



Government of Nepal  
Ministry of Agricultural Development

## High Value Agriculture Project in Hill and Mountain Areas (HVAP)



# A Report on VALUE CHAIN ANALYSIS OF OFF - SEASON VEGETABLES (OSV)



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### *Implementing Partners*



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Study Team

## Acronyms

AEC	Agro-Enterprise Centre
ANSAB	Asia Network for Sustainable Agriculture and Bio resources
APP	Agriculture Perspective Plan
ASC	Agriculture Service Centres
BMOs	Business Membership Organizations
CADP	Commercial Agriculture Development Project
CCI	Chamber of Commerce and Industry
CBS	Central Bureau of Statistics
CBO	Community Based Organization
DADO	District Agricultural Development Office
DDC	District Development Committee
DOA	Department of Agriculture
FGD	Focus Group Discussion
FNCCI	Federation of Nepalese Chambers of Commerce and Industry
GDP	Gross Domestic Products
GO	Government Organization
ha	Hectare
HVAP	High Value Agriculture Project in Hills and Mountain Areas
HVC	High Value Crop
IFAD	International Fund for Agriculture Development
IPM	Integrated Pest Management
JTA	Junior Technical Assistant
Kg	Kilogram
MDD	Marketing Developing Directorate
MEDEP	Micro Enterprise Development Program
MOAC	Ministry of Agriculture and Cooperatives
MPC	Marketing and Planning Committee
MASL	Meters above the sea level
MT	Metric Tons
NARC	Nepal Agricultural Research Council
NARDF	National Agriculture Research and Development Fund
NEAT	Nepal Economic, Agriculture, and Trade Activity
NGO	Non-Governmental Organization
OSV	Offseason Vegetables
PPD	Plant Protection Directorate
SNV	The Netherlands Development Organization
TEPC	Trade and Export Promotion Centre
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
VDD	Vegetable Development Directorate

## Executive Summary

Offseason vegetables have emerged as an important source of income and an effective means of poverty reduction in Nepal with the increasing consumption volume of vegetables in the country, market growth in Nepal and adjoining cities of India. Providing support to High Value Agriculture Project in Hill and Mountain Area (HVAP) in designing the project's activities for the promotion of value chain, Asia Network for Sustainable Agriculture and Bioresources (ANSAB) has prepared this report analyzing the value chain of offseason vegetables. This study focused on HVAP districts along the three road corridors - Chhinchu-Jajarkot, Surkhet-Dailekh and Surkhet-Jumla - and suggests possible interventions to the project. Six districts within the road corridors - Dailekh, Jajarkot, Jumla, Kalikot, Salyan and Surkhet are used for detailed situation study of the offseason vegetables. Findings of the study are validated through sharing meetings and interactions with stakeholders at district, regional and national levels.

In terms of production and sales, the major offseason vegetables grown in the study areas are cauliflower, tomato, cabbage, peas and beans. Most of the production pockets are located along the roads or 1-5 km away from the road heads. Only about 40% of the cultivated land is irrigated. There is no cold storage facility in the production areas, and the farmers in the area have not felt the need for it since the vegetables are sold immediately after harvest. But in regional market (Birendranagr), there is a need for cold storage. Vegetables produced in the three road corridors have different end markets. In Chhinchu-Jajarkot corridor, 25% of the produced vegetables are marketed through the collection centre, 55% are consumed at local markets, 10% are traded by the local traders, and the remaining volume are traded to the wholesaler at Birendranagar. In Surkhet-Dailekh corridor, 20 % of the offseason vegetables are supplied to the district level local markets, 30% are marketed through collection centres and 40 % are traded through the local traders. In Surkhet-Jumla corridor, the percentage supplied to the local market, local traders and the collection centers are about 35%, 20% and 30% respectively.

Building on the current status in production, marketing and trade of the offseason vegetables, this study has analysed some critical issues that limit the commodities to become more competitive. The major issues range from production/marketing of the offseason vegetables in the districts to the regulatory environment at national level, and include unavailability of suitable/adequate seeds and varieties, unavailability of appropriate production and transportation technology, slow technology adoption rate, small sized production pockets, post harvest losses, loss during transportation, and inadequate support for input subsidies and marketing extension. Farmers in most of the project districts use traditional practices as *Doko* (local basket) for transporting and retail selling the products to retail markets, and jute bags for transporting to distant markets. The post harvest loss is highest for tomato which is about 33%, followed by cauliflower (14%), cabbage (13%), green pea (10%) and bean (7%). Other challenges specific to production are: disease and pests severities, deteriorating soil environment, lack of year round irrigation and poor quality of seed and fertilizer. Challenges specific to marketing are: poor market infrastructures, fluctuating prices, poor availability of price information to farmers contributes to market imperfectness.

The study has suggested some specific short and long terms interventions for the project to enhance the competitiveness of the offseason vegetable subsectors in the project areas. The interventions focus on production, marketing and policy, and are presented under the strategic areas of intervention of this report. Among the short term interventions, introduction of the

poly-house technology, promotion of irrigation technology, support in providing high yielding and improved varieties of vegetables, and support in capability building trainings are required to enhance the production sector. For marketing, developing of marketing structures, establishment of marketing and technology information centres, and training on postharvest management are required. The project can also take initiatives regarding long term interventions as development of hybrid varieties, verification/demonstration of different botanical pesticides, development of well-equipped vegetable market, and support from the government for import substitution and export promotion as it will be helpful to uplift the offseason vegetable sector of Nepal. Interventions towards commercialization of the offseason vegetables would help to improve the welfare of rural poor in the Mid-Western hills in Nepal and would help to reduce the import substitution of vegetable in the country as well.

## 1. INTRODUCTION

### 1.1 Background

In a joint initiation of the Government of Nepal/Ministry of Agriculture and Cooperatives (MoAC) and IFAD, a six-year High Value Agriculture Project (HVAP) in Hill and Mountain Areas is being implemented since July 2010 in partnership with SNV Netherlands Development Organisation and Agro Enterprises Centre (AEC/FNCCI) for reduction of poverty and vulnerability of women and men in Mid-Western Development Region. District government line agencies including national and local NGOs contracted under MoAC/Project Management Unit (PMU) are responsible for the implementation of field level activities. The project covers ten districts: Dailekh, Jajarkot, Jumla, Kalikot, Salyan, Surkhet, Dolpa, Mugu and Humla of Mid-Western Development Region and Achham of Far Western Development region which are served by three north-south corridors: Chhinchu-Jajarkot, Surkhet-Dailekh and Surkhet-Jumla.

Based on a comprehensive study conducted by SNV Netherlands Development Organisation and Department of Agriculture (DoA)<sup>1</sup> along with other studies, the project has selected 18 high value (later revised to 12) agriculture crops and non timber forest products/medicinal and aromatic plants (NTFPs/MAPs) that show considerable potential to address the region's widespread poverty through the process of socio-economic reunification. The project aims to integrate rural poor, especially women and marginal groups, in high value agriculture and NTFP/MAPs value chains and markets and for improved income, employment opportunities and ability to respond to market demand and opportunities based on marketing agreements with private agribusiness. The project follows Inclusive Business and Value Chain Development approach in the geographic boundaries demarcated by accessibility to roads. The demand driven nature of the project demands the project engage with agribusiness companies to integrate poor producers in their supply chain. To support in designing the project's activities, Asia Network for Sustainable Agriculture and Bio-resources (ANSAB) carried out value chain analysis of offseason vegetables, turmeric, timur, and goat meat in the project area.

ANSAB is an independent, non-profit, civil society organization committed to biodiversity conservation and economic development through community-based enterprise oriented solutions, and is working in South Asia since 1992. Since its establishment, ANSAB has implemented a variety of innovative approaches to promote natural products-based enterprises and value-chain interventions in Nepal. ANSAB has also provided different expert services to stakeholders working in Nepal and other neighbouring countries.

This study is one of four carried out by ANSAB from November 2011 to June 2012, and analyses the status and potential of the Offseason Vegetables value chain in the project districts.

### 1.2 Objectives of the study

The main objective of this assignment is to provide sufficient understanding on the current status and future potential of the offseason vegetables value chain and to identify specific bottlenecks and opportunities that can be addressed through project intervention, thereby

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<sup>1</sup> SNV & DoA. 2009: *High Value Agriculture Commodities and NTFPs in Western Nepal: Assessment of Value Chains in the Surkhet- Dailekh, Surkhet- Jajarkot and Surkhet-Jumla Road Corridor Districts.*

increasing production, income and employment of rural poor. The specific objectives are as follows:

- Prepare value chain maps of each product that depicts the chain actors and their functions and inter-relationship.
- Identify major production pockets, growth potential, market trends and competitiveness of the value chain (supply and demand) including its future prospects within the country and abroad.
- Identify and examine constraints and opportunities within the value chain and recommend interventions to overcome constraints and make use of opportunities to promote inclusive and sustainable pro-poor economic growth and competitiveness.
- Analyse dynamics of processing and value creation, reward distribution, value chain governance and power relation structures and knowledge transfer.
- Identify the underlying policy, institutional and infrastructural issues that affect the competitiveness of the value chain with reference to the role of government and private sectors in the region.
- Identify institutions and organisations working for the value chain from national to local levels that can contribute to pro-poor value chain development.
- Analyse gender and social inclusion/pro-poor perspective at all steps of value chain mapping that enquire about the relative proportions of women and men, caste/ethnic communities at each node and between nodes.

### 1.3 Methodology

#### 1.3.1 Study area

The study was conducted in the HVAP districts of Mid-Western Region, which have accessibility to the three major road corridors of the area-i.e. Chhinchu-Jajarkot, Surkhet-Jumla, and Surkhet-Dailekh. The districts covered during the study are Surkhet, Dailekh, Kalikot, Jajarkot, Salyan and Achham. The study covered the major market centres of these districts along the road corridors and the production pockets linked to the market centres.

**Figure 1: Map showing the study area**



*Source: HVAP, 2011*

### 1.3.2 Data Collection and Analysis

The study has applied both qualitative and quantitative research methods for obtaining information on offseason vegetable subsector. Both primary and secondary sources were used to collect data.

A brief description of the preparatory activities, data collection and analysis are given below:

**Preparatory Activities:** Initially, a literature review and consultation with HVAP was conducted for detail planning. Three separate sets of checklists for farmers, traders and stakeholders were developed. Similarly, two sets of questionnaires, one for farmers and one for traders, were developed to obtain household level data. The checklists and questionnaires along with a travel plan were finalized in consultation with the HVAP team.

**Data Collection:** Interviews, focus group discussions (FGDs) (See detail table in Annex), observations, stakeholders' consultations/meetings, checklists and questionnaires and sharing and validation workshops were conducted to gather information at each level of value chain . Prior to commencing ground study, an inception workshop was conducted in Birendranagar, Surkhet, to provide insights on the concept, scope of the study including study approach and methodology to the team members and enumerators and to prepare field mobilization plan.

A dedicated team for offseason vegetables study having designated value chain expert, research assistant and enumerators was mobilized in the field for 25 days covering all the three road corridors. Market centres and production pockets of these road corridors were visited where the team conducted interviews with traders and farmers and filled up questionnaires. Focus group discussions were conducted with traders and farmers in some strategic market centres and production pockets respectively. Meetings were conducted with DADO, DDC, DCCI and other relevant supporting organizations of visited districts. Publications and other relevant documents were also collected from the stakeholders.

A district level consultation and sharing workshop was conducted in Birendranagar where the preliminary findings were presented to the participating commercial farmers, traders, processors, input suppliers, representative from regional agriculture directorate, DCCI, DADOs and facilitating organizations. The participants provided their inputs, which were noted and compiled.

The team also visited major regional market centres namely Birendranagar, Nepalgunj, Dhangadi, Butwal and Kathmandu and conducted interviews with traders, processors, and exporters for getting insights of regional trade. Visit to custom offices, quarantine offices, Trade and Export Promotion Centre, Vegetable Development Directorate, Nepal Agricultural Research Council, Department of Agriculture, and relevant organizations were conducted for interactions and secondary data collections.

A two-day "Regional Value Chain Consultation and Intervention Strategy Development Workshop" was conducted from 15-16 February 2012 in Nepalgunj to share and validate the collected information and obtain regional trade perspective. In the workshop, group exercises were conducted with farmers, traders/processors and other stakeholders, which provided further detailing of intervention strategies. The comments, suggestions and inputs from the workshop were compiled and incorporated in the study. Likewise, a half-day national validation workshop involving the secretary of Ministry of Agriculture and Cooperative and other high-level officials representing different government institutions, different projects and development

agencies was conducted in Kathmandu. This national workshop validated the information collected from the field with suggestions and feedbacks.

**Data Analysis and Report Preparation:** The collected data is analysed systematically in order to obtain the objective of the study. A detailed value chain map of the offseason vegetable subsector in the study areas is prepared with estimated volume of market transactions. Economic analysis is done to present the situation of production and value addition of the offseason vegetables including cost of production and distribution of margin along the chain. Market trends and competitiveness analysis is conducted to provide details on end markets, supporting markets, enabling environment and inter-firm cooperation between VC actors. Similarly, analysis of governance structure is done to present the status of power relationship and trust in the value chain along with gender issues and inclusiveness. The constraints are analysed through initial understanding of opportunities and identification of the factors that prevent in reaping the opportunities. Market based solutions are suggested to address the constraints. The analysis of market-based solutions is done which provided with the list of possible areas of project interventions. The suggested interventions are then prioritized in short term and long term and presented.

Qualitative data of the study is summarized and presented in a descriptive form in the report. Tables, figures and graphs are also used to present the data. Triangulation and validation of the data is done to the extent possible with the use of different sources including publications, websites and workshops.

## 2. VALUE CHAIN ANALYSIS

### 2.1 Introduction to value chain

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 hilly 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. It is essential to know at first what the present situation is and what strategy needs to be adopted in order to overcome the bottlenecks. The participatory situation analysis is being understood as the first step towards understanding the real situation. This exercise has the advantage of compiling the existent knowledge of all stakeholders into the common understanding of the entire offseason vegetable value chain.

Service and inputs providers such as agro-vets, agriculture sub-centres (DADOs & Service centres), I/NGOs, cooperatives, who provide essential services and inputs for offseason 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 offseason vegetable value chains. In general, collection centres are owned and managed by the farmers themselves, who organize production and coordinate the marketing of their produce to improve prices and reliability. Most of the vegetables produced in Nepal are sold and consumed in the country. Only a small portion of the vegetables produced in the country is exported to India, however it represents a vast market opportunity for the vegetable sector. The current export goes to India through unofficial routes because of non-tariff trade barriers.

Industrial-scale processing operations are extremely limited in agriculture sector in Nepal. There is no practice of premium for the fresh and high-value produce that creates incentives to build volumes and improve efficiencies for the markets. Agriculture sector possesses fundamental barriers for its development in the country, because there are low levels of private investment in the sector and it has relatively low priority in national development planning. A major challenge to enable small producers to gain access to markets is to reliably produce adequate volumes of high quality produce to supply to the wider markets. Similarly, higher volume of production requires adequate supply of quality inputs on time, yet, this is lacking in many parts of the country including value chain studied areas. Skewed land distribution is another bottleneck for major investment. There is also reluctance by the landowners to rent out land establishing possible tenancy claims/rights, often leaving the productive agricultural land as fallow.

**Table 1: Road corridors-wise market centres, production pockets and estimated transaction**

<b>Road Corridor</b>	<b>Market centres</b>	<b>Production pockets</b>	<b>Estimated Transaction (Mt.)</b>
Surkhet – Dailekh	Gadi-2, Ratanangla; Seri – 9, Guranse; Dandaparajul – 7, Upallo Dungeswor; Belpata - 5, Chupra	Latikoili -3, Manikapur; Seri – 7,9; Gaganpani-1,2; Baraha-1; Dandaparajul—4,5,6,7,9; Baraha-5,6,7,8,9; Malika-1,2,4,5; Belpata - 1,5,7,9; Kalbhairab-1,7,9; Dandaparajul-1,3,5,7,8; Lakuri-6,7,8 Gauri	555
Chhinchu-Jajarkot	Chhinchu -7, Surkhet; Sahare -8, Botechaur; Deusthal -6, SalliBazar; Khalanga-3	Chhinchu- 7, Jajarkote tole; Deusthal-7,9 Dhamari pipal-6; Khalanga -9	429
Surkhet – Jumla	Kunathari -4, Baddichaur; Rakam-4, Bakhrikot Bazar; Khidki jeula; Nagma; Chandannath -1(Jumla bazaar)	Kunathari-4; Baddichaur; Rakam - 1, 6,7; Singaudi-9; Singhasen -9, Khidki jeula , Malika-7; Manma-6,7; Chandannath -1	180

Among three road corridors, Surkhet-Dailekh road corridor has higher percentage of transaction, which occupied 48% of the total transaction followed by Chhinchu-Jajarkot road corridor having 37% of the total transaction. There is low transaction from Surkhet-Jumla road corridor that only occupied 15% of the total transaction of offseason vegetables.

