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*Full Length Research Paper*

# Challenges of *Asparagus racemosus* marketing in Nepal: A study from Sarlahi district

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***Asparagus*** **is a valuable medicinal plant. Most of its parts are useful. Its tender leaves and shoots are mostly cooked as vegetable. Root tubers are used as sex tonic and cure many diseases. But its markets and price rate were unstable. So, this paper focuses on marketing channels and the trends of price, quantity and income obtained as well as suitable months for harvesting. Forty percent of total cultivators' households were randomly selected from the eleven village development committee of Sarlahi District. Both primary data using Participatory Rural Appraisal tools and secondary data from different sources were collected and analyzed in MS-Excel. Suitable marketing channels were developed through group discussions of cultivators, officials and businessmen separately. The trend of price rate of** ***Asparagus racemosus*** **Willd. was increasing to Nepalese rupees (NRs) 225.00 per kilogram in 2008 from NRs 104.00 per kilogram in 2004, whereas price rate of** ***A. racemosus*** **hybrid was almost stable that is NRs 80.00 from 2004 to 2006 and NRs 120.00 from 2007 to 2008. March and April were found to be the suitable months of harvesting and March is the best month for harvesting of cultivated** ***Asparagus*** **to have the highest yield and availability of markets.**

**Key words:** *Asparagus racemosus*, markets, trend, cultivators, Nepalese rupees.

## INTRODUCTION

*Asparagus* is the Greek word for 'stalk' or 'shoot' belongs to *Liliaceae* family. The *Asparagus* genus is considered to be of medicinal importance because of the presence of steroidal saponins and sapogenins in various parts of the plant (Goyal et al., 2003). It is valuable medicinal plant, generally found from tropical to subtropical regions up to an altitude of 1200 m (Dutta, 2007; Bhattarai, 2001). Although it usually grows in a variety of soils, sandy loam and soil rich in organic matter is more suitable for its root growth. Soil ph 6 to 8.5 is suitable for its cultivation (Dutta, 2007).

*Asparagus* is a good source of folic acid, potassium, dietary fiber (Palep, 2003). The methanol extracts of the roots of asparagus wild is reported to show considerable *in vitro* antibacterial activity against various common pathogens (Shrestha and Shrestha, 2008). It also has potent antioxidant, immunostimulant, anti-dyspepsia and antitussive effects (Nishritha and Saxena, 2007). Root tubers of *Asparagus* are energetic and used as sex tonic, leucorrhea, anemia and many other diseases.

They are fed to get relief from milking disorder of cattle which are regarded as appetizer, alternative and stomachic. Tender leaves and shoots are cooked as vegetable which are considered to be vital tonic for recovering patient and post natal mothers (Dutta, 2007; Purohit and Vyas, 2004). Fruit is eaten to treat pimples (Bhattarai, 2002). Therefore, asparagus is known as compassionate queen of herbs.

About 300 species of asparagus are known to occur in the world. Some of the European species to be mentioned are *Asparagus officinalis* var. *altitis, Asparagus densiflorus 'Sprengeri', Asparagus acutifoliu*

**Photo 1.** *Asparagus racemosus* hybrid cultivated at Raniganj by Gautam, L.

**Photo 2.** *Asparagus racemosus* Willd. cultivated at Sasapur by Paudel, K.

*(Syn., Asparagus corruda Scop., Asparagus ambiguus De Not., Asparagus commutatus Ten.), etc* are reported to be a popular vegetable consumed in many parts of the world (Goyal et al., 2003). Although the detailed research for the identification of different types of asparagus has not yet been conducted, eight varieties of Asparagus species may be found in Nepal (www.Efloras.org). To distinguish *Asparagus racemosus* Willd. and *A. racemosus* hybrid, their photos taken from research sites of Sarlahi district are shown in Photos 1 and 2

**Marketing channels of asparagus in Nepal**

There are various intermediaries between cultivators and wholesalers/industries involved in the asparagus marketing. These marketing links are shown in Figures 1a and b.

**Price rate and markets for *A. racemosus***

150 varieties of medicinal and aromatic plants (MAPs) are found in Terai-Bhabar and Churia range of Sarlahi and Mahottari districts out of which, mainly the cultivation of *Asparagus* (*A. racemosus)*, Sarpagandha (*Rauwolfia serpentine)*, Safed Mushli (*Chlorophytum borivillianum*), Pamarosa (*Syzugium jambos*), Lemon grass (*Cymbopogoon citrates*), Citronella (*Pelargonium citrosum*), Tulsi (*Ocimum tenuiflorum*) and Chamomile (*Matricaria chamomilla*) are widely cultivated in community forests, leasehold forests and private lands in these two districts (Non-Timber Forest Products' Promotion Association of Nepal, 2006).

