Impact of CDM (Clean Development Mechanism) through Carbon Crediting and Carbon Financing on the Livelihood of Beneficiaries in Himachal Pradesh

Project Report

by

SHUBHAM RANAUT
(H-2016-30-MBA)

Submitted to

DR YASHWANT SINGH PARMAR UNIVERSITY
OF HORTICULTURE & FORESTRY
SOLAN (NAUNI) HP -173 230

in

partial fulfilment of the requirements for the degree

of

MASTER OF BUSINESS ADMINISTRATION
COLLEGE OF HORTICULTURE

2018

Dr Krishan Kumar
Professor & Head

Department of Business Management
College of Horticulture
Dr Y S Parmar University of Horticulture and Forestry, Nauni-Solan-173230 (HP)

CERTIFICATE-I

This is to certify that the Project entitled**, "Impact of CDM (Clean Development Mechanism) through Carbon Crediting and Carbon Financing on the Livelihood of Beneficiaries in Himachal Pradesh ",** has been submitted to Dr. Y. S. Parmar University of Horticulture and Forestry, Nauni-Solan by Shubham Ranaut (H-2016-30-MBA) in partial fulfillment of Master of Business Administration programme. This project is done under my guidance and to the best of my knowledge no part of this project has been submitted for any other degree or diploma.

Date:
Place: Nauni, Solan (H.P.)

_____
Dr Krishan Kumar)
Project Advisor

CERTIFICATE-II

This is to certify that the project entitled, **"Impact of CDM (Clean Development Mechanism) through Carbon Crediting and Carbon Financing on the Livelihood of Beneficiaries in Himachal Pradesh",** has been submitted to Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Nauni, Solan (H.P.) by Shubham Ranaut (H-2016-30-MBA) in partial fulfillment of the Master of Business Administration programme. This project has been approved by the examination committee after conducting an oral examination in collaboration with the external examiner.

(Dr Krishan Kumar)
Project Advisor

External Examiner

(Dr Krishan Kumar)
Professor and Head
Department of Business Management

Dean
College of Horticulture
Dr Y S Parmar, UHF, Nauni-173 230, Solan (HP)

Date:
Place:

CERTIFICATE-III

This is to certify that the project entitled "**Impact of CDM (Clean Development Mechanism) through Carbon Crediting and Carbon Financing on the Livelihood of Beneficiaries in Himachal Pradesh",** has been submitted to Dr Yashwant Singh Parmar University of Horticulture and Forestry, Nauni, Solan (H.P.) by me in partial fulfilment of the Master of Business Administration programme is my original work and no part of the project has been copied from any other source. Information used from other sources has been duly acknowledged by me.

_____

Date: Student's Signature

Place: Nauni (H.P.) Student Name: Shubham Ranaut

H-2016-30-MBA

CERTIFICATE-IV

This is to certify that all the corrections pointed out by the external examiner have been incorporated in the project entitled "**Impact of CDM (Clean Development Mechanism) through Carbon Crediting and Carbon Financing on the Livelihood of Beneficiaries in Himachal Pradesh",** has been submitted to Dr Yashwant Singh Parmar University of Horticulture and Forestry, Nauni, Solan (H.P.) by Shubham Ranaut (H-2016-30-MBA) in partial fulfillment of the Master of Business Administration programme.

(Dr Krishan Kumar)	**(Dr Krishan Kumar)**
Project Advisor	**Head of Department**

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With limit less humility, I am grateful to THE ALMIGHTY who is full of mercy and due to his blessing, I am able to complete my project on time and I also owe this pride to my beloved ***grandfather Sh. Shakti Chand Ranaut,*** *for his prudent persuasion, selfless sacrifice and heartfelt blessing which has made this manuscript to be reality. I dedicate this work to his blessings.*

"No scientific endeavor is a result of an individual's efforts. And so comes the time to look back on the path traversed during this endeavor and to remember the faces and spirits with sense of gratitude"

I deemed it to be my profound privilege to express my deep sense of gratitude and profound personal regards to esteemed teacher and Project advisor, ***Dr Krishan Kumar*** *(Professor and Head, Department of Business Management), whose superb guidance, critical analysis, constructive criticism, constant encouragement and unparalleled execution of the essential requisites during the entire course of study are beyond reach of my formal words.*

