

Value Chain Issues in Fresh Vegetables

H.B. K.C.^{1*} and S. Dhimal²

¹Chief, National Centre for Potato, Vegetable and Spice Crops Development, Khumaltar, Lalitpur

²Horticulture Development Officer, SCDC, Panchkhal, Kavrepalanchok

*Corresponding email: kchari2002@gmail.com

Abstract

The distinctive agro-ecological zones of Nepal put forward an enormous prospect for growing different types of vegetables. Rapid urbanization has created a high demand for fresh vegetables. Fresh vegetables have emerged as an important source of income and an effective means of poverty reduction with the increasing consumption volume in the country, market growth in Nepal and adjoining cities of India. Many modern technologies have been adopted by the farmers for commercial production of the vegetables. Despite of greater scope and potentiality there are various value chain issues in this sector. Farmers are lacking enough land, suitable varieties for cultivation in different agro-ecological areas, irrigation facility and suitable technologies of irrigation; liquid fertilizers in protected cultivation and suitable package of practices are lacking. Technical know-how about improved production technology, postharvest handling, marketing and processing is lacking. An economy of scale is always a problem in supply side. Seasonal balance in the production of different commodities has not been maintained inviting price variation. Grading, packaging and labeling with tracking system have not been maintained. Middle man are powerful in the market thus producers and consumers both are affected with low and high price respectively. The suitable technologies delivery by skilled manpower has always been a problem. The coordinated efforts from all stakeholders is necessary to resolve these issues and uplift the fresh vegetable sector of Nepal for income generation and nutrition security of the farmers as well as for import substitution and export promotion.

Keywords: Fresh vegetables, protected cultivation, hybrid varieties, post-harvest, value chain

1. Introduction

Nepal has diverse agro-climatic zones which are suitable for the production of different niche high value crops. Nepal is an agrarian country having 27.6% contribution of agriculture in GDP where 65.6% population is engaging (MoALD, 2019 in press). Majority of agriculture is subsistence type by small holder farmers. Horticulture sub-sector has the most significant role in AGDP with shares of 38.59 percent where vegetables sub-sector share 20.48% (MoALD, 2019 in press). The unique agro-ecological zones favored by altitudes, topography, and aspect within the country offer an immense opportunity for growing different types of fresh vegetables. In Nepal, there are 3.2 million vegetable holdings that accounts to about 69 percent of the total households. The vegetable sector

contributes more than Rs. 36 billion of value in the country, with cauliflower, tomato and cabbage as the lead contributors with values of Rs. 4.9 billion, Rs. 4.4 billion and 2.8 billion respectively (CBS, 2010). With the increasing consumption of the vegetables in the country, offseason vegetable farming has emerged as an important source of income and an effective means of poverty reduction in the rural and peri-urban areas of Nepal. In offseason vegetable value chains, a tangible vegetable volume is moved from its initial production field to market and consumed by final beneficiaries. Off-season vegetable is being recognized as a major agriculture commodity that holds the comparative advantage for export to India (HVAP, 2011). Between July and September, the agro-climatic conditions in the Tarai plains of Nepal and India become unsuitable for vegetable cultivation due to water logging and flooding. The vegetable produced in hilly and mountainous regions at this time has comparative advantage to export to India. The contribution of vegetables to AGDP has slowly increasing in recent years.

2. Materials and Methods

This article is based mainly on information coming from field visits and informal and formal discussions with farmers and other stakeholders. The secondary information collected from different literatures is also included. The knowledge and experiences of the authors in this sector is also included to discuss the information.

