Received: 30 April, 2024 Revised: 30 May, 2024 Accepted: 30 June, 2024

Analysis of Marketing Channels and Supply Chain Dynamics in Onion Production in Siraha District of Nepal

- Ananta Raj Dahal, PhD[1]

Abstract:
This article aims to investigate the marketing channels and supply chain dynamics in Onion production within Siraha District, Nepal. By analyzing the major marketing channels, the study seeks to identify the present status and constraints on both production and marketing processes. Through a combination of qualitative and quantitative research methods, including interviews with local farmers, traders, and stakeholders, as well as market surveys, this study had provided valuable insights into the challenges and opportunities facing onion producers and marketers in Siraha District. Most of the common marketing channel as "producers- local traders- wholesalers- retailers-consumers". Onion traders in the study area were mostly facing the problem of storage as their major marketing constraint along with the fluctuating market price.

Key words: Marketing channels, supply chain, dynamics, onion, production

Background of the Study

Nepal, where on average 60.4 percent of the population is dependent on agriculture, is no exception. Together with the involvement of more than half of the total population in agriculture and its huge share of the country's national GDP by 27 percent (NPC, 2020), the agricultural sector has become an indispensable sector of the nation, thus considered as the backbone of the national economy. Among the diverse agricultural commodities, horticultural commodities constitute an important fraction in

[1] Assistant Professor of the Department of Economics, Patan Multiple Campus, TU.

the agricultural industry of Nepal. Out of total, horticultural commodities contribute 14 percent of the total AGDP and of which vegetables only contribute 9.71 percent AGDP (MoAD, 2011).

Nepal is richly endowed with numerous agricultural crops and plants. The variation in temporal, altitudinal, topographical aspects has made agricultural biodiversity (Shrestha, 2007). Siraha, a Terai district also exhibits numerous agricultural potentialities. The district has 1, 22,757 ha of land, of which 73514 (60.15) is presently fertile and cultivable; however, the total of 72300 ha (58.87 percent) land now cultivated helps to sustain food deficiency in the Terai region of Nepal (DADO, 2012). The present production scenario of onion crops in Siraha district is 82080 mt under the production area of 5660 ha with productivity of14.50 tm/hectare (MoAD, 2011). In terms of production and sales, onion is an important vegetable crop of Siraha and is extensively grown on a wide scale by many farmers, farmer's groups and farmer's cooperatives.

Onion is the third most important vegetable after cauliflower and cabbage in terms of area, and production in Nepal. It is cultivated in about 20,000 hectares (ha) in Nepal and around 0.3 million metric ton of onion is produced annually in the country (MoAD, 2011). Onion is best suited to Terai, low and mid hills; and it is also becoming an attractive sub-sector for source of income generation (ADS, 2015). Bhudhathoki (2001) suggests that the areas under the onion crop and number of farmers growing onion have been increasing to generate high income from this crop as compared to cereal and other annual crops. Different actors, stakeholders and institutions are involved in production and supply of onion and their value adding activities. The function in this case includes input supply, production, and collection, trading, wholesaling and retailing as major value chain activities.

Nepal’s agricultural economy is undergoing structural changes. The recently implemented Agriculture Development Strategy (ADS) 2015 also

aims to improve food self-sufficiency and reduce poverty through commercialization. But still our Nepalese agricultural growth is constrained by poor infrastructures, weak institutions, and inadequate technical support for commercialization and value chain development (DADO).

A supply chain is a network of organizations, individuals, resources, activities, and technologies involved in the creation and delivery of goods and services to end customers. It encompasses all stages of product and service flow, from raw material extraction to final consumption, and includes functions such as procurement, manufacturing, logistics, distribution, and retailing.

In simpler terms, a supply chain refers to the entire process of how a product or service moves from its origin point (like raw materials or components) through various stages until it reaches the end user or consumer. This process involves coordinating and integrating flows of materials, information, and finances among suppliers, manufacturers, distributors, retailers, and customers to ensure products and services are delivered efficiently, effectively, and in a timely manner.

