ROLE OF ANNAPURNA CONSERVATION AREA PROJECT (ACAP) IN RURAL HOUSEHOLD ECONOMY OF MACHHAPUCHCHHRE VDC, KASKI

A Thesis

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in Partial Fulfillment of the Requirements for the Degree of

MASTER OF ARTS

in

ECONOMICS

Submitted by

DIL PUN

Department of Economics

Prithvi Narayan Campus, Pokhara

Tribhuvan University

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Department of Economics

LETTER OF RECOMMENDATION

This thesis entitled "***Role of ACAP in Rural Household Economy of Machhapuchhre VDC, Kaski"*** has been prepared by Dil Pun under my supervision in partial fulfillment of the requirements for the Degree of Master of Arts in Economics. I forward it with recommendation for approval.

…….

Laxmi Kanta Sharma

Lecturer

Thesis Supervisor

Date: Aug 12, 2013

Department of Economics

APPROVAL LETTER

We certify that the thesis entitled *"**Role of ACAP in Rural Household Economy of Machhapuchhre VDC, Kaski**"* submitted by Dil Pun to Department of Economics, Prithvi Narayan Campus, Pokhara, Faculty of Humanities and Social Sciences, Tribhuvan University, in partial fulfillment of the requirements for the degree of ***MASTER OF ARTS*** in ***ECONOMICS*** has been found satisfactory in scope and quality. Therefore, we accept this thesis as a part of the said Degree.

Thesis Evaluation Committee

Head of Department

Prof. Dr. Yadav Sharma Gaudel

Head, Department of Economics

External Examiner

Prof. Dr. Krishna K.C.

Head, Department of Geography

Thesis Supervisor

Laxmi Kanta Sharma

Lecturer, Department of Economics

Date: Aug 29, 2013

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Dil Pun

Campus Roll No.: 12/064

Date: Aug 10, 2013 T.U. Regd. No.: 6595-94

Abstract

This study entitled "Role of ACAP in rural household economy of Machhapuchchhre V.D.C.", Kaski is focused on the objectives to examine the role of ACAP, its socio-economic impacts and to find out the level of production, employment, inequality and income in Machhapuchre VDC. Both analytical and statistical research methods have been used for accomplishing the objectives of this study. This research is based on the data for a period of 10 years. Percentage, Mean, Variance, Gini-Coefficient, χ^2 – test and F-test were used to examine the role of ACAP in Machhapuchre VDC.

The study shows that number of households and people involved in agricultural development with modern technology has been significantly increased and the production of cereal crops, vegetables and animal husbandry could raise the living standard of people of the study area. The average income of the household was found 277.05 thousands Rupees and Gini's coefficient value was 0.3969 showing decreasing rate of inequality. The F- statistics test confirmed that the programes of ACAP were successful in increasing the income, employment, environmental awareness and improving the living standard of people in the project implemented area.

Overall, the residents of the project area were supportive of ACAP's programme and the household economy was significantly strengthened due to the project. Also the study confirmed that the natural and socio-economic awareness impact was reflected in the general life of the people. Further studies are recommended in the area specially for the impact analysis of socio-cultural factors like values and institution and technology.

***Keywords**: Socio-economic impact, employment, income, production, inequality.*

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ABBREVIATION

ACA	:	Annapurna Conservation Area
ACAP	:	Annapurna Conservation Area Project
ADP	:	Agriculture Development Program
AED	:	Alternative Energy Development
ALD	:	Agriculture and Livestock Development
BPN	:	Biodiversity Profiles of Nepal
CAMC	:	Conservation and Management Committee
CBS	:	Central Bureau of Statistics
CC	:	Climate Change
CEEP	:	Conservation Education and Extension Program
CHC	:	Cultural Heritage Conservation
CID	:	Community Infrastructure Development
GDP		Gender Development Program
GEE	:	Gender Equity and Empowerment
HDR	:	Human Development Report
HDI	:	Human Development Index
HH	:	House Hold
IGA	:	Income Generation of Agriculture
INGO	:	International Non Government Organization
MOP	:	Management Operational Plan
NTNC	:	National Trust for Nature Conservation
NRCP	:	Natural Resources Conservation Program
NGO	:	Non-Government Organization
NLSS	:	Nepal Living Standard Survey
NPC	:	Nepal Population Census

PC	:	Per Capita
SCDP	:	Sustainable Community Development Program
STMP	:	Sustainable Tourism Management Program
SLC	:	School Leaving Certificate
UCO	:	Unit Conservation Office
VDC	:	Village Development Committee
WB	:	World Bank

CHAPTER –I

INTRODUCTION

1.1 Background

The Annapurna Conservation Area Project (ACAP) is Nepal's largest protected area covering 7,629 sq km in the Annapurna range of the Himalayas across the Manang, Mustang, Kaski, Myagdi, and Lamjung districts undertaking of National Trust for Nature Conservation (NTNC) and also the first Conservation Area and located in North-Central Nepal. Project was launched in 1986. A pilot programme that initially focused in Ghandruk Village Development Committee (VDC) proved successful and was subsequently broadened to incorporate other VDCs. After being gazetted as a Conservation Area in 1992, ACAP is divided into seven Unit Conservation Offices (UCOs): Jomsom, Manang, Bhujung, Sikles, Ghandruk, Lomanthang, and Lwang with 57 VDCs. It is home to over 100,000 residents of different cultural and linguistic groups. ACAP is rich in biodiversity and is a treasure house for 1,226 species of flowering plants, 102 mammals, 474 birds, 39 reptiles and 22 amphibians.

Additionally, ACA is the first protected area that has allowed local resident to live within the boundaries as well as own their private property and maintain their traditional rights and access to the use of natural resources. It is also the first protected area, which has refrained from using army assistance to protect the dwindling natural resource base on which the region depends. Instead, it invests whatever financial resources available for community development and social capital building in the region. NTNC receives no regular funding support from the government for the operation of ACAP, but has been granted the right to collect entry fees from visiting trekkers. The revenue is ploughed back to implement conservation and development activities in ACA. Additional funds are raised from national and international donors. This is an exemplary achievement of a Non-Government Institution ability to manage a significant portion of the protected area system in Nepal.

The principles of the project are people’s participation, catalytic role and sustainability. Therefore, Annapurna Conservation Area (ACA) is managed by the local people themselves with minimal intervention from the Government and/or other

institutions. The legal framework for ACA is provided by the Conservation Area Management Regulations (CAMR), 2053 B.S., which is approved by Nepal Government. The Conservation Area Management Committee (CAMC), which is formed under the CAMR in each village development committee, is entrusted with the responsibility to manage, utilize, and protect all the natural resources within its own respective VDC.

The seven Unit Conservation Offices (UCOs): Jomsom, Manang, Bhujung, Sikles, Ghandruk, Lomanthang, and Lwang with 57 VDCs for better and efficient administration and program implementation. The focus of Jomsom, Manang and Ghandruk, which are among the most popular trekking destinations, is on integrated tourism management and other development activities that benefit the local communities and the environment. The Program priorities for Bhujung, Sikles and Lwang are poverty alleviation and integrated agriculture development and agro-forestry. Similarly, while the focus in upper Mustang, which came under the jurisdiction of ACA in 1992, has been on managing controlled tourism on a sustainable basis, and promoting heritage conservation, which is the major tourist attraction.

The project's main long-term goal is to conserve the biodiversity of the area and at the same time the sustainable development activities has been under taking to uplift the socio-economic condition of local people. To meet this goal, various programs and activities as Natural Resources Conservation Program (NRCP), Conservation Education and Extension Program (CEEP), Sustainable Tourism Management Program (STMP), Agriculture Development Program (ADP), Sustainable Community Development Program (SCDP), Alternative Energy Development Program (AEDP) and Gender Development Program (GDP) are under execution. ACAP is flexible innovative plan and that has been implementing multi faces program according to area-based needs and requirement of the local people. That is seemed the main program of ACAP.

Some activities of ACAP are as Conservation of Resources (with programs like forest management and wildlife management activities, soil and water conservation, training for local nursery workers, forest guards and leaders, promotion of alternative energy and fuel-efficient technologies, restoration of sites of historical, culture and

archaeological importance, research and survey on subjects like biodiversity and wildlife census and formation of local institutions like conservation area management committees and sub-conservation area management committees).

Community Development (with programs like improvement, maintenance and construction of schools, trails and bridges, general health and sanitation facilities with health and family planning clinics, adult literacy, extension of agro-forestry and agriculture through training, demonstrations and seeds distribution and other programs targeted to women, youth and socially and economically deprived people for their income generation)

Tourism Management (with programs like formation of local lodge management committees with hotel and lodge management training for lodge operators, brochure and publicity materials, information posts, visitor centers, helicopter evacuation for visitors for search and rescue during emergency, training for trekking guides and eco-camp site development)

Conservation, Education and Extension (with programs like conservation education classes in schools with conservation awareness camps, indoor and outdoor conservation education centers, education materials development, village clean-up campaigns, programs on mobile audio-visual extension, natural history museum and visitor information services, environmental resource library, study tours and training for villagers).

ACAP has been working as their many objectives and mission statement to role in the entire region of ACA and to promote, conserve and manage nature in all its diversity balancing human needs with the environment on a sustainable basis for posterity ensuring maximum community participation with due recognizance of the linkages between economics, environment and ethics through a process in which people are both the principal actors and beneficiaries.

Additionally, it is known as the natural and cultural features of ACA have made it the most popular trekking destination in the country, drawing more than 60 percent of the country's total trekkers. Tourism over the year has been firmly established as one of the most important and competitive sectors of the local economy.

The Study area lies in northern-central part of this district within the project area of the Annapurna Conservation Area Project (ACAP). ACAP is working in study area from the established time of project. Due to manage ACA more effectively, it has been divided unit conservation offices. The unit conservation office Lwang lies on the southern flank of the Annapurna range. The Program priorities for Lwang are poverty alleviation and integrated agriculture development and agro-forestry. Within this UCO Lwang lies Seven Village Development Committees (VDCs) i.e. Dhampus, Lwang/Ghalel, Ghachok, Lahachok, Rivan, Sardikhola and Machhapuchhre in Kaski district.

Since Machhapuchhre VDC lies in UCO Lwang. ACAP has been managing various programs in study area as per the goal of project. ACAP's major focus is to manage natural resources, equally crosscut program like Natural Resources Conservation Program, Gender Development Program, Community Development Program, Alternative Energy Program, Conservation Education and Extension Program, Agriculture and Livestock Development Program and Tourism Development Program are implements through CAMCs with financial and technical assistance of the UCO. Since project's long-term goal is to conserve the biodiversity of the area and at the same time the sustainable development activities have been under taken to uplift the socio-economic condition of local people. To meet this goal, ACAP is more flexible with innovative plan and that has been implementing multi faceted programs according to area-based needs and requirement of the local people.

The focus of the present study attempts to find and evaluate the role of ACAP in rural household economy of Machhapuchhre VDC of Kaski District for sustainable development and to find socio-economic impact of Machhapuchhre VDC in income, employment and agro-production. There are 441 total households and the total population of this VDC is 2256. 244 households are taken as the samples from the specific area. Out of them, 244 households have been chosen as for sample. Around fifty five percent of household from each ward of the VDC have been selected at random to collect the primary data. This study is based on primary cross sectional data from study area Machhapuchhre VDC for a period of 2001/02-2010/11.

1.2 Statement of the Problem

Nepal is a developing country. In Nepal 81 percent population live in rural area (NLSS, 2066/2067). Nepalese people still depend largely on agriculture and forests as 85 and 70 percent respectively. The majority population is rural based. Unemployment, seasonal employment and low-income source are the major problems of Nepal. Therefore, Nepalese people have been struggling for its development but it has not been able to raise the living standards of people. Large numbers of people are living in rural areas and their major source of income and employment is agriculture. Because of traditional technology, small and fragmented land holdings, unavailability of fertilizers to the required level, lack of irrigation facilities, lack of good marketing etc. The productivity in agriculture sector is very low. Low-income production in agriculture and unemployment problem is increasing day by day. Various socio-economic problems like lack of infrastructure, political instability, strike, lack of industrial machinery equipment, lack of raw materials, power shortage etc. are appearing as hindrances for industrialization in Nepal. In such scenarios, millions of active people are going in foreign country for employment and income. Nepalese economy has been surviving from remittance. Such kind of problems became a serious matter for all kind of sectors as conserving and developing natural, social, and cultural etc.

Due to the low-income sources and unemployment are the major problems of our country and rural area because they cause poverty. Because of low income people are not able to have access to their basic needs therefore they suffer from inadequate food, poor clothing, weak health, low purchasing power, low life expectancy and landlessness. They have no income to fulfill minimum necessities of life. They live below the poverty line. So, income and employment generation are major aspects for coming out of the vicious circle of poverty.

Remittance may not be a sustainable source for income and employment for further development and only traditional agricultural occupation cannot contribute much. So, to reduce the traditional agricultural dependence and for sustainable development other sources of income and employment must be created there needs to a balance between natural biodiversity and sustainable development and other different factors to uplift Nepali economy.

In this context, the concept of sustainable development of various NGOs and INGO could play an important role for production, employment and income in rural area as a study area of Nepal. To reduce unbalanced condition between of Nepalese biodiversity and economy conditions through production employment and income generation and poverty alleviation. There needs sustainable development. NGO's and INGO can be a weapon to fight against poverty through generating employment and increasing income in Nepalese economic context. In Nepal, so many NGO's and INGO have been working for Nepalese peoples to uplift their life in society. Among them, The Annapurna Conservation Area Project (ACAP) is also the largest NGO as an autonomous and not-for-profit organization, mandated to work in the field of nature conservation, cultural heritage protection, and sustainable development in covered area of Nepal.

The present study is focused to answer the following questions that, what kinds of role have been play by the ACAP project for income, employment generation and agro-production annually such as sustainable development for rural household economy in study area? It has been tried to explain how people increase their income, generate employment and agro-production as a level of financial supported by ACAP. It focuses the need of ACAP for increasing opportunities.

It mainly focuses on the following questions:

1. What are the changes in socio-economic status of the people in the study area brought by the ACAP?
2. How is it playing the role to increase income and employment generation?
3. Whether it increases agro-production or not?

1.3 Objectives of the Study

The general objective of the study is to analyze the role of ACAP in rural household economy of Machhapuchhre VDC, Kaski.

