

**IMPROVED VEGETABLE SEED MARKETING IN
SELECTED DISTRICTS OF NEPAL**

**By
Subhechcha Shrestha
Shankar Dev Campus
Campus Roll No.: 368/063
2nd Year Exam Symbol No.: 2682**

**A Thesis Submitted to
Office of the Dean
Faculty of Management
Tribhuvan University**

*In partial fulfillment of the requirement for the Degree of
Master in Business Studies (MBS)*

**Kathmandu, Nepal
February, 201**

RECOMMENDATION

This is to certify that the thesis

Submitted by:

SUBHECHCHA SHRESTHA

Entitled:

**IMPROVED VEGETABLE SEED MARKETING IN
SELECTED DISTRICTS OF NEPAL**

*has been prepared as approved by this Department in the prescribed format of
the Faculty of Management. This thesis is forwarded for examination.*

.....
Dr. N.K. Pradhan
(Thesis Supervisor)

.....
Prof. Dr. Kamal Deep Dhakal
(Head, Research Department)

.....
Asso. Prof. Prakash Singh Pradhan
(Campus Chief)

VIVA-VOCE SHEET

We have conducted the viva-voce of the thesis presented

by:

SUBHECHCHA SHRESTHA

Entitled:

**IMPROVED VEGETABLE SEED MARKETING IN
SELECTED DISTRICTS OF NEPAL**

And found the thesis to be the original work of the student and written according to the prescribed format. We recommend the thesis to be accepted as partial fulfillment of the requirement for the degree of

Master of Business Studies (MBS)

Viva-Voce Committee

Head, Research Department

Member (Thesis Supervisor)

Member (External Expert)

DECLARATION

I hereby declare that the work reported in this thesis entitled “**Improved Vegetable Seed Marketing in Selected Districts of Nepal**” submitted to Office of the Dean, Faculty of Management, Tribhuvan University, is my original work done in the form of partial fulfillment of the requirement for the degree of Master of Business Studies (MBS) under the supervision of **Dr. N.K., Pradhan** of Shankar Dev Campus, T.U.

.....
Subhechchha Shrestha
Shankar Dev Campus
Campus Roll No.: 368/063
2nd Year Exam Symbol No.: 2682

ACKNOWLEDGEMENTS

This study was undertaken as the research work for partial fulfillment of the Masters Degree of Business Studies (M.B.S.), Department of Management, Tribhuvan University. I have selected the topic “Improved Vegetable Seed Marketing in Selected Districts of Nepal” for my research work.

This study would not have been possible without the support of many people. I would like to express my deep sense of gratitude to my thesis supervisor, Dr. N.K. Pradhan who was abundantly helpful and offered invaluable assistance, support and guidance during my work. Also, I would like to express my sincere gratitude to the Shankar Dev Campus.

I am very thankful to all the respondents for providing me necessary information for my study, without which this study would not have been successful. Moreover, I would like to extend special thanks to CEAPRED for providing me the required information during my study.

Finally, I would like to thank my family and friends for all their invaluable support, understanding & endless love, through the duration of my studies.

Subhechcha Shrestha

TABLE OF CONTENTS

	Page No.
RECOMMENDATION	i
VIVA-VOCE SHEET	ii
DECLARATION	iii
ACKNOWLEDGEMENTS	iv
TABLE OF CONTENTS.....	v
LIST OF TABLES.....	vii
LIST OF FIGURES.....	viii
ABBREVIATIONS	ix
EXECUTIVE SUMMARY	xi
CHAPTER - I INTRODUCTION	1
1.1 Background.....	1
1.2 Statement of the problem.....	2
1.3 Objective of the study	3
1.4 Rationale of the study	3
1.5 Limitations of the study	4
1.6 Organization of the study.....	4
CHAPTER - II LITERATURE REVIEW	5
2.1 Conceptual Review	5
2.1.1 Vegetable	5
2.1.2 Seed.....	5
2.1.3 Stages of Seed Multiplication	6
2.1.4 Truthful label	7
2.1.5 Hybrid seed.....	7
2.1.6 Marketing.....	7
2.2 Review of Related Studies.....	8

2.2.1	History of vegetable seed production in Nepal	8
2.2.2	Major vegetable seeds produced in Nepal	8
2.2.3	Vegetable seed related policies and acts	10
2.2.4	Supporting/related agencies (institutional framework)	11
2.2.5	Demand and Supply of Vegetable Seed in Nepal	16
2.2.6	Vegetable seed marketing in Nepal	22
2.2.7	Problems/constraints	29
 CHAPTER – III RESEARCH METHODOLOGY.....		32
 CHAPTER – IV RESULTS AND FINDINGS		33
4.1	General information of surveyed agro-vets and seed companies.....	33
4.2	Status of business.....	33
4.3	Major vegetable seeds sold	36
4.4	Major seasons for vegetable seed sale	1
4.5	Status of seed supply.....	37
4.6	Seed agreement and related problems.....	39
4.7	Packaging, practice of truthful labeling and price difference	41
4.8	Vegetable seed supplying districts.....	43
4.9	Different actors and their role in vegetable seed production till marketing.....	47
4.10	Marketing channel/structure of vegetable seed in Nepal	48
4.11	Farmers' complaints about vegetable seed sold	49
4.12	Provision of compensation for loss due to seed.....	50
4.13	Constrains	51
 CHAPTER – V CONCLUSIONS AND RECOMMENDATIONS		54
5.1	Conclusions.....	54
5.2	Recommendations.....	55
 REFERENCE.....		56
 ANNEXES.....		58

LIST OF TABLES

Table No.	Title	Page No.
Table 2. 1:	Regional Vegetable Seeds Production Areas	8
Table 2. 2:	Summary of institutional roles and activities: Vegetable Seeds	15
Table 2. 3:	Vegetable seed demand in Nepal	17
Table 2. 4:	Estimated improved seed requirement for 10 vegetables for 2009/10	17
Table 2. 5:	Share of Domestic and Imported Seed in the Nepalese Market for Selected Crops in (2003/04).....	19
Table 2. 6:	Vegetable seed production in Nepal.....	20
Table 2. 7:	Import of Vegetable Seeds for 2008/9 and 2009/10.....	21
Table 2. 8:	Annual sales of improved seeds of vegetable, 1992/93 - 2010/2011	23
Table 2. 9:	Value Chain of Vegetable Seeds in Nepal	25
Table 3. 1:	Development region and district wise number of surveyed Agro-vets and Seed Companies.....	32
Table 4. 1:	Establishment year of agro-vets and seed companies..	33
Table 4. 2:	Annual transaction of the agro-vet or company	34
Table 4. 3:	Annual transaction scenario (in %)	34
Table 4. 4:	District wise percentage of OP and hybrid seed sale (in %)	35
Table 4. 5:	District wise vegetable seed sale months with respect to season	37
Table 4. 6:	Import of vegetable seeds in terms of respondents	38
Table 4. 7:	District wise OP vegetable seed supplying country	38
Table 4. 8:	Comparative price analysis of differently packed seeds per gram	42
Table 4. 9:	Vegetable seed supplying districts of vegetable seed sellers of surveyed districts.....	45
Table 4. 10:	Different actors in vegetable seed production and their roles	47
Table 4. 11:	Source of compensation for inferior quality of seed (No. of respondents) 50	
Table 4. 12:	Provision of source seed to seed producers	51
Table 4. 13:	Problem categories and explanations	52

LIST OF FIGURES

Figure No.	Title	Page No.
Figure 2. 1:	General marketing/distribution channels for commercial (improved) vegetable seeds	49
Figure 2. 2:	Value stages and activities of vegetable seed	48
Figure 3. 1:	Number of Agro-vets and Seed Company surveyed	32
Figure 4. 1:	Percentage of OP and hybrid vegetable seed sale	34
Figure 4. 2:	Ranking of vegetable seeds based on the sale	36
Figure 4. 3:	Percentage of responses for vegetable seed sale months with respect to season	36
Figure 4. 4:	Responses on performing contractual agreement	39
Figure 4. 5:	Problems faced by following the contractual agreement	39
Figure 4. 6:	Types of problems faced by agro-vets and seed companies while following the contractual agreement	41
Figure 4. 7:	Percentage of respondents practicing truthful label	41
Figure 4. 8:	Comparative price analysis of differently packed seeds per gram	43
Figure 4. 9:	Districts from where surveyed seed companies and agro-vets purchase vegetable seed (% of respondents)	44
Figure 4. 10:	General marketing/distribution channels for domestically produced and imported (improved) vegetable seeds	49
Figure 4. 11:	Major complaints faced by seed sellers from farmers about vegetable seed sold	49
Figure 4. 12:	% of respondents providing compensation to farmers	50
Figure 4. 13:	Basis for compensation by entrepreneurs	50

ABBREVIATIONS

AEC	Agro Enterprise Center
APP	Agriculture Perspective Plan
CBED	Community Based Economic Development Project
CEAPRED	Center for Environmental and Agricultural Policy Research, Extension and Development
CECI	Centre for International Studies and Cooperation
CSTL	Central Seed Testing Laboratory
DADO	District Agriculture Development Office
DANIDA	Danish International Development Agency
DFID	Department for International Development
DoA	Department of Agriculture
DUS	Distinctness, Uniformity & Stability
FAO	Food and Agriculture Organization
FR	Farmers' Right
GMO	Genetically Modified Organism
GoN	Government of Nepal
HVAP	High Value Agriculture Project in Hill and Mountain Areas
HVC	High Value Crops
KOSEVEG	Koshi Hills Seed and Vegetable Project
Li-BIRD	Local Initiatives for Biodiversity, Research and Development
MARD	Market Access for Rural Development
MoAD	Ministry of Agricultural Development
MT	Metric Ton
NAP	National Agricultural Policy
NARC	Nepal Agriculture Research Council
NPQP	National Plant Quarantine Program
NSB	National Seed Board
NSC	National Seed Company

NSP	National Seed Policy
ODA/UK	Official Development Assistance/United Kingdom
OP	Open Pollinated
PVP	Plant Variety Protection
SDC	Swiss Agency for Development and Cooperation
SEAN	Seed Entrepreneurs of Nepal
SQCC	Seed Quality Control Center
SSSP	Seed Sector Support Project
TL	Truthful Label
USAID	United States Agency for International Development
VCU	Value for Cultivation and Use
VFC	Vegetable, Fruits and Cash Crops Development Project

EXECUTIVE SUMMARY

Vegetable seed is a high value, low volume and non-perishable product which have proven to be a viable income generation option for addressing economic development of remote areas.

The objective of this report is to analyze the present trend of seed sale, to assess the comparative price differences of differently packed seeds and to identify the problems prevailing in seed business. A set of structured questionnaire was developed and used to interview fifty-seven respondents which included agro-vets and seed companies.

More than 50% of the total transaction of agro-vets and seed companies is occupied by seed of which 30% is occupied by vegetable seeds. Amongst the total vegetable seed sale, more than half (54%) is contributed by open pollinated seeds. Demand for vegetable seed is largely met by seed import namely from Japan, India and China. Out of 23 vegetables, Radish, Beans, Cauliflower and Broad leaf mustard have good demand across all agro-ecology.

Vegetable seeds are available in three types of packaging, normal plastic pouch, good plastic or paper pouch with truthful label (TL) and aluminum lined paper packages with full information as in imported seeds. The detail study explicitly states that the price differences between seeds with and without TL ranges from 40-60%. The truthful labeled and well packed or sophisticated packed seeds fetch higher price and are more popular among the growers. Thus, the sale of seed is highly dependent on good packaging in seed business. The study also highlights the importance of TL in terms of better price and reliability. Similarly, the respondents unanimously agreed on the fact that well packed seeds with full information gain better trust from farmers.

Majority of respondents performed an advance contract with seed producer groups for seed production but, a very few entrepreneurs are providing the source seeds to the producers. Likewise, limited numbers of entrepreneurs are providing compensation to farmers for inferior and low quality seeds. The types and amount of compensation depended upon the individual companies and agro-vet's policy.

The collected constrains in vegetable seed business were grouped into ten specific categories. Most prevalent constrains were low availability of source seed, lack technical know-how on seed production and processing facility and lack of farmer's commitment to keep up with the agreement with the seed companies or agro-vets.

Based on the analysis and interpretation, the report provides the recommendations for policy and implementation level.

CHAPTER – I

INTRODUCTION

Nepal is predominantly an agricultural country. Agriculture provides employment to around 66% of the population (DoA, 2012) and contributes 35.3% to Nepal's gross domestic product (Ministry of Finance, 2012). Therefore, the development of agriculture sector is a key for the development of national economy. Significant part of Nepal's gross domestic product has been represented by vegetable farming contributing a cash flow among small farmers (CBS, 2009-10). This can also be verified with the fact that 48 percent land in all Terai, 43 percent in all Hills and 9 percent in Mountains is utilized for vegetable farming which generated total vegetable production of 2,820,527 metric tons (CBS, 2009-10). Vegetable production is highly dependent on the quality and quantity of vegetable seed. As the area of vegetable production is in increasing trend, the demand of vegetable seed is also taking its pace accordingly.

1.1 Background

Vegetable seed is one of the major high value low volume agricultural products in Nepal. The Agriculture Perspective Plan (APP) and subsequent government policies have identified vegetable seed as a sub-sector among the six major priority outputs. Vegetable seed is a major input and plays vital role in increasing the production of the seasonal and off seasonal fresh vegetables in the country. It is high price-fetching essential agricultural input with increasing domestic demand and export potentiality (HVAP, 2011). The varied micro-climate of Nepal along with altitude variation and remote areas supports vegetable seed production to be one of the best options for income generation, import substitution and for export (Ghale, 2009). The demand for improved seed is increasing every year due to increase in the area under vegetable including the fresh main season and off season vegetable. Most of the vegetable seeds produced in Nepal are of open pollinated (OP) varieties whereas in some of the crops like Cabbage, Cauliflower and Tomato, the largest part of growth in seed demand is for hybrids (CEAPRED, 2010).

Almost 50% of the commercially required improved vegetable seed is met by the country's own production and the rest is met mainly by import from India, China, Japan, Korea, Thailand and other countries (CEAPRED, 2010). There is a huge gap between the demand and supply of vegetable seed in Nepal. The estimated annual seed demand of vegetable seeds in 2007/08 was 1,780 Metric Tons (MT), whereas the domestic production remained only about 900 MT (SDC, 2012). The vegetable seed demand is expected to increase by 30 MT annually (CEAPRED, 2010). The present domestic production is 1,000 MT resulting in 43% of shortfall of the total demand. This gap in demand for vegetable seed is mostly met by imports. The present trend of using hybrids contributes largely to this import as Nepal produces very few numbers of hybrids. Out of total seed import, hybrid seed import occupies about seven percent of it (CEAPRED, 2010).

However, the imported seeds come in a sophisticated packaging system with major attributes which gives more confidence to the consumers and farmers are ready to pay higher price for these seeds. Along with the production of superior quality of seeds, appropriate packing also plays equal role for the good sale of the seed. Thus, there is sufficient scope for vegetable seed production and marketing in the country since domestic production covers only fifty-seven percent of total demand. But the price of vegetable seed consists of not only its production cost but also its packaging cost. Nature, types and quality of packaging of the seeds determine the seed price in the seed market. That's why; this study has been designed to analyze the marketing of vegetable seed with special focus on the price variation in terms of types of packaging.

1.2 Statement of the problem

There are tremendous potentials for raising farm income from high value low volume vegetable seed production in Nepal. The challenge is to ensure sustainability and replicability of the initiatives taken so far. The issues of sustainability and replicability can be addressed through the approach of maximization of use of domestic seed by Nepalese farms on the one hand, and yet inducing wider scale export for the vegetables seed grown as vegetable seeds grown in Nepal are referred as very good ones on the other.

The fact remains that substantial amount of open pollinated and hybrid seeds are imported due to their shortage in the domestic market (CEAPRED, 2010). This clearly indicates that so far even the requirement of seed is not met by internal production. At present, almost 50% of the commercially required improved vegetable seed is met by the country's own production and the rest is met mainly by import from India, China, Japan, Korea, Thailand and other countries (CEAPRED, 2010). A better understanding of the seed trade (import and export), operating particularly across the Indian and Chinese borders and its implication on the domestic seed production and marketing has become essential.

Better packaging and processing is as important as quality and quantity of seed (AEC, 2004). Due to lack of the reliable packaging and labeling system in Nepali local vegetable seed, domestic competitive market were not established (Pandey, 2006). Consequently tendency of gradual replacement of the local vegetable seed with the imported seed has been experienced in these years and ultimately market has been suffered from the low quality local and imported seed. In the market, vegetable seed are sold loosely or in different packaging forms with or without the truthful label. Vegetable seed produced in Nepal is mostly sold in the market loosely and only few percentages are sold with packaging. Even though the seeds have good quality after the harvest; its quality gets deteriorated if kept loosely. Due to exposure to the air, there is high chance of increment in the moisture content of the seed which ultimately leads to insect infestation and low germination percentage. In addition to this, if the seeds are packed, lack of truthful labeling in the packet and less attractive packaging are the reasons why farmers prefer imported seeds than the domestically produced one. The truthful labeling and proper packaging make farmers feel that the product is of good quality which

persuades to pay high price. This situation affects vegetable seed producing farmers as well as the vegetable seed customers (fresh vegetable producer farmers). Another striking problem of the vegetable seed market in the case of the imported and hybrid vegetable seed is the haphazard price fixation by the importer so the ultimate consequence of price hiking could be felt on the part of the secondary wholesaler's as well as in retailer's level. The outcome of all these price increment always suffered the farmers who were involved on the vegetable farming (Pandey, 2006). This study is thus designed to respond to this problem. The findings of the study are expected to provide clear picture of the present situation to find out appropriate way out for the growth of vegetable seed marketing in Nepal.