Kohl and Uhl (1980) defined the term "marketing" as the performance of all business activities involved in the flow of goods and services from the point of production to the hands of consumption. It is a process which makes goods and services available to the consumers.

Supply chain actors and their role in onion market chain

The major supply chain actors are input suppliers, credit providers, producers, farmer traders, wholesalers, middleman, retailers and consumers.

Input suppliers

The input suppliers are those actors who are contributed for the supply of inputs such as seed, fertilizer and other technical services. There were

altogether 7 agro-vets and 2 agricultural cooperatives in the study area. Many farmers also received inputs from local government offices and AKC.

Extension service providers

Agriculture Development Office of Local government is the main body that provides extension service to the farmers. Other government offices such as AKC and locally existing NGOs such as Swabalamban Bazar, Byabasthapan TathaRojgar were also found to be providing as extension services.

Credit suppliers

Formal credit institutions such as Agricultural Development Bank, Nepal Bank Ltd., RBB and other private banks and FIs were found to be operating as credit suppliers in the study area. Other informal sources of credit such as local money lenders were also operating as credit suppliers in the study area.

Producers/farmers

Farmers are the primary and most valuable actor in the agriculture supply chain. There are basically two categories of producers in production areas i.e., subsistence and commercial producers. Subsistence farmers generally purchase and organize necessary agro-inputs, produce mainly for household consumption and sell in a small-scale market at local haat bazar whereas commercial farmers sell their produce in a larger scale to the known collectors and traders.

Local traders

Local collectors act as the bridge between producers and wholesalers. Their trading activities include: buying and assembling, repacking, sorting, and selling to the wholesale market.

Wholesalers

Wholesalers are responsible for buying the commodity from local collectors and traders and supplying them to the retailers.

Retailers

Those market actors who have direct contact with consumers are known as retailers. They purchase the products from the wholesalers and ultimately sell to the consumers. Their activities in the supply chain are buying from wholesalers or middle man, transporting to the retail shops, grading, displaying and selling to the consumers.

Consumers

Ultimate point of consumption or use of produced commodities is consumers. Consumers with respect to this study are the individual households and hotels nearby the study area.

Enablers and facilitators

The regular supports provided directly or indirectly for the functioning of the supply chain are known as enablers. Government organizations such as an office of local level, AKC, AIC, AEC etc. and non-government organizations such as ENSSURE, SBRSK are playing enablers in the study area.

Objective

To explore the major Marketing channel and supply chain of Onion production.

Research Methodology

A number of steps were followed to accomplish the present study.

Research Design

This paper aims to search marketing channel of onion with Marketing cost, price spread, marketing efficiency and producer's share in shiraha district on Madesh Pradesh. Cross sectional research design was used for this

study. Information was collected separately from household respondents, wholesaler, retailer, and producer at a single point of time through survey method (Babbie, 1998).

Sample Size and Sampling Technique

In this study, different people involved the supply chain of Onion the market in and consumers are used as the sources of information. Among them farmers, local traders, wholesalers, retails are used in supply chain and consumer also used at the time of field survey, total of them 64 people was taken. (22 farmers, 3 local traders, 4 wholesalers, 10 retailers, and 25 consumers). According to (Poate & Daplyn, 1993), a sample size of 60 is the minimum required for a bigger population that will produce a reasonable level of certainty for decision-making and fulfills the study's requirements for meaningful analysis.

The research adopted purposive and random sampling methods to select the sample in purposed study area. The study was undertaken over a period of six month from January to July 2023. The required data was collected through the enumerators under the supervision by researcher. The survey data were tabulated into Microsoft Excel and analyzed using statistical packages for social science (SPSS) 14.

Economics Status of Onion production

Cost of production of Onion

The production of onions depends on the level of inputs like labor, planting materials, fertilizers and manures, irrigation, chemicals etc. The study mainly focuses on the economics of onion cultivation.