## 2.2 Value Chain Map

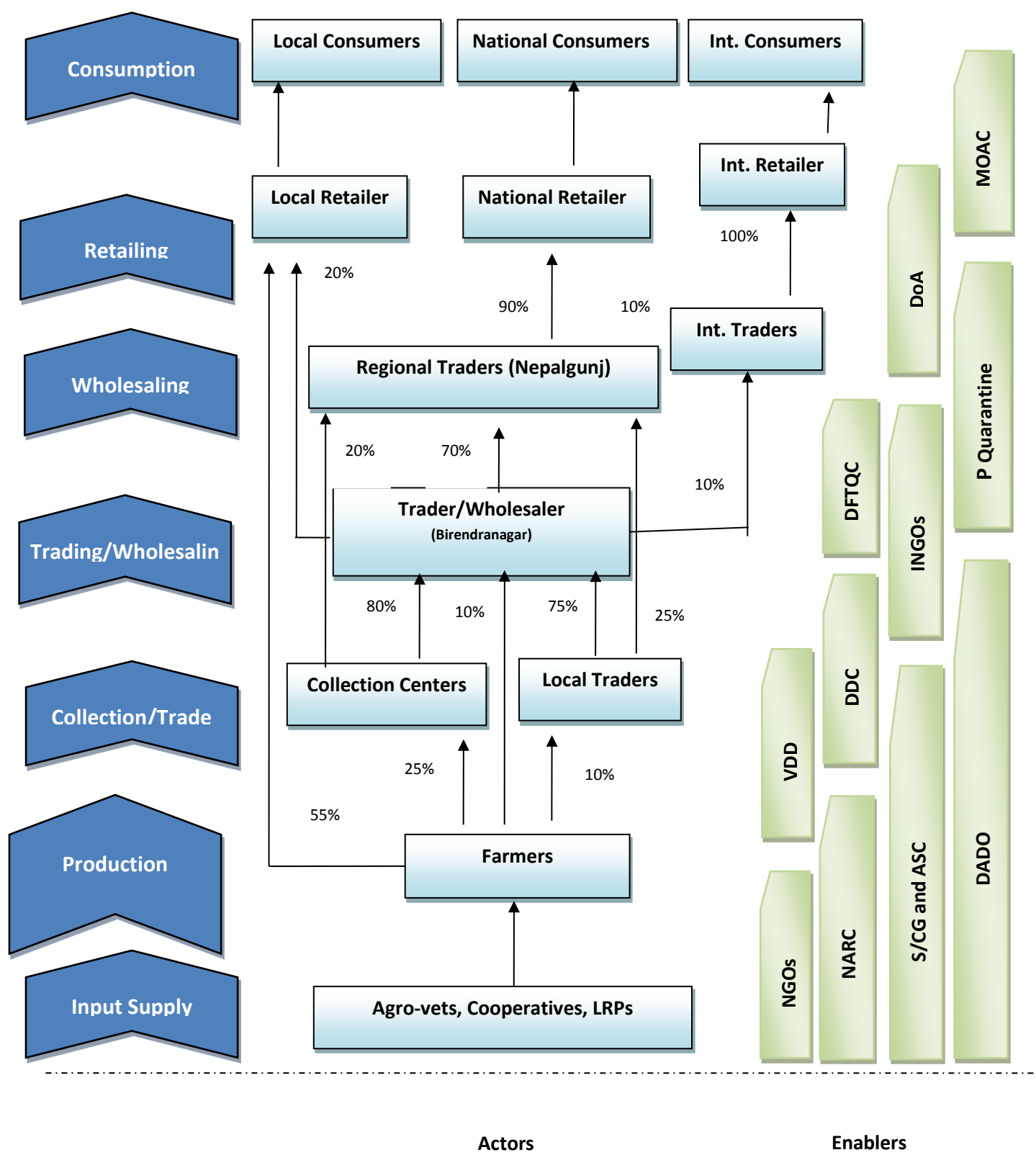
The offseason vegetable value chain map provides a graphic representation of the offseason vegetables as it moves from producers to consumers, passing through different channels. The linkages are shown vertically from the bottom to the top of the value chain. In the value chain map the left hand blocks list the major function of the chain. The function in this case includes input supply, production, collection, trading, wholesaling and retailing. During mapping, first the actors involved in this sector are listed with their respective functions and mapped accordingly. Secondly, the institutions that have been supporting this sector directly or indirectly are listed as enablers. The definition of each actor, flow of products within chain and the relationship between various actors are presented in the corridor wise value chain maps depicted and described hereunder.

### Chhinchu-Jajarkot Corridor

Major vegetable production sites in this corridor are Chhinchu, Shahare, Deusthal and Khalanga and main market centres are Chhinchu, Botechaur, Sallibazaar and Khalanga. From these market centres, the produce goes to the regional markets like Birendranagar, Kohalpur and Nepalgunj and some products move to India. The main enablers in this value chain are ASC, SCG and NGOs at production level, DADO and DCCI at district level, NARC, DOA, DFTQC, VDD, INGOs and Plant Quarantine at regional and national level and the MOAC is the apex body for policy formulation at national level.

About 25% of the offseason vegetables produced by the farmers in this corridor are collected by in the collection centre, 55% are consumed at local markets, 10% goes to local traders and the remaining goes directly to the wholesalers at Birendranagar. From collection centre, 80% goes to the wholesalers at Birendranagar and the remaining 20% goes directly to the regional wholesalers at Kohalpur and Nepalgunj. Almost 75% of the commodity from the local traders goes to the wholesalers at Birendranagar and the rest to other regional wholesalers. Wholesalers at Birendranagar supply 70% of offseason vegetables to the regional wholesalers, 20% to the local markets and rest to the international markets, mainly to India. Regional wholesalers supply about 90% of the vegetables to Surkhet, Kohalpur and Nepalgunj and remaining to the Indian markets (mostly Rupaidiya and Nanpara).

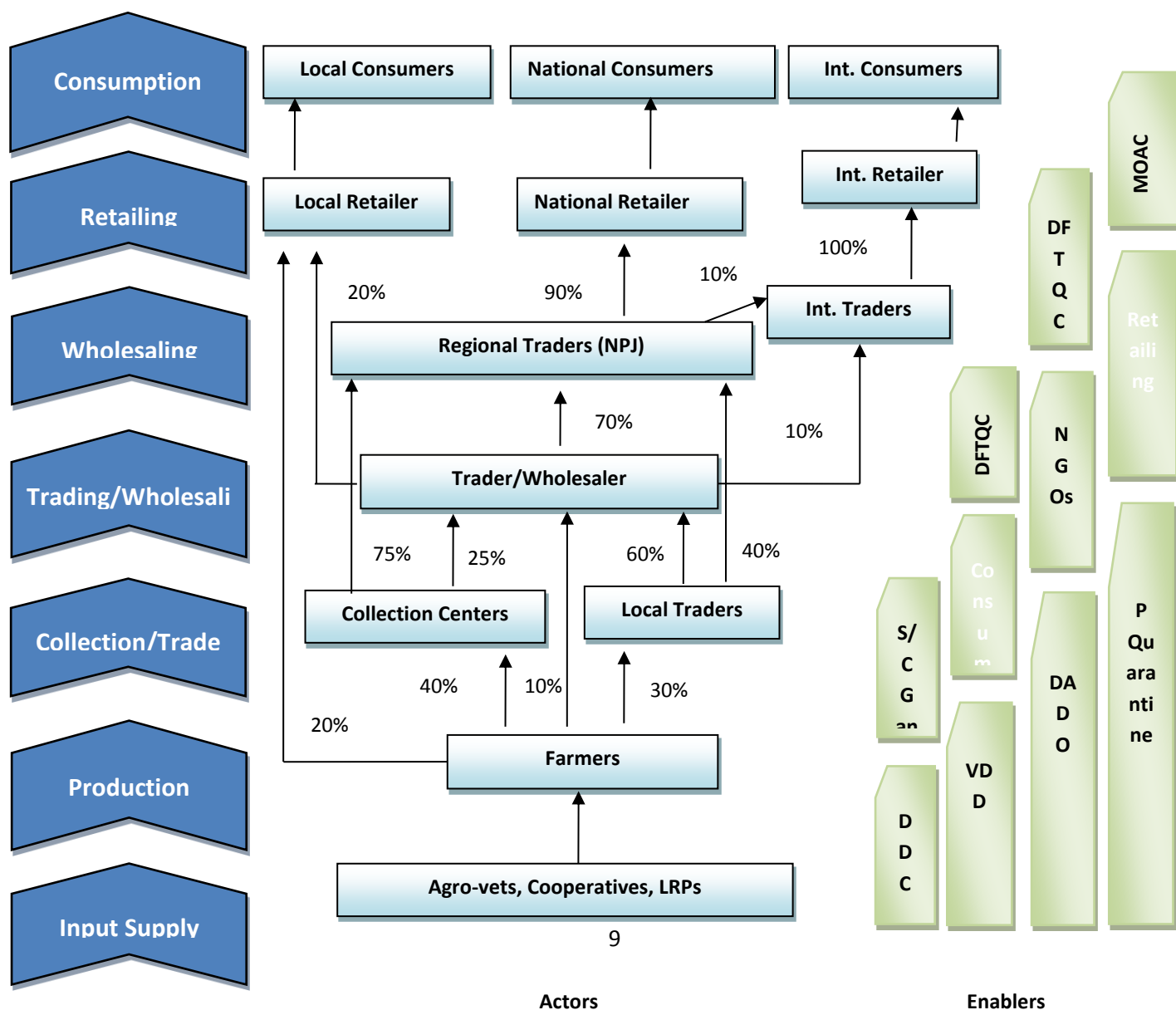
**Figure 2: Value Chain Map of Offseason Vegetables (Chhinchu-Jajarkot)**



## Surkhet Dailekh Corridor

Surkhet-Dailekh road corridor has the potential for offseason vegetable sector because of its ability to produce a large volume of the vegetable, the accessibility of the road and the availability of several collection centres. Major off season vegetable production sites of this corridor are Latikoili, Manikapur and Ratanagla of Surkhet; and Seri, Belpata, Chupra, Dandaparajul, Tharpu of Dailekh, whereas the main market centres are Birendranagar, Ratanagla, Guranse, Chupra and Mathillo Dungeshor. The main suppliers to Birendranagar are Ratanagla, Latikoili and Guranse. Offseason vegetables produced by the farmers are supplied to the local markets, collection centres and local traders each having the values of about 20%, 30% and 40% respectively. From the collection centres, 75% goes to the wholesalers at Birendranagar and the rest to the other regional markets. Almost 60% of offseason vegetables from the local traders go to the wholesalers at Birendranagar and the remaining to the regional markets. Similarly, wholesalers at Birendranagar supply 70% vegetables to the regional market, 20% to the local market and the rest to India. From regional market, 90% of off season vegetables go to the national markets and remaining to the Indian markets.

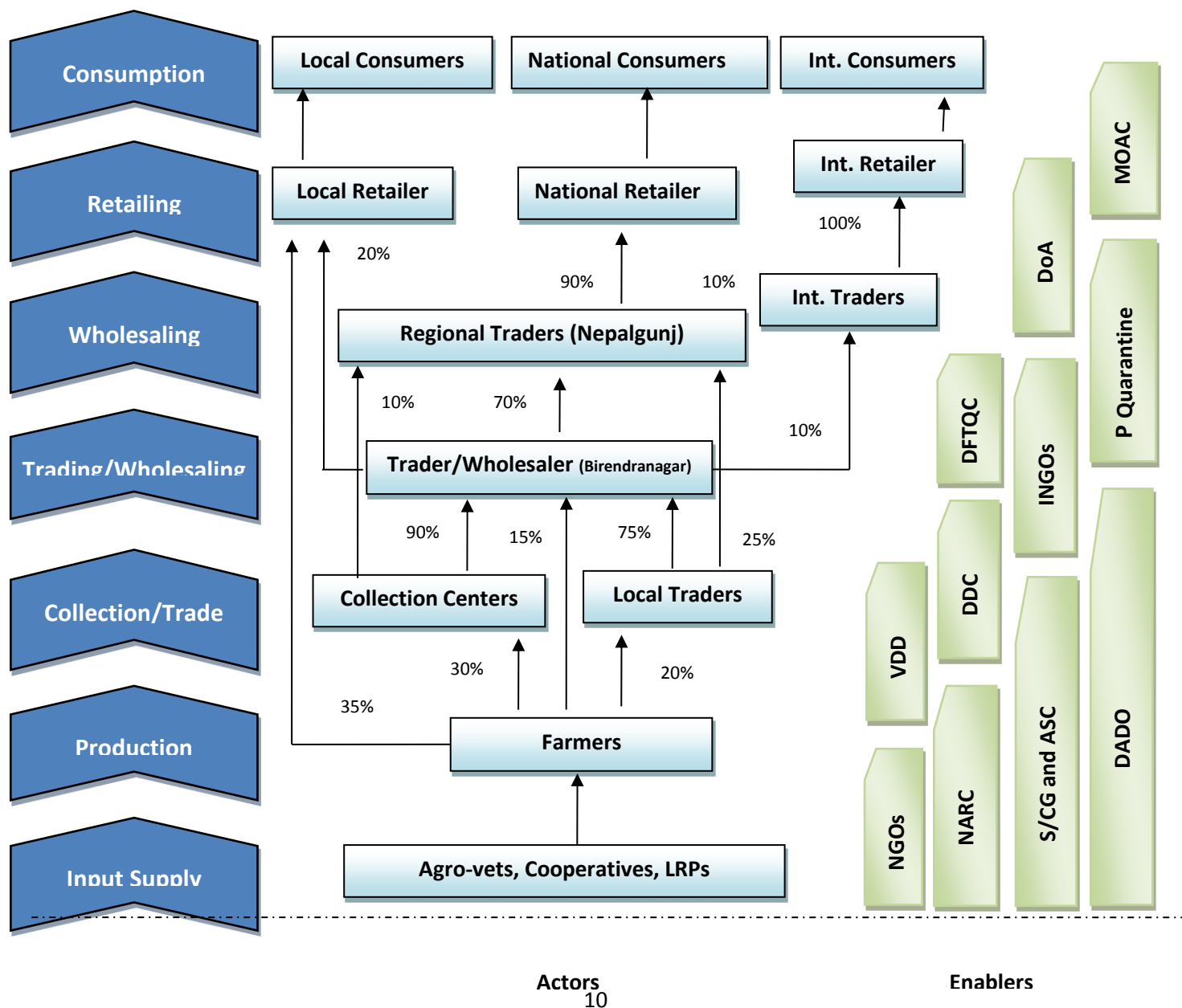
**Figure 3: Value Chain Map of Offseason Vegetables (Surkhet Dailekh Corridor)**



## Surkhet-Jumla Corridor

The major off season vegetable production pockets in this corridor are Kunathari of Surkhet; Rakam, Khitkijeula of Dailekh; Manma of Kalikot and Chandanath of Jumla district. The main market centres are Baddichaur, Rakam, Khitkijeula, Manma and Chandanath. The products that come to Surkhet and Nepalgunj through this corridor is mainly Baddichaur. Almost 35% of the offseason vegetables are supplied to the local markets from the farm, 20% are supplied to the local traders and 30% are collected at collection centres. From collection centres, vegetables move to the wholesalers at Birendranagar (90%) and the regional markets (10%). Local traders supply 75% of the offseason vegetables to the wholesalers at Birendranagar and the rest to the regional market. Wholesalers at Birendranagar supply 70% of offseason vegetables to the national markets and about 10% to India. The produce from other regional markets is supplied to the national markets (90%) and the Indian markets (10%).

**Figure 4: Value Chain Map of Offseason Vegetables (Surkhet -Jumla Corridor)**



### 2.2.1 Functions and Actors

#### **Input Suppliers**

Agricultural inputs, primarily seed, fertilizer and agrochemicals have enormous potential to leverage the efforts of hard-working farmers. In HVAP area agro-vets are the first point of contact for the farmers for receiving agricultural inputs and information. Many farmers also receive inputs/information from DADO, NGOs, farmer groups and cooperatives.