I emphatically extend my heartiest thanks to the worthy teachers ***Dr Kapil Kathuria (Associate Professor), Mrs Neena Ghonkrokta (Assistant Professor), Dr Yasmin Jhanjua (Assistant Professor), Dr Rashmi Chaudhary (Assistant Professor) ,Dr Nisha Raghuvanshi (Assistant Professor)*** *and the entire staff of the department of Business Management, University of Horticulture and Forestry, Nauni (Solan) and* ***Dr Renu Sehjal*** *for their moral support extended to me time to time.*

I can hardly overlook the co-operation, timely help and moral support extended by the galaxy of my friends ***Mr. Sachin Rajta, Er.Madhur Moksh Sharma, Er.Sumit Parmar, Mr. Atul Sharma ,Mr. Rohit Thakur, Miss. Malika Sharma, Miss. Parul Thakur, Er.Kshitij Sharma, Er. Vivek Katoch, Himachal Pradesh Forest Department*** *and my sister* ***Miss Diksha Ranaut,*** *who have always supported and helped me anytime I needed.*

I am sincerely thankful to my respondents who spread their valuable time to provide me the pertinent information.

I owe entire responsibility for all the errors and omissions

Date: ***(Shubham Ranaut)***
Place: Solan

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Date: ***(Shubham Ranaut)***
Place: Solan

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INTRODUCTION

CDM (Clean Development Mechanism) is used as a tool to combat the climate change and support development. Participating in the mechanism has raised overall awareness about low carbon solution and leverages capital for climate-friendly projects in host countries. It has also provided opportunities to support basic development needs and broader socio-economic co-benefits such as improving energy access and energy services. Projects also develop local natural resources and reduce both local air and water pollution. The CDM projects have also seen significant benefits at the grass-root level of building capacity and of local empowerment of vulnerable groups.

Kyoto protocol is considered to be the most far reaching agreement on environment and sustainable development ever adopted. Clean Development Mechanism is the only mechanism of Kyoto protocol where developing countries can participate and join in mitigation of climate change. The CDM allows the developing countries to put capital investment in “clean” projects in developing countries and gain carbon credits, which they can use to reduce its own carbon reduction targets. Himachal Pradesh (HP) is a northern state in India situated in western Himalayas, which covers an area of 55,673 Km, with population of 68,56,509 persons as per the census India 2011 (0.57 per cent of total population of India).The economy of the state is dependent on sectors like hydel power generation, horticulture, agriculture, forestry and tourism. The state is currently facing major challenges due to climate change particularly because of the fact that, it is an agrarian economy with 90 per cent rural population dependent on it for livelihood, HP is also dependent on rains for its economic activities moreover sustainability of hydro economy is dependent on snow and glaciers and climate induced and other natural disaster threat in the state.

Based on modeling and other studies, it is evident that the climate in the state is changing, and that there is rise in temperature in the Himalayan region by about 1.6 degree in the last century. A project that is Himachal Pradesh Reforestation project- improving livelihood and watersheds will be implemented in the state of Himachal Pradesh , India. The state is located in North- Western Himalayan region of state of India and has 12 districts, which are categorized into four agro climatic zones , i) Shiwalik hills, ii) Mid hills , iii) high hills , iv) Cold dry zone.

The project has been developed through a series of consultations with MHWDP and its stake holders constituents namely, Forest Department, Government of Himachal Pradesh, Local Gram Panchayat (GPs) and World Bank. The project seeks to implement A/R CDM activities on 4,003.07ha degraded lands in the watersheds of Mid-Himalayan region.The project is expected to bring value addition to the ongoing physical catchment/ drainage treatment activities undertaken as part of the MHWDP. It seeks to restore degraded lands through reforestation activities. The Clean Development Mechanism (CDM) is a mechanism under the Kyoto Protocol of the United Nations Framework Convention on Climate Change that allows developed countries to take action in developing countries to meet their greenhouse gas (GHG) emission reduction commitments. Article 12 of the Kyoto Protocol defines the dual purpose of the CDM as follows:

- To assist developing countries in achieving sustainable development and in contributing to the ultimate objective of the Convention (to address climate change
- To assist industrialized countries in achieving compliance with their Quantified

Emissions Limitations and Reductions requirements under Article 3 of the Kyoto Protocol. Under the Clean Development Mechanism (CDM) of the Kyoto Protocol, greenhouse-gas emission offsets are measured in tonnes of CO2 equivalents and are called “Certified Emission Reductions” (CERs).

