtain seed; they might be relatives or neighbors, field saved seeds or seeds bought from the local market. However, few of the producers got seed from the formal sector; agro-vet, seed distributors, companies, etc. Local inputs companies, Research centers, and Agricultural offices also played the

role of input suppliers to the producers which may be farmers or contract growers.

Producers:

Two types of farmers were involved in cucumber production: I) small farmers with subsistence cucumber production, II) Semi-commercial farmers characterized by little production volume but still targeting the market. Small subsistence farmers sold their produce to collectors. Subsistence producers aimed to produce generally for their own consumption and little quantity for supply to the market of local haat

Table 2. Major actors involved in the value chain

Actors	Sold to	Average sales price (NRs. kg ⁻¹)	Profit margin (NRs. kg ⁻¹)
Producers	Traders	23 ^f	-
Traders	Wholesalers	34	11 (47.83)
Wholesalers	local retailers	48	14 (41.18)
Retailers	consumers	60 ^c	12 (25)

Note: Percentage in the parentheses, f: farmgate price, c: consumer's price

bazaar. Commercial producers supplied the products in the big market to the collectors or

Table 3. Cost of production for cucumber farming in the study area

Variables	Cost (NRs. ha ⁻¹)	Total cost (%)
Land preparation	13496.153	4.44
Seed	8113.2204	2.67
Fertilizers	8975.9442	2.95
Organic manure (FYM)	52803.059	17.38
Micronutrients	1737.8312	0.57
Pesticides	4412.8843	1.45
Labor cost	177997.86	58.58
Irrigation	7313.3974	2.41
Power used	29005.721	9.55
Total	303856.07	100

Source: Field survey, 2020, (1NRs. = USD 0.0082)

cooperatives. Most (almost two-third) of the producers had to face the problems of storage after harvesting and marketing problems as well, due to the perishable nature of cucumber. The area was less approached by new technology, developed equipment, and other accessories. This made the producers face many challenges and obstacles throughout the production process. The value addition activities concerned with the producers

Table 4. Returns and benefit-cost ratio of cucumber farming

Particulars	Cost (NRs. ha ⁻¹)
Total cost of production (NRs. ha ⁻¹)	303856.07
Average price of cucumber (NRs. kg ⁻¹)	23
Gross revenue (NRs. ha ⁻¹)	978416.5
Net profit	674560.4
B/C ratio	3.22

include clean harvesting, sorting, washing, weighing, etc. The producers were large in number and they have traditional knowledge of cultivating cucumber. However, most of the growers were not acquainted with the modern knowledge of farming.

Traders, Wholesalers, and Retailers:

They were the key actors who are engaged in trading cucumber from the production area to the retail markets. Traders bought cucumber from the production sites and sold them to the wholesalers, through which the cucumber was sold to retailers. There was an intricate networking channel between these actors. Traders, in the area, communicated with the wholesalers and retailers of the distant market and transported the cucumber mainly through roadways as no airport is around the district. Traders sold the products to wholesalers at high prices though they bought in a low price from growers. Conflict and several misunderstandings

Figure 3. Summary of linkages of value chain actors in the study area during cucumber production

may arouse during price fixation.

Consumers:

Consumers were the final buyers of cucumber in the chain who bought cucumber for consumption. It may be consumed in raw form, salads, pickles, or in preserved form.

Enablers and Facilitators:

These were those actors who provided regular supports and services to the other actors involved in the supply chain of cucumber. They promoted new research and technology, built up organized marketing channels, provided training to the farmers, and disseminated different technologies with information. Private companies, research centers, cooperatives, custom and revenue offices, and universities were the enablers and facilitators providing the continuous and remarkable supports to the farmers.

Value chain mapping

Value addition to agricultural products can be defined as the process of increasing the economic value and consumer appeal of a particular commodity (Timsina et al. 2011). Cucumber can be consumed in raw and preserved form as well. Throughout the process; weeding, cleaning, packaging, grading, and post-harvest storage occur that add value which encourages farmers to capture a large share of the consumer food dollar. Effective storage facilities were made after harvesting of the cucumber. Product diversification and packaging were two primary steps that add value to the cucumber.