*Asparagus* roots were sold in the market at NRs. 150.00 to 250.00 per kilogram (kg) and net profit obtained was approximately NRs. 150,000.00 to 200,000.00 per hectare (Dutta, 2007). In 2001, it was estimated that the market value of *Asparagus* per kg was NRs. 160.00 in Nepalganj, NRs. 170.00 in Kathmandu and NRs. 240.00 in Delhi, India (Paudel et al., 2002); only a small percentage of that final price rate goes to the collectors (Edwards, 1996; Subedi, 1997; Malla, 1994; Lecup, 1993). A study done by Edwards (1996) showed that the price received by medicinal and aromatic plants' harvesters in Nepal is, on an average 32% of the final price given by Indian industries that process raw materials. It was estimated that about 60 to 200 tones of asparagus have been exported each year to India in raw form for which, cultivators, collectors, local traders, businessmen, wholesalers and processors are involved for its marketing (Adukiya, 2008).

Although Government of Nepal has kept asparagus in the priority list for cultivation and research (Department of Plant resources (DPR), 2003), there were no any processing units established locally as well as lack of statistics of demand and supply and price rate available in the Government offices. Biodiversity Sector Programme for Siwalik and Terai (BISEP-ST) was the Netherlands funded project for 8 districts of terai. The names of those districts are Dhanusha, Mahottari, Sarlahi, Rauthat, Bara, Parsa, Makawanpur and Chitwan. Regarding asparagus cultivation, BISEP-ST supported the purpose of Dabur Nepal to contribute to the poverty reduction as the yield per unit area of asparagus hybrid was found to be high. But, none took care about markets for sales and profitable price rate for asparagus cultivators. So, cultivators became real sufferers for selling their products to have profitable price rate. Profit-loss analysis was done and calculated that total cost of asparagus production per hectare (ha) was NRs. 540,383.16. Profit per ha gained from asparagus wild was NRs 151,781.00 whereas cultivators got loss of NRs, 171228.84 per ha if only roots were sold. Dabur Nepal Private Limited as well as other industries/wholesalers mostly uses to buy dried roots. It was estimated that 3076.29 kg of dried roots, 552.91 kg of seeds and

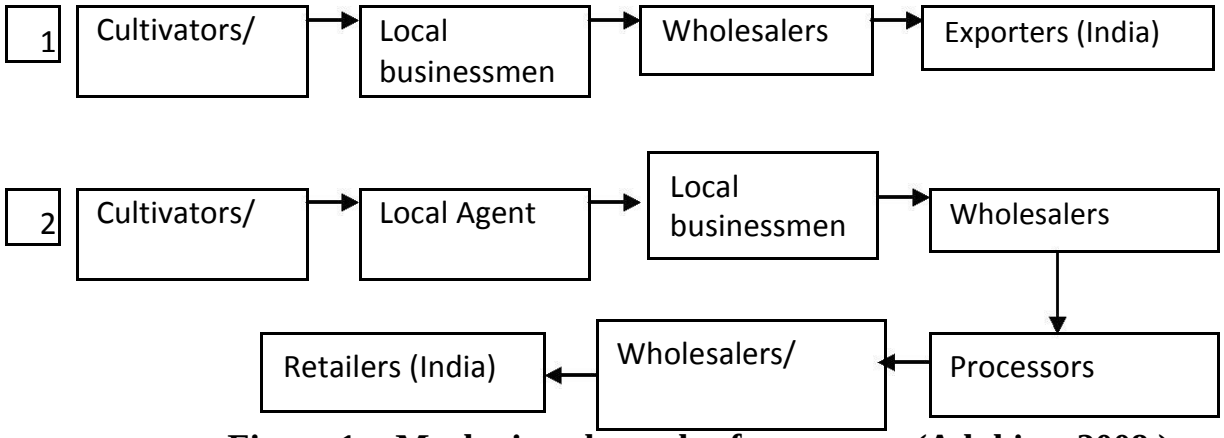


**Figure 1a: Marketing channels of asparagus (Adukiya, 2008 )**

**Figure 1a.** Marketing channels of asparagus (Adukiya, 2008).

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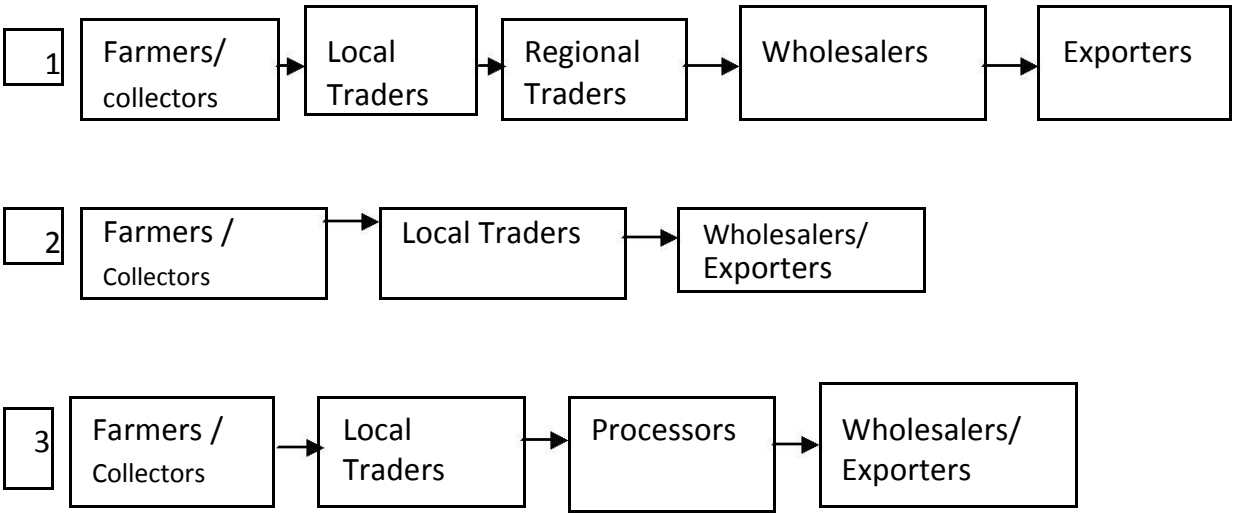