1.3 Objective of the study

The study aims to analyze the current status of the vegetable seed marketing focusing on the price variation especially due to inclusion of truthful label and types of packaging done of the domestically produced vegetable seed and imported seed to bring up the possible way out. To obtain the major objective of the study following are the specific objectives:

-) To analyze the present situation of vegetable seed marketing by agro-vets and vegetable seed companies of Nepal
-) To carry out comparative price analysis of different types of packed seeds including with and without truthful label
-) To explore major obstacles of vegetable seed business and its way forward to increase marketing in Nepal

1.4 Rationale of the study

The packaging type and use of truthful label in the packets of vegetable seed are the major reasons why the customers (fresh vegetable producing farmers) get persuaded to buy. The price difference analysis done for the loose vegetable seeds, packaging with or without truthful label and imported vegetable seeds will help the vegetable seed producing farmers, cooperatives etc. to realize the higher price they can get in both internal and external markets if properly packed with truthful label. This will then help to enhance competitiveness of domestically produced vegetable seed in comparison with the imported ones. In addition to that, this study will help the related government as well as non-government organizations to know about the problems of vegetable seed marketing and the expectations of agro-vets and seed companies for the betterment of vegetable seed marketing.

1.5 Limitations of the study

Following are the limitations of the study:

-) The study will be conducted only in few districts of the country
-) Only agro-vets and seed companies will be interviewed

1.6 Organization of the study

The research work is organized in the following chapters:

Chapter I: Introduction

This chapter deals with the introduction of the main topic of the study including background, statement of the problem, objectives, rationale and limitation of the study.

Chapter II: Literature Review

This chapter deals with the review of available literatures. It includes the conceptual review and review of related books, journals, reports, published and unpublished research works as well as theses.

Chapter III: Research Methodology

This chapter deals with the methodology of the study, including the study area, sample size, type of respondents (target group), process and methods of data collection and data analysis.

Chapter IV: Results and Findings

This chapter deals with the presentation and analysis of all the relevant collected data. Analysis is done as necessary and the major findings are drawn.

Chapter V: Conclusions and Recommendations

This is the last chapter containing the conclusions and the recommendations on the basis of the study.

CHAPTER – II

LITERATURE REVIEW

2.1 Conceptual Review

2.1.1 Vegetable

A vegetable is an edible plant or part of a plant. "Vegetable" comes from the Latin *vegetabilis* (animated) and from *vegetare* (enliven), which is derived from *vegetus* (active), in reference to the process of a plant growing (Wikipedia, 2012). Vegetable is the plant cultivated for food, edible herb or root. Vegetable includes different parts of plants as: flower bud (broccoli, cauliflower etc.), seeds (sweet corn (maize), peas, beans etc.), leaves (broad leaf mustard, mustard, spinach, lettuce, cress, garlic etc.), buds (brussels sprouts etc.), stem (kohlrabi, ginger etc.), stem shoots (asparagus, bamboo shoots etc.), tubers (potatoes, sweet potatoes, taro, and yams etc.), roots (carrots, beets, radishes, turnips etc.), bulbs (onions, garlic etc.). The nutritional content of vegetables varies considerably, though generally they contain little protein or fat and varying proportions of vitamins such as Vitamin A, Vitamin K and Vitamin B6, pro-vitamins, dietary minerals and carbohydrates. Vegetables contain a great variety of other phytochemicals, some of which have been claimed to have antioxidant, antibacterial, antifungal, antiviral and anti-carcinogenic properties (Wikipedia, 2012). Some vegetables also contain fiber, important for gastrointestinal function. Vegetables contain important nutrients necessary for healthy hair and skin as well (Wikipedia, 2012).

2.1.2 Seed

A seed is a small embryonic plant enclosed in a covering called the seed coat, usually with some stored food. It is the product of the ripened ovule of gymnosperm and angiosperm plants which occurs after fertilization and some growth within the mother plant. The formation of the seed completes the process of reproduction in seed plants (started with the development of flowers and pollination), with the embryo developed from the zygote and the seed coat from the integuments of the ovule. All seeds are different size, shape and color. Seeds have been an important development in the reproduction and spread of flowering plants. The term "seed" also has a general meaning-anything that can be sown, e.g. "seed" potatoes, "seeds" of corn or sunflower "seeds". In the case of sunflower and corn "seeds", what is sown is the seed enclosed in a shell or husk, whereas the potato is a tuber (Wikipedia, 2012). Seed is the cheapest and basic input for sustained agricultural production.

2.1.3 Stages of Seed Multiplication

To ensure adequate quality of the seed, process of seed multiplication is the must. The benefits of an improved variety are not released unless enough true seed has been produced for its commercial spread. The initial amount of pure seed which is limited in quantity is multiplied under various stages or classes or seed as follows:

1. Nucleus seed:

Nucleus seed is the initial amount of pure seed of improved variety or notified variety or parental lines of a hybrid produced under supervision of the evolver of that variety (Theagricos, 2008). The nucleus seed is sent per sent pure genetically as well as physically and is very limited in quantity (Wikipedia, 2012).

2. Breeder's seed:

It is the seed obtained from the progeny of nucleus seed. It is directly supervised by a breeder concern with the crop. It is genetically and physical purity to be 100 per cent (Theagricos, 2008).

3. Foundation seed:

It is obtained from nucleus or breeder's seed. It is produced on seed multiplication farm of a research stations. It is not as pure as the nucleus and breeder's seeds (Theagricos, 2008).

4. Source Seed/Registered seed:

It is raised from nucleus, breeders or foundations seeds under the supervision of related technologists. In Nepal, government research farms and few selected progressive farmers, cooperatives produce source seed maintaining purity from time to time. The purity is maintained through field inspections by seed certifying agencies and seed tests (Theagricos, 2008). The tag for this type of seed is white color.

5. Improved Seed/Certified seed:

It is progeny of source seed/registered or foundation seed produced when the amount of seed registered seed is supposed to be inadequate to meet farmers' requirement (Theagricos, 2008). This seed is produced in the farmers' field under the supervision of the field technicians. Improved seed is produced by seed companies, cooperatives and farmers' groups. The tag for this type of seed is yellow.

2.1.4 Truthful label

This is the label to be attached in the seed packets ready for selling. This label includes: seed produced year, seed tested date, crop name, variety, minimum germination percentage, physical purity percentage, seed weight and logo. Truthful label indicates the quality of the seed for which the producer will be responsible. The label should be yellow color and the content should be written with black color. Producers should maintain field and seed standards suggested for quality seed production as per seed act otherwise they will be punished as per the seed act (Theagricos, 2008).

2.1.5 Hybrid seed

Hybrid seed is produced by crossing two unique or elite inbred varieties with well-documented and consistent phenotypes (such as yield). In hybrid seed production, the crosses are specific and controlled. To produce hybrid seed, higher combining ability between the parents is required. Hybrids are bred to improve the characteristics of the resulting plants, such as better yield, greater uniformity, improved color, disease resistance, and so forth (Wikipedia, 2012). Crossing involves taking the pollen from the male and transferring it to the female. The first generation of offspring from this cross, look and act the same. They also show what's known as hybrid vigour: these plants come out stronger than their parents. The seed collected from a hybrid plant will either resemble one of the parents, or be sterile (West Coast Seeds, 2012)

2.1.6 Marketing

Marketing is the process of communicating the value of a product or service to customers. Marketing might sometimes be interpreted as the art of selling products, but selling is only a small fraction of marketing (Wikipedia, 2012).

The American Marketing Association defines marketing as "the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large."

Philips and Ducan have defined marketing as "Marketing includes all the activities necessary to place goods and services in the hands of consumers and industrial users, excluding only such activities as involve a significant change in the form of goods."

Carl Dysinger has defined the concept as "Marketing is finding out what the consumer wants and selling it to him at a profit."

According to Jerome McCarthy "Marketing is the performance of activities that seek to accomplish an organization's objectives by anticipating customer or client needs and directing a flow of need-satisfying goods and services from producer to customer or client.

2.2 Review of Related Studies

2.2.1 History of vegetable seed production in Nepal

Seed production of traditional vegetables like Broad leaf mustard, local Beans, Pumpkin, etc. have been practiced by farmers since time immemorial. It got a formal structure when government horticulture farms were established in early sixties. Commercial production of vegetable seed started formally only in NFY 1974/75 in Bhaktapur with Radish seed (HVAP, 2011). External assistance during the 1980s is considered to be instrumental in the development of the seeds sector in Nepal. A Swiss-funded project with FAO technical assistance, named “Fresh Vegetable and Vegetables Seed Production Project” was launched in 1981 in association with the Vegetable Development Division, DoA, which started focused intervention into vegetable seed sector. The project lasted till 1996, and provided inputs on introduction, improvement, recommendation and release of commercial varieties of vegetable seeds. Other projects also followed the way and are credited to have made important contributions in developing physical infrastructures and human resources for the vegetable seeds sector. Some of the terminated projects such as KOSEVEG (an ODA/UK funded project), VFC Rapti, MARD (an USAID funded project) and some of the recent projects such as project of Li-BIRD, CBED/CECI, CEAPRED/DANIDA, CEAPRED/SDC and SSSP (a DFID funded seed sector project active during early 1990s to early 2000s) have worked towards commercialization of vegetable seed sector.

2.2.2 Major vegetable seeds produced in Nepal

According to HVAP 2011, the major vegetable seeds produced in Nepal include Radish, Onion, Mustard, Cauliflower, Cabbage, Carrot, Cress, Beans, Squash and Swiss chard. The Table below shows major varieties of vegetable seeds and production areas. Among these areas, Rapti Area (Rukum, Salyan, Rolpa and Pyuthan) in Mid Western Region is the highest contributor of vegetable seed production in the country. Rukum district is considered to the highest contributor among the districts (HVAP, 2011).

Table 2. 1: Regional Vegetable Seeds Production Areas

Region	Vegetable Seed Variety	Districts
Eastern Region	Radish (Mino Early/ Tokinashi/ Pyuthane Red/ Chalis Dine), Pea (Sikkim Local/ Arkel), Beans (Kentucky), Onion (Red Creole), Cauliflower (Kathmandu Local/ Snowball 16), Broad leaf mustard (Marpha Chauda Pat/ Khumal Chauda Pat/ Khumal Rato Pat), French bean (Trishuli), Asparagus bean (Sarlahi Tane/ Khumal Tane), Okra	Dhankuta, Bhojpur, Terhathum, Sankhuwasabha Taplejung, Khotang, Okhaldhunga

Region	Vegetable Seed Variety	Districts
Central Region	Radish (Mino Early/ Tokinashi/ Pyuthane Red/ Chalis Dine), Pea (Sikkim Local/ Arkel), Onion (Red Creole), Cauliflower (Kathmandu Local/ Snowball 16), Broad leaf mustard (Marpha Chauda Pat/ Khumal Chauda Pat/ Khumal Rato Pat), French Bean (Trishuli), Asparagus Bean (Sarlahi Tane/ Akash/ Khumal Tane), Fava Bean, Bitter Gourd , Red Kidney Beans, Cress, Tomato	Kathmandu, Bhaktapur, Lalitpur, Nuwakot, Dolakha, Kavre, Mahottari, Rautahat, Dhanusa
Western Region	Radish (Mino Early/Tokinashi/ Pyuthane Red/Chalis Dine), Pea (Sikkim Local/Arkel), Onion (Red Creole), Cauliflower (Kathmandu Local/Snowball 16), Broad leaf mustard (Marpha Chauda Pat/Khumal Chauda Pat/Khumal Rato Pat), French Bean (Trishuli), Tomato (Manakamana), Bitter gourd, Asparagus bean (Sarlahi Tane/Khumal Tane), Cress, Coriander (Kalami/Marpha Local), Cabbage (Copenhagen Market), Swiss chard (Fordhook Giant), Carrot (Nantes), Turnip (Purple Top White Glove), Tomato (CL1131/BL 410/Lapsi/G1 and4), Cucumber (Bhaktapur Local/Khusle), Zucchini	Syangja, Baglung, Tanahu, Mustang, Kaski, Myagdi, Parbat
Mid Western Region	Radish (Mino Early/Tokinashi/ Pyuthane Red/Chalis Dine), Pea (Sikkim Local/Arkel), Onion (Red Creole), Cauliflower (Kathmandu Local/Snowball 16), Broad leaf mustard (Marpha Chauda Pat/Khumal Chauda Pat/Khumal Rato Pat), Asparagus Bean (Sarlahi Tane/Khumal Tane), Okra (Arka Anamika), Carrot (New Kuroda), Cucumber (Bhaktapur Local), Turnip (Purple Top White Glove), Squash (Grey Zucchini), Garlic (Dailekh Local)	Rukum, Rolpa, Jajarkot, Pyuthan, Salyan, Dolpa, Dailekh, Jumla, Surkhet
Far Western Region	Radish (Mino Early), Broad leaf mustard (Marpha Chauda Pat/Khumal Chauda Pat/Khumal Rato Pat), French bean (Trishuli), Pea (Sikkim Local), Coriander (Suravi), Cress, Cumin, Turnip (Purple Top White Glove / Red), Swiss chard (Fordhook Giant), Broccoli	Dadeldhura, Doti

Source: Vegetable Seed Directorate/DoA, 2010

2.2.3 Vegetable seed related policies and acts

There are plans and policies that guide the seed sector in Nepal, and its potential has been recognized under the APP as High Value Crops (HVC) are emphasized including vegetable seeds in the hill and mountains. The principal national law on seed is the Seed Act, 2045 (1988) which was enacted in 1988. The objective of this law is to maintain the convenience and economic interest of the general public by providing seed of high quality in a well planned manner upon producing, testing and processing to improve crop production. It also establishes the "National Seed Board" to formulate and implement policies relating to seed and to give the necessary advice to the Government of Nepal on the matters pertaining to the seed sector. In order to enforce the Seed Act, 2045 the Government of Nepal formulated the "Seed Regulation, 2054" (1997).

In order to introduce plant quarantine system in Nepal, the Plant Protection Act 2029 was enacted in 1972 along with the initiation of crop specific national research programs with the introduction of improved crop germ plasm. This Act affects the seed sector especially when dealing with international trade. In order to enforce the Plant Protection Act 2029, the Government of Nepal formulated Plant Protection Rules 2031 in 1974. The Pesticide Act was enacted in 1991 and the Pesticide Rules, 2050 was enforced in 1994 with regard to import, export, production, marketing and use of pesticides.

In the changed political context, Nepal has since 1990 made several policy reforms ranging from macro-economic policies to sectoral policies, including agriculture. At present, the seed sector in Nepal is guided by the following legislations:

-) The Seed Act 2045 (1988)
-) The Seed Regulation 2054 (1997)
-) Plant Protection Act 2064 (2007)
-) The Plant Protection Rules 2066 (2010)
-) The Pesticide Act 2047 (1991)
-) The Pesticide Regulation 2050 (1994)
-) The Agriculture Perspective Plan (APP) 2006
-) The Tenth Plan (2001/2002 – 2006/2007)
-) The National Agricultural Policy 2061 (NAP)
-) National Seed Policy 2056 (NSP)
-) NARC Vision 2021
-) National Plant Quarantine Program (NPQP)
-) Plant Variety Protection (PVP) and Farmers' Rights Act (FR) have been drafted but have not yet been enacted

2.2.4 Supporting/related agencies (institutional framework)

a. Ministry of Agricultural Development (MoAD)

The major institutions working in the public seed sector in Nepal are associated with the Ministry of Agricultural Development (MOAD), whose responsibility is to plan, coordinate and assure the execution of policies in the agriculture sector (MoAD, 2012). The MOAD is organized in departments, boards, companies, corporations and council, of which the followings are involved in the seed sector:

-) National Seed Board (NSB)
-) Seed Quality Control Centre (SQCC)
-) Department of Agriculture (DOA)
-) Nepal Agricultural Research Council (NARC)
-) National Seed Company Ltd. (NSC)

Among them the NSB, SQCC and DOA are directly involved in the regulation of the seed sector in the country.

b. National Seed Board (NSB)

The National Seed Board, operating directly under the MOAD, was constituted by the Seed Act 2045 (1988) to formulate and implement policies relating to the seed sector and to give necessary advice to the government on the matters affecting the sector. The NSB has three sub-committees:

- i. **Variety Approval Release and Registration Sub-committee (VARRS):** The VARRS is given the following duties: (i) preparing conditions for the approval, release and registration of varieties, (ii) making recommendations for release and registration, (iii) arranging seed multiplication, (iv) encouraging the private sector to develop new varieties, (v) making recommendations for removal of varieties from the list where necessary, and (vi) arranging promotion and protection of released varieties.
- ii. **Planning Formulation and Monitoring Sub-committee (PFMS):** the composition of this sub-committee is similar to the VARRS with many of the members and the member secretary being the same. The PFMS is given the following duties: (i) formulating programmes for organizing the supply of seed to meet the national requirement, (ii) monitoring production and consumption of seed, (iii) arranging the production of foundation and certified seed, (iv) coordinating private and government sector production, sale and distribution, and (v) prescribing seed price.