3. Results and Discussion

3.1 Present Status and Trend of Area, Production and Productivity

Nepal's vegetable cultivation area has been steadily on the rise as farmers are increasingly finding out that the product offers better returns. Land under cultivation is 3091000 ha out of which about 8.97% area is under vegetable crops. There is 208% increase in area, 364% increase in production and 175% increase in productivity of vegetables in last 26 years (191/92 to 2016/17) (MoALD, 2018). The average annual increase in last twenty years remained about 5.6 %. However, the increase in productivity is more or less stagnant in last five years. Vegetables have higher commercialization rates of 30 to 50 per cent in the year 2010 (MoALD, 2016), now it has increased further. They also have a higher cost benefit ratio of 1:3 compared with 1:1.5 for cereals (Bhandari et al., 2015). What is even more noteworthy is that vegetables, especially off-season varieties, have emerged as effective means of reducing poverty. This is because their demand is increasing and they are fetching higher prices.

In Nepal, different vegetables are grown all over the country. The vegetable crops occupy 8.97% of the total cultivated agricultural land that indicates the potential of increasing vegetable production in the country. In commercializing the agriculture sector, offseason vegetable farming has played a vital role contributing to enhancement of economic status of the farmers of the hills of Nepal. It has been providing regular employment and income to the marginal farmers and their family members throughout the year by bringing economic gains (Panta, 2001). Although the Terai region produces and sells more vegetables, vegetables grown in hilly region have better value because they are produced during rainy season when prices are relatively higher (Prasain, 2011).

In 2016/17, area under cultivation, total production and productivity of vegetable crops are seen 277,393 ha, 3,749,802 MT and 13.58 MT/ha respectively (Table 1). Among vegetable crops,

cauliflower is the number one vegetable in terms of area cultivated and covers about 35,974 ha, which is 13% of the total area under vegetable crops. Other vegetable crops that follow the cauliflower in terms of cultivation area are cabbage (29,373 ha), tomato (21,389 ha), onion (19,600 ha), radish (17,687 ha) and broad mustard leaf (12,407 ha). In terms of total production, cauliflower has the highest share, 534,141 MT, followed by cabbage 485,199 MT (MoALD, 2018).

The trend of vegetable production, marketing and consumption is changing (K.C., 2017). Use of modern technologies like plastic houses and green houses, mulching plastics, drip irrigation for production has been adopted; consumption is increased, the indigenous and wild vegetables are getting attention in the market.

Table 1: Area, Production and Productivity of Vegetables in Nepal

Year	Area (Ha)	Production (MT)	Productivity (MT/Ha)
2007/08	208108	2538904	12.20
2008/09	225154	2754406	12.23
2009/10	235098	3003821	12.78
2010/11	244102	3203563	13.12
2011/12	245037	3298816	13.46
2012/13	246392	3301684	13.40
2013/14	254932	3421035	13.42
2014/15	266937	3580085	13.41
2015/16	280807	3929034	13.99
2016/17	277393	3749802	13.52

Source: MoALD, 2018

3.2 Fresh Vegetable Trade

Vegetable imports are much higher than exports (Table 2). Although the area under vegetable production is increasing day by day, it is still insufficient to fulfill the demand of domestic market. The export of vegetables to India occurs almost exclusively during the rainy season or offseason, which runs from July to October. The amount of export is minimal, thus there is a trade deficit.

Table 2: Export and import status of vegetables in Nepal

Year	Export		Import	
	Quantity (MT)	Value (NRs. '000)	Quantity (MT)	Value (NRs. '000)
2014/15	20650	282763	449335	12505495
2015/16	16481	607692	413987	12054640
2016/17	12565	1130700	525352	16878850

Source: MoALD, 2016-2018

Among some selected fresh vegetables, the maximum import is onion, followed by tomato (Table 3). In terms of economic value, onion stands to be the highest followed by tomato, peas and chili. Cabbage has the lowest import with 87 MT followed by cauliflower at 503 MT. Clearly, the production of fresh vegetables like onion, tomato and chili should be cultivated in Nepal, with the necessary support to reduce the huge amount of import.