#### **Producer**

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 and sell the produce at local *haat bazaar*, whereas the commercial farmers sell their produce to known collectors or cooperatives. The average distance reported where a farmer has gone to a roadside ranges from 0.15 to 3.04 hours of single feet trip. As the vegetables are perishable, they have to be sold as soon as harvested. Producers pointed out that for offseason vegetables; there were no any set arrangements to make the marketing based on contract. Farmers did not have any technology of creating price advantage over time.

#### **Collectors and traders**

Collectors and traders are the key actors of the offseason vegetables value chain who are involved in trading vegetables from production pocket to the wholesale markets. Their trading activities include: buying and assembling, repacking, sorting, selling to middlemen, transporting and selling to wholesale markets. Deducting all the costs incurred in above activities including the taxes and transport damage losses, their market margin share comes to about 10-15 per cent. Both local traders and growers make a kind of mutual agreement for price negotiation. This was common in HVAP areas particularly in Dailekh and Surkhet.

#### **Wholesaler**

Wholesalers are mainly involved in buying vegetables from the traders and supplying them to the retailers. They also store products, usually for a maximum of two days. Their market margin share comes to about 5- 15 percent. They are mainly located in Kalimati, Surkhet, Nepalgunj and Butwal where there are market hubs with some infrastructure such as office buildings, open stores, transaction sheds, and shop sheds. These market hubs are usually established with government support and operated by local market management committee.

#### **Retailers**

Retailers are the other important actors with close linkages with the wholesalers and the consumers. Their involvement in the chain includes buying of vegetables, transporting to their retail shops, grading, displaying and selling to the consumers. In HVAP area (Nepalgunj, Surkhet, Dailekh), the retailers are not organized formally and they all conduct their business on individual basis.

#### **Consumers**

Consumers with respect to this study are the individual households, hotels, army camp and police who buy and consume tomato, cauliflower, cabbage, pea and beans. More than 80%, of the total consumers from Nepalgunj, Surkhet, Dailekh and Jajarkot expressed their interest for

quality of products and even mentioned the idea of paying a premium provided they get quality product (e.g. uniform size, graded, and free from disease and pest damage).

### **2.2.2 Enablers and Facilitators**

In a value chain, the enabler provides regular support services or represents the common interest of the value chain actors. Functions at the enabler level include public research and technology development, agreement on professional standards, promotional services, joint marketing or advocacy and other support service providers.

#### **Enablers in production and local processing functions**

For the farmers, District Agriculture Development Office (DADO), Nepal Agricultural Research Council (NARC) and Vegetable Development Directorate (VDD) are working to develop and disseminate different technologies in offseason vegetable farming. Microfinance institutions and cooperatives assist farmers by providing loan during plantation time. Some NGOs are involved in providing technical and financial assistance to cooperatives and farmers groups.

#### **Enablers in trading and export functions**

At traders' level, District Chamber of Commerce and Industries (DCCI) is supporting for business successes by providing market information. Agro Enterprise Centre (AEC) is working in the area of market development by providing market information and facilitating for market linkages, etc. Agriculture Information and Communication Centre, Directorate of Agribusiness Promotion and marketing Development, National Plant Quarantine Program, National Agribusiness Promotion Program, Agri-Commodity Export Promotion Program also facilitate in trading activities by providing technology and establishing collection centre and offering export related supports. Similarly, Trade and Export Promotion Centre assist in export of goods and maintain the export data.

At higher level, business enablers are Ministry of Agriculture and Cooperative (MOAC), Department of Agriculture (DOA), Ministry of Commerce and Supplies, Federation of Nepalese Chamber of Commerce and Industries (FNCCI) and Ministry of Commerce. These institutions facilitate this business through policy lobbying, policy formulation and bilateral trade agreements. The details on each enablers and facilitators are given in annex.

## **2.3 Economic Analysis**

### **2.3.1 Production Situation**

In Nepal, subsistence agriculture remains a prime occupation; about 78% of the agricultural households are subsistence based. The total cultivated area of the country is 3.09 million hectares. Different vegetables are grown all over the country but mainly as a minor crop. The vegetable crops occupy 7.3% of the total cultivated agricultural land (MOAC, 2009) that indicates the potential of increasing vegetable production in the country.

Realizing the importance of export potentiality and its contribution to the Gross Domestic Product (GDP) of the country, a number of development programmes are being implemented to promote cultivation of these crops in different parts of the country. The production area,

quantity and productivity of vegetable are increasing in the country because of the high return per unit of land from vegetables. 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).

**Table 2: Area, production and yield of vegetables in Nepal**

Year	Area (ha.)	Production (MT)	Yield (Kg/ha)
2000/2001	157162	1652979	10518
2001/2002	161048	1738086	10792
2002/2003	165988	1799973	10844
2003/2004	172586	1890100	10952
2004/2005	180823	2065193	11421
2005/2006	189832	2190100	11537
2006/2007	191922	2298689	11977
2007/2008	208108	2538904	12200
2008/2009	225154	2754406	12233
2009/2010	235098	3003821	12777
Change in 2000/01 to 2009/10)	50%	82%	21%

Source: MoAC, 2011

In the last 10 years, area under cultivation of vegetables has increased by 50% while the production has increased by 82%. Similarly the productivity of vegetables has increased by 21% in the same time frame. In 2009/10, area under cultivation, total production and productivity of vegetable crops are seen 235,098 ha, 3,003,821 MT and 12.87 MT/ha respectively (Table 2).

Among vegetable crops, cauliflower is the number one vegetable in terms of area cultivated and covers about 33,172 ha, which is 14% of the total area under vegetable crops. Other vegetable crops that follow the cauliflower in terms of cultivation area are tomato (19,724 ha), cabbage (14,306 ha), radish (13,030 ha) and asparagus bean (11,977 ha). In terms of total production, cauliflower has the highest share, 404,580 MT, followed by tomato, 317,657 MT (Table 3). In terms of sale, the major and common commercial vegetables are cauliflower, tomato and cabbage.

**Table 3: Area, production, sales and yield of some important vegetable crops in Nepal**

Vegetable	Area (ha)	Production (MT)	Sale (MT)	Yield (Kg/ha)
Cauliflower	33,172	404,580	339,273	12,196
Cabbage	14,306	302,067	269,294	21,115
Tomato	19,724	317,657	283,999	16,105
Pea	3,911	14,170	6,759	3,623
Bean	10,594	81,781	40,977	7,720

Source: CBS, 2010

Geographically, production and sale of the vegetables are better in terai and hills as compared to the mountains. Region-wise eastern, central and western regions are in better position compared to the mid and far west regions (Table 4).

**Table 4: Area, production, sales and yield of vegetable crops by geographic region**

Geographic region	Production (MT)	Sales (MT)	Sales (%)
<b>Belt</b>			
Mountains	121,565	18,828	15.5
Hills	1,261,041	766,903	60.8
Tarai	1,437,921	934,087	65.0
<b>Region</b>			
Eastern	894,877	533,775	59.6
Central	1,191,119	841,169	70.6
Western	434,210	254,335	58.6
Mid West	199,756	60,853	30.5
FarWest	100,566	29,686	29.5

Source: CBS, 2010

### Major Offseason Vegetables

**Cabbage:** Cabbage is important cash generating offseason vegetable suitable mainly for hill farmers. Mid-June to November is the off-season months for cabbage, when the demand for the product is high in Nepal and India. Non-heading, loose heading, black rot and soft rot are the major problems of commonly grown varieties of cabbage during rainy season.

**Cauliflower:** Cauliflower is cash generating offseason vegetable crop suitable for small and poor farmers of the hills from June to November because of the domestic and Indian markets during the season. The major problems faced by the farmers on off-season cauliflower are unattractive curd, loose curd, curd fuzziness, brownish and discolour curd, which are not accepted by consumers and marketers. Apart from these, poor curd yield affects the cash income of off-season cauliflower growers who are generally poor and smallholders.

**Tomato:** Offseason tomato produced in the hills from mid June to November end is one of the important cash generating commodities suitable for small and poor farmers. This is mainly due to the availability of huge domestic, as well as, Indian market demand, which has enabled the

farmers to obtain attractive gross income from Rs. 16,000 to 40,000 per ropani (500 m<sup>2</sup>) per season (Budathoki *et al*, 2004). However, in the recent years, increasing pressure of bacterial wilt, late blight, nematode and viral diseases have possessed challenges to the offseason tomato production.

**Pea:** Generally pods are used as vegetables. Hill produced pea occupy a position of considerable value because of their off-season price. On the other hand, being a nitrogen-fixing legume, it has great value for nitrogen fixation in the agricultural field.

**Beans:** Bean is one of the most important leguminous vegetables. In Nepal, it is grown for the tender vegetable and dry beans. Green beans are valuable source of protein, calcium, iron and vitamins. For best growth and yield, the optimum soil temperature is 25-30<sup>0</sup> C.

### 2.3.2 Situation of Study Districts

In the study districts (Surkhet, Dailekh, Salyan, Jajarkot, Kalikot and Jumla), many production pockets are located either along the roads or 1-5 km away from the road heads. Only about 40 per cent of the cultivated land in the production pockets is irrigated which has been limiting the cultivating area for the offseason vegetables. There is no cold storage facility in the production areas. As the offseason vegetables are immediately sold after harvest, farmers seem not to have felt the requirements of such storage. The organized wholesale markets in all districts are about 40-80 km away from the production pockets. In all districts, the leading offseason vegetables are cauliflower, tomato and cabbage.

#### Surkhet

With the introduction of different projects and programs, the commercial production of fresh vegetables has been intensified in selected pockets nearby roads and market centres. Improved varieties of vegetable seed have played a major role in these pocket areas. Improved varieties of vegetable seeds have been introduced mainly to meet the local demand for vegetables. Some hybrid varieties of vegetables have also been introduced in the production pockets. These have enhanced the production of fresh vegetables and made them available in markets for a longer period. These improved varieties of vegetables introduced in the districts are listed as follows:

- Tomatoes: Sirjana, Nutan, Manisha
- Cauliflower: Silver Cup, Snow Crown, Snowball, Madhuri, Pusa Kartiki, NS 60, Snowflek
- Cabbage: Green Coronet, T 621, Golden Acre, Green Stone
- Pea: Sikkim local, Arkel
- Beans: Chaumase, Trisuli

In Surkhet, there is only one small wholesale cum retail market centre by the name Babu & Shahi Vegetable Market in Birendranagar municipality area. Within Surkhet valley and nearby Surkhet-Nepalganj highway and other highways (Surkhet-Dailekh and Surkhet-Jumla) vegetable marketing is a little bit facilitated due to the connection of roads from pocket areas to market centres. However, transportation of vegetables in back load is common in production pockets.

Conventionally, majority of male farmers make farming related decision. Now there are some changes in conventional patterns. The study indicates that women smallholders are also taking important decision in farming.

## **Dailekh**

A large number of farmers have started production of a number of vegetables on commercial scale. Some of the popular vegetables are cauliflower, cabbage, tomato, onion, radish, bitter gourd, brinjal, peas, cucumber, bottle gourd, beans, green chilli, etc. After fulfilling the internal demand, some of the offseason vegetables are traded out to Surkhet and Nepalgunj markets. The commercial production of fresh vegetables has been intensified in selected pockets near roads and market centres. Major varieties cultivated in Dailekh district are:

- Tomatoes: Sirjana, Nutan, Manisha
- Cauliflower: Silver Cup, Snow Crown, Madhuri, Snow King
- Cabbage: Green Coronet, Golden Acre, T-621, Green Stone, Green Crown
- Pea: Sikkim local
- Beans: Chaumase, Trishuli, Rajma bean

The participation of women in group level activities, decision making in agricultural production and marketing affairs as well as access to supporting institutions for the disadvantaged groups is reported to be in a positive trend and is increasing in recent time.

## **Salyan**

In Salyan district, 24,242 metric tons (MT) of vegetables are produced in commercial production areas. These vegetables are produced to meet the demand of Nepalgunj, Dang, and Kohalpur, as well as, for export to the Indian border cities of Rupaidiya and Nanpara. Important offseason vegetables are tomato, cauliflower, cabbage, cucumber, pea and beans. With the help of improved varieties of vegetable seed, the commercial production of fresh vegetables has intensified in selected pockets near roads and collection centres. Some improved varieties of vegetables introduced in the districts are listed as follows:

- Tomatoes: Sirjana, Nutan, Manisha
- Cauliflower: Silver Cup, Snow Crown, Snowball, Madhuri, Pusa Kartiki, NS 60, Snowflek
- Cabbage: Green Coronet, T 621, Golden Acre, Green Stone
- Pea: Sikkim local, Arkle
- Beans: Chaumase, Trisuli

## **Kalikot**

Manma ward number 8 & 9 and Badalkot are important pockets for vegetable production in Kalikot district. A total of 2,873 MT of vegetables are produced in commercial production areas. In the farms without road connections, farmers face the difficulty of finding porters for transporting their produce. The major off-season vegetables cultivated in Kalikot are tomato, cauliflower, cabbage, pea, and beans. Some varieties introduced in the districts are listed as follows:

- Tomatoes: Sirjana, Manisha, Nabin
- Cauliflower – Silver Cup, Snow Crown, Snowball, Madhuri, Pusa Kartiki, NS 60, Snowflek
- Cabbage – Green Coronet, T 621, Golden Acre, Green Stone, Green hero
- Pea – Sikkim local, Arkel
- Beans– Chaumase, Ghiusimi

## Jumla

Chandannath, Patmara, Narakot, Sinza, Tatopani are important commercial pockets for vegetable production in Jumla. Modern technology of producing vegetable is still lacking in particular pockets. Technologies suited to production of vegetable production need to be upgraded. Many problems (poor quality varieties, disease, and pest) were observed during the study. Prospects appear particularly good for production of vegetables, which has a good market demand. Simple technologies including land preparation, seed sowing, methods of plant protection, use of quality seeds, irrigation methods, application of manures and fertilizer have been transferred effectively through trainings and visits. Some variety of vegetables is used in Jumla are as follows:

- Cauliflower: Snow Crown, Snowball
- Cabbage: Green Coronet, Green Stone
- Pea: Arkel
- Beans: Chaumase, Trisuli, Rajma bean

**Table 5: Area, production and yield of vegetables in some of the HVAP District 2010/2011**

District	Area (ha)	Production (MT)	Yield (kg/ha)
Surkhet	2071	32970	15924
Dailekh	2424	28115	11601
Salyan	2096	24242	11566
Jajarkot	598	5619	9369
Kalikot	324	2873	8867
Jumla	533	2228	4180

Source: VDD, 2011

**Table 6: Area, production and productivity of vegetables in some of the HVAP districts in 2010/11**

District	Particular	Cauliflower	Cabbage	Tomato	Pea	Beans
Surkhet	Area (ha)	136	146	139	53	43
	Production (Mt)	2326	2226	2925	629	495
	Yield (Mt/ha)	17.10	15.25	21.04	11.86	11.65
Dailekh	Area (ha)	292	258	154	-	321
	Production (Mt)	4005	3925	2037	-	1327
	Yield (Mt/ha)	13.72	15.21	13.27	-	4.13
Salyan	Area (ha)	115	105	125	-	81
	Production (Mt)	1323	1526	1687	-	750
	Yield (Mt/ha)	11.50	14.53	13.50	-	9.26
Jajarkot	Area (ha)	40	38	36	12	-
	Production (Mt)	468	494	300	73	-
	Yield (Mt/ha)	11.70	13	8.33	6.08	-
Kalikot	Area (ha)	21	23	-	7	39
	Production (Mt)	210	253	-	56	273
	Yield (Mt/ha)	10	11	-	8	7.0
Jumla	Area (ha)	50	55	35	25	-
	Production (Mt)	250	275	290	50	-
	Yield (Mt/ha)	5	5	8.29	2	-

Source: VDD, 2011; DADO (Dailekh, Surkhet, Salyan, Jajarkot, Kalikot and Jumla)

### 2.3.3 Costs and Gross Margin

Being highly biodegradable, fresh vegetables require greater attention during harvesting, packaging and transporting from the point of production to the final market. The marketing cost of the vegetables involves all costs of the product incurred before it reaches the terminal market (consumer). This includes cost of harvesting and packaging (material and labor costs), handling (sorting, cleaning, grading, loading and unloading), transportation and tariff, tax etc. Generally, these components constitute a large share in the total margin between the final retailer price and the cost of production (or farm-gate price). The margin is calculated to show the distribution of profits throughout the various actors as the offseason vegetables move from production to local traders, wholesalers, retail markets and finally to the consumers. The summary of gross margin is presented in the Table 7 and in detail in Annex.