Forest: The Government of India defines ‘forest’ for consideration under CDM as land having growing trees with:

1 A minimum area of 0.05 ha,

2 A minimum tree crown cover of 15per cent, and

3 A minimum height of 2 meters.

The CDM project along with the potential carbon revenue will enable reclamation of highly vulnerable (sloping) lands subjected to soil erosion and land degradation. The project activities will promote biodiversity due to protection and planting of native tree species reduce soil erosion and siltation of water bodies. All the three plantation models will also provide multiple products to the local communities generate employment and livelihood activities. In the absence of the proposed CDM project activities, land degradation would continue and the communities will continue to face shortage of biomass products.

The A/R project area consists of 3216 ha. contained in various land categories viz Forest Land (2943 ha); Community Land (227 ha) and Private land (46 ha) spread over 139 Gram Panchayats (GPs) involving 231 Village Development Societies having 4374 members including 1424 women members.

Implementation of A/R CDM project and carbon sequestration will generate CDM revenue termed as CERs. Revenue for carbon credits is calculated based on growth and accumulation of carbon in tree biomass (aboveground and below ground biomass). The biomass stocks will be periodically measured from permanent plots to estimate the carbon revenue. The total projected net greenhouse gas (carbon dioxide) removal by trees for the total project areas over the first crediting period of 20 years due to the implementation of afforestation under CDM is 8,28,016 t CO2-e of t CERs at the rate of 10.34 t CO2–e/ha/year. Verification of Carbon stocks will be carried out at the interval of every five years and the CERs generated will be sold accordingly. The CER revenue from degraded forest land and community lands will be shared with the GPs and in turn with the individual families. The CER revenue from the degraded private lands will be fully transferred to the respective farmers. The flow of CER revenue will depend on growth rate of trees and carbon price. CERs (65,582) generated for the first five year period (2006-12) has been sold at the rate of $4.75/tCO2for an amount of US$ 3,11,514.50 (193 Lakh). After deduction of Project preparation cost, Kyoto Protocol and other costs (amounting to US$55000) by the World Bank, the net Carbon revenue amounting to US$ 2,56,514.50 (Rs. 163 Lakh) has been earned during 2015-16 by the State. 10per cent amount of this amount (Rs 16.50 Lakh) was kept by the Project as overhead charges and balance 90per cent (Rs.146.56 Lakh) shared by the concerned beneficiaries (User group & GPs) in the ratio of 80:20.

Forest and Afforestation activities are important Carbon sinks, influencing climate by absorbing CO2 from atmosphere, the most prevalent and important Green House Gas (GHG), & storing carbon in wood, litter, leaves, roots & soil. The area under forest in Himachal Pradesh is estimated to be 14683km2 as per Forest Survey of India report 2013. Area under open forest accounts for 13.71per cent of the total forest area & there is a scope for afforestation activities. The HP Mid-Himalayan Watershed Development Project HP MHWDP was implemented in the mid and high hills range of 600 to 1800 meters by the Government of Himachal Pradesh with the assistance of World Bank, covering 11 watershed divisions falling in 10 districts. The Bio Carbon reforestation Project under Carbon Development Mechanism is an additional component of the HP MHWDP. The project has been registered with UN body

(UNFCCC) on March 4, 2011. The project aims to protect watersheds, enhance tree cover, conserve biodiversity, improve livelihoods and generate carbon revenue. The project is being implemented in 139 Gram Panchayats (GPs) covering 3216 ha of degraded land. The focus is on reforestation for which the farmers are receiving cash incentive by being a potential seller of carbon credits.

The distribution of carbon revenue is also well defined:

- Out of total carbon revenue 10per cent will be kept with MHWDP/Forest Department as overhead charges, the rest 90 per cent will go to the GPs/User Groups.
- In case of Forest Land, 80 per cent of the carbon revenue received (90 per cent of total) will be distributed between the User Groups/VFDS and rest 20per cent will go to the GP for undertaking works in consonance with approved GPWDP (Gram Panchayat Development Plan).
- For community land, 90 per cent of carbon revenue received after deduction will go to GP who will further distribute 80 per cent of it between the User Groups and rest 20 per cent will be utilized for works in consonance with approved GPWDP (Gram Panchayat Development Plan).