- iii. **Quality Standards Determination and Management Sub-committee (QSDMS):** The composition of this sub-committee is similar to the other sub-committees with some of the members and the member secretary being the same. The duties of the QSDMS are: (i) recommending quality standards to the NSB, and (ii) publishing the minimum quality standards for seeds.

c. **Seed Quality Control Centre (SQCC)**

The SQCC is an independent quality control organization directly under the Ministry of Agricultural Development. The objective of the SQCC is to ensure the availability of quality seed by enforcing the quality control mechanism to the farmers (SQCC, 2012). The SQCC also acts as the secretariat of the NSB, being the head of the SQCC the member-secretary of the NSB. There are three institutions under the SQCC as:

- i. **The Central Seed Testing Laboratory (CSTL):** The CSTL was established with the provision made by Nepal Gazette on 28 October 1996, to make uniformity in all seed testing laboratories for providing quality service to the clients. The CSTL is the authorized government laboratory to be accredited by ISTA. Other seed testing laboratories of DOA, NSC, and private sector are run under the close supervision of the CSTL.
- ii. **The Seed Certification Unit:** This unit was established in 2002. The major functions include development of field standards, field inspection, and field monitoring and seed certification. As per provision of Seed Act 1988, seed certification in Nepal is voluntary, but truthful labelling is compulsory.
- iii. **The Seed/Variety registration Unit:** This unit was also established in 2002. The major functions include registration and updating of varieties, conduction of DUS, VCU and grow-out test, registration of imported/exported seeds, and monitoring and inspection of the seed market to control seed quality.

d. **Department of Agriculture (DOA)**

The DOA is a public extension organization with organized network throughout the country (DoA, 2012). Under the DOA, there are the following organizations:

- i. Programme Directorates (twelve): Nine of Programme Directorates are directly involved in the seed sector: Directorate of Plant Protection, Directorate of Crop Development, Directorate of Vegetable Development, Directorate of Agriculture Extension, Directorate of Agricultural Training, Directorate of Plant Protection, Directorate of Post Harvest Management, and Directorate of Agriculture Business Promotion and Market Development
- ii. National Programmes (fourteen),
- iii. Regional Agriculture Directorates (five),
- iv. Regional Agriculture Training Centres (five),
- v. Regional Seed Testing Laboratories (six),
- vi. Regional Soil Testing Laboratories (five),

- vii. Central Soil Testing Laboratory (one),
- viii. Regional Plant Protection Laboratories (five),
- ix. Horticulture Centres (twelve),
- x. Vegetable Development Farm and Centres (nine),
- xi. Fisheries Development Training Centre (eleven),
- xii. Central Fishery Laboratory (one),
- xiii. Regional Plant Quarantine Offices and Plant Quarantine Check posts (fifteen),
- xiv. Sericulture Development Offices (eight),
- xv. District Agriculture Development Offices (DADO) (seventy-five)

Under the DADOs, there are 378 Agriculture Service Centres, four sub-centres in each 20 districts in terai, six sub-centres in each 39 districts in mid hills, and four sub-centres in each 16 districts in the high hills. There are five regional laboratories (under the Directorate of Crop Development) located at Jhumka, Hetauda, Bhairahawa, Nepalgunj and Dhangadi of eastern, central, western, mid-western and far-western development regions, respectively. They are mainly responsible for seed certification and seed testing for quality assurance in terms of certified seeds and seeds with truthful labelling.

e. Nepal Agricultural Research Council (NARC)

The Nepal Agricultural Research Council (NARC) is the main public institution involved in research in the seed sector. Nepal Agricultural Research Council (NARC), an apex public organization for agricultural research, was established under NARC Act 2048 (1990) (NARC, 2012). The apex body of NARC, which is responsible for policy making and research coordination, is chaired by the Minister of Agriculture, and the implementing body, chaired by the Executive Director, is responsible for research undertaking. It has over 50 offices, including 11 crops research programmes, four regional stations, 14 area specific stations, 13 crop-related disciplinary divisions and units. One of the mandatory functions of NARC is to supply seeds (breeder and foundation) of food and fodder crops.

The main institutes of NARC which are basically involved in seed research are (i) Seed Research Unit (SRU) of Agriculture Botany Division, and (ii) Plant Pathology Division (PPD). SRU conducts research on seed quality aspects, including seed testing and study on morphology of releasing varieties. PPD conducts research on seed health and seed health testing.

Besides these government institutions, there are teaching activities within seed science at B.Sc. and M.Sc. levels are carried out at the Institute of Agriculture and Animal Science (IAAS), Tribhuvan University and Himalayan College of Agriculture Science and Technology affiliated with Purbanchal University. The Institute of Agriculture and Animal Science (IAAS) began as a School of Agriculture under the Ministry of Agriculture in 1957 to train junior technicians. Now the IAAS, under Tribhuvan University, offers Bachelor, Master and Ph.D. programmes in different agricultural and animal science faculties. The institute also offers specialized courses on (i) principles and practices of seed technology, and (ii) vegetable seed production for bachelor's students.

The Himalayan college of Agricultural Science and Technology (HICAST) offers two courses on seed production (i) project work on vegetable seed production and (ii) seed production technology in the second and the third year of its Bachelor Agriculture Programme (BSc Honours).

f. Agriculture Training Directorate (ATD)

It also offers seed technology courses at different levels for officers, junior technicians and lead farmers. The ATD has developed specific course curricula on various topics. The officers' training is conducted at central level whereas the junior technicians' and lead farmers' trainings are conducted at regional training centres.

g. Seed Entrepreneurs Association of Nepal (SEAN):

SEAN was initiated in the year 1989 and registered with the Government of Nepal in 1991 as a non-profit organization. It is an association integrating Nepali seed entrepreneurs' engaged in production, processing, and marketing of Nepali seeds. SEAN works extensively with farmers and traders conducting field inspections as well as trade agreements with farmers and traders.

SEAN's activities can be summarized as follows

-) Organize the seed entrepreneurs' (Seed firms and individuals) in the private sector;
-) Organize regional seed production and marketing workshop and arrange contractual seed production and marketing planning between seed entrepreneurs and farmers;
-) Promote production, processing and marketing of high quality seeds by the private seed entrepreneurs;
-) Liaise and coordinate with HMG/Nepal related agencies of professional to promote and incorporate increased involvement of private sector in the National Seed Program;
-) Liaise and coordinate with the seed related national and international agencies of professional to promote exchange of scientific knowledge;
-) Provide consultative service support national and international institutions/individuals in seed related issues.

h. Non-Government Organizations (I/NGOs)

While a considerable number of I/NGO's have been involved in the vegetable seed production sector, the involvement of private sectors and entrepreneurs has been minimal if not none. Currently, The Centre for Environmental and Agricultural Policy Research, Extension and Development (CEAPRED), is implementing in a Vegetable Seed Project spread across 16 districts of Nepal. This project is funded by Swiss Agency for Development and Cooperation (SDC) and has the overall objective to reduce poverty and social tension through quick income generation in remote areas of Nepal by promoting production and marketing of vegetable seeds in remote and conflict affected areas with

special focus on deprived communities and families. CEAPRED is working in Dadeldhura, Baitadi, Achham, Surkhet, Dailekh, Kalikot, Dolpa, Rukum, Salyan, Jajarkot, Parbat, Myagdi, Kavre, Ramechhap, Okhaldhunga and Khotang to mobilize, organize and technically train farmers in different aspects of production, post harvest handling, storage and marketing of vegetable seeds. This project hopes to establish model farms at different agro-climatic zones to produce nuclear and source seeds and to sustain seed production activities and has a target to produce and market at least 300 tons of different varieties of vegetables seeds.

There are many seed enterprises but no private seed companies that have substantial resources and investment into the sector. There are 897 registered seed entrepreneurs (seed dealers other than seed producer) of which 161 are the members of Seed Entrepreneurs' Association of Nepal. Also, the DOA has listed 1,853 agro-vets across the country. Most of the seed entrepreneurs, including agro- vets, deal with vegetable and flower seed along with other agricultural inputs like fertilizers, pesticides and small tools and implements. While some seed companies do carry out quality tests, none of the seed companies have own varietal development activities in the country.

Table 2. 2: Summary of institutional roles and activities: Vegetable Seeds

Institution	Major roles and activities
National Seed Board	<ul style="list-style-type: none">)] Seed policy formulation)] Coordination of production and distribution)] Standardisation and control)] Supervising DUS characters and patent rights
NARC/ Vegetable Research Centre	<ul style="list-style-type: none">)] Variety development, maintenance and technology generation)] Identify farms for the production of breeders' seed of specified crop/variety)] Collection and preservation of indigenous crops/varieties)] Development of hybrid varieties and their seed production
Seed Quality Control Centre	<ul style="list-style-type: none">)] Seed quality testing at national and regional level)] Seed certification and quality assurance)] Secretariat for seed Board)] coordinate/ facilitate seed program planning
Vegetable Development Directorate/ Horticulture Centre	<ul style="list-style-type: none">)] Foundation/ Source seed production and management)] Crop inspection and facilitating certification)] Seed production programme development, coordination, monitoring and technical backstopping
District Agriculture Development Offices	<ul style="list-style-type: none">)] Support seed production and distribution)] Update seed statistics)] Provide technical backstopping

Institution	Major roles and activities
National Plant Quarantine Programme	<ul style="list-style-type: none"> <li data-bbox="711 233 1386 268">) Support in management of foundation/ source seed <li data-bbox="711 275 1386 380">) Update seed import and export records and make it available to national Seed Board and other related organisations <li data-bbox="711 386 1300 422">) Collect seed samples and test for seed health
Seed Entrepreneurs Association Nepal (SEAN)	<ul style="list-style-type: none"> <li data-bbox="711 428 1354 495">) Promote quality seed production, processing and marketing <li data-bbox="711 501 1289 569">) Support related organisation in seed quality monitoring and control <li data-bbox="711 575 1235 642">) Facilitate Production of foundation and commercial seeds <li data-bbox="711 648 1333 758">) Advocate enabling seed policy/ regulations for pro-active private sector role in seed sector development
Development Organizations, I/NGOs	<ul style="list-style-type: none"> <li data-bbox="711 764 1360 831">) Support production, processing and marketing of seed <li data-bbox="711 837 1370 873">) Collaboration and support concerned organisation <li data-bbox="711 879 1243 947">) Support in national level quality control programme <li data-bbox="711 953 938 987">) Market linkages

2.2.5 Demand and Supply of Vegetable Seed in Nepal

Vegetable seed is a high value, low volume and high price-fetching essential agricultural input with increasing domestic demand and export potentiality. It has both the comparative and competitive advantage for the local markets as well as exports to nearby Indian markets and Bangladesh (HVAP, 2011).

2.2.5.1 Demand of vegetable seed in Nepal

Around five dozen cultivars of vegetable seeds are produced and marketed in Nepal (HVAP, 2011). However, around 3/4th of the total domestic demand in volume term is accounted by Peas, (French) Bean, Onion, Radish, Cowpea and Okra (Table 3). Other vegetables seeds that have demand based on the estimates from the cultivation area are; Broad mustard leaf, Pumpkin, Spinach, Cress, Asparagus Beans, Gourds, Cucumber and other Cucurbits, Squash, Coriander leaf and Carrot. According to VDD/DoA 2010, based on standard seed sow rate for vegetable, it is estimated that around 2,010 MT of vegetable seeds was required for commercial vegetable farming in Nepal in the year 2009/10.

Table 2. 3: Vegetable seed demand in Nepal

Year	Domestic demand * (MT)
1974/75	293
1979/80	325
1984/85	770
1989/90	775
1991/92	777
1996/97	1,168
2001/02	1,390
2002/03	1,444
2004/05	1,507
2005/06	1,569
2006/07	1,705
2007/08	1,780
2008/09	1,932
2009/10	2,010

Source: VDD/ DoA, 2010

* includes demand for source also, most of the production of government sector in recent years is the source seed production.

Table 2. 4: Estimated improved seed requirement for 10 vegetables for 2009/10

Vegetable Variety	Cultivation Area (hectares)	Estimated seed requirement (MT)
Peas	6,920.7	553.7
French beans*	8,472.1	404.5
Onion	18,659.5	223.9
Radish	18,117.5	181.2
Okra	8,990.4	107.9
Broad leaf mustard	11,633.0	69.8
Asparagus beans	12,296.8	66.9
Pumpkin	6,519.0	45.6
Spinach	1,760.6	44.0
Cowpea	1,674.2	38.0
Other vegetables	149,181.1	274.9
Total	235,097.7	2,010.4

Source: VDD/ DoA, 2010 for cultivation areas

Note: estimates based on seed sow rate per hectares

* includes French Beans; pole, bush and sword type

Based on figures provided by VDD, DoA for 2009/10, it is reported that Cauliflower, Cabbage, Onion, Radish and Tomato are the top five vegetables in terms of area under cultivation, respectively farmed on 32,521 ha, 27,840 ha, 18,660 ha, 18,118 ha and

15,609 ha of land in Nepal. These five vegetable crops account for around 50% of the total area cultivated for vegetables in Nepal. Estimated annual commercial seed demand for Cauliflower, Cabbage and Tomato range from around 7-10 MT. Thus, it is seen that seeds of these vegetables are important both in terms of cultivated area for vegetables and potential demand in terms of volume of commercial seed required.

2.2.5.2 Supply of vegetable seed in Nepal

The area and production of vegetable in 2008/09 was 208,108 ha, and 2,538,904 MT, respectively resulting in the productivity of 12.2 MT/ha which is very low as compared to the other countries i.e. 30MT/ha (HVAP, 2011). This indicates that there is plenty of space present for the improvement of vegetable productivity in Nepal. As seed is one of the most important governing factors of productivity, the situation has created good scope for vegetable seed production in the country. As commercial vegetable farming grew, the demand for the vegetable seeds started growing rapidly as the importance of quality seed started to be recognized.

In Nepal, vegetable seed required for the cultivation of fresh vegetable is supplied through three sources: Government sector, Private sector and imports (formal as well as informal). While analyzing the past records, the supply of vegetable seed by the government sector has gradually reduced while that of private sector has increased.

A study conducted by ABTRACO for AEC/FNCCI to assess trade competitiveness of vegetables seeds, indicated that in the year 2003/4, the domestic demand for the Carrot, Radish and Tomato seeds were 16 MT, 305 MT and 4 MT, respectively. It was further indicated that more than 50% of the Tomato and carrot seeds, and around 10% of the Radish seeds' demand were met through the imports. The study also indicated that the demand for the hybrid seed was rapidly expanding as a result of demand for better productivity from commercial vegetable farming.

A trade survey in 2008/9, carried out by CEAPRED indicates that Kathmandu based seed businesses bought not more than 340 MT of domestically produced vegetable seeds. If five crops namely Radish, Broad leaf mustard, Cress, Peas and Bean are excluded then it is estimated that over 80% of the domestic demand for seeds is met through imports. Informal sources could account for anywhere from 30%-45% of the total vegetable seed consumed in Nepal, depending upon situation and circumstances. Most of these are introduced varieties of vegetables (Cabbage, Carrot, Coriander, Onion, Spinach, Tomato and Zucchini) depend highly on imports. Indigenous varieties such as Peas, Cowpea, Radish, Cucurbit crops, Beans and Broad leaf mustard are lesser dependent on imports for seeds supply.

Table 2. 5: Share of Domestic and Imported Seed in the Nepalese Market for Selected Crops in (2003/04)

Seed Crop		Supply Share %		
Season	Crop	Domestic	Imported	
		Open Pollinated	Hybrid	Open Pollinated
Winter	Cabbage	2	65	33
	Carrot	20	0	80
	Cauliflower	56	22	22
	Coriander	11	8	82
	Onion	24	0	76
	Peas	79	0	21
	Spinach	35	9	56
Summer	Sponge Gourd	33	0	67
	Tomato	50	0	50
	Zucchini	25	50	25

Source: Vegetable Seed Market Survey 2003/04, SEAN, January 2005

a. Supply from domestic production

Vegetable is one of the major subsectors contributing in AGDP. According to VDD/DoA 2009, in the fiscal year 1974/75 the total production of vegetable seed was estimated at 9 MT (only from the government sector), which grew to around 33 MT by 1984/85, 419MT by 1996/97, and around 957 MT by 2007/8 (Table 6). Till late 1970s, only the government farms used to be the source of the vegetable seeds, however, the private sector (farmers and private seed firms) emerged rapidly and started playing an increasingly critical role in supply of vegetable seeds. Vegetable seed production as a sector is relatively new but had shown good growth over the last 3 decades. Till mid 1990s the domestic demand for the vegetable seeds hovered around 770-850 MT per year, which reached around 1,168 MT in the year 1996/97. At the start of the 21st century the annual domestic demand for vegetable seed reached around 1,444 MT, but again witnessed a growth of around 33% to reach 1,932 MT by the year 2008/09.