The specific objectives are:

1. To study and analyze change in income and employment level of household in Machhapuchhre VDC.
2. To assess the economic productivity of the people due to the conservation education of ACAP.

3. To measure natural and socio-economic impact of ACAP.

1.4 Hypothesis of the Study

This study tries to find out the role of ACAP in rural household economy for sustainable community development.

1. Null Hypothesis (H_o): There is no significant role of ACAP in rural household economy for income and employment generation.
2. Alternative Hypothesis (H_1): There is significant role of ACAP in rural household economy for income and employment generation.

1.5 Significance of the study

This study attempts to identify the role of ACAP in income and employment generation in rural household. Since ACAP has been working in Machhapuchhre VDC from 1992, and financial supporting in this study area. According to report of 2009/10 and 2011/12 fiscal years of UCO Lwang, 4,90,978 and 10,75,500 rupees respectively get financial supported by ACAP in average around 7,83,239 rupees per years. This amount is spent for all purpose of project's goal such as for natural conservation financial, conservation education, social development program, infrastructure development, tourism management programs, gender development program and agriculture development program etc. ACAP works solitarily and cooperatively to with any development programs in local area too. ACAP has been managing various programs in study area as per the goal of Project.

Unemployment, seasonal employment and low income are major problems of Nepali economy. According to NLLS-III, nearly 30 million people are working in foreign countries, 56 percent household economy depending on remittance. It can be stated that Nepali economy is surviving because of remittance. Nepali active peoples' knowledge, skill and sweat are not being used for the development of our country. In this context, ACAP can be best models of income, employment production generator providing opportunities directly and indirectly giving employment to many people in rural area under the ACAP area. It also facilitates self-employment of different kinds of business and enterprises from agricultural business.

This study attempts to find out the role of ACAP in the generation of direct income, employment and agro-production in Machhapuchhre VDC, so it is useful to get knowledge about ACAP roles in income and employment generation. This study also tries to find out what the major problem and solution for overcoming the problems are. This study also is useful for making plans policies education about ACAP and from this research people will be able to understand ACAP as one of the most important models and vital roles in rural households economy.

Thus in this condition, there is an urgent need to improve rural household economy and livelihood for a sustainable development. Which plays positive and important role in Nepalese economy. By knowing this significance it has been made an attempt to study in this area at macro level as income, employment and agro-production, which will be helpful for the economic development for rural area of our Nation. Though, this study is done in a particular area of kaski district in ACAP area. The finding of this study may be helpful guideline to planer, policy makers and rural people for some other areas as well.

1.6 Limitations of the study

Basically this study has following limitations.

1. This study concerns only with the role of ACAP in rural households economy of Machhapuchhre VDC in Kaski district.
2. Other factors that can contribute to income generation and employment generation are neglected.
3. The reliability of secondary data is not tested.
4. This study tries to find out problems and solutions of household economy of Machhapuchhre VDC. The result may or may not be applicable to ACAP in general.
5. The indirect impact of ACAP and other factors are neglected.

1.7 Organization of the study

The present study has been organized in five chapters as Introduction, Literature review, Research methodology, Data analysis and presentation and Summary Conclusion with recommendation.

Chapter-first contains the background of the study, statement of the problem, objective of the study, hypothesis of the study, Significance of the study, limitation of the study and organization of the study.

Chapter-second presents review of literature where some related books, researches, articles, journals, profiles, annual reports, cbs reports etc. has been reviewed.

Chapter-third gives details about the research methodology used in this research to find the result work.

Chapter-fourth explains about physical, social and economic background of the study area, analysis of the collected data through table chart and statistical tools, findings of the study.

Finally Chapter-five includes the summary, conclusion and recommendations of the study.

CHAPTER –II

LITERATURE REVIEW

Introduction

The present chapter explains the existing literature and research related to the present study for the purpose of finding out what had already been studied and how the present research becomes a plus to this magnitude. The relevant literature and articles from national and international publications as well as unpublished reports, thesis and journals etc. related to ACAP and its role of income, employment and production have been reviewed.

2.1 Review of the Related Studies

Various studies have been carried out regarding the evaluation of role of ACAP in this sector. All studies are related with only one specific tourism sectors, climate sectors, natural sectors etc. But no one has studied about "The role of ACAP in rural household economy" in this area. The present study concerns the role of ACAP in rural household economy for sustainable development as income, employment and agro-production creation activities through ACAP program.

Paudel (2002) in his master's degree dissertation on the topic of "Role of Annapurna Conservation Area Project on Sustainable Tourism Management in Sikles Village of Kaski District" studied that the ACAP believes that tourism, if properly managed, can bring great benefits to the land and the people of the Annapurn region. Rather than a necessary evil, tourists are regarded as partners in fulfilling the goals of biodiversity conservation, cultural revitalization and sustainable economic development. The ACAP seeks not only to generate financial support for conservation and grass-roots development, but also to integrate the local residents and their economy into the mainstream of national tourism planning, giving them a meaningful role. This will hopefully avoid patronizing them by giving money so that they can remain where they are. Financial patronization is not a long-term solution.

His recommendations were as

a. Nature is not only the attraction of tourists. The local culture may also attract tourists. The culture, which the people of this village follow, should be promoted. The mother's group organizes the cultural program only after asking with tourists if they want. It should be compulsorily organized so that the tourists know about the local culture.

b. Most of the tourists travel in-group, and they used to bring the food either from Pokhara or Kathmandu. The local product cannot meet the basic needs of the tourists. So, the local people should be encouraged to produce the food materials, which tourists need.

c. Most of the tourists are interested to stay in Campsite; the local people should be encouraged to manage the hotel. Hotels and Lodge should be given the priority than Campsite because many people get employed in the Hotels and Lodge than in Campsite.

Gauchan (2007) in her project paper of topic "Economic and Environmental Impacts of Tourism in Annapurna Conservation Area" She concluded that Lete V.D.C is the entry point to major attractions of Mustang district. Majority of the domestic and Indian tourist visit the site for religious purpose while American and European visit for trekking. Tourism has played remarkable role to increase the villager's income status. Among others, hoteliers are highly benefited. People's attitude towards tourist activities is positive in almost all predetermined statements.

She has made the following recommendations

a. Income from tourism business is inflationary with season and tourist expenditure, so for sustainable tourism, domestic tourism ought to be promoted by exploring new attractions and side trips.

b. With the adoption of new technologies, the traditional uses of the resources have been deteriorated, thus leading in the degradation of the local culture. So without deteriorating the old knowledge and technologies, new technologies

should be locally tested first and fitted later to suit the local environment. Appropriate technology could be used instead.

Sharma (2011) has analyzed his research project paper on the topic "Impacts of Tourism on Local Community Development in Annapurna Conservation Area" he focused that Tourism has created demands for local products such as fresh vegetables, fruit juice, brandy spirit and created jobs for hundreds of people as guides and porters. Although tourism economy in Mustang appears small, it generates opportunities for trade, enterprises and linkage with other sectors. The major form of generation of local cash income from tourism to HH was from selling goods and services followed by wages from formal employment. To promote the local level economic benefits from tourism there is the need to develop better infrastructures followed by the awareness of the special products i.e. the traditional products of the region and better provision of lodging and fooding as responded by both the hoteliers and the non-hoteliers.

And She has recommended the following points:

a. Tourism has played remarkable role to increase the villager's income status. Among others, hoteliers are highly benefited. A large part of income earned from tourism in the mountain area leaks out while providing goods and services to the tourists.

b. Income from tourism business is inflationary with season, so for sustainable tourism, domestic tourism ought to be promoted by exploring new attractions. The alternative trekking routes need to be established away from established road.

c. The equitable benefit sharing mechanism of the revenue from the tourism should be developed considering the sustainable generation of the resources. Long and short-term tourism development plans should be developed so that tourism and its benefits are spread for the development of collective benefits for the wider community with pro-poor focus.

d. Periodic research and monitoring of the changes in the society, economy and the environment due to tourism should be done to ensure the sustainability of

the tourism and to know its expected role for the local community development.

Pandit (2009) has prepared the report "Understanding Impacts of Climate Change on Low Income Households in Southern ACAP" She studied that the major climate change impacts in this area are declining surface as well groundwater resources and water scarcity for irrigation in the dry season. The adverse effects of climate stimuli including variability and extreme events have put additional stress on overall development. It is also noticed that climate change is likely to have serious consequences in agriculture. Higher temperatures, increased and decreased winter precipitation may bring about more droughts, which have direct impact on agricultural practices.

And She has made following recommendations:

a. Diversification of less water consuming crops should be done through district level agricultural bodies.

b. Disaster preparedness knowledge for the households imparted and improved management of agricultural practices should be promoted.

Kraijo (1999) in his thesis on the topic of "AGRICULTURE or FORESTRY?" he concluded the following points:

a. Villagers with abundance of land will more easily convert agricultural land than villagers with less land.

b. Villagers with off-farm income sources are more eager to give up agricultural land than villagers who don't have this source of income.

c. The biophysical environment of places where villagers plant trees instead of traditional crops will be suitable for tree production.

d. The decision to give up agricultural production in favor of trees will be economically feasible.

UCO (2060/061), a annual report shows in "An Annual Progress Report" of Unit Conservation Office Lwang of ACAP was concluded the report that the

implementation of the project activities looks impressive as comparing the previous year. The expertise and experience of KMTNC/ACAP is reflected to conserve the biodiversity of Annapurna region. The successful participatory conservation model has been exploring and popular ting within the country as well as internationally. As a result every year many visitors come to see and interact with local people. In the ACA, it is tried to maintain delicate balance between economic development and sustainable use of resources. For the sustainable management of resources, it is initiated to strengthen of local practice and local knowledge. It means that empowerment of local institution like CAMC and other local institution was the focused area of the year.

2.2 Research Gap

From the review of existing literature, it seems that many writers, researchers and economists have studied about ACAP. Their studies have been focused especially about environmental, financial and economic development of ACAP. Many studies are related only for tourisms sectors, natural resources sectors and climate change sectors and their impact in economy. But no research works have been carried out regarding the role of ACAP in rural household economy area as a agro-forestry sector where tourist come rarely only and where the almost all of peoples depend on agriculture sector. So this research will be new research to help find out the exact economic impact of income and employment generation by the role of ACAP. Since Machhapuchhre VDC also contain agro-forestry area sector of Unit Conservation Office (UCO) of Lwang, So this research will give the impacts as a sample of this area sector. On other view, none of the research worked out such kind of research report about the Machhapuchchhre VDC as a role of ACAP in rural households economy. So it will help for further researcher or writers about Machhapuchhre VDC. So it will be first research about it. And this research will be a good contribution in economic management of rural households economy for VDC committees, projects, NGO's and anyone.

Therefore the primary data collection from each households for income, employment in this Machhapuchhre VDC is new research in concern of role of ACAP in rural households economy. The measurement of income and employment generation by

their involvement in money earning works as agriculture and livestock and other works has been carried out.

This research work is especially related with roles of ACAP in employment generation and to increase income from Agriculture and livestock production in Agro-forest area. Because of employment, income and production are major aspects of economic development and empowerment. This study has tried to search the problems and solutions of ACAP in present context.

Therefore, this study will add some values on the knowledge creation of economic impact measurement of household economy and fulfill the existing research gap.

CHAPTER-III

RESEARCH METHODOLOGY

This chapter presents a brief description of research methodology carried out during the research process to fulfill the research objectives at various stages of research. The present study attempts to examine the "Role of ACAP in rural household economy of Machhapuchchhre VDC". This chapter explains about Research Design, Population and Sample Size, Sources of Data, Procedure of Data Collection, Data Processing Procedure, Method and Tools for Data Analysis and Description of Variables.

3.1 Research Design

The study attempts to analyze the role of ACAP in rural household economy as income, employment and production generation and also tries to find out the problems and solutions for overcoming the problems of rural household of Machhapuchhre VDC. In the study area, the number of total population is 2256 and total household is 441 in this VDC. The research is covered 10 years time period i.e. 2001/02 to 2010/11 fiscal years. This study is based on the selected household's information at micro level study of household economy of Machhapuchhre VDC. The sample size decision table of Krejcie and Morgan (1970) technique has been used to collect the primary data information. The information is depending upon the selected questionnaire for the household head. Secondary data have been collected through different sources like VDC profile, District profile, annual report, books, record and other published data from ACAP/NTNC offices, CBS reports, Nepal living Standard Survey, concern websites etc. Then the collected data have been interpreted in suitable table and diagram. Similarly, data have been analyzed by using mathematical and statistical tools like percentage, average, variance, Gini- coefficient, chi-square tests and F-test etc.

3.2 Population and Sample Size

This study area is a rural area of Kaski district. The number of total population and total households of this VDC is the Population of the study. There are 441 total households and the total population of this VDC is 2256. The sample size decision

table of Krejcie and Morgan (1970), 244 households are taken as the sample from the specific area. Out of them, 244 households have been chosen as per year income level and their views for the sample study. To find out, how many households can have able to achieve economic benefit and other social and environmental impact by the ACAP programs. This study is based on the selected household's information at micro level study of household economy of Machhapuchhre VDC. The information is gathered depending upon the selected questionnaire for the household head. Necessary data is collected through an intensive field survey during November/December 2011.

Table 3.1: Ward wise Population and Sample Size in Machhapuchchhre VDC

Ward No.	Total Household	Sample	Percent (%)
1	89	40	44.94
2	34	20	58.82
3	50	25	50.00
4	51	35	68.63
5	37	20	54.05
6	42	25	59.52
7	48	30	62.50
8	47	24	51.06
9	43	25	58.14
Total	441	244	55.33

(Source: - VDC Profile 2010 and Field Survey 2011)

Table shows the sample units of household for the research purpose. Different types of household are chosen for research work. The 44.94% households from Ward No.1, 58.82% households from Ward No. 2, 50.00% households from Ward No.3, 68.63% households from Ward No. 4, 54.05% households from Ward No. 5, 59.52% households from Ward No. 6, 62.50% households from Ward No. 7, 51.06% households from Ward No. 8, and 58.14% households from Ward No.9. The total samples are selected 55.33 % households from the whole VDC.

3.3 Sources of Data

In this study, both primary and secondary data have been used. Primary data were collected through the objective oriented questionnaire and intensive field survey in different kinds of households in Machhapuchhre VDC. Secondary data have been collected through different sources like VDC profile, District profile, annual report and other published data from UCO Lwang/ACAP, various other researcher's data, Nepal living standard Survey, CBS and available report, books, records, profile and other associated reports etc.