**Figure 1b.** Marketing channels of asparagus (Kunwar, 2006).

3132.165 kg of tender shoots and leaves could be produced per ha. Seeds of asparagus wild could be sold at up to NRs. 3000.00, whereas seeds from asparagus could be sold at upto NRs. 300.00. However, the price rate of tender leaves and shoots were similar, that is NRs 45.00 (Yadav, 2008).

As the harvesting month plays vital role in marketing and price rate obtained by the cultivators, this paper also discusses on the harvesting month of *A. racemosus* to have optimum yield and price rate for marketing besides trends and marketing of *A. racemosus*. *Asparagus* has rotational period of approximately 3 years. Harvesting is mostly done in September - October (Dutta, 2007). Similarly, the roots of asparagus are harvested from January to March (DPR, 2007) and from October to November (Bhattarai, 2001).

## MATERIALS AND METHODS

### Study area

Sarlahi district provides a 'niche' for the cultivation of *A. racemosus*, which is located in the central development region of Nepal containing the features of Terai. This district is situated between latitude 26° 45' N to 27° 10' N and longitude 84° 41' to 85° 50' E. The altitude ranges approximately 60 to 659 m from mean sea level (BISEP-ST, 2005).

As shown in the location map in Figure 2, eleven Village Development Committee (VDC in Nepal is the lower administrative part of its local development ministry) out of 103 VDCs in Sarlahi district having *Asparagus* cultivated households (hhs) and traded from