From producer to consumer, vegetables pass through different stages i.e. farm gate, collection centre, wholesale and retail market. The rate of margin at different level is differed in each level. Here, for each commodity, the retail price or consumer price is more than double its farm gate price. The retail price in comparison to the farm gate price was found to be higher in cabbage (150%) followed by cauliflower (113%), green pea (111%) and tomato (94%).

**Table 7: Gross margin at different levels**

Vegetables	Farm Gate		Collection centre		Wholesale		Retail	
	Price	Margin	Price	Margin	Price	Margin	Price	Margin
Tomato	18	9.45	21.56	2.81	26.76	3.49	35	7.64
Cabbage	8	4.5	9.78	1.28	14.29	1.86	20	5.11
Cauliflower	15	11	17.82	2.32	23.54	3.07	32	7.86
Green Pea	18	14.7	21.27	2.77	27.51	3.59	38	9.89
Green Beans	14	10.7	16.68	2.18	22.22	2.89	30	7.72

Source: Field Study, 2012

The gross margin was found higher in farm gate and retail level than in collection and wholesale levels. In collection centres and wholesale markets, traders take about 15% margin. If we compare the cost of production it is nearly same for all the crops except tomato but the prices were found to be different. Gross margin is higher in green pea at all levels as compared to other vegetables. In general, the gross margin is higher for those crops that are more prone to post harvest loss (Please refer annex for detail calculation of gross margin at different levels).

#### **Post harvest losses**

The post harvest loss is more pronounced in vegetables because of their perishable nature. Lack of proper post harvest technology causes losses in weight and quality, resulting in lower market value. It is of prime importance that the vegetables we produce are of high quality and fetch high prices during selling. Due to highly perishable nature of vegetables, it becomes challenging to maintain the quality during the time of marketing. However, proper handling, proper storage and better transportation can minimize the losses.

In most production pockets, grading is not practiced for offseason vegetables. Farmers mention that grading is labour intensive and there is no significant difference in price for the graded vegetables.

Traditional packaging practice is common in the study areas and farmers are slowly adopting improved packaging materials too. Normally, vegetables are packed in *Doko* for near markets and Jute bags and plastic crates are used for distant markets. Vegetables are mostly packed in 70-90 kg capacity *Doko* without the use of any cushioning materials. About 10% transportation loss has been reported when packed in *Dokos*. Traders have started using crates for packaging after purchasing from farmers. But growers don't find it appropriate because of the difficulty in carrying crates from hillsides and its high initial investment (NRs 300 per crates). The study showed that postharvest loss of offseason vegetable is 7-33 per cent. Higher postharvest losses are due to improper harvesting, handling, packaging and poor facilities at collection centres.

**Table 8: Postharvest losses at different levels**

Vegetables	Post harvest losses in different levels (%)				Total losses (%)	Total cost of losses (Rs./kg)
	Farmers	Collection centre	Wholesale	Retail		
Tomato	10	5	8	10	33	8.51
Cabbage	4	2	2	5	13	2.81
Cauliflower	2	2	4	6	14	3.53
Green pea	1	2	2	5	10	3.05
Bean	1	1	2	3	7	1.65

Source: Field Study, 2012

In general, it is found that there is about 25-30 % postharvest loss in vegetables. In present study, the post harvest loss in tomato is found to be 33%, which is significantly higher than other products. Similarly cauliflower has 14%, cabbage has 13%, green pea has 10% and bean has 7% post harvest losses. The losses occur in different levels of marketing channel i.e. in case of tomato, the losses occur during farm gate is 10%, at collection centre is 5%, at wholesale market is 8% and finally at retail market is 10%. The cost of losses is Rs. 8.51 due to post harvest losses in tomato. Similarly the cost of losses is Rs. 2.81 for cabbage, Rs. 3.53 for cauliflower, Rs. 3.05 for Green pea and Rs. 1.65 for Beans.

## 2.4 Market Trends & Competitiveness

### 2.4.1 Import and Export Situation

Although the area under vegetable production is increasing day by day, it is still insufficient to fulfil the demand of domestic market. Nepal imports about 3,328.97 MT of cauliflower, cabbage, tomato, beans and green pea having worth Rs. 107 million from India (Table 9). Among the above-mentioned vegetables, green pea ranks the first followed by tomato, beans, cauliflower and cabbage in terms of import from India. The status of import shows a very good scope of import substitution of vegetables within the country.

Much of the trade in vegetables is not captured in these official statistics because of open boarder and illegal trade so both import and export figures are indicative only, however, assuming that the percentage of unofficial trade is similar for both imports and exports, there exists a significant trade deficit for vegetables. The export of vegetables to India occurs almost exclusively during the rainy season or offseason, which runs from July to October.

**Table 9: Import of some selected vegetables from India**

Commodities	Quantity (Kg.)	Value (Rs.)
<b>Cauliflower</b>	57,936	<b>345,239</b>
<b>Cabbage</b>	6,048	<b>42,154</b>
<b>Tomato</b>	1,492,077	<b>10,782,730</b>
<b>Green pea</b>	1,742,167	<b>95,400,482</b>
<b>Beans</b>	30,740	<b>772,325</b>
<b>Total</b>	<b>3,328,968</b>	<b>107,342,930</b>

Source: TEPC, 2012

**Table 10: Export and import status of vegetables in Nepal**

Year	Export (NPRs 000)	Import (NPRs 000)
<b>2006/07</b>	11,000	1,035,800
<b>2007/08</b>	17,500	1,210,900

Source: Gautam, 2010

## 2.4.2 End Markets

### Kalimati Fruits and Vegetable Market

Kalimati Fruit and Vegetable Market is the pioneer organized terminal wholesale market in Nepal where retailers, institutional consumers and other bulk consumer procure their supplies of commodities. For giving an organized shape to the marketing of agricultural produce, especially, vegetables and fruits in Kathmandu valley, Kalimati Wholesale Market was set up by then Department of Food & Agriculture Marketing Services under the Ministry of Agriculture in 1986.

Offseason vegetables from different parts of the country are collected and traded in this market. Price of the offseason vegetables depends on the demand and supply situation in the market. This market has 296 stalls and over 200 traders are involved in vegetable business. Kathmandu, Lalitpur, Bhaktapur, Dhading, Nuwakot, Kavrepalachowk and Makawanpur are the major suppliers of offseason vegetables in Kalimati market.

**Table 11: Annual trade volume of vegetables in Kalimati market (2010/11)**

Vegetables	Volume (MT)	(%)
Tomato Big	4029	2.01
Tomato Small	20146	10.07
Cabbage	9162	4.58
Cauliflower Local	20650	10.32
Cauliflower Terai	5614	2.81
Green pea	1775	0.89
Green French Bean	3338	1.62

Source: Kalimati Fruit and Vegetable Wholesale Market, 2011

**Table 12: Wholesale price of vegetables (Rs/kg) at Kalimati market**

Vegetables	Annual price		
	Minimum	Maximum	Average
Tomato Big	14	70	32.32
Tomato Small	9	90	32.25
Cabbage	3	42	17.69
Cauliflower Local	8	74	29.41
Cauliflower Terai	6	36	17.77
Green pea	15	120	49.39
Green French Bean	12	75	36.84

Source: Kalimati Fruit and Vegetable Wholesale Market, 2011

### **Butwal wholesale market**

The wholesale market of Butwal transacted about 50 MT of vegetables daily on an average. In regard to packaging however, no specific service facilitation is observed nor it is under development in the district. There is a cold storage in Siddharthanagar, which is mainly used to potatoes. However, chilled chambers or even the cold storages to cater to the needs of the vegetables storage are lacking.

### **Nepalgunj wholesale market**

Nepalgunj is the major wholesale market of mid-western region of Nepal. This is the border area of India and has great influence from inflow of commodities from India. Offseason vegetables especially from Surkhet, Dailekh and Salyan districts are transacted from this market.

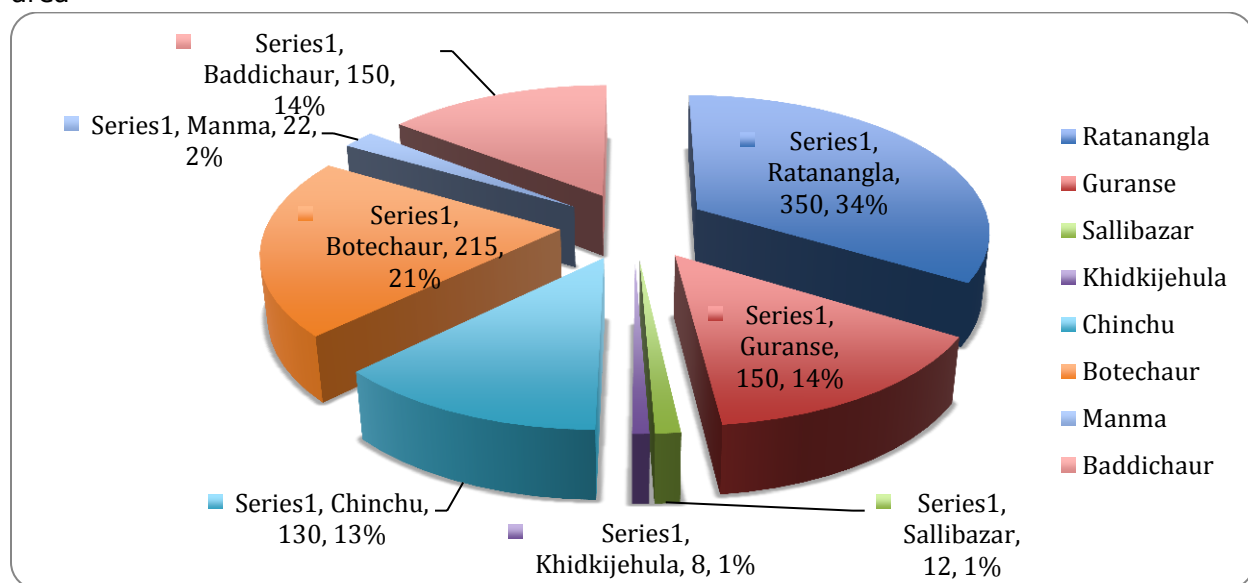
### **Birendranagar wholesale market**

In Birendranagar, there is only one small wholesale cum retail market centre by the name Babu & Shahi Vegetable Market (*Tarkari Bazar*). Within Surkhet valley and nearby the Surkhet-Nepalgunj highway and other highways (Surkhet-Dailekh and Surkhet-Jumla) vegetable marketing is a little bit facilitated due to the connection of pocket areas to the market centres.

### **Market centres in HVAP area**

In HVAP areas, the highest amount of offseason vegetables transaction occurs at Ratanangla followed by Botechaur (Figure 5). Along with these market outlets, Guranse and Baddichaur are also equally important, each representing a volume of transaction of about 150 MT per year. Rest of the market centres represents nominal transaction.

Figure 5: Annual transaction of off-season vegetables (MT) in different market centres of HVAP area



Source: Field Study, 2012

### 2.4.3 Marketing systems

For the marketing of the off-season vegetables in HVAP area there are two main marketing systems followed according to the accessibility. In inaccessible areas like Jajarkot, Kalikot and Jumla follow the first channel; in case of accessible production areas like Surkhet and Dailekh fresh off-season vegetables follow the second system.

- Farmer – Retailer/ consumer
- Farmer/ Group/ Cooperative - Collection Centre - Intermediary – Urban wholesaler market - Retailer/Indian wholesaler – consumer/exports to India

### Farm-gate Selling

This is not a prominent marketing practice. However, some farmers sell their vegetables to the buyers at the farm-gate. In this mode of marketing, buying and selling of vegetables is done in an individual basis. Buyers go to the farm, usually at a fixed time given by producers, though it can occur at any time without notice. In the study area, farmers collect their vegetables in their collection centres, and buyers purchase their produce from these collection centres. There are two types of farm gate selling: organized and unorganized farmers' collection centres. The farm-gate price is higher in the organized farmers' collection centres than in the unorganized farmers' collection centres.

### Direct Selling

10% of farmers surveyed prefer to sell their products after harvesting by them, believing that they will get a better price for their produce this way. In this case, after harvesting, farmers do general grading and bring their produce in bamboo baskets (*Dokos*) to the nearby markets on foot. In some cases, they have permanent buyers in the *bazaar* (local market), and sometimes they visit house-to-house carrying their vegetables. This is time consuming and exhausting. Some farmers have improved this method by using bicycles and motorcycles.

### **Selling to Middlemen**

Direct selling practice is decreasing as the volume of production increases. It is not possible or profitable for producers to sell their products directly to consumers, so selling to a middleman is often adopted strategy by small-scale farmers. In addition, door-to-door selling makes price setting difficult because farmers have little information regarding prices being charged by other sellers. Engaging a middleman who is willing to collect products from different producers and sell them to retailer to consumers provides employment and income to both producers and the middleman. Irrespective of volume, a middleman collects products from producers in rural areas, and after collecting a large enough volume, he/she sells to the retailers' shops in urban areas. In areas where there is no strong cooperative network and road access to farms is limited, middlemen are the key actor to bring products into market place.

### **Group/ Collective Marketing**

Farmers in marketing groups or cooperatives bring their produce to collection centres that are managed by farmers marketing management groups and they sell to the traders at collection centres.

#### **2.4.4 Enabling Environment**

Trade Policy 2009 has encouraged the production of organic, fresh and dried vegetables. It has clearly stated that cold storages will be constructed at major customs stations for the export promotion of vegetables. On top of that the policy has encouraged foreign importers to invest in Nepal for the production of vegetables (MoCS 2010).

The Government of Nepal has launched Nepal Trade Integration Strategy (NTIS) in June 24, 2010 with the objectives of strengthening trade negotiations, technical capacity of domestic non-tariff barriers and other business institutions, export capacity, and the Government's capacity to coordinate and manage Trade-Related Technical Assistance and Aid for Trade. The NTIS has placed offseason vegetables along with ginger, tea, lentils, and cardamom to build a competitive export supply capacity by Good Agriculture Practices (GAPs), Integrated Pest Management (IPM) and Quality Management System (QMS) along with Third Party Certification (TPC) programs. For this, initially it is planning to launch internationally acceptable traceability systems based on GAP certification run through TPC for which it has suggested policy and regulatory development/reform.

Nepal enjoys free access to India's markets for offseason vegetables trade, however faces restrictive non-tariff measures. The exporters who export the products to India are facing problems of unofficial payment and also equally hurt by the instable Indian government policy in agriculture commodity trade. Indian cities namely Gorakhpur, Lucknow, Siliguri, Rupaidea, which are the major markets, have been creating problems in export of Nepalese offseason vegetables by imposing import ban time and again in the name of PFA and quarantine, specifically when they have their own enough production (NEAT, 2011).

To gain the perspective of the local government, our research team interviewed several DADO officials and District Agriculture Officers (DAO) in the HVAP districts they stated that the collective effort of INGOs, NGOs, and DADO will result in synergic effects in the implementation of the value chain. To increase the effectiveness of HVAP, they recommended hiring more local social mobilizers and implement longer project periods so that the necessary knowledge and

skills are transferred to the beneficiaries. They also recognized that the government does not have enough human resources to cover large catchment areas.

#### 2.4.5 Inter-firm Cooperation

**Vertical Linkages:** Vertical linkages can be attained through cooperation between the different players or firms, and they have the benefits of transferring skills from one player to another as well as reducing transactions costs. Considering offseason vegetable value chain, vertical linkages exist between cooperatives and growers in some pockets. In overall, there is very poor vertical linkage between producers and traders.

**Horizontal linkages:** It is the relationship among different players operating at the same level of a value chain: It can be seen at producers' level where there are various OSV production groups at production pockets. Group members organize the meeting periodically and share about the status of production, input procurements and output marketing. Nevertheless, there is very few evidence of collective marketing practice in Nepal. As a result, they do not benefit from horizontal linkages that can help them generate economies of scale, which can improve their competitiveness and bargaining power. -

#### 2.5 Governance for empowerment

In HVAP districts, many of the groups were heterogeneous in terms of gender, caste and ethnicity. One stark contrast worth noting is the difference in caste, gender and ethnic composition of farmers compared to input suppliers, government officials, traders and wholesalers. While farmers are socially heterogeneous, the other stakeholders involved in the value chain are higher-status, typically male, Brahmin or Chhetri, and have a moderate income and mid-level education.

Though discrimination obviously exists, few interviewees openly addressed discriminatory practices. Some interviewees equated an increase in education with decreases in discrimination. They also hinted at a generation gap between the young and old people's views regarding the caste system and discrimination. An interaction between a Chhetri woman and a Dalit woman highlighted the prevalence of caste discrimination even between women in the committees. In Dailekh, a female Chhetri also owned a teashop. While conducting a focus group discussion with a farmers group, and offering tea and cookies to the farmers group, she handed each of the women a cookie. When she reached to a Dalit woman, she dropped the cookie without making any physical contact.