Table 3: Export and import of some selected fresh vegetables

Commodities	Export		Import	
	Quantity (MT)	Value (NRs. '000)	Quantity (MT)	Value (NRs. '000)
Tomato	515	6,427	21529	246574
Onion	2	78	123063	3974013
Cauliflower	1,657	35,367	503	4,634
Cabbage	2,518	21,816	87	118
Peas	5,838	160	862	26,278
Chili	4	645	1,710	21,287

Source: MoAD, 2018

3.3 Value Chain Issues in Different Nodes

To maximize the benefits from the business activity and be sustainable, each partner in the delivery chain from producers to consumers must operate efficiently, profitably and in collaboration with other participants in the chain. This is the concept of value chain. A generic value chain system for vegetable products has been shown in Fig. 1.

In a value chain, service and inputs providers such as agro-vets, agriculture sub-centres (Agriculture Knowledge Centres & Service Centres), I/NGOs, cooperatives, who provide essential services and inputs for vegetable production, play crucial role in value chain. Small, medium and large-scale producers, farmer groups and cooperatives such as Savings and Credit Groups (SCGs) utilize these inputs and services for vegetable production, which are sold to local consumers, middlemen, collectors, marketing committees, and traders. Collection centers are the next critical connection in vegetable value chains. These centres supply vegetables to the local and national markets. These also supply for the processing of the vegetables. From collection center, vegetables go to whole sale markets from where retailers take their part. Quite some portions of vegetables go to international markets.

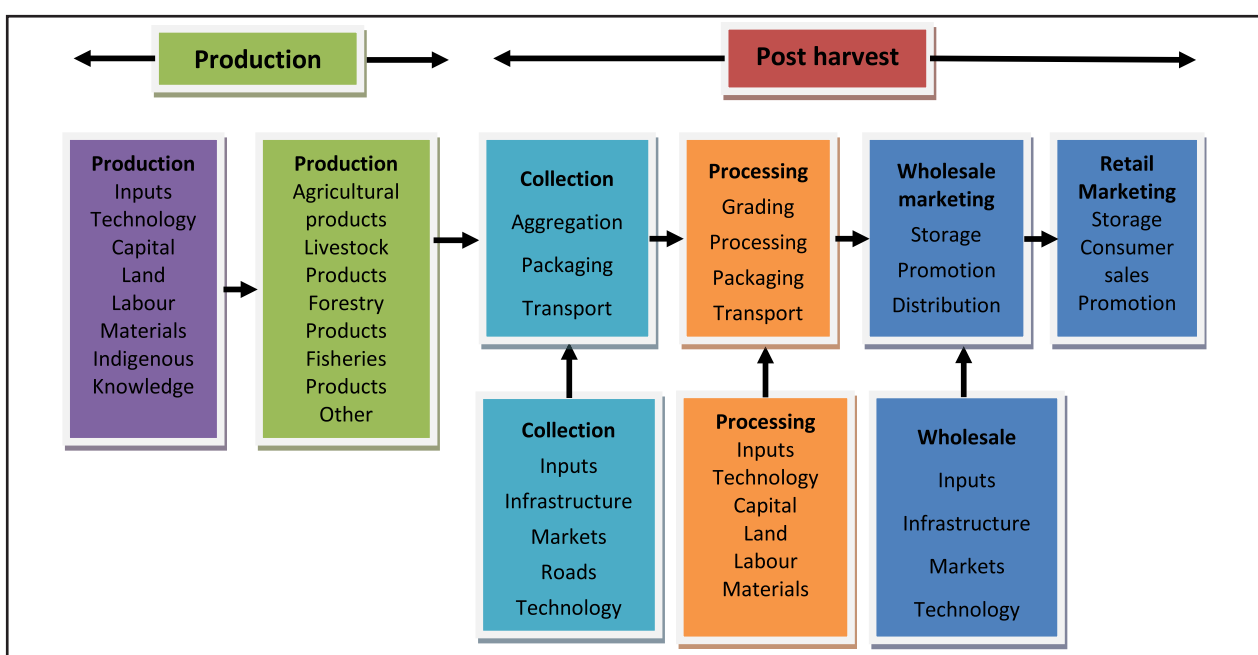


Figure 1: A generic value chain system for agricultural products

3.3.1 Production Node

There are many issues in production node of value chain, some are discussed hereunder.

