E15-2017-1 | 2017. 12.

KAPEX Joint Research Report
Enhancing Zero Hunger Challenge Initiative Action Plan 2015-2025; In perspective of Pillar-IV (100% increase in smallholder productivity and Income)

International Cooperation Coordination Division, Ministry of Agricultural Development, Nepal

Korea Rural Economic Institute

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등 록 | 제6-0007호(1979. 5. 25.)

발 행 | 2017. 12.

발행인 | 김창길

발행처 | 한국농촌경제연구원
우) 58217 전라남도 나주시 빛가람로 601
대표전화 1833-5500

인쇄처 | 세일포커스(주) 02-2275-6894

ISBN |

Acknowledgements

Ministry of Agricultural Development of Nepal started the KAPEX program after signing in the R&D between Ministry and Korea Rural Economic Institute in February 2017. It aimed at enhancing the food security framework of the country. The program consisted of KAPEX Training, KAPEX Workshop, KAPEX Academy and KAPEX Joint research. This joint research was conducted by the joint research team established in the Ministry of Agricultural Development of Nepal.

The programme has been successful in implementing all components. Achievement of program objectives is due to invaluable contributions from various organizations, officials, experts and individuals. In this respect, I would like to express my sincere gratitude to Dr. Suroj Pokharel, Secretary of Ministry of Agricultural Development for his supports during whole program. Likewise I would like to thank Mr. Lekha Nath Acharya and Mr. Dila Ram Bhandari, Joint Secretaries of Policy and International Cooperation Coordination Division of the Ministry for their leadership and guidance to the joint research team. I sincerely acknowledge the important supports of Team Members - Mr. Surendra Subedi, Agriculture officer, Mr. Sandesh Dhital Senior Horticulture Development Officer, Mr. Sirish Pun, Senior Agriculture Economist, Mr. Ishwor Barshila, Agriculture Economist and Ms. Shrijana Timilsina, Agriculture Economist. Likewise I am thankful to Mr. Pushpa Raj Aryal, Mr. Suraj Nepal, Mr. Arsan Bhattarai, Mr. Binod Acharya and Ms. Megha Subedi for collecting the household level information through household survey. I would also like to thank Mr. Mahesh Sapkota and Mr. Ramesh Acharya for their supports in data entry and analysis.

My sincere thanks are also due to Ms. Kim Yungjung of KREI for her guidance and supports to the research team. I would to express my sincere thanks to Dr. Kim and other personalities of KREI for their valuable guidance

and supports.

I would like to thank the district line agencies, farmers group and cooperatives, agro-entrepreneurs of Jhapa, Mahottari, Dolakha, Kaski, Kapilvastu, Dailekh and Kanchanpur for availing their valuable time and sharing their experiences and suggestions during the field visit. and by attending the workshops, focus group discussion meetings and on the site visits.

Last but not the least I am very much indebted to Government of Korea, Ministry of Agriculture Food and Rural Affairs for selecting Nepal as partner country and launching this program in Nepal. I am highly thankful to entire KREI family for their excellent supports and facilities.

Mr. Binod Kumar Bhattarai
Team leader

TABLE OF CONTENTS

Tables

Figure

Chapter 1

Introduction

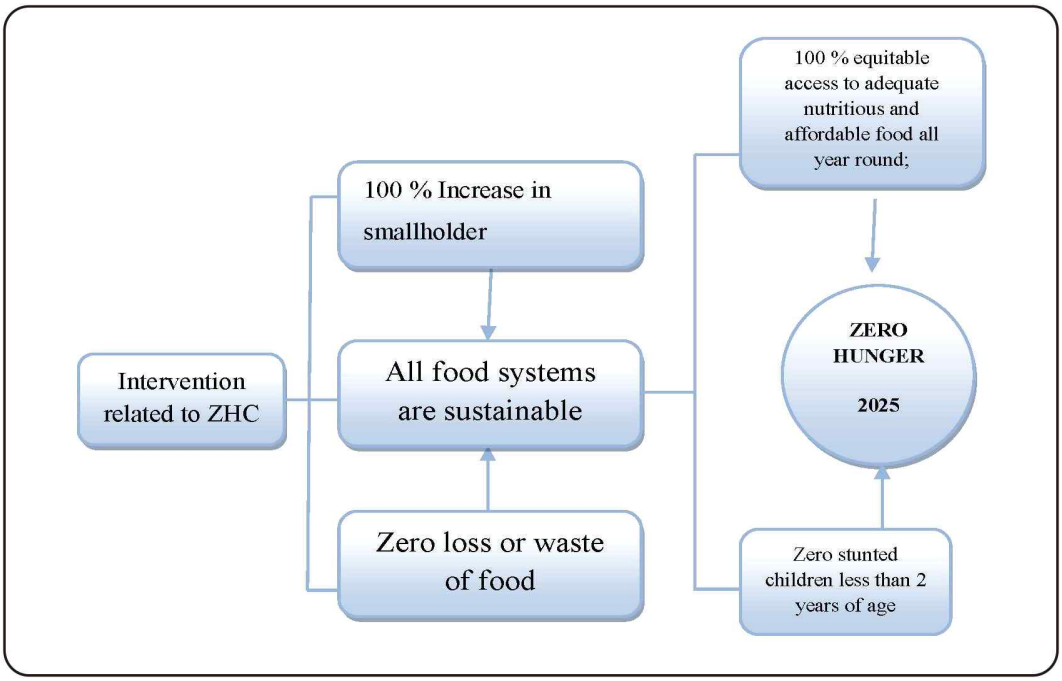
The KAPEX “Korean Experience Sharing program on Food Security” program is being carried out by Korea Rural Economic Institute under Ministry of Agriculture Food and Rural Affairs of Korea Republic in the developing countries. This program aims to improve food security and reduce poverty, and supports the strengthening of developing countries’ capacity to establish and implement agricultural policies by themselves. KAPEX also aims to plan international cooperation projects that meet partner countries needs. Government of Nepal through Ministry of Finance requested Korean government to implement the program in Nepal and accordingly Nepal was selected as partner country for the year 2017. Program period was 9 months which included KAPEX workshop, KAPEX Academy, KAPEX Training and KAPEX joint research.

KAPEX joint research is a capacity enhancement program, where the participating country will carry on research for enhancing food security framework of the country in guidance of Korean research experts. The topics of joint research selected was “Enhancing Zero Hunger Challenge Initiative Action Plan 2015-2025; In perspective of Pillar-IV (100% increase in smallholder productivity and Income)” Nepal is a signatory country of ZHC declared by the Rio+20 conference on Sustainable Development held in Brazil in 2012. Ministry

of Agricultural Development (MoAD) of Nepal has launched Zero Hunger Challenge (ZHC) national action plan (2016-2025) in collaboration with FAO with an aim to end hunger, food insecurity and malnutrition. ZHC initiative is an effort complementing to the regional and national programmes to reduce the hunger, poverty and malnutrition. ZHC action plan has eight specific objectives with one major objective; to end hunger enhancing food and nutrition security of people by maintaining their "rights to food" with respect to the provision of food sovereignty enshrined in the Nepalese Constitution. Right to food is the main priority of ZHC national action plan which aims to achieve food for all to create the zero hunger in nation. It clearly identified fifteen strategic priorities area to achieve the "food for all", a noble condition.

There are five strategic pillars emphasized in ZHC action plan. They are100% access to adequate food all year round, zero stunted children less than 2 years, all food systems are sustainable, 100% increase in smallholder productivity and income and zero loss or waste of food. Among the five pillars, the strategy to increase productivity of smallholder and their income is one of the important pillar because majority of the farmers are facing problem of low productivity and low income which are directly associated with food insecurity of smallholders in rural area of Nepal. The findings obtained from this study would be helpful to suggest for policy development and program planning which ultimately helps to uplift socioeconomic condition of rural and small holder farmers.

〈Fig 1〉 Linkage across the intervention Pillars



〈Fig 2〉 Strategic priorities of ZHC National Action Plan

1. Short description on Pillar – IV: 100% increase in smallholder productivity and income

Nepal is an agricultural country where majority of its population i.e. about 65.6% (CBS, 2012) is engaged in agriculture activities as the main source of livelihood. Agriculture sector contributes about 32.5% to national Gross Domestic Product (GDP) which relies on subsistence farming system (ADS report, 2016). The total cultivable land in Nepal is 4.1 million hectare (ha) with 3.09 million ha cultivation and only 1.3 million ha is irrigated (AICC, 2016). Nepal is divided into three ecological belts based on geographical condition. Cereal based farming system is prominent on these belts. The production and productivity of agricultural crops in Nepal is very low as compared to other countries having similar agro-ecological regions. There is no any remarkable improvement in agriculture sector despite of various developmental programs in periodic plans and policies. Nepalese agriculture is dominated by small holder farmers (NPPR, 2015) with an average of 0.68 ha of land (per household). More than 30 districts of Nepal are food insecure due to remoteness and marginal agricultural productivity of land, low crop production, high food prices and limited income opportunities (NLSS, 2010; WFP, 2009). According to World Bank report on the international poverty line (WB, 2011), about 15 percent of the population was having income of US$ 1.90 per day and 23 percent population is unable to fulfill minimum dietary requirement. According to (International Food Policy Research Institute) IFPRI's calculation of Global Hunger Index (GHI), Nepal ranks 58th among 104 countries in terms of its severity of hunger. This also reveals that Nepal is under the threat of food security, poverty and nutritional security which is directly and indirectly related to the low production /productivity and income of small holder farmers.

The most common practice of defining the categories of farmers is based on the land holdings. The table number 1 shows the landholding size of the Nepalese farmers. The land distribution pattern shows that more than 80% of the farmers have less than 1 ha of land with total area at 46.85%. Agriculture Development Strategy (ADS), 2013 has classified farm households into four groups based on landholding size: (i) landless and near landless (with land holdings of less than 0.5 ha);(ii) subsistence farmers (with holdings of 0.5 ha to 1 ha); (iii) small commercial farmers (with holdings between 1-5 ha); and (iv) commercial farmers (with landholding of more than 5 ha). In this context 80.6% of farmers are subsistence, 19.3% are small commercial and only 0.3% of farmers are commercial farmers.

〈Table 1〉 Landholdings Distribution

Size of holdings	Holdings (Number)			Area of holdings (ha)		
	Number	Percent	Percent Cumulative	Area (ha)	Percent	Percent Cumulative
Less than 0.5 ha	2,102,547	54.9	54.9	488,078.5	19.3	19.3
0.5 ha to less than 1 ha	984,022	25.7	80.6	695,060.1	27.5	46.85
1ha to less than 5 ha	732,726	19.1	99.7	1,258,096.3	49.8	96.66
5ha and above	11,798	0.3	100.0	84,404.3	3.3	100.00
Total	3,831,093	100.0		2,525,639.2	100.0	

Source: National Sample Census of Agriculture 2011/12, Government of Nepal, National Planning Commission Secretariat, CBS, Kathmandu, 2013.

In this context, the way to get country out of hunger is to increase the productivity and income of subsistence and small holder farmers.

Major objective of the Pillar IV of the ZHC is is reducing rural poverty and improving wellbeing through encouraging the decent work, and increasing smallholders “income, empowering women, small farms, fisheries, pastoralists,

young people, farmers organizations, indigenous people and their communities, supporting agricultural research and innovation, improving land tenure, access to assets and to natural resources, making sure that all interventions in agriculture and value chains bare responsible and accountable, developing multi-dimensional indicators for people's resilience and wellbeing"

As major proportions of farmers in Nepal are smallholders, this pillar emphasizes on the contribution of these farmers in achieving Zero Hunger Challenge with enhanced production and productivity. The availability of land for agricultural purpose is decreasing because of multiple reasons like increased use of agricultural land for other purposes particularly in housing and fragmentation reveals the way of increasing production is the increased productivity than area expansion. Thus participation of smallholder farmers in all dimensions of food security namely availability, accessibility, utilization and stability is important aspect of this pillar. Thus it focuses on increased productivity of all kinds of crops including cereals, vegetables, potatoes, fruits and livestock. It has emphasized on the need of expert services for enhanced technologies, timely access to inputs (eg. Seeds, fertilizers, pesticides, planting materials, poultry chicks, improved animals and fingerlings etc) and the facilities for marketing of outputs. It has hoped for capturing ecological potential of different areas for exploiting comparative advantages of niche areas. Likewise the pillar has emphasized on water use efficiency, creation of both physical and infrastructure for irrigation and improved water management practices at the same time. Increased access to productive resources particularly land and credit will be the fundamental in achieving the targets and its priority is to achieve food requirements at household level first and followed by marketing of the surplus at the second place to earn cash income.

The National Action Plan prepared for 2016-2025 for this pillar has 3 outcomes, 6 outputs and 40 activities. The outcomes, outputs and activities are as following;

Outcome 1: Productivity of crops and livestock increased to double the income of smallholder farmers

Output 1.1: income of smallholder farmers increased from the adoption of agribusiness crop production practices

Activity 1.1.1 Conduct baseline survey of smallholders on their productivity and income

Activity 1.1.2 Introduce Voucher system to increase access of smallholders on inputs and extension services

Activity 1.1.3 Apply concessional taxes and duties on the agriculture machineries and tools

Activity 1.1.4 Establish new collection and market cetners

Activity 1.1.5 Engage smallholder farmers to increase their economies of scale with collective production practices

Activity 1.1.6 Apply smallholder farmers focused extension services

Activity 1.1.7 Strengthen farm management capacity of the smallholder farmers

Activity 1.1.8 Provide input subsidy by exclusively targeting smallholder farmers

Activity 1.1.9 Promote contract farming practices

Activity 1.1.10 Disseminate agriculture innovations through the media platforms (radio, newspapers, TV etc)

Output 1.2: Income of livestock raising farmers increased with improved agribusiness practices

Actvity 1.2.1 Baseline survey of smallholders on their livestock productivity and income in all districts

Activity 1.2.2 Establish resource center for breed improvement
Activity 1.2.3 Increase raising of small livestock (goat, pigs and poultry)
Activity 1.2.4 Increase raising of large animals (Such as cow, buffalo) as private firm
Activity 1.2.5 Promote scientific management and use of public pasture lands
Activity 1.2.6 Provide access to animal health services (both preventive and curative)
Activity 1.2.7 Subsidize rural paravet services

Outcome 2: Agricultural investment increased in the small farms

Output 2.1: Access of small farms to the institutional finance services increased
Activity 2.1.1 Support for smallholder farms with institutional credit services
Activity 2.1.2 Make priority sector lending mandatory to reach the smallholder farms
Activity 2.1.3 Reduce interest rate of agricultural loans targeted to the smallholders
Activity 2.1.4 Increase access of smallholder farmers to the concessional loans
Activity 2.1.5 Simplofy lending procedures
Activity 2.1.6 Provide incentive to the farmers for investing and re-investing decisions for the intensification of agricultural activites
Activity 2.1.7 Promote group savings and credit services
Activity 2.1.8 Mobilize cooperatives to support agricultural value chains
Output 2.2: Small farms protected against their investment risks on agricultural production, processing and marketing
Activity 2.2.1 Increase the number of famres obtaining insurance for the security of their crops and livestock production and enterprise in case of failure
Activity 2.2.2 Tailor financial products to the need of smallholder farmers

Activity 2.2.3 Promote stress tolerant crop varieties and breed to mitigate the adverse effect of climate change to smallholder farmers

Outcome 3: Income of small farms doubled with access to identified employment opportunities

Output 3.1: Unemployed small farm youths earning income with access to new employment opportunities in the farm, off farm and non-farm sectors
Activity 3.1.1 Make agricultural smallholder agriculture income lucrative
Activity 3.1.2 Encourage small scale agro-processor to enhace efficiency of their production process with the application of alternative energy sources
Activity 3.1.3 Agricultural workers having opportunities for year round work in the farm, off farm and non-farm sectors
Activity 3.1.4 Engage women in the income generating activities (IFAs)
Activity 3.1.5 Enhance business planning and management capacity of the smallholder farmers
Activity 3.1.6 Protect self employed entrepreneurs by taxing import of the products that compete with local production
Activity 3.1.7 Engage smallholder farmers group in producing NTFPs and MAPs on the leasehold and community forest areas
Activity 3.1.8 Build capacity of smallholder farmers for operating agro-toursim business as an alternate source of income
Activity 3.1.9 Promote production and trade of high value agricultural products.
Output 3.2: Increased access of small farms to land and other productive natural resources
Activity 3.2.1 Make the land law smallholder farmers sensitive
Activity 3.2.2 Lease forest areas to the smallholder groups for their engagement in the larger sized productive activities

Activity 3.2.3 Apply land utilization provision for the transfer of fallow land to the cultivators on the contractual basis
Activity 3.2.4 Utilize waste land for productive purpose
Activity 3.2.5 Establish database with disaggregated figures on the contribution of smallholder farmers in production and their income levels

2. Objective of the Joint Research

The general objective of this study is to enhance Zero Hunger Challenge Initiative Action Plan 2016-2025 through pillar IV-increase in productivity and income of smallholder farmers. The added important objective is to develop the ODA project on the basis of identified priorities to support in achieving the pillar-IV objective under ZHCI action plan.