Table below indicates that over the last decade, around 50% of the domestic demand for the vegetable seeds was met by the domestic formal (government and private seed companies) sector.

Table 2. 6: Vegetable seed production in Nepal

Year	Government Sector (MT)	Private Sector (MT)	Domestic Demand* (MT)
1974/75	9	0	293
1979/80	12	8	325
1984/85	11.8	21.4	770
1989/90	15.3	189.5	775
1991/92	15.6	165.6	777
1996/97	19	400	1,168
2001/02	14	715	1,390
2002/03	14	679.6	1,444
2004/05	10.6	810	1,507
2005/06	6.8	830	1,569
2006/07	5.8	835	1,705
2007/08	6.8	900	1,780
2008/09	7.3	950	1,932

Source: VDD/ DoA

** includes demand for source also, most of the production of government sector in recent years is the source seed production.*

Taking an example of 2008/09, total estimated demand was 1,932 MT for which the supply from Private / government sector was 957.3 MT (49.5%) (VDD/DoA, 2009). According to TEPC 2009, the formal import during the year was 407.8 MT (21.1%). So, the data Gap comes to 566.9 MT (29.3%), which is met by informal channels and cross border imports (HVAP, 2011).

According to the study done by HVAP in 2011, over the last decade, around 50% of the domestic demand for the vegetable seeds was met by the domestic formal (government and private_seed companies) sector but currently, the gap in demand of vegetable seeds is mostly met by imports and to some extent domestic informal sector (farmer to farmer exchange, saved seeds, cross border informal seed supply).

b. Supply from import

Data and information at the VDD, based on a trade survey of vegetable seeds in 2002, indicate that the volume of vegetable seeds sold in Nepal was about 20 MT, which is estimated to have grown to over 50 MT by the year 2008/9 (VDD/DoA, 2009). As Nepal did not produce any hybrid seeds, the import of hybrid seeds had been in increase as a result of demand for better productivity in commercial vegetable farming. The Annual Commodity Statistics 2008/09, published by the Department of Customs indicate that over 70.2 MT of vegetable seeds under HS code 120991 was imported from the foreign

countries (excluding India), valued at around NPR. 65.3 million. In addition to formal import, larger quantities of seeds are imported from neighboring India.

Recent trends indicate that India, Thailand, Peoples Republic of China P.R, Japan and Republic of Korea are some of the major countries from where vegetable seeds are imported in Nepal. Available data indicate that in the year 2008/9 significant amount of vegetable seeds were imported from Italy and New Zealand (Table 7.)

The official data of Department of Customs indicates Nepal imported over 407 MT of vegetable seeds in the year 2008/9, valued at around NPR. 127.9 million. In the year 2009/10 the total imported is recorded at around 320 MT, valued at NPR. 78.2 million. India remained the largest import point for vegetable seeds into Nepal, accounting for over 85% of the imports over the period of 2008/9 and 2009/10. However, these import figures may not be actual total imports of vegetable seeds into Nepal.

Table 2. 7: Import of Vegetable Seeds for 2008/9 and 2009/10

Importing Countries	2008/09		2009/10	
	Imports (kg)	Imports (NPR.)	Imports (kg)	Imports (NPR.)
India	327,096	30,878,821	292,577	24,329,653
Thailand	29,013	18,024,236	8,757	9,865,939
China P. R.	15,032	4,763,312	4,321	1,021,426
Italy	10,775	2,266,194	-	-
Japan	9,615	52,236,637	4,252	29,736,695
New Zealand	9,550	113,717	-	-
Korea R	5,144	15,861,967	8,227	3,933,870
Others	1,559	3,726,193	1,803	9,343,273
Total	407,784	127,871,077	319,937	78,230,856

Source: TEPC, 2010

Note: product listed under HS Code 12149000 (Radish Seeds) and 12099100 (Vegetable Seeds) have been included, others such as HS Code 07132000 (Chick Peas), 07139000 (Dried Legumes), 9092000 (Coriander Seeds) have not been included.

It is important to note that around 12,203.6 MT of dried Peas labeled under HS Code 07131000, 6,394.3 MT of Chick peas labeled under HS Code 07132000 and 13,456.1 MT of dried leguminous vegetables labeled under HS Code 07139000 were imported into Nepal in the year 2009/10. It is unclear how much of these could have been imported “ready to be used” for food or were used as vegetables seeds. It is to be noted that Peas, Beans and other leguminous vegetables account for nearly half of the demand of vegetable seeds (based on sow seed rate) in Nepal. The data available shows that Radish seeds are seen to be imported under HS Code 12149000. Thus, the current import figures, under vegetable seeds (HS Code 12099100) available possibly do not clearly indicate the actual imports into Nepal. A research report shared by the VDD, based on country level trade survey, indicates that in the year 2008/09, over 680.2 MT of vegetable seeds could have been imported into Nepal. That is a difference of around 272 MT or around 67%

over the official listed imports of vegetable seeds. This indicates that actual figures on imports of vegetable seeds would never be known.

A look at the data available for the year 2003/04 indicates that for vegetables such as Cabbage, Carrot, Coriander, Onion, Spinach, Tomato and Zucchini; Nepal is very much dependent on imports. It is to be noted that most of these are introduced varieties of new vegetable crops in Nepal during the process of modernization of the agriculture in Nepal. These figures have been based on demand figures for the year 2003/04, which were considered to be over 25% less than current demand and when domestic seed production was at its heights. Nepal is seen to be comparatively less dependent on imports for popular indigenous vegetables such as varieties of Peas, Cowpea, Radish, cucurbit crops, varieties of Beans and Broad leaf mustard.

2.2.5.3 Export of vegetable seed produced in Nepal and its demand in international market

Traditionally, Nepal produced seeds have been exported in gunny bags (30 to 40 kg per bag) to Bangladesh and India which is one major reason for being unable to establish brand name for Nepal produced seeds in these markets. Besides this, factor affecting marketing of seeds is related to high cost of packaging materials. For e.g., cost of packing Radish seeds in 400 gm metalized foil pouch costs about Rs. 30 per kg. (AEC, 2004)

Improvement in seed quality and quantity, better packaging, processing, and reducing the elements of cost of production and marketing cost either through subsidization, institutional credit support, custom relaxation on packaging materials, use of less expensive transport route and access to other measures such as smooth flow of goods, export market/ price information among traders and farmers and other stakeholders are important factors for improvement of export status of vegetable seed production (AEC, 2004). Nepal's competitiveness can be maintained only when seed yield is increased (including the elements of development supports), labor productivity is increased (through training, better equipments and technology support), transport cost is reduced with increased access to farm production sites by vehicles/ trucks, transport management, regulatory framework is adequately established, seed sector be considered as a priority sector and incentives for establishing processing/packaging enterprises are provided.

India as recorded through official customs data. In the year 2008/09, export statistics indicate that Nepal exported seeds through HS code category 120991 to the amount of 69.3 MT, valued at around NPR. 4.2 million, mostly to India. Exports to Bangladesh have virtually come to stop, with limited quantity (around 1.6 MT) of vegetable seeds 2009/10.

2.2.6 Vegetable seed marketing in Nepal

In the vegetable seed market of Nepal, transaction of source seed and improved seed of vegetable takes place. Source seed is mostly produced by government research farms and very few seed companies and cooperatives while improved seed is produced by farmers.

The deficit amount of improved seed is imported. While comparing the annual sales of improved seeds from the fiscal year 2000/01 to 2010/11, high fluctuation can be observed (Table 2.8).

Table 2. 8: Annual sales of improved seeds of vegetable, 1992/93 - 2010/2011

Year	Quantity (Mt.)
2000/01	2
2001/02	36
2002/03	2.3
2003/04	1.48
2004/05	1.19
2005/06	2.77
2006/07	8.38
2007/08	14.77
2008/09	5.05
2009/10	6.75
2010/11	2.25

Source: (Agri-Business Promotion and Statistics Division, 2010/11)

2.2.6.1 Actors of vegetable seed marketing in Nepal

The major actors of involved in marketing of vegetable seed in Nepal are: SEAN Seed Service Centre (SSSC), Horticultural & Vegetable Farms (HVF)/ DoA, Nepal Agriculture Research Council (NARC) for research and development; DADO, HVFs/ DoA, Private Firms (SSSC), Agro-vets and Farmers for input supply; Private Firms/Entrepreneurs, CEAPRED, SSSC, farmers, Producer groups/Cooperatives for farm production; Local seed traders, agents and Producer cooperatives for assembling; Private Firms/Entrepreneurs and Agro-vets for processing and Wholesaler/Distributors, Agro-vets and Retailers for market logistics.

The government mechanism and structures still play the major role in functioning of the domestic market, as the government farms under the Vegetable Development Directorate (VDD) produce and supply the foundation (or categorized as source) seeds. These seeds are further multiplied by seed producers groups or farmers, ready for commercial sale. These commercial seeds are then collected, processed and cleaned by the private seed traders and firms, who then supply these vegetable seeds to private seed dealers (or wholesale dealers) and then are subsequently passed on to the retailer for the sale in the market. The supply of seeds from farmer to farmer is also a common practice in Nepal, where established marketing channel does not exist, or contractual farming for vegetable seeds does not exist. Vegetable Seeds are being produced on the basis of contract agreement between the seed growers' group or individual grower and private seed firms or local seed traders. The local seed traders also act as middlemen or agents from some of the private seed firms located in the urban centers and in Kathmandu. The contractual

agreements are done at least two years in advance for source seed and at least one year for commercial seed.

Table 2. 9: Value Chain of Vegetable Seeds in Nepal

Value Chain Stages	Actors	Actors' Activities	Supporting Actors	Supporting Actors' Activities
Research and Development	<ul style="list-style-type: none">) SEAN Seed Service Centre (SSSC)) Horticultural & Vegetable Farms (HVF)/ DoA) Nepal Agriculture Research Council (NARC) 	<ul style="list-style-type: none">) Maintenance of the different varieties of vegetable (Breeder and foundation) seeds) Research and development of the new varieties of vegetable seeds) Varietal testing and referencing 	<ul style="list-style-type: none">) Vegetable Development Directorate (VDD)) Entrepreneur Association of Nepal (SEAN)) National Seed Board) Seed Quality Control Centre (SQCC)) International Aid/ Development Agencies 	<ul style="list-style-type: none">) Inter-agencies linkages and coordination) Monitor and inspection of the quality of seeds produced and in the market.) Develop and ensure seed guidelines and standards) Certification and registration of seeds) Support research and development of vegetable seeds
Input Supply	<ul style="list-style-type: none">) DADO) HVFs/ DoA) Private Firms (SSSC)) Agro-vets) Farmers 	<ul style="list-style-type: none">) Provide source seeds) Technical inputs) Imports) Agro inputs (fertilisers, pesticides)) Labour 	<ul style="list-style-type: none">) SQCC) DADO) SEAN) Agro-Development Projects (ADPs)) Internal Non-Government Organisations (INGOs)/) Non-Government Organisations (NGOs) 	<ul style="list-style-type: none">) Monitor and inspection of the quality of seeds in the market (imports)) Marketing monitoring and facilitate/ support distribution of agro inputs) Funds and technical inputs) Development of support programmes and inter-linkages) Development of common knowledge platform
Farm Production	<ul style="list-style-type: none">) Private Firms/ Entrepreneurs) CEAPRED/ SSSC 	<ul style="list-style-type: none">) Production of Improved seeds) Knowledge exchange 	<ul style="list-style-type: none">) HVFs/ DoA) ADPs) INGOs 	<ul style="list-style-type: none">) Foundation (initial) capital funding) Technical Inputs, trainings and

Value Chain Stages	Actors	Actors' Activities	Supporting Actors	Supporting Actors' Activities
	<ul style="list-style-type: none">) Farmers) Producer Groups/ Coops 	<ul style="list-style-type: none">) Contract farming and assemble small seed producers and production locations 	<ul style="list-style-type: none">) NGOs/ Community-based Organisations (CBOs) 	<ul style="list-style-type: none"> Knowledge exchange) Monitor and Supervise farm productions at district level) Consolidate and group small-holding farmers, capacity building
Assembly	<ul style="list-style-type: none">) Local Seed Traders) Agents) Producer Coops 	<ul style="list-style-type: none">) Seed collection) Preliminary grading/ pricing) Bulk Packaging) Transportation) collection of seed payment for transfer to seed producers 	<ul style="list-style-type: none">) ADPs) NGOs/ CBOs 	<ul style="list-style-type: none">) Mobilise and group small-holding farmers) Linkages with consolidators and processors) Price negotiations, market linkages) Help and support up-scaling of groups and cooperatives
Processing	<ul style="list-style-type: none">) Private Firms/ Entrepreneurs) Agro-vets 	<ul style="list-style-type: none">) Imports) Storing/ Grading/ Separation) Packaging) Truthful labeling) Pricing 	<ul style="list-style-type: none">) VDD) SQCC) ADPs/ NGOs 	<ul style="list-style-type: none">) Market monitoring and inter agencies linkages) Process guidelines and standards) (Imports) Seed Testing, Certification and Registration) Help and support up-scaling of groups and cooperatives
Market Logistics	<ul style="list-style-type: none">) Wholesaler/ Distributors) Agro-vets) Retailers 	<ul style="list-style-type: none">) Distribution) Retail 	<ul style="list-style-type: none">) VDD) SQCC) ADPs/ NGOs 	<ul style="list-style-type: none">) Market monitoring) Market research) up-scaling of groups and cooperatives

Source: (HVAP, 2011)

2.2.6.2 Sources of vegetable seed

The source of vegetable seed to Nepali fresh vegetable farmers can be broadly divided into three categories:

- i. **Traditional source**: consisting for limited on farm retention of seed for select vegetables and farmer to farmer exchange of seed. However, as the commercial vegetable farming evolved over the years in the country this practice has become limited.
- ii. **Formal source**: this includes seeds supplied through government farms and agencies, seed companies and suppliers, and retail shops. This includes both domestically produced seed and imported ones also. With establishment of government farms and Agricultural Inputs Corporation in 1960s, the formal sector for seeds got established in Nepal and has been displacing the traditional source of vegetable seeds. The formal source of imports of vegetables seed are seen to account for around 25-30% of the total demand in the country.
- iii. **Informal source**: includes direct seed trading among farmers and seed producers, direct purchase from Indian border towns and other scheduled haat bazaars. Additionally, there are existences of many varieties of Indian brands of vegetable seeds in the country which are not imported through formal channels, rather distributed directly by agents or hawkers. Evidence of such was found in ample during the field visits. It is difficult to estimate how much of trade is involved in this form of sourcing of vegetable seeds. As India and Nepal share an open border, movement of people with vegetable seeds cannot be tracked. However, interactions indicated that this form of informal source could account for anywhere from 30%-45% of the total vegetable seed consumed in Nepal. This can also be classified as unaccounted imports of vegetable seeds into Nepal, some of these could even have been accounted for domestic production.

2.2.6.3 Seed Dealers

Data available at SQCC indicates that there are nearly 1,300 seed traders in Nepal who have been given permission to sell seeds as per the regulations of the country. Majority of them or all of them are source of vegetable seeds to the market. Most of these seed dealers or traders, deal with multiple products including agro-inputs (chemicals, implements, fertilizers), seeds (vegetable, cereals and others) and even equipments and machinery. Most of them are either one person shops or shops managed and operated by a family. Only limited shops have hired employees working for them, such are either located in the large urban areas or regional centers of the area; working more like a regional distributors or wholesalers.

It is important to note that seed dealer operating at the village levels are the source of information to the farmers, beyond extension services provided by the DADO on fresh vegetables. Seed dealer are seen to carry out combination of any of the following activities:

- i. support the distribution of vegetable seeds; buy vegetable seeds from the seed companies and then sell it to customers
- ii. act as a pseudo seed company; buy vegetable seed directly the seed producers, package themselves and sell it to customers
- iii. act as a collector for the domestic seed companies; collect from seed producers and then subsequently transfer it to seed companies
- iv. importer; directly import from foreign countries and sell it themselves or through available market channels

2.2.6.4 Seed Distributors

The value chain channels from seed distributors onwards are often not linear, with multiple actors such as middlemen found acting at different locations. Seed wholesalers and agro-vets are found towards the end of the value chain supplying directly to the consumers; acting like a retailer but also can be seen acting like trade intermediaries towards the source of production. Private seed firms or entrepreneurs use seed wholesalers and agro-vets to distribute their “collected” seeds to the end market. Some seed distributors also import and supply the market with imported seeds.

2.2.6.5 Agro-vets

Agro-vets are either wholesalers or retailers selling vegetable seeds and other farming products/ inputs directly to farmers. The importance of agro-vets and seed distributors lies not only in their service of providing seeds but also being source of information about quality seeds and reference point for recommending farmers of seeds and agricultural inputs. Agro-vets are seen to help “bridge” the technical gap between the products and the farmers.