3.4 Procedure of Data Collection

A list of households of the study area was taken from the VDC office for sampling and 244 households which 55.33 percent of the total households were selected by sampling. To collect the desired information for fulfilling the objectives of study and intensive observation was conducted in the study area. Investigator collected desired information by taking personal interview with household head or with some other member of the family. Information had been filled up in the pre-structured questionnaire (Annex-6).

3.5 Data Processing Procedures

The collected data and information from various sources have been properly synthesized, arranged, tabulated and calculated to serve the objective of the study by using computer program like MS word, excel etc. Data and information are processed in such a manner that makes clear picture about the role of ACAP in rural household economy.

3.6 Methods and Tools for Data Analysis

The data have been categorized and tabulated according to objectives of the study. Then, it has been interpreted in suitable table and diagram. Similarly, data have been analyzed by using mathematical and statistical tools like percentage, average, variance etc. Data and information have been forwarded for further interpretations. For the statistical analysis of the collected data and information, income inequality, chi-square tests, F-test (one way ANOVA short-cut method) techniques are used for analysis.

3.6.1 Variance

Variance is used to show inequality in income distribution, which is calculated by using the following formula.

$$\text{Variance V} = \sigma^2 = \sum_{i=1}^{n} \left(\frac{\overline{X} - x_i}{N} \right)$$

Where,

σ^2 = Variance

x_i = Income of the household

$\overline{X}$ = Mean income

N = Number of observation

This is exactly equal to the square of standard deviation. It is useful tool to estimate variation. However, it is influenced by mean level of income.

3.6.2 Gini-Coefficient

It measures the inequality in income distribution. It can be calculated by using the following formula in case of Grouped data.

$$G_c = \frac{1}{100^2} \left[\sum X_i Y_{i+1} - \sum X_{i+1} Y_i \right]$$

Where,

G_c = Gini-Coefficient (0<G<1)

X_i = Cumulative of variable on X

Y_i = Cumulative of variable on Y

If the value of G approaches to one, there is extent of inequality and vice-versa. A very ideal distribution may have zero value of G, symbolizing perfect equality in the distribution.

3.6.3 Lorenz Curve

The Lorenz curve is the graphical method to measure the extent to inequality in the distribution of income. It shows the difference between equal distribution and actual distribution of income in the study area. As the area between equal and actual distribution lines increases the inequality in the distribution of income also increases and vice-versa.

3.6.4 Chai – Square Test

χ^2 – test is of great application in such a situation where does not need any assumption regarding the population parameter. It also called distribution of free test. It explains the magnitude of discrepancy between expected frequency and observed frequency. So, it is often used to know the difference in theory and observation. χ^2 is a no-negative quantity. Hence, if value ranges from zero to infinity if it is zero the discrepancy between observed and expected frequency completely vanishes. And if the chai-square values increases, the discrepancy between the expected the observed and estimated frequency goes up. So, the chai-square test is preformed to know whether the difference between observed and estimated frequency is significant of that is only due to sampling fluctuations.

$$\chi^2 = \sum \frac{(O-E)^2}{E}$$

Where,

O = Annual observed frequency

E = Annual expected frequency

Decision Making

i. If the calculated the value of χ^2 less than the tabulated value at a given level of significance and degree of freedom, we consider the fit as good.

ii. If the calculated the value of χ^2 greater than the tabulated value at a given level of significance and degree of freedom, we consider the fit is to be poor.

3.6.5 F – Test

Here, One way ANOVA short-cut method has been used. When the response variable is affected by more than one factors ANOVA technique is applied. One Way Analysis of Variance was used to test the significance in different income group at 5% level of significance. The decision on significant or insignificance was done on the basis of calculated value at 5% level of significance. When the calculated value is less than tabulated value, this means there is no significance difference. When the calculated value is greater than tabulated value, this means there is significance difference.

3.7 Description of Variables

3.7.1 Households

Household is defined as an economic unit mostly private and non-institutional in which two or more members are living together, expenditure are put together and decision making is concentrated at one point. The household is taken as an ultimate unit in sampling procedure of the study.

3.7.2 Total Household Income and Employment

The income, which is earned by family members from different sources are defined as total household income. In this study, total household income is the sum of total net income from agricultural production, livestock, labour, business and cottage, pension, service, remittances etc.

The employment, person engages in various activities to earn income. This study area, the people, who works inside or outside of home to earn income is included for employment of family members of the household within a given time period.

CHAPTER-IV

DATA ANALYSIS AND INTERPRETATION

4.1 Physical, Social and Economic Background of the Study Area

This chapter presents the geographical information of Machhapuchchhre VDC of Kaski district in particular. Information about socio-economic as income, employment under the role of ACAP and production impact of study area included as part of the background provided in study.

4.1.1 Geographical Location and Boundary

The Study area, Machhapuchhre is a village and VDC of Kaski District and it lies in northern-central of this district within the project area of the Annapurna Conservation Area Project (ACAP). It is situated 20 kilometer north of Pokhara the district head quarter of Kaski. The total area of Machhapuchhre VDC is 268.40 square kilometer. Its periphery is 83^0. 91′ to 84^0. 08′ east longitude and 28^0.32′ to 28^0. 58′ north latitude. The elevation ranges from 1288 meter to 7555 meter above from the near sea level. The climate of this VDC is subtropical, temperate and alpine (Tundra). (MOP of CAMC, Machhapuchhre 2010) (Annex-5)

4.1.2 Total Area and its Land Sector of VDC

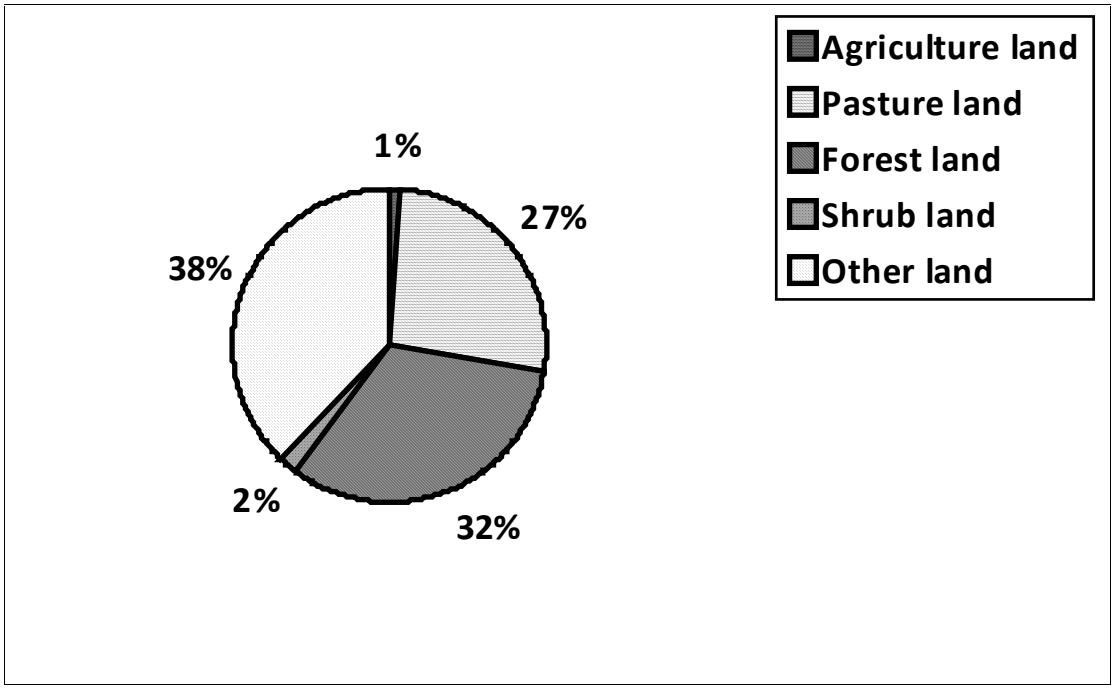
According to natural land use records, the total area of Machhapuchhre VDC is 268.40 square kilometer. These are separated in five sectors as Agriculture land, Pastureland, Shrub land, Forestland and Other land.

Table 4.1: Land use by Type, 2010 of VDC

S.N.	Land Group	Area in sq. km.	% of Area
1.	Agriculture land	3.1 sq. km.	1.16 = 1 %
2.	Pastureland	71.6 sq. km.	26.68 = 27 %
4.	Forestland	86.8 sq. km.	32.34 = 32 %
3.	Shrub land	5.2 sq. km.	1.93 = 2 %
5.	Other land	101.7 sq. km.	37.89 = 38 %
Total		268.40 sq. km	100

(Source: Management Operational Plan of CAMC, Machhapuchhre 2010)

Figure: 4.1 Land use by Type, 2010 of VDC in Percent



Above Table and Figure shows that out of the total area, Agriculture land is 3.1 sq. kilometer it's 1.16 percent, Pasture land is 71.6 sq. kilometer it's 26.68 percent, Forest land is 86.8 sq. kilometer it's 32.34 percent, Shrub land is 5.2 sq. kilometer it's 1.93 percent and Snow covered land is 101.7 sq. kilometer it's 37.89 percent. It shows that the Agriculture area is the smallest than others.

4.2 Population and Sample of the Study Area

The study area, the number of total population and total households of this VDC are the Population of the study. There are 441 total households and the total population of this VDC is 2256. Of which 1143 are males and 1113 are females. Population growth rate of study area is 1.51 percent and population density is 8.27 square kilometer. In Nepal context, population growth rate is 1.4 percent and population density is 181 sq. kilometer (CBS, report, 2068). Around fifty five percent of household from each ward of the VDC has been selected at random to collect the primary data for Sample. Such as 244 households are selected for sample households from all study area. There is 1411 population where 709 male and 702 female. This study based on primary cross sectional data from Machhapuchhre VDC. The population and sample structure of the study is shown in the following tables.

Table 4.2: Ward and Gender wise Households Population in VDC

Ward No.	Households		Population					
			Male		Female		Total	
	No.	Size	No.	%	No.	%	No.	%
1	89	4.5	202	8.95	201	8.91	403	17.86
2	34	6.1	97	4.30	110	4.88	207	9.17
3	50	4.48	117	5.19	107	4.74	224	9.93
4	51	5.5	145	6.43	133	5.89	278	12.32
5	37	4.7	100	4.43	73	3.24	173	7.67
6	42	6.7	136	6.03	146	6.47	282	12.50
7	48	4.2	96	4.26	104	4.61	200	8.87
8	47	5.74	133	5.91	137	6.07	270	11.97
9	43	5.1	117	5.19	102	4.52	219	9.71
Total	441	5.1	1143	50.66	1113	49.34	2256	100

(Source: VDC Profile 2010)

Table 4.3: Ward and Gender wise HH Population in VDC of Sample

Ward No.	Sample Households		Sample					
			Male		Female		Total	
	No.	Size	No.	%	No.	%	No.	%
1	40	6.07	124	8.79	117	8.29	241	17.08
2	20	6.9	70	4.96	68	4.82	138	9.78
3	25	5.2	67	4.75	63	4.46	130	9.21
4	35	6.08	105	7.44	107	7.58	212	5.03
5	20	5.6	60	4.25	52	3.69	112	7.94
6	25	4.88	59	4.18	63	4.47	122	8.65
7	30	5.47	78	5.53	84	5.95	162	11.48
8	24	5.91	63	4.47	79	5.60	142	10.06
9	25	6.08	83	5.88	69	4.89	152	10.77
Total	244	5.8	709	50.25	702	49.75	1411	100

(Source:- Field Survey 2011)

The above table shows that the total number of population in VDC is 2256 and the total number of households is 441. The average size of households is 5.1 and national size is 4.88 (CBS, 2011). There is 50.66 percent male and 49.34 percent female out of the total population in VDC. Then Sample table 4.3 also shows nearly similar data result form with population's data.

4.2.1 Caste and Ethnic Composition Households

Caste and Ethnic composition is related with the caste wise distribution of population, different physical, social and economic elements have affected the distribution of population. Which reveals uneven density of various castes and inhabitants of the study area. The settlement pattern of people is different castes as Bramin, Kshetri, Gurung, Magar, Tamang, Kami, Pariyar and others etc. The caste structure of the study is shown in the following table.

Table 4.4: Caste and Ethnic Composition Households

S. No.	Ethic	Households				Population			
		Population HH		Sample HH		Population		Sample	
		No.	%	No.	%	No.	%	No.	%
1	Bramin	35	7.94	20	8.19	173	7.67	116	8.22
2	Chhetree	7	1.59	4	1.64	42	1.86	26	1.85
3	Gurung	138	31.29	92	37.70	697	30.89	509	36.07
4	Magar	144	32.65	78	31.97	790	35.02	445	31.54
5	Tamang	36	8.16	14	5.74	150	6.65	65	4.61
6	Kami	33	7.48	14	5.74	103	4.57	104	7.37
7	Pariyar	35	7.94	18	7.38	110	4.87	115	8.15
8	Others	13	2.95	4	1.64	191	8.47	31	2.19
Total		441	100	244	100	2256	100	1411	100

(Source: - VDC Profile 2010 and Field Survey 2011)

The above table shows the Cast group; Bramin, Chhetri, Kami, Pariyar and Ethnic group; Gurung, Magar, Tamang and others are in this VDC. The table shows that out of total HH, Bramin, Chhetri, Gurung, Magar, Tamang, Kami, Pariyar and others are 7.94, 1.59, 31.29, 32.65, 8.16, 7.48 and 7.94 percent respectively. The total population of Bramin, Chhetri, Tamang, Kami, Pariyar and others are 7.67, 1.86, 30.89, 35.02, 6.65, 4.57, 4.87 and 8.47 percent respectively. Then Sample table of this ethnic composition also shows nearly similar data result form with population's data.

4.2.2 Active Age group

The population is categorized into three groups on the basis of active age group. The group falls between 16 to 60 is known as active age groups remain two group falls in inactive group. The tables present below reflect the picture of economically dependent and independent population in VDC level along with the sample.