Table 1: Yield, cost, revenue and Benefit Cost ratio

PARTICULARS	OWN LAND	RENTED LAND
Yield (mt/ha)	**15.134**	**15.73**
Fixed Cost (Rs/ha)	18,750	38,750
TOOLS	18,750	18,750
LAND RENT		20,000
Variable Cost (Rs/ha)	**99,225**	**1,10,125**
LABOR AND PLOUGHING	81,828.75	90,320
IRRIGATION	2359.5	2,900.5
SEEDS	3539.25	3,550.25
PESTICIDES AND FERTILIZERS	11797.5	13,354.25
Total Cost (Rs/ha)	1,179,75	1,48,875
Selling Price of Onion (Rs/kg)	22.4	22.4
Onion sold (kg/ha)	13562	14,157
Revenue (Rs/ha)	303788.8	317116.8
Net margin (Rs/ha)	185813.8	168241.8
B/C ratio	**2.535**	**2.13**

Source: Field Survey, 2023

Due to the seasonal behavior of onion the variable items were considered under cost while calculating cost of production. The fixed costs were also taken into account in the analysis. On their own land, the average yield of onion was found to be 15.134 Mt/ha in the study area. Yield was found higher as compared to the National average. The average cost of production was found Rs. 1, 17,975/ha in the study area. The study also revealed that an average of Rs. 7.79 is required to produce one kg onion. The land on lease was found to be yielding more in numbers as compared to native land. This was mainly due to the commercialization prospect. Rented land farming were too profitable with benefit-cost ratio 2.13 but not more than that of own-land farming which was solely due to increased total cost in production.

Table 2: Benefit-cost ratio of producers with different level of education

Level of Education	Benefit-cost ratio
Illiterate	2.603
Primary	2.664
Secondary level	2.5487

Source: Field Survey, 2023

The benefit-cost ratio of onion producers was analyzed accordance to their educational status. Among the producers, one with the primary level of education was found to have higher benefit-cost ratio (2.664) than those groups with no education and secondary level of education. The increased yield among the growers with secondary education showed that it was all due to the increased cost of production, both variable costs and fixed costs of production.

Analysis of Marketing System in Punjab carried out by (Sulumbe et al., 2010) found productivity of onion 14.27Mt/ha and average cost of production was 1, 15,570 Rs/ha, and Rs. 8.09/kg, which is marching result of this research. Joshi et al. (2014) findings are more consistent with findings of this research.

Problem of Production and Marketing

The production and marketing of onion together faced various constraints over the nation. These problems were centered to various actors in the supply chain and the Siraha district being Terai area is no prone to be saved from indifferent circumstances of storage, transport and many more aspects.

Table 3: Problem of marketing (for traders)

Problems	1	0.8	0.6	0.4	0.2	Sum	Score	Rank
Lack of transportation	4	8	23	6	5	46	0.6	III
Lack of proper market	2	7	7	15	12	46	0.504	IV
Fluctuating market price	13	16	5	4	8	46	0.695	II
Lack of storage facility	23	13	6	2	2	46	0.830	I
Inefficient middleman	1	3	4	17	21	46	0.365	V

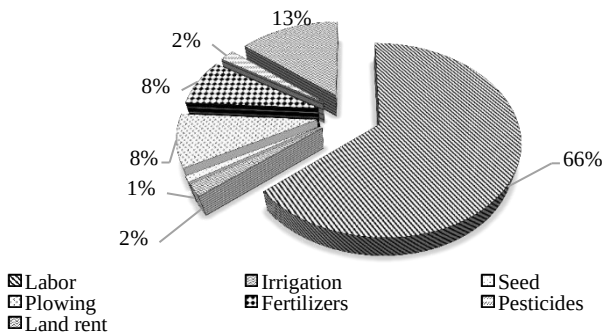
Source: Field Survey, 2023

Table 3 revealed that the problem score of storage was the highest. Thus, onion traders (local traders, wholesalers, retailers) in Siraha were mostly facing the problem of storage. The post-harvest losses were highest due to lack of storage and high perishable nature of onion. The score of a separate market was the least. Hence, it was ranked as the least problem concerning other problems. In Siraha, there was no separate market for the onion trade although traders ranked it as least among others.