Some agro-vets, themselves are also involved in vegetable seed production and/or procure and collect seeds from the producers or groups; doubling as private seed entrepreneurs. Figure 4 indicates the various value stages within the vegetable seed sector and the actors within each value stage. Additionally, we can see that the same actor playing different role as per the difference in value stage. There are instances when some value stages, such as assembly and processing are by-passed by the farm production stage to be directly sold at retail as indicated by the purple arrow. There are events when the farm production stage directly sells to the processing stage, thus bypassing assembly stage or agents/ middlemen. However, it is seen that majority of the transaction and volume would be following value stages indicated in the Figure 4, prior to being sold at the retail level.

Agro vets tend to have more technical knowhow and often do their research for procurement of good quality seeds. Being mediums between suppliers and farmers, they can influence the farmers' choice of seeds. The role of agro vets, is generally seen to be that of service providers, but agro vets are essentially still traders and businessmen and it has been reported that their interest in profits significantly shadow their role as service providers since in many cases seed producing farmers sell their seeds directly to agro vets who in turn sell the seeds to farmers who use them to grow vegetables. It has been noted that agro vets, as a retailers, profit significantly more selling imported seeds which are more expensive. According to HVAP 2011, while the profit percentage remains the same, (say 10%, local seeds cost Rs. 100 and imported seeds cost Rs. 500, the farmer gains Rs. 10 for local seeds and Rs. 50 for imported seeds) the profits obtained selling expensive seeds are more than selling locally grown seeds. In the same line the introduction of new seeds is based upon credit, trend of distributors and agro vets taking on stock from suppliers with payment after sale or end of season are common. This system of credit also works with the risks that the distributors and agro vets take upon themselves when taking new seeds in. Both of these are the result of lack of practices of certification and quality assurance which require the tests that the seed laboratories in Nepal are not able to carry out due to lack of land and long time required for the GROW-OUT TEST (ELECTROPHORESIS test for QUICK VARIETAL VERIFICATION is not available in Nepalese seed laboratories).

2.2.7 Problems/constraints

According to the several studies conducted, following are the major problems/constraints which are causing obstacles in smooth marketing of vegetable seed in Nepal:

i. Use and Quality of Foundation/ Source Seed

Quality of the vegetable seeds depends upon the genetic purity and quality of source seed. There have been always doubts on the use of quality foundation or source seeds. The lack of supply of source seed in adequate quantity is an obstacle for commercialization of new improved varieties in the country. The supply is not only the problem for new varieties, but also for regularly grown improved varieties, including those that are location specific. Additionally, many of the introduced varieties of vegetables have lost their seed production pockets, what exists now are the traditional or indigenous vegetable varieties only. In a situation where quality source seeds are not guaranteed, these indigenous varieties would also be dependent on imports over the years.

ii. Lack of seed companies

There are many seed entrepreneurs in Nepal, however not many seed companies having capacity or carrying out research and development activities. Much of what exist is seed traders who at best collect and channelize grown vegetable seeds into the market. Unless larger seed companies with resources and capacity to invest in the sector are established

or groomed, vegetable seed sectors would be dependent on some external project or imports to provide for the demand.

iii. High Cost of Production

In a contract-based production system contracts are made in bulk, while the actual individual production occurs in smaller quantity and across scattered plots, due to which economies of scale is not met and involves high costs of transportation and quality monitoring as well as low productivity. Competing with imported seeds from India coming through formal or informal channel is going to be impossible over the years. As indicated the prices of the vegetable seed is one of the important factors farmers consider while adopting a vegetable seed, though not the only one.

iv. Inadequate production planning

It is a general fact that seeds should be produced only in technically feasible locations. Seed production is carried out across any place by many farmers under contract from seed entrepreneurs, which has resulted in genetic shift and deterioration of varietal characters (e.g., Mino Early, Pyuthane Red; Marpha broadleaf mustard, Kathmandu local Cauliflower). An example can be seen from the Surkhet valley which has a sub-tropical type of climate and thus is not suitable for Mino Early Radish seed production. However, it is found being done there. Bagarkot in Dadeldhura was designated a pocket area for seeds of some vegetables including Cauliflower and Chillies which failed showing that there have been inadequate efforts made while designating pocket areas.

v. Varietal deterioration

The issue of varietal deterioration is a culmination of several factors and over time become susceptible to diseases. Varietal maintenance programme is very much required and in mid 1980s variety-wise maintenance at different horticulture farms/ centre was proposed. However, in practice such maintenance has not been performed in the farms/centres as identified. Lack of resources and lack of identification of sectoral scientist/ resource persons for varietal development and maintenance has hampered in maintenance of varieties.

vi. Size of land holdings of farmers

Farmers in Nepal usually have very small landings and consequently, farming systems are usually mixed systems with marked interactions among different systems, particularly within cropping and livestock systems. Farmers grow food crops, plant a few trees, tend a small kitchen garden around homestead and keep animals for draft, milk and meat.

vii. Vegetable Seed Quality Deterioration

As vegetable seed production takes place across the country in far and remote places, there are strategic locations where they get collected. However, not all collectors or seed

entrepreneurs are seen to have proper storage facility, neither are there any established storage facilities available. In addition to this there is no practice of numbering different batches of seeds delivered to be able to identify them over a period of time. These facts only help to deteriorate the quality of seeds that reach the market, which in turn decreases the demand for domestically produced seeds.

viii. Diversity of the sector

The diversity of vegetable seeds is one of the biggest problems in the development of this sector. Due to the diversity, addressing the sector on a national planning and policy level faces more complications. National planning requires co-ordination in the allocation of seed pockets keeping in mind the country's total demand of all vegetable seeds while at the same time considering imports as well as the possibilities of export to other countries.

ix. Availability of manpower and labour

There have been very frequent reports during interactions carried out about the lack of manpower and labor available in rural Nepal due to the mass migrations of people for foreign employment. Foreign employment considered to be financially lucrative has two sets of impacts – first the lack of available manpower in Nepal and secondly, the effect caused by lack of production; which later results in the form of increased import due to insufficient production. Interactions carried out within the capital indicated that there are no local producers of seeds in Kathmandu. In some areas there were no farmers and in other areas the farmers did not have access to the required labor. This shortage of labor in remote areas has greatly increased the labor wages, thus resulting into higher cost of production. Coupled with the labor unavailability, difficulty in harvesting (lack of synchronization in flowering) and threshing (by palms in case of carrot seed) reduce efficiency and entail very painful process.

x. Isolated and scattered production

Lack of large seed production pockets resulting into difficulty in field inspection/monitoring of the production process and increase transactions costs. Lack of collection centers/storage at local level further increase the cost and degrade seed quality.

CHAPTER – III

RESEARCH METHODOLOGY

The study was proceeded with the desk study of related books, reports and newsletters etc. of related ministries, departments, governmental and non-governmental organizations as secondary source of information. For the primary source of information forty agro-vets, sixteen seed companies and one seed company also acting as agro-vet of eleven districts representing three agro-ecological regions of Nepal (terai, mid hill and high hill) was interviewed through purposive sampling. The sampled districts includes: Kailali, Dadeldhura, Chitwan, Bhairahawa, Kaski, Surkhet, Banke, Kathmandu, Lalitpur, Bhaktapur and Kavre. A set of semi structured questionnaire was prepared which included questions related to the major vegetable seed they are selling, its source, major months of selling, packaging and price variations of differently packed seeds. Also the respondents were asked about the major problems of vegetable seed business and their suggestions to address those problems. The data obtained from the survey was compiled, entered and analyzed with the application of SPSS and MS-Excel software. On the basis of the information obtained and analysis done, suggestions are recommended for betterment of the vegetable seed marketing in Nepal.

Figure 3. 1: Number of Agro-vets and Seed Company surveyed

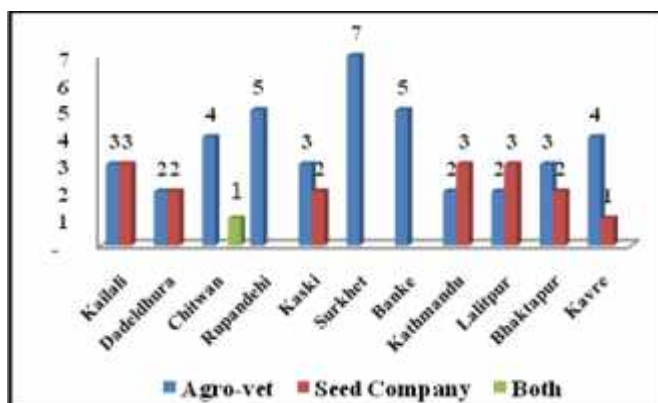


Table 3. 1: Development region and district wise number of surveyed Agro-vets and Seed Companies

District	Agro-vet	Seed Company	Both	Total
Kailali	3	3	-	6
Dadeldhura	2	2	-	4
Surkhet	7	-	-	7
Banke	5	-	-	5
Rupandehi	5	-	-	5
Kaski	3	2	-	5
Chitwan	4	-	1	5
Kathmandu	2	3	-	5
Lalitpur	2	3	-	5
Bhaktapur	3	2	-	5
Kavre	4	1	-	5
Total	40	16	1	57

CHAPTER – IV

RESULTS AND FINDINGS

This chapter includes general information of surveyed agro-vets and seed companies; status of their business; major vegetable seeds sold; major seasons for vegetable seed sale; status of seed supply; seed agreement and related problems; packaging, practice of truthful labeling and price difference; vegetable seed supplying districts; different actors and their role in vegetable seed production till marketing; marketing channel/structure of vegetable seed in Nepal; farmers’ complaints about vegetable seed sold; provision of compensation for loss due to seed and constraints in vegetable seed system in Nepal.

4.1 General information of surveyed agro-vets and seed companies

Total 40 agro-vets, 16 seed companies and a company acting as agro-vets as well of eleven districts were surveyed (Figure 3.1 and Table 3.1). The mean year for establishment of those agro-vets and seed companies is 12.1 years while the minimum and maximum year of establishment is 0.5 years of Kaski and 29 years of Chitwan (Table 4.1).

Table 4. 1: Establishment year of agro-vets and seed companies

District	Mean	Minimum	Maximum
Kailali	10.7	3	24
Dadeldhura	8.0	5	14
Chitwan	13.6	6	29
Butwal	14.8	7	22
Kaski	7.5	0.5	20
Surkhet	13.3	7	18
Nepalgunj	15.4	12	19
Kathmandu	15.0	6	28
Lalitpur	10.8	7	17
Bhaktapur	11.6	6	18
Kavre	12.2	6	18
Total	12.1	0.5	29

Source: Field Survey, 2012

4.2 Status of business

Both agro-vets and seed companies are functional as agriculture input suppliers supplying seeds, chemical fertilizers, pesticides and tools. The annual transaction of the agro-vets and companies ranged from 0.5 million to 30 million across the country (Table 4.2). The

positive co-relation between the year of establishment and annual transaction clearly indicates that the older agro-vets have larger number of customers than the newly established ones which could be explained as this business is influenced by the good will and trust so the customers are attached to the specific input suppliers. In Nepal, there are few seed companies functioning as Seed Company as well with their own outlets or agro-vets which in this report are mentioned as "both" category.

Table 4. 2: Annual transaction of the agro-vet or company

Agro-vet or seed company	Mean	Minimum	Maximum
Agro-vet	6,813,158	500,000	30,000,000
Seed Company	10,121,429	1,500,000	30,000,000
Both	20,000,000		
Total	7,935,849	500,000	30,000,000

Source: Field Survey, 2012

More than 50% of the total transaction of the agro-vets and seed companies is occupied by the seeds of both food grains and vegetables. A larger portion of the seed sale (>50%) is occupied by vegetable seeds.

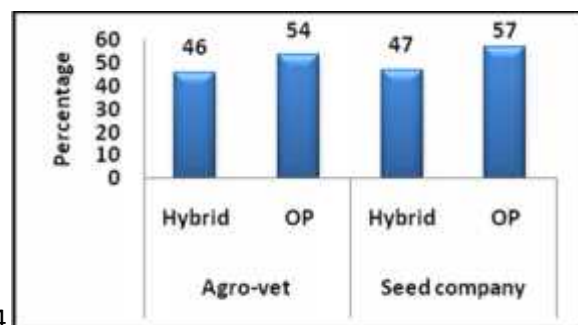
Table 4. 3: Annual transaction scenario (in %)

Agro-vet or seed company		Vegetable seed	Food grain seed	Chemical fertilizer	Pesticide	Other products
Agro-vet	Mean	31	17	13	22	18
	Minimum	5	2	2	5	5
	Maximum	65	50	40	60	60
Seed Company	Mean	29	29	8	20	13
	Minimum	5	10	5	10	5
	Maximum	100	90	20	50	47
Both	Mean	25	75			
	Minimum	25	75			
	Maximum	25	75			
Total	Mean	30	21	11	21	17
	Minimum	5	2	2	5	5
	Maximum	100	90	40	60	60

Source: Field Survey, 2012

Furthermore, of the total quantity of vegetable seed sale, greater portion (54%) is contributed by open pollinated varieties and the remaining (46%) is contributed by hybrid in agro-vet. Similarly, for Seed Company, larger portion (57%) of total vegetable seed sale is occupied by OP and the remaining (47%) by hybrid (Figure 4.1

Figure 4. 1: Percentage of OP and hybrid vegetable seed sale



and Table 4.4). The logic for the larger sale of OP seeds by the seed companies could be due to the seed companies being involved in seed production of open pollinated varieties.

Table 4. 4: District wise percentage of OP and hybrid seed sale (in %)

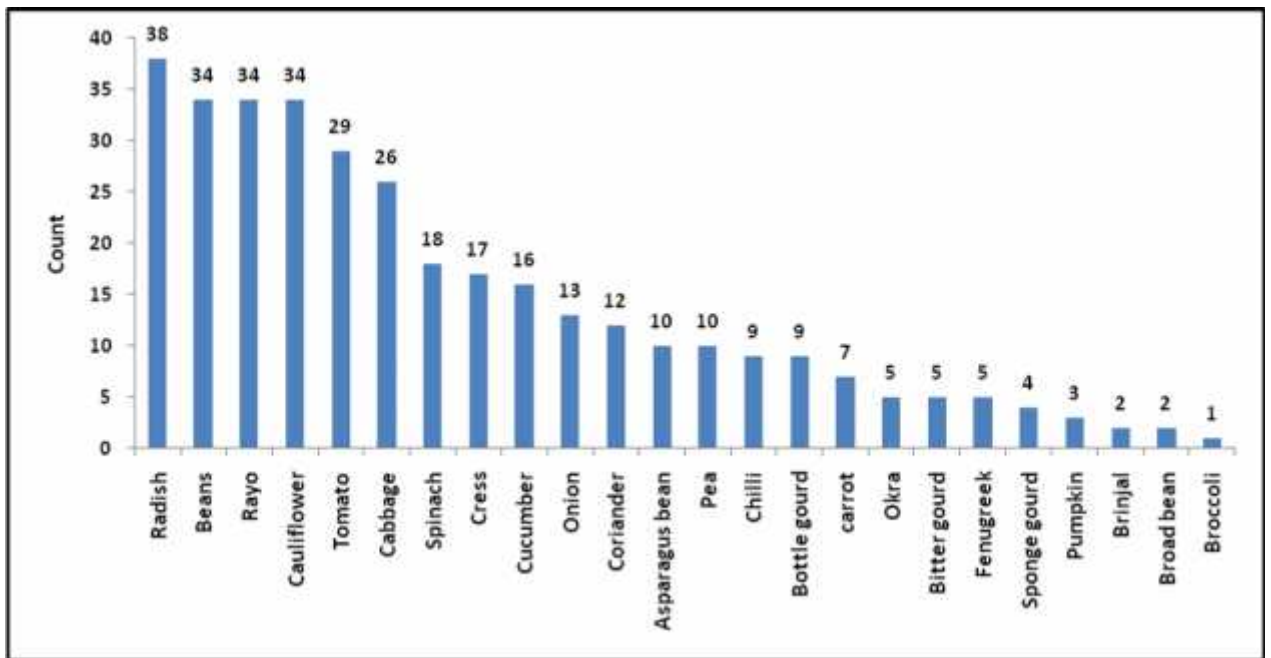
District	Agro-vet or seed company	OP seed	Hybrid seed
Kailali	Agro-vet	62	38
	Seed Company	83	17
	Total	73	28
Dadeldhura	Agro-vet	25	75
	Seed Company	55	45
	Total	40	60
Chitwan	Agro-vet	34	66
	Both	90	10
	Total	45	55
Rupandehi	Agro-vet	34	66
	Total	34	66
Kaski	Agro-vet	63	37
	Seed Company	65	35
	Total	64	36
Surkhet	Agro-vet	50	50
	Total	50	50
Banke	Agro-vet	75	25
	Total	75	25
Kathmandu	Agro-vet	65	35
	Seed Company	63	37
	Total	64	36
Lalitpur	Agro-vet	70	30
	Seed Company	73	27
	Total	72	28
Bhaktapur	Agro-vet	70	30
	Seed Company	65	35
	Total	68	32
Kavre	Agro-vet	48	53
	Seed Company	10	90
	Total	40	60
Total	Agro-vet	54	46
	Seed Company	65	35
	Both	90	10
	Total	58	42

Source: Field Survey, 2012

4.3 Major vegetable seeds sold

There are several vegetables that are grown throughout the country. Based on the data, 23 major vegetables were mentioned to be sold through agro-vets and seed companies. About sixty nine percent of the respondents sold Radish seed and is the highest moving commodity. Beans, Cauliflower, Tomato and Broad leaf mustard were other commodities which were sold by majority of the agro-vets and companies. The seeds of exotic crops like Broccoli, Cress are also sold in the local market (Figure 4.2).