Generally in HVAP areas, women are responsible for carrying out domestic chores and taking care of children. However, with the involvement of women in vegetable production and marketing, several women reported that their husbands have started for helping with domestic chores. Now some women are also taking lead roles in farmers groups and cooperatives. This has resulted in an increase in respect and social status. However, very few female own agro-vets, or are technicians, wholesalers and traders.

Furthermore, women's mobility has increased in the communities. Now they are more vocal about their needs, interests and opinions. Many women involved in vegetable farming are earning some income as a result they have become financially independent and no longer have to rely on their husbands for petty cash. Numerous interviews suggested that women's involvement in offseason vegetable has also increased women's knowledge of running a vegetable business.

**Table 13: Women participation in cooperatives**

Districts	Total number of cooperatives	Number of agri-cooperatives	% of agri-cooperatives	Women participation (%)	
				Total	Agri-cooperatives
<b>Jumla</b>	152	24	15.78	37.31	33.51
<b>Kalikot</b>	70	32	45.71	27.79	20.34
<b>Surkhet</b>	383	84	21.93	28.11	28
<b>Dailekh</b>	160	24	15	27.60	27
<b>Jajarkot</b>	84	8	9.52	27.41	27.96
<b>Salyan</b>	96	52	61.90	42.68	22.21

Source: District Development Profile of Nepal, 2012

Among the studied districts, the total number of cooperatives and agriculture cooperatives are more in Surkhet. However, the percentage of agri-cooperatives is more in Salyan i.e. 61.9% and is very low in Jajarkot.

#### **Participation in offseason vegetable production activities**

In the HVAP area, women, men and children, irrespective of age, ethnicity and economic status are involved in offseason vegetable related activities. Major broad categories of work in the study districts are vegetable production, household related activities and other employments.

Women contribute most of the labour for vegetable cultivation and household work. In some villages, it was reported that women were given 'lighter' work; however, this is contested because for example, women tend to transport manure, plantation, weeding, harvesting etc. Men tend to plough, irrigate, etc. It remains to be judged which types of work are 'lighter' and which are 'heavier'. Nevertheless, the perception of the villagers is that workload of women are lighter and as a result they receive less daily wages, usually 25-50% lower than men for the same job. Children, usually above 10 years old, contribute their labour during the main vegetable cultivation and harvesting seasons.

**Table 14: Activities performed by women and men**

Activities	Men	Women
<b>Agriculture</b>	Ploughing, digging, irrigation, Harvesting	Manure transportation, weeding, planting, harvesting
<b>Wage Labour</b>	Inside and outside village, construction work, skilled labour, mason, carpenter	Only agricultural labour inside the village, carrying stones and mud in construction work.
<b>Employment</b>	Inside and outside Nepal — army, company, GOs, NGOs, Gulf countries and India	None; except a few at village level such as primary school teaching
<b>Water fetching</b>	Sometimes fetch water from nearby taps if they exist	Mostly done by women on a regular basis

Activities	Men	Women
<b>Money borrowing</b>	Mostly by men, especially when amount is large. Men have official documentation e.g. land owning certificates as proof of collateral.	Only women headed households borrow money and in small amounts.
<b>Fetching fodder and grasses</b>	Involved partially	Mostly by women
<b>Household reproductive work</b>	Rarely	Mostly by women
<b>Marketing</b>	Large purchase and sale	Small purchase and sale

### Access to Services / resources

Level of access to basic services varies significantly between men and women. This also varies significantly across the HVAP districts.

**Table 15: Gendered access to services**

Services	Men	Women
<b>Education</b>	<ul style="list-style-type: none"> <li>• Primary to higher level education</li> <li>• Education outside village/district</li> <li>• Education in private school</li> <li>• Normally complete school</li> </ul>	<ul style="list-style-type: none"> <li>• Access to primary education</li> <li>• Less opportunity for secondary and higher education</li> <li>• Education mostly in government school</li> <li>• Education only within village</li> <li>• Do not normally complete full education, pressures of work burdens force them out of school</li> </ul>
<b>Health</b>	<ul style="list-style-type: none"> <li>• Better mobility, better nutrition, independence, and control over finances result in better health.</li> </ul>	<ul style="list-style-type: none"> <li>• Mobility limited, must be accompanied by males to travel long distances. No control over finances, poor nutrition contributes to poorer health.</li> </ul>
<b>Financial/Credit</b>	<ul style="list-style-type: none"> <li>• Hold most of the power over financial management borrow from money lenders and institutions</li> </ul>	<ul style="list-style-type: none"> <li>• Access to small saving, cash generated from sale of vegetable and chicken etc.</li> <li>• Women-headed households have more access compared to others</li> <li>• Borrow mostly from savings-and-credit groups</li> </ul>
<b>Communication/ Information</b>	<ul style="list-style-type: none"> <li>• Men have greater mobility and exposure and are more informed</li> </ul>	<ul style="list-style-type: none"> <li>• Limited knowledge because of limited mobility</li> </ul>
<b>Legal</b>	<ul style="list-style-type: none"> <li>• More aware, controls decisions</li> </ul>	<ul style="list-style-type: none"> <li>• Only women-headed households have access</li> </ul>

## Control of Resources

Men usually own land and make all the major household decisions. Although the family might be consulted, the male head of the family makes the final decision on the purchase, sale, construction, and rental of land and property. Women have control over ornaments and small livestock. Fixed property, the land and house, is usually registered in the name of the men of the household. Men also tend to spend more money for their daily personal entertainment such as drinking tea, smoking cigarettes, chewing tobacco, and drinking alcohol while very few women spend money this way.

## 2.6 Opportunities and Constraints

The diverse agro-climatic conditions of Nepal have provided nearly unlimited scope for growing all types of vegetables known in the world. Further, increase in general awareness of the nutritional values of vegetables among the people has increased tremendous scope of promoting the production and marketing of fresh vegetable in Nepal. Looking at the trend, the total demand for vegetable is projected to expand considerably in the near future. Furthermore, it has been widely realized by several researchers that Nepal has comparative advantage in some of the fresh vegetables as well as in the production of so many offseason vegetables. Thus exploring markets niches and with proper export promotion activities Nepal can harvest that potential benefit provided appropriate technology and adequate infrastructure, legal and policy environment for market oriented vegetable production. Some of the examples would be appropriate site selection, commercial size pockets, appropriate vehicles, all season transportation network, year round irrigation facilities, extension (both production and technology and market networking) post harvest activities, collection/ market centres, credit facility, information and communication.

**Table 16: Opportunities and Constraints**

Type	Opportunities	Constraints
<b>Market access</b>	<ul style="list-style-type: none"> <li>• Potential to sell in terai and Northern India since there is difficult to produce during rainy season</li> <li>• Potentiality to gain better price of off-season vegetable</li> <li>• Availability and development of MIS (MOAC and AEC)</li> </ul>	<ul style="list-style-type: none"> <li>• Low volume of production and inferior quality products</li> <li>• Inadequate market information and pricing mechanism</li> <li>• Lack of organized market</li> </ul>
<b>Input supply</b>	<ul style="list-style-type: none"> <li>• Availability of Agrovets and other input providers</li> <li>• Existence of NARC research stations for quality seed</li> </ul>	<ul style="list-style-type: none"> <li>• Most of the Agrovets are located at district head quarters</li> </ul>
<b>Technology and product development</b>	<ul style="list-style-type: none"> <li>• Conducive geographical locations for OSVs</li> <li>• Availability of service providers (DADO, I/NGOs, Agro-vets, Co-operatives)</li> <li>• Off-season vegetable varieties and other inputs available</li> </ul>	<ul style="list-style-type: none"> <li>• Inadequacy of seed and other inputs at production pockets</li> <li>• Poor access to production and postharvest handling technology at farmers and trader level</li> <li>• Available mainly in the</li> </ul>

Type	Opportunities	Constraints
	<ul style="list-style-type: none"> <li>• Production and post production technologies available at least at research stations</li> <li>• Product diversification (pickles tomato sauce and ketchups, green peas, dried vegetables and canned beans snacks)</li> </ul>	<ul style="list-style-type: none"> <li>• research stations and to the reach of few farmers</li> <li>• Poor access to processing industry/units</li> </ul>
<b>--Management and Organization</b>	<ul style="list-style-type: none"> <li>• Existence of producers' groups, collection centers, marketing cooperative</li> </ul>	<ul style="list-style-type: none"> <li>• Low knowledge on management practice, record keeping/ accounting, business planning</li> <li>• Un organized marketing channels and marketing practices</li> </ul>
<b>Access to finance</b>	<ul style="list-style-type: none"> <li>• Saving credit groups, cooperatives</li> </ul>	<ul style="list-style-type: none"> <li>• Groups poor performance due to lack of knowledge and expertise to handle the groups</li> </ul>
<b>Infrastructure</b>	<ul style="list-style-type: none"> <li>• Extension of agriculture roads going on and irrigation expanding</li> <li>• Availability of land for cold storage and market structure</li> </ul>	<ul style="list-style-type: none"> <li>• Basic infrastructures (road, irrigation and electricity) poorly available; Still lack of year round functioning roads and irrigation</li> <li>• Lack of cold storage</li> </ul>
<b>Governance for empowerment</b>	<ul style="list-style-type: none"> <li>• Increasing participation of women farmers, dalits and janajatis in OSV</li> <li>• Employment creation, income generation and nutrition</li> </ul>	<ul style="list-style-type: none"> <li>• Still women farmers are deprived of income generation activities like OSV marketing</li> <li>• Poor service delivery from stakeholders</li> </ul>
<b>Regulatory (policy)</b>	<ul style="list-style-type: none"> <li>• Tax exemption in agricultural commodities</li> <li>• Input subsidies (for fertilizers)</li> </ul>	<ul style="list-style-type: none"> <li>• Multiple taxes in practice</li> <li>• Just nominal subsidies and poor access to poor farmers</li> </ul>

### 3. MARKET BASED SOLUTION

#### 3.1 Identification of Market-based Solutions

It is crucial to assess the market-based solutions to study their feasibility and sustainability and to clarify the offer of and the demand for the solution. This assessment also identifies potential solution providers (public, private and civil society) and users, analyses their constraints, and prioritizes systemic solutions to address the constraints of service providers and users (SNV, 2008). This approach allows working on those constraints of service providers and users that are hampering the market system to work properly. The following table illustrates the

assessment of market-based solutions of the offseason vegetables value chain and also suggests the possible areas of project intervention/facilitation.

**Table 17: Market based solutions addressing value chain constraints of OSV**

Value chain Constraints	Market Based Solutions
Low volume of production and quality (size, shape and colour) not meeting the requirements of buyers	<ul style="list-style-type: none"> <li>• Offseason vegetable production zoning</li> <li>• Timely availability of quality inputs (seeds, fertilizer &amp; pesticides)</li> <li>• Training on production and postharvest handling</li> </ul>
Poor market information and pricing mechanism	<ul style="list-style-type: none"> <li>• Easier access to reliable market information through collaboration between traders, DCCI and media agencies and telecom operators for dissemination of MIS</li> </ul>
Lack of processing facilities and knowledge on post harvest handling	<ul style="list-style-type: none"> <li>• Provision of small scale vegetable processing unit (Tomato sauce and Solar Drying) near to collection centre</li> <li>• Training on grading, packaging, processing and quality standards to lead farmers, local traders, wholesaler and retailer</li> </ul>
Poor knowledge on entrepreneurship development	<ul style="list-style-type: none"> <li>• Provision of business planning and enterprise development training to commercial farmers and local traders</li> <li>• Access to business development services</li> </ul>
Poor access Banks and to microfinance institutions to farmers and traders	<ul style="list-style-type: none"> <li>• Provision of training to traders and lead farmers in development of financial plan presentable to commercial banks</li> <li>• Access to microfinance to farmers and local traders</li> </ul>
Poor infrastructure	<ul style="list-style-type: none"> <li>• Establishment and upgradation of collection centres in each pockets</li> <li>• Provision of cold storage at Birendranagar – 6, Surkhet</li> <li>• Provision of a well equipped wholesale market in each district headquarters.</li> </ul>
Lack of Cooperative Marketing Centre (CMC)	<ul style="list-style-type: none"> <li>• Provision of Cooperative Marketing Centre (CMC) in potential market hubs (Baddichaur, Guranse, Chhinchu)</li> </ul>
Poor technological knowledge with agro-vet owners	<ul style="list-style-type: none"> <li>• Better linkage of agro vet owners and research stations and DADO</li> <li>• Technological training to agro-vet owners</li> </ul>
Lack of easy language Nepali book on OSV production and post harvest handling	<ul style="list-style-type: none"> <li>• Development and distribution of easy language Nepali book on off-season vegetable package of practices and postharvest handling.</li> </ul>

### 3.2 Assessment of Market-based Solutions

It is crucial to assess the market-based solutions to study their feasibility and sustainability and to clarify the offer of and the demand for the solution. This assessment also identifies potential solution providers (public, private and civil society) and users, analyses their constraints, and prioritizes systemic solutions to address the constraints of service providers and users (SNV, 2008). This approach allows working on those constraints of service providers and users, which are hampering the market system to work properly. Table 18 illustrates the assessment of market-based solutions of the offseason vegetable value chain and also suggests the possible areas of project intervention/facilitation.

**Table 18: Market based solutions**

Market Based solutions	Supply and demand analysis	Service provider and users	Constraints of service providers and users	Possible areas of project intervention/facilitation
<b>Off season vegetable zoning; product standardization and quality maintenance</b>	<ul style="list-style-type: none"> <li>High market demand of quality (uniform, good keeping quality) offseason vegetables at national level and India</li> <li>Greater motivation of farmers' for offseason vegetable production</li> </ul>	<ul style="list-style-type: none"> <li>NARC</li> <li>DADOs/ASC</li> <li>Experts/Technicians</li> <li>NGOs</li> <li>Cooperatives</li> <li>Farmer's group</li> <li>Commercial farmers</li> </ul>	<ul style="list-style-type: none"> <li>Technology (uniform varieties, postharvest technology) available mainly in the research stations and to the reach of few farmers</li> <li>Inadequacy of quality seed and other inputs at production pockets at appropriate time</li> <li>Products quality (size, shape and colour) not meeting the requirements of buyers</li> </ul>	<ul style="list-style-type: none"> <li>Development of offseason vegetable zone (Annex 7) Development of hybrid varieties</li> <li>Introduce poly house technology</li> <li>Training on production, grading and quality standards to potential buyers to lead farmers and local traders</li> </ul>
<b>Strengthen the existing MIS information</b>	<ul style="list-style-type: none"> <li>Possibility of expansion of existing MIS platform</li> <li>Greater demand for MIS both at farmers' level and traders' level and their willingness to pay minimal charge in exchange of market information</li> </ul>	<ul style="list-style-type: none"> <li>AEC/FNCCI</li> <li>DCCI</li> <li>Agriculture Produce Market Centre (APMC)</li> <li>Collection centres</li> <li>Cooperatives</li> </ul>	<ul style="list-style-type: none"> <li>Low institutional capacity of DCCI and APMC for MIS compilation and dissemination</li> <li>Low coordination between MIS provider and media agencies</li> <li>Requirement of greater investment in setting up SMS based MIS for wider dissemination and easier access</li> </ul>	<ul style="list-style-type: none"> <li>Capacity building and institutional strengthening of AEC and DCCI as market information centre</li> <li>Facilitate for development of mechanism of wider dissemination of the information through coordination between APMC, CC, and cooperatives</li> <li>Facilitate for contractual agreements between DCCI and media agencies and telecom operators for dissemination of MIS</li> <li>Provide technical and partial financial assistance towards development of SMS based MIS to AEC/FNCCI</li> </ul>
<b>More research on OSV</b>	<ul style="list-style-type: none"> <li>Prior experience of NARC on similar activities and</li> </ul>	<ul style="list-style-type: none"> <li>NARC</li> <li>DADOs/ASC</li> </ul>	<ul style="list-style-type: none"> <li>Low manpower and budget at NARC</li> <li>Poor quality technological inputs at</li> </ul>	<ul style="list-style-type: none"> <li>Coordination and collaboration with NARC to identify and develop the</li> </ul>