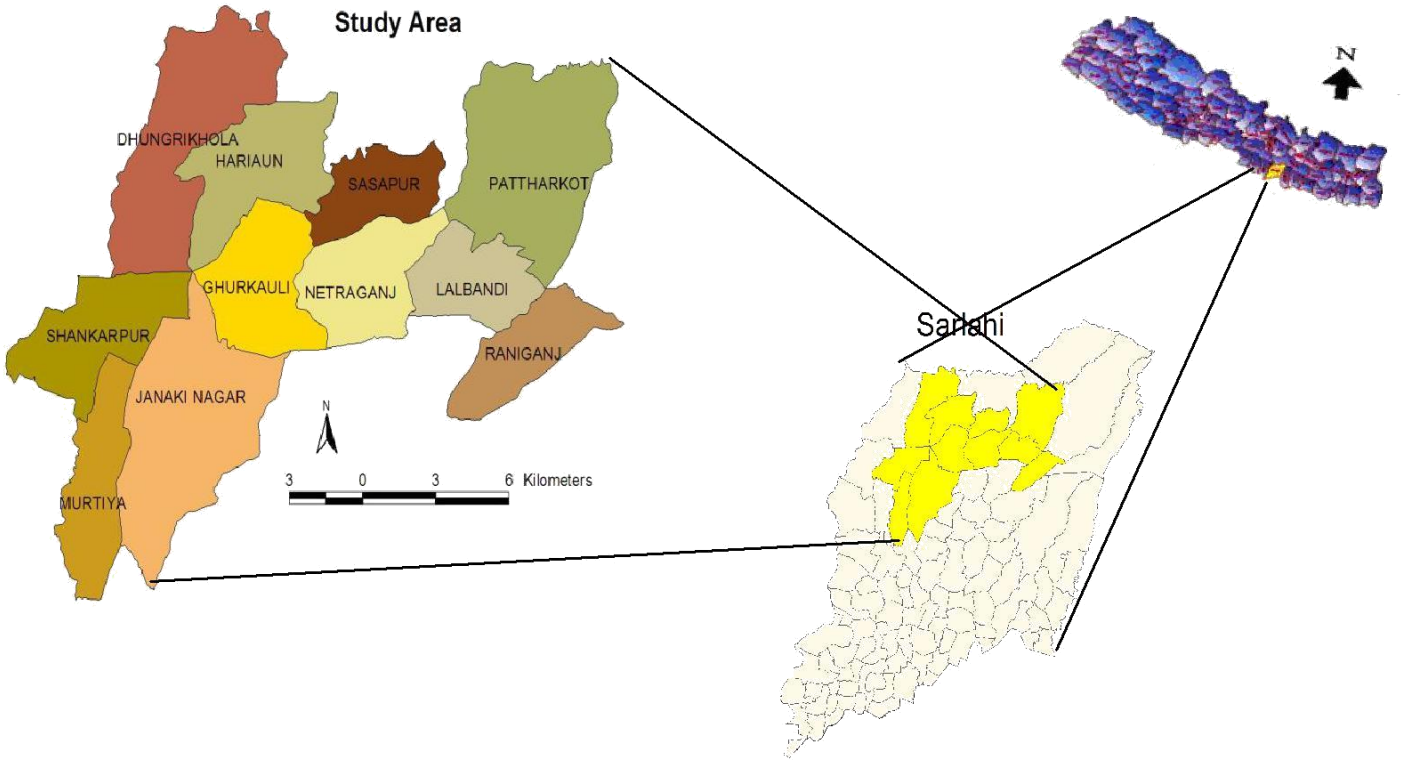


**Figure 2.** Location map of study area.

the last five years were selected for this study. 11.11% (1:9) of total VDCs of Sarlahi district were selected and 40% of total cultivators' hhs from each VDCs selected randomly by the lottery method. Number of cultivators interviewed was 54 excluding wholesalers/industries as well as other key persons. Those VDCs were Lalbandi, Murtiya, Sankarpur, Janakinagar, Netraganj, Sasapur, Raniganj, Hariwan, Gurkauli, Patharkot and Dhungrekhola.

### Data collection and analysis

Primary data were collected using participatory rural appraisal techniques such as structured interviews, key informant interviews, focus group discussions and checklists. Secondary data were collected from the relevant literatures and reports available in the libraries, offices and websites. They were ratified by triangulation during field observation and data collection. The study was carried out in 2008. MS Excel was used to analyze the collected data. Only two varieties of asparagus were taken into consideration for the study. *A. racemosus* wild is a local variety in the one hand and asparagus improved, popularly and locally called *A. racemosus* hybrid in Sarlahi district on the other hand which had mostly been distributed by Dabur Nepal. Unit of land is expressed in Kattha (1 hectare = 29.41 Kattha).

## RESULTS AND DISCUSSION

### Marketing trend of asparagus in Nepal

Although detailed survey and mapping on quantities and marketing of MAPs have not been conducted (Bhattarai, 2002), Kunwar (2006) has illustrated the marketing trend of asparagus in Nepal as shown in Figure 3.

The amount of annually traded MAPs in Nepal is estimated about 180 to 420 tons (Olsen, 1997) out of which, asparagus contributed on an average 91.5 tons per year. The year 1992 is the highest and 1991 is the lowest export of asparagus from Nepal showing the fluctuation of its international market demand (Table 1).

Royalty is fix amount like tax to be paid to the government while purchasing MAPs, which indicates price rate fluctuation. Development region is a higher administrative part of Nepal. Nepal has divided into 5 development regions, 14 zones and 75 districts. There is a good chance of earning revenue and sustaining the livelihood of asparagus dependents through sustainable management of asparagus and giving legal permissions to collect it from the forests and protected areas as suggested by Maraseni et al. (2008). The medicinal raw materials annually exported from Nepal to India and other countries are estimated between 18 to 20 million dollar (Kanel, 2000). Approximately 90% of harvested non-timber forest products (NTFPs) are traded to India