Relationships existing among different value chain actors in cucumber production were established and are represented in the value chain mapping (Figure 3). In the figure, the left side has a vertical representation of the major function of the chain. After the production of cucumber, different actors of trading like collectors, middlemen, local traders, and wholesalers passed the product to the retailers. Then, the cucumber is kept by the sellers in the street market (36%), and is bought by the hotels and restaurants (24%), as well as the

individual consumers (32%).

Economic analysis of cucumber production

Cost of production of cucumber:

The cost incurred during the production of cucumber in the study area greatly varied, it might be due to variation of the amount of inputs used by the farmers. It incurred different types of cost, as it needs various kinds of inputs like seed, fertilizers, irrigation, human labor, pesticides, power plants (greenhouse, solar energy, etc.) used, etc. Labor cost was estimated in terms of man-days and transformed into a monetary value which was NRs.177997.86 ha⁻¹. The result revealed that the total cost of production per hectare was NRs. 303856.07 (1 NRs. = 0.0082 USD). Seed costs incurred in cucumber production accounted for NRs. 8113.2204 ha⁻¹; fertilizer cost was NRs. 8975.9442 ha⁻¹; organic manure (FYM) was NRs. 52803.059 ha⁻¹. Then as well, micronutrients, pesticides, and irrigation cost tallied for NRs. 1737.8312 ha⁻¹, NRs. 4412.88, and NRs. 7313.39 ha⁻¹ respectively. There was an increase in the purchasing of seeds and other inputs by 36% than that in the previous year (Table 3).

Returns and Benefit-cost analysis of cucumber farming

The average total return was calculated NRs. 978416.5 (NRs.1 = USD 0.0082); average price of cucumber per kg was NRs. 23. The benefit-cost ratio (B/C ratio) was 3.22 (Table 4). On that account, cucumber cultivation was considered to be a more cost-effective enterprise in the study area.

Marketing channels

Marketing channel is a track of line formed when the goods are moved from producers to ultimate consumers (Stanton 1975). Marketing channel is the consolidation of agencies by which the seller markets his product to the ultimate consumers (Howard 1975). Four common marketing channels are used by the farmers of the study area. Channel 1 is the most preferred one by the farmers.

Table 5. Ranking of the problems faced by the farmers during cucumber farming in the study area

Scale	0.2	0.4	0.6	0.8	1	Total (N)	I _{imp}	Rank
Production problems								
Lack of inputs on time	48	18	9	19	26	120	52.9	IV
Diseases and Pest	2	9	12	40	57	120	83.5	I
High price of input	14	25	42	21	18	120	60.6	II
Lack of credit	46	42	18	11	3	120	40.5	V
Irrigation problems	13	29	40	26	12	120	59.2	III
Marketing Problems								
Perishable nature	2	37	50	29	2	120	58.6	IV
Low price	17	16	25	30	32	120	67.3	II
Transportation problems	63	27	14	12	4	120	37.8	V
Lack of storage facilities	36	11	8	7	58	120	66.7	III
Faulty marketing system	6	32	17	41	24	120	67.5	I

Source: Field survey, 2020

1. Producers → local traders → wholesalers → retailers → consumers
2. Producers → local traders → middlemen → wholesalers → consumers
3. Producers → middlemen → retailers → consumers
4. Producers → middlemen → consumers

Market margin and Producer's share

Market margin can be defined as the price gap between the consumer's paid amount and the amount received by the farmers (Bowbrick 1976). Likewise, producer's share is the fraction of the consumer's payment received by the producers (Kumar et al. 2017). The study reveals that the marketing margin and Producer's share of cucumber was NRs. 37 kg⁻¹ and 38.33% respectively.

Marketing margin = Consumer's price (P_c) – Amount received by farmers (P_f)

$$= 60 - 23$$

$$= \text{NRs. } 37 \text{ kg}^{-1}$$

$$\text{Producer's share} = (P_f / P_c) \times 100\%$$

$$= (23/60) \times 100\%$$

$$= 38.33\%$$

Price trend analysis, Market margin and Producer's share analysis

The average annual price trend analysis from 2013 to 2019 in the district was found to be increasing. The study revealed that 60% of the cucumbers produced in the district were generally exported to other neighboring districts; Rupandehi and Chitwan, and Kathmandu. In 2015, a massive earthquake hit Nepal; so the production of cucumber was low due to which demand increased. For this reason, farmers sold cucumber at a high price (NRs. 17 kg⁻¹) which was 21.42% more than the previous year (NRs. 14 kg⁻¹). In 2019, the average farmer's price of cucumber was NRs. 23 kg⁻¹ (NRs. 1 = USD 0.0082). The consumer's price, market margin, and producer's share in 2019 was NRs. 60 kg⁻¹, NRs. 37 kg⁻¹, and 38.33% respectively (Figure 4). The reason for decreasing