The specific objectives of the study are;

- To identify the causes of low production, productivity and income of smallholder farmers of selected districts of Nepal on rice production practices
- To identify the causes of low production, productivity and income of smallholder vegetable farmers of selected districts of Nepal
- To suggest appropriate measures for inclusion of smallholder farmers in the mainstream of country's sectoral development objective.
- To help in prioritizing the interventions for new ODA project from Korean government

3. Organization of the report

The quantitative information collected through household survey was the major source of information during report preparation. However the qualitative information generated from different techniques of PRA like Focus Group Discussion, Key Informants Interview, Stakeholders meetings, and secondary information sources provided the foundation and evidences to validate the household results. The report is organized in four parts. Part 1 of the report provides the study background and study methodology employed to carry out the assignment, while Part 2 provides the methodologies and processes of the study. Study findings are presented in part 3 and conclusion is provided in Part 4. An executive summary of findings is provided at the initial part of the document while several data tables/information supporting the main text and methodology are provided in Annexes.

4. Limitation of the Study

This study was carried out with limited time and resources. The extensive survey covering whole country with higher sample size on the household information could not be carried out due to such constraints. However FGD and KII carried throughout the survey district provided strong background for validation. Despite this, the study has other limitations as,

Vegetables and rice were the focused commodities for this study purpose so it could not capture all agriculture commodities

Sample size were too small considering huge engagements of farmers in agriucilture production in Nepal

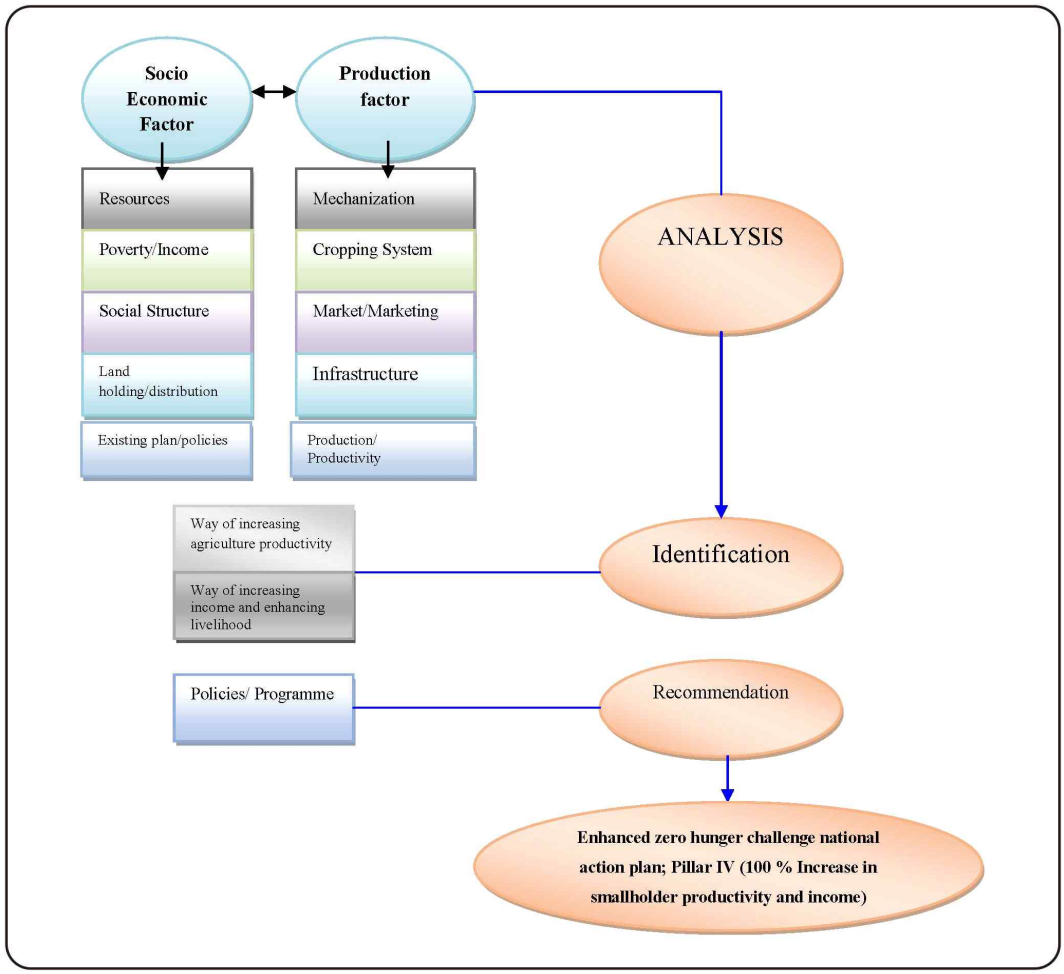
Chapter 2

Methodology

Zero Hunger Challenge (ZHC) National Action Plan (NAP) has aimed to create the zero hunger condition by assuring “food for all” status in Nepal by 2025; an ambitious target. As national economy and livelihood of majority of population largely depend on agriculture, increase in production and productivity of agriculture is the driving key to create food for all condition in Nepal. The agriculture system of Nepal is still in subsistence stage, there are different problems are interconnected for that. To make the agriculture system more commercial and viable deliberate attempts have to be done in policies and plans related to agriculture sector. Among the five pillars of ZHC national action plan, our research team will focus on pillar IV; 100% increase in smallholder productivity and income. By this joint research, we will enhance the ZHC national action plan by finding the way of bridging between theoretical statement in action plan and practical attainability in household level of Nepalese small holder farmers. The activities identified in the action plan will be redesigned.

After submission of the inception report to KREI and feedbacks received from Korean expert, the methodology has been changed slightly. Major changes made in methodology are;

〈Fig 3〉 Conceptual framework of research



1. Study Methods

Both qualitative and quantitative methods were utilized for analysis. The household survey through semi structured questionnaire provided the basis for quantitative analysis. The qualitative data were collected through several ap-

proaches of consultations and PRA techniques. Subsequently, a set of checklists were developed for focus group discussions, Key informants survey, stakeholder meetings which form the basis for qualitative analysis. The quantitative data collected through household survey and secondary sources was the primary basis for report preparation while the qualitative data were used to validate the information collected through survey procedures. Besides desk study was conducted to review the different policies regarding food security and smallholder farmers' inclusion in development processes. The questionnaire and checklists were prepared and pre tested before finalizing it. National level workshops were also conducted for expert opinions on the findings of the study. The household questionnaire is presented in the Annex….

1.1. Selection of Study area

The research design encompasses, what are the selection procedures for the districts and the sample size, selection of rural municipalities and wards to household levels, etc. According to new constitution 2015, there are seven provinces with the provision of districts, municipalities and rural municipalities. For this study, seven districts were selected, one from each province. The selection of districts is done purposively. The total of four districts from Terai and three from Hill and Mountain regions are selected. Within these districts, Rural municipality and Municipality from respective district were selected based on NEKSAP's annual report and in consultation of respective DADO and DLSO. The selected districts were as following;

Province 1: Jhapa (Rice)
Province 2: Mahottari (Rice)

Province 3: Dolakha (Vegetables)

Province 4: Kaski (Vegetables)

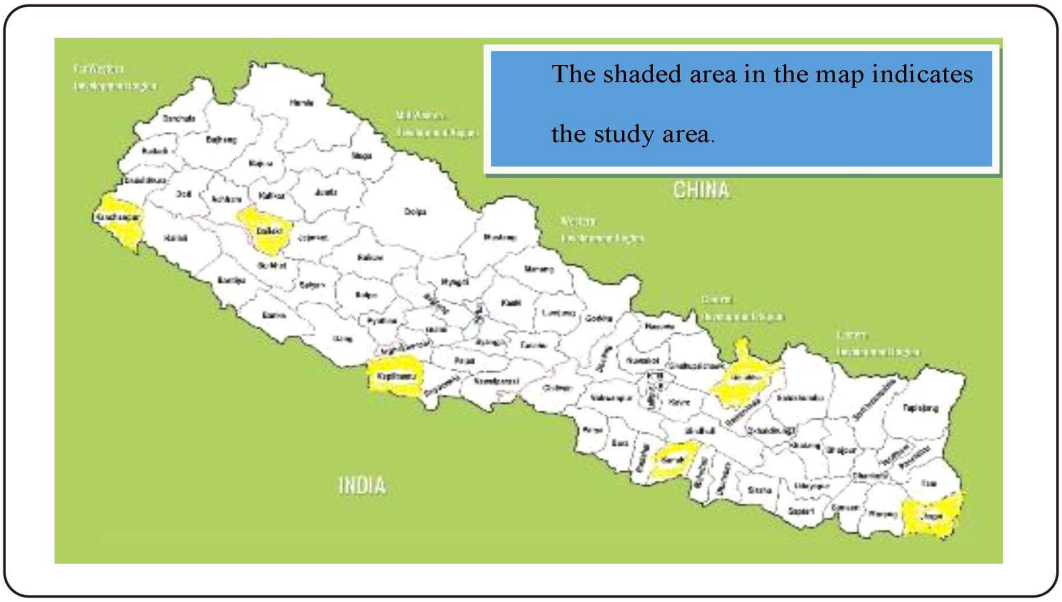
Province 5: Kapilvastu (Rice)

Province 6: Dailekh (Vegetables)

Province 7: Kanchanpur (Rice)

The shaded area in the map indicates the study area.

〈Fig 4〉 Map of Nepal indicating study area



1.2. Sampling Design for Household Survey

As the study included all 7 provinces of Nepal, it is difficult to gather all information throughout the country. So 7 districts one from each province were selected purposively for the household survey. A total of 350 household sam-

ples were selected for interview. The key informants survey and Focus group discussion were held in each of the selected districts. The summary of the sample size for household survey, the number of Focus Group Discussions, Key Informants Interviews, and stakeholder consultations made is illustrated in table 2.

〈Table 2〉 Sample size of field survey

S.N	Description			Total
		Rice growing area	Vegetables growing area	
1	Number of districts	4	3	7
2	Number of Municipalities			
3	Sample Household	200	150	350
4	Focus group discussions	4	5	9
5	Key informants survey	4	3	7
6	Government agencies consulted (DADO)	4	3	7

1.3. Data Collection tools and procedure

1.3.1. Household survey

○ Household survey from the selected sample households was the main source of primary data for quantitative analysis. A set of semi-structured questionnaire schedule was prepared and administered to the respondents to collect data broadly on the following components, such as demographic information (age, sex, education/literacy, main occupation, economic situation (landownership, income, sources of income, production status, cost of production and volume of sale with prices), and factor production indicators (seed, fertilizer, labor) and problems of agricultural development in the selected areas.

○ The enumerators who were oriented by rigorous trainings were used for household data collection. The questionnaire was directed to the respondents and enumerators filled up the answers provided by the respondents.

○ To ensure that the questionnaires be filled-in with proper and right way, the research team observed the process of household questionnaire filling in and provided suggestions right in the field to enumerators, when needed. The team leader himself participated in the household survey of Kapilvastu district where pre-testing was also conducted.

1.3.2. Focus Group Discussion

○ The research team carried out 9 focus group discussions in the selected districts where more than 270 farmers participated.

○ Considerable qualitative information with respect to livelihood condition, major crops productivity, opportunities and constraints for agricultural development, scope of mechanization and way to solve labor shortage, scope for commercialization based on current demand and supply situations of major crops and market access etc were collected through Focus Group Discussion using checklist.

○ Focus Group Discussions were participatory, democratic and gender friendly where female were encouraged to express their views

1.3.3. Key informants interview

The research team visited different development stakeholders of the survey areas including the District Agriculture Development Offices, Agriculture service centers, Project management units of Prime Ministers Agriculture Modernization Project in each districts, Farmers groups and cooperatives mem-

bers, and NGOs. About 70 Key informants who were considered knowledgeable about the food and nutrition security status, socio economic development and agricultural development in the targeted districts and existing obstacles/ problems were identified and interviewed.

They were encouraged to express their views on the existing government policies, local priorities, food and nutrition security status of the people, problems related to smallholder farmers and constraints for increased productivity. The expressed views and feelings have been analyzed, documented and summarized in the report wherever deemed appropriate.

1.4. Orientation to the enumerators

The one day orientation training was organized to the enumerators. Enumerators were taken to the field and oriented about the data collection methods.

1.6. Field Work

As survey covered whole country on geographic basis, a lot of time was spent during travelling in the field. The selected districts spreaded east to west and north to south so considerable time was spent on field work. The enumerators after rigourous training were employed for household data collection while the joint research team were involved more on focus group discussion and key informants survey. However some of team members were also engaged in the household survey as well. Relevant information were collected from field work and were used as basis for report preparation.