Table 4.5: Active Age group

Age Group	Gender	Population	%	Sample	%
Below <15	Male	344	15.25	170	12.05
	Female	328	14.54	187	13.25
	Total	**672**	**29.79**	**357**	**25.30**
16 - 60	Male	695	30.81	459	32.53
	Female	681	30.18	454	32.18
	Total	**1376**	**60.99**	**913**	**64.71**
61 < Above	Male	104	4.61	80	5.67
	Female	104	4.61	61	4.32
	Total	**208**	9.22	**141**	**9.99**
Total		2256	100	1411	100

(Source: - VDC Profile 2010 and Field Survey 2011)

The above Table shows that out of total population 29.79 percent belongs to group 0-15 years, 60.99 percent belongs to group 16-60 and 9.22 percent belongs to group 60 to above as in the VDC record. So there are only 60.99 percent of total population economically active and 39.01 percent of total population is inactive. Such high dependent population 39.01 percent is one of the most responsible factors of the cause of economic impact in the study area. The dependent ratio of the VDC is 1.6. Then Sample data also shows nearly similar data result form with population's data.

4.2.3 Education Level

One of the key determinants of development of a community is their literacy status. It is considered that education is the third eye of human beings Education is a lifelong process by which people can improve their economic and social status and uplift the standard of living. Educational status is the indicator of socio-economic development of the society and also the measurement of self-awareness, knowledge and empowerment. Educational status of Nepal has been improving in recent decades. According to population census 2001 to 2011, overall literacy rate of study area has been improving. Literacy rate of the study area can be seen in the following table.

Table 4.6: Education level

Level	Population				Sample			
	Male	Female	Total	%	Male	Female	Total	%
Illiterate	119	191	310	20.48	22	78	100	9.47
Literate	495	460	955	63.08	392	362	754	71.40
Secondary	74	52	126	8.32	80	33	113	10.70
Intermediate	61	38	99	6.54	36	30	66	6.25
Bachelor	13	10	23	1.52	8	10	18	1.71
Master	1	-	1	0.06	3	2	5	0.47
Total	763	751	1514		541	515	1056	
Illiterate %	7.86	12.62	20.48	100	2.08	7.39	9.47	100
Literate %	42.54	36.98	79.52		49.15	41.38	90.53	

(Source: - VDC Profile, 2010 and Field Survey, 2011)

The above table shows that it is not worthy that if educated person of S.L.C. to higher education is brought under consideration both at the VDC level and sampled households, it seems to be consistent. According to the table 42.54 percent male and 36.98 percent female are literate and 7.86 percent male and 12.62 percent female are illiterate from the total population. Sample selection data also shows about similar percent to the population percent.

4.2.4 Households Structure

Household structure also gives the one of socio-economic impact in the society. In general, there are three types of the house, Slate roof, Tin roof, Thatched roof and Sanitation as a toilet/bathroom, tap. And there is one sub-health post also for health care of people in the VDC. Following table shows the housing structure of the VDC.

Table 4.7: Households Structure

House structure	Population HH	%	Sample HH	%
Slate roof	175	39.68	114	46.72
Tin roof	218	49.44	109	44.67
Thatched roof	48	10.88	21	8.61
Total	441	100	244	100
Sanitation (Toilet/Bathroom)	427	96.83	230	94.26

(Source: - VDC Profile 2010 and Field Survey 2011)

The above table shows that, 39.68 percent household are slate roof house and 49.43 percent HH are Tin roof and 10.88 percent HH are Thatched roof household out of total household of population and 96.83 percent household has got sanitation available. Then Sample data shows nearly similar data result with population's data.

4.2.5 Occupational Status

Occupation is the main source of income; there are different occupational groups in the study area. In this context population is divided into different groups according to their involvement in different occupation. The rural economy of this VDC is primarily agricultural and secondly most of the young people move out to foreign land in search of lucrative job opportunities. The following tables represent the picture of population depend on different occupations.

Table 4.8: Occupational Status

Occupation	Population				Sample			
	Male	Female	Total	%	Male	Female	Total	%
Govt/Privat service	69	25	94	7.29	16	27	43	4.78
Pension	N/A	N/A	N/A	-	45	19	64	7.14
Employ Abroad	235	28	263	20.40	143	22	165	18.4
Labors	70	31	101	7.84	57	13	70	7.80
Enterprise	3	2	5	0.39	12	2	14	1.56
Grocery/Business	8	4	12	0.93	6	5	11	1.23
Student(aboveSLC)	N/A	N/A	N/A	-	33	34	67	7.47
Farmers (Agri.)	342	472	814	63.15	158	305	463	51.62
Total	727	562	1289	100	470	427	897	100

(Source: - VDC Profile 2010 and Field Survey 2011)

The above table shows that agriculture is the main occupation in the VDC where 63.15 percent of total population and the second major occupation status shows 20.40 percent of the total population as employ foreign. A few 0.39 and 0.93 percent of total populations are having enterprise (cottage industry) and grocery/business respectively as an occupation. Then Sample table also shows around equal level range percent to the population table.

4.2.6 Employment Status

Employment (any job or any occupation) is the main source of the income and it is basic determinant of income. There is relationship between the income and employment. It is assured that those members who are in the age group of 16 – 60 are the working age population. The working age people, who work at least nine month or

more is called employed. Likewise working age people who work less than nine month but more than three months are called semi-employed or seasonally employed. The following table shows the employment status of the working age in study area.

Table 4.9: Employment structure

Employment status	Population				Sample			
	Male	Female	Total	%	Male	Female	Total	%
Employment	304	53	357	27.7	159	49	208	23.19
Semi-employment	423	509	932	72.3	311	378	689	76.81
Total	727	562	1289	100	470	427	897	100

(Source: - VDC Profile 2010 and Field Survey 2011)

The above table shows that 27.7 percent people are employment of and other 72.3 percent people are in semi-employment or seasonal-employment of total working age of population. Then Sample data also shows nearly similar data result form with population's data.

4.2.7 Land Holding Households and Cultivatable Land

Nepal is primarily an agricultural country. More than 81 percent of the economically active population in Nepal is estimated to be involved in agriculture. So land is one of the most important factors of production. In general there is positive relationship between landholding and level of income. Most of the people in rural area are low income due to their insufficient land to generate income. The following table shows the nature of landholding household of the study area.

Table 4.10: Land Holding HH and Cultivatable Land

Area in Ropani	Population	%	Sample	%
Land less	88	19.96	18	7.38
0 – 3	82	18.59	80	32.79
4 – 7	113	25.62	61	25.00
8 – 13	95	21.54	54	22.13
14 – 39	56	12.70	31	12.70
40 – 65	5	1.14	-	-
65 < above	2	0.45	-	-
Total	441	100	244	100

(Source: - VDC Profile 2010 and Field Survey 2011)

The above table shows that the landless households 19.96 percent, the most in average 4-7 Ropanies landholding households are 25.62 percent, A few average 65 and above Ropanies landholding households are 0.45 percent of total population. And others 0-3, 8-13, 14-29 and 40-65 Ropanies landholding households are middle percent as 18.59, 21.54, 12.70 and 1.14 percent respectively. Then sample data of also shows nearly similar data result form with population's data.

4.2.8 Households with sufficient Agricultural Productions

Agricultural production sufficiency is most important in any rural area. How many households depend on agriculture production? The following table shows the agriculture productions according to households of the study area.

Table 4.11: Households with sufficient Agricultural Productions

Sufficient Condition	Month	Population	%	Sample	%
Surplus	12 to Above	32	7.26	21	8.61
Equal	9 - 12	91	20.63	72	29.51
Less < 9	6 - 9	105	23.81	60	24.59
Less < 6	3 - 6	132	29.93	55	22.54
Less < 3	0 - 3	81	18.37	36	14.75
Total		441	100	244	100

(Source: - VDC Profile 2010 and Field Survey 2011)

The above table shows that 7.26 percent households are surplus condition of the total population. 29.93 percent households are highest percent at less than 6 month sufficient households of total population and equal sufficient condition households are 20.63 percent. Similarly, less < 9 month sufficient condition households are 23.81 percent and less < 3 sufficient condition household are 18.37 percent. Then sample also shows nearly similar data result form with population's data.

4.2.9 Average Households Income

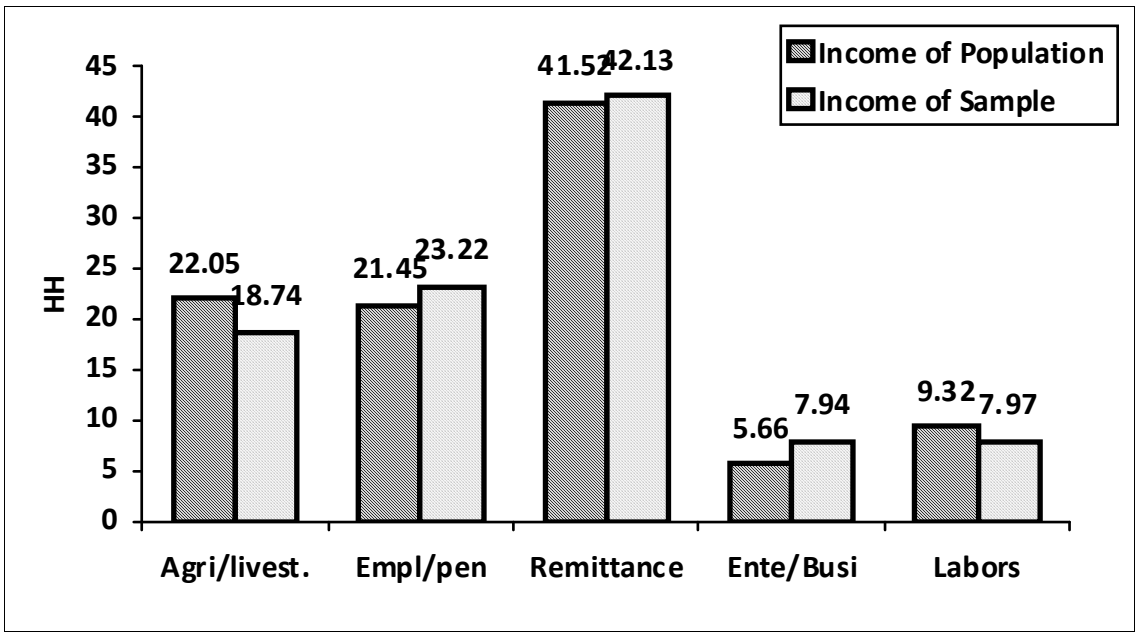
One of the important aspects of rural development is to uplift the economic status of the rural community. The various interventions promote diversity to the rural economy. The options of income generating activities become widely available in the village. Average per capita income and average household income is the most important part to determinant living standard measurement. The following table shows the average per capita income and average household income according to VDC profile.

Table 4.12: Average Per-capita and Households Income of per year

Income sources	Population income		Sample income	
	In Rs."000"	(%)	In Rs."000"	(%)
Agriculture/Livestock HH	111.77	22.05	113.11	18.74
Employ/Pension PC	108.69	21.45	140.13	23.22
Remittance PC	210.47	41.52	254.32	42.13
Enterprise/ Business HH	28.7	5.66	47.93	7.94
Labors PC	47.28	9.32	48.12	7.97
Total	506.91	100	603.61	100

(Source: - VDC Profile 2010 and Field Survey 2011)

Figure 4.2: Average Per-capita and Households Income of per year



The above table and figure show that in average 22.05 percent income comes from agriculture and livestock per households of the total population, 21.45 percent income from employment and pension, 41.52 percent income from remittance it is the highest

income percent of total population, 5.66 percent income from enterprise and business and 9.32 percent income from labors. It shows that highest percent from remittance and second percent from agriculture and livestock. Then sample of this population also shows nearly similar data and figure result form with population's data.

4.2.10 Average Investment of Households

It is most likely that the average annual expenditure of the households shows their economic status. Investment is also the important part for economic determination of household living standard. In the case, where the income level is low, people tend to spend a larger portion of their income on food. As the income of the household rises, the areas and avenues for expenditure expand. The assessment of the pattern of expenditure of the household gives a clear hint on what could be the probable pattern of existing economy.

Table 4.13: Average Investment of Households

Expenditure	Population	Percent	Sample	Percent
	Invest. Rs.“000”	(%)	Invest. Rs.“000”	(%)
Food	95.67	36.81	97.68	35.86
Non-food	148.76	57.22	118.33	43.44
Agriculture	10.35	3.98	34.87	12.80
Livestock	5.18	1.99	21.52	7.90
Total	259.96	100	272.4	100

(Source: - VDC Profile 2010 and Field Survey 2011)

The table shows that per household average investment for food 36.81 percent, 57.22 percent for non-food, 3.98 percent for agriculture and 1.99 percent for livestock. The sample shows investment for food and non-food percent are around similar percent to the population but investment for agriculture and livestock are a little different percentage from population.

4.3 Income and Production Innovation of Total Sample Household

4.3.1 Income of Sample Household in 2001/02 and 2010/11

During the study period the total sample households' per year average income has been collected by the theirs income from agriculture, livestock, remittance, jobs, business etc. average income of the households is most important part of the economy study so It is collected the data for ten year are different such as fiscal year of 2001/02 and 2010/11. It's shown the following table.

Table 4.14: Per Year Average Income of Households in 2001/02 and 2010/11

Income in "000"	HH in 2001/02	%	HH in 2010/11	%
0-200	114	46.72	92	37.70
200-400	78	31.97	78	31.97
400-600	31	12.70	36	14.75
600-800	14	5.74	21	8.62
800-1000	4	1.64	7	2.86
1000-1200	1	0.41	5	2.05
1200-1400	1	0.41	3	1.23
1400-1600	1	0.41	2	0.82
Total	244	100	244	100

(Source:- Field Survey 2011)

Above table show that at the fiscal year 2001/02 the highest income of households number is 0.41 percent and the lowest income of households number is 46.72 percent which is the highest households number and total average income is 277.05 thousands rupees, variance is 51200 and standard deviation is 226.27 per year. And at the fiscal year 2010/11 the highest income household number is 0.82 percent and the lowest income of households number is 37.70 percent, which is the large households group and average income is 344.26 thousand rupees, variance is 80400 and standard deviation is 283.55. Then average income, variance and standard deviation of fiscal year 2010/11 is greater than 2001/02. Which is the increasing ratio position in average income of fiscal year of households (Annex – 1).

Income Distribution of Sample

The concept of household income of rural area is closely related to the problem of income inequality. The income distribution data are always affected by errors in definition as well as measurement of income. Such errors are likely to be extreme situation of subsistence base agriculture, where it is difficult to define income much or less accurately through survey techniques. Therefore, gathering income distribution data in the study area is very scanty. In this section, the distribution of income is brought under discussion among the 2001/02 and 2010/11 per year income of households in study area. In order to study the income distribution and inequality on the distribution, the sample households of the study are distributed into two groups of ten years different such as 2001/02 and 2010/11 year time period. Which are the households per year incomes are shown on the following tables.