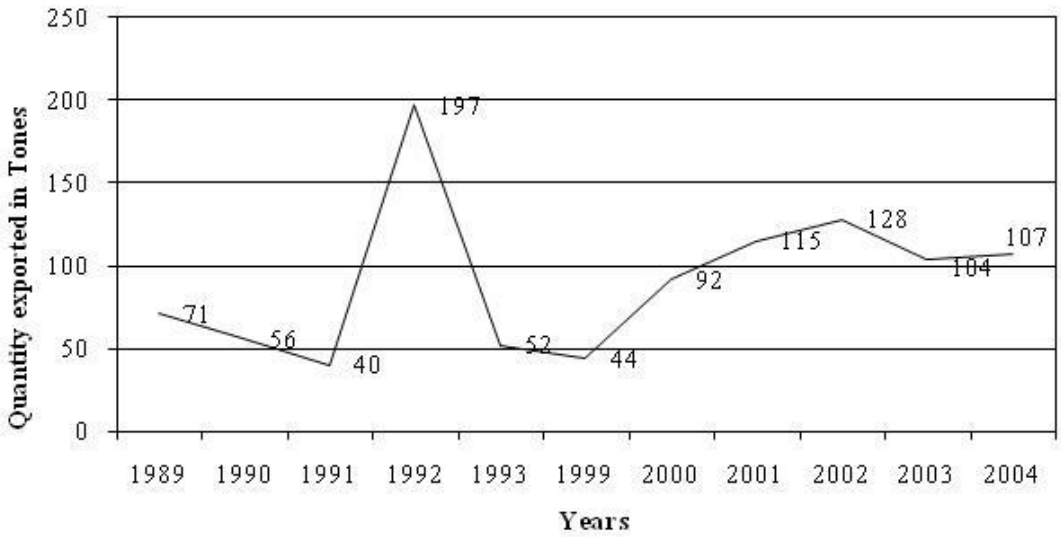


**Figure 3.** Amount of asparagus (hybrid+wild) exported.

**Table 1.** Quantity and royalty of asparagus from Fiscal Year 2007 to 2008 (Department of Forests, 2008).

| Development region | Fiscal year 2006/2007 | | Fiscal year 2007/2008 | |
|---|---|---|---|---|
| | Quantity in kg | Royalty in NRs | Quantity in kg | Royalty in NRs |
| Eastern | 400.0 | 2,000.0 | 0.0 | 0.0 |
| Central | 6,500.0 | 30,500.0 | 10,880.0 | 53,525.0 |
| Western | 2,962.0 | 14,810.0 | 1,507.0 | 7,535.0 |
| Mid-Western | 3,398.0 | 16,990.0 | 5,007.0 | 16,810.0 |
| Far-Western | 0.0 | 0.0 | 1,000.0 | 5,000.0 |
| Total | 13260 | 64,300.00 | 18394.00 | 82870.00 |

(Nepalese Rupees (NRs) 72.00 = US$ 1.00 in 2008).

(Rawal, 1995). If such amount were properly processed and exported through systematic way, it would help to alleviate the living standard of the Nepalese people.

### Trend of quantity sold, price per kg and income from asparagus in Sarlahi district

The trend of sold quantity of *Asparagus* hybrid is increasing at increasing rate from 2004 to 2008 (2004 to 2005 at 50 kg, 2005 to 2006 at 200 kg, 2006 to 2007 at 1734 kg and 2007 to 2008 at 3028 kg). But in case of asparagus wild, the trend of sold quantity differs from that of asparagus hybrid as the trend increased at 25 kg from 2004 to 2005 and increased at 5 kg only from 2005 to 2006. The increase rose to 95 kg from 2006 to 2007 and decreased to 5 kg from 2007 to 2008. The trend is illustrated in Figure 4.

The trend of *Asparagus* wild has much fluctuation. The reason behind this is that no one took initiation for the promotion of asparagus wild, whereas the trend of asparagus hybrid was found to be increasing because Dabur Nepal had taken initiation for the promotion of asparagus hybrid. At the time of cultivation, Dabur Nepal provided seedlings on spots for plantation at subsidized rate that is NRs.1.00 per seedling and technical support for cultivators. BISEP-ST also subsidized the cultivators for seedlings of asparagus hybrid.

The trend of price per kg of *Asparagus* wild increased at NRs. 28.00 from 2004 to 2005 with a slight decrease from 2005 to 2006 at NRs 20.00 and then increased steadily at increasing rate from 2006 to 2008. But that of *Asparagus* hybrid was found stable from 2004 to 2006. It increased at NRs 40.00 from 2006 to 2007 and again became stable in its price rate.

Although the price rate in the case of wild variety was found to increase but its rate varies every year. On the contrary, the trend in price rate of asparagus hybrid showed no increasing trend from 2004 to 2006. After that, its rate fluctuated a little. Thus, the price rate of