1.7. Validation workshops

The validation workshop was conducted on 12th November 2017 to validate the results of research study. The workshop was chaired by Dr. Suroj Pokhrel, Secretary for Ministry of Agricultural Development. The participants commented on the findings of the research. The final report was prepared by incorporating the comments and suggestions of the workshop

1.8. Methods of data analysis

○ The quantitative information from household survey were entered into computer in the framework of SPSS and STATA. The data were processed and relevant statistics were calculated and used for analysis

○ The data have been presented in form of pictures, figures and tables and appropriate conclusions were drawn based on the analysis.

Chapter 3

Findings of the research

Both qualitative and quantitative research methods were used for this study. Similarly both primary and secondary data were collected for the study purpose. The desk review was conducted to collect secondary information regarding food security situation of the country, policy environments and government programs for smallholder and poor farmers. This section will cover the findings of both desk review and field research.

1. Findings from desk review

1.1. Characteristics of smallholder farmers

One of the major problems of commercialization of agriculture in Nepal is the small land holding size. The higher number of farmers in small agricultural land of the country makes many farmers small and landless. The land holding distribution pattern of the country shows that more than 80% of farmers has landholding less than 1 ha which are considered smallholders by definition.

When we account 5 ha as the commercial unit, only 0.3% of farmers have land more than 5 ha which it typical characteristics of Nepalese agriculture and makes most of the farmers subsistence due to land holding natures.

〈Table 3〉 Landholdings Distribution

Size of holdings	Holdings (Number)			Area of holdings (ha)		
	Number	Percent	Percent Cumulative	Area (ha)	Percent	Percent Cumulative
Less than 0.5 ha	2,102,547	54.9	54.9	488,078.5	19.3	19.3
0.5 ha to less than 1 ha	984,022	25.7	80.6	695,060.1	27.5	46.85
1ha to less than 5 ha	732,726	19.1	99.7	1,258,096.3	49.8	96.66
5ha and above	11,798	0.3	100.0	84,404.3	3.3	100.00
Total	**3,831,093**	**100.0**		**2,525,639.2**	**100.0**	

Source: National Sample Census of Agriculture 2011/12, Government of Nepal, National Planning Commission Secretariat, CBS, Kathmandu, 2013.

While there are different types of farmers within small and marginal categories. FAO categorizes the farmers on the basis of landholding and in context of Nepal, it has categorized small and poor farmers as following;

Landless wage earners:Households whose livelihoods depend mainly on daily wages;

Marginal farmers: farmers holding < 0.5 ha of land;
Small farmers: farmers holding 0.6 to 1.0 ha of land (average 0.8 ha);
Women-headed Households:Households having woman as a bread earner in the family;
Remote area dwellers: farmers living in the remote areas without an access to proper market facilities;
Non-irrigated land holders: Farmers without irrigated land in the hills and mountains; Small and marginal farmers without irrigated land in Terai;
Food insecure Households:Households not having food to eat for more than 3 months in a year.
Households producing inadequate food for the family (farmers with per capita net edible food production of less than 253 kg - Rice:120 kg and Wheat/Maize:133kg);
Households earning low/no income to afford procuring food from the market; and
Households having members suffering from malnutrition.

Source: FAO Nepal 2016, Pro-poor policy

The major characteristics of small holder farmers in Nepal are;

Poor resource base:

Small holder farmers poses small resource base because of which they can not take risks for new technologies as they fall in more danger of food insecurity in case of crop failure

Holding of marginal land: Most of the small farmers have marginal lands which are unproductive. The poor resource base and possession of marginal lands make them more vulnerable to any kinds of external shocks

Lack of access to finance:

Another problem with smallholder farmers is that they donot have easy access to finance. Mostly small and poor farmers reside in country side where there are limited banks which demand collateral for credit services. They do not have knowledge on all the procedure for loans so they are compelled to take loans from landlords, friends and micro finance institution which demand high interest rate.

Small productivity and subsistence level of production:

As the land holding is small they have poor access to quality seeds, fertilizer which makes their production low. The subsistence level of production compels them to search for new job for survival. They are not skilled and thus work as agricultural labor which provide low wage rate and many of them are compelled to go to foreign countries for jobs. This situation is growing in Nepal which in return makes shortage of labor force as well.

Seasonal food shortage:

Due to subsistence farming and low productivity total production of crops and

food items are not enough to meet the family food requirements. Besides, they require money to maintain their family needs like education, health, clothings and they sell their crops immediately after harvest. Thus the food shortage is prominent for small holers where they make copping strategies by various means. Some of common coping strategies are selling of their assets-lands, family jwelries, selling of livestocks, taking high interest loans, going for other works like labor and unskilled foreign employment. This tendency is growing and making agriculture more faminized.

Poor health service access:

Small holder farmers have poor access to health services. As they do not have enough resources they lack good health service access.

Low education level:

Small and marginal farmers do not have access to good education. They can not send their children to quality schools. As the children have to support their parents for agricultural works they posses low quality education. This vicious cycle grow up and makes poor more poorer generation by generation.

Production system is supported by family labor:

All productive population of the family support the production system. As they can not pay to high labor costs other members of family have daily business of supporting their production system.

Limited access to quality factor production: As small farmers can not afford quality inputs like seeds, fertilizers and they rely on low skills requiring technologies.

Less participation in development opportunities:

As small holder farmers have to work hard for their livelihoods they are not aware of other development opportunities which makes them deprived of other opportunities.

Fallowing of land and migration:

The smallholder farmers do not produce sufficient food to meet their family requirements. There is growing trends of keeping fallow land and migrate to seek job in city area or foreign countries maily gulf countries. Some skilled youth also get opportunities to work in Korea and Japan as well. As most of the male of the family migrate, the agriculture remains the responsibilities of women, children and old generation people, which in turn makes this more un productive.

Lack of insurance against risk:

Government of Nepal has started crop and livestock insurance program from 2012 which provides 75% premium subsidies to the farmers. But small holder farmers lack information on such government programs. Even if they know about the program, they are not willing for insurance because it increases the cost while market price remains same. As a result their crops are not insured and are vulnerable to external shocks like climate and natural disaster related risks.

1.2. Food security situation of the country

Nepal is ranked as one of the most vulnerable countries in terms of food insecurity. It comes in 44th on the basis of Global Hunger Index, while 32 out

of 75 districts are still food deficit. Almost stagnant agriculture growth over decade is responsible for such food deficit in the country. The povery based food insecurity is highly prevalent in Nepal. Several studies have revealed that food insecurity is prominent in that area where there is the dominance of socially excluded communities such as; i) Poverty rate is much lower in urban areas (15%) than rural areas (27%); 2) Seasonal poverty is highest (34%) in April-May and lowest in October-January; 3) Poverty increases with household size, and children under seven years of age, and female headed households have slightly lower poverty rates; 4) Dalits bear a much higher burden of poverty than non-Dalits; households headed by agricultural wage workers are poorest and 5) Poverty is very high among marginal farm holding (<0.5 ha) and small farm holding (<1.0 ha), and poverty declines drastically with increase in farm sizes above one hectare (FNSPA, 2016).

Looking at all four dimensions of food security viz; Availability, Access, Utilization and stability, Nepal's food and nutrition security is considere alarming. The Food and Nutrition Security Plan of Action of Nepal, 2016 has identified key areas of intervention for enhancing food security situation of country which are as following;

Availability:

- Increase the production and productivity of cereals, pulses and oil seeds through increased availability and access to improved seeds; improvement of farmer's small scale irrigation mainly through Water Users Association, Shallow tube wells and non-convetional irrigation, and increased productivity of water mainly through irrigation and water resources management framework; and small scale farm mechanization
- Emhasize on horticulture crops which have high regional comparative advantages and competitiveness; proven opportunity to plant fruit orchads in

degraded forest and community forest; and proven post harvest handling to reduce damage

- Strategic interventions in livestock for increased production of milk, meat and eggs
- Promote forestry sector for livelihood, utilization of Non-Timber Forests products (NTFP), use of agro forestry , cultivation of agriculture crops like ginger, essential oils, turmeric, lapsi, vegetables and fruits in the forests area
- Promote fisheries secor
- Work on trade and market interventions
- Support for storage

Access

To increase the access the connectivity is the major component. Increasing the income sources of vulnerable groups, having effective programs for vulnerable women, children and elderly are some ways to increase access. It is believed that country's food insecurity is more related to distribution than the production. Thus increasing the service delivery, enhancing connectiveness are the ways to increase the access

Utilization

Diversification of diets is ways of increasing utilization. Rice is the major food crops in Nepal but there are several food crops grown which are highly nutritious. Thus promotion of local food habits, access to quality services can also increase the utilization pattern.

Cereal and Vegetable trade situation

Nepal's trade balance has remained deficit since long time. In the last FY

2016/17, Nepal imported Rs. 984,302,948,000 while exported Rs. 73,036,244,000 resulting in the trade deficit of Rs. 911,266,704,000. The trend of total trade balance can be seen the table below.

〈Table 4〉 Trade balance of Nepal in the last fiscal years

Title	FY 2016/17	FY 2015/16	FY 2014/15
Imports (NPR.'000)	984,302,948	786,191,403	774,712,277
Exports (NPR.'000)	73,036,244	85,194,754	70,254,165
Trade Deficit (NPR.'000)	(911,266,704)	(700,996,649)	(704,458,112)

If looked at the cereal foreign trade within the foreign total trade, cereal trade occupies about 3.8% in FY 2016/17 which is in the decreasing trend against 4.48% and 4.22% in respective earlier fiscal year. In cereal, the country has trade deficit of Rs. 40,119,190,000. The trend of the last three fiscal years in table below shows increasing trade deficit in the cereals.

〈Table 5〉 Cereal export and import trend in the last three fiscal years

Title	FY 2016/17	FY 2015/16	FY 2014/15
Imports (NPR.'000):	40,149,262	39,025,913	35,670,123
Exports (NPR.'000):	30,072	16,303	16,804
Trade Deficit (NPR.'000)	(40,119,190)	(39,009,610)	(35,653,319)

The rice in the total cereal import occupies significant place. It is around 60% in FY 2016/17. The import value in the same FY is Rs. 23,878,583, 000. Quantity wise 590,198 ton of rice was imported in FY 2016/17. The import of the rice is in increasing trend. The country is spending around USD 239 million (NPR 100= USD 1) per year in importing rice. The quantity and value of the rice in the last fiscal year has been given in the table below.

〈Table 6〉 Rice import trend in the last three fiscal years.

Rice	FY 2016/17	FY 2015/16	FY 2014/15
Import Amount (ton)	590,198	539,608	736,926
Import Value (NPR.`000)	23,878,583	22,803,067	25,252,732

Vegetable

In FY 2015/16 Nepal imported vegetable worth around Rs. 4,564,787,653 (SAWTEE 2017). The import has been in increasing trend. In 2016/17 it has been estimated that around Rs.10 billion amount of vegetable is imported in Nepal. Very negligible amount of vegetable is exported to foreign countries.

1.3. Status of Vegetables Production in Nepal

The table below summarizes the area, production and productivity of major vegetables in Nepal.

Area, Production and Yield of Vegetables in Nepal (2015/16)

Province 1					
S.N.	Districts	Area (ha)	Production (mt)	Yield (mt/ha)	Remarks
1	Jhapa	8417	145127	17.24	
2	Illam	3237	45247	13.98	
3	Panchthar	1964	23593	12.01	
4	Taplejung	880	10585	12.00	
5	Morang	9345	138689	14.84	
6	Sunsari	7739	92482	11.95	
7	Dhankuta	5351	120673	22.60	
8	Bhojpur	1773	10976	6.19	
9	Sankhuwasabha	1807	18408	10.20	
10	Solukhumbu	589	7922	13.40	
11	Khotang	14273	149552	10.48	
12	Udaypur	1327	16252	12.25	
13	Terhathum	1632	26842	16.40	
14	Okhaldhunga	1157	11875	10.26	
Total		59490	818222	13.75	

Province 2					
S.N.	Districts	Area (ha)	Production (mt)	Yield (mt/ha)	Remarks
1	Parsa	7472	134960	18.06	
2	Bara	10746	202448	18.84	
3	Rautahat	10575	101970	9.64	
4	Mahottari	12330	156569	12.70	
5	Mahottari	6907	78354	11.34	
6	Dhanusha	8058	99984	12.41	
7	Siraha	5543	73431	13.25	
8	Saptari	16740	268518	16.04	
Total		78371	1116234	14.24	

Province 3					
S.N.	Districts	Area (ha)	Production (mt)	Yield (mt/ha)	Remarks
1	Chitwan	7014	90462	12.90	
2	Makwanpur	3233	57971	17.93	
3	Kathmandu	1910	50660	26.52	
4	Lalitpur	2415	47519	19.68	
5	Bhaktapur	3239	57758	17.83	
6	Kavre	9761	134790	13.81	
7	Dhading	6077	76056	12.52	
8	Nuwakot	3110	39547	12.72	
9	Rasuwa	662	5725	8.65	
10	Sindhupalchok	4075	39161	9.61	
11	Dolakha	1830	23653	12.93	
12	Ramechhap	995	11143	11.20	
13	Sindhuli	1506	8390	5.57	
Total		45827	642836	14.03	

Province 4					
S.N.	Districts	Area (ha)	Production (mt)	Yield (mt/ha)	Remarks
1	Nawalparasi	4620	59575	12.90	
2	Baglung	2091	30083	14.38	
3	Gorkha	1837	19751	10.75	
4	Tanahu	3160	32852	10.40	
5	Syangja	2546	33210	13.04	
6	Lamjung	3460	33382	9.65	
7	Manang	166	2023	12.22	
8	Mustang	191	2640	13.82	
9	Kaski	5150	67418	13.09	
10	Myagdi	1019	11634	11.42	
11	Parbat	827	11191	13.53	
Total		25067	303758	12.12	

Province 5					
S.N.	Districts	Area (ha)	Production (mt)	Yield (mt/ha)	Remarks
1	Rupandehi	4782	105277	22.01	
2	Kapilbastu	4018	63558	15.82	
3	Palpa	2063	32837	15.92	
4	Arghakhanchi	1893	17260	9.12	
5	Gulmi	874	8230	9.42	
6	Dang	5300	75000	14.15	
7	Pyuthan	1087	11091	10.20	
8	Rolpa	2133	19580	9.18	
9	Rukum	2390	22515	9.42	
10	Banke	5145	62829	12.21	
11	Bardiya	4950	79100	15.98	
Total		34635	497276	14.36	

Province 6					
S.N.	Districts	Area (ha)	Production (mt)	Yield (mt/ha)	Remarks
1	Dolpa	490	4156	8.48	
2	Jumla	2739	7191	2.63	
3	Mugu	618	3069	4.97	
4	Humla	358	2598	7.26	
5	Kalikot	536	4950	9.24	
6	Salyan	2528	27359	10.82	
7	Jajarkot	860	10694	12.44	
8	Dailekh	2611	25833	9.89	
9	Surkhet	2148	30330	14.12	
Total		12888	116180	9.01	

Province 7					
S.N.	Districts	Area (ha)	Production (mt)	Yield (mt/ha)	Remarks
1	Bajura	661	6442	9.74	
2	Bajhang	790	7313	9.26	
3	Achham	521	4258	8.17	
4	Doti	1951	23109	11.85	
5	Kailali	14924	217442	14.57	
6	Kanchanpur	4720	54644	11.58	
7	Dadeldhura	1217	16780	13.78	
8	Darchula	1222	14293	11.70	
9	Baitadi	1070	14250	13.32	
Total		27075	358530	13.24	
Nepal		283353	3853037	13.60	

1.4. Status of Potato Production in Nepal

The table below summarizes the area, production and productivity of major vegetables in Nepal.