The socio - economic and environmental benefits of community include:

Benefits of bio carbon project Knowledge generation on project preparation, planning and management, watershed protection. It is also help to sequestration of CO2 generating Carbon revenue and to make cash incentive to communities. It also look after the payments to local institutions to improve infrastructure and assist improved production of milk and NTFP etc. Another factors like employment generation, firewood, fodder, timber are major developing factor in the community's

An effective monitoring system has been put is in place. The monitoring covers a range of parameters such as area planted, condition of the land parcels, survival of seedlings, tree biomass growth, events occurring in the project area etc. Plantation Journals are being maintained & updated to reflect relevant information of each parcel

Project has been implemented as a sub project of the Mid Himalayan Watershed Development Project (MHWDP) involving HP Forest Department and the local institutions i.e. Gram Panchayats through community user groups. The officials responsible for coordinating

project implementation and organization of data/information/reporting of the project have been designated at various levels.

Need of Study

Himachal Pradesh is working for sustainable development (CDM) for eradicating the effect of carbon emission, thus number of projects are initiated and local villages are involved in different models aimed at reforestation forestry, community forestry and farm forestry. the present study was conducted to examine the present status and impact of different CDM activities. It will help in restructuring of the policy. Mainly to study :

1) *Reforestation forestry model*: In this model , reforestation of degraded un-demarcated forest land purposed with a tree density 1,100 plants/ha. The species to be planted under this model include largely with native species. This models aims to protect the watershed and regenerate native flora, supplemented with planting of native tree species on degraded sloping high altitude lands of selective GPs have been examined.

2) *Community forest model:* This model is proposed for reforestation degraded community lands. The species included in this model are largely native species. The reforestation activity will leads to protection of watersheds , improvement in biomass required to meet the local community needs of small timber , fuel wood (woody litter) , fodder for livestock and non-timber forest products.

3) *Farm forestry model :* this model covering an area of 533.15 ha includes reforestation of abandoned or long term fallow private lands with tree species aimed at largely providing fruits and fodder to the land owners .

Objectives of Study

Following were the specific objectives:

- To examine the improvements made in the productive potential of the selected land parcels covering degraded land watershed catchment areas of Himachal Pradesh Reforestation Project
- To study impact on livelihood and incomes of rural households residing in the selected land parcels.

Chapter 2

REVIEW OF LITERATURE

Review of literature gives a theoretical base for research. The existing knowledge provides an understanding about various concepts in any discipline and helps in selecting appropriate methodology. The following studies have been consulted for present studies:

Agarwal (2006) Described the accounting and taxation aspect of carbon credit and raised some question regarding accounting of carbon credit .In his opinion sale of CERs should be treated as other income, not turnover.

Robert (2008) stipulated that so far there is no structured policy to reduce the emissions of carbon dioxide and other greenhouse gases, majority of the previous researches were focused on the western countries. With reference to the emerging issue – global warming, majority of the country across the globe have started showing their serious concern for this issue, and need has been raised to form a structured policy to have fair distribution of emission allowances which also exert positive impact on the economy of the country.

Savalia (2009) Explained the process of carbon credit and showed that India has generated 70.14 million CERs/Carbon Credit units as on the July 31, 2009 and has expected roughly another 145 million to to push into the international market and mentioned name of some Indian company which are earned multimillions through execution of CDM projects.

Mizrach (2010) examined that Kyoto also created a Clean Development Mechanism (CDM) which provides incentives for developing countries to lower their carbon emissions. These projects, the majority of which are in China and India, generate primary Certified Emission Reductions (pCERs) which serve as substitutes for emissions in the EU ETS. Nearly 2500 projects have been approved by the CDM executive board which produce an annual average of 389:3 million CERs. CDM credits have, since 2007, traded in secondary markets (sCERs). Volumes reached 887 MM in 2009.The European Climate Exchange (ECX) has emerged as the major trading venue. In 2009, it handled 78per cent of EUA trading volume and almost 97 per cent of the CER activity. Because CO2 is a global pollutant, that .linkage between emissions trading schemes is emerging as a substantive issue.

Nitin and Shubhangi (2011) stipulate the potential for the energy projects under clean development mechanism and voluntary market. Climate change is one of the greatest

environmental threats facing the world today. To tackle this problem, a protocol was adopted in Kyoto in 1997 which establishes legally binding commitments to developed countries to bring down the emissions of six major greenhouse gases by 5.2per cent compared to the year 1990. Three flexibility mechanisms have been provided to developed countries to achieve the target of emission reduction under this protocol and one of them is the Clean Development Mechanism (CDM), which allows industrialized nations or private entities therein to implement emission reduction projects in developing countries and receive credits in the form of Certified Emission Reduction (CERs), which may be counted against their national reduction targets. The paper discusses about the scope of hydroelectric and wind projects in the CDM market in India and also looked at the options available other than the CDM market, namely the Voluntary Carbon Market. It also identifies to what extent the potential of these projects could be harnessed and also presents the key challenges to making full use of these opportunities.