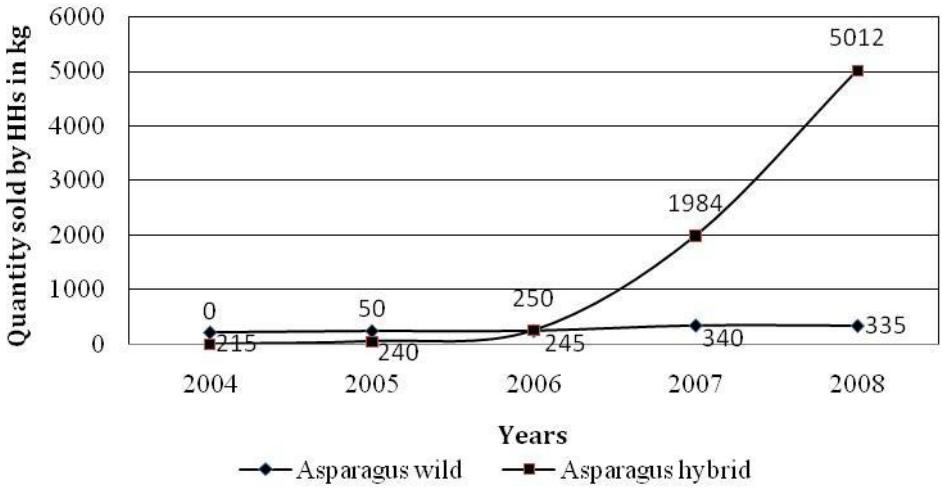


**Figure 4.** Trend of total quantity sold by respondent's hhs.

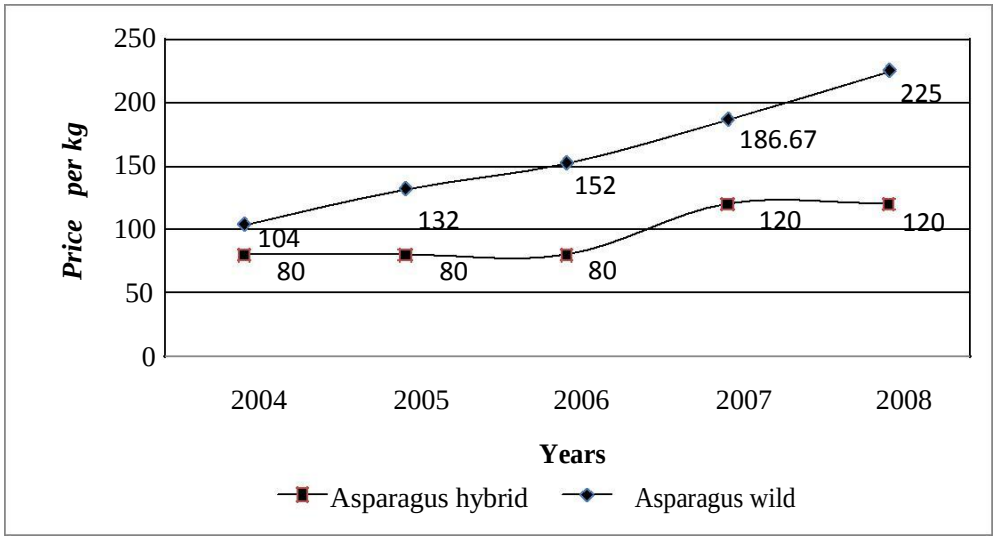


**Figure 5.** Trend of price per kg of asparagus wild and asparagus hybrid.

*Asparagus* wild shows higher potentiality for marketing in comparison to asparagus hybrid as shown in Figure 5.

From the sale of *Asparagus* wild, the trend of total income increased by NRs.9900.00 from 2004 to 2005 and also increased at increasing price of NRs. 25650.00 from 2006 to 2007, which increased at decreasing price of NRs 4750.00 from 2005 to 2006 and from 2007 to 2008 at NRs 10450.00. Thus the trend of total income obtained from *Asparagus* wild was fluctuating with increasing rates from year to year. In case of asparagus hybrid, the trend of total income obtained continuously increased at increasing rate from 2004 to 2008 as shown in Figure 6.

The reason behind this was that the number of cultivators increased due to publicity and motivation by different organizations for the cultivation of asparagus hybrid. Thus, the cultivation of asparagus wild should be prioritized to conserve gene pool and promote domestication; otherwise, it might disappear from the wild.

## Marketing channels of *Asparagus* in Sarlahi district

From group discussions with the cultivators and officials in Sarlahi, it was found that there are few local markets. These are Lalbandi, Nawalpur and Barhathwa. In addition, the cultivators claimed they had information about international market but had no link with such markets. Among such markets are; Birganj, Dhalkebar, Nijgadh, Hetauda, Chandranigahpur, Janakpur, Kathmandu, Gorkha Ayurved Company, Dabur Nepal

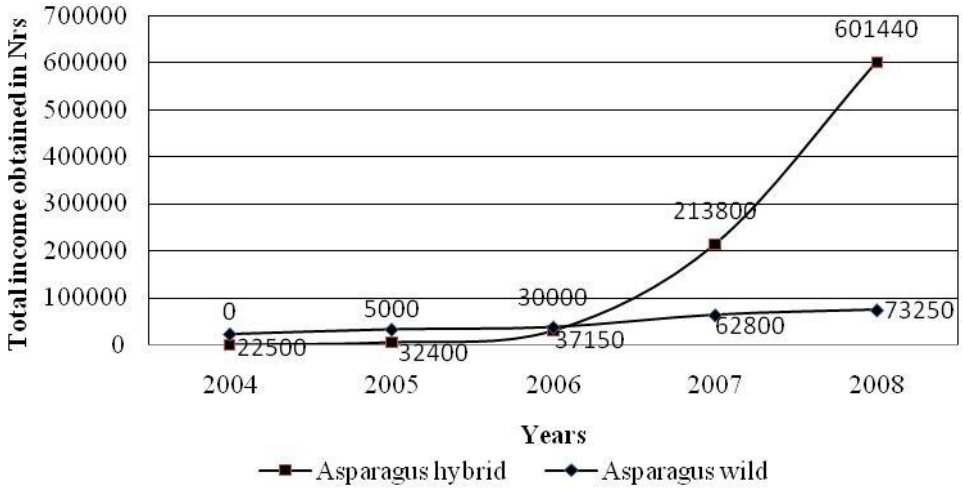


**Figure 6.** Trend of total income from asparagus wild and asparagus hybrid.

and Singh durbar Baidhkhana. Other Indian markets not at the reach of the cultivators include, Raxaul, Jayanagar, Sitamadhi, Patna and so on.