Area, Production and Yield of Potato in Nepal (2015/16)

Province 1					
S.N.	Districts	Area (ha)	Production (mt)	Yield (mt/ha)	Remarks
1	Jhapa	14760	221843	15.03	
2	Illam	6815	94459	13.86	
3	Panchthar	2087	25451	12.19	
4	Taplejung	3925	48345	12.32	
5	Morang	5900	67850	11.50	
6	Sunsari	2900	49200	16.97	
7	Dhankuta	2010	37170	18.49	
8	Bhojpur	3500	35725	10.21	
9	Sankhuwasabha	1310	13630	10.40	
10	Solukhumbu	10150	153799	15.15	
11	Khotang	2909	33810	11.62	
12	Udaypur	775	9074	11.71	
13	Terhathum	2909	33810	11.62	
14	Okhaldhunga	1494	15751	10.54	
Total		61444	839917	13.67	

Province 2					
S.N.	Districts	Area (ha)	Production (mt)	Yield (mt/ha)	Remarks
1	Parsa	1050	15750	15.00	
2	Bara	7032	126576	18.00	
3	Rautahat	2696	32376	12.01	
4	Mahottari	1350	19980	14.80	
5	Mahottari	3650	40880	11.20	
6	Dhanusha	2325	30225	13.00	
7	Siraha	1950	23790	12.20	
8	Saptari	5570	47345	8.50	
Total		25623	336922	13.15	

Province 3					
S.N.	Districts	Area (ha)	Production (mt)	Yield (mt/ha)	Remarks
1	Chitwan	1908	35099.4	18.40	
2	Makwanpur	4943	69585	14.08	
3	Kathmandu	910	19550	21.48	
4	Lalitpur	970	17264.8	18.89	

5	Bhaktapur	1336	21498.5	16.09	
6	Kavre	9785	184622	18.87	
7	Dhading	1643	23513.44	14.31	
8	Nuwakot	3070	44017	14.34	
9	Dolakha	3000	36000	12.00	
10	Sindhupalchok	5035	63492	12.61	
11	Rasuwa	2509	35898	14.31	
12	Ramechhap	3341	38475	11.52	
13	Sindhuli	2001	27212	13.60	
Total		40451	616227	15.23	

Province 4					
S.N.	Districts	Area (ha)	Production (mt)	Yield (mt/ha)	Remarks
1	Nawalparasi	1200	13000	10.83	
2	Baglung	3000	35594	11.86	
3	Gorkha	2500	25924	10.37	
4	Tanahu	788	7486	9.50	
5	Syangja	875	12282	14.04	
6	Lamjung	1900	20792	10.94	
7	Manang	658	7625	11.59	
8	Mustang	282	3650	12.94	
9	Kaski	1700	20760	12.21	
10	Myagdi	1878	16455	8.76	
11	Parbat	1550	3675	2.37	
Total		16331	167243	10.24	

Province 5					
S.N.	Districts	Area (ha)	Production (mt)	Yield (mt/ha)	Remarks
1	Rupandehi	3930	55640.94	14.16	
2	Kapilbastu	2515	26407	10.50	
3	Palpa	730	7523	10.31	
4	Arghakhanchi	690	5540	8.03	
5	Gulmi	475	4606.8	9.70	
6	Dang	2250	32500	14.44	
7	Pyuthan	894	14058.8	15.73	
8	Rolpa	1940	21048	10.85	
9	Rukum	1742	20140	11.56	
10	Banke	2860	31460	11.00	
11	Bardiya	4300	57800	13.44	
Total		22326	276725	12.39	

Province 6					
S.N.	Districts	Area (ha)	Production (mt)	Yield (mt/ha)	Remarks
1	Dolpa	960	10725	11.17	
2	Jumla	2650	26500	10.00	
3	Mugu	635	5187.5	8.17	

4	Humla	785	6437	8.20	
5	Kalikot	1265	18343	14.50	
6	Salyan	872	7977.75	9.15	
7	Jajarkot	720	5175	7.19	
8	Dailekh	1664	18094	10.87	
9	Surkhet	1177	24454	20.78	
Total		10728	122893	11.46	

Province 7					
S.N.	Districts	Area (ha)	Production (mt)	Yield (mt/ha)	Remarks
1	Bajura	755	8305	11.00	
2	Bajhang	1404	11680	8.32	
3	Achham	411	3705	9.01	
4	Doti	2405	32550	13.53	
5	Kailali	5010	75100	14.99	
6	Kanchanpur	1672	25916	15.50	
7	Dadeldhura	838	14047	16.76	
8	Darchula	643	8593	13.36	
9	Baitadi	855	11918	13.94	
Total		13993	191813	13.71	
Nepal		190896	2551740	13.37	

1.5. Status of Rice Production in Nepal

The table below summarizes the area, production and productivity of major vegetables in Nepal.

Status of rice

	Province no 1			
S.no.	District	Area (Ha)	Prod..(Mt)	Yield Mt/Ha
1	TAPLEJUNG	4,075	8,680	2.13
2	SANKHUWASHAVA	13,655	29,650	2.17
3	SOLUKHUMBU	1,525	3,575	2.34
4	PANCHTHAR	9,250	21,184	2.29
5	ILLAM	12,500	31,750	2.54
6	TERHATHUM	7,610	17,300	2.27
7	DHANKUTA	7,664	22,090	2.88
8	BHOJPUR	16,093	36,970	2.30

9	KHOTANG	12,150	19,400	1.60
10	OKHALDHUNGA	4,350	9,580	2.20
11	UDAYAPUR	11,500	40,958	3.56
12	JHAPA	83,000	315,175	3.80
13	MORANG	78,000	275,925	3.54
14	SUNSARI	44,900	155,110	3.45
	Total	306,272	987,347	3.22

	Province No 2			
S.no.	District	Area (Ha)	Prod..(Mt)	Yield Mt/Ha
1	SAPTARI	31,900	82,250	2.58
2	SIRAHA	33,500	85,000	2.54
3	DHANUSHA	35,200	121,100	3.44
4	MAHOTTARI	25,400	83,500	3.29
5	MAHOTTARI	42,540	117,500	2.76
6	RAUTAHAT	30,400	101,100	3.33
7	BARA	55,400	143,900	2.60
8	PARSA	40,500	152,000	3.75
	Total	294,840	886,350	3.01

	Province No 3			
S.no.	District	Area (Ha)	Prod..(Mt)	Yield Mt/Ha
1	DOLAKHA	3,090	6,500	2.10
2	SINDHUPALCHOK	8,750	20,125	2.30
3	RASUWA	1,050	2,520	2.40
4	RAMECHAP	9,020	21,654	2.40
5	SINDHULI	13,265	35,900	2.71
6	KAVRE	11,308	33,975	3.00
7	BHAKTAPUR	4,250	24,400	5.74
8	LALITPUR	4,650	21,166	4.55
9	KATHMANDU	7,905	40,200	5.09
10	NUWAKOT	15,695	62,627	3.99
11	DHADING	11,545	41,369	3.58
12	CHITWAN	27,342	92,925	3.40
	Total	117,870	403,361	3.42

	Province 4			
S.no.	District	Area (Ha)	Prod..(Mt)	Yield Mt/Ha
1	MANANG	–	–	–
2	MUSTANG	–	–	–
3	GORKHA	9,756	20,292	2.08
4	LAMJUNG	14,059	37,772	2.69
5	TANAHU	12,538	44,384	3.54
6	KASKI	22,000	75,544	3.43
7	PARBAT	8,830	20,924	2.37
8	SYANGJA	16,800	59,848	3.56
9	MYAGDI	3,738	12,090	3.23
10	BAGLUNG	5,874	17,849	3.04
11	NAWALPARASI EAST	22,250	78,936	3.55
	Total	115,845	367,639	3.17

	Province 5			
S.no.	District	Area (Ha)	Prod..(Mt)	Yield Mt/Ha
1	PALPA	6,820	30,266	4.44
2	GULMI	9,992	25,815	2.58
3	ARGHAKHANCHI	8,050	23,345	2.90
4	NAWALPARASI WEST	22,250	78,936	3.55
5	RUPANDEHI	69,600	275,880	3.96
6	KAPILBASTU	58,000	128,520	2.22
7	ROLPA	4,715	11,928	2.53
8	PYUTHAN	6,525	23,135	3.55
9	DANG	36,508	123,870	3.39
10	BANKE	31,900	92,725	2.91
11	BARDIYA	48,500	173,500	3.58
12	RUKUM EAST	1,781	5,241	2.94
	Total	304,641	993,161	3.26

	Province 6			
S.no.	District	Area (Ha)	Prod..(Mt)	Yield Mt/Ha
1	DOLPA	276	475	1.72
2	MUGU	1,400	2,196	1.57
3	HUMLA	574	443	0.77
4	JUMLA	2,900	5,900	2.03

5	KALIKOT	2,500	4,726	1.89
6	RUKUM WEST	1,781	5,241	2.94
7	SALYAN	6,951	25,371	3.65
8	JAJARKOT	3,063	5,580	1.82
9	DAILEKH	8,307	26,529	3.19
10	SURKHET	13,252	42,803	3.23
	Total	41,004	119,264	2.91

	Province 7			
S.no.	District	Area (Ha)	Prod..(Mt)	Yield Mt/Ha
1	BAJURA	3,310	8,606	2.60
2	BAJHANG	7,006	21,791	3.11
3	DARCHULA	4,480	10,061	2.25
4	ACHHAM	16,571	31,539	1.90
5	DOTI	10,668	22,114	2.07
6	BAITADI	7,000	16,470	2.35
7	DADELDHURA	5,225	17,419	3.33
8	KAILALI	71,250	233,250	3.27
9	KANCHANPUR	45,796	145,207	3.17
	Total	171,306	506,457	2.96
	N E P A L	1,351,778	4,263,579	3.15

1.6. Edible cereal grain production and requirements in Nepal

Cereals are the major staple food crops in Nepal. Rice dominates among cereals in terms of area and production. Major cereals grown in Nepal are rice, wheat, maize, millet and barley. Production and availability of cereal grains by and large determine the food security situation in Nepal. The table 5 shows the trend of edible cereal grain production and requirements in Nepal for last one decades.

〈Table 7〉 Edible cereal grain production and requirements

Year	Rice production (Mt)	Total cereal production (Mt)	Total cereal requirements (Mt)	Total Balance (Mt)
2006/07	2060280	4815284	4995194	-179910
2007/08	2336694	5195211	5172844	22367
2008/09	2461204	5160406	5293316	-132910
2009/10	2211439	4984987	5367129	-382142
2010/11	2473991	5570019	5235551	334468
2011/12	2820915	6020295	5077134	943161
2012/13	2455136	5648265	5239823	408442
2013/14	2808160	6085776	5295886	789890
2014/15	2555123	5500728	5345170	155558
2015/16	2374389	5355232	5426631	-71399

Source: MESD, MoAD, 2016

The table shows that production of the cereal grains has been fluctuating throughout the decades. The requirements have grown constantly as it increases with the increase in population. However the production of major food crops depends on the good monsoon. As there is lack of irrigation facility; timely and constant rain increases the production of rice which ultimately increases the volume of food crops production. As, the share of rice in total grain production is more than 40%, the production of rice determines the food security situation of the country. The table has clearly showed that food availability throughout the country is not bad however access and stability are the major issues in food security.

1.7. Food Security Policies in Nepal

The Constitution of Nepal

The constitution of Nepal has ensured the right to food to its citizen. Under the article 36 constitution mention right relating to food. They are:

(1) Every citizen shall have the right relating to food. (2) Every citizen shall have the right to be safe from the state of being in danger of life from the scarcity of food. (3) Every citizen shall have the right to food sovereignty in accordance with law.

Under article 42, section 4, constitution ensures the right of farmers. It states:

"Every farmer shall have the right to have access to lands for agro activities, select and protect local seeds and agro species which have been used and pursued traditionally, in accordance with law"

14th Plan 2073/74-75/76 (2016-2019)

The running 14th development plan has mentioned about food and nutrition security. It has set target to achive food and nutritional security through sustainable access in food and their use.

Agriculture Development Strategy (ADS) 2015 to 2035

The Ministry of Agricultural Development (MoAD) has launchedAgriculture Development Strategy (ADS)- a 20-year vision document with the first 10-year action plan- from next fiscal. It has envisioned, the four flagship/prioritized programmes. Among these four programmes is Food and Nutrition Security Programmes (FANUSEP).

FANUSEP aims at improving food and nutrition security of the most vulnerable groups. It consists of three subprograms: the Nepal Food Security Project (NAFSP), currently been finalized as part of the GAFSP; the Food and Nutrition Security Plan of Action (FNSP), currently been finalized with assistance of FAO; and a new food and nutrition security project to be designed and implemented in the second 5-year period of the ADS action plan. Agriculture development strategy has set targets for achieving food and nutrition security as;

〈Table 8〉 Indicators for food and nutrition security in ADS

Indicators	Current situation	Target short term	Target mid term	Target long term
Self sufficiency in food grains	5% trade deficit in foodgrains	0% trade deficit	0-5% trade surplus	0-5% trade surplus
Food poverty	24%	16%	11%	5%
Nutrition	41.5% stunting; 31.1% underweight; 13.7% wasting; 18% women with low BMI	29% stunting; 20% underweight; 5% wasting; 15% women with low BMI	20% stunting; 13% underweight; 2% wasting; 13% women with low BMI	8% stunting; 5% underweight; 1% wasting; 5% women with low BMI

Source: ADS, 2015

The National Agriculture Policy, 2061 (2004)

The National Agriculture Policy, 2061 follows an objective of creating enabling environment for agriculture-led rural development. It emphasizes competitiveness of agriculture sector encouraging farmers to go for commercial production. The policy divides farmers into two groups – small and big ones and aims to provide more resources to the small farmers. Those owning less than four hectares of land are labeled as resource poor farmers. They enjoy government assistance provision to boost their productivity. The policy aims at increasing productivity and promoting natural resources to utilize them in the interest of farmers.