Kansal *et al.*,(2011) analyzed the Indian scenario and state that India is likely to emerge as the biggest sellers and Europe is going to be biggest of buyers of carbon credit. India has generated some 30 million carbon credit and has roughly another 140 million to push into world market.

Gupta (2011) discussed the basic concept and importance of carbon credit . They emphasis on the method used to save the environment and stated that the business opportunities in the global emission market in Indian context.

Galinato *et al.* (2011) examined that the effect of the Clean Development Mechanism regulations that create temporary certified emission reductions on harvesting decisions, land use allocation, and the carbon supply in forest plantations. Under the accounting rules set during the 2003 Conference of the Parties (COP) in Milan under the United Nations Framework Convention on Climate Change (UNFCCC), forest projects can accumulate carbon credits called temporary certified emission reductions (tCERs) and long-term certified emission reductions (lCERs).The important aspect is to decide the proper policy of CDM regarding the amount of supply and rotation interval choices. Here the author emphasis on how increase or decreases in demand for carbon affects the CDM policy/program. The policy also emphasis on getting tCERs approval, there are two criteria: First, the host country must have ratified the Kyoto Protocol and must establish a Designated National Authority (DNA) to determine sustainability of crediting projects within the country. Second, any land that is to be converted

into carbon forest plantations must have been without forest cover between December 31, 1989, and the start of the projects activity.

Simon *et al.* (2011) encountered the win-win scenario has been done for climate change development specially focusing on stove replacement program with carbon finance and study the possibilities for the same. They focuses on the improved cook stove technologies form an important, if asymmetrical, environment–development interface, and illustrate the mutually supported local (development) and global (climate change) benefits of continued improved stoves use. In practice, there are a number of challenges to achieving effective 'win-win' outcomes—including cultural, financial, governance and technological barriers. Carbon finance provides an opportunity to fund scalable. Nicholson *et al.* (2011) stipulated the carbon pricing and relative competitiveness about the low-carbon base load generating technologies. Here the research paper define and apply a set of fit-for-service criteria to identify technologies capable of supplying base load electricity and reducing GHGs by amounts and within the timescale set by the Intergovernmental Panel on Climate Change (IPCC). Only five current technologies meet these criteria: coal (both pulverized fuel and integrated gasification combined cycle) with carbon capture and storage (CCS); combined cycle gas turbine with CCS; Generation III nuclear fission; and solar thermal backed by heat storage and gas turbines. The analysis of the data shows nuclear power to be the standout solution for low emissions base load electricity, in terms of cost and ability to meet the timetable for GHG abatement. Further, nuclear power's relative competitiveness increases as the carbon price rises.

Bharti *et al.* (2011) focused on carbon credit from composting of municipal solid waste. The Municipal Solid Waste (MSW) used in formation of windrow was collected from the NERIST campus. Loss on Ignition (LOI) was measured which represents the amount of carbon and remaining ash in solid waste samples after ignition. As an absolute measure of biodegradable carbon, LOI provides an excellent measure of biological decomposition in a composting process. Only, biodegradable components of waste are converted into CO2 during the composting process.

Sharma (2012) suggested that income from sale of CERs should be accounted for under the head 'Business and Profession'. However , in case of sale of intangible , it would be taxable under the head 'Capital Gains' though most companies in India are recording earnings from carbon credit trading as Income from 'Other Sources' currently.

Sood (2012) explained the accounting, reporting and taxation aspect of carbon credit. She also investigated that there is currently no authoritative accounting literature and either the financial accounting standard board or International accounting standard board on accounting emission allowances although both U.S and International accounting standards setters have previously attempted to address the issue. Companies have developed their own accounting policies in the absence of explicit authoritative guidance.

Chapter 3

MATERIAL AND METHODS

Research methodology is the systematic way to solve the research problems. It may be understood as science of studying how research is done systematically. When we talk about m, formulating logic behind the methods or techniques and why we are not using others. Research process starts with defining research problem, formulating hypothesis, design research, collection of data and finding interpretation and analysis of data to form a report.

3.1 Research Design

The descriptive research design was adopted for the concerned research study.