Figure 4. Price trend analysis, Market margin and Producer's share analysis

producer's share can be considered as the timely increase in consumer's price and almost no or very little increase in farmer's price.

Problems of cucumber production and marketing

The problems during production and marketing of cucumber in the study area were identified and ranked on the basis of seriousness of the problems.

During the production of cucumber, the major problems were found to be disease and pest problems followed by high price of inputs, irrigation problems, lack of inputs on time, and lack of credit. In a like manner, the value obtained from the rank scale of marketing problems revealed that a faulty marketing system is the major problem and the least problem was transportation. The rank followed the faulty marketing system by a low price, lack of storage facilities, perishable nature, and transportation problems (Table 5).

SWOT analysis

A SWOT analysis evaluates the internal strengths and weaknesses, and the external opportunities and threats in production environment. The internal analysis is used to identify resources, capabilities, core competencies, and competitive advantages inherent to the producers. The external analysis identifies market opportunities and threats of produce. SWOT analysis was carried out as an analysis technique for the cucumber farming in the Nawalpur district of Nepal. The results of SWOT analysis was given in Table 6. Demand based production on the basis of season and market information should be focused on strengthening the value chain. Installation of plant clinics and storage units would add help in controlling the outbreak of severe pest and diseases. The required inputs, if available in the time of need, may help growers in self-motivating for cucumber farming. Efficient cooperative based marketing should be promoted to strengthen the bargaining power of farmers. Extension agencies should be strengthened. The fixed price of cucumber should be determined on the basis of the cost incurred during the production so that the farmers can get optimum benefits. Proper marketing channels should be constructed. The farmers should be made more aware of the use of modern technologies and practices to shift them from subsistence to commercial farming. Training programs, conferences, and seminars should often be conducted in the area regarding the problems and solutions of all the actors involved in the value chain.

Table 6 SWOT analysis in cucumber production and marketing

Strengths	Weakness
1. High demand in the domestic market	1. Low price
2. Required less capital investment	2. Lack of appropriate varieties
3. Climatic propriety and availability of fertile land	3. High middlemen margins
4. Comparative advantages over other vegetables	4. No technology transfer training received by farmers
5. Traditional knowledge, skills, and experience of farmers	5. Poor market management
6. Nutritive value and disease control	6. Weak bargaining power of farmers against traders
Opportunities	Threats
1. High import scenario so there is less competition in the market.	1. Open border
2. Shifting from subsistence to commercial cucumber production.	2. Inadequate availability of inputs on time.
3. Employment generations	3. More incidences of disease and pests.
4. Value additional potential	4. Inconsistency in seasonal demand of cucumber.
5. Availability of large farms with good production capacity	5. Expensiveness in quality inputs
	6. Highly fluctuating price
	7. Decreasing labor availability due to migration

CONCLUSIONS

The findings of the study showed that in cucumber farming, the quality seed production and distribution, introduction of improved variety, disease and pest management, post-harvest management, and access to finance were key components for successful cucumber production. The cucumber growers were interested to the approaches to capital (credit/loans), technical inputs, market assurances (price and quantity), and the highest market prices. The major bottlenecks of cucumber production and marketing were disease and pest outbreaks, high price of inputs, and faulty marketing system. The price trend analysis showed that there was increasing price of cucumber since last few years. Gross returns and benefit-Cost (B/C) ratio were found higher in the study area, indicating that the cucumber farming was a profitable enterprise. Transportation facilities, market price information, packaging, storage, grading, and other sectors were needed to be improved to fetch a good price of production. Research works are needed on development and improvement of the economical production packages, input responsive and profitable practices, and capacity enhancement packages through trainings, farm visits, and field demonstrations.

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CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest regarding the publication of this manuscript.