Cost components of Onion production

The overall cost of production comprises total fixed cost and total variable cost. Land, equipment's, vehicle and other machineries are included in fixed cost whereas variable cost includes labor, seed, fertilizers and others. The study reported two different structures of cost of production of onion for producer having own land and land on lease.

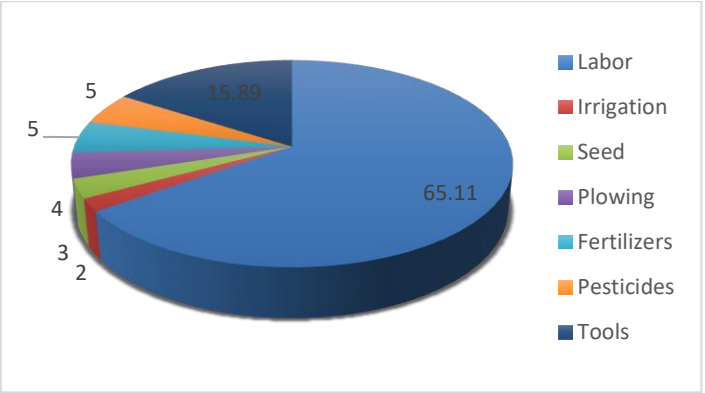
Figure 1: Cost components for rented land



Source: Field Survey, 2023

Figure 1 showed that onion cultivation practice was labor intensive. Labor cost comprised 66 percent of total cost of production followed by land rent 13 percent, plowing 8 percent, fertilizers 8 percent, pesticides and irrigation 2 percent and seed materials percent. With compare the cost labour cost is maximum due to maximum numbers of labour need for the onion production and per unit labour price also high. Similarly, the study of (Subedi et. al., 2013) found that labor cost comprised the most (39.20 percent) compared to the other cost components. Findings of this research were also in line with (Sulumbe et al., 2010) who also found labor cost comprising 53 percent of total cost.

Figure 2: Cost components for own land



Source: Field Survey, 2023

Figure 2 showed that the cost components of onion production for the growers in their own land. Altogether 69.11 percent was comprised by labor and ploughing which was followed by pesticides (5 percent) and fertilizers (5 percent). The total fixed cost included only the cost of tools and equipments which was about 15.89 percent

Postharvest loss in wholesaler and retailer

Agricultural commodities are mostly perishable in nature and onion is not exception to that. So, post-harvest losses are experienced at various level of market distribution, from local traders to retailers, due to storage

problem. The loss in the shelf-life of onion is accounted only after the producers in the supply chain. The study is concerned to know about the actual post-harvest losses.

Table 5: Post-harvest Loss of onion

Category of trader	Illiterate Loss %	Primary Loss %	Secondary Loss %	Higher Secondary Loss %	Overall Loss % (Mean ± SD)
Wholesaler	36	30.5	17	0	28.50 ± 8.103
Local trader	32	22	0	0	25.34±5.859
Retailers	34.5	26.8	22.5	19	26.70 ± 5.034

Source: Field Survey, 2023

Table 5 expressed that storage was the main problem for onion marketing. According to the study, the post-harvest loss was high in the Siraha district. Losses in the wholesaler were higher than the retailer. Comparing the losses with the educational status, traders with no any sort of education i.e., Illiterate were found to be facing higher post-harvest losses than to those with Primary and secondary education whereas traders with Higher secondary or secondary level education were found to have the lower level of post-harvest losses. The finding is in line with (Gautam, 2010) which estimated total post-harvest loss in onion production in Nepal. Similarly, the study conducted by (Kachare et al., 2020) reported the post-harvest loss of 30-33 percent.

Marketing channel in study Site

The direction of flow of the products beginning from producer and ultimately to the consumers is referred to as a marketing channel. Various actors play important role in the marketing channel with their distinct characteristics.