Table 4.15: Income distribution of Households in 2001/02 (A)

Income in "000"	Mid Value (x)	No. of HH (y)	Total income (xy)	No. HH %	Total income %	Cumulative % of HH = X_i	Cumulative % of income = Y_i
0-200	100	114	11400	46.7	16.9	46.7	16.9
200-400	300	78	23400	32.1	34.6	78.8	51.5
400-600	500	31	15500	12.7	22.9	91.5	74.4
600-800	700	14	9800	5.7	14.5	97.2	88.9
800-1000	900	4	3600	1.6	5.4	98.8	94.3
1000-1200	1100	1	1100	0.4	1.6	99.2	95.9
1200-1400	1300	1	1300	0.4	1.9	99.6	97.8
1400-1600	1500	1	1500	0.4	2.2	100	100
Total		244	67600	100	100		

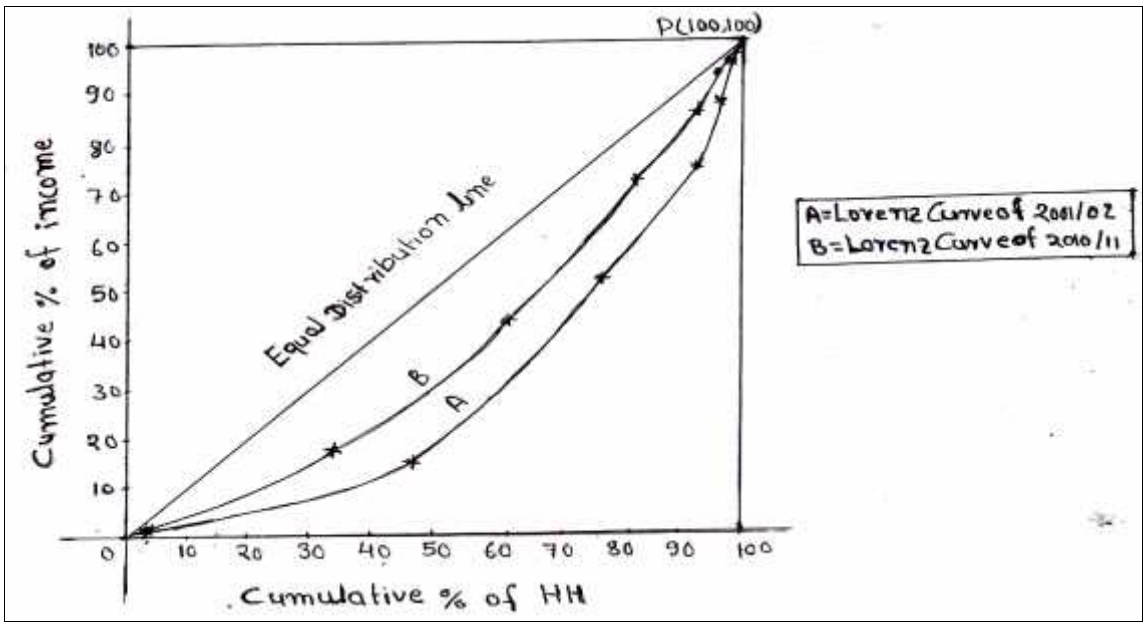
(Source:- Field Survey 2011)

Table 4.16:Income Distribution of Households in 2010/11 (B)

Income in "000"	Mid Value (x)	No. of HH (y)	Total income (xy)	No. HH %	Total income %	Cumulative % of HH = Xi	Cumulative % of income = Yi
0-200	100	6	600	2.4	0.5	2.4	0.5
200-400	300	76	22800	31.1	16.9	33.5	17.4
400-600	500	71	35500	29.1	26.3	62.6	43.7
600-800	700	54	37800	22.1	28.1	84.7	71.8
800-1000	900	22	19800	9.1	14.7	93.8	86.5
1000-1200	1100	8	8800	3.3	6.5	97.1	93
1200-1400	1300	5	6500	2.1	4.8	99.2	97.8
1400-1600	1500	2	3000	0.8	2.2	100	100
		244	134800	100	100		

(Source:- Field Survey 2011)

Figure 4.3: Income Distribution of Sample households



The above tables and figure shows that the per year income inequality distribution of sample households. There are two Lorenz's curves OAP and OBP respectively. OAP

curves represent income distribution of 2001/02 fiscal years and OBP represent income distribution of 2010/11 fiscal years. The Lorenz curve of A is more variable than B. There is higher inequality of income distribution is in 2001/02 than in 2010/11. Then it shows that the income distribution is being better than ten year ago and we can see also Gini's coefficient values of the fiscal years of 2001/02 is 0.3969 and 2010/11 is 0.2519 which also show that income distribution is better than ten year ago (Annex –2).

4.3.2 Agro-Productivity of Sample Households 2001/02 and 2010/11

Agriculture Production and Livestock Production

The economy of study area is heavily dependant on agriculture where about 63.15 percent of the population is dependent. Thus, agriculture plays a vital role in the economy of the people of study area. This region provides a good support for agriculture production and livestock production. During the study period the total sample households per year average agro-production has been collected for a period of ten years. It is shown in following tables.

Table 4.17: Average production of HH in Agriculture

Crops	2001/02		2010/11		Change in HH (%)	Change in Qty. (%)
	Average Qty.	HH	Average Qty.	HH		
Paddy	8.1529 qt.	157	8.5906 qt.	159	1.27	5.37
Maize	5.0151 qt.	225	5.0159 qt.	225	0.00	0.02
Millet	3.1294 qt.	221	3.1417 qt.	221	0.00	0.39
Been	69.8793 kg.	199	70.1645 kg.	199	0.00	0.41
Oil seed	22.1791 kg.	74	22.7067 kg.	75	1.00	2.38
Potato	57.6122 kg.	92	76.8416 kg.	98	6.52	33.38
Vegetables	70.1987 kg.	151	265.422 kg.	225	49.01	278.89
Cash crop	57.0281 kg.	87	85.0779 kg.	104	20.69	49.18

(Source:- Field Survey 2011)

The above table shows that agriculture production condition in ten year different time period at 2001/02 and 2010/11 fiscal years. It found that the households increasing change percent and quantity of production increasing percent are highest in vegetables production that are household involving is 49.01 percent and quantity production is 278.89 percent. It seems that highest change percent in quantity and household is in vegetables product at 2010/11 than 2001/02 and others are around same way

Table 4.18: Average production of HH in Livestock

Livestock	2001/02		2010/11		Change in HH %	Change in Qty. %
	Qty.	HH	Qty.	HH		
Buffaloes	486	159	535	165	3.77	4.88
Cow	185	61	162	59	-3.28	-12.43
Oxen	234	147	236	147	0.00	0.85
Goat	238	50	575	95	90.00	141.59
Sheep	583	8	743	9	12.50	27.44
Chicken/Duck	964	133	1364	150	12.78	41.49
Bee Hive	134	75	145	79	5.33	8.21

(Source:- Field Survey 2011)

The above table shows that agriculture production condition in ten year different time period at 2001/02 and 2010/11 fiscal years. It found that the households increasing change percent and quantity of production increasing percent are highest in goat stock that are household involving is 90 percent and quantity production is 141.59 percent. It seems that highest change percent in quantity and household is in goat stock product at 2010/11 than 2001/02 and others is also increasing slowly but cow stock production is decreasing.

4.4 HH Income and Employment Status in 2001 to 2011

Households income and employment status are taken from the period of 2001/02 and 2010/11 fiscal years based on per year income of the households. Here, those households, which were involved in income generation after participating ACAP's programs and others programs and the other natural resource growth in the forest such as the grass and then who knew the income awareness from the Programs etc. All kinds of employments are included such as conservation teachers, conservation management committee secretary, for some farmers for growing vegetables and cash crops and some are livestock for the second supported income sources. Then around all income are second supported for households economy and around all employments are the semi-employments anyway these are all income generation and employment for economic, even if it is not so big amount of income and it is not full employment for the households. Which is shown in following table.

Table 4.19: HH Income and Employment 2001/02 to 2010/11

F/Y	Income in Rs. "000" of HH					Mini.	Max.	Total	Total
	0-20	20-40	40-60	60-80	80<Ab	"00"	"000"	HH	Empl.
2001/02	4	-	-	-	-	10	20	4	4
2002/03	2	1	-	-	-	10	40	3	4
2003/04	2	1	-	-	-	10	40	3	5
2004/05	1	2	1	-	-	10	60	4	6
2005/06	2	2	1	-	-	10	60	5	8
2006/07	1	2	2	1	-	10	80	6	8
2007/08	2	2	2	1	1	10	90	8	11
2008/09	1	1	2	2	1	10	100	7	9
2009/10	1	1	2	1	1	10	150	6	8
2010/11	1	2	2	1		10	170	6	7
Total	17	14	12	6	3			52	70
Percent	32.7	26.9	23.1	11.5	5.8				

(Source:- field survey 2011)

Figure 4.4: Involved HH for income in ten years period

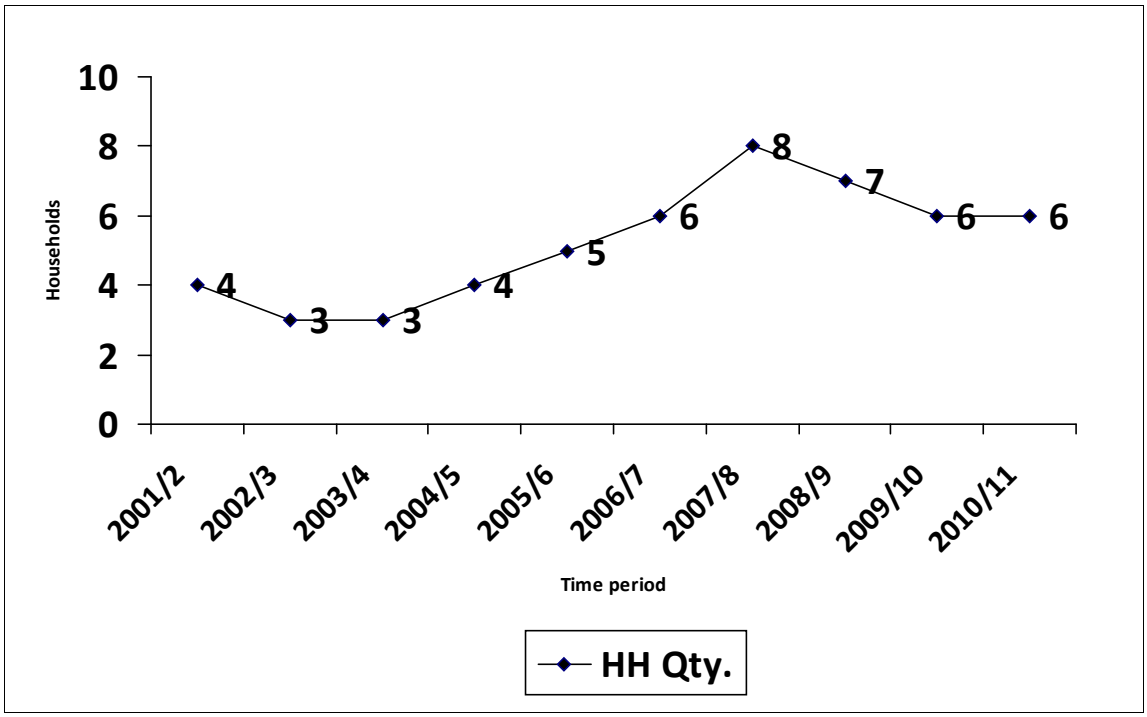


Figure 4.5: Semi-employment in ten years period

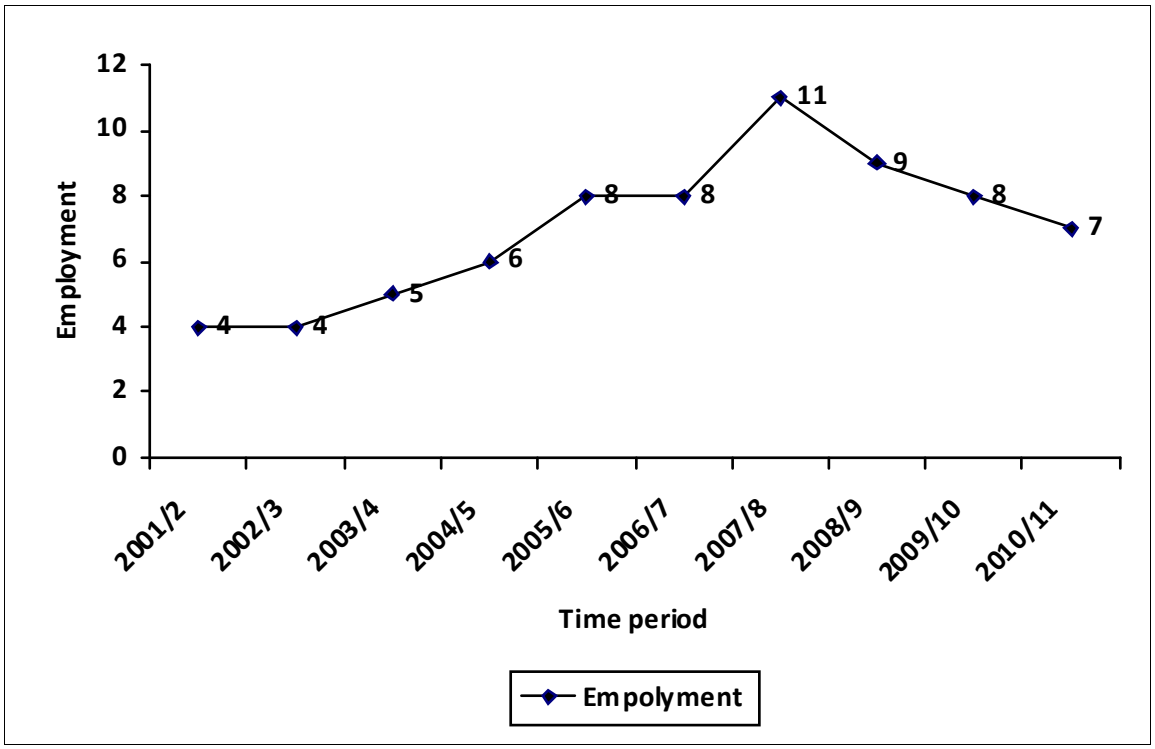
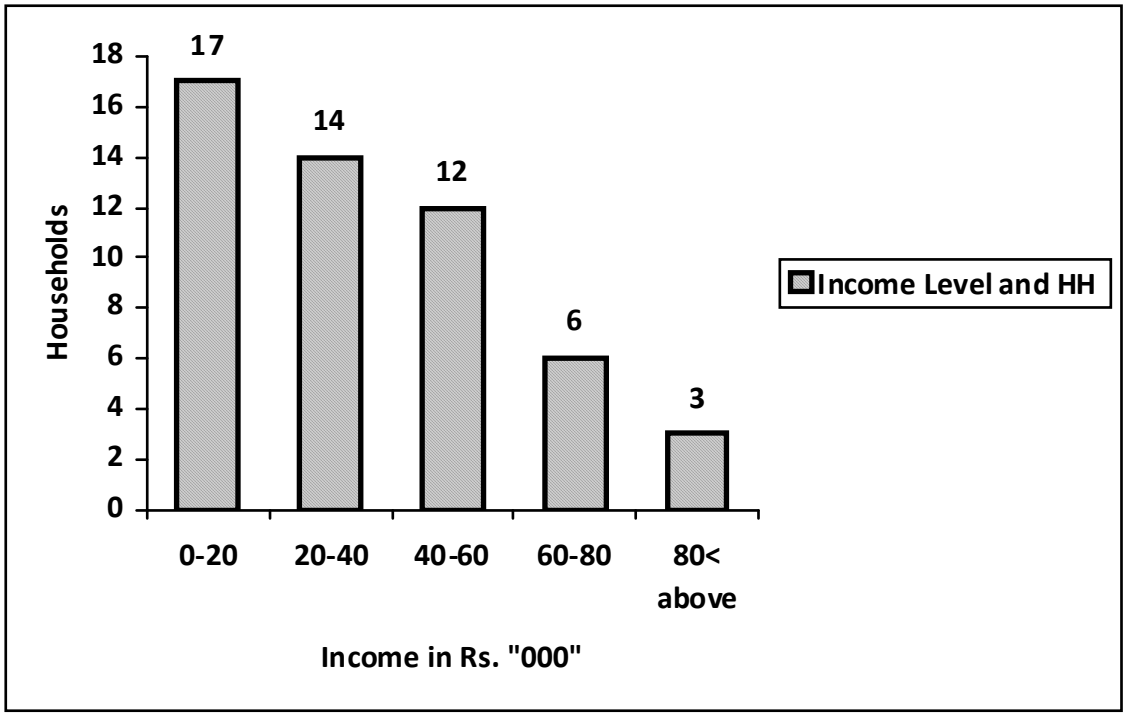


