Government of Nepal
Ministry of Agricultural Development

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

IFAD

A Report on

VALUE CHAIN ANALYSIS OF TURMERIC

December 2011

Project Management Unit (PMU)
Birendranagar, Surkhet, Nepal
Phone: + 977 83 520038
Fax: + 977 83 525403
Email: info@hvap.gov.np
Website: www.hvap.gov.np

Implementing Partners

SNV

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGEMENT

This study was accomplished with the help and support of several organisations, institutions, and individuals, which are rather difficult to cover in rendering them with full acknowledgement compared to what they have contributed in the study process. We would like to thank all who directly or indirectly helped in executing field study, supported the study process, and took strong participation in the workshop, interactions and discussion.

We would like to especially thank Mr Rajendra Bhari, Project Manager, HVAP, Surkhet and his entire team members for providing cordial support in designing the study method, field study and for their active participation in district, regional and national level validation workshops. Without their critical help and support the findings wouldn't come to this shape. Likewise, help and support from HVAP team including Mr Eelco Baan, Mr Sanjeev Shrestha, Mr Madan Rauniyar and Mr Keshav Karki, is praiseworthy – thank you very much for your genuine support, help and facilitation of the total study process.

The study team is highly grateful to all the participant farmers, entrepreneurs /traders /processors, and staff from DADO, DCCI (from all the project district offices) and various organisations for their active support and help in providing useful information, sharing facts and figures and for their cordial company during the study. Help from field level staff, enumerators and those directly or indirectly involved in the study are duly acknowledged.

Thank you all,

Study Team

ABBREVIATIONS

AEC	Agro Enterprise Centre
AEO	Agriculture Extension Office
AICC	Agriculture Information and Communication Centre
ANSAB	Asia Network for Sustainable Agriculture and Bioresources
APMDD	Agribusiness Promotion and Marketing Development Directorate
APMC	Agriculture Produce Market Centre
ASTA	American Spice Trade Association
BDS	Business Development Services
BIS	Bureau of Indian Standards
BMOs	Business Membership Organisations
CC	Collection Centre
CAA	Commercial Agriculture Alliance
DADO	District Agriculture Development Office
DAG	Disadvantaged Group
DDC	District Development Committee
DOA	Department of Agriculture
DCCI	District Chamber of Commerce and Industry
DFTQC	Department of Food Technology and Quality Control
EU	European Union
ESA	European Spice Association
FNCCI	Federation of Nepalese Chambers of Commerce and Industry
FMCG	Fast Moving Consumer Goods
FAO	Food and Agriculture Organization of the United Nations
FAOSTAT	FAO Statistics
FGD	Focus Group Discussion
GAPs	Good Agricultural Practices
GMPs	Good Manufacturing Practices
GMO	Genetically Modified Organism
GRP	Ginger Research Program
GDP	Gross Domestic Product
GOs	Governmental Organisations
Ha	Hectare
HVAP	High Value Agriculture Project in Hill and Mountain Areas
HH	Household
IFAD	International Fund for Agricultural Development
IDRC	International Development Research Centre
IFOAM	International Federation of Organic Agriculture Movement
ITC	International Trade Centre
ISO	International Standards Organization
INGO	International Non-governmental Organisation
JABAN	Jadibuti Association of Nepal
JAS	Japanese Agriculture Standards
LRP	Local Resource Person
LNGO	Local Non-government Organisation
MoAD	Ministry of Agricultural Development
MT	Metric Tons
MIS	Marketing Information System
MEDEP	Micro-Enterprise Development Programme

MFIs	Micro-Finance Institutions
msl	Meters above sea level
NARC	Nepal Agricultural Research Council
NSCDP	National Spice Crop Development Program
NPR	Nepalese Rupees
NARDEF	Nepal Agriculture Research and Development Fund
NGO	Non-governmental Organisation
NTIS	Nepal Trade Integration Strategy
NTFP	Non Timber Forest Products
OCN	Organic Certification Nepal
PPP	Public Private Partnership
PPD	Plant Protection Directorate
SNV	SNV Netherlands Development Organisation
SPSS	Statistical Package for Social Sciences
TEPC	Trade and Export Promotion Centre
US	The United States
VDD	Vegetable Development Directorate
VC	Value Chain
VDC	Village Development Committee

EXECUTIVE SUMMARY

Turmeric is an essential spice for the Nepalese households and is listed as one of the top five major spice crops in Nepal. This report analyses the turmeric value chain and is prepared by Asia Network for Sustainable Agriculture and Bioresources (ANSAB) commissioned by High Value Agriculture Project in Hill and Mountain Areas (HVAP) in order to design its activities for the value chain promotion. The study is focused in HVAP districts along the three road corridors - Chhinchu-Jajarkot, Surkhet-Dailekh and Surkhet-Jumla - and suggests possible interventions to the project. Findings of this study are validated through sharing meetings and interactions with stakeholders at district, regional and national levels.

Turmeric can be regarded as a good cash crop for the hilly regions as it requires less water and less capital investment for its production, grows with comparatively less use of fertiliser, adoption of simple technology and has low pest/disease infestation. The total national production of turmeric in 2010/11 was 35,295 MT and was cultivated in 4,080 hectares. The production of turmeric over past some years show the increasing trend both in terms of volume and area cultivated. Major portion of the production has gone for the domestic consumption with only a recorded volume of 104 MT of export in 2009/10, mostly to India. HVAP districts account for about 10% of the national production having major share of Salyan, Achham, Surkhet and Dailekh districts. Turmeric production is unaccounted in four districts – Jumla, Mugu, Dolpa and Humla. The cost of production of fresh turmeric is calculated to be NPR 18.2/kg with labour and seed occupying the major share of 33% and 31% of the total costs respectively. About 30% of the total production of turmeric in the project districts is sold in local markets, mostly in dried form. The two types of the dried forms mostly found in the markets are - i) the sliced and dried known as *chana* and ii) the boiled and dried known as *giti*. The demand of *giti* is high in the regional markets and its cost of production is around NPR 106/ kg at farmers' level. Usually the farmers are involved in producing dried turmeric although there are some cases reported where the traders purchase turmeric in fresh forms.

The estimated total transaction of dried turmeric in the three road corridors is 247 MT. Among the three road corridors, Chhinchu-Jajarkot has the largest production and transaction of turmeric with a calculated transaction volume of around 223 MT. The major turmeric market centres of this road corridor are Chhinchu, Ramghat, Botechaur, Gairibazaar and Baluwa Sangrahi. The other two corridors: Surkhet-Jumla and Surkhet-Dailekh are comparatively new in terms of regional trading and account about 9% and 1% respectively of the total transactions in the three corridors. Birendranagar and Nepalgunj are the major regional markets for turmeric from the project districts. The market price of the turmeric is not stable in the project area; in 2010/11, the price was varied from NPR 100 to 300 with an average of NPR 200 per Kg. But in first quarter of 2012, the price for local dried turmeric was NPR 110 to140 per Kg.

Farmers process and make turmeric powder by themselves in their houses or avail the service of local water mills and small processers. The commercial processing of the powder is done by both the medium and big processors in the project area, which are mainly located in Birendranagar and in surrounding areas such as Botechaur. These processors supply their products to all of the three road-corridors and especially in Karnali Highway. Powder from other regional markets such as Birgunj, Nepalgunj, Butwal and Biratnagar are also found in significant volume in the project area.

Turmeric from Nepal possesses limitation to be exported to India. The neighbouring country India is the largest producer and exporter of turmeric with world's export share of more than 70% in 2010. In 2009/10 Nepal imported 615 tons of turmeric, mostly from India, and the import is in increasing trend. Because of the highly competitive Indian market, both in terms of price and quality (e.g. good finish, high *curcumin* content), Nepal has less competitive and comparative advantages to export turmeric to India.

This study has assessed the specific constraints and opportunities in the turmeric value chain that can be addressed through HVAP interventions thereby increasing production, income and employment in the project area. The major constraints as identified by the study are: low volume of production, low access to market and market information, lack of information and availability of seeds, dispersed production, lack of knowledge on proper cultivation and post-harvest handling, low number of processing mills and lack of proper processing technologies, lack of access to finance, problem of storage and transportation, lack of turmeric specific farmers' groups and no specific programmes on turmeric.

The prioritised areas of short term interventions in production and processing sector are: piloting high yielding varieties; development of seed production pockets; development of turmeric specific farmers' groups, supporting farmers on production and post-harvest handling methods, introduction of improved and efficient processing technology and support for establishment of processing mills and upgrading of existing processors. Similarly, interventions suggested in marketing are strengthening the institutional capacity of DCCI of the project districts, facilitate for contract arrangements and training on business planning and enterprise development. Facilitation to produce improved seeds, initiation of work towards GAPs and GMPs, and supporting in establishment of infrastructures are some long-term interventions suggested.

CHAPTER ONE
INTRODUCTION

1.1. BACKGROUND

In a joint initiation of the Government of Nepal/Ministry of Agricultural Development (MoAD) and the International Fund for Agricultural Development (IFAD), a six-year High Value Agriculture Project in Hill and Mountain Areas (HVAP) is being implemented since July 2010 in partnership with SNV Netherlands Development Organisation and Agro Enterprise Centre (AEC/FNCCI) for the reduction of poverty and vulnerability of women and men in Mid-Western Development Region. The project covers ten districts: Achham, Dailekh, Jajarkot, Jumla, Kalikot, Salyan, Surkhet, Dolpa, Mugu and Humla of Far-Western and Mid-Western Development Regions served by three north-south roads: Chhinchu-Jajarkot, Surkhet-Dailekh and Surkhet-Jumla. The project follows Inclusive Business and Value Chain Development approaches in the geographic boundaries demarcated by accessibility to roads. To support in designing the project's activities, Asia Network for Sustainable Agriculture and Bio-resources (ANSAB) was commissioned to conduct value chain analysis of four different products – turmeric, timur, goat meat and off -season vegetables – in the project area.

ANSAB is an independent, non-profit, civil society organisation 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 the four value chain[1] studies carried out by ANSAB from November 2011 to June 2012. This study analyses the status and potential of turmeric value chain in the project districts.

1.2. OBJECTIVES

The main objective of this assignment is to provide sufficient understanding on the current status and future potential of the turmeric value chain and to identify specific bottlenecks and opportunities that can be addressed through the project interventions, thereby increasing production, income and employment of rural poor. The specific objectives are as follows:

- Prepare value chain map that depicts the chain actors and their functions and inter-relationship.
- Identify major production pockets, growth potential, market trends and competitiveness of the selected value chain (supply and demand) including its future prospects within the country and abroad.
- Identify and examine constraints and opportunities within the selected 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.

[1] Goat meat, turmeric, off-season vegetables and timur

- Identify the underlying policy, institutional, and infrastructural issues that affect the competitiveness of the selected value chain with reference to the role of government and private sectors in the regions of focus.
- Identify institutions and organisations working for selected value chain from national to local levels (local, regional, national organisations from government, non-government and private sectors) 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 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 sites include Achham, Dailekh, Jajarkot, Kalikot, Salyan and Surkhet districts in the following three north-south road corridors: Chhinchu-Jajarkot, Surkhet-Dailekh and Surkhet-Jumla (see Fig 1).

Figure 1 Map showing the study area

Source: HVAP, 2011

The study team visited 34 market centres and production pockets along the major three road corridors within the project districts. The details of market centres and production pockets visited and places of FGD conducted are presented in Annex 2.

1.3.2. DATA COLLECTION AND ANALYSIS

The study has applied both qualitative and quantitative research methods for obtaining information on turmeric. Both primary and secondary sources were used for the collection of data for this purpose.

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

Preparatory Activities: Initially, review of literatures 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 travel plan were finalised in consultation with HVAP team.

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

A dedicated team (See Annex 1) for turmeric study having designated value chain expert, research assistant and enumerators was mobilised 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 (See Annex 2 for details). Meetings were conducted with DADO, DDC, DCCI and other relevant supporting organisations 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 participating commercial farmers, traders, processors, input suppliers, representative from Regional Agriculture Directorate, DCCI, DADOs and facilitating organisations. 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 and focus group discussions with traders, processors, and exporters for getting insights of regional trade. Visit to JABAN, custom offices, quarantine offices, Trade and Export Promotion Centre, Vegetable Development Directorate, National Spice Crop Development Board, Department of Plant Resources, Department of Agriculture, and relevant organisations were conducted for interactions and secondary data collections.

A two-day "Regional Value Chain Consultation and Intervention Strategy Development Workshop" was conducted in 15-16 February 2012 in Nepalgunj to share and validate the collected information. 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 which focused more on policy issues was conducted in Kathmandu with the related stakeholders including representatives from ministry. Verified issues were finally standardised based on inputs.

Data Analysis and Report Preparation: The collected data were analysed systematically in order to obtain the objectives of the study. A detailed value chain map of the turmeric subsector in the study areas was prepared with estimated volume of market transactions. Economic analysis was done to present the situation of production and value addition of the turmeric including cost of production and distribution of margin along the chain. Market trends and competitiveness analysis was conducted to provide details on end markets, supporting markets, enabling environment and inter-firm cooperation between VC actors. Similarly, analysis of governance structure was done to present the status of power

relationship and trust in the value chain along with gender issues and inclusiveness. The constraints were analysed through initial understanding of opportunities and identification of the factors that prevent in reaping the opportunities. Market based solutions have been suggested to address the constraints. The analysis of market-based solutions was done which provided with the list of possible areas of project interventions. The suggested interventions were then prioritised in short term and long term and presented.

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

CHAPTER TWO

VALUE CHAIN ANALYSIS

2.1. INTRODUCTION TO VALUE CHAIN

Turmeric (*Curcuma longa L.*) is one of the 25 spice crops used for culinary and seasoning of foods in Nepal (GRP, 2009). It has also been listed as one of the top five major spices in the country (NSCDP, 2010). In Nepal, turmeric has been used for the daily household purposes for spice and medicinal use from the time immemorial. With increased awareness on the benefits of the turmeric among the users and its use in a number of processed products, the demand of turmeric is increasing both at domestic and international markets.

Turmeric can be regarded as a good cash crop for tropical hilly regions of Nepal as its production requires less water, low technology, less capital investment, and it can be grown with comparatively less fertiliser use and low pest/disease infestation. The sloppy topography of hilly region and the nature of soil are optimal for turmeric cultivation as it allows no accumulation of water. From environmental perspective, turmeric cultivation in the sloppy land can be beneficial as it prevents soil erosion. Also, since the cultivation mostly involves the use of organic manure and mulching, it helps to retain the soil fertility. Usually, turmeric is grown in those lands where other horticulture crops and grains do not grow properly.

Regarding the production of turmeric in the project areas, it has greater scope of expansion in terms of area and production as the current production is mostly for domestic consumption. The production area can also be extended by the poor having marginal land, which will be beneficial for them in terms of earning extra income from the sales of the crop. The processing requirement for turmeric is simple and can be done even within farm with use of simple machinery equipment.

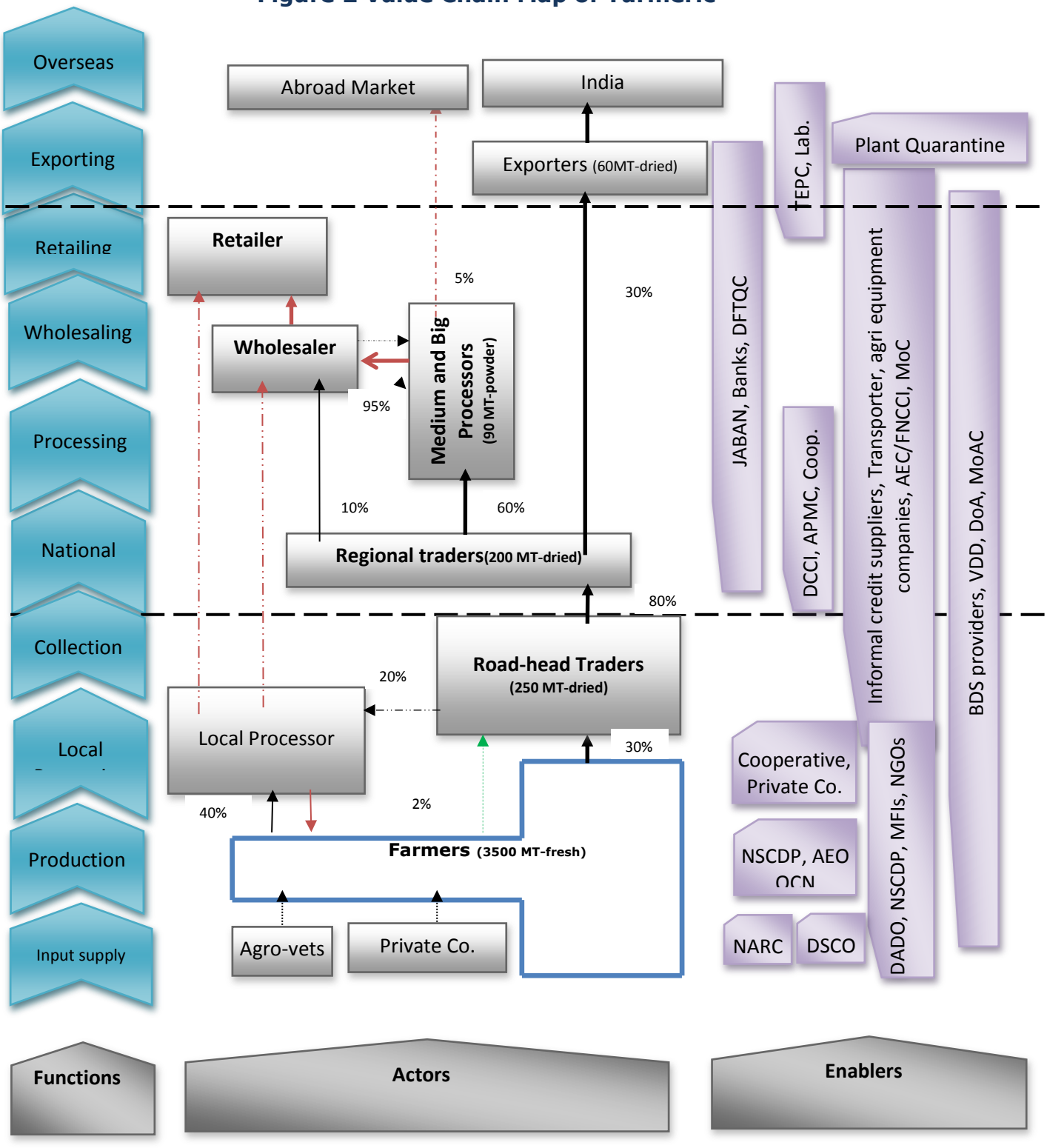
Turmeric has also import substitution potential as the country is importing various turmeric products mainly powder. Similarly, it was observed during the field study that the local turmeric products have higher preference over the imported ones due to the good quality of the local produce.