Land:

The most important issues of value chain in production node are being the availability of land for large scale farming. The land fragmentation has been hindering for commercial farmers. The land leasing is not also that easy due to low land holding and complex social structures. Most of the current land leasing practice is for five years; due to no legal binding the breach in the agreement is quite common. Land is available in remote areas but due to transportation and other difficulties that land has not been used for vegetable cultivation. Thus the size of production is low and cost of production is high creating difficulties in supply side of the market.

Inputs supply:

Short supply of inputs is quite important issue. The quality seed of improved varieties of crops, machines and equipments for the value chain functions, irrigation facilities, and chemical fertilizers are not supplied well in all vegetable growing areas. Sufficient irrigation facility is the most limiting input in this sector.

Financing:

Due of growth of financial sector up to remote areas, the availability of finance has been improved to some extent. However, the high interest rate and lengthy and tedious procedure of financial institutions has been discouraging farmers to go for agri-financing. Government has announced interest subsidies for agri-loan but due to their limited access it is not been reached to real growers.

Technology delivery:

New and modern technologies are being developed and imported in the country very fast. Many such technologies are not in the reach of general growers. The service delivery mechanism has been disturbed now due to transition period of state restructuring. The technicians in public sector are also not well aware, well trained and well skilled to deliver the technologies to the farmers. Moreover, the access to public sector technology delivery is limited due to less number of personnel and service delivery points. Private sector service delivery is very much limited in small areas.

Pest management:

Many diseases and insect pests are being attacking vegetable crops in the country. Some diseases like Root Knot Nematode (*Meloidogyne* sps), Leaf minor (*Tuta absoluta*), many viral diseases etc. have emerged as devastating pests. The management of some of the disease pests has become difficult in one hand, in other hand the issue of chemical residue in fresh vegetables is also emerging.

Seasonal production balance:

The farmers engaged in vegetable production do not have the capacity to plan their production. This leads to overproduction in some places and underproduction in others. Farmers appear interested in producing various kinds of vegetables in small quantities, not enough to cater to the need of markets. Farmers are not aware about market signal to get good price of their commodity.

3.3.2 Post Harvest Node

Post-harvest handling is very much in poor condition. This the most neglected issue in Nepalese agriculture sector. As vegetables are the fresh products the post harvest losses is as high as 30% of the production. High tomato losses (up to 33%) (HVAP, 2011) are common in Nepal even though tomato production appears to be most profitable than other vegetables. Due to poor knowledge, skill and technologies the post harvest loss is very high in vegetable sector. The most important issue in this sector is technology and inputs delivery to the production areas. Even the simple plastic crates are not much available to the growers. Grading and packaging practices are very limited. Cold chain maintenance for transportation is not at all available in Nepal.

3.3.3 Marketing Node

Marketing of the fresh vegetables is very important part of vegetable value chain. This is the most important issue for Nepalese farmers. As the production planning is not market oriented no contract with market players before hand or buy back guarantee, the farmers has to rely on the collectors for their product marketing. The market players, the middleman are powerful in the market to set the price of the products. Thus the farmers are getting fewer prices of their products and consumers are fetching more price. This is the nature of fresh product marketing in Nepal.

Economies of scale:

Farmers are small holders and are scattered. For local consumption and local market there is not much issue. But larger cities where vegetable demand is high, regular supply of the large volume is necessary. Moreover, larger markets demand diversity of vegetable products. Thus to get the volume supply as demanded by the collectors/wholesalers is always difficult. This situation makes the collection cost high, thus the wholesalers always attracted towards Indian market to get regular supply in required volume.

Price determination and Price Information

Market price determination should be the automatic process based on the market rules of demand and supply. But as market players are powerful farmers are usually getting less price of their products. Price information of different fresh markets are available online and also from SMS services. But this facility is not always accessible to rural farmers.