Figure 4.6: Involved Households and Income in ten years period



Above table and figures has expresses that the during fiscal year 2001/02 to 2010/11 period by the activities programs of ACAP, the number of households are involving in income and employments generation they are 52 household out of total sample household, 70 semi-employments from those household and around 1000 to 170 thousand rupees per year supported income of households and the highest number of income generation involving households are 17 which is 32.7 percent. And figure expresses that during the ten years period highest number of households increase is 8 in fiscal years 2007/08 and highest employment number of households increase is 11 also in same fiscal year. It shows that in the fiscal years 2007/08 the households number curve and employment number curve are increasing and then the curve is decreasing. It shows that since the role of ACAP there is increasing the income and employment generation at some period but lack of proper market the increasing rate is seemed slow position.

Hypothesis-Testing

a. Role of ACAP in Income Generation

Here, an attempt has been made to test hypothesis between role of ACAP and income generation. During ten years period data from field survey about the different income groups of Household are statistically tested. It is attempted to statistically test yearly income of household in either increasing or decreasing, which that households are involved in income generation. For this one-way ANOVA short-cut method has been used for testing hypothesis. The stated hypothesis is given below.

H_0: There is no significant role of ACAP for HH in income generations.

H_1: There is a significant role of ACAP for HH in income generation.

To test the above hypothesis during 2001/02 to 2010/11 fiscal years number of households and per year income table no. 4.14 are adopted and calculated. From the F-test result calculated value F = 6.187 where tabulate value is F = 2.6896 at 5% level of significance for n_1=4 and n_2=30 degree freedom, which is greater than the tabulate (critical) value of F. So there is null hypothesis (H_0) is rejected and alternative hypothesis (H_1) is accepted. Then, it shows that from this result, it can be concluded that there is significant role of ACAP in income generation of households during 10 years period. (Annex-3)

b. Role of ACAP in Employment Generation

Here, an attempt has been made to test hypothesis between role of ACAP and employment generation. The formula of Karl Pearson's χ^2 test has been used to that the stated hypothesis. This is as follows.

H_0: There is no significant role of ACAP to employment generation.

H_1: There is a significant role of ACAP to employment generation.

Since, the calculated value of χ^2 is 147.48, which is greater than the tabulated value of χ^2 at 5% level of significance with 9 degree of freedom is 16.919. So there is no significant different between observations and expected frequency then null hypothesis is accepted and the alternative hypothesis is rejected. From the result, it

can be concluded that the role of ACAP is significant in semi-employment generation. (Annex-4)

From the above both hypothesis-testing result show, there are significant role of ACAP in income and semi-employment generation of rural household economy in during 10 years period.

4.5 Natural and Socio-economic Impact in Study Area

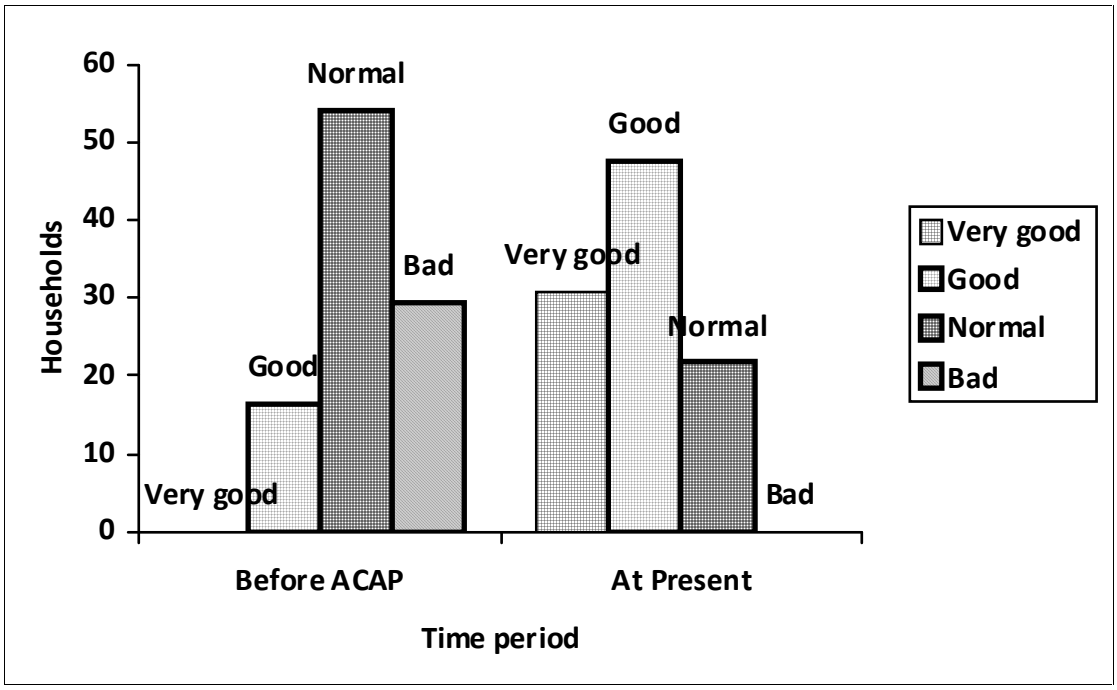
During field survey period it was found that there was a significant difference in natural and social awareness among people before ACAP and after ACAP. It was questioned with respondents as their view, their feeling about in Natural impact, Social impact, Natural planets impact and Animal species etc. It is shown in all together following table.

Table 4.20: Natural and Social Awareness or improvement impact

Impact	Natural and Social Awareness or improvement			
	Before ACAP	Percent %	At Present	Percent %
Very good	0	0	75	30.74
Good	40	16.39	116	47.54
Normal	132	54.10	53	21.72
Bad	72	29.51	0	0
Total	244	100	244	100

(Source:- Field Survey 2011)

Figure 4.7: Natural and Social Awareness or improvement impact



The above table and figure shows that Natural and Social Awareness has improved before ACAP, According to All respondent's view, feeling and their abundance etc. It shows that at before ACAP, very good is no, bad is 29.51 percent but And after ACAP, there very good is 30.74 and bad is no percent. So, It shows that the natural and socio-economic awareness impact is well improving significantly at after ACAP than before.

4.5.1 Use of Alternative Energy Sources

Forest has played an important role in the rural life of the people of Nepal. The forest is used for fodder, firewood and construction timber. As stated above more than 80 percent of the entire country's energy requirement comes from fuel wood. The main source of energy in the village is fuel wood for cooking food for the households, cooking animal feed and some of household use for making local liquor. There were seemed some alternative sources of energy helping to reduce the burden on the forest resource. Such as Electricity, Bio-gas, LP-gas, Solar and Improved stove etc.

Table 4.21: Alternative energy sources use

Type of energy	2001/02	2010/11	Used HH
Fuel wood	110 Bhari	80 Bhari in average	234
Electricity	Only 5 ward	9 Ward	244
Bio-gas	-	32	32
LP-gas	-	68	58
Solar	-	4	4
Improve stove	-	3	3

(Source:- MOP of CAMC in Machhapuchhre VDC 2000, Field Survey 2011)

The above table shows that 10 year ago all of total households used to firewood, the electricity was just starting in the villages and other alternative sources also did not have with them. At present, table shows that so many alternative energy have got used such as Bio-gas used households are 32, LP-gas used households are 58, Electricity used households are all ward and It seem that fuel wood use rate is reduced such as average 110 Bhari to average 80 Bhari in ten year period. It is good sign for natural conservation as social impact in study area by role of conservation programs.

4.6 Problems of Study Area

The area is facing many external and internal problems. There are so many kind and so many sides of problems seemed such as for income and employment generation and socio-economic impact for study area.

Some common problems of study area

a. In geographically, there are majority parts of land are hilly, rocky and forest lands parts and the only small part of land for agriculture in total VDC area so lack of agricultural land is in of study area.

b. Since traditional systems in agriculture production so there are low agricultural income production. Farmers can't get good return in accordance with their investment due to the adoption of traditional method.

c. There are lacks of collection centers of agro-product, proper market, and products managing such as agro products and there is lack of awareness regarding Agro-business in local farmers. Such as livestock product as milk they did not get market so they make only Gee traditionally but they don't know about the other products from milk. So farmer could not get good price for milk.

d. In livestock due to various kinds of diseases and parasites animal husbandry is not flourished. Vet nary doctors (Vets), medicine and tools are not available as per the demand of the farmers.

e. Educated/Efficient/Skilled manpower is unwilling to work in Agriculture sector. There are lack of proper advice suggestions and counseling to the farmer regarding agro-productions management and agro-marketing.

f. Some of them farmers give up the production of cash crop product and vegetable product due to the lack market, lack of products management knowledge and due to unfix price in the study area. Therefore, it is difficult to sustainable income and employment generation in farming in study area.

g. According to local people, there are need much regular observation and supervision by concern authority of ACAP in study area most for conservation natural resources area and since there need stabilized and systematic rule and security for the forest guards, CAMC members and others local people who want to conserve for natural resources, because it encourages people to in conserve the natural resources. Then it discourages to the robber or damager of natural resources.

4.7 Major Findings

The main objective of the study is to analyze the role of ACAP in rural household economy as income, employment and agro-production in study area. Moreover the study also tries to measure natural and socio-economic impact in study area. To fulfill the above stated objective of the present study, Machapuchchhre VDC, 244 household respondents have been selected randomly as sample from 441 households and sample was conducted during f/y 2001 to 2011. Data are analyzed by using simple statistical tool like mean, percentage, variance, standard deviation, χ^2-test and F-test are the major findings of study, following findings are drawn.

a. During the study period, the total sample households are collected to find out their income distribution in ten year time period different. It is found that Income equality distribution of Sample, Average income, Variance, Standard Deviation value and Gini's coefficient values of F/Y 2010/11 is better than F/Y 2001/02 i.e. Gini's coefficient values of the fiscal years of 2001/02 is 0.3969 and 2010/11 is 0.2519 which show that income distribution is better than ten year ago.

b. During the period f/y 2001 to 2011, in agriculture production condition significant change was found in vegetable production by 278.89 percent and cash crops by 49.18 percent. The number of households involved in vegetables production was highest ie.49.01 percent. Similarly goat 141.59 percent and sheep farming 27.49 percent, poultry farming 41.49 percent have been found significantly increased. Many households were found involved in more income generating activities. Then it was found that the households increasing change percent and quantity of production increasing percent are highest in vegetables production and goat stock in study area.

c. During the period of F/Y 2001/02 to 2010/11, households involved in income and employment after participating ACAP's programs and with others programs and concern activities. Out of 244 households 52 households were found involved in income and 70 people are involved in semi-employments for more income generation activities. And per year income of household is around 1 to 170 thousand rupees.

d. The responses on socio-economic changes and awareness was observed positive and about 30.74 percent people ranked it as very good, 47.54 percent people ranked it as good and as out 21.74 percent people ranked it normal. Similarly, The fire wood consumption was found significantly reduced from average 110 Bhari to 80 Bhari at present. It was found that around 32 households were using bio-gas and 58 houses used LP-gas now. It was found the natural and socio-economic awareness impact is well improving significantly at after ACAP than before.

e. Literacy rate of study area has been improving. There are male literate 49.15 and female literate 41.38 percent and illiterate male 2.08 percent and female 7.39 percent of sample household. The occupations are found that primarily 51.62 percent in engaged on agriculture. Secondly, 18.4 percent population goes out abroad as employ foreign (remittance).

f. It is found that, employed people are 23.19 percent and 76.81 percent people are semi-employment or seasonal-employed of total working age of sample people. Like some households in rural areas running in very hardly because of lack of agriculture land, lack of other income sources as remittance, job they are depending in labor and natural resources.

g. In the study area, it is found that the natural and socio-economic awareness impact is well improving significantly at after ACAP. Local peoples are indirectly and directly most benefited from ACAP.