Overall, turmeric can be one of the best value chains to work on, which can provide substantial benefits to its actors as well as to the local and national economy.

2.2. VALUE CHAIN MAP

Figure 2 illustrates the value chain map of turmeric in the Mid-Western Development Region of Nepal. The map presents the various functions, actors and enablers of the value chain and their descriptions are made in subsequent paragraphs. The tentative flow of product and transactions volume of various actors is also placed in the map based on the information received from the study.

Figure 2 Value Chain Map of Turmeric[2]



Legends

Dried | Fresh | Processed

Source: ANSAB Field Survey, 2011

[2] Indicative quantity are calculated based on interaction with stakeholders

2.2.1. Functions

The major functions involved in the turmeric value chain are input supply, production, collection, processing, trading and exporting. The major inputs in turmeric are seed, organic manure and mulch. Commercial farmers produce turmeric for sales purpose. Processing is done at local level as well as in market centres. At household level, farmers conduct cleaning, boiling/slicing and drying in order to make dried turmeric. Some farmers process powder with use of traditional equipment. In places where water mills and electric mills are available, processing into powder is done by use of these mills. Big scale commercial processing is usually done in major market centres, most of them located in and around Birendranagar. Trading usually consists of collection, local trading and regional or national trading. The product reaches the domestic consumers through wholesalers and retailers. Some traders and processors are involved in exporting the product.

2.2.2. Actors

Input suppliers: Farmers are the main input suppliers since they use their own seeds, manure and labour during cultivation. Manure is prepared at field whereas mulch is collected from their surroundings or the nearest forest. The collection time of mulch varies depending upon the availability. Farmers usually contact the nearest agro-vets for the supply of agriculture equipment and pesticides, however, the use of these inputs is very rare and in low volume in the project areas. There are government's Agriculture Extension Offices/DADOs for looking over the technical issues and provide trainings to farmers, however, the implementation aspect is very weak and in case of turmeric, the support towards production is negligible. The Ginger Research Programme (GRP) of Nepal Agriculture Research Council (NARC) has initiated to conduct some research on varietal trial of turmeric but is yet to release and recommend any variety.

Farmers: Farmers can be broadly categorised into two types based on the production volume of turmeric: i) non-commercial farmers cultivating only to fulfil domestic requirements and ii) commercial farmers cultivating the produce for selling in market.

Non-commercial farmers are common in the project areas. Usually, these farmers cultivate turmeric in marginal lands which are unsuitable for other crops or produce in small patch land that is sufficient for their domestic supply throughout the year. Most of the farmers in Surkhet-Jumla and Surkhet-Dailekh road corridors fall under this category. However, with increase in commercialisation of turmeric, few farmers, mainly from production pocket near Birendranagar such as Kunathari are interested to go for commercial production. In Chhinchu-Jajarkot road corridor, the numbers of non-commercial farmers increase as we move up from Salli Bazaar to Jajarkot Khalanga.

Commercial farmers are mostly concentrated in production pockets nearby Birendranagar, Chhinchu and Botechaur market centres. They are mostly located in the Chhinchu-Jajarkot road corridor such as Lekhparajul, Sahare, Mehalkuna, Ramghat, Dashrathpur, Malarani, Dharapani, Majhkanda. Kunathari, Babiyachaur, Guthu, Lekhgaun are some example VDCs with commercial farming in other places. The area of turmeric cultivation varies from 0.5 Ropani to 11 Ropani per farmer. The commercial farmers usually supply dried turmeric to the road-head traders or to processors.

Local Processors: Turmeric is mostly sold in dried or powdered form. There are only some cases, e.g., Botechaur market, where the fresh turmeric is traded. Therefore, farmers are involved in local processing of fresh turmeric into dried form. This mainly involves cleaning, grading, boiling and or slicing and drying in open sunlight.

For the powder processing at local level, farmers usually use the service of nearby water mills or electric mills. The water mills are usually community owned, whereas, most of the electric mills are operated in private ownership. Those who do not have access to these mills usually process the powder at their own home by use of local hammering equipment called *dhiki* and *janto*. The powder processed at this level are mostly for domestic consumption and some sell surplus quantity to the local markets.

Road-head Traders: Road-head traders are usually located in the end point of motorable road. They usually have their own retailing and wholesaling business of various goods including turmeric. The villagers usually are in close contact with these traders and in most of the cases rely for supply of daily goods and credit purchase. The road-head traders operate as collection centres for various produce including turmeric of the surrounding villages and either supply to regional traders or to local processors. Some of the road-head traders act as regional traders themselves by supplying to bigger market centres, especially Birendranagar, Nepalgunj and Kathmandu. Some supply to local as well as bigger processors also. Approximately 50 MT dried turmeric is supplied to local processors. In most of the cases the road-head traders only purchase dried turmeric but some traders in Botechaur, Baluwa Sangrahi and Chhinchu of Chhinchu-Jajarkot road corridor also purchase fresh turmeric and process themselves prior to selling to Nepalgunj traders or big processors.

Regional Traders: Regional traders represent those traders collecting the produce from the road-head traders, hold to a good quantity and sell to exporters and processors in regional market centres mainly Nepalgunj and Birendranagar. There are approximately 20-25 regional traders who are mainly concentrated in Chhinchu, Botechaur, Ramghat, Gairi Bazaar and Baluwa Sangrahi market centres. Mostly, the turmeric is supplied to processing companies in Birendranagar, whereas, it is supplied to national traders/exporters in Nepalgunj who in turn supply to other regional markets like Kathmandu, Dhangadi etc. and export to India.

Medium and Big Processors: These processors are located in regional market centres namely Birendranagar, Nepalgunj and Kathmandu. Most of them have bigger processing capacity with grinder, pulverising mill and packaging machines. There are approximately three big processors, such as Bhattarai Spices Production and Packaging Factory, and Malika Masala Factory in Birendranagar who supply to the buyers in Karnali highway. The average transaction of these processors is 100-200 quintals of powder per year. Similarly, three medium processors are located in Botechaur and Gaire Bazaar with pulverising mill but without packaging machines. Similarly, there are several medium and big turmeric processors located in various other regional markets such as Nepalgunj and Kathmandu.

Distributor/Wholesalers: Distributor/Wholesalers are usually located in market centres that supply turmeric powder mostly to the retailers. They get the powder from both the local and regional processors. Some wholesalers also purchase dried *giti or chana* from the regional traders and sell it to the processors or the retailers.

Retailers: These are the shops operated at local level and deal with the food and spice items. They acquire goods from the wholesalers and sell them to the consumers. Almost all the transaction of turmeric by the retailers is in powder form.

Exporters: Exporters are located in Nepalgunj and Kathmandu who purchase dried turmeric (mostly *giti*) from the suppliers. The exporters of Nepalgunj supply to India whereas the exporters of Kathmandu supply to abroad countries and are usually

themselves processors. Organic turmeric products are also exported to abroad countries, e.g., by Annapurna Organic Industry.

2.2.3. Enablers and Facilitators

In a value chain, the enabler includes all chain-specific actors providing regular support services or representing common interest of the value chain actors. For example, 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

At the farmers' level, District Agriculture Development Office (DADO), Nepal Agriculture Research Council (NARC) and National Spice Crop Development Program (NSCDP) under Vegetable Development Directorate (VDD) are working to develop and disseminate different technologies in turmeric farming and processing. Microfinance institutions and cooperatives assist farmers by providing loan during the plantation time. MEDEP has provided some technical and financial assistance (such as providing grant for purchase of machineries) for local processing of turmeric. Some local NGOs such as Women Empowerment Forum in Dailekh are also involved in facilitating turmeric production and marketing.

Enablers in Trading and Export Functions

At traders' level, Business Membership Organisations (BMOs) like Jadibuti Association of Nepal (JABAN), District Chamber of Commerce and Industries (DCCI) are supporting for business success. Agro Enterprise Centre (AEC) is working in the area of market development by providing market information, facilitation for market linkages, etc. Agriculture Information and Communication Centre (AICC), Directorate of Agribusiness Promotion and Marketing Development, National Plant Quarantine Programme, National Agribusiness Promotion Programme, Agri-Commodity Export Promotion Programme are also facilitating trading activities by providing technology and establishing collection centre and export related supports. Similarly, Trade and Export Promotion Centre (TEPC) assists in export of goods and maintains the export-import data. Department of Food Technology and Quality Control (DFTQC) under MoAD monitors and regulates the food quality. Organic certifiers such as Organic Certification Nepal (OCN) offer an internationally accredited inspection and certification service to local operators at a reasonable cost.

At higher level, business enablers are Ministry of Agricultural Development (MoAD), Department of Agriculture (DOA), Ministry of Commerce and Supplies (MoCS) and Federation of Nepalese Chambers of Commerce and Industry (FNCCI), and they facilitate business through policy lobbying, policy formulation and bilateral trade agreements. For the details on some enablers and facilitators, please refer to Annex 3.

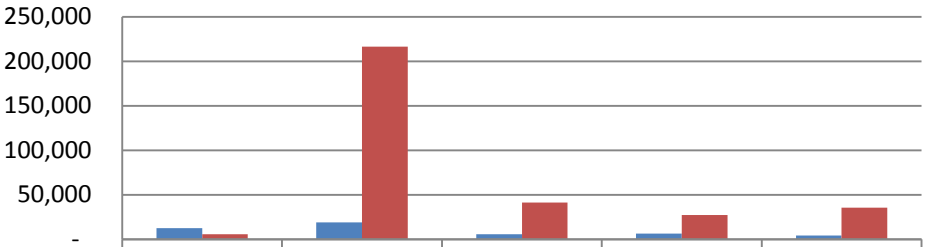
2.3. ECONOMIC ANALYSIS

With total production of more than 35000 MT, turmeric is mainly consumed domestically and only a negligible quantity (104 MT) is exported. The import quantity of turmeric is higher than its export (615 MT). This section analyses the current situation of production including the cost of production and the distribution of margins, market trend and competitiveness and governance for empowerment of turmeric.

2.3.1. Production

In 2010/11, the total cultivated area of turmeric was 4,080 hectares (Ha) while the total production quantity was 35,295 MT.

Figure 3 Total Cultivated Area and Production Volume of Turmeric and Other Spices in 2010/11

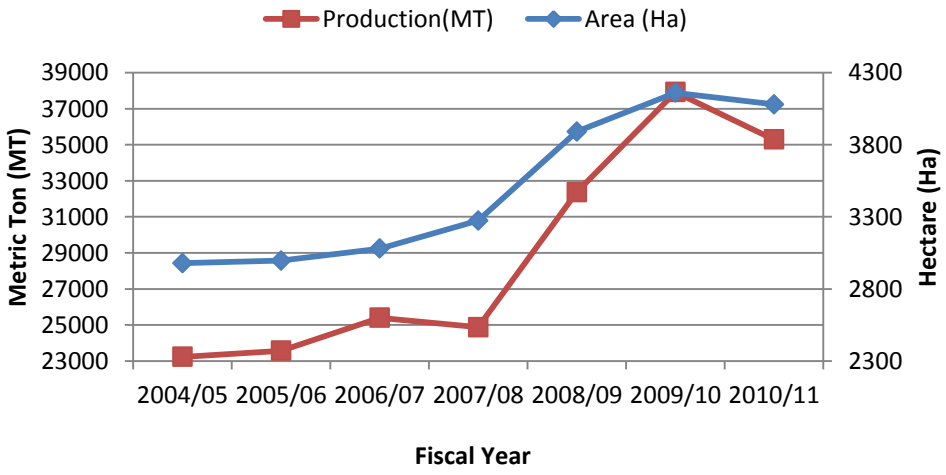


	Large Cardamom	Ginger	Garlic	Chilli	Turmeric
Area (Ha)	12,584	19,081	5,773	6,349	4,080
Production (MT)	5,517	216,289	41,183	27,203	35,295

Source: Data from VDD, 2010/11

The production data reveals the increasing trend of turmeric both in terms of production volume and the area cultivated till 2009/10 with a slight decrease in 2010/11. The trend is more over constant from 2004/5 to 2007/8 but afterwards a huge jump was observed in 2009/10 for which the production increased by more than 50%.

Figure 4 Production Trend of Turmeric in Various Fiscal Years



Source: Data from NSCDP2009/10 and VDD 2010/11

Turmeric has been cultivated all around Nepal ranging from Terai plains to hilly region since time immemorial. Turmeric can be grown in diverse tropical conditions from sea level to 1,200 msl, at a temperature range of 20-30 degree Centigrade with an annual rainfall of 1,500 mm or more, under rain-fed or irrigated conditions. Though it can be grown on different types of soil, it thrives best in well-drained sandy or clay loamy soil. Central Development Region is the largest producer of turmeric in the country, contributing to about 30% of the total production and the least contribution of 11% is from Far-Western Development Region. The Mid-Western Development Region, which occupies the majority

of the HVAP project area contributes 14% of the total production and comprises 15% of the total turmeric cultivated area.

Table 1 Area of Production, Production Volume and Productivity of Turmeric in FY 2010/11

Development Region	Area of Production (ha), %		Production Volume (MT), %		Productivity (MT/ha)
Eastern	917	22%	8585	24%	9.36
Central	1156	28%	10711	30%	9.26
Western	946	23%	7260	21%	7.68
Mid-Western	608	15%	5003	14%	8.24
Far-Western	454	11%	3736	11%	8.23
Nepal	**4080**	**100%**	**35295**	**100%**	**8.65**

Source: Data from VDD, 2010/11

The above table also reveals the overall average productivity of turmeric to be 8.65 MT/Ha. The productivity of MWDR is less of the national average at 8.24 MT/Ha.

The current scenario of turmeric production in HVAP districts shows that Salyan and Achham are the largest production districts each having cultivated area of 152 Ha and 100 Ha respectively. However, due to less coverage area of these districts by the three road corridors on which the HVAP activities are focused, the largest production area is found to be in Surkhet and Dailekh among the HVAP districts. The production of turmeric is not listed in Jumla, Humla and Dolpa.

Table 2 Area, Production and Productivity of HVAP Districts in FY 2010/11

HVAP Districts	Area (Ha)	Production (MT)	Productivity (MT/Ha)
Salyan	152	1289	8.48
Achham	100	760	7.60
Surkhet	72	619	8.60
Dailekh	50	426	8.52
Jajarkot	28	234	8.36
Kalikot	17	115	6.76
Mugu	3	15	5.00
Jumla	-	-	-
Humla	-	-	-
Dolpa	-	-	-
Total	422	3458	

Source: Data from VDD, 2010/11

Turmeric is mostly produced for domestic purpose and is available in almost all VDCs surrounding the selected three road corridors. However, the VDCs in and around the Chhinchu-Jajarkot road corridor produce comparatively high volume of turmeric among the three corridors because of large number of commercial farmers and trade associated in the corridor.

Production of turmeric is done in a traditional way that is derived from forefathers. Though research has been done to certain extent on the scientific cultivation of turmeric by government research programmes (e.g., Production of a booklet on cultivation techniques of turmeric by NSCDP), the information is not disseminated to a wider population. The

production mainly involves land preparation, seed plantation, manure application, mulching, weeding and harvesting. The seed selection and seed treatment is not much in practice in the project areas. The use of chemical fertiliser and pesticides is also rarely practiced. The crop is either harvested in a year (9 month crop cycle) or in two years. Usually when bulbs (known as *mau* or *budi* or *dana*) are used as seed, the harvesting is usually done in 9 months whereas if fingers (also known as *sella* or *naya*) are used then the harvesting is done at 2 years. Some VDCs where two years harvesting was observed are Naule Katuwal, Sinhasaini, Lalu, Satakhani. The two years harvesting has bigger size and higher weight and is also considered to be of better quality by the processors. The proper irrigation is not well practiced as well. The post-harvest activities mainly consist of separation of bulb and fingers, cleaning and washing. For the processing into dried turmeric two methods are commonly used, i.e., i) boiling and drying (makes *giti* or *sutho*) and ii) slicing and drying (makes *chana*). Storage of seed is usually done in pit and is kept for 3-4 months until next plantation.

Almost all farmers in the project area are using local seed variety. The seed varieties are usually named after the size of fingers such as *sinke or sella sano* (small finger), *mudke or kutke or sella thulo* (big finger). Usually three categories are found namely a) small rhizome with strong smell, b) medium sized rhizome and c) big sized rhizome. The big sized rhizome, as explained by some respondents, is different variety than the local one and is considered to be of inferior quality due to less flavour and smell. The processors mostly prefer medium sized rhizome. NSCDP has categorised turmeric into mainly two varieties - i) those used as spices and ii) those used for colouring purpose. Ginger Research Programme of Kapurkot, Salyan has tested several turmeric germplasms for its productivity but has not recommended releasing any special variety till now.