Table 6: Marketing channel used by the onion producers (Percent)

Producer-local trader-wholesaler-retailer-consumer	53.33
Producer-wholesaler-retailer-consumer	26.8
Producer-local trader-retailer-consumer	10.86
Producer-retailer-consumer	8.6
Total	100

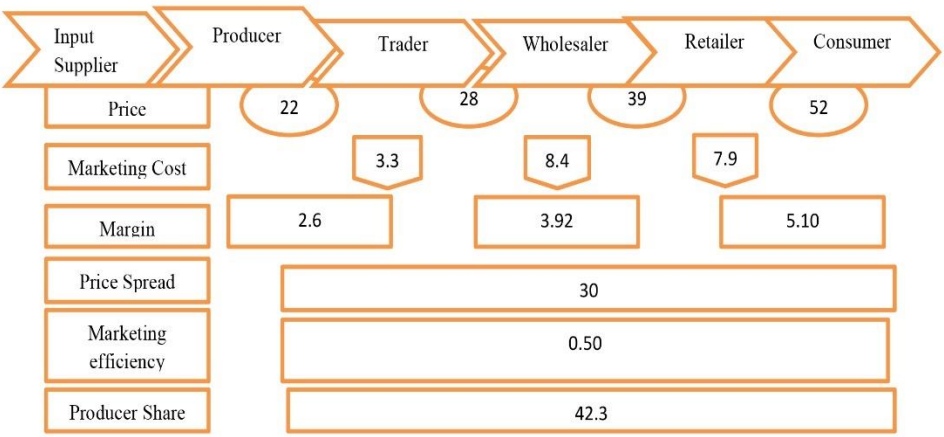
Source: Field Survey, 2023

Table 6 analyzed that the uses of different marketing channels by the producers. It shows that the most common marketing channel was "producers-local trader-wholesalers-retailers-consumers" used by 53.33 percent, "producers-wholesaler-retailer-consumers" used by 26.8 percent, "Producer-local trader-retailer-consumer" used by 10.86 percent and "Producer-retailer-consumer" used by 8.6 percent. The result is line with (Gauta et al., 2000) in Nepal revealed that 45 percent of the producers followed "producers-wholesalers-retailers- consumers" channel and (Mehedi Adnan et al., 2014) where they found 55 percent of onions marketed by "producers-wholesalers-retailers-consumers" channel.

Marketing cost, price spread, margin, marketing efficiency and producers share price:

The summary of supply to each actor, marketing costs, margin, marketing efficiency, price spread and producers share on consumer's rupee (Rs.) per kg of onion in the onion supply chain are given below.

Figure 3: Marketing cost, price spread, marketing efficiency and producer's share



Source: Field Survey, 2023

The average farm price per kg of onion was found to be Rs. 22. Similarly, the average price used by traders and wholesalers was found to be Rs. 28 and Rs. 39 respectively. The average retail price paid by the consumers was Rs. 52 per kg. The marketing cost incurred for local traders, wholesalers and retailers was Rs. 3.3, Rs. 8.4 and Rs. 7.9 respectively. The price spread was Rs. 30 per kg i.e., around 58 percent of price was spread in the supply chain. The study revealed that retailers were having higher margins (Rs. 5.10) among the actors of the supply chain. It was found that marketing efficiency and producers share was 0.50 and 42.3 percent respectively. The producers share found lower as compared to 67 percent producers share as reported by (Sidhu et al., 2018). Poudel (2013) found that the price spread was Rs. 27 which was similar with this research.

Consumers Purchasing Pattern

The pattern of purchasing onions varies according to the consumer's family size, income of the family, availability of the onion in the market and many more. The varied intakes of onions are observed as their need and consumption.

Table 7: Consumer Purchasing Pattern

Purchasing Pattern	No. of Consumers (%)
Daily	32
Weekly	36
Twice a month	20
Once a month	12