Figure 4. 2: Ranking of vegetable seeds based on the sale

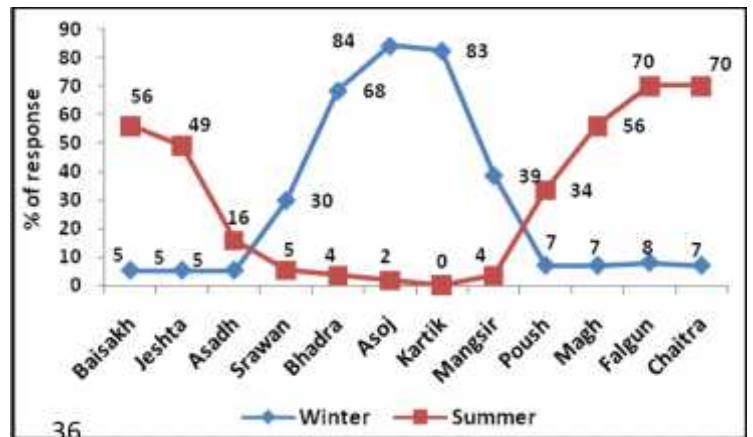


Source: Field Survey, 2012

4.4 Major seasons for vegetable seed sale

In Nepal, there are two seasons for growing vegetables, winter and summer season. Broad leaf mustard (Broad leaf mustard), carrot, Peas, Onion, Radish falls in winter vegetables. Summer vegetables are cucumber, sponge gourd, bitter gourd, pumpkin and bottle gourd etc. Four months; Bhadra, Asoj, Kartik and

Figure 4. 3: Percentage of responses for vegetable seed sale months with respect to season



Source: Field Survey, 2012

Mangsir are the peak period for the sale of winter vegetables whereas seeds of summer vegetables sells highest during the months of Magh, Falgun, Chaitra, Baisakh (Figure 4.3).

Table 4. 5: District wise vegetable seed sale months with respect to season

District	Winter	Summer
Kailali	Asar – Kartik	Poush - Jestha
Dadeldhura	Phalgun – Kartik	Magh - Asar
Chitwan	Bhadra – Mangshir	Poush - Jestha
Rupandehi	Asoj – Baisakh	Shrawan - Asoj, Magh-Baisakh
Kaski	Shrawan – Mangshir	Phalgun - Jestha
Surkhet	Jestha – Mangshir	Poush - Bhadra
Banke	Shrawan – Mangshir	Mangshir - Asar
Kathmandu	Shrawan – Mangshir	Poush - Jestha
Lalitpur	Shrawan – Mangshir	Poush - Asar
Bhaktapur	Shrawan – Chaitra	Poush - Jestha
Kavre	Bhadra – Mangshir	Magh - Jestha

Source: Field Survey, 2012

4.5 Status of seed supply

Nepal's vegetable production is highly dependent upon seed import. Majority of vegetable seeds both hybrid and open pollinated are imported from across the world. Recent trends indicate that India, Thailand, China, Japan and Korea are some of the major countries from where vegetable seeds are imported in Nepal.

Out of 23 vegetables mentioned by the respondents, seeds of eleven vegetables are imported from India followed by Thailand (8), Japan (7), Korea (8), Denmark (4) and China(7) . Majority responded that the Cole crops like Cauliflower, Cabbage are imported mainly from Japan followed by India and few from other countries like Korea, Thailand and Denmark. Radish seeds are imported largely from Korea and are very popular in Nepalese market. Onion seeds are solely brought from India whereas the greater portion of Tomato, Cucumber, Chilli and Bitter gourd seeds are imported from India. Japanese seeds occupy the major portion in terms of carrot. Almost all seeds of Asparagus bean are imported from China (Table 4.6). Japan and India are the two countries for importing Capsicum and Okra seeds.

Table 4. 6: Import of vegetable seeds in terms of respondents

Crops	No. of respondents						Total
	Japan	India	Korea	Thailand	Denmark	China	
Cauliflower	49	12	4	2	2	0	69
Cabbage	31	5	3	2	1	0	42
Radish	6	0	21	4	0	2	33
Tomato	2	20	0	10	1	1	35
Onion	0	10	0	0	0	0	10
Capsicum	8	8	0	0	0	0	16
Okra	2	2	0	0	0	0	4
Carrot	12	1	6	1	0	2	22
Cucumber	4	13	7	11	0	1	36
Asparagus bean	0	0	0	1	0	26	27
Coriander	0	5	1	3	0	1	10
Chilli	0	10	1	4	0	0	15
Bitter gourd	0	16	0	10	0	1	27
Sponge gourd/bottle gourd	0	20	3	8	0	0	31
Leafy vegetables	0	3	0	0	0	2	5
Total	114	125	46	56	4	36	

Source: Field Survey, 2012

In case of OP vegetable seed, agro-vets and seed companies of six districts (Dadeldhura, Rupandehi, Kaski, Lalitpur, Bhaktapur and Kavre) buy the required seed in the domestic market while agro-vets and seed companies of five districts (Kailali, Chitwan, Surkhet, Banke and Kathmandu) are supplied with the vegetable seed from Nepal as well as India.

Table 4. 7: District wise OP vegetable seed supplying country

District	OP vegetable seed supplying country (%)		
	Nepal	India	India and Nepal
Kailali	50	17	33
Dadeldhura	100	-	-
Chitwan	80	-	20
Rupandehi	100	-	-
Kaski	100	-	-
Surkhet	-	-	100
Banke	-	20	80
Kathmandu	80	20	-
Lalitpur	100	-	-
Bhaktapur	100	-	-

Kavre	100	-	-
-------	-----	---	---

Source: Field Survey, 2012

4.6 Seed agreement and related problems

At present, vegetable seed is produced on the basis of contract agreement between the seed producers (group, individual grower or private seed firms). Majority of entrepreneurs (57%) perform the contractual agreement in advance for the seed production. However, Nepalese seed producing farmers are inclined towards infringement of the contract and sell the seeds to the third party providing nominal higher price.

The whole seed production system is not well organized and systematic. Almost 50% of agro-vets and companies interviewed carry out the legal agreement with the seed producing farmers, co-operatives for seed production. However, majority of agro-vets or companies (44%) do not practice the system of providing source seed to the seed producers but rely on the farmer's seed and collect the seed only at the end of the season. The provision of source seed and minimum monitoring of standing crop ensures the good quality of seed. But most of the entrepreneurs lack knowledge on mandatory specifications for production of quality source seeds which leads to the inferior quality of following generation seeds.

Figure 4. 4: Responses on performing contractual agreement

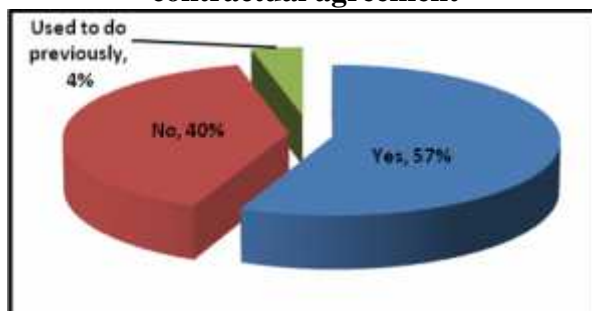
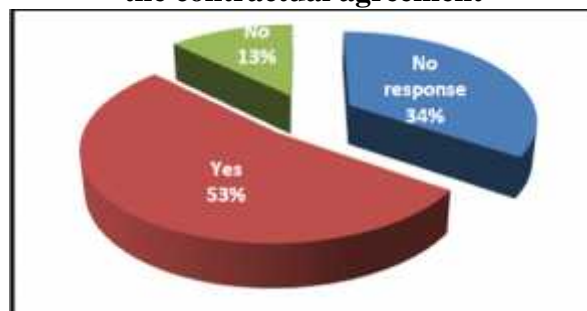


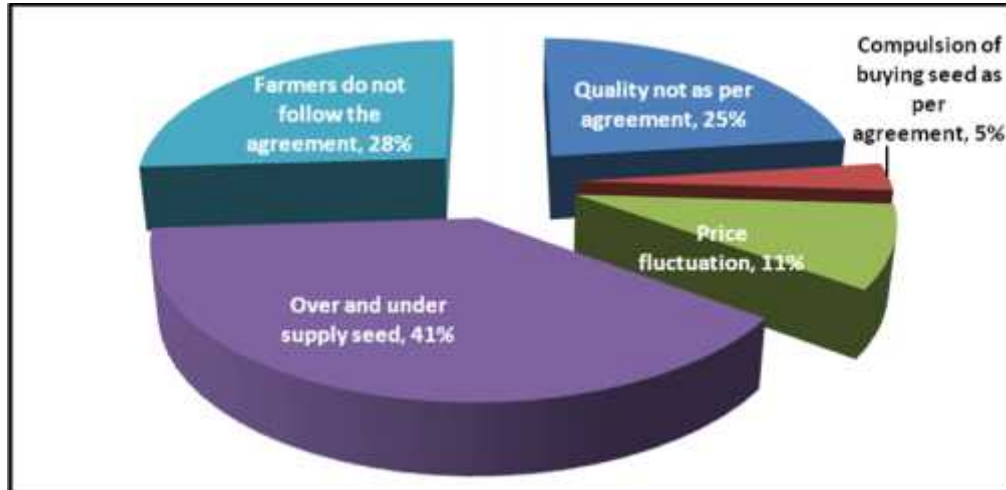
Figure 4. 5: Problems faced by following the contractual agreement



Source: Field Survey, 2012

About 53% of the total respondents faced problem when buying seed on the following the agreement while only 13% of the respondents did not faced any problem. Most of the respondents (having problem due to contractual agreement) i.e. 41% had felt that the farmers try to sell all seed produced when they had over production which is higher than the contracted amount. In the other hand, the buyers suffer due to the under production of seed which hampers their business. 28% had the complaint against the farmers that they do not follow the agreement properly. According to them, if farmers get higher price than the contracted one, they sell their product to another party and cancel the contract. This had resulted in high loss to the suffering buyer. About 25% were unhappy due to low quality seed supplied by the farmers. In addition to this, farmers' also neglect in cleaning and grading of seeds after harvesting.

Figure 4. 6: Types of problems faced by agro-vets and seed companies while following the contractual agreement



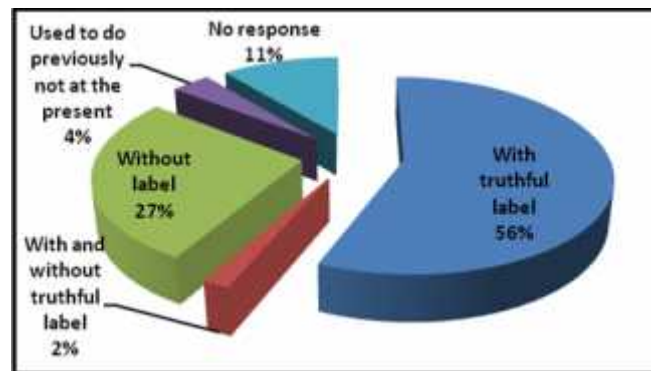
Source: Field Survey, 2012

About 11% had complaint about the price fluctuation in vegetable seed market. Sometimes, the pre-contracted price gets too high than the market price during the harvesting time. About five percent did not like the concept of compulsion of buying seed as per the agreement.

4.7 Packaging, practice of truthful labeling and price difference

Vegetable seeds are available in three types of packages in agro-vets and outlets. The usual practice is plastic pouch packed seeds, second is plastic pouch packed seeds with truthful label and the third is the well packed seeds with full information mostly in imported seeds. Hybrids are imported directly packed in the sophisticated packages and are becoming popular with the farmers. The repacked seeds in plastic pouch along with the truthful label are also pre-dominantly sold in the agro vets throughout the country.

Figure 4. 7: Percentage of respondents practicing truthful label



Source: Field Survey, 2012

One of most important feature required for selling seed is inclusion of truthful label in the seed packets which include the crop name, variety, germination percentage, physical

purity, place of production, name of producer and date of harvest. The truthful label helps the customers to know about its quality and the producer. If the attributes written in the label are not as it is mentioned in the label, the producer will be liable to get punished. Among the total respondents, 56% sell vegetable seed with truthful label while 27% sell without truthful label, 4% used to sell with truthful label but have stopped it and 2% sell with and without truthful label.

Sellers have experienced difference in price of seed packets with and without truthful label. About 89 % felt higher price of seed with truthful label in comparison to that without truthful label. The detail survey clearly states that the price differences between the seeds with and without truthful label are from 40-60%. Almost all respondents unanimously agreed to the fact that price of seeds with TL are higher compared to packs without TL. Majority responded that the price to be higher up to 40-60% depending upon the crop and seed availability.

Insight of the comparative analysis for the price between the packed seeds, packed with TL and imported package of few crops have been presented in this report. The detail study on the price of ordinary plastic, TL and imported seeds of six crops clearly indicated significant differences among the groups.

The price of ordinary packed seeds is 1.4 per gram, the truthful labeled seeds are Rs 2.09 and imported seeds are Rs 6.98. The TL seeds of Radish are 33% higher price than the ordinary packed seeds whereas the attractively packed and imported seeds are 70% higher price than the truthful labeled seeds.

In case of Tomato, the price differences between the ordinary packed and truthful labeled seeds is extremely high (94.7%) whereas between the truthful labeled and imported packed is very narrow (3.6%). The price of ordinary packed seed is Nrs. 2 per gram, the truthful labeled is Nrs. 32 per gram and imported hybrid is Nrs. 34. Likewise, in depth analysis of the price status of the Cauliflower and Cabbage seeds, the difference between the ordinary packed and truthful seeds ranges from 90-97% whereas, the difference between the truthful labeled and imported seeds is very low (3-10%). The price gap between the truthful labeled and ordinary plastic packed seed is 37% where the gap between the TL seeds and the imported seeds was 40% in bitter gourd. The price difference between the TL seeds and ordinary seeds was 52% and between TL and imported seeds was 31% in Beans. The overall price analysis clearly indicates the premium price of TL in comparison to ordinary packed seeds.

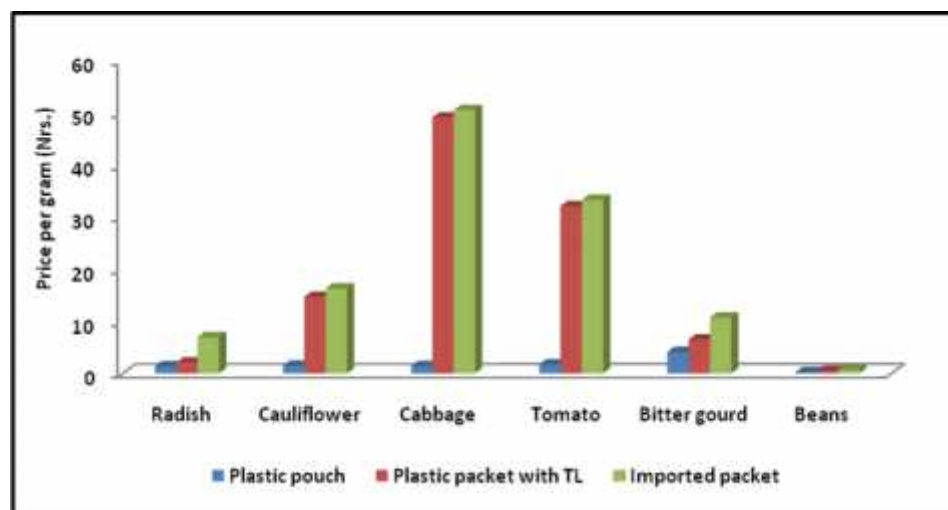
Table 4. 8: Comparative price analysis of differently packed seeds per gram

Crop	Price per gm		
	Pouch	Plastic	Imported pack
Radish	1.39	2.09	6.98
Cauliflower	1.5	14.7	16.3
Cabbage	1.4	49.1	50.5
Tomato	1.7	32.1	33.3
Bitter gourd	4.1	6.5	10.7

Beans	0.24	0.51	0.74
-------	------	------	------

Source: Field Survey, 2012

Figure 4. 8: Comparative price analysis of differently packed seeds per gram



Source: Field Survey, 2012

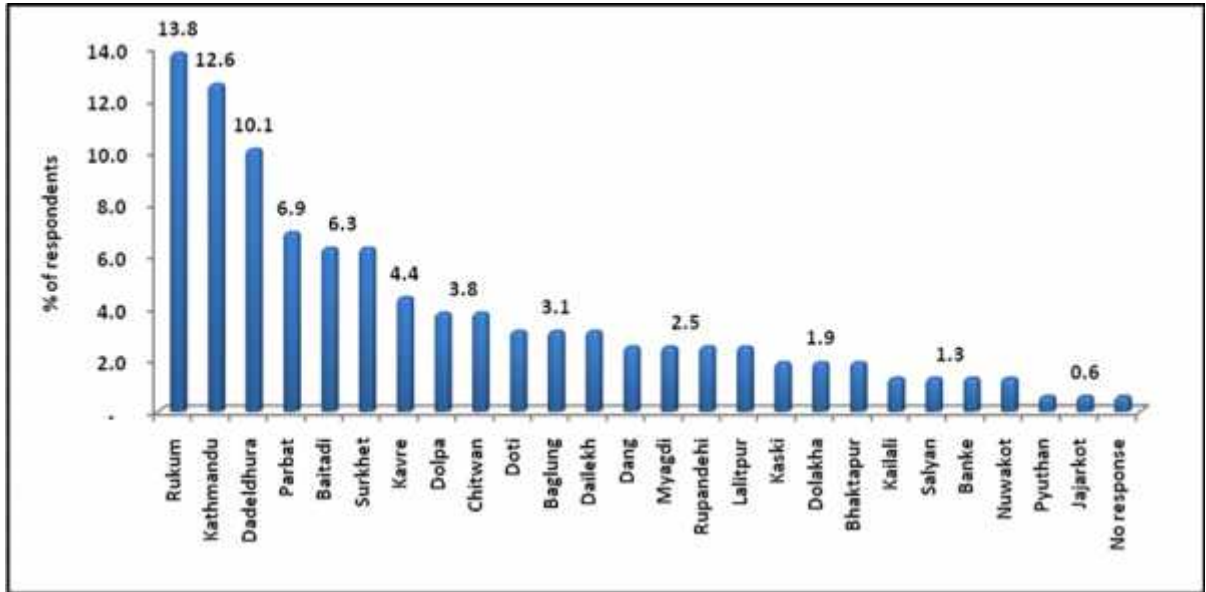
Like in all trading, co-relation between sale and good packaging plays an important role in seed business too. Almost all agro-vets and companies agreed to the fact that reliability and trust is enhanced with attractive packaging with complete information. A few number also expressed that the attractive packaging promotes the customer's willingness to buy though the price may be little higher. Thus, appropriate packaging with complete information or Truthful Label was emphasized by all the interviewees for good business. A look at the average price per gm of Radish seed loosely packed, packed with TL and imported package indicated a big variation amongst three (Figure 4.8). According to the 78 % respondents, farmers trust imported packed seed in comparison to seed produced and packed in Nepal.