There is a good potential for expansion of production in the project areas. The climatic and soil properties of major areas of the project except for high altitude regions are favourable for production pockets.

2.3.2. Cost of Production

Except for some commercial production, most of the turmeric is produced by traditional farming practices where the farming knowledge derived from forefathers is used with no or less application of chemical fertiliser. The soil fertility is increased by the use of farmyard manure and mulch. Mulching is done by using available natural litters such as dried leaves, green leaves along with small branches, pine, straw etc. The major factors in production include: land renting, inputs and labour cost. For the purpose of this study, cost of production was calculated based on the focus group discussions with farmers conducted in various production pockets in and around the three road corridors. As the productivity varied from place to place depending upon the land types and inputs supplied, average productivity of 8.24 MT/Ha is used as obtained from the analysis of field data. The conversion ratio from fresh to dry is kept as 1:5, i.e., from the 500 Kg fresh turmeric, 100 Kg dried turmeric is produced.

The cost of production of fresh turmeric comes around NPR 18.2/Kg at farm gate. Similarly, for the dried turmeric, the cost of production (calculated after additional cost of processing and drying) comes around NPR 106/Kg at farm gate (See Table 3).

Out of the major cost in the production of fresh turmeric, the highest cost is incurred in labour cost with 33% share of total cost of production of fresh turmeric. Similarly, the cost of seed and manure represent 31% and 20% share of the total cost (See Table 4).

Farmers usually keep seeds from the previous harvest. Farmers usually separate 20% to 25% of harvest as seed. The seeds are stored in a pit for three to four months till plantation. Some farmers barter/procure seeds either from neighbours or other commercial farmers. The cost of seed is usually higher than the fresh ones. Similarly, farmyard manure is also mostly prepared in the field itself. For the mulching, farmers usually rely upon the nearby forest. Due to difference in distance of forest from farm, the time required for mulch varies from place to place.

Table 3 Calculation of Cost of Production for Fresh and Dried Turmeric

S N	Descriptions	Quantity	Unit	Rate	Total (NPR)
Cost of production for fresh turmeric					
A	**Land renting**	1	Ropani	500	**500**
B	**Inputs**				**4,300**
1	Seed	100	Kg	23	2,300
2	Manure/Fertilizer	50	doko/sack	30	1,500
3	Others (e.g. Ag. equip., pesticides, sacks)	1	Lump sum	500	500
C	**Labour**				**2,500**
1	Land preparation	1	man-days	250	250
2	Ploughing (by bullocks)	0.25	per day	500	125
3	Labour for FYM application	1	man-days	250	250
4	Mulch collection	10	doko/sack	50	500
5	Plantation	0.5	man-days	250	125
6	Weeding	1	man-days	250	250
7	Harvesting (412 Kg)	2	man-days	250	500
8	Cleaning and grading	2	man-days	250	500
Total production of fresh turmeric from a Ropani (in Kg) land				**412**	
			Grand total cost for fresh turmeric		**7,300**
			Loss in percentage	*2.5%*	*183*
			Cost of production (per Kg) of fresh turmeric		**18.2**
Additional cost for making dried turmeric (by boiling and drying) at farm level					
9	Processing (boiling)	1	man-days	250	250
10	Firewood and other equipment for 412 kg boiling	1	Lump sum	400	400
11	Drying	2	man-days	250	500
Total production of dried turmeric from a Ropani (in Kg) land				**83**	
			Grand total cost for dried turmeric		**8,633**
			Loss in percentage	*2.0%*	*173*
			Cost of production (per Kg) of dried turmeric		**106**

Source: Field Study, 2011

Over here, the average mulch collection time is kept around 8 *doko* per day. The use of pesticides and herbicides are none or negligible and are not mentioned in the cost. Farmers themselves provide labour. Generally, women are involved in production and post-harvest/processing activities whereas men are mostly involved in land preparation and marketing activities.

Table 4 Share Percentage of Major Factors in Total Cost of Production of Fresh Turmeric

Summary of the Major Costs	Per Kg	Share %
Labour	6.1	33%
Seed	5.6	31%
Manure/Fertiliser	3.6	20%
Others	2.9	16%
Total	*18.2*	*100%*

Source: ANSAB Field Study, 2011

2.3.3. Value Addition and its Distribution

Turmeric is mainly used as spice and adds flavour and colour to the food. It has an earthy, bitter, peppery flavour and has a mustardy smell. The active ingredient of turmeric is *curcumin*. Besides spice, it has been used in various products due to its property. Some uses of turmeric are briefly discussed in below paragraphs.

Medicinal use: Turmeric has been traditionally used for curing a number of diseases. It is popular for its anti-bacterial, anti-fungal, anti-ulcer and anti-tumoral effects. Its use is reputed to alleviate asthma, cough, jaundice, and also used for treating skin inflammations.

Food additive: Turmeric is widely used food additive for products that are specially packaged to protect from sunlight. It is also used in mustard, pickles for compensating fading colour.

Food industry: It is used in a number of products including bakery products, dairy products, cereals, sauces and ketchups, biscuits, cakes etc. It is also used as a natural colouring agent in foods.

Cosmetics: Turmeric is used to manufacture various sunscreen, fairness creams and lotions. The anti-oxidant properties help to lighten the skin.

Natural Dye: Due to its strong colour, it is used as a natural dyeing agent for silk, wool, cotton and other fabrics.

Different forms of turmeric are used according to different consumer segments. For instance, households and institutions prefer the powdered form; the FMCG segment prefers in dry and oleoresin type, while the health-care sector prefers in the oleoresin forms. The major value added products can be categorised as a) primary products, and b) secondary and derived products.

2.3.3.1. Primary Products

Dried rhizome: Dried turmeric is mostly traded as whole rhizome, which is then processed into powder or oleoresin by flavour houses and industrial sectors. Rhizomes come as fingers, bulbs and splits. Fingers are the secondary branches from the mother rhizome, the bulb, and splits are the bulbs cut into halves or quarters before curing. The fingers are 2 to 8 cm long and 1 to 2 cm wide, and are easier to grind than the more fibrous bulbs and split, and therefore, command a higher price (FAO, 2004).

In the project area, turmeric is dried usually at farm level. Farmers mostly prepare the dried turmeric in two ways: i) by slicing and drying, and ii) by boiling and drying. The dried turmeric made by employing first method is known as *chana* and by second method is

known as *giti*. Prior to slicing or boiling, the fresh rhizome is cleaned of soil and washed properly. Slicing is done by farmers by use of knives and dried in sun for 10 to 15 days. The making of *chana* is more common with non-commercial farmers, whereas making *giti* is more popular among commercial farmers as regional markets mostly demand for *giti*.

Boiling for *giti* preparation is done by use of big cooking utensils in most of the area. However, in some market centres such as Botechaur and Baluwa Sangrahi in Chhinchu-Jajarkot road corridor, traders who purchase fresh turmeric in bigger quantity use big drums for boiling purpose. It is also seen that marketing cooperative in Lekhparajul, near to Chhinchu market centre, are practising heating the rhizome in pit. However, this method still requires to be further tested for better efficiency.

Rubbing on cemented floor or carpets by hands further polishes the dried turmeric and gives it a shiny appearance. Some traders also spray the solvent of turmeric powder in water over the dried turmeric to give it an attractive look.

Turmeric powder is either made at household level by the farmers for domestic consumption or is processed in the nearby water mills/electric mills. The local traditional equipment called *dhiki* and *janto* are mostly used for powder making at home. The process is labour intensive and tedious to perform. Therefore, the farmers with access to water mills or other electric mills/grinders prefer to process in these mills. In the villages the rental charge for the grinding service is paid as barter with some quantity of the turmeric powder prepared in the mills. The reported average quantity of barter is 1 *kuruwa* (a local measuring equipment with tentative capacity of 500 gm powder) per 4 *kuruwa* powder processed. In cash, the mills charge NPR 15 per Kg of the processed powder. The farmers however, sometimes face difficulty in convincing the mill owner for processing turmeric as turmeric makes the machine yellowish in colour and is also said to damage the grinder.

For commercial production of powder, the mills usually consist of grinder, mill and packaging machine. The grinder breaks the *giti* into smaller pieces which is sorted through screens and smaller pieces are then taken to mill (usually flour mill) for making fine turmeric powder. Packages of the processed powder are made by the use of a packaging machine and are finally sold to market.

2.3.3.2. Secondary and Derived Products

Curry powder: Turmeric is an important ingredient in the curry powder. Turmeric content in the curry powder blends range from 10-15% to 30%. Curry mixes for vegetarian dishes contain less turmeric, in a range of 5 to 10% whereas for fishes and meat dishes contain 20-30% turmeric.

Oleoresins: These are obtained by solvent extraction of the powdered or comminute (small pieces) rhizomes. Depending upon the solvent used for extraction and on the turmeric type and cultivar, the process can yield about 12% of an orange/red viscous liquid which contains various proportions of the colouring matter, i.e. the curcuminoids, the volatile oils which impart the flavour to the product, and non-volatile fatty and resinous materials. The compounds of interest in turmeric oleoresins are the curcuminoids (40 to 55%) and the volatile oils (15 to 20%) (FAO 2004).

Curcumin: The curcuminoids mostly consist of curcumin. Curcumin is a crystalline material, which is obtained by further purification of curcuminoids. It is preferably used as a natural food colorant in products where the turmeric flavour is undesirable, such as cheese, ice cream, beverages and baked products. Content of curcumin depends upon the

type of turmeric. Such as "Madras" type has 2% whereas "Alleppey" type has 4% to 7%. Similarly, turmeric produced in the Caribbean, Central and South America has low curcumin content (FAO, 2004). The curcumin extraction is not in wider practice in Nepal although the demand for curcumin is high worldwide. Gyan Herbal Udhyog of Nepalgunj has experimented the curcumin extraction and is planning to go commercial in coming future. However, according to the company representative, the curcumin content of the turmeric from the Western Region is low (3-4%) as compared to Eastern varieties (4-6%) and Indian varieties (7-8%).

Turmeric essential oil: It is obtained by distillation or by supercritical fluid extraction of the powdered rhizome. It is also product of curcuminoids purification from oleoresins. The major compounds found in turmeric oil, upto 50 to 60% are the sesquiterpene ketones, ß-, and ar-turmerone, however, there is tremendous variation in published composition of turmeric essential oils. The demand for turmeric oil has little interest in the Western food industry, and it has no commercial value, as opposed to oleoresin (FAO, 2004).

2.3.4. Distribution of Costs and Margins

The Table 5 presents approximate calculation of cost of goods sold and the profit margin.

The turmeric goes through various value additions from production to final consumption. However, the major value addition done prior to reaching the domestic consumer mostly include primary processing or making dried turmeric and secondary processing of making powder out of dried ones. The table represents only the tentative calculation assuming the price of the dried turmeric to be at NPR 140/Kg and that of powder to be at NPR 400/Kg to the consumers. However, due to high fluctuation of price, especially of dried turmeric (from NPR 100 to NPR 300 in 2011), the selling price and profit margin can alter significantly.

The table shows that when the farm gate price is NPR 20/Kg, there is a margin of NPR 1.8 approximately to the farmers. The local traders purchasing fresh turmeric, processing and selling it make an approximate profit of NPR 21.8/Kg with their selling price of the dried turmeric being NPR 140/Kg. However, since most of the farmers conduct drying activities, the profit margin of the farmers can reach to NPR 34/Kg while selling in dried form. It also creates an employment of approximately 3000 man-days per ton of the dried turmeric produced. Last year (2011), farmers received an average price of NPR 200 to 225 for the dried turmeric from the major trading areas of the project, with greater margin. However, in the beginning of 2012, the farmers' selling price had dropped to around NPR 110 to 140.

The greater value addition is done during the processing of the powder with proper packaging and marketing. The major cost involved during the processing of powder are the raw material cost, transportation cost, grading and processing cost, storage cost, packaging cost, marketing cost, financial cost, and administrative and operation cost. Loss of 5% is calculated during processing, which can alter depending upon the quality of dried turmeric. With the total cost of goods sold for powder coming around NPR 253.1/Kg, the profit margin for processors comes approximately NPR 47 while selling in NPR 300/Kg. Since, the market price for the powder is moreover constant; the profit margin of the processors varies significantly with variation in price of dried form. The estimated average profit margin for the wholesalers comes around 8-10% and that of retailer is 10-15%.

Table 5 Cost of Goods Sold and Profit Margin Calculation

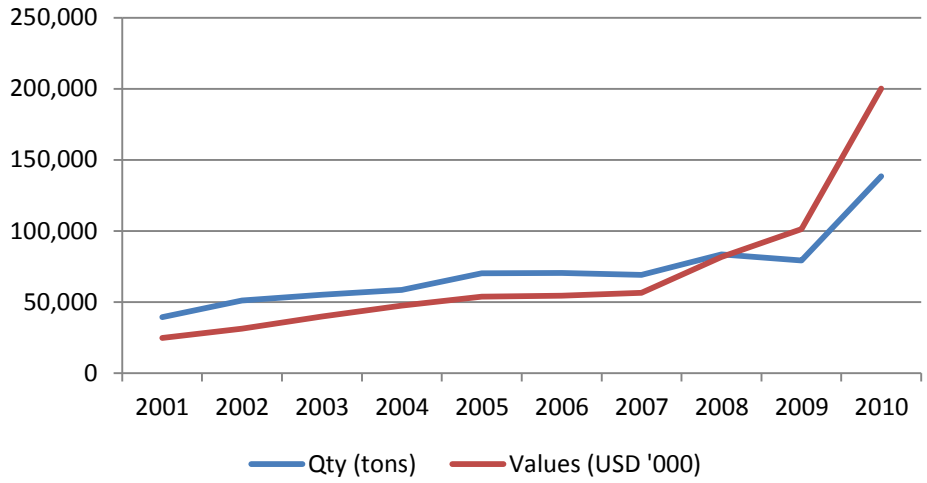
Items	Costs (in NPR)	Items	Costs (in NPR)	Items	Costs (in NPR)	Items	Costs (in NPR)	
Total expenses for 1 kg production (see Table 3)	17.7	Purchase price (5 kg required for 1 kg prod)	100.0	Purchase price (1.3 kg required for 1 kg prod)	182.0	Purchase price	300.0	Commission to retailer (Rs 50)
		Boiling cost	7.8	Transportation cost	5.0	Transportation cost	2	
		Drying cost	6.0	Grading Processing cost	10.0	Rental cost	1.5	
		Transportation cost	2.0	Storage cost	3.0	Financial charge	3.75	**Consumer Price Rs 400/kg**
				Packaging cost	5.0	Operation cost	4	
				Marketing cost	10.0			
				Financial charge	11.0			
				Admin and operation cost	15.0			
Total	17.7	Total	115.9	Total	241.0	Total	310.8	
loss (2.5%)	*0.4*	*loss (2%)*	*2.3*	*loss 5%*	*12.1*	*Loss 2%*	*6.2*	
Cost of production (fresh)	**18.2**	**Cost of production (dried)**	**118.2**	**Cost of goods sold (powder)**	**253.1**	**Cost of goods (powder)**	**317.0**	
Farm gate price (fresh)	20.0	Farm gate price (dried)	140.0	industry door price	300.0	Wholesaling price	350	
Profit per kg of fresh sold	**1.8**	**Profit per kg of dried sold**	**21.8**	**Profit per kg powder sold**	**47.0**	**Profit per kg powder sold**	**33.0**	

Source: Field Study, 2011

2.4. MARKET TREND AND COMPETITIVENESS ANALYSIS

Being an essential spice in most of the households in Nepal, there is a good demand of turmeric in domestic market. Its demand is also increasing worldwide with an increased awareness on its beneficial uses and the development of new products. According to ITC (2010), the trade of turmeric has increased significantly worldwide. As illustrated in Figure 5, the worldwide export quantity of turmeric in 2001 was 39,478 MT, which increased to 138,384 tons in 2010.

Figure 5 Worldwide Export Trend of Turmeric in Terms of Quantity and Value



Source: Data from ITC, 2011

India is the biggest producer and exporter of turmeric worldwide since several years. In 2010, India exported 107,924 tons of turmeric and occupied 72.6% of the share in world export. The second and the third largest exporters are Indonesia and UAE; however, their export volume is far below at 3.8% and 3.4%. Nepal's export share is just 0.1% of the worldwide export.

The top importers worldwide are UAE, Malaysia, Japan and USA whose import share are 13.1%, 7.6%, 7.2% and 7.2% respectively. Nepal's import share worldwide is around 0.1%. (See Annex 4 for details)

A brief discussion on end markets, marketing channels, domestic markets and situation of import and export of the turmeric with a focus on the project specific areas is presented in the following sections:

2.4.1. End Markets

Turmeric, especially powder, is found in every market centres within the project districts. These market centres consist of both local made as well as imported ones from other regions. However, the quantity and quality of turmeric products varies in different market centres. The market centres in the three road corridors within the project districts along with the country's regional and export markets for turmeric are listed in Table 6.