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REFERENCES

- Bowbrick P. (1976) Market margin investigations and price control of fruit and vegetables. *Irish Journal of Agricultural Economics and Rural Sociology*, 6(1): 9-20.
- Ghimire D. Lamsal G. Paudel B. Khatri S. Bhusal B. (2018) Analysis of Trend in Area, Production and Yield of Major Vegetables of Nepal. *Trends in Horticulture*, 1: 1-11. DOI:10.24294/th.v1i2.914
- Howard J. (1975) *Fundamentals of marketing*. McGraw-Hill, Kogakusha Ltd.
- Karki Y.K. (2002) *Agricultural Market and Marketing Information system of Vegetable Market in Kathmandu Valley*. Kathmandu. Master dissertation. Institute of Agriculture and Animal Sciences, Rampur Campus, Chitwan, Nepal.
- Khanal S. Shrestha M. (2019) Agro-tourism: prospects, importance, destinations and challenges in Nepal. *Archives of Agriculture and Environmental Science*, 4(4): 464-471. DOI:

- <https://doi.org/10.26832/24566632.2019.0404013>
- Kumar V. Kumar V. Kumar A. Kochewad S.A. Singh M.P. (2017) Marketing channels, marketing cost, margin and producer's share in consumer's rupee in paddy marketing. *Agro Economist - An International Journal*, 4(1): 21-27.
- MOAD. (2012-2018) Statistical information on nepalese agriculture. Singhdurbar, Kathmandu: Central Bureau of Statistics.
- MOAD. (2015) Agri-Business Promotion and Statistics Division. Ministry of Agriculture Development. Singhdurbar, Kathmandu: Government of Nepal.
- MOAD. (2016) Statistical information of Nepalese Agriculture. Ministry of Agriculture Development, Monitoring, Evaluation and Stastics section. Singha Durbar, Kathmandu: Government of Nepal.
- MOAD. (2017) Statistical information on nepalese agriculture 2073/74 (2016/17). Singhdurbar, Kathmandu: Ministry of Agriculture Development.
- MOAD. (2018) Statistical information on nepalese agriculture 2077/18. Singhdurbar, Kathmandu: Ministry of Agriculture Development.
- MoF (2015) Nepal Portfolio Performance Review (NPPR). Ministry of finance. https://mof.gov.np/uploads/document/file/report_2015_20150914084119.pdf
- Monteiro S.B. Pereira M. Branco I. Reis A.C. (2017) Value chain mapping methodology: a proposal for a process mapping project. Valencia, Spain: International Joint Conference - ICIEOM-ADINGOR-IISE-AIM-ASEM. pp. 1-8.
- Mukherjee P.K. Nema N.K. Maity N. Sarkar B.K. (2013) Phytochemical and therapeutic potential of cucumber. *Fitoterapia*, 84: 227-236. DOI: <https://doi.org/10.1016/j.fitote.2012.10.003>
- Reddy J. (2015) Cucumber information cultivation guide. In Reddy, Vegetable farming. <https://www.agrifarming.in/cucumber-farming>. Retrived on March 19, 2015.
- Shrestha B. (2008) Off- Season Vegetables Marketing Channels of Small Growers: A Case of Yampaphant, Tanahun, Nepal. Wageningen, The Netherlands: Van Hall University of Applied Sciences. <https://edepot.wur.nl/192>
- Shrestha K.P. Shrestha J. (2018) Value Chain Analysis of Large Cardamom in Ilam District of Nepal. *Azarian Journal of Agriculture*, 5(6): 179-189.
- Shrestha T.N. Ghimire N. P. (1996) Fresh vegetable production in Nepal. National Seminar on Vegetable Development. Kathmandu: Vegetable Development Division, Kathmandu, Nepal. .
- Stanton W. J. (1975) Fundamentals of marketing. McGraw-hill, Kogakusha Ltd.
- 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. *Archives of Agriculture and Environmental Science*, 4(1): 57-62, <https://dx.doi.org/10.26832/24566632.2019.040109>
- Timsina K.P. Shrestha K.P. Chapagain T.R. Pandey S. (2011) Value chain analysis of Turmeric (*Curcuma longa*) in eastern Nepal. *Nepal Agricultural Research Journal*, 11: 70-79.