The long-term vision of the agriculture sector is to bring improvement in the living standards through sustainable agricultural development by transforming subsistence agricultural system into a commercial and competitive agricultural system. The policy aims at achieving high and sustainable economic growth through commercial agriculture system contributing to food security and poverty reduction. It emphasizes:

- increased agricultural production and productivity,
- making agriculture competitive in regional and world markets with commercial agriculture system,

- conserving, promoting and utilizing natural resources, environment and bio-diversity

Agri Business Promotion Policy, 2063 (2006)

The Agri Business Promotion Policy highlights the diversification, commercialization and promotion of agriculture sector with private sector involvement in commercial farming. It emphasizes that the living standard of the farmer would not improve unless the agriculture sector is transformed from subsistence level to commercial farming. *The policy aims to alleviate poverty through commercialization of agriculture. Similarly, policy invisages to launch special programs for poor, dalit and woman farmers to support their agr0-enterprises.* It realizes the need of promoting internal and external markets. This policy was prepared in the spirit of National Agriculture Policy 2061 emphasizing business service centers establishment for quality agriculture inputs and services. Partnership between the private sector and Government has been emphasized for the export of quality goods. In the context of Nepal's entry into the WTO, developing market network is its priority. The policy considers infrastructure development as a cornerstone for commercialization and has envisaged promotion of partnership approach between Government and the private sector.

Food and Nutrition Security Plan of Action (FNSP), 2013

The Food and Nutrition Security Plan (FNSP) plan has been developed by Ministry of Agriculture Development (MoAD) with technical support from FAO. *The development objective of the FNSP is to reduce hunger, malnutrition and poverty among the poorest households by improving sustainable agricultural-based livelihoods.* The FNSP is organised in nine programme components: Agriculture Field Crops, Fisheries, Food Quality and Safety, Forestry, Gender Equity and Social Inclusion, Horticulture, Nutrition Education and Training,

Legislation and Animal Health and Production.

Multi-sector Nutrition Plan 2013-2017

Developed in the leadership of National Planning Commission and in collaboration with key partners, the Multi-sector Nutrition Plan 2013-2017 has the goal of improving maternal and child nutrition, which will result in the reduction of Maternal Infant and Young Child (MIYC) under-nutrition, in terms of maternal BMI and child stunting, by one third.

It offers a package of activities/interventions with priority strategic objectives by sector that, over a period of five years, should contribute to a reduction by one third the current prevalence rates of chronic malnutrition, and embark the country well on the way towards significantly reducing this problem within the next ten years to ensure that malnutrition no longer becomes an impeding factor for enhancing Nepal's human capital and socio-economic development.

It is possible to significantly reduce chronic malnutrition among children less than two years of age within a period of 10-20 years, according to existing evidence.

The MSNP has set the following objectives to accomplish in five years:

- Percent prevalence of stunting among children under 5 years of age reduced below 29%
- Percent prevalence of underweight among children under 5 years of age reduced below 20%
- Percent prevalence of wasting among children under 5 years of age reduced below 5%
- Reduce undernutrition among women 15-49 years of age (BMI<18.5) by 15%

Nepal: Zero Hunger Challenge; National Action Plan (2016 - 2025)

With a view to make Nepal free from hunger and malnutrition by 2025, the Ministry of Agricultural Development (MoAD) launched the Zero Hunger Challenge Initiative on December 19, 2014. The ZHC initiative as a national agenda, recognizes the importance of interconnectedness of food systems with the use of natural resources that impact poverty, hunger and malnutrition. It is a vision and invitation to action uniting all stakeholders working for food security.

The priority of the ZHC initiative is over the activities related to five strategic Pillars. These Pillars emphasize on the improvement of agricultural systems to overcome poverty, hunger and malnutrition. They intend to create new scopes for access to increased incomes for adequate micro-nutrient intake affordability. They also emphasize on changing nutritional behaviour for best utilization of selected food items.

The country adopted ZHC initiative as a national agenda holding the vision for preparing a National Action Plan to eradicate hunger by 2025. To move ahead with this process, a roadmap was prepared by MoAD to launch the ZHC initiative and then formulate the National Action Plan covering a period of ten years starting from 2016 till 2025.

2. Findings from field study

Basically two types of study were conducted in the field. The qualitative research methods used are the components of Participatory Rural Appraisal techniques which included Focus Group Discussion, Key Informants Interview, Direct Observation, Informal meetings, Stakeholder consultations. Likewise, the quantitative research techniques used in the field included the household survey

through questionnaire. The findings of the field study have been summarized in two broad headings;

2.1. Findings from Qualitative research techniques

The focus group discussions, Key informants interview and stakeholder consultations were carried out in all selected 7 districts. Altogether 9 FGDs, 7 KII and 7 Stakeholder consultations were carried out during the study periods. The research questions were concentrated on general food security situation of the area, potential crops, potential for commercial development, constraints for agricultural development, farmers need and future prospects of development.

As the country is diverse in climate, geography, culture, food habits and so is in the development status and prospects. The consulted farmers were heterogenous in nature from highly commercial to below subsistence, so their problems are diverse their aspirations are different. However some common problems were also observed like price and market; irrigation and quality input supply. General observation of the discussions and interactions are summarized as;

Types of farmers

Farmers consulted can be categorized into four types on the basis of landholdings and three types on the basis of their level of engagements and income generation from farming. On the basis of farm size; farmers can be categorized as size landless, marginal, small and large farmers. While on the basis of level of engagements and income farmers can be cateogorized as; below subsistence and subsistence farmers, semi commercial farmers and commercial farmers. On the perspective of food security landless and marginal farmers who were below

subsistence and subsistence level were at high risk of food insecurity. While small farmers who were semi commercial and commercial; were at little risk of food insecurity and large farmers were food secured. There was not much correlation between commercialization and farm size as most of the small farmers were much commercial than large farmers. However landless and marginal farmers could not practice commercial farming because of unavailability of minimum threshold land size required for commercial farming. Some landless farmers also have started commercial farming by leasing the lands but they are considered temporarily engaged in farming.

Farmers group/ cooperatives are leading the agriculture development

It was found the farmers group and cooperatives are serving as change factor for agriculture development. Most of the farmers contacted were found to be the member of either group or cooperatives or both. It was the government intervention that motivated farmers to form the group and mobilize their development activities through group approach. One of the demerit in group approach was that it could not attract individual large farmers. Now it is not mandatory for a farmer to be the group member for government assistance, however this approach is still popular and many farmers involve in agriculture development in group approach. They seek government support through group or cooperative but there is the danger of elite capture in the group approach too. As it was found that the husband and wife of same family served as secretary and president of the group and it was in their control whom they want benefitted from the development programs.

The group approach still seems relevant but in changed context of political and administrative transformation, as the service will be more closer to people, there is scope for individual entrepreneurs development and cooperatives more responsible for development works.

Agriculture still the main source of livelihood

Agriculture is still the main source of livelihood of majority of farmers. The large and small-commercial farmers get major income from agriculture while marginal and subsistence smallholder farmers are seeking other alternatives for livelihood. The skilled labor tend to migrate to urban areas for better income sources while unskilled labor continue to be agricultural labor. The scenario is changing due to large number of youths migrating to gulf countries for works and survival. Very few have migrated to developed countries like Korea, Japan as agricultural and skilled labor.

Increased tendency of fallowing of land

Agriculture is not lucrative in Nepal. A simple benefit cost analysis reveals that it is not profitable when subsistence farming is practiced. A few farmes have started commercial farming yet they are facing other difficulties like connectivity problems, price fluctuations and quality input availability. Those farmers who are receiving continous support from government offices and NOGs are continuing the farming while others are in temptation to leave the farming activities. There are mainly two factors for increased fallowing of land. The major reason is small production and low profitability due to which farmers are not able to meet the family needs. Such farmers seek other alternatives and leave the farming. The other reason is societal reason. Agriculture is considered as labor intensive business which requires regular works. Even a commercial farmer which becomes well off from agriculture farming tend to leave the business after some years. As their children and other family members find the job difficult they switch to other alternatives which make the land fallow.

Increased migration resulting labor shortages

It is estimated that 1 meber in every 2 families are in foreign countries for

better employment opportunities. This trend is increasing year after year. Majority of migrants are from rural areas which are active agriculture labor force. This trend is evacuating the labor force from agriculture sector and making labor shortages. It has increased the labor cost and making the cost of production high. As there is inflow of agriculture products from neiboring countries especially from India and it has decreased the competitivenss of farmers as well.

Agriculture mechanization is necessary but may not be applicable in all regions

Agriculture mechanization is thought to solve the labor problems but the land topography of hills and high hills does not allow high level of mechanization. As every farm units are not connected it is practically imposible for mechanization in large section of hills and high hills areas. Moreover, mechanization is growing in flat lands (Terai region) but due to small landholding it is being difficult to have economies of scale in that areas too.

Oppportunities for agricultural development in the country

Despite many difficulties, agriculture development is only way to get many people out of hunger and poverty. More than 65% of population are engaged in agriculture and most of them are practicing subsistence farming. Agriculture is not only the source of livelihood but also culture and only option for survival to large segments of country. Now many villages have been connected to roads (though very rough and seasonal), it has created some hope for further development. The diverse climatic conditions allow every season crops throughout the country. The North-south distance is very short (200 km- 300 km) which connects both China and India, it provides opportunities for agriculture exports in these countries. The agriculture land is productive and can produce for its self sufficiency and also to export earnings. Identification and develop-

ment of exportable commodities are essential and promotion of such crops in long term provides opportunitie for economic development as well. The different policies are conducive for farming and there is huge scope of agriculture development in the country.

Problems identified during discussion

There are several problems of agriculture and it is more area and farmers category specific. But majority of farmers have some common problems which are as following on priority basis;

- Lack of irrigation facility
- Lack of quality seeds
- Shortage of labor and increased labor cost
- Low agriculture price
- Problems of wild animals (Monkey, Porcupine- Dumsi)
- Storage facility- Cold storage and other
- Deteriorating soil health
- Post harvest loss
- Technology
- Problems faced with mechanization

2.2. Findings from Household survey

Out of 350 households selected only 335 households were used for analysis purposes due to poor response from the farmers surveyed. Around 90% of the households were headed by the male and it was similar in both vegetables growing and rice growing districts. The male were significantly higher in household heads than female (Table 7)

〈Table 9〉 Gender of household head

Gender	Hilly Region				Terai Region				
	Districts[1]				Districts[2]				
	Dolakha	Kaski	Dailekh	Total	Jhapa	Mahottari	Kapilvastu	Kanchanpur	Total
Female	2 (5.1)	9 (18.0)	5 (10.0)	16 (11.5)	5 (9.8)	1 (2.0)	7 (15.60)	5 (10.0)	18
Male	37 (94.9)	41 (82.0)	45 (90.0)	123 (88.5)	46 (90.2)	49 (98.0)	38 (84.40)	45 (90.0)	178 (90.8)
Total	39 (100)	50 (100)	50 (100)	139 (100)	51 (100)	50 (100)	45 (100)	50 (100)	196 (100)

Notes: 1. Pearson Chi-Square value = 3.739 at 1 df and p value = 0.154
2. Pearson Chi-Square value = 5.348 at 1 df and p value = 0.148
Figure in parentheses indicate percent.

Regarding the types of family around two thirds were Nuclear family and one third of family leaved in jointly. This shows the changing pattern of family in Nepal. Previously most of the families were joint families which consisted 3-4 generations in the single household. Due to rapid urbanization and different priorities within the family members, the trend has shifted in splitting of families from joint to nuclear. The situation is more prominent in cities than rural areas. One of the major factors for land fragmentation is the increased nuclear families where each nuclear families have their own land ownership. Migration has definitely increased the land fragmentation due to increased selling of land by the out migrants.

〈Table 10〉 Type of Family

Type of family	Hilly Region				Terai Region				
	Districts[1]				Districts[2]				
	Dolakha	Kaski	Dailekh	Total	Jhapa	Mahottari	Kapilvastu	Kanchanpur	Total
Joint	2 (5.10)	29 (58.0)	25 (50.oo)	56 (40.30)	9 (17.60)	12 (24.00)	28 (62.20)	16 (32.20)	65 (33.20)
Nuclear	37 (94.90)	21 (42.00)	25 (50.00)	83 (59.70)	42 (82.40)	38 (76.00)	17 (37.80)	34 (68.40)	131 (66.80)
Total	39 (100)	50 (100)	50 (100)	139 (100)	51 (100)	50 (100)	45 (100)	50 (100)	196 (100)

Notes: 1. Pearson Chi-Square value =28.522 at 1 df and p value = 0.00
2. Pearson Chi-Square value = 24.608 at 1 df and p value = 0.00
Figure in parentheses indicate percent.

The education status of the household head was poor. More than 63% of household head were either illiterate or just literate which shows their poor capacity to use recent technologies. The use of recent technology depends on the education of the household head who are the main decision makers in the family. The educated people are the innovators as well as early adopters in the diffusion process while illiterate are the leggards in the diffusion cycle. The case was almost similar in both rice growing and vegetable growing regions as reflected by table 9.

〈Table 11〉 Education of the Household Head

Education	Hilly Region[1]				Terai Region[2]				
	Districts				Districts				
	Dolakha	Kaski	Dailekh	Total	Jhapa	Mahottari	Kapilvastu	Kanchanpur	Total
Illiterate	5 (12.8)	27(54)	14 (28)	46 (33.1)	4 (7.8)	5 (10.00)	7 (15.60)	1 (2)	17 (8.70)
Literate	21 (53.80)	7 (14.0)	9 (18.0)	37 (26.60)	24 (47.10)	30 (60.0)	37 (82.20)	22 (44.00)	113 (57.70)
SLC	7 (17.90)	10 (20.00)	14 (28.00)	31 (22.30)	16 (31.40)	12 (24.00)	1 (2.20)	19 (38.80)	48 24.50)
Higher Secondary	4 (10.30)	0 (0.00)	11 (22.20)	15 (10.80)	4 (7.80)	3 (6.00)	0 (0.00)	7 (14.00)	14 (7.10)
University level	2 (2.10)	6 (12.00)	2 (4.00)	10 (7.20)	3 (5.90)	0 (0.00)	0 (0.00)	1 (2.00)	4 (2.00)
	39 (100)	50 (100)	50 (100)	139 (100)	51 (100)	50 (100)	45 (100)	50 (100)	196 (100)

Notes: 1. Pearson Chi-Square value = 42.038at 1 df and p value = 0.00
2. Pearson Chi-Square value = 38.6214 at 1 df and p value = 0.00
Figure in parentheses indicate percent.

The table 10 shows the major occupation of the surveyed farmers. Agriculture was major occupation in both regions which was followed by jobs and private businesses. Mostly small and large farmers were engaged in agriculture as their major source of income while land less and marginal farmers had to engage in other activities like farm labor, other skilled works to generate livelihood. As, the landless and marginal farmers have few small size of land; they can not rely on their farm production for livelihood. There was tendency of leaving farming by large farmers after they became well off from farming.

There is likely that new generation from large farmers may not be engaged in farming. Thus there should be strong policies to use their land either by contract farming or leasehold.