Table 6 Major Market Centres in Project Districts and Regional and Export Markets

Road Corridor	Market Centers
Chhinchu-Jajarkot Corridor	Surkhet: Chhinchu, Ramghat, Melkuna, Botechaur, Dharbase, Ghaire Bazaar Salyan: Baluwa Sangrye, Majhkanda,Salli Bazaar Jajarkot: Marko Bazaar, Ghoreta, Jaktipur, Khalanga
Surkhet-Dailekh Corridor	Surkhet: Rata Nangla Dailekh: Guranse, Mathilo Dungeswor,Chupra, Dailekh Bazaar
Surkhet-Jumla Corridor	Surkhet: Baddichaur Dailekh: Tallo Dungeswor, Ramaghat, Tunibagar, Rakam Karnali, Khirki Juila Kalikot: Jite/Hulma, Manma
Regional Markets	Birendranagar, Dhangadhi, Nepalgunj, Butwal, Kathmandu
Export Markets	India, Japan, Germany, Belgium

Source: Field Study, 2011

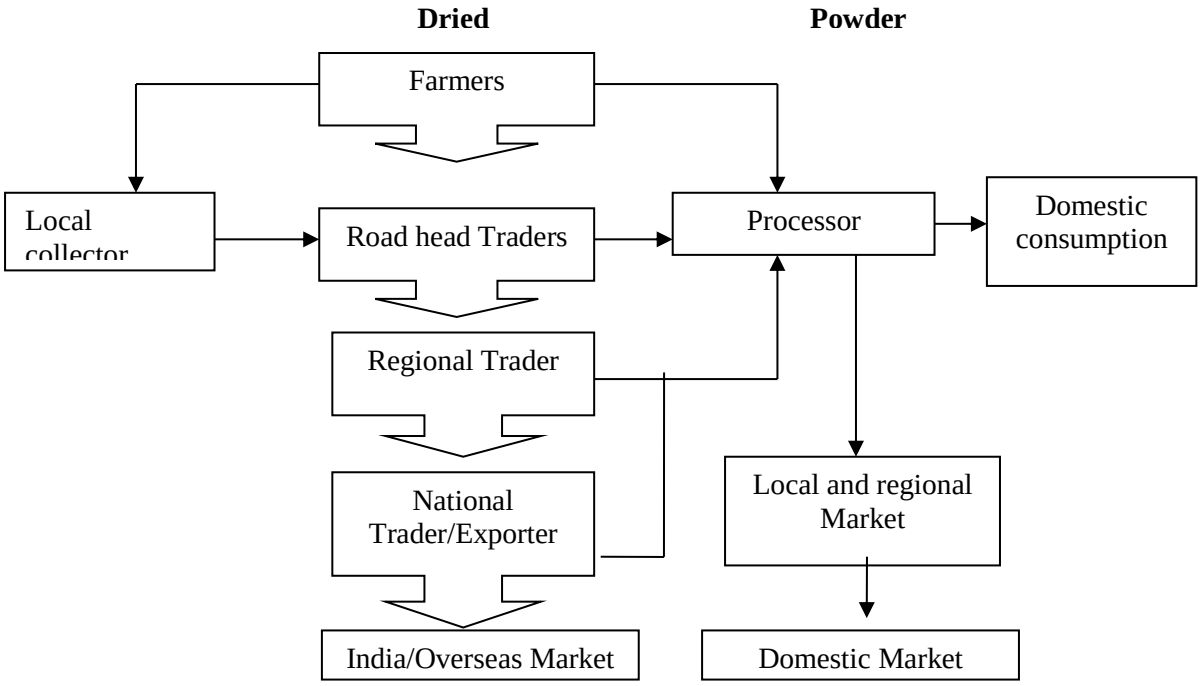
District wise, the market centres are mainly located in Surkhet and Dailekh districts, as greater span of the road corridors mostly fall in these districts. The market centres beyond Manma are not considered in this list as the production of turmeric in Kalikot and Jumla are very less and the volume of market transaction is also low. Despite Salyan and Achham districts being good producers of turmeric in the region, only few market centres along the road corridors fall in Salyan, whereas, none of the market centres fall in Achham. The produce from Achham comes to market centres such as Tunibagar, Rakam Karnali and Khidki Jiula, which are bordering market centres of the district.

The major regional market centres of turmeric from project areas are Birendranagar and Nepalgunj. Few quantity reaches Kathmandu and other market centres. For the turmeric, which is exported from this region, the major destination is India via Nepalgunj.

2.4.2. Marketing Channels

Mostly, dried turmeric and powder are sold in the market. Fresh turmeric is transacted only in few market centres where the road-head traders themselves conduct the dry processing prior to selling to other markets. The marketing channels for turmeric transaction are illustrated in following figure.

Figure 6 Marketing Channel for Turmeric



Source: Field Study, 2011

Usually, farmers conduct the drying activities of the turmeric and transport to the market centres for selling to the road-head traders. Sometimes, local collectors purchase goods from farmers, and then supply to the road-head traders. In some market centres, farmers also sell fresh turmeric to the local collectors or road-head traders. Road-head traders either sell to the regional traders or to the local processors. The regional traders then supply the products either to the national traders/exporters or to the processors. The processors sell to local and regional market through distributors/wholesalers or by their own.

2.4.3. Domestic and Regional Markets

The domestic market is the major market for turmeric. The data from NSCDP and TEPC reveal that out of the total supply of about 35,910 tons, 99.8% is consumed domestically. There is also significant import of turmeric as compared to its export. The turmeric is mostly consumed in powder form in domestic market. Most of the farmers in the project areas along the road corridors produce sufficient turmeric for their domestic consumption. However, due to wearisome processing, some farmers prefer to buy the powder from local market. Some of them sell the excess quantity in the local market centres.

Besides the local produce, several brands of turmeric powder are available in these market centres which are processed in the regional markets. Some examples of the turmeric brands seen during the study are presented in Annex5.

The characteristics of the market centres as per the road corridor are presented in the following headings:

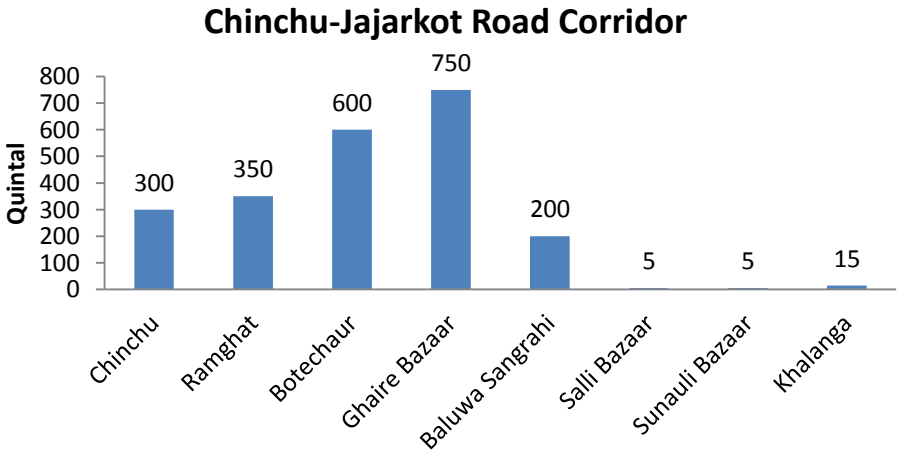
Chhinchu-Jajarkot Road Corridor:

Chhinchu-Jajarkot road corridor has comparatively higher turmeric transaction with greater numbers of commercial farmers, regional traders (approximately 20) as well as big

processors. The regional traders supply goods to Nepalgunj, Birendranagar and other regional markets in greater quantity. Transaction of both fresh and dried turmeric is seen among the farmers and traders; however, the quantity of fresh transaction is comparatively low and is only seen in this road corridor among the three of the project area. Within dried turmeric, the whole form *i.e., giti,* is most common and is highly demanded than the sliced dried form, i.e., *chana*. Based on the data obtained from field study, the approximate quantity of dried turmeric transacted in various market centres is presented in Figure 7.

The estimated total transaction of dried turmeric from this road corridor (except for the turmeric products brought from outside) was found to be around 223 MT. It is seen that Ghaire Bazaar and Botechaur market centres have the largest volume of transaction of the product. Ramghat, Chhinchu and Baluwa Sangrahi are also other major turmeric market centres. There are very few transactions in market centres beyond Baluwa Sangrahi such as Salli Bazaar, Sunauli Bazaar, Marko Bazaar, Ghoreta, Jaktipur and Khalanga. The road condition beyond Salli Bazaar is not in good condition and is seasonal. There are no bridges connecting Salli Bazaar and upper portion of the road corridor, which has limited the transportation of the product through ferry only during the day time and good weather condition. The major turmeric production pockets of Chhinchu-Jajorkot road corridor are presented in Table 7.

Figure 7 Dried Turmeric Transactions in Major Market Centres of Chhinchu Jajarkot Road



Source: Field Study, 2011

Table 7 Major Production Pocket of Chhinchu-Jajarkot Road Corridor as per Major Market

Market Centres	Major Production pockets with tentative walking distance to market centre of some pockets
Chhinchu	Lekhparajul (3 hr), Chhinchu (1 hr), Maintada
Ramghat	Ramghat (1 hr), Dasarathpur (2 hr), Kalyan (3 hr), Neta (4 hr), Lekhparsa (3 hr)
Botechaur	Sahare (1 hr), Ghumkhare, Dharapani (3 hr), Dahachaur (2 hr), Kaprichaur, Malarani (1 hr), Kalche
Gairibazar	Malarani (1 hr), Dharapani, Sahare, Kalimati Kalche, Kalimati Rampur,
Baluwa Sangrahi	Majkanda, Kunbindedaha, Dhanjaripipal,
Salli Bazaar	Dhanjaripipal,

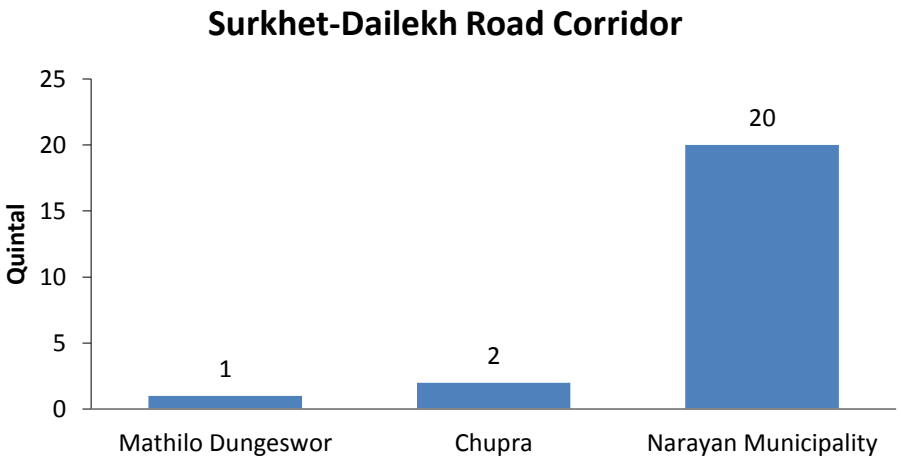
Source: Field Study, 2011

For the local consumption, turmeric powder both produced locally and imported from the regional markets is equally popular. Since the concentration of commercial processors is more in the lower portion (in and around Botechaur) and only a few are in the upper portion of the corridor, the market centres at the upper portion usually rely on turmeric from outside markets. Around 80% of total powder traded in these market centres are from the outside markets and they come from Birendranagar and other regional markets such as Birgunj, Butwal and Biratnagar.

Surkhet-Dailekh Road Corridor:

This road corridor is the shortest among the three and has good road condition. The commercial turmeric farmers are comparatively less and so is the turmeric transaction. The approximate volume of transaction from this road corridor of dried turmeric (except for the turmeric products brought from outside) is 0.2 MT. The estimated share of outside powder in market centres is 80%-90% due to low production of local powder. The local powder does not reach market as turmeric is grown in most places only to fulfil the household needs. Farmers with surplus produce sell to the local markets. Both dried and powder forms are transacted. Within dried, *chana* is the most common form of transactions. There are few processors in this road corridor involved in commercial production of powder, however, their activities are limited within their territory only. The major turmeric market centres in Surkhet-Dailekh road corridor and their estimated quantity of transaction of the dried turmeric are presented in Figure 8.

Figure 8 Dried Turmeric Transaction in Major Market Centres of Surkhet-Dailekh Road Corridor



Source: Field Study, 2011

The figure reveals that only Narayan Municipality has visible transaction of turmeric. There is greater dominancy of turmeric powder from outside in the market centres of this road corridor.

Table 8 Major Production Pockets of Surkeht- Dailekh as per Major Market Centres

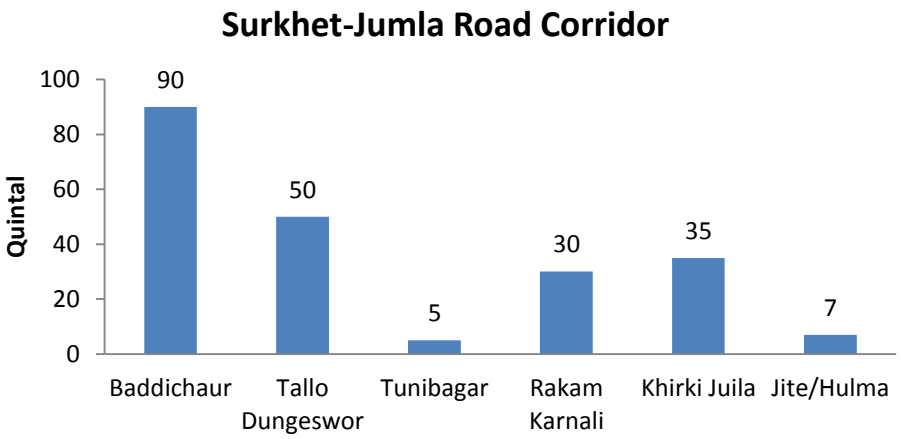
Market Centres	Production pockets with estimated walking distance of some production pockets
Mathillo Dungeswor	Dada Parajul (1 hr), Awal Parajul (1 hr), Baraha, Malika
Chupra	Belpata (1 hr), Kal Bhairab (1 hr), Lakuri (1hr),Gamudi (1.5 hr)
Narayan Municipality	Narayan Municipality (1 hr), Toli, Ruwakot, Bhawani, Basi, Raniban, Badakhola

Source: Field Study, 2011

Surkhet-Jumla Road Corridor:

This is the longest among the three corridors and has the highest number of market centres. However, the volume of transaction of the turmeric is very low in this corridor. There are very few commercial farmers and most of them are located in production pockets in the periphery of Birendranagar. Turmeric from this region is mostly supplied to the big processors in Birendranagar. There are also few regional traders who supply to Nepalgunj market. It is estimated that only 2.2 MT of dried turmeric is transacted from the market centres of this road corridor to the regional market centres. The trade of *chana* is more common as most of the farmers make *chana* than *giti*. The popularity of the *chana* in these areas is due to low trading of turmeric and making *chana* has been practised since a long time. *Giti* are, however, more preferred by the traders and may receive slightly higher price than *chana.* As a result, few farmers have recently tried making *giti* in the area. The major market centres and their estimated transaction volumes are presented in following Figure 9.

Figure 9 Turmeric Transactions in Major Market Centres of Chhinchu-Jajarkot Road Corridor



Source: Field Study, 2011

From the field study, it is found that Baddichaur and Tallo Dungeswor have comparatively more transaction. Baddichaur is emerging as a hot spot for turmeric as more and more farmers in and around the region are now cultivating (or planning to cultivate) the product in a commercial way. The processors from Birendranagar are also showing more interest in production from this place. As we go further to Kalikot from Tallo Dungeswor, the market transaction of local turmeric seems to get low. Due to market shifting phenomena with expansion and upgrading of road, the once big market of Tunibagar was shifted to Rakam Karnali then to Khirki Jiula and now to Jite.

Table 9 Major Production Pockets of Surkhet- Dailekh as per Major Market Centres

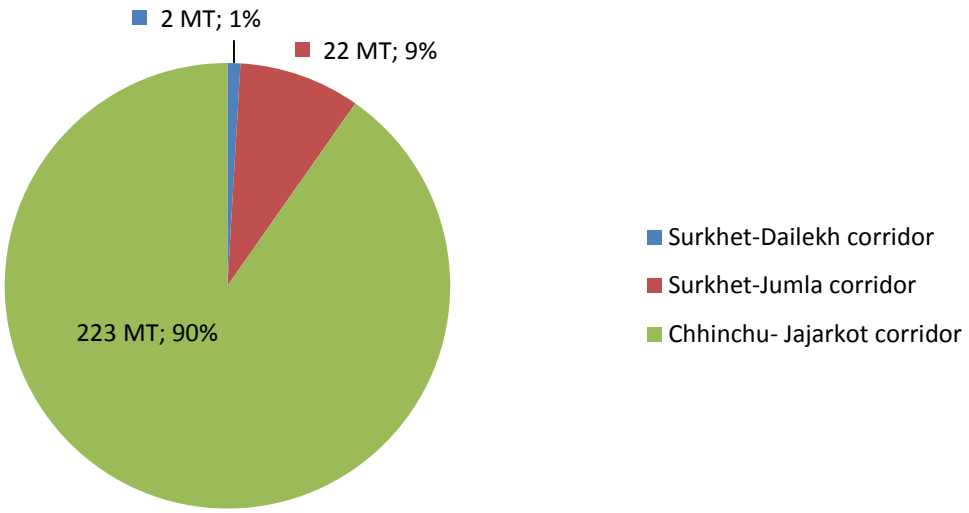
Market Centres	Production pockets with tentative walking distance of some production pocket
Baddichaur	Kunathari (2 hr), Pokharikanda (2 hr), Salkot (2.5 hr), Babiyachaur (3 hr), Tatapani, Ghatgaun, Bijaura, Khadkabada (2 hr), Vidhyapur (3.5 hr), Guttu (4 hr)
Tallo Dungeswor	Naule Katuwal (1 hr), Malika, Nepa (1 hr), Dullu (1 hr)

Market Centres	Production pockets with tentative walking distance of some production pocket
Tunibagar	Bhariabsthan (3 hr), Raniban (1 hr), Layati (2 hr)
Rakam Karnali	Kalikasthan ,Tilepata (2 hr), Sinhasain (2 hr), Rakam Karnali (1 hr), Pulletola (2 hr), Toli (2 hr)
Khirki Juila	Gamaudi, Kalekanda, Sinhasain (2 hr)
Jite/ Hulma	Lalu (0.5 hr),Kotbada (2 hr),Badalkot (2 hr), Malkot (3 hr),Raku (2 hr)
Birendranagar	Satakhani (3 hr), Hariharpur (3 hr), Jarbuta (2 hr), Ratu (3hr), Garpan (4hr), Latikoili (1 hr), Uttarganga,

Source: Field Study, 2011

As per the information received in field, the Chhinchu-Jajarkot corridor occupies an approximate 90% share of the total transaction of turmeric among the three road corridors. Similarly, Surkhet-Jumla road corridor has an approximate 9% and Surkhet-Dailekh road corridor has the remaining 1% of the total share.