CHAPTER-V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

The study area lies in northern-central part of this district within the project area of the Annapurna Conservation Area Project (ACAP) and the program priorities for Lwang are poverty alleviation and integrated agriculture development and agro-forestry. ACAP has been managing various programs in study area as per the goal of project. Programs are implements through CAMCs with financial and technical assistance of the UCO. Since ACAP has been implementing multi faceted programs according to area-based needs and requirement of the local people. Therefore, the study was focused in finding the role of ACAP in rural household economy of Machhapuchhre VDC Kaski.

General objective of this study was to analyze the role of ACAP in rural households economy of Machhapuchhre VDC, Kaski. And changes in income, employment, and productivity level of household and natural and socio-economic impact due to the conservation education of ACAP study were taken as specific objectives. Survey and analytical research approaches were used in this study. Both primary and secondary data are used. Out of 441 households 244 households have been taken as the sample households for the study. The study was based on cross sectional data for a period of 10 years, 2001 to 2011.

The whole study has divided into five chapters. First chapter has given the introduction about the research topic, statement of problem, objectives of the study and limitation of the study. Second chapter is literature review in which different related books, theses, and articles have been reviewed in the significant way. The third chapter is meant for research methodology. Descriptive type of research design has been adapted to analysis the facts and figures obtained from different sources.

During the study period, the total sample households are collected to find out their income distribution in ten year time period different. It is found that Income equality

distribution of Sample, Average income, Variance, Standard Deviation value and Gini's coefficient values of F/Y 2010/11 is better than F/Y 2001/02 i.e. Gini's coefficient values of the fiscal years of 2001/02 is 0.3969 and 2010/11 is 0.2519 which show that income distribution is better than ten year ago.

During the period f/y 2001 to 2011, in agriculture production condition significant change was found in vegetable production by 278.89 percent and cash crops by 49.18 percent. The number of households involved in vegetables production was highest ie.49.01 percent. Similarly goat 141.59 percent and sheep farming 27.49 percent, poultry farming 41.49 percent have been found significantly increased. Many households were found involved in more income generating activities. Then it was found that the households increasing change percent and quantity of production increasing percent are highest in vegetables production and goat stock in study area.

During the period of F/Y 2001/02 to 2010/11, households involved in income and employment after participating ACAP's programs and with others programs and concern activities. Out of 244 households 52 households were found involved in income and 70 people are involved in semi-employments for more income generation activities. And per year income of household is around 1 to 170 thousand rupees.

The responses on socio-economic changes and awareness was observed positive and about 30.74 percent people ranked it as very good, 47.54 percent people ranked it as good and as out 21.74 percent people ranked it normal. Similarly, The fire wood consumption was found significantly reduced from average 110 Bhari to 80 Bhari at present. It was found that around 32 households were using bio-gas and 58 houses used LP-gas now. It was found the natural and socio-economic awareness impact is well improving significantly at after ACAP than before.

Data and information have been collected from questionnaire survey, personal meeting and discussion. The responses have been examined for the purpose of the study and secondary data are collected from books, journal, annual reports, profiles thesis etc. All collected data are arranged, analyzed and interpreted through the use of statistical tools as percentage, mean, variance, standard deviation, χ^2-test, F-test, pie chart, bar diagram, line charts etc.

5.2 Conclusion

Based on "Role of ACAP in Rural Household Economy of Machhapuchhre VDC, Kaski" which is confined only in Machhapuchhre VDC. In this study, the role of ACAP in rural household economy is deeply analyzed. On the basis of the above finding, discussion by the role of ACAP programs the findings have been drawn and the conclusion about the role of ACAP in rural household economy have been drawn as its final shape of the study.

During the period f/y 2001 to 2011, It is found that Income equality distribution of Sample, Average income, Variance, Standard Deviation value and Gini's coefficient values of F/Y 2010/11 is better than F/Y 2001/02 i.e. Gini's coefficient values of the fiscal years of 2001/02 is 0.3969 and 2010/11 is 0.2519 which show that income distribution is better than ten year ago.

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used LP-gas now. It was found the natural and socio-economic awareness impact is well improving significantly at after ACAP than before.

In the study area, ACAP was supporting from establish time as a goal of the projects to conserve the natural biodiversity of the area and at the same time the sustainable development activities and financial supporting in productive sector, education sectors, awareness sectors, conservation sectors, basic infrastructures sector and activities, trainings etc. It can be concluded that ACAP have been playing significant role in rural household economy to increase production, income and employment directly and indirectly.

Finally, It was found that many people have been trying to income and employment generating activities as agricultural product, milk product, herb product etc. But there are facing various problems for households economy as income and employment, because of there are lack of market, lack of collection and supplier center of agro products, lack of agro-base industries and there are lack of agro-business knowledge for community area people.

Therefore, these are urgently needed to agro-product collection and supplier center and training of agro-business knowledge, agro-base industries as well as for the sustainable development of rural household economy.

5.3 Recommendations

On the basis of the study of Machhapuchhre VDC it is generally recommended that, in such as income and employment generation and socio-economic impact. Based on this study and above conclusion the recommendations are made for further improvement and to solve the various problems of study area for local community. Recommendations are normally designed to solve identified problems. Looking at the typical problems of rural areas in the past decades, rural development recommendations normally aim to make rural places economically, socially, culturally and environmentally healthy. The economic and social well-being of rural communities, to providing the conditions for a meaningful and fulfilling life for all people living in rural areas. Then the recommended are,

A. Along with agro-production technology the agro-production marketing and supply mechanism also need s to be upgraded.

B. To reduce seasonal unemployment more training should be focused on agro-base industries special for agro-business mechanism.

C. More focused activities are to be targeted for improving infrastructures in agriculture sector to improve irrigation fertilizer supply seeds quality and cropping pattern.

D. The status of women and dalit group was found quite miserable so government should focus on this issue.

E. As the educated households have higher income level in the study area, it is clear that education my help to reduce the extent of poverty. So the compulsory education programs should be increased and time relevant education training, suggestion and proper counseling should be provided for income, employment and natural conservation.

F. Vetenary doctors and medicine should be made available as per the need. Agro machine tools, fertilizer and seeds should be made available in time as per the farmers' demand at discount price. As farmers can get more return through unseasonable vegetables and fruits management/processing training regarding it should be provided.

G. Training should be provided to use modern machines, tools, fertilizer and seeds etc. by bringing modern spirit in agriculture.

H. Poor households who have no income sources needs more job oriented training for income generations.

I. In study area, it seem that some household have grown agro-production as a vegetables, cash crops and livestock production but they do not have sufficient market or they do not know about agro-business so then they deduce their extra production. It discourages people in agriculture and causes low income. So proper acts and rules should be brought for the in rural area such as

marketing trainings, agro-production, milk production and management trainings, supplying training to farmers for production promotion.

J. In the study area the employment rate is very small and semi-employment economic base is only seasonal. They should also aim at offering job opportunities for women and young people. The maximum number of rural households should be encouraged to create especially family farms. There should be created local finances and initiated new small enterprise start-up. Make their key players work together towards common goals with an agreed value basis. The goals and values are set using a bottom-up approach. The local administration should be empowered with reasonable fiscal and decision-making for local people to sufficient income and employment opportunities to allow individuals and families for employment creation.

K. In the study area, the majority of farmers still use locally made agriculture tools. Mechanization of agriculture is at a very low speed. The farmers use the most basic equipments as traditionally so these people should be encouraged to use modern equipments. And it is found that the some households are in low-income sources. They have unemployment, non-remittance, no-land etc too. They only depend on labour and directly and indirectly depend in natural resources for their income and needs. So those households should be trained for income generation as possible and provide a minimum set of services. This means they should be well connected with neighboring areas, which is the basis of tourism/recreation related industries as agro-product collecting, marketing, small shopping training for income generation.

ANNEX – 1

Table Annex 1.1: Per HH Average Income and Variance between 2001/02 - 2010/11

Income in "000"	Mid value (x)	2001/02				2010/11			
		f_1	d'	f_1d'	$f_1d'^2$	f_2	d'	f_2d'	$f_2d'^2$
0-200	100	114	0	0	0	92	0	0	0
200-400	300	78	1	78	78	78	1	78	78
400-600	500	31	2	62	124	36	2	72	144
600-800	700	14	3	42	126	21	3	63	189
800-1000	900	4	4	16	64	7	4	28	112
1000-1200	1100	1	5	5	25	5	5	25	125
1200-1400	1300	1	6	6	36	3	6	18	108
1400-1600	1500	1	7	7	49	2	7	14	98
Total		N= 244		$\sum f_1d'$ =216	$\sum f_1d'^2$ =502	N= 244		$\sum f_2d'$ =298	$\sum f_2d'^2$ =854

Here, N=244, A=100, d'= $\frac{x-A}{h}$, where, A=100, h=200, and $\sum f_1d'$= 216,

$\sum f_1d'^2$=502, $\sum f_2d'$=298, $\sum f_2d'^2$=854

Average income of 2001/02 $\overline{X}_1 = A + \frac{\sum f_1 d'}{N} \times h = 100 + \frac{216}{244} \times 200 = 277.05$

Average income of 2010/11 $\overline{X}_2 = A + \frac{\sum f_2 d'}{N} \times h = 100 + \frac{298}{244} \times 200 = 344.26$

Variance of income of 2001/02, V= $\sigma^2 = \sum_{i=1}^{n}\left(\frac{\bar{x}-x_i}{N}\right) = \left\{\frac{\sum f_1 d'^2}{N} - \left(\frac{\sum f_1 d'}{N}\right)^2\right\} \times h^2$

$$= \left\{\frac{502}{244} - \left(\frac{216}{244}\right)^2\right\} \times 200^2$$

$$= \{2.06 - 0.78\} \times 40000$$

$$= 1.28 \times 40000$$

$$\therefore \ V = \sigma^2 = 51200$$

Standard Deviation, $\sigma = \sqrt{\pm^2} = \sqrt{51200} = 226.27$

Variance of income of 2010/11, $V = \sigma^2$

$$= \sum_{i=1}^{n}\left(\frac{\bar{x} - x_i}{N}\right) = \left\{\frac{\sum f_2 d'^2}{N} - \left(\frac{\sum f_2 d'}{N}\right)^2\right\} \times h^2$$

$$= \left\{\frac{854}{244} - \left(\frac{298}{244}\right)^2\right\} \times 200^2$$

$$= \{3.5 - 1.49\} \times 40000$$

$$= 2.01 \times 40000$$

$$\therefore \quad V = \sigma^2 = 80400$$

Standard Deviation, $\sigma = \sqrt{\pm^2} = \sqrt{80400} = 283.55$

ANNEX-2

Table Annex 2.1: Gini's coeffic. of f/y 2001/02 for Income inequality distribution

Income in "000"	x	y	xy	% of y	% of xy	Xi	Yi
0-200	100	114	11400	46.8	16.86	46.8	16.86
200-400	300	78	23400	32.0	34.62	78.8	51.48
400-600	500	31	15500	12.7	22.93	91.5	74.41
600-800	700	14	9800	5.7	14.49	97.2	88.9
800-1000	900	4	3600	1.6	5.33	98.8	94.23
1000-1200	1100	1	1100	0.4	1.63	99.2	95.86
1200-1400	1300	1	1300	0.4	1.92	99.6	97.78
1400-1600	1500	1	1500	0.4	2.22	100	100
		244	67600	100	100		

X_i	Y_i	X_iY_{i+1}	$X_{i+1}Y_i$
46.8	16.86	-	1328.57
78.8	51.48	2409.26	4710.42
91.5	74.41	5863.51	7232.65
97.2	88.9	8134.35	8783.32
98.8	94.23	9159.16	9347.62
99.2	95.86	9470.97	9547.66
99.6	97.78	9699.78	9778.00
100	100	9960.00	-
		$\sum X_iY_{i+1} = 54697.03$	$\sum X_{i+1}Y_i = 50728.24$

$$\therefore G_c = \frac{1}{100^2}\left[\sum X_i Y_{i+1} - \sum X_{i+1} Y_i\right]$$

$$= \frac{1}{100^2}\left[54697.03 - 50728.24\right]$$

$$= \frac{3968.79}{10000}$$

$$= 0.3969 \qquad \therefore G_c = 0.3969$$

Table Annex 2.2: Gini's coeffi. of f/y 2010/11 for Income inequality distribution

Income in	x	y	xy	% of y	% of xy	Xi	Yi

"000"							
0-200	100	6	600	2.4	0.5	2.4	0.5
200-400	300	76	22800	31.1	16.9	33.5	17.4
400-600	500	71	35500	29.1	26.3	62.6	43.7
600-800	700	54	37800	22.1	28.1	84.7	71.8
800-1000	900	22	19800	9.1	14.7	93.8	86.5
1000-1200	1100	8	8800	3.3	6.5	97.1	93
1200-1400	1300	5	6500	2.1	4.8	99.2	97.8
1400-1600	1500	2	3000	0.8	2.2	100	100
		244	134800	100	100		

X_i	Y_i	X_iY_{i+1}	$X_{i+1}Y_i$
2.4	0.5	-	16.75
33.5	17.4	41.76	1089.24
62.6	43.7	1463.95	3701.39
84.7	71.8	4494.68	6734.84
93.8	86.5	7326.55	8399.15
97.1	93	8723.4	9225.6
99.2	97.8	9496.38	9780
100	100	9920	-
		$\sum X_iY_{i+1} = 41466.72$	$\sum X_{i+1}Y_i = 38946.97$

$$\therefore G_c = \frac{1}{100^2}\left[\sum X_i Y_{i+1} - \sum X_{i+1} Y_i\right]$$

$$= \frac{1}{100^2}\left[41466.72 - 38946.97\right]$$

$$= \frac{2519.75}{10000}$$

$$= 0.2519 \qquad \therefore G_c = 0.2519$$

ANNEX – 3

Income Status of Total Households during Fiscal Years 2001/02 to 2010/11

At the period of 2001/02 to 2010/11 fiscal years per year income of the households are shown in following table.