In this study, single market of Dabur Nepal Pvt. Ltd. existed for asparagus hybrid. There were no any other markets or businessmen in between cultivators and Dabur Nepal. On the contrary, asparagus used to move through local businessmen and road headers in between cultivators and wholesalers. There were quite a number of markets for asparagus wild resulting in high competition and handsome price rate.

In order to improve the marketability adequate channel of the commodity needs to be harnessed. Figure 7 shows suggested marketing channels that would improve the cultivation of the commodity. This would boost the nation's Gross Domestic Product (GDP) in the area of agriculture.

## Suggested marketing channels of cultivated *Asparagus*

In channels 1, 2 and 3, there are individual marketing while channel 4 shows organizational marketing. There is no any systematized marketing channel for asparagus in Sarlahi district as well as any other MAPs too. Most of the participants suggested the needs of NGOs/government's interventions chiefly for recommending the suitable varieties, timely technical supports and securing markets on profitable price rate.

Thus, there is a need of systematic marketing channel for *Asparagus* in particular and MAPs in general. The above mentioned four channels have their own merits and demerits. However, a channel 4 shows more competitiveness than those of other channels as it involves Government and NGOs for their mediation. Cultivators are seen to be ensured to market their cultivated MAPs including asparagus, which has not been practiced yet. Most of the participants of group discussions forward their views against the monopoly and long channels of marketing.

## Harvesting period and best month of harvesting of *Asparagus*

The Table 2 showed that months of March and April were most common period for *Asparagus* harvesting in Sarlahi as about 26% respondents were in support of March to April and only about 3% of respondents were in favor of March to June and January to April. Those months had not been taken in account for analysis. So, those months have been deleted. The criteria of selecting suitable months were maximum yield, availability of markets and market price rate. This harvesting period was also concentrated on cultivated *Asparagus* of both varieties.

## Best month for harvesting of cultivated *Asparagus*

Harvesting period of both *A. racemosus* Willd. wild and hybrid might vary due to several factors such as irrigation, seed quality, soil, climate, ecological zones and/or physiological zones. Individual interview of 47% of participants responded March as the best month followed by April as shown in Figure 8 and so March was inferred the best month of harvesting for both varieties of *A. racemosus*. As per the respondents, the reason behind this is that processing takes long sunny period to dry asparagus roots after digging, cleaning and cutting into pieces. April and May have long sunny days to dry asparagus after harvesting in March. But January and February have colder moist days, the sun light of which cannot dry properly on one hand and after May, rainy