Marketing infrastructure:

The proper marketing and storage infrastructure is lacking. Many vegetable growing areas in hills and high hills are still lacking the road access

Informal trade:

The most of the farmers growing in small scale commercially are selling their products to the collectors. There is informal trade; they even don't know their price at the collection point. Collectors send to the traders, collect the prices and give back to the growers. Thus growers could not get the price of their products in time.

Production process tracking:

Different production process has been adopted by the farmers. The conventional production process with the use of chemicals in need, traditional by default organic, adoption of GAP/IPM and adoption of organic process are commonly practiced by the farmers. Quite few farmers in peri-

urban areas have been practicing PGS and ICS procedure for organic production. Thus different kinds of products from different production practices are available in the market. Due to lack of their different identity and tracking system consumers are confused, and thus sometimes cheated by the salesman.

Competitiveness:

Small scale farming, high cost of inputs, high transportation cost etc increase the price of the Nepalese vegetables in wholesale market thus is hard to compete with Indian vegetables. The cost of production is high in Nepal in comparison to India, probably because of higher level of commercialization of agriculture in India, subsidies in inputs, such as, fertilizer, irrigation, energy and machinery, improved technology and extension service. Indian vegetables get access to Nepalese market after a simple quarantine check and the Nepalese products are unable to compete with them in price creating an adverse impact on the production of vegetables in Nepal.

Export node

Nepalese vegetables are grown mostly for the domestic market. However, few quantities of fresh vegetables are exported mostly to India, and also to Bhutan, Bangladesh and Arabian countries. Due to the geographical and seasonal advantage of Nepalese hills, the vegetables like cabbage, cauliflower, pea pods, tomato, green chilly and many others are exported to India. Indian demand for fresh vegetables can be clearly seen from the increase in vegetable imports in India every year. Tomatoes also used to be exported to India in large quantities. The export of summer and winter vegetables mainly takes place during the rainy season as it is a lean season in India. Traders from neighboring areas in India visit Nepalese wholesalers to collect vegetables during this time. Likewise in Bangladesh where there is not sufficient land for vegetable production needs to import a huge quantity of fresh vegetables. But, normally, Bangladesh levies high tariffs particularly for tomato, cabbage; lettuce etc.

Both the supply and demand sides look positive but marketing of vegetables is not getting the priority it deserves leading to low levels of exports. The regular supply of the demanded volume by the importer has not been maintained thus leading to discontinuation of the trade. The tracking system of the products quality has not been initiated. The poor grading and packaging practices also affect the regularity of the trade. Many issues of SPS and other non tariff barriers have hindered the export to India.

3.3.5 Processing Node

Processing of vegetables has been started to some commodities. Preservation of vegetables is quite common practice in Nepal. Preparing the most common product 'gundruk' from Broad Leaf Mustard, Cauliflower leaves and mustard leaves is the traditional practice in Nepal. Besides that, preparing pickles by preservation from vegetables in small and medium level processing industries is being practiced. These processed products are also exported to many countries where Nepalese are spread over.

Nepalese consumers are not much habituated in processed vegetables thus the market is limited. The frozen vegetables are not preferred and also the facilities to sale such products are limited. Moreover, as year round fresh vegetables are available in the market this has less scope in Nepal.

4. Way Forward

- Vegetable production zoning and production planning based on market signal.
- Ensure acceptable quality and large scale production for regular supply.
- Promotion of protected horticulture technology.
- Development of hybrid varieties.
- Capacity development of farmers, extension agents and researchers for effective and quality delivery of technologies.
- Promotion of postharvest technologies and equipment to the farmers and traders
- Infrastructure development (access roads, markets, collection centres, storage etc).
- Price information and marketing system improvement with facility of product tracking.
- Promotion of organic or safe production process
- Facilitation to resolve trade hurdles

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