〈Table 12〉 Major Occupation of the Household Head

Major occupation	Hilly Region[1]				Terai Region[2]				
	Districts				Districts				
	Dolakha	Kaski	Dailekh	Total	Jhapa	Mahottari	Kapilvastu	Kanchanpur	Total
Agriculture	30 (76.90)	33 (66.00)	29 (58.00)	92 (66.20)	44 (86.30)	49 (98.00)	40 (88.90)	49 (98.00)	182 (92.90)
Job	8 (20.50)	10 (20.00)	21 (42.00)	39 (28.00)	5 (9.80)	0 (0.00)	2 ()4.40	1 (2.00)	8 (4.10)
Business	1 (2.60)	3 (6.00)	0 (0.00)	4 (2.90)	1 (2.00)	1 (2.00)	2 (4.40)	0	4 (2.00)
Labour	0 (0.00)	2 (4.00)	0 (0.00)	2 (1.40)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Skillful work	0 (0.00)	2 (4.00)	0 (0.00)	2 (1.40)	1 (2.00)	0 (0.00)	1 (2.20)	0 (0.00)	2 (1.00)
Total	39 (100)	50 (100)	50 (100)	139 (100)	51 (100)	50 (100)	45 (100)	50 (100)	196 (100)

Notes: 1. Pearson Chi-Square value = 16.864 at 1 df and p value = 0.032
2. Pearson Chi-Square value = 11.672 at 1 df and p value =2.32
Figure in parentheses indicate percent.

The demographic characteristics of sample households is presented in table 11. The average age of household head was around 52 years which is relatively good age to carry out agriculture work. The family size was 5.4 with more than 70% of family members in active population category (15 years-59 years) and the dependent ratio was 0.61. The average family size was highest in Mahottari district which is significantly higher than the national average of 4.6.

〈Table 13〉 Demographic characteristics of sample households

	Hilly Region					Terai Region					
	Districts					Districts					
	Dolakha	Kaski	Dailekh	Total	F-value	Jhapa	Mahottari	Kapilvastu	Kanchanpur	Total	F-value
Age of household head	51.05 (10.93)	58.56 (14.63)	47.12 (8.85)	52.3381 (12.69)	12.11***	51.49 (14016)	50.62 (13.87)	51.33 (12.14)	51.08 (8.94)	51.12 (12.38)	0.05
Male members (no)	2.35 (0.90)	2.84 (1.45)	2.66 (0.63)	2.6403 (1.07)	2.26	2.72 (1.23)	3.56 (1.75)	2.64 (1.00)	2.62 (1.07)	2.89 (1.35)	5.91 ***

	Hilly Region					Terai Region					
	Districts					Districts					
	Dolakha	Kaski	Dailekh	Total	F-value	Jhapa	Mahottari	Kapilvastu	Kanchanpur	Total	F-value
Female members (no)	2.07 (1.01)	2.58 (1.33)	2.68 (0.62)	2.4748 (1.05)	4.17	2.76 (1.21)	3.44 (2.03)	2.57 (1.20)	2.22 (0.82)	2.75 (1.45)	6.75 ***
Active Member (no)	3.64 (1.50)	3.96 (1.77)	2.66 (0.85)	3.4029 (1.52)	11.24***	3.60 (1.67)	4.56 (2.08)	3.97 (1.82)	4.36 (1.54)	4.12 (1.81)	2.80 ***
HH size	4.43 (1.14)	5.42 (2.29)	5.34 (1.24)	5.1151 (1.72)	4.49***	5.49 (1.8572)	7 (3.43)	5.22 (1.82)	4.84 (1.53)	5.64 (2.42)	8.46 ***
Dependent Population	0.79 (0.86)	1.5 (1.33)	2.64 (1.24)	1.7122 (1.39)	27.9***	1.86 (1.13)	2.4 (2.81)	1.2 (1.08)	0.5 (0.91)	1.5 (1.82)	11.91 ***
Dependent ratio	0.33 (0.49)	0.5012 (0.56)	1.1637 (1.01)	0.6949 (0.82)	16.24***	0.68 (0.59)	0.82 (1.16)	0.42 (0.48)	0.20 (0.61)	0.53 (0.79)	6.53 ***

Notes: Figures in parenthesis indicate standard deviation
*** indicates level of significance at 1 % level

The table below shows the land holding size in rice growing district. Average land size used for rice cultivation was 0.62 hectare per farmers while 0.87 ha was the average land holding size of that area. The main reason for not using all the lands for rice cultivation was unavailability of irrigation facility. Some of the lands were used for commercial vegetable farming in that area also which ultimately decreases the rice area. The economic benefit from rice is very little so farmers tend to switch to other crops for better income. However rice has been the major staple crops and also the culture, so even if the economic benefits are negligible farmers have continued to grow rice. But, if the trend persists for longer period, there is the danger of decreasing rice areas which directly affects on the food security situation of the whole country. Thus it was felt that rice should be protected and farmers be incentivised for national benefits as well.

〈Table 14〉 Land holdings in rice growing districts

Land type (ha)	Jhapa	Mahottari	Kapilvastu	Kanchanpur	Total	F-value
Own Irrigated	0.38 (0.45)	1.2 (1.33)	0.63 (0.54)	0.50 (0.26)	0.66 (0.82)	10.26***
Own Rainfed	0.28 (0.97)	0.07 (0.25)	0.15 (0.74)	0 (0.00)	0.13 (0.63)	1.9
Leased In	0.08 (0.23)	0.07 (0.31)	0.16 (0.74)	0.04 (0.20)	0.08 (0.25)	0.66
Rica Cultivated	0.57 (0.48)	0.66 (0.58)	0.81 (0.75)	0.43 (0.22)	0.62 (0.54)	4.13***

Notes: Figures in parentheses indicate standard deviation
*** indicates significant at 1 % level

Table below shows that the labor cost was highest in rice production. The tillage cost which also includes the machinery was also significantly high. There was little cost for seed, manure and fertilizers as compared to labor and machinery cost. The increased migration was the main reasons for increasing both labor costs and machinery cost. The evidences shows that labor cost has tripled in last decade it is mainly because of short supply. The use of machineries has increased to cope the labor shortages but the cost is still higher because the purchasing cost of machineries are higher due to high tariff rates (almost 200%) and the globally increased price of fuel has added to higher use cost. The government has subsidized the agriculture machineries but the process of subsidy are very lengthy and discouraging. Thus it is necessary to implement custom hiring practices to reduces the machinery cost where government can subsidize to establish such centers.

〈Table 15〉 Cost of rice cultivation of sample households in rice producing districts

Cost components (NRs)	Jhapa	Mahottari	Kapilvastu	Kanchanpur	Total	F-value
Seed	3768 (2742)	2493 (1369)	3984 (2866)	6340 (7305)	4148 (4431)	7.17***
FYM	12134 (42295)	14254 (25952)	2238 (3568)	6858 (4352)	9057 (25630)	2.15*
Chemical Fertilizer	4707 (2982)	8771 (13392)	7183 (5366)	6008 (2574)	6644 (7604)	2.67**
Tillage cost/machinery	19515 (22651)	27522 (37232)	24737 (34940)	25114 (11680)	24185 (28257)	0.72

Cost components (NRs)	Jhapa	Mahottari	Kapilvastu	Kanchanpur	Total	F-value
Labor	42989 (31111)	78238 (175928)	47706 (33480)	43154 (13648)	53106 (92445)	1.70**
Total cost	83112 (73716)	135577 (242327)	93959 (51249)	87474 (22073)	100099 (131575)	1.69

Notes: Figures in parentheses indicate standard deviation
***, ** and * indicate significant at 1, 5 and 10 percent level

The average yield of rice was almost 4.9 mt/ha in rice growing areas while the revenue gerated per farmers from rice was only NRs. 119361 . The margin received per season is very small around NRs 19262. When compared to whole country this margin will be much lower because the selected areas are high productive. The Benefit cost ratio of rice in rice growing region was 1.36. It indicates that we have scope for increased income from rice farming when we practice two season rice. The cropping intensity of the area is almost 2, and farmers cultivate other crops like maize, wheat, oilseeds, potatoes, pulse crops and vegetables in other seasons. The average productivity of rice was 4.8 t/ha which was higher than the national average.

〈Table 16〉 Rice production, Yield and Revenue of sample households in rice producing districts

	Jhapa	Mahottari	Kapilvastu	Kanchanpur	Total	F-value
Rice production (Kg)	2006.27 (1741.10)	2951.20.64 (2674.83)	3518.00 (3376.54)	1848 (908.97)	2554.03 (2411.742)	5.51***
Yield (Kg/ha)	3669.26 (1327.40)	6907.04 (18676.96)	4271.44 (1407.45)	4281.77 (959.14)	4789.74 (9507.38)	1.19
Total cost	83112 (73717)	135578 (242327)	93959 (51249)	87474 (22073)	100099 (131575)	1.7
Revenue	91732 (33185) (43527.63)	172676 (466924)	105119 (34868)	107044 (23979)(22724.17)	119361 (237696)	1.17
B:C ratio	1.46 (0.74)	1.26 (0.91)	1.41 (0.87)	1.29 (0.36)	1.36 (0.75)	0.82

Notes: Figures in parentheses indicate standard deviation
*** indicates significant at 1 % level

The major source of rice seed was agrovet. Reuse of own seed for next year is being reduced in recent years which shows the good seed replacement rate. However, the quality of such seeds needs to be regularly monitored by responsible authorities. It was found that government also provided the seed which was not significant however. The use of improved seeds has increased the rice productivity. The use of hybrid seeds for rice is increasing, which is good for increased productivity. However, there is limited research in hybrid rice development in Nepal. Most of the hybrid rice seed are imported from India both formally and informally, a strong quality regulation mechanism should be in place to minimize the risks. Similarly, Nepal Agriculture Research Council, which is mandatory body for agricultural research in Nepal should focus on hybrid rice variety development.

〈Table 17〉 Source of Rice seed in sample households in rice producing districts

Source of Seed	Jhapa	Mahottari	Kapilvastu	Kanchanpur	Total
Own	27 (52.9)	8 (16.0)	4 (8.9)	35 (70.0)	74 (37.8)
Agrovet	20 (39.2)	41 (82.0)	38 (84.4)	14 (28.00)	113 (57.70)
DADO	4 (7.8)	0 (0.00)	0 (0.00)	0 (0.00)	4 (2.00)
NGOs	0 (0.00)	0 (0.00)	1 (2.20)	1 (2.20)	2 (1.00)
Others	0 (0.00)	1 (2.00)	2 (4.40)	0.00 (0.00)	3(1.50)
Total	51 (100)	50 (100)	45 (100)	50 (100)	196 (100)

Notes: Pearson Chi-Square value = 72.086 at 12 df and p value = 0.00
Figure in parentheses indicate percent.

It was found that with proper management, it was possible to increase the rice productivity. Majority of the rice farmers believe that they can increase the rice productivity. Irrigation was found to be top priorities for farmers to increase the rice productivity. They believe that increased use of FYM may improve their soil health and help in increased productivity.

〈Table 18〉 Possibility of increment of rice in rice producing districts

Productivity can be increased	Jhapa	Mahottari	Kapilvastu	Kanchanpur	Total
Yes	51 (100)	44 (88)	23 (51.1)	50 (100)	168 (85.70)
No	0 (0.00)	6 (12)	22 (48.90)	0 (0.00)	28 (14.30)
	51	50	45	50	196

Notes: Pearson Chi-Square value = 61.44 at 6 df and p value = 0.00
Figure in parentheses indicate percent.

Quality seeds are definitely the priroty for increased productivity of rice. Farmers demand that government should ensure the quality supply of seed and regulate agrovets and seed companies strictly. The government research stations should be strenghthened and capacited for better supply of quality breeder and foundation seed. They do believe that proper use of machineries can increase the productivity as it can minimize the other losses in the field. With the combination of these priorities, it was stated that 30% of yield can be increased in rice with minimal efforts.

〈Table 19〉 Major priorities to increase the rice production

Variables	Most priority	Priority	Moderate Priority	Less priority	least priority	Index value	Ranking
Seed	39(19.9)	73 (37.2)	49 (25)	32 (16.3)	3 (1.5)	0.72	III
FYM	54 (27.55)	56 (28.57)	72 (36.73)	11 (5.6)	3 (1.53)	0.75	II
Irrigation	89 (45)	32 (16.32)	44(22.45)	24 (12.24)	7 (3.57)	0.78	I
Machinery	10 (5.01)	24 (12.24)	26 (13.26)	103 (52.55)	33 (16.83)	0.5	IV
Labor	3 (1.53)	12 (6.12)	5 (2.55)	26 (13.26)	150(76.02)	0.34	V

2.3. Determinants of household income from rice production using income function regression model

a. Socio economic factors

The total income from rice production was regressed with important socio-economic explanatory variables. The overall F value of the model was found 213.95 which was statistically highly significant at one percent level. This implies that the explanatory variables included in the model are important for the explanation of the variation in dependent variable. The coefficient of determination R^2 was 0.82 which indicates that about 82 percent variations in the income from rice was explained by the explanatory variables used in the model. The adjusted R^2 (0.81) indicates that when degree of freedom is taken into account, the variations in the dependent variable (income from rice) is explained by explanatory variables by 81% in the model. This revealed that the model fitness is satisfactory. The multicollinearity of the explanatory variables was checked using variance influence factor (VIF) method. The VIF above 10 is supposed to have severe multicollinearity (Gujarati et al., 2015). The VIF for all the variables was less than 10 with a mean of 1.37 (ranged from 1 to 1.71). This indicates that there was no problem of multicollinearity.

The variable education level of household head (literate =1 otherwise zero) had a positive impact on the income. Those farmers who are educated, their income would increase by about NRs. 10713 as compared to those who are illiterate. It was found significant at 10 percent level of significance. The educated household head can apply their skills, knowledge and capacity in their practical life which help to increase the income through better management practice. Similarly, increase in one economically active member in the household decreases the income by about NRs. 35, however, it was statistically

non-significant. As only farm income was taken into account, the economically active members might get involved in non-agriculture activities and most of them were migrated for other employment opportunities, it was no significant change in the agriculture income. If such manpower can be fully used in agriculture, it might increase the income.

With respect to household size, increase in household size by one member, the income from rice production increased by about NRs. 2755 and it was statistically highly significant at one percent level. The added family member in household also gets engaged in agriculture activities which reduces the problem of labor scarcity. The care and management is increased when the household member get engaged in agricultural activities which help to increase the income. Similarly, increase in the area under rice cultivation by one hectare, the income from rice production is increased by about NRs. 94821 and it was statistically highly significant at one percent level.