Table Annex 3.1: Per year income Status in Households 2001-2011

F/Y	Income per year in Rs. "000" and No. of HH					Mini. Rs.	Max. Rs.	Total HH
	0-20	20-40	40-60	60-80	80>Ab.			
2001/02	4	-	-	-	-	1000	20000	4
2002/03	6	1	-	-	-	1000	40000	7
2003/04	8	2	-	-	-	1000	40000	10
2004/05	9	4	1	-	-	1000	60000	14
2005/06	11	6	2	-	-	1000	60000	19
2006/07	12	8	4	1	-	1000	80000	25
2007/08	14	10	6	2	1	1000	90000	33
2008/09	15	11	8	4	2	1000	100000	40
2009/10	16	12	10	5	3	1000	150000	46
2010/11	17	14	12	6	3	1000	170000	52
Average	11.2	7.6	6.1	3.6	2.3	1000	81000	34

(Source :- field survey 2011)

Hypothesis Testing

Here during ten years period data from field survey about the different income groups of Household are statistically tested. It is attempted to statistically test yearly income of household in either increasing or decreasing. For this one-way ANOVA short-cut method has been used for testing hypothesis. The stated hypothesis is given below.

H_0: There is no significant role of ACAP for HH in income generations.

H_1: There is a significant role of ACAP for HH in income generation.

To test the above hypothesis is 2001/02 to 2010/11 income group and household table.

Let x be the Income Group of Households

F/Y	x_1	x_1^2	x_2	x_2^2	x_3	x_3^2	x_4	x_4^2	x_5	x_5^2
2001/02	4	16	-	-	-	-	-	-	-	-
2002/03	6	36	1	1	-	-	-	-	-	-
2003/04	8	64	2	4	-	-	-	-	-	-
2004/05	9	81	4	16	1	1	-	-	-	-
2005/06	11	121	6	36	2	4	-	-	-	-
2006/07	12	144	8	64	4	16	1	1	-	-
2007/08	14	196	10	100	6	36	2	4	1	1
2008/09	15	225	11	121	8	64	4	16	2	4
2009/10	16	256	12	144	10	100	5	25	3	9
2010/11	17	289	14	196	12	144	6	36	3	9
Total	$\sum x_1$= 112	$\sum x_1^2$= 1428	$\sum x_2$= 68	$\sum x_2^2$= 682	$\sum x_3$= 43	$\sum x_3^2$= 365	$\sum x_4$= 18	$\sum x_4^2$= 82	$\sum x_5$ =9	$\sum x_5^2$ =23

Level of significant 5% test statistics: F – test since to test the hypothesis direct method is lengthy, we compete it by using short-cut method.

i) Computing correction factor C.F = $\frac{T^2}{N}$

$T = \sum x_1+\sum x_2+\sum x_3+\sum x_4+\sum x_5 = 112+68+43+18+9 = 250$

Therefore, C. f = $\frac{T^2}{N} = \frac{(250)^2}{35} = \frac{62500}{35} = 1735.71$

ii) Compute SSC = $\frac{\left(\sum x_1\right)^2}{n_1}+\frac{\left(\sum x_2\right)^2}{n_2}+\frac{\left(\sum x_3\right)^2}{n_3}+\frac{\left(\sum x_4\right)^2}{n_4}+\frac{\left(\sum x_5\right)^2}{n_5}-\frac{T^2}{N}$

$= \frac{12544}{10}+\frac{4624}{9}+\frac{1849}{7}+\frac{324}{5}+\frac{81}{4}-1735.71$

$= 1254.4 + 513.78 + 264.14 + 64.8 + 20.25 – 1735.71$

$= 2117.37 – 1735.71$

$\therefore$ SSC = 381.66

iii) Compute SST = $\sum x_1^2+\sum x_2^2+\sum x_3^2+\sum x_4^2+\sum x_5^2 - \frac{T^2}{N}$

= 1428 + 682 + 365 + 82 + 23 – 1735.71

= 2580 – 1735.71

∴ SST = 844.29

iv) Compute SSE,

SSE = SST – SSC

SSE = 844.29 – 381.66

∴ SSE = 462.63

One-Way ANOVA Table

Sources of variation	Sum of square	Degree of freedom	Mean square	F value
Between sample (SSC)	381.66 (SSC)	K – 1 = 5-1 = 4	MSC=SSC/K-1 =381.66/4 =95.415	F = MSC/MSE = $\frac{95.415}{15.421}$ F = 6.187
Within Sample (SSE)	462.63 (SSE)	N – K = 35-5 = 30	MSE=SSE/N-K =462.63/30 =15.421	
Total variation	844.29 (SST)	N – 1 =35-1=34		

Degree of freedom $n_1 = 4$ and $n_2 = 30$, it is the value of 30.

Therefore,

The tabulated value of $F_{0.05}$ at $n_1 = 4$ and $n_2 = 30$ is 2.6896

From the above result calculated value of F is greater than the tabulated (critical) value of F. So there is null hypothesis is rejected and the alternative hypothesis is accepted. From the result, it can be concluded that the role of ACAP is significant in

income generation and there is significant relation between number of household and income group during 10 years period.

ANNEX-4

Relationship between ACAP and Semi-Employment

Hypothesis testing

In this chapter an attempt has been made to test hypothesis. The formula of Karl Pearson's χ^2 - test has been used to that the stated hypothesis. Which is as follows.

H_0: There is no significant role of ACAP to semi-employment generation.

H_1: There is a significant role of ACAP to semi-employment generation.

To test the above hypothesis about through role of ACAP in semi-employment generation fiscal years 2001/02 to 2010/11 data have been adopted and calculated.

Table Annex 4.1: Per year Semi-employment Status in Households 2001-2011

F/Y	O	E	O-E	$(O-E)^2$	$(O-E)^2 / E$
2001/02	4	34	-30	900	26.47
2002/03	8	34	-26	676	19.88
2003/04	13	34	-21	441	12.97
2004/05	19	34	-15	225	6.62
2005/06	27	34	-7	49	1.44
2006/07	35	34	1	1	0.03
2007/08	46	34	12	144	4.24
2008/09	55	34	21	441	12.97
2009/10	63	34	29	841	24.74
2010/11	70	34	36	1296	38.12
	$\sum O = 340$				$\chi^2 = 147.48$

(Source:- field survey 2011)

Where,

$$E = \frac{\sum O}{n} = \frac{340}{10} = 34$$

There, O = Annual observation Frequency

E = Annual Expected Frequency

$$\therefore \text{ Calculated } \chi^2 = \sum \frac{(O - E)^2}{E} = 147.48$$

Degree of freedom = n –1 = 10 –1 = 9

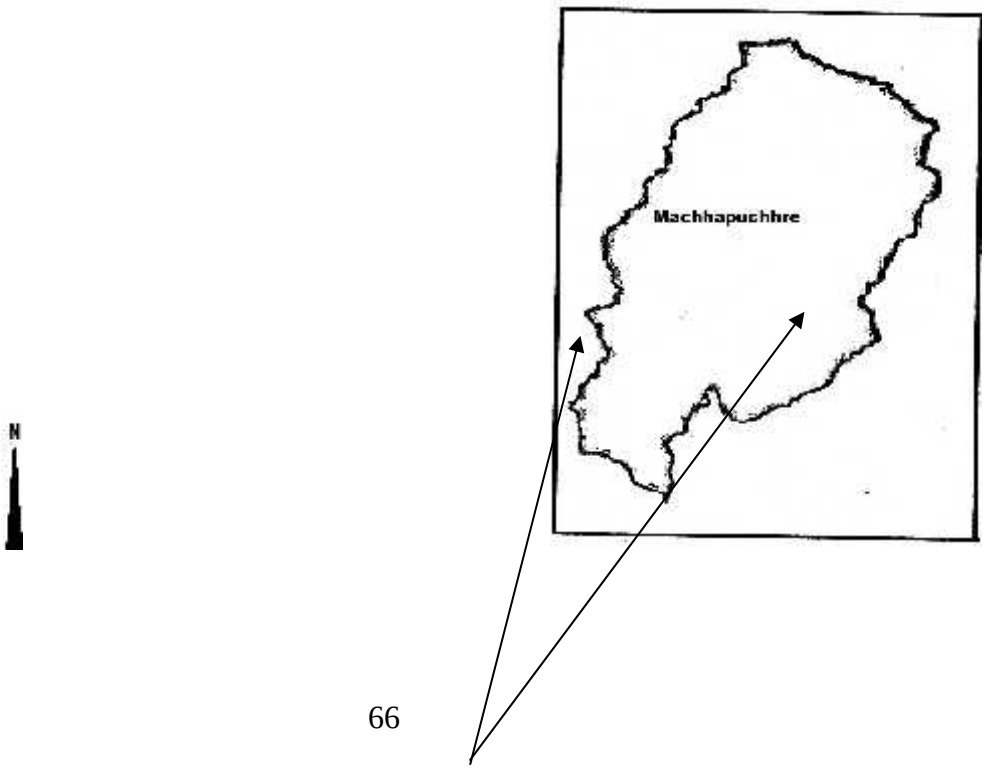
Therefore,

The tabulated value of χ^2 at 5% level of significance with 9 degrees of freedom is 16.919. Since, the calculated value is greater than the tabulated value. So null hypothesis is rejected and the alternative hypothesis is accepted. From this result, it can be concluded that the role of ACAP is significant in semi-employment generation.

ANNEX-5

Study Area Map

Machhapuchhre VDC



Kaski District Map

ANNEX - 6

Questionnaire

Dear Respondents,

This study is especially designed for the purpose of partial fulfillment of the M.A. Degree of Economics program at P.N. Campus, Pokhara. This study aims to examine based on the "Role of ACAP in rural household economy". All information mentioned in this questionnaire will be confidential and none of the name will be included anywhere during the course of study. So I expect kind cooperation from all of you.

I. General Information of the Respondent:

Name of Respondent:- . . . . Interview No:- . . .

Gender:- . . . . . Ward No:- . . .

Age:- . . . . . . Cast:- . . . .

Education:- . . . . . Occupation:- . . . . .

II. Household Socio-economic Information on the Respondent.

1. How many members are in your family as a time of group?

Age Group	Male	Female	Total
Below 15			
15 – 60			
61 to above			
Total			

2. Education level

Level	Male	Female	Total
Illiterate			
Literate			
Secondary			
Intermediate			
Bachelor			
Master			
Total			

3. House Structure.

House Structure	Yes/No	Owned/Rented/Others
Slate roof		
Tin roof		
Thatched roof		
Sanitation		
Others		

4. Land holding.

Land of Type	Area (in Ropani) at 10 year ago	Area (in Ropani) at Present
Khet		
Bari		
Pakho		
Private forest		
Land less		
Others		
Total		

5. Livestock Structure and Market Values.

Livestock	Cast	10 year ago	Present

		Qty	Market V.	Total Rs.	Qty	Market V.	Total Rs.
Buffaloes	Local						
	Improve						
Cow	Local						
	Improve						
Oxen	Local						
	Improve						
Goat	Local						
	Improve						
Sheep	Local						
	Improve						
Chicken	Local						
	Improve						
Duck	Local						
	Improve						
Bee Hive	Local						
	Improve						
Others	Local						
	Improve						

6. Income sources.

a. Income from livestock products

Livestock's Products	10 year ago			Present		
	Qty.	Market value	Total Rs.	Qty.	Market value	Total Rs.
Milk						
Ghee						
Honey						
Wool						
Manure						
Drag Power						
Hen						
Goat/Sheep						
Buffaloes						
Total						

b. Income from agriculture products.

Crops	10 year Ago			Present		
	Qty/Unit	Market V.	Total Rs.	Qty/Unit	Market V.	Total Rs.
Paddy						
Maize						
Millet						
Wheat						

Soya been						
Mustard seed						
Potato						
Vegetables						
Fruits						
Cash crop						
Seed crop						
Others						

b. (i) Agriculture productions sufficient.

Sufficient Condition	Month	10 year Ago	Present
		Tick Mark (√)	Tick Mark (√)
Surplus	12 to Above		
Equal	9-12 month		
Less < 9 month	6-9 month		
Less < 6 month	3-6 month		
Less < 3 month	0-3 month		

c. Occupation of family members.

Occupation	Gender	10 year Ago		Present	
		No. of per.	Annual in Rs.	No. of per.	Annual in Rs.
Government Service	Male				
	Female				
Private Service	Male				
	Female				
Pension	Male				
	Female				
Employment Abroad (Remit.)	Male				
	Female				
Labors	Male				
	Female				
Enterprise	Male				
	Female				
Business/ Grocery	Male				
	Female				
Farmers	Male				
	Female				
Student Above SLC	Male		-		-
	Female		-		-
Total	Male				
	Female				

c. (i) Employment status

Employment Status	10 year Ago			Present		
	Male	Female	Total	Male	Female	Total
Full-employment						
Semi-employment						
Unemployment						
Total						

7. Expenditure in household activities

Expenditure	10 year ago	Present
	In Rupees.	In Rupees.
Food		
Non-Food		
Agriculture		
Livestock		
Total		

8. Normally Surplus of Agriculture, Livestock and Natural products sell condition in VDC area.

Products	Particular Name	Quantity	Market value in Rs.	Total in Rs.
Agriculture				
Grain, Seed crop, Fruit, Vegetables, Straw, etc.				
Livestock				
Goat, Buffaloes, Hen, Milk, Meat, Gee, Manure, Draft power, Honey, wool, ox, etc.				
Natural Products				
Fire wood, Grass, Timbers, Bamboo Products, Soil, Nigalo (bamboo), Herbs, etc.				

III. Role of ACAP in Socio-economic and Natural Activities.

9. What you think about Natural and Social Awareness or improvement impact before ACAP and at present in your area?

Impact	Natural and Social Awareness or improvement	
	Before ACAP	Present
Very good		
Good		

Normal		
Bad		

10. Do you have any alternative energy sources used?

Type of energy	10 year ago	Present
Fuel wood		
Electricity		
Bio-gas		
LP-gas		
Solar		
Improve stove		
Others		

11. Have you/your family members participated on conservation program of ACAP?

Type of Training / Workshop	Participated members
Empowerment	
Awareness	
IGA	
Conservation	
Others	

12. Did you start any activities to improve your household economy after participating

the program of sustainable development by ACAP and others?

i) Yes ii) No iii) Others

If yes, what type of income activities have you started?

Sector	Name	Start year	Investment Rs. "000"	Income Average	Profit/loss	Involve	
						Male	Female
Agriculture							
Livestock							
Tourism							
Enterprise							
Forest products							
Others							

13. What types of activities for income, employment and production generation programs should be established to harmonic development between rural household economy and conservation in your VDC for sustainable development?

14. What have been the main problems facing on Natural Conservation and what types policies should be done from concern sectors?

15. If any suggestions please mention below.

Thank you.

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