Figure 10 Market Share of Three Road Corridors in Turmeric Transaction (MT, share%)

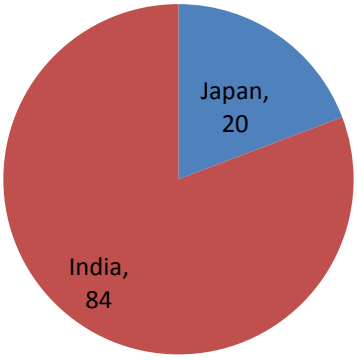


Source: Field Study, 2011

2.4.4. Export Market and Prospects

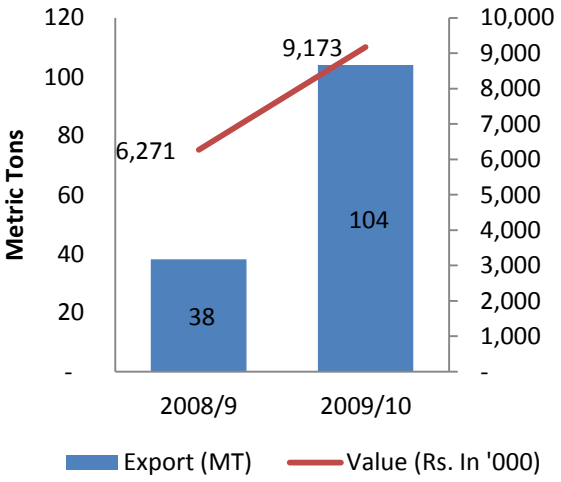
The export of the turmeric is very less as compared to its production. As observed in the study, the production of turmeric is mainly oriented towards fulfilling the domestic needs of farmer households rather than selling in markets. Commercial production of the product is also less as compared to the domestic production. In recent years, however, the export of the product is in increasing trend. Figure12 shows the export trend of past two years as obtained from MoAC (now MoAD). According to the traders, the increase in export in recent years is because of increasing demand from India. In 2009/10, turmeric was exported to India and Japan only, with India occupying 81% (84 MT) share of the total export in terms of quantity (TEPC 2010). The total volume of export was recorded to be 104 MT and of value NPR 8.3 million. However, according to traders, the demand in 2011/12 from India plummeted down to 50%.

Figure 12 Major Export Destination and Quantity Exported of Turmeric from Nepal - 2009/10



Source: Data from TEPC, 2010

Figure 11 Export Trend of Turmeric from Nepal



Source: Data from MoAC 2009/10

The major turmeric item exported from Nepal is in its dried form. Nepali turmeric needs to improve its quality (such as its appearance, finger size, cleanliness, curcuminoid content) and meet the requirement for exports (explained below) in order to increase its export quantity. Besides, the product diversification such as curry powder, oleoresins, curcumin can have greater market worldwide. However, Nepali hilly turmeric is considered to be having strong smell, colour and flavour. The major competitors for Nepali turmeric are Indian varieties, which have positioned themselves in top position in world market. The price of Indian varieties is also comparatively less than Nepali turmeric (for e.g. when the Nepali turmeric is traded at NPR160 the Indian varieties are available in NPR 130).

Requirements for Export and Quality Assurance:

There are various quality requirements defined by the importing countries that need to be fulfilled prior to export. The major standards for turmeric product include cleanliness specifications for spices, turmeric oleoresin specifications and requirements for organic spices and products.

For the cleanliness specifications usually two major standards are popular i) American Spice Trade Association (ASTA) specification (ASTA, 2007) and ii) European Specification (ESA, 2011). Besides, importing countries can have their own specification. India uses its own specification known as Agmark for grade designations and quality (AGMARK, 2005). The details of these standards are provided in Annex 6.

Similarly, for the products to be sold as 'organic', an accredited certification body must certify the turmeric products. There are slight differences in standards between countries. IFOAM, the International Federation of Organic Agriculture Movement, has established organic production, processing and trading standards, and tried to harmonise certification systems worldwide. The EU has also established its own basic regulations for organic products. The US and Japan have their own organic standards known as US NOP standard and JAS respectively. .

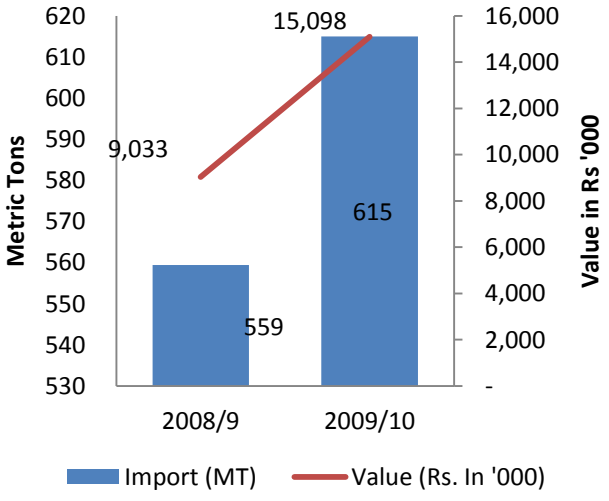
The dried rhizome with a clean and smooth skin, uniform skin and flesh, colours, and a clean snap when broken are the quality parameters. Turmeric cleanliness specification for import pertains for whole rhizomes.

Since curcuminoids, the colour constituents of turmeric, deteriorate with light and to a lesser extent, under heat and oxidative conditions, it is important that the ground turmeric be packed in a UV protective packaging and appropriately stored.

2.4.5. Import Situation and Substitution Potential

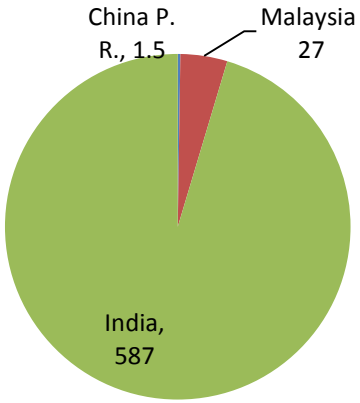
Despite greater volume of production of turmeric, Nepal is importing greater quantity of turmeric than it exports. According to traders, one of the reasons is due to import of low priced Indian varieties (ranging from NPR 80 to 140 per kg for dried turmeric). The Figure 14 illustrates the import quantity and value of turmeric products in 2008/9 and 2009/10.

Figure 14 Import Situation of Turmeric Products



Source:Data from MoAC, 2009/10

Figure 13 Major Turmeric Supplying Countries and Quantity Supplied in Nepal in 2009/10



Source: Data from TEPC, 2010

The figure illustrates the increasing trend of import. India is the major source country of import accounting for more than 95% of total import in 2009/10. All turmeric products i.e. fresh, dried and powder are imported from India however the exact status of various

turmeric products is not recorded. According to Nepalgunj based traders, most of the Indian dried turmeric (200-300 MT) is imported from the Eastern Nepal (mostly from Pathlaiya) because it is cheaper to import the product from this part. In order to reduce the cost of production and increase the essence, the Indian dried turmeric varieties are mixed with Nepali varieties by the powder processing industries in Nepal. Other countries from where turmeric is imported are Malaysia and China. Nepal has potential for import substitution of turmeric products, mainly powder. There are several brands of Indian turmeric powder available in the market especially in big cities like Kathmandu, Nepalgunj, etc. with attractive packaging and similar price as Nepali brands. However, due to comparatively strong taste and flavour compared to Indian brands, Nepali brands can replace them, provided the packaging is good and the product has uniform quality.

2.4.6. Enabling Environment

National: Turmeric, although being one of the major spice crops, has not received much attention by the government plans and programmes. There is very less data available on production, trade and actors involved in production and trade of turmeric. Little work has been done towards research and development of the crop. NARC has conducted some research on this aspect, but they are limited within reports. The improved varieties of seeds as well as seed pockets and production pockets are yet to be developed. Without the proper contract law, the farmers are not excited towards going commercial due to great variation in prices as well as market demand. There is greater scope of import substitution of turmeric as well export potential, provided that more enabling environment are available at production, processing and trading.

Local: Due to its production mostly for domestic consumption, the local production is even not sufficient to fulfill the local demand. It is of less priority among the Agriculture Extension Offices as well as local non-governmental organisations. However, with increase in commercialisation of turmeric in and around Surkhet area, more and more farmers are themselves motivated towards commercial farming of turmeric. The major concern of the farmers during the field study was the market information and market linkages. There are no or less processing facilities at local level and most of the medium to big processors located at regional markets and are running below capacity due to storage problem. The condition of major roads, i.e., Chhinchu-Jajarkot and Surkhet-Jumla are still very poor and is seasonal only, delimiting the year round supply and trade of goods. The use of marginal land for turmeric farming is also not benefitted due to absence of rural roads in many places. HVAP has prioritised the turmeric value chain and is about to implement programmes on promotion of the subsector, which is good news to the farmers of this area who are planning to go commercial.

2.4.7. Inter-firm Cooperation

Vertical Linkage

Vertical linkages can be attained through cooperation between the different players or firms, such that they have the benefits of transferring skills from one player to another as well as reducing transaction costs. Considering turmeric value chain, vertical linkages exist between cooperatives and growers in some pockets. During the study, some processors such as Bhattarai Spices Processing and Packaging Factory and Malika Spice Factory were found to have agreement with the growers for supply of goods; however, it is limited to only a few commercial farmers. Usually farmers sell their products to traders in the market centres. Mostly transaction is done in cash. There is less evidence of giving advance to

farmers. Regional traders from the project areas also sell their goods on spot market basis. Commercial farmers are also themselves traders in some places. When purchasing fresh turmeric, the traders themselves dry turmeric prior to sending them to regional markets. There is very less flow of information on market and quality through the chain.

Horizontal Linkage

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 farmers' groups at production pockets, however, specific group for turmeric are not present. Group members organise the meeting periodically and share about the status of production, input procurements and output marketing. Nevertheless, there are very few evidences of collective marketing practices like the one at Jagannath Agriculture Multi-cooperative in Lekhparajul, Surkhet. 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. At traders' level, they are more united in BMOs like JABAN and share their experience to some extent.

2.4.8. Supporting Markets

Turmeric farmers are less involved in commercial farming and trading. The trend of bartering turmeric with other goods and vice versa is common in most of the production pockets of the project districts. For processing at local mill, giving a share of processed turmeric rather than cash is more popular in most areas. There is less incidence of taking financial loans for turmeric farming due to low volume. The trading of turmeric is mostly done on spot market basis. Prior contract among traders and farmers are non-existent. Some processors are recently trying to enter into contract with some commercial farmers. The market information system is very poor. Unavailability of quality inputs especially seed is hampering those who are willing to go commercial. As for the processors, there are only few processors dedicated to turmeric processing. Most of the processors are merely providing rental service to their customers rather than trading. Access to finance is difficult due to low number of financial institutions in most of the project area. Among those who are present also lack willingness to invest in farming. It is especially difficult for the farmers and traders of the project areas due to less valuation of land they own which is not accepted as collateral by most of the existing financial institutions.

2.5. GOVERNANCE FOR EMPOWERMENT

Good governance is essential also in order to empowering actors in the value chain. It is possible by assuring adequate access to basic production inputs, credit, capacity building and market information among others (IDRC 2000). Although there are many farmer groups in the project areas, no groups exist specific to turmeric. The market channels are also not well organised and have several constraints, mainly in relation to its least effect in terms of efficiency and equity. The market is unstable and there is great fluctuation in price of dried turmeric. The local markets are mainly governed by the regional markets, which in turn relies on the Indian demand and supply of the product. Although the production of the turmeric is an increasing trend, its commercial production is still low in project areas. There are several economic and institutional barriers such as low access to market and market information, quality standards, unstable market, unavailability of quality inputs which are limiting growth of the sector. Nevertheless, potential exists for an improved and well functioning market that will enable smallholder producers to derive greater benefits from their production activities.

2.5.1. Gender Issues and Inclusiveness

In the project districts, farmers as well as traders, male mostly dominates the household. In the study done on 108 farmers and 38 traders, 94.5% of household head was found to be a male. It is seen that women are mainly involved in major activities related to the production of turmeric such as planting, preparation of farmyard manure, collection of mulch and weeding. These activities require more labour and greater time involvement of women due to depleting resources. This has hit hard women who are mostly involved in production and most of the women surveyed have raised it as a serious concern during the study. The processing of turmeric, i.e., cleaning, drying and making powder, is also mostly done by women, and is equally labour intensive and tedious as most of the activities are done manually. The roles of men are prominent during land preparation and marketing activities. Men mostly have their role in pricing and they usually owe income from selling. However, decision on turmeric cultivation is mostly done jointly. Depending upon the available resources, excluded and marginalised people are equally involved in turmeric cultivation. Nearly 14% Dalits and 20% Janjati among the farmers studied were observed to be involved in turmeric cultivation. Most of them have grown turmeric for fulfilling their domestic demand (around 60% with turmeric cultivation below 0.5 Ropani and remaining not more than 1 Ropani). The farmers with less land don't prefer to grow turmeric as the crop cycle is comparatively long (9 months to 2 years) and the market is quite uncertain.

At traders' level, male are leading the trading activities, however, many firms have their own family members as source of labour. In the sample survey of 112 employees, 70% of the labour force was from the family members and the members were involved in trade throughout the year. Similarly, among the remaining employees nearly 14% labour force was from the Dalits and 16% from Janjati. The Dalits and Janjati are mostly involved as seasonal labourers. The survey also revealed that the labour contributions in firm are similar from gender perspective with nearly 43% of the employee being female.

There is not a clear-cut role defined in terms of access to resources between male and female. Usually, women have larger access to forest resources while collecting mulch. Similarly, they seem to be involved equally while making decisions on cultivation and marketing. On the other hand, usually male gets control over the benefits, but most of the income/benefits go to the family basket for the welfare and need of the family members- that are jointly decided in majority of the cases. The feminisation of agriculture due to migration of male members of the family is also observed in some places such as Sinhasaini, Rakam Karnali and Kunathari VDCs. Some farmers consider turmeric to be appropriate crop in labour shortage scenario as the cultivation requires less labour because it is less infested by disease, pest and animals and requires less inputs such as water, fertiliser and weeding).

Both men and women are in general not restricted while accessing the enabling factors at macro level as it could be reflected in terms of cultural settings, values and norms. General belief and value of male member's domination in accessing the enabling factors are slowly changing also in the favour of female members in the family, mainly at the household level.

2.6. CONSTRAINTS AND OPPORTUNITIES

The following table presents the constraints and opportunities of the subsector.

Table 10 Constraints and Opportunities in Turmeric Subsector

Type	Opportunities	Constraints
Market access	• Potential of market expansion both within domestic and international level.	• Low volume of supply to the markets because limited number of farmers are involved in production and they are scattered in nature • Low access of farmers and local traders to large buyers and low exposure of exporters to international markets • Trade from the project area is concentrated in Surkhet and Nepalgunj market and very less export to India • High fluctuation in price, especially due to dependency of trade with India which itself is largest producer and exporter of turmeric • Low and inconsistent quality of goods
	• Presence of MIS platform (MoAD, AEC)	• No or very low access of farmers to market information • Very limited information (mostly price) is provided by existing MIS platform
Input supply	• Presence of NARC as a research centre for high quality seed • Production of seeds at local level • Mostly grown organic	• Lack of information and availability of quality seeds • Problem of seed volume if going commercial due to dispersed production • Difficulty in collection of raw to prepare organic manure and mulch
Technology & product development	*Production* • Can be produced in marginal land, less irrigation required, • Less occurrence of disease and pest; less manifestation by rodents and other animals	*Production* • Low productivity and use of traditional farming practices • Problem of red ants in some areas (loss of 1-2%)
	Processing • Less sophisticated processing equipment; can be done in local level • Non-perishable for greater time period if stored properly (for dry and powder) • Greater product diversification (dry, powder, extracts, curry powder, colouring agent, medicinal, cosmetics, etc.)	*Processing* • Only use of local technology for dried turmeric making which is tedious and time consuming • Low knowledge on proper storage techniques • Low number of processing mills at local level • Limitation in entering higher value market such as abroad market, cosmetics/medicine/food industries, due to improper packaging, lack of quality grading and certification, and low curcumin content)
Management and organisation	• Existence of producers' groups, collection centers, marketing cooperative • Existence of LRP in project area for technology generation • DADO /NARC for technology transfer	• Low knowledge of farmers, collection centres, cooperatives and processors on proper record keeping/ accounting, business planning
Access to finance	• Existence of microfinance institutions, cooperatives, farmer groups and commercial banks in some places	• Low access of farmers, processors, traders to finance due to lack of friendly policy of banks and other financial institutions; requirement of collateral; low valuation of land
Infrastructure	• Existence of collection centres	• No specific collection centres for turmeric.