〈Table 20〉 Socioeconomic factors affecting income from rice production

Variables	Coefficients	Standard error	t-value	p-value
Education of HH (#)	10713.65*	6619.25	1.62	0.10
Economically active members	-34.72	1333.24	-0.03	0.97
Household size	2755.15***	1009.62	2.73	0.00
Rice area (ha)	94820.52***	3534.38	26.83	0.00
Constant	-19719.11**	7760.90	-2.54	0.02
Observations	196			
F (4, 191)	213.95***			
R square	0.818			
Adjusted R^2	0.814			

Notes: ***, ** and * indicate significant at 1, 5 and 10% level of significance. # indicates the dummy variable.

b. Inputs of rice production

The revenue per hectare of household from rice production was positively regressed with increased use of inputs. The overall F value of the model was found 4.83 which was statistically highly significant at one percent level. This implies that the explanatory variables included in the model are important for the explanation of the variation in dependent variable.The multicollinearity of the explanatory variables was checked using variance influence factor (VIF) method. The VIF above 10 is supposed to have severe multicollinearity (Gujarati et al., 2015). The VIF for all the variables was less than 10 with a mean of 1.29 (ranged from 1 to 1.68). This indicates that there was no problem of multicollinearity.

The variables of different input costs had a positive impact on the income. Per hectare revenue is negatively regressed with area of rice production. With increased farm size, the care and management are reduced so the per hectare revenue is negatively regressed with the increased area.

〈Table 21〉 Input Factors affecting income from rice production

Variables	Coefficients	Standard error	t-value	p-value
Seed Cost	0.022	0.045	0.50	0.618
Farm Yard Manure Cost	0.001	0.005	0.34	0.736
Chemical Fertilizer Cost	0.069	0.051	1.36	0.174
Land preparation cost	0.121***	0.044	2.75	0.007
Labor cost	0.140***	0.066	2.12	0.035
Area	-0.016	0.050	-0.32	0.750
Constant	8.003***	0.782	10.23	0.00
Observations	196			
F (6, 189)	4.83***			
R square	00.13			
Adjusted R^2	0.10			

Notes: ***, ** and * indicate significant at 1, 5 and 10% level of significance. # indicates the dummy variable.

2.4. Determinants of yield from rice production using yield function regression model

a. Socio-economic factors

The dependent variable rice yield (transformed to natural logarithm) was regressed with socioeconomic variables. The result revealed that those household who had educated household head, their yield increase by about 22 percent and it was found statistically significant at 10 percent level of significance. Similarly, addition of one economically active member in household and increase in household size by one member had positive effect on the rice yield, however, they were statistically non-significant. The variable, area under rice cultivation was statistically non-significant, increase in area had negative impact on the rice yield.

〈Table 22〉 Socioeconomic factors affecting rice yield

Variables	Coefficients	Standard error	t-value	p-value
Education of HHH (#)	0.224*	0.115	1.940	0.053
Economically active member	0.005	0.023	0.220	0.825
Household size	0.022	0.018	1.240	0.218
Rice area (ha)	-0.079	0.062	-1.290	0.199
Constant	7.981***	0.135	59.070	0.000

Notes: ***, ** and * indicate significant at 1, 5 and 10% level of significance. # indicates the dummy variable.

b. Inputs

The yield of ricewas regressed with increased use of inputs. The overall F value of the model was found 4.63 which was statistically highly significant at one percent level. This implies that the explanatory variables included in the model are important for the explanation of the variation in dependent

variable.The multicollinearity of the explanatory variables was checked using variance influence factor (VIF) method. The VIF above 10 is supposed to have severe multicollinearity (Gujarati et al., 2015). The VIF for all the variables was less than 10 with a mean of 1.29 (ranged from 1 to 1.68). This indicates that there was no problem of multicollinearity.

The variables of cost of different inputs had a positive impact on the rice yield. Which reveals that increased use of inputs results the increment of yield. Rice yield was found negatively regressed with area of rice production. That means with increase in rice production area there is decrement on yield.

〈Table 23〉 Inputs factors affecting yield of rice

Variables	Coefficients	Standard error	t-value	p-value
Seed Cost	0.021	0.045	0.47	0.639
Farm Yard Manure Cost	0.002	0.005	0.42	0.675
Chemical Fertilizer Cost	0.067	0.051	1.31	0.192
Land preparation cost	0.124***	0.044	2.8	0.006
Labor cost	0.130*	0.066	1.96	0.052
Area	-0.017	0.050	-0.33	0.738
Constant	4.89***	0.785	6.24	0.000
Observations	196			
F (6, 189)	4.63***			
R square	00.13			
Adjusted R^2	0.10			

Notes: ***, ** and * indicate significant at 1, 5 and 10% level of significance. # indicates the dummy variable.

The average own land among the vegetable producing districts was 0.11 ha for the hilly region whereas the average leasehold land area was 0.2 ha. As most of the hilly areas were not suitable for farming, only agriculture land was taken into account for the analysis. Moreover, this land holding was much low-

er than the national average of 0.68 ha. Due to scarcity of labor force and practical difficulty in using machines, many cultivated lands have been left away by the farmers and the trend is increasing in the hilly areas. These lands are now being used for fodder and forages for the livestock animals.

〈Table 24〉 Land holding in sample households in vegetable producing districts

	Dolakha	Kaski	Dailekh	Total	F-value
Own	0.05 (0.15)	0.22 (0.20)	0.15 (0.34)	0.11 (0.17)	31.79***
Leasehold	0 (0)	0.57 (4.00)	0 (0.00)	0.20 (2.40)	0.9

Notes: Figures in parentheses indicate standard deviation
*** indicates significant at 1 % level

An effort was made to analyze the level of training received by the vegetable farmers. Almost 50% of the vegetable farmers stated that they have participated in the training program. However the frequency of the training was very limited. As there is change in technology, farmers need to participate regularly in the training program. There are limited agriculture technicians in the field and government extension service is not enough. It was revealed that government extension service has reached around to 20% of the farmers in the country. Some of the extension activities have been carried out by the NGOs as well but the access to training, quality inputs, and technologies are limited which are determining factors in agricultural productivity of the area.

〈Table 25〉 Participation on training related to vegetable technology in sample households of vegetable producing districts

Training	Dolakha	Kaski	Dailekh	Total	F-value
Yes	17 (43.6)	6 (12)	47 (94)	70 (50.40)	31.79***
No	22 (56.04)	44 (88)	3 (6.00)	69 (49.60)	0.9

Notes: Pearson Chi-Square value = 68.23 at 2 df and p value = 0. 00
Figure in parentheses indicate percent.

Like rice farmers, vegetable farmers also believed that it was possible to increase the vegetable productivity in their areas. Among the sampled households, 50% of the respondents said that there is possibility of increasing the production by adopting the good agricultural practices (GAP).

〈Table 26〉 Possibility of increment of vegetable in vegetable producing districts

Increase in production	Dolakha	Kaski	Dailekh	Total	F-value
Yes	17 (43.6)	6 (12)	47 (94)	70 (50.40)	31.79***
No	22 (56.04)	44 (88)	3 (6.00)	69 (49.60)	0.9

Notes: Pearson Chi-Square value = 68.23 at 2 df and p value = 0. 00
Figure in parentheses indicate percent.
41% of respondent said that 20-30% increment is possible.

Seed was the major priority for vegetable farmers to increase the productivity. Irrigation and Compost were ranked as second important priorities by the farmers. Likewise machinery and labor were also prioritized as 4^{th} and 5^{th} respectively by the farmers.

〈Table 27〉 Major priorities to increase the vegetable production vegetable producing districts

Variables	Most priority	Priority	Moderate Priority	Less priority	least priority	Index value	Ranking
Seed	48 (34.53)	66 (47.48)	13 (9.35)	7 (5.03)	5 (3.59)	0.81	I
FYM	21 (15.10)	38 (27.33)	54 (38.84)	16 (11.51)	10 (7.19)	0.66	II
Irrigation	54 (38.84)	21 (15.10)	26 (18.70)	21 (15.10)	17 (12.23)	0.71	II
Machinery	10 (7.19)	8 (5.75)	32 (23.02)	65 (46.76)	24 (17.26)	0.48	IV
Labor	6 (4.31)	6 (4.31)	14 (10.07)	30 (21.58)	83 (59.71)	0.34	V

Notes: Pearson Chi-Square value = 68.23 at 2 df and p value = 0. 00
Figure in parentheses indicate percent.
41% of respondent said that 20-30% increment is possible.

Household benefit cost analysis was carried out for vegetable growers. Household B/C ratio was 1.95 for vegetable farmers. The net profit per household was NRs. 11111. So per hectare net profit from vegetable was almost NRs. 110000.

The labor cost was highest among factor costs in vegetable farming which contributed 60% to total cost. Seed, FYM and chemical fertilizer costs were other considerable costs for vegetable farming whose shares were almost equal to each other. Higher level of labor costs can be reduced with practical mechanization in vegetable farming.

〈Table 28〉 Cost of vegetable cultivation of sample households in vegetable producing districts (household level)

Inputs	Dolakha	Kaski	Dailekh	Total	F-value
Seed cost	3238.39 (4932.820	4721 (12669.04)	801.5 (3262.20)	2894.85 (8384.37)	2.85*
FYM cost	2800.78 (4894.74)	4087 (5549.56)	1279.6 (1050.72)	2716.26 (4399.46)	5.42***
Chemical fertilizer cost	2208.57 (2878.94)	160 (218.88)	509.22 (496.91)	860.63 (1767.125)	20.96***
Tillage cost	2076 (2394)	3066 (2310)	3480 (1498)	2937 (2143)	5.12***
Labor Cost	15757 (16024)	19368 (18512)	9893 (2817)	14946 (14550)	5.75***
Total cost	26082 (24389)	31401.66 (26457.42)	159663 (6210)	24355.9 (21691.2)	7.07***
Total revenue	29280.13 (47739.05)	42659 (60724)	33100 (29887)	35466 (47808)	0.95
B:C ratio	1.52 (1.63)	2.18 (1.73)	2.05 (1.56)	1.95 (3.33)	0.46

The value in the parenthesis denotes the Standard deviation of the average value.
*** denotes the significance level of F-value at 1%.

2.5. Determinants of household income from vegetable production using income function regression model

The total household income from vegetable production was regressed with cost of important input variables. The overall F value of the model was found 9.82 which was statistically highly significant at one percent level. This implies that the explanatory variables included in the model are important for the explanation of the variation in dependent variable. The coefficient of determination R^2 was 0.26 which indicates that about 26 percent variations in the income from vegetable was explained by the explanatory variables used in the model. The multicollinearity of the explanatory variables was checked using variance influence factor (VIF) method. The VIF above 10 is supposed to have severe multicollinearity (Gujarati et al., 2015). The VIF for all the variables was less than 10 with a mean of 1.37 (ranged from 1 to 1.71). This indicates that there was no problem of multicollinearity.

The explanatory variables; seed cost, FYMcost, chemical fertilizer cost, labor cost of household had positive impact on the income but land preparation cost had negative impact on the income. That means with increased use of improved seed (improved seed price is high), FYM, chemical fertilizer and labor results the increment in revenue of household.

〈Table 29〉 Factors affecting income from vegetable production

Variables	Coefficients	Standard error	t-value	p-value
Seed Cost	0.327	0.469	0.7	0.487
Farm Yard Manure Cost	2.055	0.914	2.25	0.026
Chemical Fertilizer Cost	0.117***	2.120	0.06	0.00

Variables	Coefficients	Standard error	t-value	p-value
Land preparation cost	-2.191	1.734	-1.26	0.209
Labor cost	1.404***	0.275	5.1	0.000
Constant	14290.47*	6561.453	2.18	0.031
Observations	139			
F (5, 133)	9.82***			
R square	0.2696			
Adjusted R^2	0.2421			

Notes: ***, ** and * indicate significant at 1, 5 and 10% level of significance. # indicates the dummy variable.

Chapter 4

Conclusion and Recommendation

The KAPEX “Korean Experience Sharing program on Food Security” program is being carried out by Korea Rural Economic Institute under Ministry of Agriculture Food and Rural Affairs of Korea Republic in the developing countries. This program aims to improve food security and reduce poverty, and supports the strengthening of developing countries’ capacity to establish and implement agricultural policies by themselves. KAPEX also aims to plan international cooperation projects that meet partner countries needs. Government of Nepal through Ministry of Finance requested Korean government to implement the program in Nepal and accordingly Nepal was selected as partner country for the year 2017. Program period was 9 months which included KAPEX workshop, KAPEX Academy, KAPEX Training and KAPEX joint research.

The joint research was conducted in 7 districts of Nepal one from each provinces. The qualitative and quantitative research techniques were used for the study. Focus Group Discussion, Key Informants Interview, Stakeholder consultations and informal meetings were carried out as part of qualitative research while household survey was conducted to gather primary information for quantitative analysis. The study area was divided into two broad areas a) rice growing area and b) vegetable growing areas. 200 households were surveyed in rice

growing districts and 150 households were surveyed in vegetable growing districts. Vegetable production was found to be more costly than rice but revenue was found to be much higher than rice. The analysis shows that benefit cost ratio of rice is below 1 which means not profitable while that of vegetables are higher than 1 means are profitable.

Majority of the surveyed households in both the regions were small and marginal and the benefits from agriculture farming was very low. Thus it is necessary for developing programs and policies to support such farmers.

As this was the joint research program, the three officers participated in the 3 months long Kapex academy and have done research on rice. Key recommendations of the academy are listed below;

1. Specific Recommendation from rice development in Nepal from KAPEX Academy

PROBLEMS/ PRESENT SITUATION	RECOMMENDATIONS	CONSIDERATION
Land Tenure and Ownership • Feudal land ownership. • 26.1 % farmers don't have land to farm on. • Land reform is being the hot agenda since 1950s but still no significant achievement.	Scientific land reform on the basis of land-to-tiller principle to end landlordism and assure the ownership of real farmers (Tough task).	Broad political consensus, need based policy formulation. Compensation for landlord with consensus.
Land fragmentation. • Very small land holding i.e. 0.68 ha per household with 3.2 parcels. • Inheritance system of land transfer, land tenure and conversion of agriculture land into residential land are major causes.	Land consolidation Land banking will be suitable for land consolidation because it is beneficial for land holders and farmers. Land zoning Government can encourage consolidation by providing support to the agriculture zone which can motivate the land holder farmers to work as a cooperatives.	Motivation of farmers. Non- farm income activities. Implementation of policies.

PROBLEMS/ PRESENT SITUATION	RECOMMENDATIONS	CONSIDERATION
Conversion of land • Agriculture land is being converted into residential land in urban area and plain region. • Agriculture land is being idle in rural areas due to migration and scarcity of human resources. • Major reasons; Unbalanced development and migration, unplanned urbanization, lack of scientific land use mechanism, socio-economic reasons.	Land utilization plan with land zoning to discourage the land conversion. Strict provisions to discourage the farmland conversion.	Motivation of land holders, implementation of plans and policies. Commercialization of agriculture so that agriculture land can create the competitive income.
Land use pattern and quality degradation. • Paddy is being cultivated traditionally in hilly areas where there is sloppy terrace. • The quality of farmland is degrading day by day due to; fragile geological structure avalanches, landslides in the hills, river-damaged areas, haphazard use of chemical fertilizers, overgrazing and unscientific farming in steep slope.	Scientific land use plan; Right crop in right farmland, Agriculture zoning. Sustainable use of land, land reclamation program for degraded land, Efficient research and extension System.	Investment to implement the policies.
Implementation of policies At present, there are 59 land-related Acts and 23 regulations in place but the implementation is not significant. Major reasons are; Political instability (5 major political system change within 70 years) Low investment (Agriculture is subsistence, agriculture/land gets less priority in national budget, budget focused on service and some development activities), Lack of coordination between implementing organizations (MoAD is responsible agriculture development and Ministry of land reform is responsible for land management). Problems on policy formation (no need based and contradictory with each other, policy for policy).	Formulation of need based comprehensive policies and laws. Effective institutional arrangement and coordination. (Related organizations must have close coordination and efficient implementation organizational arrangement). Prioritized investment.	Political stability and consensus. Capacity of nation to manage the investment.