Market Based solutions	Supply and demand analysis	Service provider and users	Constraints of service providers and users	Possible areas of project intervention/facilitation
<b>production, processing and marketing</b>	<ul style="list-style-type: none"> <li>its potential capacity for expansion</li> <li>High demand of seeds due to increased interest of farmers towards commercial OSV farming</li> </ul>	<ul style="list-style-type: none"> <li>Experts/Technicians</li> <li>NGOs</li> <li>Cooperatives</li> <li>Farmer's group</li> <li>Commercial farmers</li> </ul>	<ul style="list-style-type: none"> <li>farmers and trader level</li> </ul>	<ul style="list-style-type: none"> <li>uniform and high quality varieties of vegetables</li> <li>Develop linkage of input providers with farmers</li> </ul>
<b>OSV production and post harvest handling training</b>	<ul style="list-style-type: none"> <li>Availability of NGO, DADO, NARC, ASC to provide training</li> <li>Farmers, traders and marketers are using traditional methods which needs to be improved</li> </ul>	<ul style="list-style-type: none"> <li>NGOs</li> <li>DADO</li> <li>Research stations</li> <li>Farmers' group</li> <li>Farmers</li> </ul>	<ul style="list-style-type: none"> <li>Technological knowledge poor with JT, JTA, LRP</li> <li>Less idea for commercial OSV production and postharvest handling at commercial pockets</li> </ul>	<ul style="list-style-type: none"> <li>Provide ToT to LRPs, technicians (JT, JTA, staffs of DADOs) and lead farmers on production and postharvest handling practices and develop as resource person at local level</li> <li>Postharvest management training for farmers and traders</li> </ul>
<b>Training on entrepreneurship development in OSV</b>	<ul style="list-style-type: none"> <li>Business development service providers (private and NGOs) conducting business trainings at local level</li> <li>As a necessity for the farmers moving towards commercial farming and for proper operation of CC and processors</li> </ul>	<ul style="list-style-type: none"> <li>BDS providers (Private, National NGO, LNGO)</li> <li>Farmers' group</li> <li>Collection centres and processors</li> </ul>	<ul style="list-style-type: none"> <li>Only work on basis of demand with provision of certain incentives for providing the service</li> <li>Lack of information among farmers, collection centres, processors and other local enterprises on BDS providers and their services to farmers</li> </ul>	<ul style="list-style-type: none"> <li>Provide business scheme training to farmers' group through BDS providers (private, National NGO, LNGO)</li> <li>Provide business planning and enterprise development training to collection centres, and traders through BDS providers (private, National NGO, LNGO)</li> </ul>
<b>Easy access to microfinance to farmers and marketers</b>	<ul style="list-style-type: none"> <li>Various financial institutions providing loans to farmers and traders</li> <li>Investment as essential requirement for expansion of business</li> </ul>	<ul style="list-style-type: none"> <li>Microfinance Institutions</li> <li>Cooperatives and Saving Groups</li> <li>Commercial banks</li> <li>Farmers</li> <li>Traders</li> </ul>	<ul style="list-style-type: none"> <li>Only provide services according to demand and assessment of service seeker</li> <li>Lack of linkage to MFIs by cooperatives and groups</li> <li>Low coordination between traders, commercial farmers and commercial banks</li> <li>Low knowledge of traders and commercial farmers on development of proper financial plans</li> </ul>	<ul style="list-style-type: none"> <li>Assess the demand for finance from farmers and facilitate to establish linkage between their groups/cooperatives with MFIs</li> <li>Capacitate farmers' groups/cooperative in legal documentation and other relevant task for getting financial loan/assistance from MFIs</li> <li>Facilitate for roundtable talk between traders, commercial farmer and commercial banks for development of</li> </ul>

Market Based solutions	Supply and demand analysis	Service provider and users	Constraints of service providers and users	Possible areas of project intervention/facilitation
				<p>policy acceptable to both parties</p> <ul style="list-style-type: none"> <li>• Provide training to traders and lead commercial farmers in development of financial plan presentable to commercial banks</li> </ul>
<b>Establishment /up gradation of collection centres, storage house and cold storage</b>	<ul style="list-style-type: none"> <li>• Availability of government budget as well as donor programs for development of infrastructures</li> <li>• High demand of farmers and other actors for greater benefit to wider population</li> </ul>	<ul style="list-style-type: none"> <li>• DADOs</li> <li>• Donors</li> <li>• HVAP</li> <li>• I/NGOs</li> <li>• VC actors</li> <li>• Indirect beneficiaries</li> </ul>	<ul style="list-style-type: none"> <li>• Lack of assessment (including impact and number of beneficiaries) of potential sites for infrastructure development</li> <li>• Lack of access to government and donors programs and their information</li> </ul>	<ul style="list-style-type: none"> <li>• Identification and assessment of potential sites for development of infrastructure which can provide greater impact and wide base of beneficiaries</li> <li>• Facilitate better linkage and access of beneficiaries to government and donor programs through better coordination</li> <li>• Provide financial assistance for establishment of infrastructure on PPP basis</li> </ul>
<b>Technological training to agro-vet owners</b>	<ul style="list-style-type: none"> <li>• Availability of agro-vets to provide inputs/service</li> <li>• Farmers are using poor quality inputs for OSV farming</li> </ul>	<ul style="list-style-type: none"> <li>• Agro-vets</li> <li>• NGOs</li> <li>• DADO</li> <li>• Research stations</li> <li>• Farmers' group</li> <li>• Farmers</li> </ul>	<ul style="list-style-type: none"> <li>• Poor technological knowledge with agro-vet proprietor</li> <li>• Unavailability of quality seed, pesticides and fertilizers</li> </ul>	<ul style="list-style-type: none"> <li>• Technological training to agro-vet owners</li> <li>• Facilitate for better linkage of agro vet owners and research stations and DADO</li> </ul>
<b>Publication and distribution of easy language Nepali book on off-season vegetable</b>	<ul style="list-style-type: none"> <li>• Availability of OSV technologies and English reading materials</li> <li>• Lack of easy language Nepali book on OSV production and postharvest handling</li> </ul>	<ul style="list-style-type: none"> <li>• Farmers</li> <li>• Agro-vets</li> <li>• NGOs</li> <li>• DADO</li> <li>• Research stations</li> </ul>	<ul style="list-style-type: none"> <li>• Deficient of publication committed for OSV production and post handling practices at service provider level</li> <li>• Unavailability of easy language Nepali book on OSV at production pockets</li> </ul>	<ul style="list-style-type: none"> <li>• Develop and distribute easy language book on OSV production and postharvest handling technology</li> </ul>

## 4. STRATEGIC AREAS OF INTERVENTIONS

This chapter presents some strategic areas for intervention for the HVAP project. The interventions are designed prioritising the suggested possible project interventions/activities mentioned in Chapter Three. The suggested interventions are categorized into two broad categories:

- a) Short Term — interventions that can have a visible output within project duration
- b) Long Term — interventions that can be initiated within project duration but with its visible output seen beyond project period

Annex 7 presents the tabular presentation of the interventions, activities and beneficiaries identified by the study.

### 4.1 PRIORITY AREAS OF INTERVENTIONS (SHORT TERM)

#### 4.1.1 Production

**Offseason vegetable zoning:** Most of the farmers in vegetable growing districts are smallholders and their production is small. Hence, commercialization of offseason vegetables means mobilization of a large group of the farmers in the production of target commodities. Practice of zoning approach for offseason vegetable production can be promoted.

**Introduce poly-house technology:** Offseason tomato produced in the hills from July to November is one of the cash generating crops suitable for small and poor farmers. During July to November (rainy season) tomato has huge export potential to the plains of Nepal, India & Bangladesh. The offseason tomato in open field during the rainy season has been constrained mainly by high rainfall, bacterial wilt, late blight, alternaria and septoria leaf spot. Therefore, the standard poly-house structure should be introduced. There is need of subsidy for large-scale poly-houses in initial stage.

**Irrigation technology:** For vegetable farming, irrigation plays a major role in yield and productivity. Drip & plastic pound should be promoted in water insufficient pockets eg. Ratanangla and Haldu. And cannel/pipe/lift irrigation should be promoted in sufficient water resource pockets like Surkhet (Kunathari-3 and 4, Manikapur- 1 and 3), Dailekh (Belpata, Chupra), and Jajarkot (Khalanga-5).

**Training cum Exposure Visit:** Almost all the offseason vegetables grown in India come from three hilly states i.e. Himachal Pradesh, Jammu & Kashmir and Uttarakhand. Farmers of these areas are satisfied with offseason vegetables and are producing better quality vegetables. Therefore, training cum exposure visit for leading traders & entrepreneur farmers and HVAP staff to India could be a useful intervention for knowing the successful practices in offseason vegetables.

**Offseason vegetable production training:** Off-season vegetable farming is one of the potential sources of income and a reliable means for the reduction of poverty and malnutrition persisting over the low, medium & high hills of Nepal. It can be produced successfully with little amendments in the growing techniques by the use of plastic sheets and drainage of excess soil moisture in the mid hills and mountains from rainy summer to autumn seasons. The training on offseason vegetable production should focus on the technical aspects of offseason production

and micro-irrigation in order to strengthen farmers' knowledge and skill, and improve their livelihood and socio-economic status through income generation activities.

**Training to agro-vet owners:** Technological training (production technology, quality inputs and IPM) to agro-vet owners is important for commercialization & smooth implementation of offseason vegetable production programme (HVAP).

#### 4.1.2 Marketing

**Promotion of cooperative marketing system:** As marketing of produce by small farmer individually is insufficient, development of a Cooperative Marketing Centre (CMC) in potential market hubs like Baddichaur, Guranse and Chhinchu could be a potential area of intervention.

**Distribution of plastic crates:** There is a possibility of reducing postharvest losses of vegetables by proper packaging. Therefore, 80% subsidized plastic crates should be provided to farmers' groups/cooperatives.

**Establishment of agriculture information centre:** Vegetables have very fluctuating market prices both in the domestic and export markets. Similarly, new varieties, inputs and technologies have been developed by researchers, therefore, an established marketing & technology information centre at pocket sites (call centre) with involvement of the farmers cooperatives, local government, DADO and private sector is necessary.

**Development of market structure and establishment of cold storage:** Development of market structure is the most important requirement for effective marketing. In Surkhet (Birendranagar – 6) a well-equipped wholesale market with cold storage facilities should be developed.

**Postharvest management training:** Reduction of losses is more economical than increasing production. Therefore, there is need to provide training to the farmers and traders for increasing their technical knowledge on postharvest handling technologies.

**Packaging & storage training:** Packaging is a fundamental tool for the postharvest management of highly perishable offseason vegetables. The present packaging system still depends on the traditional forms of packages like, bamboo baskets (*Doko*) and gunnysacks. Use of plastic crates, corrugated fibreboard boxed has to be encouraged. Similarly, proper temperature and humidity management are very effective tools in ensuring that the produce remains in good condition during storage. Therefore, packaging and storage training to traders, wholesaler and retailers is recommended.

#### 4.1.3 Policy and Institutions

**Provision of crop insurance:** Sometimes heavy rainfall, hailstorm, disease may create series of problems and loss to the crops. To encourage farmers for offseason vegetable production, provision of crop insurance could be promoted.

**Publication and Publicity:** The handy and easy language composed book, booklet, leaflets and poster on off-season vegetable production techniques, postharvest management and marketing technologies of each crop should be developed and circulated to relevant farmers and marketers.

## 4.2 PRIORITY AREAS OF INTERVENTIONS (LONG TERM)

### 4.2.1 Production

**Development of hybrid varieties:** Development of high yielding hybrid varieties could be conducted in joint collaboration with the Horticulture Research Division, Nepal Agricultural Research Council.

**Verification/Demonstration of Different Botanical Pesticides:** The different botanical pesticides such as Neem, plant extracts (Banmara, Teetepati, Asuro, Lantana, Garlic, Ginger, Timur and other such organic products) should be evaluated for the management of various insect-pests. The locally available resources can be utilized as far as possible along with IPM approaches with cultural practices such as high ridge planting, multiple cropping with marigold, crop rotation and other relevant organic measures. Activity should be conducted in joint collaboration with Horticulture Research Division and Entomology Division, Nepal Agricultural Research Council.

### 4.2.2 Marketing

**Development of well-equipped vegetable markets:** In district headquarters of Jumla, Kalikot, Jajarkot and Dailekh, well equipped vegetable markets with storage facilities is recommended.

**Development of agriculture road:** Competitiveness in vegetable production and promotion is largely shaped by effective transportation (both accessibility and timely availability) facility. Therefore, emphasis should be given to promote the agricultural road development in the potential pocket areas.

### 4.2.3 Policy and Institution

**Government support for export promotion:** For the export promotion of the Nepalese vegetables to the Indian markets, the government has to play an effective role to identify and minimize the non-tariff barriers that the Nepali offseason vegetables are facing. Some of the barriers that the project could address to the government are - transferring of produce to the Indian truck at the borders, considerable delay in custom clearance, and non inclusion of Nepali vegetable and their price in the price bulletin published by the regulated markets thus reducing the opportunity to cash the brand name or the quality name of the Nepali vegetables.

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Annex 1: Suggested off-season calendar:

Vegetables	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
Tomato							←	→	→	→	→	
Cauliflower						←	→	→	→			
Cabbage						←	→	→	→			
Pea						←	→	→	→	→	→	
Bean						←	→	→	→	→		

Annex 2: Average value of offseason cabbage at different sectors in HVAP area

Farmers		Collection centre		Wholesale		Retail	
Item	Cost	Item	Cost	Item	Cost	Item	Cost
Production		Collection cost	0.25	Trucking	2	Market Charge	0.10
Seedling	0.5	Purchase	8	Load/unload	0.25	Transport	0.25
Fertilizer	0.5	Others	0.25	Taxes	0.15	Purchase	14.29
Pesticides	0.25	-	-	Others	0.25	Others	0.25
Labour	2	-	-	Purchase	9.78		
Others	0.25	-	-				
<b>Total cost</b>	<b>3.5</b>	<b>Total cost</b>	<b>8.5</b>	<b>Total cost</b>	<b>12.43</b>	<b>Total cost</b>	<b>14.89</b>
<b>Margin</b>	<b>4.5</b>	<b>Margin (15%)</b>	<b>1.28</b>	<b>Margin (15%)</b>	<b>1.86</b>	<b>Margin</b>	<b>5.11</b>
<b>Farm Gate price</b>	<b>8</b>	<b>Local trader price</b>	<b>9.78</b>	<b>Wholesale price</b>	<b>14.29</b>	<b>Retail price</b>	<b>20</b>
<b>Loss (4%)</b>	<b>0.30</b>	Loss ( 2%)	0.20	Loss (2 %)	0.71	Loss (5 %)	1.6

Annex 3: Average value of off-season tomato at different actors in HVAP area

Farmers		Collection centre		Wholesale		Retail	
Item	Cost	Item	Cost	Item	Cost	Item	Cost
Production		Collection cost	0.5	Trucking	2	Market charge	0.1
Seedling	0.75	Purchase	18	Load/ Unload	0.25	Transport	0.25
Fertilizers	1.25	Others	0.25	Taxes	0.15	Others	0.25
Pesticides	0.8	-	-	Purchase	20.62	Purchase	26.76
Labour	3	-	-	Others	0.25	-	-
Staking	2.5	-	-	-	-	-	-
Others	0.25	-	-	-	-	-	-
<b>Total cost</b>	<b>8.55</b>	<b>Total cost</b>	<b>18.75</b>	<b>Total cost</b>	<b>23.27</b>	<b>Total cost</b>	<b>27.36</b>
<b>Margin</b>	<b>9.45</b>	<b>Margin (15%)</b>	<b>2.81</b>	<b>Margin (15%)</b>	<b>3.49</b>	<b>Margin</b>	<b>7.64</b>
<b>Farm Gate</b>	<b>18</b>	<b>Local trader price</b>	<b>21.56</b>	<b>Wholesale price</b>	<b>26.76</b>	<b>Retail price</b>	<b>35</b>
<b>Loss (10%)</b>	<b>1.8</b>	Loss (5%)	1.07	Loss (8%)	2.14	Loss (10%)	3.5

Annex 4: Average value of off-season cauliflower at different actors in HVAP area