Type	Opportunities	Constraints
	• Extension of mobile networks • Developing regional roads and extension of agriculture roads	• Improper storage so that the dried turmeric gets damp and decays • High transportation cost
Governance for empowerment	• Potential to create employment and generate income	• No farmer groups dedicated to turmeric cultivation, which has resulted in low bargaining power with buyers and are vulnerable to cheating (by buyers)
Regulatory (policy)	• Mentioned as major spice crop • Existence of NSCDP	• No specific programme in turmeric • No proper contracting law for contract farming

CHAPTER THREE

MARKET BASED SOLUTIONS

3.1. IDENTIFICATION OF MARKETBASED SOLUTIONS

The following table presents the market-based solutions for addressing the value chain constraints of turmeric:

Table 11 Market-based Solutions Addressing Value Chain Constraints of Turmeric

VC Constraints	Market-based Solutions
Low access to large buyers in domestic and international market	• Increased access of farmers and local traders to large buyers • Provision of market diversification both in domestic and international market
Low and inconsistent product quality	• Awareness and training on grading and quality standards • Provision of product standardisation with quality assurance
Low access to market information	• Better access to market information system with extended information
Low access to quality seeds and low volume of seed supply	• Provision of research and development of quality seeds • Easy availability of quality seeds to farmers • Training to farmers on commercial seed production
Low production volume and low productivity	• Access of famers to technical knowledge on scientific production practices including seed selection and its treatment, crop management practices and disease/pest control • Access to training on more efficient post-harvesting and storage technology/methods
Lack of proper processing technology/facilities	• Provision of establishment of processing mills at local levels on community-private-partnership basis • Access to equipment and technical support on more efficient processing technologies/methods • Upgrading of existing bigger processors at regional markets for greater capacity and product diversification
Low knowledge on proper record keeping/accounting and business planning	• Access to business development services
Low access of farmers, processors and traders to finance	• Access of farmers to microfinance • Access of big traders/ processors to loans
Lack of turmeric specific collection centre, improper storage and high transportation cost	• Provision of establishment/upgrading of turmeric specific collection centres • Provision of establishment of big capacity storage house in regional market centres (Surkhet and/or Nepalgunj) • Provision of establishment of gravity ropeways
Lack of turmeric producer groups	• Provision of turmeric specific farmers' groups in major production pockets
Lack of specific programmes in turmeric	• Provision of specific programmes for turmeric

3.2. ASSESSMENT OF MARKETBASED SOLUTIONS

The following table illustrates the assessment of market based solutions of the turmeric value chain with the list of possible areas of project intervention/facilitation.

Table 12 Assessment of Market-based Solutions for Turmeric Value Chain

Market-based Solutions	Supply and Demand Analysis	Service Providers and Users	Constraints of Service Providers and Users	Possible Areas of Project Intervention/Facilitation
Increased access of farmers and local traders to large buyers and market diversification	• Greater interest of buyers to work with farmers to fulfil their supply need • Farmers' willingness for greater production if more market available • Greater market demand worldwide	• Large buyers and processors • Farmers	• Low knowledge of farmers and local traders about large buyers and processors • Less reach of domestic buyers to commercial production pockets • Low knowledge on export markets and insufficient financial sources and information for participation in market diversification	• Facilitate linkage of farmers and local traders to large buyers through arranging market visits of farmers, production pocket visits of buyers, conducting business meetings and supports towards contract agreement • Provide information on various markets and support exporters in participation in international spice trade fairs
Awareness and training on quality standards and provision of product standardization	• Information on quality standards available • Good market demand for quality labelled product	• Traders/consultants and APMDD • Farmers and processors	• Low communication and reach of regional traders to farmers • Lack of agency for placing and implementing quality labels	• Facilitate and conduct ToT training on grading and quality standards by potential buyers/consultants • Facilitate to develop a quality assurance label for turmeric powder
Better access to market information system	• Possibility of expansion of existing MIS platform • Greater demand for MIS both at farmers' level and traders' level and their willingness to pay charge for the service	• DCCI, collection centres, cooperatives • Farmers, cooperatives, collection centres	• Low institutional capacity of DCCI to provide MIS service in the project districts • Low coordination between MIS provider and collection centre, cooperatives and media for dissemination	• Capacity building and institutional strengthening of DCCI for providing MIS service • Facilitate for development of mechanism for wider dissemination of the information through collaboration with collection centre, cooperatives and media

Market-based Solutions	Supply and Demand Analysis	Service Providers and Users	Constraints of Service Providers and Users	Possible Areas of Project Intervention/Facilitation
Easy availability of quality seeds and commercial farming of seeds	• Prior experience of NARC on similar activities and its potential capacity for expansion • High demand of seeds due to increased interest of farmers towards commercial farming	• NARC, DADOs, • Farmers	• Less programmes and low budget of NARC towards R&D of quality turmeric seeds • No recommendation found for high yielding varieties suitable to local climatic condition • Lack of identified seed pocket area • Low knowledge on proper seed production practices and its storage	• Coordinate and collaborate with NARC in R&D of quality turmeric seeds • Piloting of high yielding varieties of seeds (including those having high curcumin content) developed by NARC and available in other places • Facilitate DADOs in identification and declaration of turmeric seed pocket area • Facilitate farmers for producing good volume of seeds and provide them quality seed production and storage training • Develop linkage of commercial seed producers with seed buyers
Access to technical knowledge for scientific production practices and post-harvest handling	• Presence and capacity of local NGO, Agriculture Extension Offices, LRPs to provide training • Farmers using traditional methods which needs to be improved for increasing productivity	• DADOs, agriculture technicians • Farmers	• Low technical knowledge on proper production practices and post-harvest handling to local agriculture technicians • Lack of publication dedicated for turmeric productions and post-harvest handling practices • Less idea on promising areas for commercial turmeric production	• Provide ToT to local agriculture technicians (JT, JTA, staffs of DADOs) and lead farmers on scientific production and post-harvest handling practices who will provide training to farmers • Develop training materials and publications on turmeric production and post-harvest handling • Facilitate DADO towards identification and declaration of turmeric production pockets
Establishment of processing mills at local levels and access of farmers and processors to equipment and technical support	• Capacity of suppliers to supply the required processing equipment • Willingness of users to pay for better processing technology/service	• Trading companies, equipment manufacturers • Processors, farmers	• Lack of sufficient investment and knowledge in establishment of local processing mills • Lack of especially designed technology for curing (boiling) , slicing and drying for turmeric • Problem of investment (difficulty in obtaining loan and high interest) for purchase of	• Provide technical and financial support for establishment of local processing mills on community-private-partnership basis • Collaborate with equipment manufacturer in developing and piloting suitable technology for curing, slicing, and drying of turmeric • Conduct assessment of promising processors and provide technical and

Market-based Solutions	Supply and Demand Analysis	Service Providers and Users	Constraints of Service Providers and Users	Possible Areas of Project Intervention/Facilitation
			equipment for capacity upgrading and product diversification	financial (soft loans) support for upgrading and product diversification
Access to business development services	• Presence of business development service providers • Greater requirement of BDS for taking farming as business	• BDS providers (Private, NGO) • Farmers, collection centres and processors	• Only work on basis of demand with provision of certain incentives for providing the services • Lack of information among farmers, collection centres, processors and other local enterprises on BDS providers and their services to farmers	• Provide business scheme training to farmers' groups through BDS providers • Provide business planning and enterprise development training to collection centres, processors and traders through BDS providers
Access to microfinance and loans	• Various financial institutions providing loans to farmers and traders • Investment as essential requirement for expansion of business	• Microfinance institutions, commercial banks, cooperatives and saving groups, farmers, traders	• Only provide services according to demand and assessment of service seeker • Lack of linkage to MFIs by cooperatives and groups • Low coordination between traders, commercial farmers and commercial banks • Low knowledge of traders and commercial farmers on development of proper financial plans	• Assess the demand for finance from farmers • Capacitate farmers' groups/cooperatives in legal documentation and other relevant task for getting financial loan/assistance from MFIs • Facilitate for round-table talk between traders, commercial farmer and commercial banks for development of policy acceptable to both parties • Provide training to traders and lead commercial farmers in development of financial plan presentable to commercial banks
Establishment/upgrading of collection centres (CC), storage house, and gravity ropeways	• Availability of government budget as well as donor programmes for development of infrastructures	• DADOs, donors, projects • VC actors, other indirect beneficiaries	• Lack of assessment (including impact and number of beneficiaries) of potential sites for infrastructure development • Lack of access to government and donor programmes and	• Identification and assessment of potential sites for development of infrastructure which can provide greater impact and wide base of beneficiaries • Facilitate better linkage and access of beneficiaries to government and donor

Market-based Solutions	Supply and Demand Analysis	Service Providers and Users	Constraints of Service Providers and Users	Possible Areas of Project Intervention/Facilitation
	• High demand of farmers and other actors for greater benefit to wider population		their information	programmes through better coordination • Support establishment of infrastructure on community-private- partnership basis
Develop turmeric farmers' groups	• Presence of LNGOs to facilitate for organising groups • Farmers' willingness to get organised in groups	• LNGOs • Farmers	• Lack of orientation and awareness on benefits towards forming specific group	• Organise farmers' groups and facilitate establishment of turmeric farmers' groups within them or create new groups
Provision of specific programmes of turmeric	• Government budget provision for spice crop development • Greater commercialisation of turmeric in recent years	• NSCDP/VDD • Turmeric VC actors	• Less focus on turmeric compared to other spice crops • Turmeric VC actors not well organised	• Facilitate turmeric farmers' groups and other VC actors to get organised for better lobbying with government

CHAPTER FOUR

STRATEGIC AREAS OF INTERVENTIONS

This chapter presents some strategic areas of interventions for HVAP. The interventions are designed prioritising the suggested possible project interventions/activities mentioned in Chapter Three. The suggested interventions are categorised 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

3.3. PRIORITY AREAS OF INTERVENTIONS (SHORT TERM)

3.3.1. Input Supply

Piloting high yielding varieties: Ginger Research Programme (GRP), Kapurkot has been conducting varietal trials by collecting different germplasms from different parts of the country. According to GRP, they are going to release a variety within a year. The project can collaborate with GRP and pilot the high yielding varieties in the project areas. Similarly, high yielding varieties available in India can be piloted in the project area to check their productivity and climate compatibility. There are about 30 turmeric varieties grown in India. For example, Suvarna variety released by the Indian Institute of Spice Research, Calicut has the yield potential of 43 MT/ha. It has also high curcumin content of 8.7%. Similarly, other varieties as Alleppey and Madras (Perianadan) are of great commercial importance in India[3]. List of some commercially important varieties are presented in Annex 8A.

Facilitate towards identification and declaration of seed production pockets: In this process, the project can collaborate with respective DADOs, local NGOs, traders and cooperatives towards identification of promising seed production pockets. With clear identification of promising seed pockets, the project can provide technical support to commercial farmers of the area towards quality seed production such as selection of proper varieties and types, seed treatment, cultivation methods, storage, etc. The project can also support DADOs of the project specific districts to declare seed production pockets and advertise them through government and private sector channels. Respective DADOs can support the project by collecting the demand of quality seed and linking them with the seed producers. Some examples of potential areas suitable for seed production are Lekhparajul, Sahare, Malarani, Ramghat, Dharapani, Kunathari, Babiyachaur VDCs or Surkhet. .

3.3.2. Production and Post-harvest Handling

Create and strengthen farmers' group organisations: So far the separate turmeric farmers' groups are not found in project districts, so it is advisable for the project to facilitate the existing farmers' groups within project area and mobilise them to cultivate turmeric. The creating and/or strengthening farmers' groups is very essential to bring the turmeric farmers to get organised and work collectively towards promotion of the value chain and gain maximum benefit from the collective power and be able to respond to the market demand and opportunities. The groups can also be involved in marketing

[3] http://agriexchange.apeda.gov.in/Market%20Profile/MOA/Product/Turmeric.pdf

activities in community-private- partnership model. It might be in the form of private limited or marketing cooperative.

Support farmers on production and post-harvest handling methods: The project can support farmers on cultivation and post-harvest handling techniques (including quality standards such as cleaning, grading, sorting and packaging) especially targeting the existing and potential commercial farmers and traders within the project districts. The study has shown a greater concentration of commercial farming and trading in the lower portion of Chhinchu-Jajarkot road corridor such as in Sahare, Malarani, Dharapani, Ramghat and Lekhparajul. The project can support the partner LNGOs and DADOs who can appoint agriculture technicians for getting Training of Trainees (ToT) on scientific production and post-harvest handling. The partner LNGOs and DADOs can further mobilise trained agriculture technicians for training and technical support to farmers and traders. For conducting training, the project can support on developing and publishing the training materials and relevant publications.

3.3.3. Processing

Introduce improved and efficient processing technology: Support of the project is suggested in designing and piloting of efficient processing technology for curing (boiling) and drying. Use of these technologies help to reduce the time requirement as well as increase the efficiency, which can play vital role towards cost reduction and quantity generation. The project can collaborate with equipment manufacturers such as those making solar dryer for ginger, to develop turmeric specific curing and drying equipment that can be operated at local level.

Support for establishment of processing mills and upgrading of existing processors: The project can support the potential processors to increase access to finance and technology for establishment of processing mills on community-private-partnership basis. Some potential sites for such establishments are Chupra, Baddichaur, Tallo Dungeswor, Khalanga (Jajarkot). The local processing mill might consist of a grinder machine and a powder-making mill along with other infrastructures. These facilities will not only add value to the product but also create employment at local level especially for women and disadvantaged groups.

For the upgrading of existing processors, the project can support on activities like packaging equipment purchase, packaging designing activities, new processing machine purchase, proper storage facilities, and creating market linkages through providing technical advisory service and financial support such as soft loans and grants. Some of the processors identified during the study that showed their willingness to work with the project for their capacity upgrading are Bhattarai Masala Production and Packaging Industry (Khagendra Bhattarai), Malika Masala Udhyog (Sher Bahadur Khadka), Shiva Shakti Rice Mill (Gita Ram Thapa) of Surkhet, Jwala Gadi Masala Udhyog of Dailekh. The details of the processors are included in Annex 8B.

3.3.4. Marketing

Strengthen the institutional capacity of DCCI for upgrading its MIS service for wider dissemination of market information: With AEC/FNCCI already having its own MIS platform, the project can strengthen the institutional capacity of the DCCI for MIS service throughout the project districts. This includes but not limited to providing trainings to staffs and infrastructural support. The project can facilitate for better

collaboration with collection centres, cooperatives and media (FMs and local newspapers) for wider dissemination of information. It is advisable to go for SMS based MIS services in the project district, which can ensure wider user base and sustainability of the service due to fee-based mechanism.

Facilitate for contract arrangements between farmers' groups and buyers: With identifying the interested buyers of turmeric from local and regional markets, the project can facilitate for contract arrangements between the beneficiaries farmers' groups and buyers. The project may conduct a series of meetings between these groups and provide assistance on paper works. Some of the buyers identified during the study who are interested in going for contractual relationship are Bhattarai Masala Production and Packaging Industry (Khagendra Bhattarai), Malika Masala Udhyog (Sher Bahadur Khadka), Shiva Shakti Rice Mill (Gita Ram Thapa) of Surkhet and Gyan Herbal of Nepalgunj (interest on high curcumin content turmeric).

Provide training on business planning and enterprise development: These trainings can be provided at two levels: i) at the farmers' group level - trainings on business scheme preparation, which is simple version of detail business planning and ii) at the collection centres and processors' level - trainings on business planning and enterprise development can be provided, which also include organisation management and record keeping. In this process, the project can train the representatives from beneficiary farmers' groups and collection centres and processors in order to develop them as local resource person (LRPs). Since there is already one company in Surkhet named KP Business Service (P.) Ltd., this can be used for further backstopping of LRPs. For this purpose, recently developed three toolkit modules of ANSAB - Business Planning, Entrepreneurship Development, and LRP Development - can also be used.

3.4. PRIORITY AREAS OF INTERVENTIONS (LONG TERM)

Facilitate to produce quality seeds: NARC is presently conducting some research on turmeric quality seeds; however, there is necessity of greater efforts to produce more varieties of high yielding quality seeds. Further, the varieties with high curcumin content should also be researched. Therefore, the project needs to work collaboratively with NARC and government extension offices and Gyan Herbal (shown keen interest on high curcumin content varieties) for production of high yielding varieties of turmeric seeds having high curcumin content.

Initiate to work towards GAPs and GMPs: In the long run, Nepali turmeric can target more remunerative markets of EU, USA and Japan. To introduce the products in these markets, Good Agricultural Practices (GAPs) and Good Manufacturing Practices (GMPs) will be the pre-requisites. Therefore, the project can start the work on these areas.

Support in establishing infrastructures: During the study, there were demands of collection centres at various locations such as Lekhparajul, Ramghat, Botechaur and Baddichaur. Similarly, the demand of the gravity ropeway was also mentioned in different places as from Bharang to Mohoti, Dhapchakot to Botechaur, and Dharapani to Besepaani during FGDs. In this context, the project can work towards identification and assessment of potential sites for the development of infrastructures that can provide greater impact and wide base of beneficiaries, and facilitate better linkage and access of beneficiaries to government and donor programmes through better coordination

3.5. OTHER SUGGESTED AREAS OF INTERVENTIONS

Develop linkages of the producers with MFIs: Collaborating with partner LNGO, the project can assess the financial needs (generally farmers need loan for seed purchase) of the beneficiary farmers' groups. After the demand analysis, the project can coordinate and facilitate the farmers' groups and/or cooperatives to develop linkage with MFIs and build their capacity towards business planning, legal documentation, finance management and other relevant documentation related to receiving loans from MFIs and its proper disbursement.

Support in getting loan from bank: The project can facilitate traders and lead commercial farmers for getting loan from the banks by organising roundtable talks between traders, commercial farmers and commercial banks in order to develop favourable bank policies for both the parties. Similarly, the project can provide trainings to the traders and lead commercial farmers to develop financial plan ready to be presented to commercial banks.

Support for product diversification: Product diversification can be done targeting both the national and international markets. One area identified during the study is to work on curcumin extraction. Gyan Herbal, a Nepalgunj based company, has shown its willingness to tie up with project for research and production of curcumin extract which have high demand in international markets. The company estimates its potential demand of turmeric to be 300-400 tons.