3.1.1 Population and Research Area

The research was conducted among 60 beneficiaries of Himachal Pradesh.

3.1.2 Sampling Technique

Sampling is defined as the segment of population that is representative of whole population. The number of individual in a sample is called a sample unit. The respondents were selected by convenience sampling depending on availability of respondents. Convenience sampling is a type of non-probability sampling technique where subjects are selected because of their convenient accessibility and proximity to the study.

3.2 Data Collection

Two types of data have been collected for the resent study.

3.2.1 Primary Data

Primary data was collected through closed ended, open ended and structured interview schedule.

3.2.2 Secondary Data

Secondary data was taken from journals, magazines, research articles, newspapers and books.

3.3 Applied Analytical Tool

Simple mathematical tools have been used for the satisfying the objectives with a view of keeping the analysis simple and easy to understand.

3.3.1 Mathematical Tools

The information collected from the sample respondents was analyzed by applying percentage method.

a) Percentage

The formula used for percentage method is:

$$\boldsymbol{P = \frac{X}{Y} * 100}$$

Where

X= Number of respondents failing in specific category to be measured.

Y= Total Number of respondents

3.3.2 Statistical Method:

The following statistical tools have been used to analyze the data collected from the resent study.

a) Arithmetic Mean:

The arithmetic mean has been applied to study the opinion of the sample respondents on 5-point scale for different statements. This tool helps researcher to draw appropriate inferences from the responses collected from the respondents.

The formula used for Arithmetic Mean is:

$$\boldsymbol{X = \frac{\sum X}{N}}$$

Where

X= Arithmetic Mean

$\sum$X= Sum of the values of the variables

N= Number of Observation

b) Standard Deviation:

The standard concept was introduced by Karl Pearson in 1823. The standard deviation measures the absolute dispersion or variability of distribution; the greater the amount of the dispersion or variability), the greater the standard devation, the greater will be the magnitude of the deviation of the values from their mean. A small standard deviation means a high degree of uniformity of the observation as well as homogeneity of the series; a large standard deviation means just the opposite.

The formula used for standard deviation is:

$$\textbf{Standard Deviation} = \sqrt{\frac{\sum x2}{\mathbf{N}}}$$

Where

$x=(X-\overline{X})$

N= Number of observations

3.3.3 Total Weighted Score method:

Total Weighted Score Method is a method in which we have to provide different Weights according to their importance and multiply the values of the items (X) by the weights (W) provided. Then add all the values to obtain the total weights of all the items and the one which get highest score will get the first rank and the one which get the lowest score will get the lowest rank.

3.4 SWOT Analysis

SWOT is a deliberate planning method used to evaluate strengths, weakness, opportunity and threats of a project. It is the simple review process when combined with goal-setting activity; SWOT is a useful tool that will provide road map to reach our goal successfully.

Chapter 4

Results and Discussions

Following are the results and discussions on the basis of present study :

Table 4.1 Age wise distribution of respondents

Age (years)	Frequency	Per cent
Less than 20 years	7	11.7
21-30 years	25	41.7
31-45 years	10	16.7
>45 years	18	30.0
Total	60	100.0