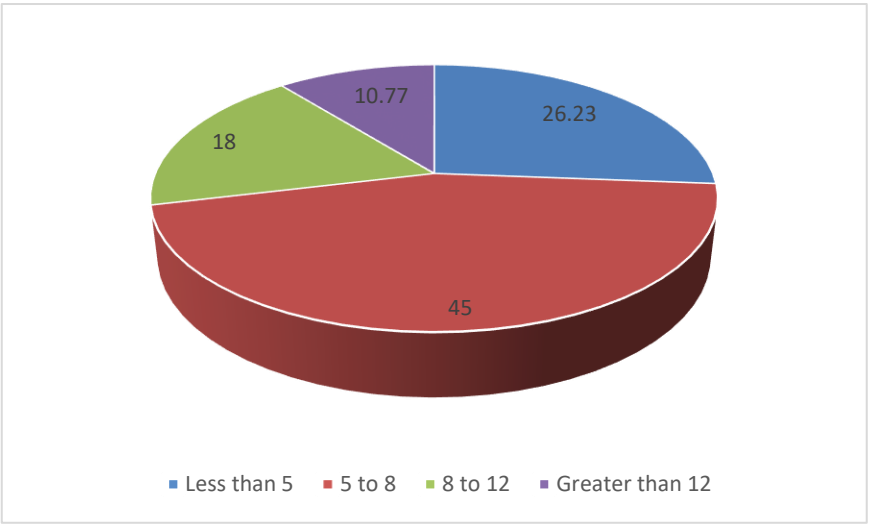
Source: Field Survey, 2023

Table 7 expressed the consumers purchase pattern of Onion for their consumptiom,32 percent purchase daily, 36 percent weekly purchase weekly, 20 percent purchase twice a month and 12 percent purchase once a month.

Monthly Consumption of Onion

The monthly consumption greatly depends upon the family size, food culture, religion, income of the family and more. This different level of consumption emphasizes the changing demand in the market.

Figure 4: Monthly consumption of Onion by household (kg)



Source: Field Survey, 2023

Figure 4 represented that in a month, 45 percent of the consumers were observed consuming onion at the rate of 5-8 kg. Only 10.77 percent of the consumers were consuming the bulk amount of >12 kg onions.

Consumer Cost Opinion

Respondents provided information through the sample survey, consumers response about the cost of the commodity overall deals with the pricing of it in the market. Variation among the consumer's opinion on the price affects the purchasing power of onion in the market.

Table 8: Consumer cost opinion

Opinion	Percentage
Expensive	12
Moderate	60
Cheap	28
Total	100

Source: Field Survey, 2023

Table 8 represented that during the survey, the consumer were asked about the price of onion in the market of Siraha. From the total consumers, 60 percent said that the price of onion is moderate and 12 percent said that it is expensive whereas 28 percent said that it is cheap.

Conclusion

From the study it was found that the weed infestation was the major constraint for the production of onion suggesting that the improved cultivation practices would be beneficial to boost the production, other problems being considered. The study also revealed the most common marketing channel as "producers- local traders- wholesalers- retailers-consumers".

Majority of the onions are transferred from producers to wholesalers compared to other actors. Wholesalers are obtaining onions not only from the producers but local traders from the district and outside the district. In addition, most of the consumers are purchasing onions from the retailers

whereas some of them are getting directly from the producers. Agro-vets and Co-operatives are the suppliers of the onion seeds to the growers.

Adding to this, the market margin analysis of onion was highest for retailers with the price spread of Rs.30. Producer's share on consumer rupee was observed as 42.3 percent. Onion traders in the study area were mostly facing the problem of storage as their major marketing constraint along with the fluctuating market price. This too suggests that the major contribution of concerned authorities in providing market and storage facilities would be a really important action to bolster the onion production and boss the supply chain.

REFERENCES

Agricultural Projects Service Centre and John Mellor Associates, (1995). Agriculture Perspective

Agriculture Development Strategy, (ADS) (2015). Agriculture Development Strategy 2015-2035 main document part:1. Government of Nepal, Ministry of Agricultural Development, Singh Durbar, Kathmandu.

Collection and trade of wild-harvested orchids in Nepal,2013. *Journal of Ethno biology and Ethno medicine, 9*, 1-10.

Daniels, H., & Fors, S. (2014). Supply & Value Chain Analysis of Onions in Ethiopia.

District Agriculture Development Office (DADO) (2014). Annual Agriculture Development Program and Statistics book, Siraha, Nepal: Authority.