Farmers		Collection centre		Wholesale		Retail	
Item	Cost	Item	Cost	Item	Cost	Item	Cost
Production		Collection cost	0.25	Trucking	2	Market Charge	0.1
Seedling	0.5	Purchase	15	Load/ Unload	0.25	Transport	0.25
Fertilizers	0.75	Others	0.25	Taxes	0.15	Purchase	23.54
Pesticides	0.5			Purchase	17.82	Others	0.25
Labour	2			Others	0.25		
Others	0.25						
<b>Total cost</b>	<b>4</b>	<b>Total cost</b>	<b>15.5</b>	<b>Total cost</b>	<b>20.47</b>	<b>Total cost</b>	<b>24.14</b>
<b>Margin</b>	<b>11</b>	<b>Margin (15%)</b>	<b>2.32</b>	<b>Margin (15%)</b>	<b>3.07</b>	<b>Margin</b>	<b>7.86</b>
<b>Farm Gate</b>	<b>15</b>	<b>Local trader price</b>	<b>17.82</b>	<b>Wholesale price</b>	<b>23.54</b>	<b>Retail price</b>	<b>32</b>
<b>Loss (2%)</b>	<b>0.3</b>	<b>Loss (2%)</b>	<b>0.37</b>	<b>Loss (4%)</b>	<b>0.94</b>	<b>Loss (6%)</b>	<b>1.92</b>

Annex 5: Average value of off-season pea at different actors in HVAP area

Farmers		Collection centre		Wholesale		Retail	
Item	Cost	Item	Cost	Item	Cost	Item	Cost
Production		Collection cost	0.25	Trucking	2	Market Charge	0.1
Seed	0.25	Purchase	18	Load/ Unload	0.25	Transport	0.25
Fertilizers	0.15	Others	0.25	Taxes	0.15	Purchase	27.51
Pesticides	0.15	-	-	Purchase	21.27	Others	0.25
Labour	1.5	-	-	Others	0.25	-	-
Staking	1	-	-	-	-	-	-
Others	0.25	-	-	-	-	-	-
<b>Total cost</b>	<b>3.3</b>	<b>Total cost</b>	<b>18.5</b>	<b>Total cost</b>	<b>23.92</b>	<b>Total cost</b>	<b>28.11</b>
<b>Margin</b>	<b>14.7</b>	<b>Margin (15%)</b>	<b>2.77</b>	<b>Margin (15%)</b>	<b>3.59</b>	<b>Margin</b>	<b>9.89</b>
<b>Farm Gate</b>	<b>18</b>	<b>Local trader price</b>	<b>21.27</b>	<b>Wholesale price</b>	<b>27.51</b>	<b>Retail price</b>	<b>38</b>
<b>Loss (1 %)</b>	<b>0.18</b>	<b>Loss (2%)</b>	<b>0.42</b>	<b>Loss (2 %)</b>	<b>0.55</b>	<b>Loss (5%)</b>	<b>1.9</b>

Annex 6: Average value of off-season bean at different actors in HVAP area

Farmers		Collection centre		Wholesale		Retail	
Item	Cost	Item	Cost	Item	Cost	Item	Cost
Production		Collection cost	0.25	Trucking	2	Market Charge	0.1
Seed	0.25	Purchase	14	Load/ Unload	0.25	Transport	0.25
Fertilizers	0.15	Others	0.25	Taxes	0.15	Purchase	22.22
Pesticides	0.15	-	-	Purchase	16.68	Others	0.25
Labour	1.5	-	-	Others	0.25	-	-
Staking	1	-	-	-	-	-	-
Others	0.25	-	-	-	-	-	-
<b>Total cost</b>	<b>3.3</b>	<b>Total cost</b>	<b>14.5</b>	<b>Total cost</b>	<b>19.33</b>	<b>Total cost</b>	<b>22.82</b>
<b>Margin</b>	<b>10.7</b>	<b>Margin (15%)</b>	<b>2.18</b>	<b>Margin (15%)</b>	<b>2.89</b>	<b>Margin</b>	<b>7.72</b>
<b>Farm Gate</b>	<b>14</b>	<b>Local trader price</b>	<b>16.68</b>	<b>Wholesale price</b>	<b>22.22</b>	<b>Retail price</b>	<b>30</b>
<b>Loss (1 %)</b>	<b>0.14</b>	<b>Loss (1%)</b>	<b>0.17</b>	<b>Loss (2 %)</b>	<b>0.44</b>	<b>Loss ( 3%)</b>	<b>0.9</b>

Annex 7: Suggested interventions

Interventions	Beneficiaries/ activities details			
	Who	Whom	How	Where
Development of offseason vegetable pocket	Farmers group, NGOs, DADOs HVAP	Commercial farmers	Selection of pocket area Training on production and postharvest management Linkage with buyers	Dailekh (Belpata, Baraha-5, Piladi, Goganpani, Ratu, Khidkijewela); Surkhet (Manikapur, Gadi, Kunathari, Malarani, Gokulpur, Sahare, Chhinchu); Jajarkot (Khalanga -5,6, 9); Kalikot (Manma-8 & 9, Badalkot-1); Jumla (Chandanath-1, Tatopani, Narakot, Patmara)
Business capacity building	NGOs, DADOs HVAP	Commercial farmers, Traders, Marketers	Training on business planning Micro-enterprise development training	Farmers (Pocket area); Traders (Main market centres); marketers (Wholesalers & retailers)

Interventions	Beneficiaries/activities details			
	Who	Whom	How	Where
Introduce poly-house technology	Farmers group, NGOs, DADOs HVAP	Commercial farmers	Subsidy and Technical support	All HVAP
Irrigation technology	Farmers group, NGOs, DADOs HVAP	Commercial farmers	Technical and financial support	Belpata, Chupra (water resource-motella khola); Gurase (Drip, plastic pound); Dandaparajul (Batase to Tharpu); Manikapur (Water resource – Geruni Khola); Khalanga 5,6 (Water resource-Ranshe Khola)
Exposure visit	NGOs, DADOs, HVAP	Farmers, traders, marketers and DADO staff	Training and Visit	Farmers (Pocket area); Traders (Main market centres); marketers (Wholesalers & retailers); DADO staff (HVAP districts)
Offseason vegetable production training	NGOs, DADOs, HV AP	Commercial farmers	ToT training (production) Booklets publication	Surkhet, Dailekh, Jajarkot, Salyan, Kalikot, Achham
Development of market structures	NGOs, DADOs, HV AP	Commercial farmers, Traders, Marketers	Market Infrastructure	District headquarter of Surkhet, Dailekh, Jajarkot, Salyan, Kalikot, Achham
Development Cooperative Marketing Centre (CMC)	NGOs, DADOs, HV AP	Commercial farmers, Traders, Marketers	Technical and financial support	Baddichaur, Guranse, Chhinchu
Establishment of agriculture information centre	Farmers group, private sector DCCI NGOs, DADOs, NARC HVAP	Commercial farmers, Cooperatives Traders, Marketers	Technical and financial support	Commercial pockets
Establishment small scale vegetable processing unit (Tomato sauce and Solar Drying)	Private sector, DADO, HVAP	Commercial farmers, Cooperatives Traders, Marketers	Technical and financial support	Near to collection centre
Postharvest management training	NGOs, DADOs, HV AP	Commercial farmers, Traders, Marketers	ToT training (production) Booklets publication	Surkhet, Dailekh, Jajarkot, Salyan, Kalikot, Achham
Development of hybrid varieties	NARC	Commercial farmers	Financial support	HRD, Khumaltar
Establishment of	NGOs,	Commercial	Technical and	Birendranagar – 6, Hatiya Bazar

Interventions	Beneficiaries/activities details			
	Who	Whom	How	Where
cold storage	DADOs,HV AP	farmers, Cooperatives Traders, Marketers	financial support	
Development of agriculture road	NGOs, DADOs,HV AP	Commercial farmers, Cooperatives Traders, Marketers	Technical and financial suppor	Manikapur-1,3 (2 Km.); Dharapani VDC of Surkhet; Upallo Dungeshwor (50 m)
Provision of crop insurance	MOAC, DADO, HVAP	Commercial farmers	Crop insurance and minimum price guarantee	All commercial farmers

## Annex-8 Details of enablers

**Department of Agriculture:** District Agriculture Development Office (DADO) operates under Department of Agriculture of the Ministry of Agriculture and Cooperative and is functional in all 75 districts. DADO is the main point for activities related to agriculture of associated district. DADOs are implementing various activities on OSV promotion, which are mainly focused at the production level. Group formation, technical advice to growers, technology demonstrations, and trainings are some of their activities.

**Vegetable Development Directorate (VDD):** The objective of this agency is to promote OSV by improving production and productivity and increasing farmers' income. Collection and selection of varieties, technology generation, production and distribution of quality planting materials, providing training and technical know-how to the farmers are some of the key activities of this section.

**Nepal Agricultural Research Council (NARC):** At national level this program has the mandate to conduct research work. Horticulture Research Division at Khumaltar, Lalitpur carries out research in explicitly OSV production and storage technologies.

**Plant Protection Directorate:** The PPD is designed as the government agency responsible for the program implementation on the Plant Protection Sector and is responsible for four national level programs—the office of Registrar of Pesticides, the National Plant Quarantine Program, and Regional plant Protection Laboratories. During export of OSV, the plant quarantine offices work on legal formalities of export.

**Nepal Agriculture Research and Development Fund (NARDEF):** It has funded various research and development projects conducted by government extension offices, NARC and different NGOs.

**Trade and Export Promotion Centre (TEPC):** The Government of Nepal has established "Trade and Export Promotion Centre", a national trade promotion organization of the country in November 2006, as a focal point, with the objective of promoting foreign trade in general and export trade in particular of the country.

**High Value Agriculture Project (HVAP):** THVAP project was formally launched in Nepal concentrating its activities in mid-western development region of Nepal. The project primarily focuses on Inclusive Business (IB) approach whereby it seeks to mitigate poverty by incorporating lower income communities within the supply chain of larger and more established companies. Offseason vegetable is one of the priority sub sector of this project.

### **Non-government Organizations and Projects**

**AEC/FNCCI:** FNCCI has created Agro Enterprise Centre (AEC) as an autonomous unit in September 1991. It has its own optimal guidelines, policies and program approval is given by a separate Board comprising of FNCCI Executive Members, Representative from District Chambers of Commerce & Industry, Commodity Associations, Permanent Invitees from various related government agencies and donors. The mission of this Centre is to expand and strengthen market oriented private sector driven agro enterprises in order to increase the value and volume of high-value products old domestically and internationally.

**MEDEP:** The Micro-Enterprise Development Programme (MEDEP) started in 1998 is a multi donor funded poverty reduction initiative implemented by the Government of Nepal with the technical and financial support of UNDP. The programme helps to improve the livelihood of the poor and excluded communities by creating various income generating opportunities through skill development trainings and support to establish small business enterprises. Specifically in OSV sector, MEDEP has transfer the skill to micro-entrepreneurs and entrepreneurs are producing and marketing various vegetables.

**Table 9: FGDs conducted in market centres and production pockets**

Road Corridor	Market Centres	Production Pockets
Chhinchu-Jajarkot	<ul style="list-style-type: none"> <li>Chhinchu -7, Surkhet</li> <li>Sahare -8, Botechaur</li> <li>Deusthal -6, SalliBazar</li> <li>Khalanga-3</li> </ul>	<ul style="list-style-type: none"> <li>Chhinchu- 7, Jajarkote tole</li> <li>Khalanga -9, Khalanga Bazar</li> </ul>
Surkhet-Dailekh	<ul style="list-style-type: none"> <li>Gadi-2, Ratanangla</li> <li>Birendranagar - 6</li> <li>Seri - 9, Guranse</li> <li>Belpata -5, Chupra</li> <li>Dandaparajul - 7</li> <li>Upallo Dungeswor</li> </ul>	<ul style="list-style-type: none"> <li>Latikoili -3, Manikapur</li> <li>Seri - 9, Guranse</li> <li>Dandaparajul-7, Tharpu</li> <li>Belpata -3, Belpata</li> </ul>
Surkhet-Jumla	<ul style="list-style-type: none"> <li>Baddichaur,</li> <li>Tallo Dungeswor</li> <li>Rakam -1</li> <li>Jaksi</li> <li>Khidkijeula</li> <li>Chandannath -1</li> </ul>	<ul style="list-style-type: none"> <li>Kunathari- 4</li> <li>Rakam -1</li> <li>Jaksi</li> <li>Khidkijeula</li> </ul>

**Annex 10: List of places visited and people met**

SN	Name	Address	Designation
1	Ganga Bahadur Buda	Gadi-2, Ratanangla	Vegetable Trader
2	Man kumari Yogi	Gadi-2, Ratanangla	Vegetable Trader
3	Ishwor Deuja	Jarbut-8	Vegetable Trader/farmer
4	Janak Lal Rokaya	Jarbut-8	NEAT, staff
5	Ganga Buda	Gadi-2, Ratanangla	Vegetable Trader/farmer
6	Kamal Buda	Gadi-2, Ratanangla	Vegetable Trader
7	Durga Dhakal	Jarbut-8	Vegetable Trader/farmer
8	Dhanasara Dhakal	Jarbut-8	Vegetable Trader/farmer
9	Pushpa Dhakal	Jarbut-8	Vegetable Farmer
10	Kalam Singh buda	Gadi-2, Ratanangla	Vegetable Trader/farmer
11	Ganesh Parajuli	Belpata-2	Vegetable Trader/farmer
12	Khum Bahadur Thapa	Belpata-5	Vegetable Trader/farmer
13	Til Bahadur Oli	Belpata-5	Vegetable Trader/farmer
14	Nam Bahadur Thapamagar	Belpata-5	Vegetable

			Trader/farmer
15	Dipak Kumar Pantha	Kalvairabh-7	Vegetable Trader/farmer
16	Prem Bahadur Karki	Belpata-5	Vegetable Trader/farmer
17	Shyam Rana	Belpata-5	Vegetable Trader/farmer
18	Bishnu Rana	Belpata-5	Vegetable Trader/farmer
19	Mann Kumari Thapa	Belpta-5	Vegetable Trader/farmer
20	Bal Kumari Dangi	Belpata-5	Vegetable Trader/farmer
21	Surendra Shahi	Dandaparajul-7	Vegetable Trader
22	Nar Bahadur Shahi	Dandaparajul-7	Vegetable Trader
23	Tulsi Prasad Acharya	Dandaparajul-7	Vegetable Trader
24	Dipak Thapa	Dandaparajul-7	Vegetable Trader
25	Padam lal Bhatta	Dandaparajul-8	Vegetable Trader
26	Prem Bahadur Malla	Dandaparajul-7	Vegetable Trader/farmer
27	Gandha prasad Acharya	Dandaparajul-7	Vegetable Trader/farmer
28	Dammar Khatri	Belpata-3	Vegetable Farmer
29	Thir Bahadur Parajuli	Belpata-3	Vegetable Farmer
30	Ram Bahadur Parajuli	Belpata-3	Vegetable Farmer
31	Ganesh Khatri	Belpata-3	Vegetable Farmer
32	Chandra Prasad Sharma	Belpata-3	Vegetable Farmer
33	Ganesh Parajuli	Belpata-3	Vegetable Farmer
34	Yubaraj Timilsina	Belpata-4	Vegetable Farmer
35	Jung Bhadur Bika	Belpata-4	Vegetable Farmer
36	Dalli Bika	Belpata-5	Vegetable Farmer
37	Rupa Bika	Belpata-5	Vegetable Farmer
38	Jhalak Bahadur Rana	Belpata-6	Vegetable Farmer
39	Gopal Thapa	Belpata-6	Vegetable Farmer
40	Sabitri Acharya	Dandaparajul-7	Vegetable Farmer
41	Ram Bahadur Godar	Dandaparajul-7	Vegetable Farmer
42	Madan Aale	Dandaparajul-7	Vegetable Farmer
43	Prem Bahadur K.C.	Dandaparajul-7	Vegetable Farmer
44	Nanda Neupane	Dandaparajul-7	Vegetable Farmer
45	Deurupa Aryal	Dandaparajul-7	Vegetable Farmer
46	Harikala Aryal	Dandaparajul-7	Vegetable Farmer
47	Gita Aryal	Dandaparajul-7	Vegetable Farmer
48	Nanda kala Aryal	Dandaparajul-7	Vegetable Farmer
49	Ratna Aryal	Dandaparajul-7	Vegetable Farmer
50	Mayasara Bhatta	Dandaparajul-7	Vegetable Farmer
51	Jayasara Bika	Dandaparajul-7	Vegetable Farmer