Support in developing quality assurance label: There is a massive problem of adulterating the turmeric powder with maize and rice flour. This has affected the business of the honest ones providing the fair products. To address this issue, the project can facilitate activities towards designing a quality assurance label in collaboration with AEC and/or Agribusiness Promotion and Marketing Development Directorate (APMDD). The quality norms can be set after a consultation with experts, processors and consumers. The project also needs to support at the beginning for systematic monitoring activities to processors. A fee-based mechanism should be developed for user license of the quality assurance label. The label will help both the consumers and processors with an assurance of the good quality product for the consumers while providing premium price to the processors.

Facilitate to bring traders to production pocket and conduct business meetings: This activity can benefit both the farmers and buyers to create a business linkage and increase trust between them. In addition, the traders can also provide hands on training on the quality requirements of the market.

Conduct exposure visit for lead farmers and traders: Facilitation should be provided to arrange exposure visits and business meetings for commercial farmers and local traders of the production pockets in the project districts to large buyers in regional markets mainly Nepalgunj, Butwal and Kathmandu. Similarly, such exposure visits can be organised for the regional traders/exporters to Indian cities with high turmeric trade such as Nizambad, Dugiralal in Andra Pradesh; Erode, Coimbatore, Salem, Dharmapuri in Tamil Nadu. Prior to the exposure visits, study should be conducted towards identifying large buyers and their willingness to work with the project beneficiaries. These sorts of exposure visits will be helpful for being familiar with the buyers' requirements and also establishing a good business relationship.

Support to participate in the trade fairs and exhibitions: The project can support exporters to participate in international trade fairs and exhibitions, which will provide them a real knowledge of the buyers' requirement, and exposure to international market, thus helping the exporters expand their buyers' base. World Spice Congress in India and Biofach Nuremberg in Germany are some of the trade fairs and exhibitions where the exporters along with government personnel can be assisted for their participation.

Facilitate for better lobbying with the government: The project can facilitate for conducting meetings and workshops for the farmers' groups and other value chain actors. It will be helpful to farmers and other value chain actors for their collective voice in order to lobby with the government agencies for addressing their concerns such as prioritisation of turmeric in their annual planning in turmeric potential districts (e.g., Surkhet), and research for developing high yielding varieties.

REFERENCES

NSCDP (2011). Spices Cultivation Technology (Ginger/Turmeric), Vegetable Development Directorate, MoAC, GoN, Kathmandu, Nepal

GRP (2009). Annual Technical Report 2008/9, Ginger Research Programme, Nepal Agriculture Research Council, Salyan, Nepal

VDD (2011). Annual Progress Report 2010/11, MoAC, GoN, Kathmandu, Nepal

NSCDP 2010. Annual Report 2009/10, Vegetable Development Directorate, MoAC, GoN, Kathmandu, Nepal

FAO (2004). Turmeric- Post-Production Management, http://www.fao.org/fileadmin/user_upload/inpho/docs/Post_Harvest_Compendium_-_Turmeric.pdf

ITC (2011). Trade Statistics for International Business Development, http://www.trademap.org/SelectionMenu.aspx

TEPC (2010). Trade Statistics, http://www.tepc.gov.np/tradestatistics/

IDRC (2000). International Development Research Centre. A Handbook for Value Chain Research. Ottawa: IDRC.

Statistical Year Book (2009/10). GoN, Government of Nepal, Kathmandu, Nepal

APEDA (2011). http://agriexchange.apeda.gov.in/Market%20Profile/MOA/.../Turmeric.pdf

AGMARK (2005). Spices Grading and Marking Rules, http://www.agmarknet.nic.in/spices.pdf

ASTA (2007). http://www.astaspice.org/files/members/Revised2007Version.pdf

ESA (2011). http://www.esa-spices.org/index-esa.html/publications-esa

ANNEXES

Annex 1

Information on study team:

The entire study team was led by Dr. Bhishma Prasad Subedi, Executive Director of ANSAB who provided necessary guidance to the study and mobilized team for conduction of ground study. The study was coordinated by Mr. Puspa Lal Ghimire, Manager/Value Chain Expert and was assisted by Mr. Kabir Ratna Sthapit, Program Officer. For the conduction of field study and data compilation, Mr. Dinesh Banskota was recruited as research assistant, and service of several local enumerators and Local Resource Persons were seek for conduction of household questionnaire survey. Mr. Ritu Panta, Data Analyst/Statistician, looked over the data compilation and report preparation. He was also involved actively throughout the questionnaires and checklists preparation and provided guidance in collection of data in the field. Dr. Durga Devkota, Gender and Social Inclusion Expert, made contribution in designing of the study ensuring the generation and compilation of gender and social inclusion disaggregate data. She also trained and mobilized the teams so as to make study inclusive and with greater reflection in gender equity and social inclusion issues of the region. Mr. Sudarshan Khanal, Program Planning and Communication Specialist at ANSAB contributed towards editing the study document.

Annex2

Table 13 Visited and surveyed market centres and production pockets

Road Corridor	Market Centres Visited	Market Centres Surveyed	Production Pockets Visited	Production Pockets Surveyed
Chhinchu-Jajarkot	Chhinchu, Botechaur, Gairibazar, Baluwa Sanghrahi, Salli Bazaar, Sunauli Bazar, Marko Bazar, Ghoreta, Khalanga	Chhinchu, Botechaur, Gairibazar, Baluwa Sanghrahi, Salli Bazaar	Lekhparajul, Sahare, Malarani, Sunali Bazaar	Malarani, Sahare, Majkara, Ghajeripipal, Kubindae, Chadani, Bamae, Lekhparajul,
Surkhet-Dailekh	Guranse, Mathilo Dungeswor, Chupra, Narayan Municipality	Chupra, Narayan Municipality	Belpatta, Bestada	Belpatta, Kalbhairav, Chupra, Pagnath, Simada, Katti, Bindebasane, Simada,
Surkhet-Jumla	Baddichaur, Tallo Dungeswor, Tunibagar, Rakam Karnali, Khirki Juila, Jite/Hulma, Manma	Tallo Dungeswor, Tunibagar, RakamKarnali, Jite/Hulma, Manma,	Kunathari, Naule Katwal, Raniban, Rakam Karnali, Singhasaini, Kalekanda, Lalu	Naule Katwal, Malika, Singhasaini, Rakam Karnali, Bhairavstahn, Dhamali, Raniban, Lalu, Seuna, Kotbada, Ghailagu, Kalekandha,

Table 14 FGDs conducted in market centres and production pockets

Road Corridor	FGDs conducted in Market Centres	FGDs conducted in Production Pockets
Chhinchu-Jajarkot	Chhinchu, Botechaur, Baluwa Sangrahi	Sahare, Sunauli Bazaar, Lekhparajul
Surkhet-Dailekh	Chupra, Narayan Municipality	Belpatta,
Surkhet-Jumla	Tallo Dungeswor, Jite/Hulma	Kunathari, Naule Katwal, Rakam Karnali, Singhasen, Kalkada, Lalu,

Annex 3

Brief information on the Enablers and Facilitators of the turmeric value chain

a) Government Organizations

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 of activities related to agriculture of associated district. In turmeric, DADOs are implementing various activities on promotion mainly focussing at the production level. Group formation, technical advice to growers, technology demonstrations, and trainings are some of their activities.

National Spice Crop Development Program (NSCDP): This is the national program of spice crops with mandate to promote the spice sector including turmeric. This program has very limited field programs to support the farmers.

Spice Development Centre, Panchkhal: In relation to turmeric, the objectives of this centre are: selection production of high yielding turmeric varieties. However, the access of farmers' to this service is currently lacking.

Nepal Agricultural Research Council (NARC): NARC is responsible for agriculture research in Nepal. Ginger Research Program situated at Kapurkot, Salyan carries out research in turmeric production, processing and storage technologies. It has conducted turmeric germplasm testing and yield evaluation trial at its various locations; however, the program has limited output towards turmeric as its major focus is in ginger.

Vegetable Development Directorate (VDD): The objective of this agency is to promote spices by improving production and productivity; promoting export of spices, substitute spice imports and increases 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.

Plant Protection Directorate (PPD): 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 turmeric, the plant quarantine offices work on legal formalities of export.

Nepal Agriculture Research and Development Fund (NARDEF): It has been funding 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.

b) Non-governmental Organisations

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 technical and financial support from UNDP. The programme has supported some entrepreneurs groups for turmeric processing.

c) Business Membership Organisations and Private Sector

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 sold domestically and internationally. It is one of the major partners in HVAP.

JABAN: Jadibuti Association of Nepal (JABAN) established in 2055 B.S. located in Nepalgunj and is an association of traders and processors. As a supporting organization to NTFP and spices, market information is provided regularly. Recently JABAN has established laboratory facility with Gas Chromatography (CG) machine in the support of government of Nepal. JABAN is mostly focussed its activities in western part of the country.

Annex4

Trade Indicators (Source: ITC, 2011)

Table 15 Trade Indicators of Top Ten Turmeric Exporters of the World in 2010 AD

Exporters	Trade Indicators							
	Value exported in 2010 (USD thousand)	Quantity exported in 2010	Quantity Unit	Unit value (USD/ unit)	Annual growth in value between 2006-2010 (%)	Annual growth in quantity between 2006-2010 (%)	Annual growth in value between 2009-2010 (%)	Share in world exports (%)
World	200077	138289	Tons	1447	38	15	94	100
India	145325	107924	Tons	1347	39	16	108	72.6
Indonesia	7545	6119	Tons	1233	62	28	180	3.8
United Arab Emirates	6850	8574	Tons	799			104	3.4
China	6200	2184	Tons	2839	58	29	42	3.1
Netherlands	4528	1191	Tons	3802	27	18	72	2.3
Myanmar	4032	3305	Tons	1220	46	14	-32	2
Viet Nam	3242	1492	Tons	2173	-7	-31	81	1.6
Peru	2568	1017	Tons	2525	26	11	350	1.3
Pakistan	1966	761	Tons	2583	65	24	165	1
Germany	1935	455	Tons	4253	31	10	86	1

Table 16 Trade Indicators of Top Ten Turmeric Importer of the World in 2010 AD

Importers	Trade Indicators							
	Value imported in 2010 (USD thousand)	Quantity imported in 2010	Quantity Unit	Unit value (USD/ unit)	Annual growth in value between 2006-2010 (%)	Annual growth in quantity between 2006-2010 (%)	Annual growth in value between 2009-2010 (%)	Share in world imports (%)
World	186351	96611	Tons	1929	32	5	96	100
United Arab Emirates	24427	17622	Tons	1386	50	14	199	13.1
Malaysia	14175	6272	Tons	2260	49	12	117	7.6
Japan	13485	3798	Tons	3551	24	-3	46	7.2
United States of America	13368	3522	Tons	3796	19	5	99	7.2
United Kingdom	9118	2781	Tons	3279	30	4	93	4.9
Sri Lanka	8785	4197	Tons	2093	70	4	100	4.7
Iran (Islamic Republic of)	8748	9712	Tons	901	54	30		4.7
Bangladesh	8571	6225	Tons	1377	40	9	135	4.6
India	8002	4626	Tons	1730	12	-7	45	4.3
South Africa	7826	2466	Tons	3174	41	2	161	4.2
Germany	7544	2212	Tons	3410	32	10	116	4

Annex5

Table 17 Some Brand Names of Turmeric Powder in the Project Area

Brand Name	Manufacturer	Address
Century	Dugar Spice and Foods	Biratnagar
Rentury	Bhattarai Masala Production and Packaging Industry	Birendranagar
Uajalo	Malika Masala Udyog	Birendranagar
Krishna	Shree Radha Krishna Masala Products	Butwal
Surya	Surya Masala Udhyog	Butwal
Everest	Everest Food Products	Birgunj

Annex 6

Quality Standards

a) ASTA Cleanliness Specifications

The ASTA Cleanliness Specifications have become a standard for most exporting countries, who have built their facilities to meet those requirements. Importing countries that do not have specified standards may have used ASTA's specifications.

Table 18 ASTA Cleanliness Specification for Turmeric

Whole insects, dead	Excreta, Mammalian	Excreta, Others	Mold	Insect Defiled/Infested	Extraneous Foreign Matter [1]
by count	by mg/kg	by mg/kg	% by weight	% by weight	% by weight
3	11.1	11.1	3	2.5	0.5

[1] *extraneous matter includes but is not restricted to: stones, dirt, wire, string, stems, sticks, non toxic foreign seeds, excreta, manure, and animal contamination.*

ASTA sampling guidelines are as follows: precisely weighed samples are passed through a sieve (U.S. Standard No 8, or standard pepper sieve No 9) with a white paper underneath to observe foreign matter, insects and mammalian excreta. Rhizomes are examined for mold and defiling insects. Foreign matter is reported by count (insects) or by weight.

b) European Union Cleanliness Specification

EU-member countries such as the U.K., Germany and the Netherlands have their own specifications. The European Spice Association (ESA) has a set of "quality minima for herbs and spices", but has yet to finalise the cleanliness specification standards for spices and spice products.

Table 19 ESA Quality Minima for Turmeric

Turmeric product	Total Ash (% w/w) max (ISO 928)	Acid Insoluble Ash (%w/w) max (ISO 930)	Moisture (%w/w) max (ISO 939)	Volatile oil (v/w) min (ISO6571)
Whole	8[a]	2[a]	12[a]	2.5[a]
Ground	9[b]	10[b]	10[b]	1.5[c]

[a]*: British Standards Institute*
[b]*: Indian Standards Institute*
[c]*: European Spice Association*

Extraneous matter and foreign matter should not exceed 1% and 2%, respectively. Should be free from live and/or dead insects, insect fragments and rodent contamination visible to the naked eye (corrected if necessary for abnormal vision).

Salmonella must be absent in (at least) 25 g of material. Yeast and mold: 105/g (target), absolute maximum: 106/g. E. coli: 102/g (target), absolute maximum: 103/g.

The European Union has fixed limits for aflatoxin, which should not exceed 10 ppb (total aflatoxins), and 5 ppb for aflatoxin B1. Individual European Union member countries have their own limits varying from 1 to 20 ppb. In the United States, aflatoxin B1 should not exceed 20 ppb.

c) Agmark Specifications:

1) Grade Designations and Quality of Turmeric (whole)

Special Characteristics					
	Organic extraneous matter, % (m/m) (Max.)	Inorganic extraneous matter, % (m/m) (Max.)	Defective rhizomes, % (m/m) (Max.)	Moisture, % (m/m) (Max.)	Curuminoid content, % (m/m) (Min.)
(1)	(2)	(3)	(4)	(5)	(6)
Special Standard	0.8 1.5	0.2 0.5	3.0 5.0	12.0 12.0	2.0 Not specified
General Characteristics (7)					

(1) Turmeric shall be primary or secondary rhizomes commercially called bulbs or fingers respectively of the plant Curcuma longa L;
(2) Rhizomes may be in natural state or polished;
(3) They shall not be artificially coloured;
(4) They shall be free from mould growth, living insects and practically free from dead insects, insects, insect fragments and rodent contamination;
(5) They shall comply with restrictions in regard to Aflatoxins, Metallic Contaminants, Insecticide or Pesticide residue, Poisonous metals, naturally occurring Contaminants, Microbial load etc as specified by the Codex Alimentarius Commission or as per buyers' requirements for Export purposes and the Prevention of Food Adulteration Rules, 1955 for domestic trade.
(6) Lead chromate test shall be negative.

Definitions:

(a) "Defective rhizomes" means shrivelled rhizomes, internally damaged, hollow or porous rhizomes, rhizomes scorched by boiling and other types of damaged rhizomes.
(b) "Inorganic extraneous matter" includes stones, particles of soil, dust, mud and the like;
(c) "Organic extraneous matter" includes all vegetable matter other than rhizomes.

2) Grade Designations and Quality of Turmeric Powder

Special Characteristics					
	Moisture % (m/m) (Max.)	**Total ash % (m/m) (Max.)**	**Acid insoluble ash, % (m/m) (Max.)**	**Curcuminoid content % (m/m) (Min.)**	**Starch % (m/m) (Max.)**
(1)	(2)	(3)	(4)	(5)	(6)
Special	10	7.0	1.5	2.0	60
Standard	12	9.0	1.5	Not specified	60
General Characteristics (7)					

(1) Turmeric powder shall be prepared by grinding clean, dry Turmeric (*Curcuma longa* L) rhizomes.
(2) It shall be ground to such fineness that 98% of the product passes through a 300-micron sieve. It shall be labelled "Coarse Ground" when 98% of the product passes through 800-micron sieve.
(3) It shall have its characteristic taste, flavour and free from musty odour.
(4) It shall be free from any colouring matter, foreign starch and any other adulterant.
(5) It shall be free from mould growth, living insects and practically free from dead insects, insect fragments and rodent contamination.
(6) It shall comply with restrictions in regard to Aflatoxins, Metallic Contaminants, Insecticide or Pesticide residue Poisonous metals, naturally occurring Contaminants or as per buyers requirements for export purposes and the Prevention of Food Adulteration Rules, 1955 for domestic trade.
(7) Lead chromate test shall be negative.

d) Organic requirements:

In general, to be labelled "organic", a product must be grown following organic agricultural practices. Post-harvest handling and processing must be done in certified facilities, whether on the farm or in food packing or processing facilities. Only mechanical, thermal or biological methods can be used in organic processing. The use of genetically modified organisms (GMO) (plants, animals or bacteria) and products of GMO are prohibited in organic production. Likewise, ionising radiation and sewage sludge are prohibited from organic agricultural practices. In addition to standards pertaining to the production of organic products, IFOAM basic standards include environmental and social justice requirements. IFOAM, EU and U.S. organic standards include lists that allow the use of specific synthetic, non-agricultural or non-organic agricultural substances. To comply with organic standards and practices, the operator must document all farming and post-harvest activities. The following records must be maintained: farm field map, field history, activity register, input records including purchases, output records including sales, harvest records, storage records, pest control records, movement records, equipment cleaning and labelling. All such documentation must meet specific standards that are enumerated in directives issued by the certification agencies.