The imported packed seed contains all the mandatory information including the truthful label which is more trusted by the farmers throughout the agro-ecology. Large number of respondents (84%) unanimously expressed the same view that good packaging plays a good role in seed marketing as farmer's have greater trust on imported well packed seeds (Table 4.8).

4.8 Vegetable seed supplying districts

Most of the seed companies and agro-vets surveyed purchase vegetable seed required for their business from Rukum, Kathmandu (especially agro-vets) and Dadeldhura (Figure 4.9).

Figure 4. 9: Districts from where surveyed seed companies and agro-vets purchase vegetable seed (% of respondents)



Source: Field Survey, 2012

The major vegetable seed supplying districts for seed sellers of Kailali districts are: Dadeldhura, Doti, Kailali, Baitadi; for Dadeldhura are: Dadeldhura, Doti and Baitadi; for Surkhet: Surkhet, Dailekh and Jajarkot; for Banke: Dolpa, Salyan; for Kathmandu: Myagdi, Kathmandu, Dadeldhura; for Bhaktapur: Bhaktapur, Nuwakot, Dolakha, Kavre; for Chitwan: Chitwan, Dang; for Kaski: Baglung, Kaski, Myagdi; for Lalitpur: Nuwakot, Lalitpur, Bhaktapur, for Kavre: Rupandehi, Kavre, Dolakha and for Rupandehi: Pyuthan, Dang, Kaski (Table 4.9).

Table 4. 9: Vegetable seed supplying districts of vegetable seed sellers of surveyed districts

District	Percentage of respondents										
	Kailal i	Dadeldhur a	Surkhe t	Bank e	Kathmand u	Bhaktapu r	Chitwa n	Kask i	Lalitpu r	Kavr e	Rupandeh i
Dadeldhur a	31	25	6	19	13	6	-	-	-	-	-
Doti	60	40	-	-	-	-	-	-	-	-	-
Rukum	9	-	14	18	9	-	14	18	9	9	-
Dolpa	17	-	-	33	-	-	-	17	17	17	-
Pyuthan	-	-	-	-	-	-	-	-	-	-	100
Baglung	-	-	-	-	-	-	20	80	-	-	-
Parbat	-	-	-	-	9	-	27	36	9	-	18
Kailali	100	-	-	-	-	-	-	-	-	-	-
Baitadi	30	40	10	-	-	-	-	-	10	-	10
Kathmand u	10	-	5	5	15	15	10	-	10	25	5
Chitwan	-	-	-	-	-	-	83	-	-	-	17
Dang	-	-	25	-	-	-	50	-	-	-	25
Kaski	-	-	-	-	-	-	-	67	-	-	33
Myagdi	-	-	-	-	25	-	-	50	25	-	-
Surkhet	-	-	60	20	10	-	-	-	10	-	-
Dailekh	-	-	80	-	-	-	-	-	20	-	-
Jajarkot	-	-	100	-	-	-	-	-	-	-	-
Salyan	-	-	-	100	-	-	-	-	-	-	-
Rupandehi	-	-	-	25	-	-	-	-	25	50	-
Banke	-	-	100	-	-	-	-	-	-	-	-
Kavre	-	-	-	14	-	29	-	-	14	43	-
Dolakha	-	-	-	-	-	33	-	-	-	67	-
Nuwakot	-	-	-	-	-	50	-	-	50	-	-
Lalitpur	-	-	-	-	-	25	-	-	75	-	-
Bhaktapur	-	-	-	-	-	67	-	-	33	-	-

Source: Field Survey, 2012

4.9 Different actors and their role in vegetable seed production till marketing

Various actors are involved in the process of vegetable seed production till marketing. Each of these actors perform crucial role. Following are the roles of different actors in different stages of production till marketing:

Table 4. 10: Different actors in vegetable seed production and their roles

Stages	Input supply	Farm production	Assembly	Processing	Logistics
Actors involved	<ul style="list-style-type: none">) DADO) Horticulture Centres) Private Firms (SSC)) Agro-vets) Farmers 	<ul style="list-style-type: none">) Private Firms/ Entrepreneurs) Farmers) Producer Groups/ Coops 	<ul style="list-style-type: none">) Local Seed Traders) Agents) Producer Coops 	<ul style="list-style-type: none">) Private Firms/ Entrepreneurs) Agro-vets 	<ul style="list-style-type: none">) Wholesaler/ Distributors) Agro-vets) Retailers
Activities	<ul style="list-style-type: none">) Provide source seeds) Technical inputs) Agro inputs (fertilisers, pesticides)) Labour 	<ul style="list-style-type: none">) Production of Improved seeds 	<ul style="list-style-type: none">) Seed collection) Preliminary grading/ pricing) Bulk Packaging) Transportation) collection of seed payment for transfer to seed producers 	<ul style="list-style-type: none">) Imports) Storing/ Grading/ Separation) Packaging) Truthful labeling) Pricing 	<ul style="list-style-type: none">) Distribution) Retail

Source: Field Survey, 2012

Production Stage:

-) Vegetable seed producers/ farmers are increasingly getting themselves organised into vegetable seed producers' cooperatives or groups. These have been initiated either by donor funded projects or in some case community efforts.
-) The mid-western, far-western and central hills are currently the main pockets of vegetable seed production. The vegetable seed production pockets in eastern hills and Terai (in general) do not have much production.

Assembly Stage:

-) Representatives (or a member) from farmers' groups usually acts as the local seed trader or collector for a particular region. They often act as agents to private firms or seed traders/ entrepreneurs/
-) In case of presence of cooperative, the cooperative have started to act as the middlemen linking producers and private seed firms or distributors. They are taking up the orders (contracts), consolidating and collecting seeds from across its members. This to some extent has also given them negotiating power in terms of price and quantity.

Processing and Logistics Stage:

-) Value chain channels from seed distributors onwards are often not linear, with multiple actors such as middlemen found acting at different locations.

-) Seed wholesalers and agro-vets are not only acting like a retailer, but also can be seen as trade intermediaries towards the source of production.
-) Agro-vets supposedly “bridge” the technical gap between the inputs and the farmers, establishing themselves as reference point.

Relationship between Production and Market Actors:

-) There often is absence of or limited weak dialogue between the market and production actors. The “contracts” are often not binding, as the legal basis are not always ensured, they usually act as a document of “mutual trust”.
-) There is an informal nature of relationship among the actors, with general lack of professionalism in terms of technical knowledge in terms of production and processing. Additionally, limited investment in technical capacities, enforcement and abidance to contracts hampers ensuring quantity and quality of production. As current vegetable seeds market has volatile or limited profits, the cohesion to produce and market best product is fragile.

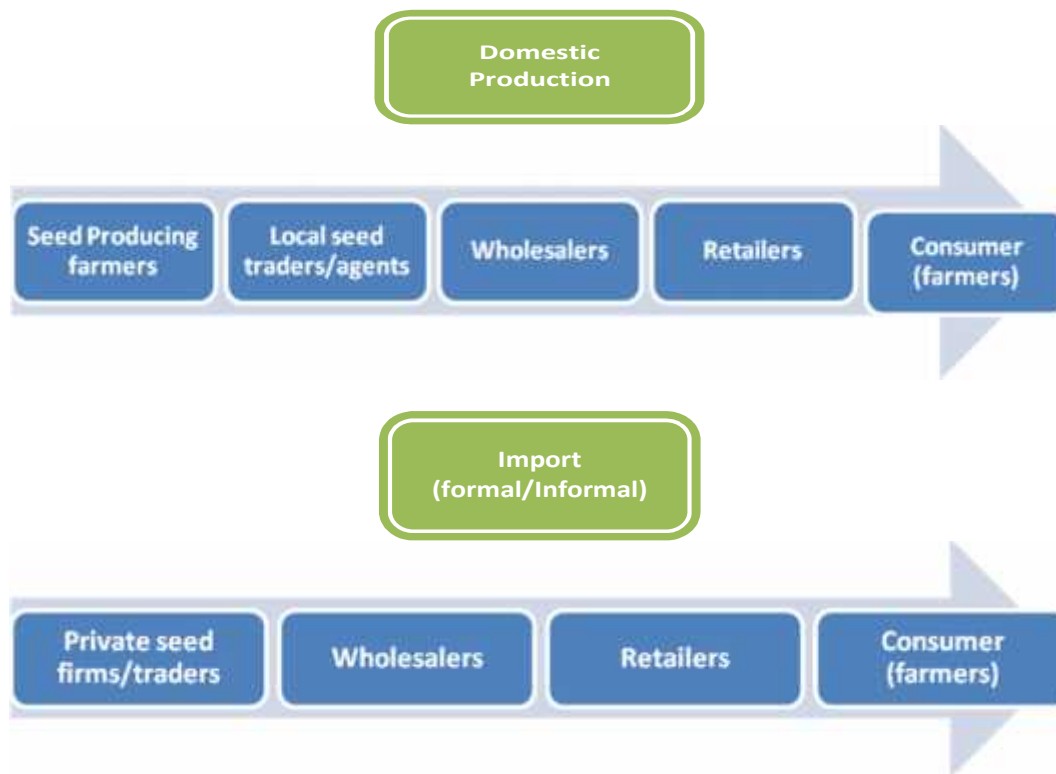
4.10 Marketing channel/structure of vegetable seed in Nepal

Major suppliers of improved seed of vegetable in Nepal are either seed producing farmers or the importers. In case of domestically produced improved vegetable seed, farmers produce seed with or without the prior contract agreement with the seed traders. Farmers sell seed to traders/agents (esp. Local) mostly in case of prior agreement. Local traders sell seed to wholesalers who act as supplier of retailer. Finally, the seed is bought by the fresh vegetable farmers from retailers. In absence of prior agreement, farmers sell seed to local seed traders/agents or directly to wholesalers, retailers.

In case of imported seed, private seed firms/traders import seed and sell to wholesalers. Wholesalers then sell to retailers and finally fresh vegetable farmers buy from retailers.

The figure below shows the most common marketing channels being practiced in Nepal:

Figure 4. 10: General marketing/distribution channels for domestically produced and imported (improved) vegetable seeds

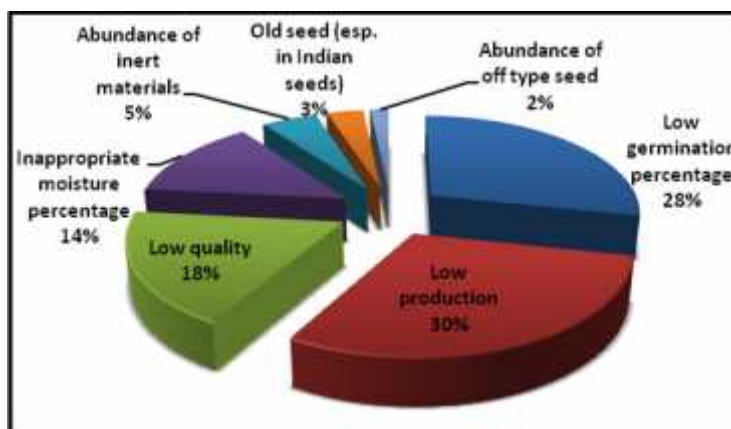


Source: Field Survey, 2012

4.11 Farmers' complaints about vegetable seed sold

Most of the surveyed seed companies and agro-vets (79%) faced complaints from farmers for the OP vegetable seed they sold. The major complaints faced are: Low production, Low germination percentage, Low quality, High and low moisture percentage, abundance of inert materials, old seed and abundance of off type seeds (Figure 4.11). Low germination percentage, inappropriate moisture percentage, abundance

Figure 4. 11: Major complaints faced by seed sellers from farmers about vegetable seed sold (% of respondents)



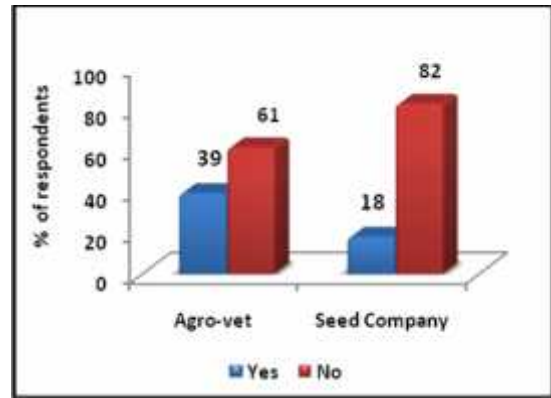
Source: Field Survey, 2012

of inert materials and off types of seeds leads to low quality of seed which results in low production. Among these, most of the respondents faced the complaint about low production (30%) and low germination percentage (28%). According to the survey, problem of old seed is found in seeds from India.

4.12 Provision of compensation for loss due to seed

Agro-vets differ on the way or strategies to respond to farmer's complaints on low quality seeds. Majority (61%) of the agro-vets or companies were not in the practice of compensation to the farmers. A few agro-vets provide compensation themselves whereas very few (0.3%) facilities for the compensation from the concerned company (Table 4.11). Compensation for yield loss inferior seeds though is not a regular practice but it is necessary to maintain the trust built with the farmers. The compensation if provided by the seed providers, the type and amount varies with the individual company. The type of compensation is based on the company rule.

Figure 4. 12: % of respondents providing compensation to farmers



Source: Field Survey, 2012

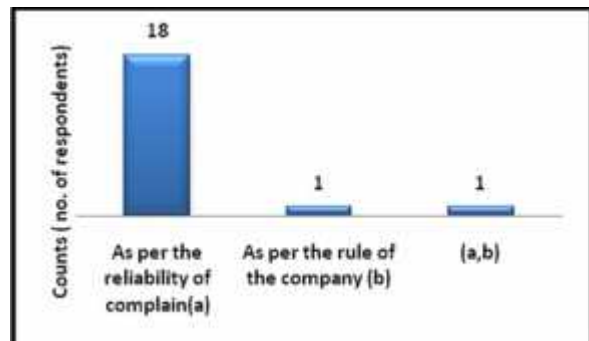
Table 4. 11: Source of compensation for inferior quality of seed (No. of respondents)

	Own Company	Company from where the seed is bought
Agro-vet	14	1
Seed Company	3	0

Source: Field Survey, 2012

Some companies provide the remuneration as per the company rule whereas based on the reliability some companies and agro-vets estimate the loss and compensate some percentage of the loss. Out of twenty companies providing the compensation, 18 compensated from their own company whereas two agro-vets provided the compensation from the concerned seed company itself (Figure 4.13).