Migration of youth from the rural areas.	Specific act and policy for fostering agricultural successors should be enacted with the provision of long-term support to the young and coming home farmers. Education, guidance on management, overseas training, annual successor contests etc. could be effective tools for motivation and attraction of young personnel in agriculture. Professional farm supporting project for established farm successors by means of loan support for purchasing farming machines, farmland as well as lease fees can be helpful for retaining young personnel in rural areas.	Step-by-step fostering system should be applied beginning with the information collection and long-term plan preparation with detailed study depending on the specific conditions and interest group consultation. Separate wing for rural agricultural human resource can be created for facilitation.
Poor cooperation among government, non-government and private organizations.	Authorized mechanism for coordinated efforts should be established. The agricultural programs to be launched by non-government organizations should be assessed by designated authorities including the suggestions from related local authorities. The extension programs and research program should be assessed on the basis of current policies and programs of the nation	
Low investment in rice research. Insufficient adaptive research.	Increase investment in rice R&D with specific treatment on the basis of output. Technology demand survey on the basis of current situation and specific geographical conditions.	Deployment of excessive manpower (extension and researchers) at central organizations to the local and provincial organizations. The research and extension technicians should be exempted from administrative works.
Poor linkage among extension, research, education and farmers.	The research and extension system should be integrated as an independent organization with exemption from administrative works. Regional, municipality and village level research and extension centers should be established	In depth review of current situation and past performance should be carried out Strong political and beurocratic commitment Gradual integration Educational research should be in line with current demand in the country with functional communication.

2. Recommendations based on research findings

Based on the research findings following are the general recommendation regarding increasing small holder productivity

a. Support for irrigation: there are several irrigation schemes, small irrigation and shallow tube wells are much better and low cost intensive to support small farmers to increase their productivity
b. Policy support for increased land size: The contract or lease practice should be legalized through act so that it will decrease the fallow land and land owners can provide their land to promosing farmers in lease
c. Ensure quality supply of seeds: Seeds are the most important factor for agriculture production. Farmers demand from government farms and research stations that quality seed supply should be ensured. Thus strengthening government farm capacity to provide breeders seeds to seed producers group and cooperatives to ensure quality seed replacement
d. Ensure timely supply of fertilizer
e. Increase access to finance: easy loan process and low interest rate can encourage farmers to take loan and invest in agro enterprises.
f. Emphasize on practical mechanization scheme: Establish custom hiring centers in Terai region with all kinds of equipments and mechinaries can be supplied in rent. For high hills and mid hills small equipments that are women friendly needs to be promoted.
g. Increase the cropping intensity: Cropping intensity in rice growing areas are matter of worry. Nowadays farmers are growing rice and keeping their land fallow in many areas, such tendency should be checked with appropriate policies. The lack of irrigation is major reason for decreasing

cropping intensity, thus ensuring all season irrigation can increase the cropping intensity and income of the farmers

h. Continuous support to farmers: The government needs to support the farmers with different schemes so that they are motivated for farming. As it shows that farming is not much profitable, farmers tend to leave the farming for other alternatives which increases the food deficit in the country.

i. Special package for rice growers: It shows that rice farming is in loss, farmers are cultivating rice to preserve their farming culture as well, so it is urgent to implement special package for rice farmers like direct payment and subsidies

j. Market management and price: The price is the major motivating factors for farmers. But lower price not only decreases farmers income it will also drag them out of farming. The market and price should be in control so that it will not distort the market.

k. Technological support: Regular technical support and motivation are required to farmers for better productivity and income.

l. Insurance support

m. Invest in post harvest technologies and infrastructures

n. Capacity development of farmers for export

o. Good agriculture practices

p. Pesticide management and control

q. Development of branding for special niche products (e.g. Guranse Potato, Dolakha Vegetables and Kapilvastu rice) for better price and to increase competitiveness

As this study aimed to improve zero hunger challenge action plan pillar IV, the activities of the zero hunger action plan should be prioritized on the basis

of urgency. Thus following are the recommendations to improve the ZHC action plan Pillar IV;

Outcome 1: Productivity of crops and livestock increased to double the income of smallholder farmers

1.1 Immediate Action

1.1.1 Categorization of farmers on the basis of land holding and level of engagements and income from agriculture sector- Baseline information and data collection

1.1.2 Introduce incentives package based on the farmers categorization, voucher system can be used as appropriate tools for such differential incentive packages

1.1.3 Extension services to farmers for introducing latest technologies

1.1.4 Subsidy program in chemical fertilizer through voucher

1.1.5 Direct subsidy for organic fertilizers and much emphasis should be given for self producers

1.1.6 Ensure the supply of quality seeds, strenghthen the capacity of Nepal agriculture research council in seed production and supply; also develop the government farm as seed resource centers

1.2. Mid-term and long term Action

1.2.1 Invest on irrigation, much emphasis should be provided to shallow tube wells in rice areas and small and non-conventional irrigation in vegetable areas

1.2.2 Identify the niche production zone for specific crops and special package planning for such niche products

1.2.3 Establish collection centers, market centers and increase connectivity and access to market

1.2.4 Land consolidation schemes, land bank, contract farming and lease hold

farming governed by act

1.2.5 Land reclamation program and land pooling program to increase the productive land size

1.2.6 Increase mechanization, establish custom hiring centers and encourage in practical mechanization schemes

1.2.7 Invest on research to develop hybrid varieties by own research system

1.2.8 Apply concessional taxes on the machines and equipments

1.2.9 Establish the Direct payment system in rice farming

1.2.10 Operate output based incentives for extension workers as well as farmers

Outcome 2: Agricultural investment increased in the small farms

2.1 Immediate action

2.1.1 Reduce the interest rate of agricultural loans

2.1.2 Increase the access of small farms to financial institution

2.1.3 Aware the small holder farmers on government schemes for interest subsidy program

2.1.4 Increase the coverage of crop insurance schemes

2.1.5 Promote group savings and credit services

2.1.6 Simplify the lending procedure

2.1.7 Promote stress tolerant crop varities

2.1.8 Mobilize cooperatives for value chain development financing

2.2 Mid term and long term action

2.2.1 Make pririoty sector lending mandatory to reach the smallholder farmers

2.2.2 Encourage for exportable products development

2.2.3 Branding of the valuable products for better prices

2.2.4 Price policies conducive for small holder farmers

2.2.5 Development of enterprises

2.2.6 Develop and implement special package programs for rice and vegetables

2.2.7 Encourage good agriculture practices and wise use of pesticides for pests and disease control

Outcome 3: Income of small farms doubled with access to identified employment opportunities

3.1 Immediate action

3.1.1 Emphasize on value addition through post harvest processing

3.1.2 Engage women in income generating activities

3.1.3 Enhance the business and entepreneural capacity of the farmers through practical trainings and support

3.1.4 Start the pro-poor value chain readiness program

3.1.5 Engage smallholder farmers in producing high value crops, NTFPs and MAPs

3.1.6 Skilled trainings for machines and equipments handling and repair

3.1.7 Develop agro-tourism, organic farming based home stay programs

3.1.8 Implement contract farming and leasehold farming

3.1.9 Use of unused productive fallow land for this law may be required

3.1.10 Use Agro forestry practices

3.2 Mid term and long term action

3.2.1 Make the land law smallholder farmers sensitive

3.2.2 Lease forest areas to the smallholder groups for their engagement in the larger

3.2.3 Utilize waste land for productive purpose

3.2.4 Provision to transfer the fallow land from land owners to small holder farmers with compensation to owners

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Annexes

KAPEX Questionnaire survey for small holder vegetable/rice growers

Name of surveyerM ========== Superviser NameM==========

DateM==========

District==========R/Municipality==========

Ward no=========

Section 1 : Major Household Information

Section 1.1 : Information of Answerer

NameM==========Gender:

Male/female AgeM=========yrs

Marietal Status: Unmarried/Married/Widow/Divorsed

Religion : Hindu/ Buddist/ Cristian/Muslim/others

Caste: Deprived/ Ethnic/others

Education status======= Major Occupation==========

Minor Occupation =======

Section 1.2 : Information of Household head

NameM==========Gender:

Male/female AgeM=========yrs

Marietal Status: Unmarried/Married/Widow/Divorsed

Religion : Hindu/ Buddist/ Cristian/Muslim/others

Caste: Deprived/ Ethnic/others

Education status======= Major Occupation==========

Minor Occupation =======

Section 2 : Population Status of the household (Particulars of All member of household should be included)

SN	Name of Family member	Gender	Age	Education	Education status	Major Occupation	Income from Non-agriculture Sector (Rs)
1							
2							
3							
4							
5							
6							
7							
8							

Indicators :

Gender: Male-1female-2

Education: Educated -1 Uneducated-2

Education status : Non formal-1 Preprimary -2 Primary-3 Lower secondary 4 secondary- 5 Higher secondary-6 Bachelors and above -7

Major Occupation: Agriculture-1 Job-2 Business-3 Labour-4 Skilled work-5 Foreign employment-6 Household work-7 Student-8 Unemployed-9

Section 3 : Economic Status of the Household

3.1 Do you have your own agricultural land?

a. Yes b. No

3.2 If yes, Please state the area of land.

Type of Land	Own Land	Leased taken from others owners	Leased given to others	Remarks
	Ha	Ha	Ha	
Year round irrigation				
Seasonal				
Unirrigated				

3.3 Please specify the crop/ area and production status of your land

Name of crop	Rainy season		Winter season		Other season	
	Area (Ha)	Production (Mt)	Area (Ha)	Production (Mt)	Area (Ha)	Production (Mt)
Rice						
Other cereals						
bnxg						
Oilsees						
Vegetables						
Fruits						
Others						

3.4 Please specify the major source of income and average income for your household.

Source of Income	Average income (Nrs)	Remarks
Agriculture		
Non-Agriculture		

Section 4 : Information related to Vegetable Production

4.1 Please specify the major vegetable you have produced.

a. Winter season

b. Rainy season

c. Off season

4.2 Please specify the major production inputs and their cost for vegetables (Based on last year)

Area========== Varieties==========

Irrigated/Unirrigated==========

SN	Particulars	Unit	Total Volume	Rate	Cost (Nrs)	Remarks
a	Agriculture inputs					
1	Seed/seedlings					
2	FYM/ compost manure					
3	Chemical Fertilizer					
	Urea					
	DAP					
	Potash					
4	Pesticides					
5	Others					
b	Ploughing/tractors					
c	Labour man days (1 day= 8 hours)					
	Nurcery preparation					
	Land preparaion					
	Seedlings transplantaions					
	Weeding/pesticides application					
	Irrigation					
	Fertilizer application					
	Harvesting					
	Others					
	Total man days					
d	Labor by self					
e	Net labor					
	Grand total					

4.3 Please specify the major varieties area and production of major vegetable you have produced in your land.

Particulars	Name of vegetables	Varieties	Area (Ha)	Production (Mt)	Total Production (Mt)
Winter season					
Rainy season					
Off season					

4.4 Where do you find the different varieties of vegetable seed?

a. Own source

b. Purchase from agro vets

c. From Government farms/ offices

d. NGOs

e. Others (Please specify)

4.5 Do you have taken training related vegetable production technologies?

a. Yes

b. No

4.6 If yes, then who gave such trainings?

a. Government offices/farms

b. NGOs

c. Cooperatives

d. Others (Please specify)

4.7 Please specify the major utensils/tools used for vegetable production and source of utensils

SN	Particulars	Way of getting utensils	Costs	Remarks
1				
2				
3				
4				
5				

4.8 In your view, Can you increase the present production of vegetables in the future ?

a. Yes

b. No

4.9 If yes, how much percentages can be increased? Please specify in percentage .

0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100

4.10 In your view, for the increase in vegetable production what should be taken in mind ? Please specify in priority wise.

1	Technology and information	
2	Irrigation	

3	Production Inputs	
4	Others	

4.11 Market related information

SN	Particulars	Average	Maximum	Minimum	Remarks
1	Self use				
2	Marketed volume				
3	Sell price				
4	Nearby market				

Section 5 : Rice related Information

5.1 Please specify the major production inputs and their cost for vegetables (Based on last year)

Area========== Varieties==========

Irrigated/Unirrigated==========

SN	Particulars	Unit	Total Volume	Rate	Cost (Nrs)	Remarks
a	Agriculture inputs					
1	Seed/seedlings					
2	FYM/ compost manure					
3	Chemical Fertilizer					
4	Pesticides					
5	0thers					
b	Land preparation					
c	Irrigation					
d	Harvesting and post-harvest operations					
	Total cost					
	Production side					
d	Raw rice					
e	Rice by-products					
	Total income					
	Net Income					

5.2 Please specify the major varies of rice you have produced.

a.

b.

c.

d.

5.3 Where do you find the different varieties of rice seed?

a. Own source

b. Purchase from agro vets

c. From Government farms/ offices

d. NGOs

e. Others (Please specify)

5.4 Do you have taken training related rice production technologies?

a. Yes

b. No

5.5 If yes, then who gave such trainings?

a. Government offices/farms

b. NGOs

c. Cooperatives

d. Others (Please specify)

5.6 Please specify the major utensils/tools used for rice production and source of utensils

SN	Particulars	Way of getting utensils	Costs	Remarks
1	Domestic utensils			
2	Tractors			

3	Threshers			
4	Harvesters			
5	Power tillers			

5.7 Information regarding the rice production a/c to rice varieties

Season	varieties	Area	Unit	Production			Irrigation status		Remarks
				Average	Maximum	Minimum	Irrigated	Un -irrigated	

5.8 In your view, Can you increase the present production of rice in the future ?

a. Yes

b. No

5.9 If yes, how much percentages can be increased? Please specify in percentage

0-10	10-20	20-30	30-40	40-50	50-60	60-70	70-80	80-90	90-100

5.10 In your view, for the increase in rice production what should be taken in mind? Please specify in priority wise.

1	Technology and information	
2	Irrigation	
3	Production Inputs	
3	Others	

5.11 Market related information

SN	Particulars	Average	Maximum	Minimum	Remarks
1	Self-use				
2	Marketed volume				
3	Sell price				
4	Nearby market				

5. What the major problem of agriculture production in Nepal?

a.

b.

c.

d.

e.

f.

Thank you