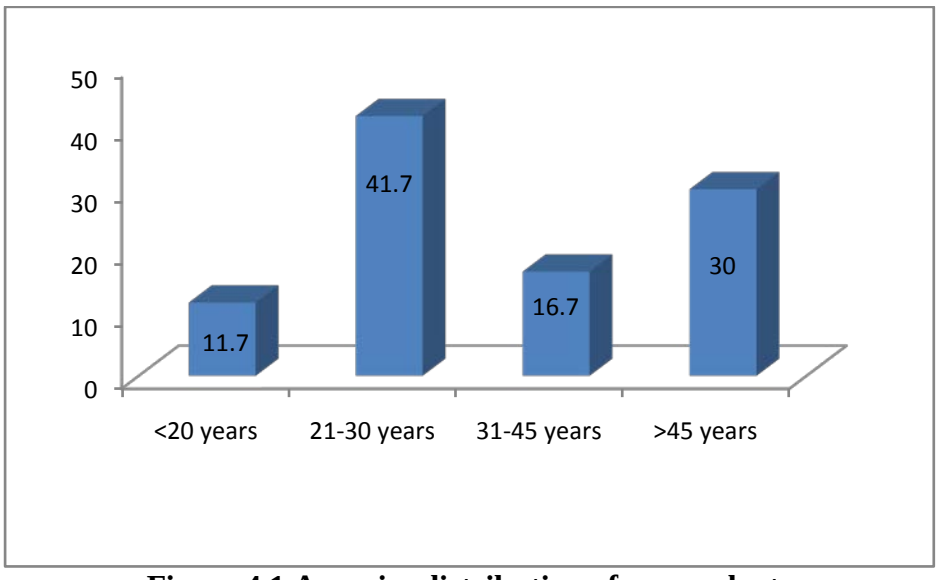

Figure 4.1 Age wise distribution of respondents

The figure 4.1 presents age status of respondents for the present study. Thus the above figure states that majority of respondents are the age group lies in the distribution of 21- 30 which is 41.7 per cent, 30 per cent are of the age group of above 45, 16.7 per cent are of the age group 31-45 and 11.7 per cent are the age group less than 20 years.

Table 4.2 Gender wise distribution of respondents

Gender	Frequency	Per cent
Male	32	53.3
Female	28	46.7
Total	**60**	**100.0**

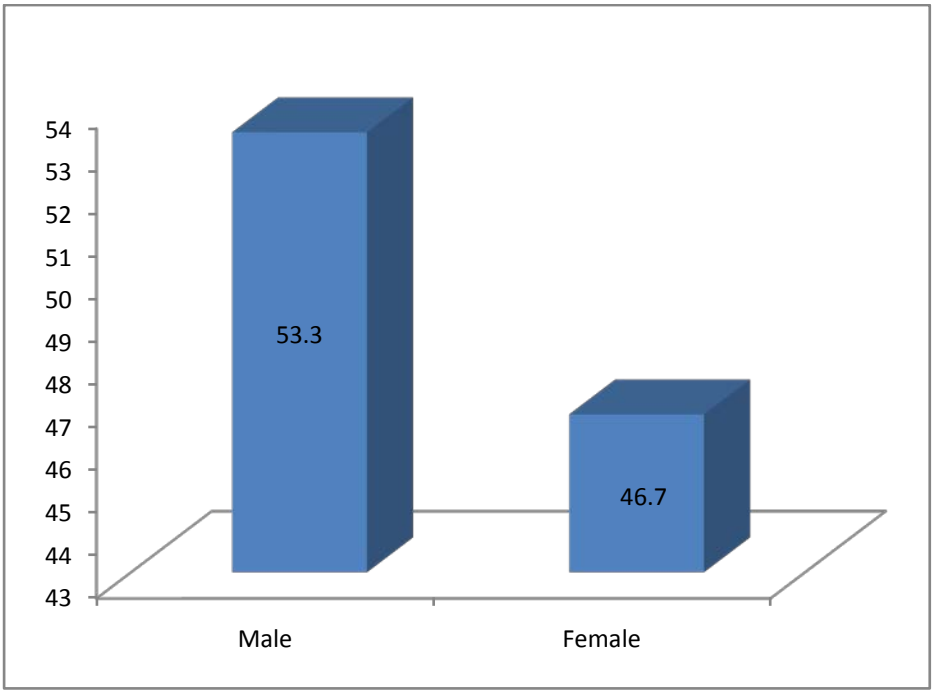

Figure 4.2 Gender wise distributions of respondents

It is revealed from above tabulated and graphical representation that largely male respondents were taken into sample representation, since male respondents were keen and enthusiastic about revealing Clean Development Mechanism future aspects.

Table 4.3 Education wise distribution of respondents

Education	Frequency	Per cent
Matriculation	9	15.0
Senior secondary level	21	35.0
Graduate	24	40.0
Post graduate	2	3.3
Doctorate	4	6.7
Total	**60**	**100.0**