Figure 4. 13: Basis for compensation by entrepreneurs (No. of respondents)



Co-operatives, seed companies and agro-

vets are the three important actors of vegetable seed value chain producing, procuring and selling the seeds. There is no distinction between seed companies and agro-vets in terms of their role. Both agro-vets and seed companies are involved in collecting seeds from producers, groups, packaging and finally selling. In Nepal, the usual approach is the agro-vets collect the seeds from the farmers at the end of the season. Only eighteen percent of agro-vets or seed companies involved in seed business manage the source seed and provide them to the seed producer farmers and the remaining seventy eight percent seed companies and agro-vets collect the seed at the end of the crop season and small percentage (4 %) used to provide the source seed however due to scarcity of source seed have ceased from this practice (Table 4.12).

Table 4. 12: Provision of source seed to seed producers

S. N	Description	No. of respondents	Percentage
1.	Provide source seed	10	18
2.	Do not provide source seed	44	78
3.	Used to but not now	2	4

Source: Field Survey, 2012

4.13 Constrains

The complaints expressed by the respondents are mainly of ten categories (Table 4.13). All agro-vets have complaint about famers' lack of technical knowledge on seed production and processing. The whole problem starts from this point and leads to inferior quality of seeds.

The price fluctuation and lack of scientific pricing system hampers the proper functioning of the business resulting in unhealthy competition.

Almost all respondents commented on the dishonesty of farmers. The Nepalese farmers break the agreement and sell the seeds to those paying higher price. Such breakage of contract is promoted by poacher traders who enter into the chain or contract and take away the seeds providing nominal better price.

Additionally, farmers are not very reliable on maintaining the purity and quality of seeds. The negligence on quality maintenance could be due to the lack of good orientation and technical knowledge on seed production. Loose monitoring and quality control system of the country too aggravates the farmer's negligence.

The lack of supply of source seed in adequate quantity is a major obstacle for commercialization of any varieties in the country. The supply is not only the problem for new varieties, but also for regularly grown improved varieties, including those that are location specific. Lack of proper system of providing source seed to the seed producing farmers by the companies also adds to the low quality seed production. Inaccessibility to the reliable authority for source seeds and low understanding on the importance of good quality seeds by farmers was mentioned by higher number of respondents which

ultimately leads to low quality seeds. Furthermore supply of breeder and foundation seed limits the production of the further generation seeds.

Limited quantity of seeds due to many reasons: low volume of source seeds availability, lesser production due to lesser technical knowledge, lack of knowledge on demand and supply influences the pricing of seeds. Price fluctuates based on the volume of seeds available i.e. higher price during shortage and lower price during glut.

Lack of large seed production pockets resulting into difficulty in field inspection/monitoring of the production process and higher transaction costs. Lack of collection centers/storage at local level further increase the cost and degrade seed quality.

Table 4. 13: Problem categories and explanations

Categories	Explanations
1. Source seed) Quantity not available as per agreement) Lack of honesty; sells to who gives higher price
2. Timely availability) Farmers do not produce seed as per agreement
3. Technical knowledge) Lack of technical knowledge on seed production and seed processing
4. Quantity) Seed supply not as per agreement) Lack of source seeds) Not enough volume for mechanized packaging) Irregularity on seed supply
5. Quality) Lack of machinery equipments for processing) Low technical knowledge on production and processing) In access to reliable source seed) Low monitoring and quality control) Admixture (mixing of new and old seeds to obtain volume)
6. Packaging) No proper lab testing facility) No authentic information) Less functional authorized body for lab testing and quality declaration) Lack of proper standards for packaging
7. Price) No scientific pricing system) Difficulty in selling higher seeds with higher price) Fluctuation of price) Higher price in shortage and lower in glut
8. Market Information system) Lack of information on demand and supply) Lack of price information
9. Processing) Lack of mechanized processing facility) Lack of mechanized processing information) High price for mechanized processing facilities

Categories	Explanations
10. Policy	<ul style="list-style-type: none"> <li data-bbox="690 233 1315 304">) Lack of proper and functional quality control system <li data-bbox="690 304 1274 346">) No policy for price fixation and regularity <li data-bbox="690 346 1364 382">) No strict seed registration and marketing policies

Source: Field Survey, 2012

CHAPTER – V

CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

Vegetable seed demand is in increasing trend. There is a huge gap between demand and supply of the vegetable seeds. The seed business possesses good scope in domestic as well as export market.

There are three different stakeholders in vegetable seed supply chain; agro-vets, seed companies and companies with own outlets. A large portion of the seed sale of these stakeholders is occupied by vegetable seed and more than half (54%) of the total vegetable seed sale is contributed by seeds: open pollinated varieties. The demand of OP seeds widens the scope of seed production and sale of OP vegetable seeds.

The seed production and sale of OP and hybrids has been going on since a decade ago however, the quality remains a big issue. Due to country's weak seed quality control policy, the low quality seed has been a never ending problem. The flaw is present from the base of the seed system. The limited supply of assured quality source seed is the initiation of the low quality seed supply system followed by insufficient orientation and knowledge on quality seed production methodology also adds to the low quality seed. The sustainable supply of source seeds needs to be placed by the concerned authority. The private and public sector's focus should be towards capacitating the producers on seed production technologies, processors for processing and packaging as well as the service providers or seed providers on quality control aspects.

Vegetable seeds are produced based on the contractual agreement between the buyer and producer of the seeds. However, the whole seed supply is disturbed by the poachers provoking the producers for infringement of the contracts for nominal higher price and taking away the seeds. This creates artificial shortage of the seeds leading to unscientific pricing of the seeds. Immediate action needs to be taken at all levels to tackle this problem.

The seed processing and packaging is one of the most neglected area in the whole seed system. Presently, three types (loosely packed, TL and sophisticated packed seeds) of packed vegetable seeds are available in the market. The loosely packed seeds though fetch very low price but mostly of inferior quality are predominantly available in the market. Government should strictly limit or eliminate the sale of loosely packed seeds and implement the rule of selling TL seeds.

The value chain of the vegetable seed needs to be strengthened in future days by policy reform, capacity building, infrastructure development and research. The quality control should be the primary thrust in the vegetable seed system for coming days.

5.2 Recommendations

Specific pocket areas for specific crop seeds should be developed to obtain a good volume of seeds and to avoid seed poaching.

To initiate a good quality and sustainable seed production system, quality source seed from the concerned authority such as Nepal Agriculture Research Council should be accessible to the farmers and should be available regularly as per the demand of farmers. Farmer's technical capacity needs to be enhanced on seed production and processing through training.

The private seed companies should be involved in creating the new seed production pockets and strictly follow the rule of signing contract with producers.

The seed sellers (agro vets or seed companies) should be well versed with the requirements for Truthful labeling. Training on primitive seed testing methods should be provided to the seed producers and agro-vets which will aid in Truthful labeling.

Seed quality control should be taken very seriously and needs to be implemented from the starting point i.e. from the producer level. The seed producer groups or farmers should be well oriented on the importance of quality and methodology of quality control.

Emphasize on minimum processing and packaging standard of the produced seeds and also should emphasize on implementing the truthful labeling of the seeds to obtain premium price and also guarantee the quality of yield.

Government should strictly limit or eliminate the sale of loosely packed seeds and implement the rule of selling truthful labeled seeds.

REFERENCE

- AEC. (2004). *A Study Report on Trade Competitiveness Vegetable Seeds (Radish- Mino Early, Carrot- New Kuroda and Hybrid Tomato)*. Kathmandu: Federation of Nepalese Chambers of Commerce and Industry (FNCCI) and USAID.
- Agri-Business Promotion and Statistics Division. (2010/11). *Statistical Information on Nepalese Agriculture*. Kathmandu: Ministry of Agricultural Development.
- CBS. (2009-10). *Nepal Vegetable Crop Survey*. Kathmandu: Central Bureau of Statistics.
- CEAPRED. (2010). *vegetable Seed Import Situation Analysis and Policy Feedback for Import Substitution Strategy (Vegetable Seed marketing Survey)*. Lalitpur, Nepal: Center for Environmental and Agricultural Policy Research, Extension and Development (CEAPRED).
- DoA. (2012). Retrieved November 2012, from Department of Agriculture: <http://www.doanepal.gov.np/>
- Ghale, Y. (2009). Vegetable Seed to Improve Livelihood in Rural Nepal. *Asia Brief / Nepal*.
- High Value Agriculture Project in Hill and Mountain Areas (HVAP). (2011). *Value Chain Analysis of vegetable Seeds in Nepal*. Nepal: Ministry of Agriculture and Cooperatives, Government of Nepal.
- Ministry of Finance. (2012). *Economic Survey, 2011/12*. Kathmandu: Government of Nepal.
- MoAD. (2012). Retrieved 2012, from Ministry of Agricultural Development: <http://www.moad.gov.np/content.php?id=203>
- My Agriculture Information Bank. (2011). Retrieved 2012, from Stages of Seed Multiplication: <http://agriinfo.in/default.aspx?page=topic&superid=3&topicid=84>
- NARC. (2012). Retrieved 2012, from Nepal Agriculture Research Council: <http://narc.gov.np/about/index.php>
- Pandey, S. (2006). *Vegetable Seed Marketing in Kathmandu Valley*. Bhaktapur, Nepal: Himalayan College of Agricultural Sciences and Technology (HICAST).
- SDC. (2012). *Vegetable Seed Project*. Retrieved April 28, 2012, from Swiss Agency for Development and Cooperation (SDC) in Nepal: <http://www.swiss->

cooperation.admin.ch/nepal/en/Home/Vegetable_Seed_Project_VSP_Phase_3/vsp_
more

SQCC. (2012). Retrieved 2012, from Seed Quality Control Center:
<http://sqcc.gov.np/objectives/>

Theagricos. (2008). Retrieved 2012, from Stages of Seed Multiplication:
<http://theagricos.com/seed-technology/seed-multiplication/stages-of-seed-multiplication/>

West Coast Seeds. (2012). Retrieved 2012, from What are Hybrid Seeds Exactly:
<http://www.westcoastseeds.com/topicdetail/topic/what-are-hybrid-seeds-exactly/>

Wikipedia. (2012). Retrieved 2012, from Vegetable:
<http://en.wikipedia.org/wiki/Vegetable>

Wikipedia. (2012). Retrieved 2012, from Seed: <http://en.wikipedia.org/wiki/Seed>

Wikipedia. (2012). Retrieved 2012, from Hybrid seed:
http://en.wikipedia.org/wiki/Hybrid_seed

Wikipedia. (2012). Retrieved 2012, from Marketing:
<http://en.wikipedia.org/wiki/Marketing>

ANNEXES

Annex 1: List of the surveyed organizations

S.N	Organisation	Type	District
1.	NEMACOL	Seed Company	Kathmandu
2.	Himalayan Agro Enterprises	Seed Company	Kathmandu
3.	Kisan Bij Bhandar	Agro-vet	Kathmandu
4.	Raila Bijbhandar	Agro-vet	Kathmandu
5.	Annapurna Bij Bhandar	Agro-vet	Kathmandu
6.	National Agro center	Agro-vet	Lalitpur
7.	Everest Seed Company	Agro-vet	Lalitpur
8.	C.G Seeds and Fertilizer	Seed Company	Lalitpur
9.	National Seed Enterprises	Seed Company	Lalitpur
10.	Kathmandu, Agro	Agro-vet	Lalitpur
11.	Puspa Agrovet	Agro-vet	Bhaktapur
12.	Bhaktapur Bij Bhandar	Seed Company	Bhaktapur
13.	Rajan Seed Store	Seed Company	Bhaktapur
14.	Bhaktapur Krisi Samagri Suppliers	Agro-vet	Bhaktapur
15.	Mantsir Krishi, Samagri Pasal	Agro-vet	Bhaktapur
16.	Kisan Agro-vet	Agro-vet	Kavre
17.	Bhagwati Agrovet	Agro-vet	Kavre
18.	Paachkhal Bijbhandar	Seed Company	Kavre
19.	Dhital Agro-vet, Banepa	Agro-vet	Kavre
20.	Sangrila Agro-vet	Agro-vet	Kavre
21.	Saajha Bij Bhandar	Seed Company	Dadheldhura
22.	United Seeds Interntional	Seed Company	Dadheldhura
23.	Saaud Agro-vet Center	Agro-vet	Dadheldhura
24.	Deep Jwala Shakti Agro-vet	Agro-vet	Dadheldhura
25.	Shrestha Agro-vet Center	Agro-vet	Surkhet
26.	Bishal Agro-vet, Center	Agro-vet	Surkhet
27.	Kirsak Agro-vet, Center	Agro-vet	Surkhet
28.	Basant Agro-vet, Center	Agro-vet	Surkhet
29.	Kiran Agro-vet, Center	Agro-vet	Surkhet
30.	Sital Agro-vet, Training, Center	Agro-vet	Surkhet
31.	Bangali, Agro-vet	Agro-vet	Surkhet
32.	Jay Kishan Agro-vet Center	Agro-vet	Rupandehi
33.	Annapurna Agro Center	Agro-vet	Rupandehi
34.	Shree Nepal, Agro-vet	Agro-vet	Rupandehi
35.	Yadav Agro Concern	Agro-vet	Rupandehi
36.	D.N. Agro-vet	Agro-vet	Rupandehi
37.	Tiwari Krisibikas Farma	Agro-vet	Banke
38.	Annapurna Agro Farm	Agro-vet	Banke
39.	Munal Agro-vet	Agro-vet	Banke

S.N	Organisation	Type	District
40.	Trimurti Agro-vet Center	Agro-vet	Banke
41.	Sagarmatha Agro-vet Center	Agro-vet	Banke
42.	Sagarmatha Agro International	Agro-vet	Chitwan
43.	Nepal Agro Seeds and Inputs Company	Seed Company	Chitwan
44.	Shrijana Agro Center	Agro-vet	Chitwan
45.	Dawadi Agro Enterprises	Agro-vet	Chitwan
46.	Sohayogi Agro-vet, Center	Agro-vet	Chitwan
47.	Nepal Kresi Sewa Bhandar	Agro-vet	Kaski
48.	Harabhara Agro-vet Sansar	Agro-vet	Kaski
49.	Pokhara Seed Company	Seed Company	Kaski
50.	Unnati Agro-vet	Agro-vet	Kaski
51.	Sampurna Kresi Samagri Bhandar	Agro-vet	Kaski
52.	Krisak Sahayog, Kendra	Agro-vet	Kailali
53.	Universal Agro Saplayars	Agro-vet	Kailali
54.	Unik Biu Uudhog	Seed Company	Kailali
55.	Samiuhi Agro, Center	Agro-vet	Kailali
56.	Kisan Agro-vet	Agro-vet	Kailali
57.	Panchasakti Biu Company Pvt. Ltd.	Seed Company	Kailali

Annex 2: Questionnaire for Agro-vets and Seed Companies

I would like to introduce myself as a student of M.B.S. final year, Shankar Dev Campus, Kathmandu, engaged in a research work. I am going to prepare a dissertation on “Improved Vegetable Seed Marketing in Selected Districts of Nepal” in order to fulfill the partial requirement of Master Degree in Business Studies (M.B.S) of Tribhuvan University.

I heartily request for your valuable comments, views, suggestions and information on this issue that could be very useful for my study. So, I humbly request you to fill up the following questionnaire.

Thanking You.

Subhechchha Shrestha

.....
.....

1. Name of agro-vet/seed company:
2. Address:
3. Contact no.:
4. Name of respondent :
5. Establishment year :
6. Annual transaction (Rs.) :
- 6.1 What % if the following agri-inputs are sold?
 - a. Vegetable seed
 - b. Cereal seed
 - c. Chemical fertilizer
 - d. Pesticide
 - e. Others
7. Out of total seed sold, how much % are hybrid seed and OP seed?
 - a. Hybrid %, Quantity (k.g), Price (Rs.)
 - b. OP %, Quantity (k.g), Price (Rs.)
8. Please list the major five vegetable crops (OP/Hybrid both) sold:

9. What are the major months of vegetable seed sale?
 - a. For winter vegetable (cauliflower, cabbage, radish, carrot, pea etc.)
.....
 - b. For summer vegetable (cucumber, sponge gourd, bitter gourd, pumpkin, bottle gourd etc.).....
10. List the name of country from where hybrid seed is imported? (e.g. Cabbage from Japan)

11. From where do you buy OP vegetable seed?
12. Have you practiced prior written agreement while buying OP vegetable seed?
13. Do you sell OP vegetable seed with Truthful Label (TL)?
14. Is there any difference in the price of TL packed seed and simply packed seed (with name only)?
 - a. Yes
 - b. No.
15. If yes, then please mention the price of following seeds packed with and without TL

Crop	Variety	Quantity per packet (gm)	Price per packet (Rs.)		
			Plastic packet	Packaging with TL and photo	Imported seed with proper packaging

16. Which seed farmers mostly prefer?
 - a. Imported packed seed
 - b. Seed packed in Nepal
17. From which district of Nepal do you buy seed produced in Nepal?
18. Do the farmers complain about the OP vegetable seed you sell?
 - a. Yes
 - b. No.
19. If yes what type of complaints do you get?
20. Do you have any provision of compensation to farmers if the production loss occurs due to seed sold by you? If yes what are the basis for the compensation?
21. Do you have any suggestions regarding the quality, price, availability etc. of OP vegetable seed?
22. What are the difficulties you have suffered during the vegetable seed production and marketing and what can be done to solve those?

Thank you for your cooperation.