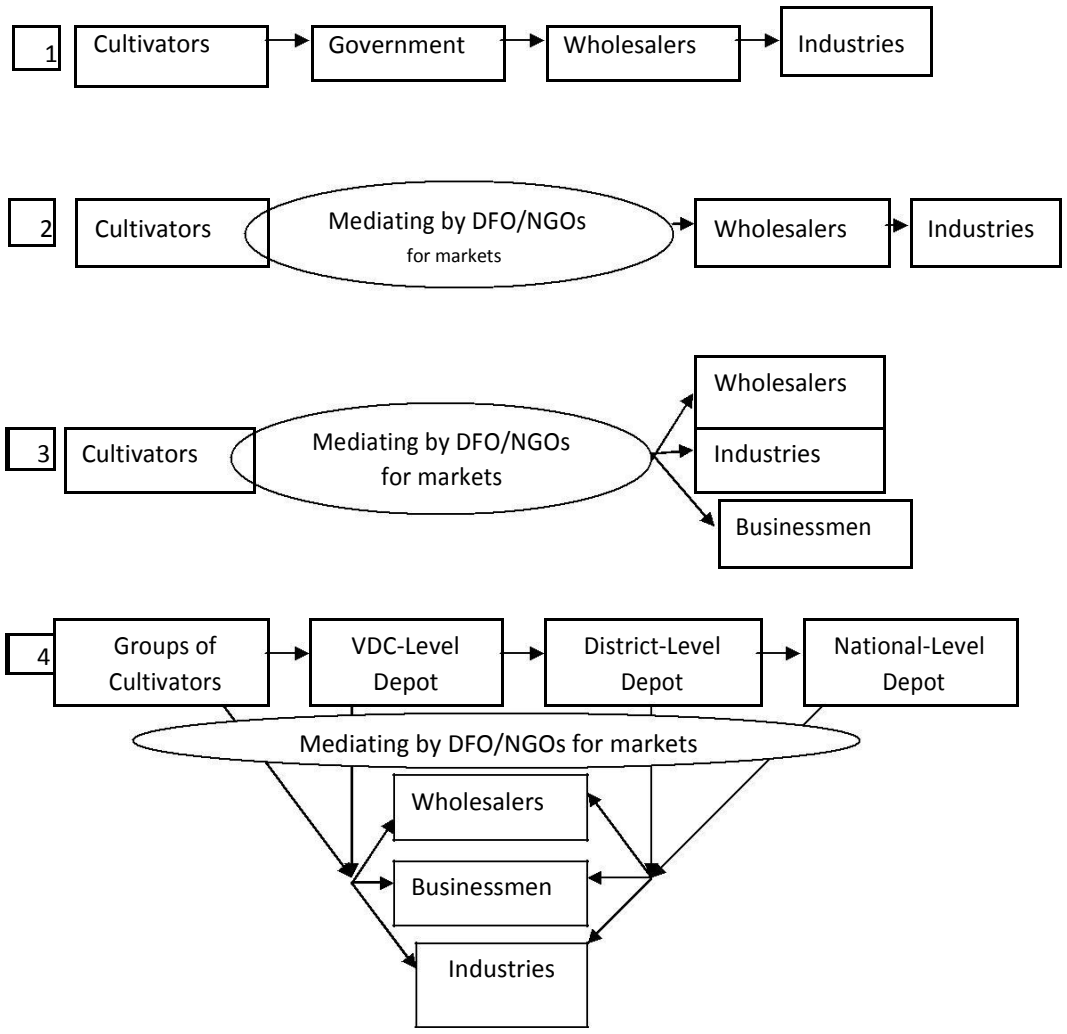


**Figure 7.** Marketing channels of cultivated *Asparagus racemosus.*

In channels 1, 2 and 3, there are individual marketing while channel 4 shows organizational

**Table 2.** Suitable harvesting period of cultivated *Asparagus*.

| November | December | January | February | March | April | May | June | % of total respondents' hhs |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | 22.86 |
| | | | | | | | | 25.714 |
| | | | | | | | | 5.714 |
| | | | | | | | | 8.571 |
| | | | | | | | | 11.428 |
| | | | | | | | | 14.285 |
| | | | | | | | | 5.714 |
| | | | | | | | | 2.857 |
| | | | | | | | | 2.857 |
| | | | | | | | | 100 |

season starts on the other hand resulting in rotting of *A. racemosus* Willd*.* and deteriorating the quality for their use.

**Conclusions**

The trend of total quantity traded and income obtained

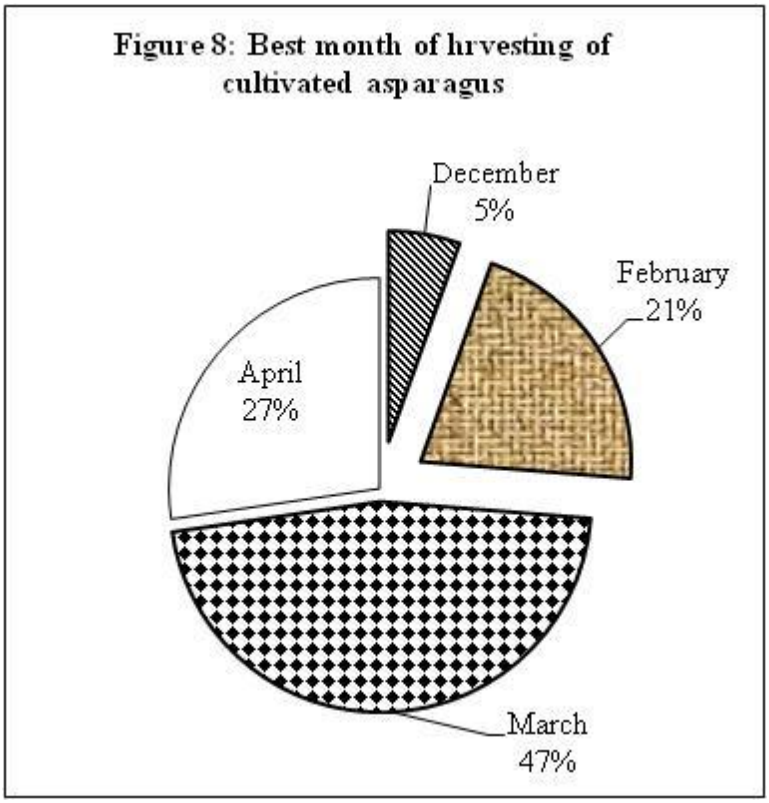


**Figure 8.** Best month of harvesting of cultivated *Asparagus*.

from asparagus hybrid was found to be increasing from 2004 to 2008 due to motivation and publicity, whereas those of *Asparagus* wild had fluctuated at increasing rate. The trend of price per kilogram of asparagus wild was increasing. But, the trend of price per kilogram of asparagus hybrid was almost stable. To uplift the livelihoods of cultivators and get them benefitted, the concerned authority intervention of Government/NGOs may play important role for recommending the suitable varieties, timely technical supports and securing markets on profitable price rate. March and April are suitable months for harvesting of cultivated asparagus; and March is the best month for harvesting of *Asparagus* to obtain the highest yield and price rate in markets.

At district level, medicinal plants' section at District Forest Offices in Nepal with trained medicinal plant technician should be arranged. *Asparagus* management action plan should be formulated and implemented. There is a need to conduct researches on chemical constituents of *Asparagus* wild and *Asparagus* hybrid to distinguish them to know the causes of higher demand and price rate of asparagus wild. The causes of low price rate and unavailability of markets of *Asparagus* hybrid could also be explored.

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