In the processing plant, the operator must present an "organic handling plan" that will show how contamination from prohibited materials and commingling with non-organic products will be prevented. This includes a detailed description of the process, receiving and storage of ingredients and finished products, cleaning and sanitation of the processing equipment, facilities pest management, and a documentary "paper trail" that must permanently record all of the above.

For the spice and oleoresins production, ionizing radiation and the use of volatile synthetic solvents are prohibited for use in the processing of organic products.

Annex 7

Examples of Drying Machine (Source: FAO, 2004)

Annex 8

A. Commercially Grown Varieties of India

Variety	Characteristics
Alleppey	Highly coloured variety. It is grown in Kerala and is marketed as Alleppey turmeric
Duggirala	A long duration type (9 months), major variety of Andhra Pradesh. Rhizomes are bright yellow in colour. Grown mostly in Guntur district. Yield of raw material 25 MT/ha.
Armoor	Mostly grown in Nizamabad district ct of Andhra Pradesh. Medium duration type. Yield of raw material 25-30 tons/ha.
Suvarna	This is a high yielding type released by IISR, Calicut. It has yield potential of 43tons/ha. It has also high curcumin content of 8.7%

Source: agriexchange.apeda.gov.in/Market%20Profile/MOA/.../Turmeric.pdf

B. Names of Processors Interested to Work with Project

SN	Name of Company	Address	Contact Person	Contact Number
1	Bhattarai Masala Production and Packaging Industry	Surkhet	Khagendra Bhattarai	9858050653
2	Malika Masala Udhyog	Surkhet	Sher Bahadur Khadka	9858051499
3	Shiva Shakti Rice Mills	Surkhet	Gita Ram Thapa	9848262534
4	Jwala Gadi Masala Udhyog	Dailekh		9748030123

Annex 9

FGD Participants List

Chhinchu traders FGD

S.NO	Name of Participants	Organisation	Address	Mobile No.
1	Khadak Bahadur Budha	Trader	Ramghat -4	98482046071
2	Tak Kable Yadav	Trader	Ramghat-5	9848000961
3	Ram Kebal Yadav	Trader	Chhinchu-6	9848115014
4	Moti Ram Sharma	Trader	Lekhaparajul	98848192790
5	Tarkeswar J aisawal	Trader	Chhinchu -7	9848047351
6	Puspa L. Gimire	ANSAB	Kathmandu	
7	Prakash Katwal	ANSAB	Kathmandu	
8	Sanjeeb Kumar Shrestha	SNV	Surkhet	9841341118
9	Kabir Ratna Sthapit	ANSAB	Kathmandu	9849275909
10	Pradeep Majgaiyan	ANSAB	Kathmandu	9803007881

Chupra Traders FGD

S.NO	Name of Participants	Organisation	Address	Mobile No.
1	Kabir Ratna Sthapit	ANSAB	Kathmandu	9849275909
2	Sandeep Kumar Panta	Trader	Belpata-5	9848242007
3	Yagya Raj Bhandari	Trader	Belpata-2	9748030422
4	Gayan Bahadur Parajuli	Trader	Belpata-2	9748034298
5	Ganesh Parajuli	Trader	Belpata-5	081690076
6	Amar Bahadur Bhandari	Trader	Belpata-5	9748041485
7	Chandra Bahadur Bhandari	Trader	Belpata-1	9848221111
8	Lalit Bahadur Bista	Trader	Belpata-5	9848208881
9	Prem Bahadur Karki	Trader	Belpata-5	9848213805
10	Deepak Kumar Panta	Trader	Belpata-5	9848139754
11	Bhog Bahadur Bista	Trader	Belpata-5	9848168960
12	Mohammat Ali	Trader	Belpata-5	993892008
13	Keshab Karki	HVAP	Surkhet	9848050385
14	Dhansara	LRP	Surkhet	9848128103
15	Dinesh Bastakoti	ANSAB	Kathmandu	9841878492
16	Pradeep Majgaiyan	ANSAB	Kathmandu	9803007881

Tallo Dungeswor Traders FGD

S.NO	Name of Participants	Organisation	Address	Mobile No.
1	Sarbajeet Thapa	Durga Agricultural Group	Naulekatuwal	9814597321
2	Top Bahadur Thapa	Pancheswar Hat Bajarsamiti	Naulekatuwal	9748015993
3	Top Bahadur Thapa	Vegetable group	Naule -4	9748030108
4	Lal Bahadur B.K.	NEAT	Naulekatuwal	9848017313
5	Yog Narayan Singh			9848181394

6	Keshab Karki	HVAP	Surkhet	
7	Denesh Bastakoti	ANSAB	Ktm	9841878492
8	Dhansara G.C	LRP	Surkhet	9848128103
9	Kabir Ratna Sthapit	ANSAB	Ktm	9849275909
10	Dhan Bahadur Shahi	Pancheswari Cooperatives	Naulekatuwal	

BaluwaSangrhi Traders FGD

S.NO	Name of Participants	Organisation	Address	Mobile No.
1	Dhansara G.C	LRP	Surkhet	9848128103
2	Sharaswati Oli	Agricultural Saving and Credit cooperatives	Salyan -9 sangrahi	
3	Tilak Oli	Agricultural Saving and Credit cooperatives	Salyan -9 sangrahi	9848081730
4	Um Bahadur Kuwar	Agricultural Saving and Credit cooperatives	Salyan -9 sangrahi	
5	Jhamane Budha	Agricultural Saving and Credit cooperatives	Kubinda -3	
6	Sher Bahadur	Agricultural Saving and Credit cooperatives	Majhakada -9	9748042242
7	Kul Bahadur Puri	Agricultural Saving and Credit cooperatives	Majhakada -9	9848042633
8	Pramod Khadka	Agricultural Saving and Credit cooperatives	Majhakada -9	
9	Khum Lal Budha	Agricultural Saving and Credit cooperatives	Majhakada -9	9816559088
10	Kabir Ratna Sthapit	ANSAB	Ktm	9849275909

Baddichaur Traders/Farmers FGD

S.	Name of Participants	Organisation	Address	Mobile No.
1	Kabir Ratna Sthapit	ANSAB	Kunathari- 4 Surkhet	98492275909
2	Narayan Prashad Sigdel	Shree Janajoti Higher secondary school	Kunathari- 4 Surkhet	9858023524
3	Parsu Ram Kadel	Shrot Khola Jadibuti Krishi Sahakari	Kunathari- 4 Surkhet	9848119700
4	Yani Ram Adikari	Sthaniya Shanti Samiti	Kunathari- 4 Surkhet	9848138019
5	Dhim Raj Magar	Shrot Khola Jadibuti Krishi Sahakari	Kunathari- 4 Surkhet	9858051250
6	Bal Bahadur Khadka	Shrot Khola Jadibuti Krishi Sahakari	Kunathari- 2 Surkhet	9848122890
7	Rabi lal Koirala	Cooperative Agro vet	Kunathari- 4 Surkhet	9848161175
8	Sakta Bahadur Khadka	Cooperative shop	Kunathari- 4 Surkhet	
9	Lal Bahadur Basnet	Social Worker	Kunathari- 4 Surkhet	
10	Kamal Prasad Lamichane	Irrigation office	Kunathari- 4 Surkhet	9848139390

11	Bhawan Siha Sijapati		Kunathari- 5 Surkhet	98481223701
12	Prakash Katwal	ANSAB	KTM	9741044873
13	Puspa L. Ghimire	ANSAB	KTM	9851051225

Chupra Farmers FGD

S.	Name of Participants	Organisation	Address	Mobile No.
1	Pradeep Majgaiyan	ANSAB	Kathmandu	9803007881
2	Prem Bahadur Khatri	Farmer	Chupra	9848211012
3	Resham Bhandari	Farmer	Chupra	
4	Kul Karki	Farmer	Chupra	
5	Hikmat Bahadur Godar	Farmer	Chupra	
6	Purna Bahadur	Farmer	Chupra	
7	Ganesh Bahadur Khatri	Farmer	Matela	
8	Youbraj Timalsina	Service provider	Belpata -4	9848003433
9	Durga Prasad Gautam	Social mobilizer	Belpata -4	9748025600
10	Thir Bahadur Khatri	Farmer	Belpata -3	
11	Rana Bahadur Khatri	Farmer	Belpata -5	
12	Thir Bahadur Khatri	Farmer	Belpata -3	
13	Sayam Bahadur Rana	Farmer	Belpata -5	9748020694
14	Tilak Karki	Farmer	Belpata -1	9848141035
15	Kabir Ratna Sthapit	ANSAB	Kathmandu	98492275909
16				

Naule Katwal Farmers FGD

S.	Name of Participants	Organisation	Address	Mobile No.
1	Bam Bahadur Thapa	Durga Krishi Taja Tarkari	Naule katuwal-4	9848022142
2	Nar Bahadur Thapa	Durga Krishi Taja Tarkari	Naule katuwal-4	
3	Dil Bahadur Thapa	MahalakshamiTajaTarkari	Naule katuwal-4	
4	Nayanlal Thapa	Durga Krishi Taja Tarkari	Naule katuwal-4	9815516335
5	Ghanshyam Thapa	Durga Krishi Taja Tarkari	Naule katuwal-4	9815556641
6	Thapa	MahalakshamiTajaTarkari	Naule katuwal-4	
7	Lal Bahadur Thapa	MahalakshamiTajaTarkari	Naule katuwal-4	
8	Iswari Thapa	Durga Krishi Taja Tarkari	Naule katuwal-4	98165506876
9	Indra Thapa	Durga Krishi Taja Tarkari	Naule katuwal-4	
10	Bhakta Bahadur Thapa	Durga Krishi Taja Tarkari	Naule katuwal-4	
11	Lok Bahadur Thapa	Durga Krishi Taja Tarkari	Naule katuwal-4	
12	Sher Bahadur Thapa	Durga Krishi Taja Tarkari	Naule katuwal-4	
13	Dhansara G.C	LRP	Surkhet	

14	Kabir Ratna Sthapit	ANSAB	Kathmandu	98492275909

Rakam Karnali Farmers FGD

S.	Name of Participants	Organisation	Address	Mobile No.
1	Gopal Shing Majhi	Latamandu Krishak Samuha	Rakam	9842002810
2	Dhan Bahadur Majhi	Latamandu Krishak Samuha	Rakam-7	9848007464
3	Pana Bahadur Majhi	Latamandu Krishak Samuha	Rakam	
4	Pabitra Majhi	Latamandu Krishak Samuha	Rakam	
5	Debisara Majhi	Latamandu Krishak Samuha	Rakam	9848007664
6	Jaisara Majhi	Latamandu Krishak Samuha	Rakam	
7	Daidhara Majhi	Latamandu Krishak Samuham	Rakam	9848001810
8	Hojayali Majhi	Latamandu Krishak Samuha	Rakam-7	
9	Motiram Majhi	Latamandu Krishak Samuha	Rakam-7	9848116204
10	Nar Bahadur Sijapati	Latamandu Krishak Samuha	Rakam-7	9848142449
11	Bhadra B.K	Latamandu Krishak Samuha	Rakam-4	
12	Uday Magar	Latamandu Krishak Samuha	Rakam-4	9848002816
13	Hurpati Majhi	Latamandu Krishak Samuha	Rakam-7	
14	Yog Narayan Shiha	Latamandu Krishak Samuha	Rakam-7	
15	Dhansara G.C	LRP	Surkhet	
16	Kabir Ratna Sthapit	ANSAB	Kathmandu	98492275909

Sihashin Farmers FGD

S.	Name of Participants	Organisation	Address	Mobile No.
1	Hari Chandra Puri	Krisak KalyanSamuha	Sihashin -9	
2	Dhanrup Thapa	Krisak Kalyan Samuha	Sihashin -9	9848115048
3	Bhagirathi Acharya	Krisak Kalyan Samuha	Sihashin -8	9848077441
4	Lal Shova Shahi		Sihashin -8	9848972932
5	Naurata Puri	Krisak Kalyan Samuha	Sihashin -8	9848301780
6	Dhanraj Puri		Sihashin-8	
7	Bimala Thapa	Krisak Kalyan Samuha	Sihashin-8	
8	Dopa Puri	Krisak Kalyan Samuha	Sihashin-8	
9	Sarada Puri	Rakam Agriculture Service Center	Sihashin-8	
10	Yog Narayan Singh	Krisak Kalyan Samuha	Sihashin-8	
11	Gota K.C	Krisak Kalyan Samuha	Sihashin-8	
12	Dhansara G.C	Krisak Kalyan Samuha	Surkhet	
13	Kabir Ratna Sthapit	ANSAB	Kathmandu	9849227590 9

Kalikanda Farmers FGD

S.	Name of Participants	Organisation	Address	Mobile No.
1	Hari lal Bhadr	Farmer	Kalikanda	9848478181
2	Gitanand Bhadr	Farmer	Kalikanda	
3	Gangaram Bhadra	Farmer	Kalikanda	
4	Bhakti Ram Bhadra	Farmer	Kalikanda	
5	Riuli Bhadra	Farmer	Kalikanda	
6	Abi Karki	Farmer	Kalikanda	98485526891
7	Chhite Mul	Farmer	Kalikanda	9848281882
8	Birun Kala Jaishi	Farmer	Kalikanda	
9	Nabaraj Mul	Farmer	Kalikanda	9848775645
10	Kaludebi Bhai	Farmer	Kalikanda	
11	Harka Bhul	Farmer	Kalikanda	9848536909
12	Gambhir Bhul	Farmer	Kalikanda	
13	Hari Shiva	Farmer	Kalikanda	
14	Dabale Sarki	Farmer	Kalikanda	
15	Gita K.C	LRP	Surkhet	
16	Kabir Ratna Sthapit	ANSAB	Kathmandu	98492275909

Sahare Farmers FGD

S.	Name of Participants	Organisation	Address	Mobile No.
1	Dinesh Bastakoti	ANSAB	Sahare -8	9841878492
2	Dal Bahadur Oli	Farmer	Sahare -8	9848140652
3	Shal Bahadure Oli	Farmer	Sahare -8	
4	Gita Ram Thapa	Farmer	Sahare -8	9848262534
5	Sigachi Khatri	Farmer	Sahare -4	9848218782
6	Ser Bahadur B.K	Farmer	Sahare -9	9848214408
7	Jaya Bahadur Gharti	Farmer	Sahare -8	
8	Bir Bahadur Gharti	Farmer	Sahare -9	
9	Khal Bir Budha	Farmer	Sahare -9	
10	Sumitra Rana	Farmer	Sahare -9	
11	Pampakali Rana	Farmer	Sahare -9	
12	Narendra Kumar	Farmer	Sahare -9	
13	Gita K.C	LRP	Surkhet	
14	Dhansara G.C	LRP	Surkhet	
15	Kabir Ratna Sthapit	ANSAB	Kathmandu	98492275909

Lekhparajul Farmers FGD

S.NO	Name of Participants	Organisation	Address	Mobile No.
1	Dinesh Bastakoti	ANSAB	Kathmandu	9841878492
2	Ram Raj Khadka	Farmer	Lekhparajul	9748036679

3	Padam Bahadur Oli	Chure Parbat Krishi Samuha	Lekhparajul	9848191323
4	Mansi Budha	Farmer	Lekhparajul	9842032536
5	Motiram Sharma	Trader	Lekhparajul	9848192790
6	Tikaram Oli	Farmer	Lekhparajul	
7	Mankumari Sharma	Farmer	Lekhparajul	
8	Harikala Sharma	Farmer	Lekhparajul	
9	Ram Shara Khadka	Farmer	Lekhparajul	
10	Tika Sharma	Teacher	Lekhparajul	9814575488
11	Sagar Godar	ANSAB	Kathmandu	
12	Nar Bahadur	Farmer	Lekhparajul	9748040353
13	Ratnalal Budha	Farmer	Lekhparajul	
14	Nokhe Katha	Farmer	Lekhparajul	
15	Budde Bhudha	Farmer	Lekhparajul	
16	Kabir Ratna Sthapit	ANSAB	Kathmandu	

Sunauli Bazaar Farmers FGD

S.	Name of Participants	Organisation	Address	Mobile No.
1	Dinesh Bastakoti	ANSAB	Ktm	9841878492
2	Hiralal Basnet	Farmer	Ghajaripipal	
3	Debilal Khatri	Farmer	Ghajaripipal	
4	Sukhadev Anjan	Farmer	Sunauli	9748027900
5	Dal Bahadur Pariyar	Farmer	Sunauli	9748047873
6	Mohan B.K	Farmer	Ghajaripipal	
7	Bijay Pun	Farmer	Sunauli	974850928
8	Shantosh Basnet	Farmer	Ghajaripipal	
9	Dhan Bahadur Khadka	Farmer	Ghajaripipal	9813829324
10	Dambar Budhathoki	Farmer	Chande	9816508856
11	Dhansara G.C	Farmer	Surkhet	
12	Kabir R. Sthapit	ANSAB	Kathmandu	98492275909

Jite/Hulma Farmers/Traders FGD

S.No	Name of Participants	Organisation	Address	Mobile No.
1	Dinesh Bastakoti	ANSAB	Ktm	9841878492
2	Radhika Bhandari	Farmer	Lalu-6	
3	Durga Bahadur Bist	SAADA Nepal	Kalikot	9848348317
4	Ramane Bist	Farmer	Lalu-4	
5	Kebal Siha	Farmer	Lalu-9	
6	Lal Bahadur B.K	Farmer	Brokhada	
7	Kaili Debi	Farmer	Brokhada	
8	Maglo B.K	Farmer	Brokhada	
9	Dangali Bogati	DFO	Manm	9848307025
10	Jang Bahadur Shahi	DFO	Manm	9848319808
11	Sagar Godar	ANSAB	Kathmandu	

12	Kabir R. Sthapit	ANSAB	Kathmandu	98492275909