Gautam, D. (2010), "Internationalization of Small Businesses of Border Region: A Study of the Determinants" Journal of Borderland Studies, Vol 25, 3&4

Gautam, S., Xu, Y., Dumaguin, M. (2000) Resveratrol sel ectively inhibits leukemia cells: a prospective agent for *ex vivo* bone marrow purging. *Bone Marrow Transplant* **25**, 639–645 https://doi.org/10.1038/sj.bmt.1702189

Hailu, A.,&; Zemedu, L. (2017). Value chain analysis of onion: the case of Ejere district, West

Harvest Practices of Onion: A Case of Bogra and Joypurhat District in Bangladesh**.** *Universal Journal of Agricultural Research 2(2)* DOI:10.13189/ujar.2014.020205

Joshi, N. P., Maharjan, K. L., Piya, L., & Tamang, D. T. (2017). North-south agricultural trade dependence in Nepal and reliance on import. *Development of food marketing system in Indian subcontinent and its possibilities of trade links with Japan*, 27-28..

Kachare S., Tiwari, S., Tripathi, N.(2020) Assessment of Genetic Diversity of Soybean (Glycine max) Genotypes Using Qualitative Traits and Microsatellite Markers. *Agricultural Research, 9,* 23-34. https://doi.org/10.1007/s40003-019-00412-y

KM Mehedi, A., MD Mostafizer, R.,and Anindita, S. (2014)Marketing Channels and Post

Maity, T., &; Sharangi, A. (2014). Supply Chain Management of Onion in India: Status, Issues and Scope. *International Society for Horticultural Science, 239–244*(1006)

Mila, F. A., Nahar, A., Amin, M. R., Culas, R. J., & Ahmed, A. (2022). Empirical assessment of onion supply chain constraints in Bangladesh: A pre-covid to covid situation. *Journal of Agriculture and Food Research, 10,* 100418. https://doi.org/10.1016/j.jafr.2022.100418

Ministry of Agricultural Development, Agri-Business Promotion and Statistics Division, Kathmandu, Nepal. http://www.moad.gov.np/en/.

Ministry of Agriculture and Cooperatives, (MoAC) (2011). A Report on Value Chain Analysis of

(MOAD) (2014). Statistical information on Nepalese Agriculture. Government of Nepal,

National Planning Commotion (NPC) (2020). National Review of Sustainable Development Goals. Authority.

Offseason Vegetables (OSV), Kathmandu, Nepal: A*sia Network for Sustainable Agriculture and Bioresources (ANSAB) and USAID.*

Plan: Main Document. Prepared for His Majesty's Government of Nepal; and Asian Development Bank, Manila. Agricultural Projects Service Centre, Kathmandu; and John Mellor Associates, USA.

Poudel, P. (2013). Marketing Margin Assessment of Off-Season Vegetables Value Chain in

Shoazone, Oromia national regional state of Ethiopia. *International Scholars Journals,* 5(*2375–0693)*.http://www.ansab.org/wp-content/uploads/2012/01/HVAP_VCA-Report_Off-Season-Vegetables.pdf

Shrestha, S.G. (2007). Necessity for Watershed Conservation for Nepal's Overall Development. *Hamro Sampada* .

Sidhu, R., Kumar, S., &; Vatta, K. (2008). Supply Chain Analysis of Onion and Cauliflower in Punjab. *Agricultural Economics Research Review, 23,* 10.

SirahaDailekh Road Corridor. *Journal of Agriculture and Environment, 13,27*-31. doi: http://dx.doi.org/10.3126/aej.v13i0.7584

Subedi, A., Kunwar, B., Choi, Y., Dai, Y., van, T., Andel, and Chaudhary, RP. (2013)

Sulumbe, I. M., Shettima, B., & Amp, Singh, D., (2010a). *Onion "Srijana": Cultivating Technology.* Vegetable Development Directorate, Lalitpur, Nepal.

Swedish University of Agricultural Sciences (SLU), 1654–9392, 100.

Xaba, B. G., &; Masuku, M. B. (2012). An Analysis of the Vegetables Supply Chain in Swaziland. *Sustainable Agriculture research 2(2),*1. https://doi.org/10.5539/sar.v2n2p1