52	Bir Bahadur Bika	Dandaparajul-7	Vegetable Farmer
53	Lakchhman Shrestha	CCI, Dailekh	Immediate Past Chairman
54	Ganesh Khadka	CCI, Dailekh	Vice chairman
55	Shilpa Kuwar	Link Helvetas, Dailekh	Link Helvetas staff
56	Sarita Thapa	LILI, Helvetas, Dailekh	LILI, Helvetas staff
57	Suryanath Yogi	DADO, Dailekh	Chief
58	Ghanashyam Karki	DADO, Dailekh	DADO staff
59	Khadak Karki	DADO, Dailekh	DADO staff
60	Phirtu Man Chaudhary	DADO, Dailekh	DADO staff
61	Bhuvan Malla	DADO, Dailekh	DADO staff
62	Krishna Prasad Pandey	Seri-9	Vegetable Trader
63	Pasupati Sharma	Seri-9	Vegetable Trader
64	Shyam lal Kandel	Seri-9	Vegetable Trader
65	Om Prakas Pokhrel	Seri-9	Vegetable Trader
67	Ram Prasad Kandel	Seri-9, Tallo Guranse	Vegetable Farmer
68	Balaram Acharya	Seri-9, Tallo Guranse	Vegetable Farmer
69	Pashupati Lamichhane	Seri-9, Tallo Guranse	Vegetable Farmer
70	Agnidhar Sharma	Seri-9, Tallo Guranse	Vegetable Farmer
71	Motikala Lamichhane	Seri-9, Tallo Guranse	Vegetable Farmer
72	Shyam Prasad Koirala	Seri-9, Tallo Guranse	Vegetable Farmer
73	Tikaram Lamichhane	Seri-9, Tallo Guranse	Vegetable Farmer
74	Tham Bahadur Khatri	Seri-9, Tallo Guranse	Vegetable Farmer
75	Som Acharya	Seri-9, Tallo Guranse	Vegetable Farmer
76	Bhim Prasad Sapkota	Seri-9, Tallo Guranse	Vegetable Farmer
77	Bhakti Prasad Lamichhane	Seri-9, Tallo Guranse	Vegetable Farmer
78	Prabal Shahi	Birendranagar-6, Hatiya, Surkhet	Vegetable Trader/Wholesaler
79	Manasara Adhikari	Birendranagar-6, Hatiya, Surkhet	Vegetable Wholesaler
80	Tara Shahi	Birendranagar-6, Hatiya, Surkhet	Vegetable Retailer
81	Sojhi Roy	Birendranagar-6, Hatiya, Surkhet	Vegetable Retailer
82	Ajhu Roy	Birendranagar-6, Hatiya, Surkhet	Vegetable Retailer
83	Dhaniram Sharma	Birendranagar-6, Hatiya, Surkhet	Vegetable Retailer
84	Dal Bahadur Adhikari	Birendranagar-6, Hatiya, Surkhet	Vegetable Retailer
85	Ram Prasad Gautam	DADO, Surkhet	Chief
86	Chitra Bhadur Rokaya	DADO, Surkhet	DADO staff
87	Yam lal Giri	DADO, Surkhet	DADO staff
88	Tara Gurung	DADO, Surkhet	DADO staff
89	Durga Datta Bartaula	DADO, Surkhet	DADO staff
90	Tej Bahadur Khanal	DADO, Surkhet	DADO staff

91	Laxmi Paudel	Latikoili -3, Manikapur, Surkhhet	Vegetable Farmer
92	Harka Bahadur Khatri	Latikoili -3, Manikapur	Vegetable Farmer
93	Nawal Singh Buda	Latikoili -3, Manikapur	Vegetable Farmer
94	Kul Narayan Bhatti	Latikoili -3, Manikapur	Vegetable Farmer
99	Sher Bahadur Khatri	Latikoili -3, Manikapur	Vegetable Farmer
97	Ratna Bahadur B.C.	Latikoili -3, Manikapur	Vegetable Farmer
98	Amrit B.C.	Latikoili -3, Manikapur	Vegetable Farmer
100	Basanta Upadhyay	Latikoili -3, Manikapur	Vegetable Farmer
101	Fulmati Chaudhari	Latikoili -3, Manikapur	Vegetable Farmer
102	Tek Bahadur B.C.	Latikoili -3, Manikapur	Vegetable Farmer
103	Ratna Regmi	Latikoili -3, Manikapur	Vegetable Farmer
104	Dil Bahadur Pakhurel	Latikoili -3, Manikapur	Vegetable Farmer
105	Jaya Lal Puri	Latikoili -3, Manikapur	Vegetable Farmer
106	Ganesh Thapa	Latikoili -3, Manikapur	Vegetable Farmer
107	Dal Bahadur Khadka	Latikoili -4, Manikapur	Vegetable Farmer
108	Prem Bahadur Rana	Khalanga-3, Jajarkot	Vegetable Wholesaler
109	Kamala Shahi	Gairekhali-2	Vegetable Retailer
110	Sangita Pariyar	Tallo thati	Vegetable Retailer
111	Prem Bahadur Shahi	Tallo thati	Vegetable Retailer
112	Dipak Shahi	Gairekhali-2	Vegetable Retailer
113	Sabitri Rana	Gairekhali-2	Vegetable Retailer
114	Hasta Bahadur Shahi	Khalanga-3	Vegetable Retailer
115	Bhadra Bahadur Batala	Khalanga-9	Vegetable Farmer
116	Dal Bahadur Batala	Khalanga-9	Vegetable Farmer
117	Him Bahadur Oli	Khalanga-9	Vegetable Farmer
118	Dharma Bahadur Khatri	Khalanga-9	Vegetable Farmer
119	Kushal Pariyar	Khalanga-9	Vegetable Farmer
120	Mishri Bika	Khalanga-6	Vegetable Farmer
121	Krishna Bahadur Katri	Khalanga-9	Vegetable Farmer
122	Baljit Khatri	Khalanga-3	Vegetable Farmer
123	Dhan Bahadur Khatri	Khalanga-9	Vegetable Farmer
124	Mann Bahadur Oli	Khalanga-8	Vegetable Farmer
125	Tilak K.C.	DADO, Jajarkot	DADO staff
126	Nabin Gairhe	DADO, Jajarkot	DADO staff
127	Resham Bashnet	DADO, Jajarkot	DADO staff
128	Ram Krishna Chaudhari	DADO, Jajarkot	DADO staff
129	Deviram Belbase	DADO, Jajarkot	DADO staff
130	Top Bahadur Shahi	DADO, Jajarkot	DADO staff
131	Bhim Bahadur Nepali	DADO, Jajarkot	DADO staff
132	Mann Bahadur Batala	DADO, Jajarkot	DADO staff
133	Bhadra Bahadur Shahi	DADO, Jajarkot	DADO staff
134	Prithivi Shakya	DADO, Jajarkot	DADO staff
135	Deepak Gharti Magar	DADO, Jajarkot	DADO staff
136	Parvin Giri	NEAT, Jajarkot	District Manager

137	Shiva Prasad Poudel	NEAT, Jajarkot	Field Supervisor
138	Dilli Bd. Khadka	NEAT, Jajarkot	Technician
139	Kamala Sunuwar	NEAT, Jajarkot	Technician
140	Bhim Bahadur Khatri	NEAT, Jajarkot	Technician
141	Nirmala Kathayat	Deusthal-6, Sallibazar, Salyan	Vegetable Trader
142	Nirmala Poudel	Deusthal-6	Vegetable Trader
143	Pradip Shah	Deusthal-6	Vegetable Trader
144	Ganjaman Budha	Deusthal-6	Vegetable Trader
145	Man Bahadur Bashnet	Deusthal-6	Vegetable Trader/farmer
146	Ghan Bahadur B.C.	Deusthal-2	Vegetable Trader
147	Khushmi Budha	Deusthal-2	Vegetable Retailer
148	Saradha Sunwar	Deusthal-5	Vegetable Retailer
149	Bijaya Nepali	Ghajari-6	Vegetable Retailer
150	Tonga Bahadur B.C.	Ghajari-6	Vegetable Retailer
151	Gausari Shah	Majkanda-7	Vegetable Retailer
152	Raman Budha	Devsthal-6	Vegetable Retailer
153	Sher Bahadur Bika	Botechaur, Surkhet	Vegetable Trader
154	Pahalman Gharti	Botechaur, Surkhet	Vegetable Trader
155	Lilaram Dangi	Botechaur, Surkhet	Vegetable Trader
156	Bhawani Prasad Sharma	Chhinchu-7, Surkhet	Vegetable Trader
157	Bhim Bahadur Poudel	Chhinchu-7, Surkhet	Vegetable Trader
158	Durga Thapa	Chhinchu-7, Surkhet	Vegetable Trader
159	Bijay Poudel	Chhinchu-7, Surkhet	Vegetable Trader
160	Deu Prasad Bashnet	Chhinchu-7, Jajarkote-tole, Surkhet	Vegetable Farmer
161	Kala Bashnet	Chhinchu-7, Jajarkote-tole, Surkhet	Vegetable Farmer
162	Goma Khatri	Chhinchu-7, Jajarkote-tole, Surkhet	Vegetable Farmer
163	Til Bahadur Bashnet	Chhinchu-7, Jajarkote-tole, Surkhet	Vegetable Farmer
164	Megh Bahadur Bashnet	Chhinchu-7, Jajarkote-tole, Surkhet	Vegetable Farmer
165	Binod Kathayat	Chhinchu-7, Jajarkote-tole, Surkhet	Vegetable Farmer
167	Tirtha Bashnet	Chhinchu-7, Jajarkote-tole, Surkhet	Vegetable Farmer
168	Sari Bika	Chhinchu-7, Jajarkote-tole, Surkhet	Vegetable Farmer
169	Harisr Bashnet	Chhinchu-7, Jajarkote-tole, Surkhet	Vegetable Farmer
170	Durga Bohora	Chhinchu-7, Jajarkote-tole, Surkhet	Vegetable Farmer
171	Manasara Bashnet	Chhinchu-7, Jajarkote-tole, Surkhet	Vegetable Farmer

		Surkhet	
172	Mandhari Bashnet	Chhinchu-7, Jajarkote-tole, Surkhet	Vegetable Farmer
173	Balak Ram Devkota	DADO, Jumla	DADO staff
174	Bishnu Bahadur Mahat	DADO, Jumla	DADO staff
175	Singha Kathayat	DADO, Jumla	DADO staff
176	Ram Bhagat Mahato	DADO, Jumla	DADO staff
177	Kamal Mahat	DADO, Jumla	DADO staff
178	Bhim Prasad Pandey	JAPEC, Jumla	Manager
179	Ramlal Acharya	Manma-6, Kalikot	Vegetable Farmer
180	Rupa Acharya	Manma-6	Vegetable Farmer
181	Rishi Acharya	Manma-6	Vegetable Farmer
182	Devilal Pandey	Manma-7	Vegetable Farmer
183	Padam Bika	Manma-7	Vegetable Farmer
184	Danta Bika	Manma-7	Vegetable Farmer
185	Tara Giri	Badalkot-1	Vegetable Farmer
186	Biru Bharati	Badalkot-1	Vegetable Farmer
187	Ganesh Bhattari	Badalkot-1	Vegetable Farmer
189	Dhana Devkota	Manma-5	Vegetable Farmer
190	Aana Pandey	Manma-5	Vegetable Farmer
191	Mana Sara Pandey	Manma-5	Vegetable Farmer
192	Tikaram Yogi	Singhasen -9, Dailekh	Vegetable Farmer
193	Motiram Puri	Singhasen -9	Vegetable Farmer
194	Gorakh Bika	Bharta-6	Vegetable Farmer
195	Lal Bahadur Raut	Rakam-9	Vegetable Farmer
196	Datta Bahadur Raut	Bharta-6	Vegetable Farmer
197	Dhanarup Thapa	Singhasen -9	Vegetable Farmer
198	Birkha Bahadur Bahnet	Pipalkot-3	Vegetable Farmer
199	Dil Bahadur Shahi	Singhasen -9	Vegetable Farmer
200	Arjun Kumar Jaisi	pipalkot-4	Vegetable Farmer
201	Ram Bahadur Thapa	Pipalkot-4	Vegetable Farmer
202	Bishnu Puri	Singhasen -9	Vegetable Farmer
203	Jhuma Majhi	Rakam-1	Vegetable Farmer
204	Dhupi Majhi	Rakam-1	Vegetable Farmer
205	Naurata Majhi	Rakam-1	Vegetable Farmer
206	Laxmi Majhi	Rakam-1	Vegetable Farmer
207	Chndra Sijapati	Rakam-1	Vegetable Farmer
208	Parbati Majhi	Rakam-1	Vegetable Farmer
209	Gopi Shahi	Rakam-4	Vegetable Trader /retailer
210	Nar Bahadur Bika	Rakam-4	Vegetable Trader/Retailer
211	Dhan Bahadur Sunwar	Rakam-4	Vegetable Trader/Retailer
212	Janak Sijapati	Rakam-4	Vegetable Trader

213	Dhirendra Kumar Sijapati	Rakam-4	Vegetable Trader
214	Kaluwa Bika	Rakam-4	Vegetable Trader
215	Lila Ram Majhi	Rakam-5	Vegetable Trader
216	Harilal Kandel	Kunathari -3, Surkhet	Vegetable Farmer
218	Lok Bahadur Thapa	Kunathari -3	Vegetable Farmer
219	Khadka Bahadur Sharma	Kunathari -4	Vegetable Farmer
220	Amar Bahadur Darlami	Kunathari -4	Vegetable Farmer
221	Dal Bahadur Kandel	Kunathari -4	Vegetable Farmer
222	Yagya Prasad Koirala	Kunathari -4	Vegetable Farmer
223	Khadka Bahadur Gautam	Kunathari -8	Vegetable Farmer
224	Kabita Kandel	Kunathari-4	Vegetable Farmer
225	Chandra Bahadur Sijapati	Kunathari-4	Vegetable Farmer
226	Parshu Ram Kandel	Kunathari-4, Baddichaur, Surkhet	Vegetable Trader
227	Chandra Bahadur Sijapati	Kunathari-4, Baddichaur, Surkhet	Vegetable Trader
228	Dhiraj Mahatara	Kunathari-4, Baddichaur, Surkhet	Vegetable Trader
229	Chandramani Kandel	Kunathari-4, Baddichaur, Surkhet	Vegetable Trader
230	Parag Prasad Chaudhari	Kunathari-4, Baddichaur, Surkhet	Vegetable Trader
231	Khushi Ram Chaudhari	Kunathari-4, Baddichaur, Surkhet	Vegetable Trader
232	Mitra Raj Pyakurel	CCI, Surkhet	Officer
233	Sital Kumar Barnawal	Hat bazarline, Butwal-7	Vegetable W/s
234	Shiva, Ramu	Hat bazarline, Butwal-7	Vegetable retailer
235	Nasib Ahamad	Hat bazarline, Butwal-7	Vegetable W/S
236	Gautam Agrahari	Hat bazarline, Butwal-7;	Vegetable W/S
37	Murali Agrahari	Hat bazar, shopping complex Butwal-7	Vegetable w/s
238	Shakir Ali	Hat bazarline, Butwal-7	Veg. w/s and commission agent
239	Babu Kawadiya	Rani Talau Sabji Mandi, Nepalganj	VegetableW/S
240	Rijwan Rai	Rani Talu Sabji Mandi, Nepalganj	VegetableW/S
241	Md. Aamkra	Aakram Tarkari Pasal, Nepalganj	Vegetable retailer
242	Abdul Hamid	Ramjanaki Sabji Mandi, Dhangadi	Vegetable W/S
243	Omkar Gupta	Ramjanaki Sabji Mandi, Dhangadi	Vegetable W/S
244	Chandu Chaudhari	Ramjanaki Sabji Mandi, Dhangadi	Vegetable retailer
245	Faruk Ansari	Ramjanaki Sabji Mandi,	Vegetable W/S

		Dhangadi	
246	Mohan Sharma	CCI, Dhangadi	General Secretary

### **Annex 11: Study team**

Dr. Bhishma P. Subedi - Executive Director of ANSAB - has provided necessary guidance to study team where Mr. Puspa Lal Ghimire, Program Manager, ANSAB has played a role of Deputy Team Leader for this study and coordinated all study activities. Specifically, the study on *Offseason Vegetables* was conducted under the leadership of Dr. Dhruba Raj Bhattarai and was assisted by Mr. Santosh Upadhya, Research Assistant. Several local enumerators and Local Resource Persons were mobilized for to conduct household questionnaire survey. Mr. Ritu Panta, Data Analyst/Statistician, looked over the data compilation and report preparation. He was also actively involved throughout the questionnaires and checklist preparation and provided guidance for field data collection. Dr. Durga Devkota, Gender and Social Inclusion Expert, contributed to the designing of the study, ensuring disaggregate data regarding gender and social inclusion is generated and compiled. She also trained and mobilized the teams to make the study inclusive and with a greater reflection on gender equity and social inclusion issues of the region. Mr. Sudarshan Khanal, Program Planning and Communications Specialist, Mr. Prakash Katwal Sr. Program Officer and Mr. Kabir Ratna Sthapit, Program Officer of ANSAB provided contribution in reviewing and editing the study document.