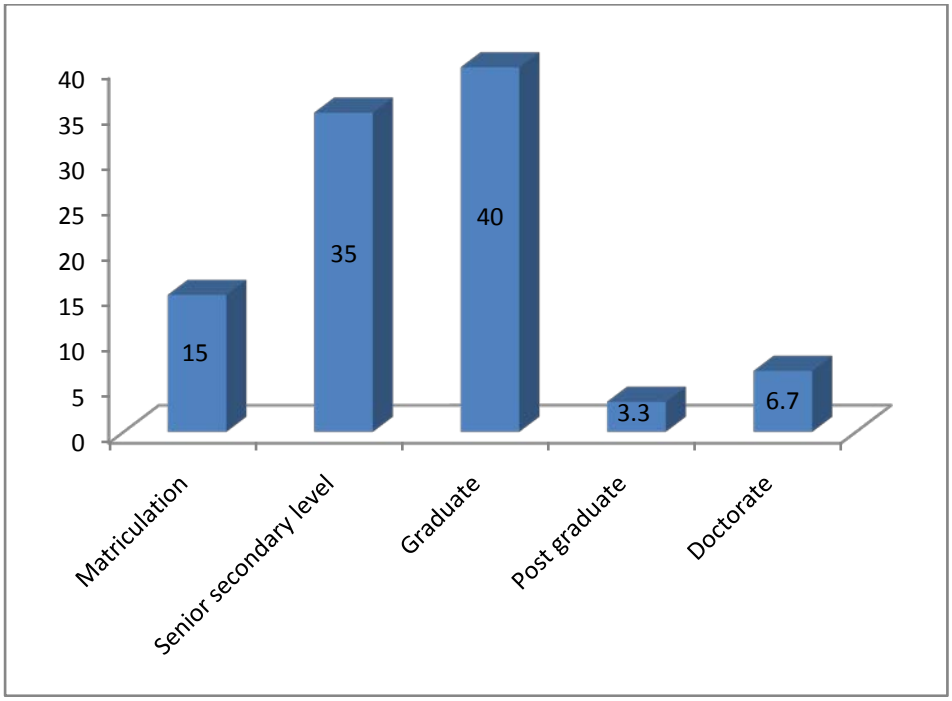

Table 4.3 Education wise distribution of respondents

The table no. 4.3 displays the education qualification of the respondents. It is stated by the figure that maximum number of respondents were graduates , 35 per cents of the respondents were of senior secondary level, 15 per cent of the distribution shows matriculation , 6.7 per cents respondents were having educational qualification of doctorate and 3.3 per cents were post doctorate.

Table 4.4 Family size wise distribution of respondents

Family	Frequency	Per cent
Single	20	33.3
Joint family	21	35.0
Nuclear family	19	31.7
Total	**60**	**100.0**

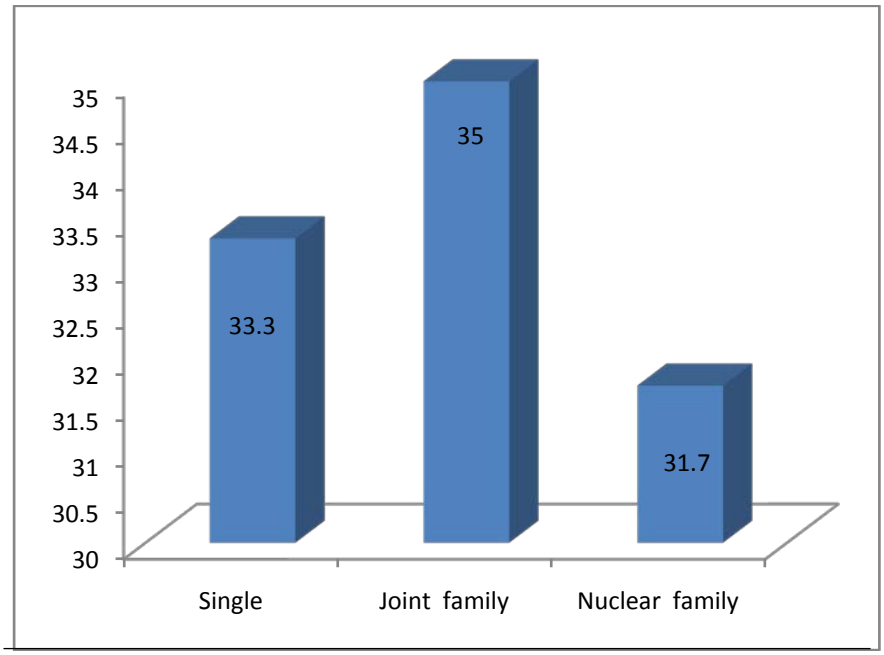

Figure 4.4 Family size wise distributions of respondents

Above tabular distribution shows the family size of the respondents in the present study. 35 per cents of the respondents were having joint family, 33.3 respondents in the present study were single and 31.7 per cent of the respondents were having the nuclear family.

Table 4.5 Awareness about global warming

Awareness	Frequency	Per cent
Yes	51	85.0
No	9	15.0
Total	**60**	**100.0**

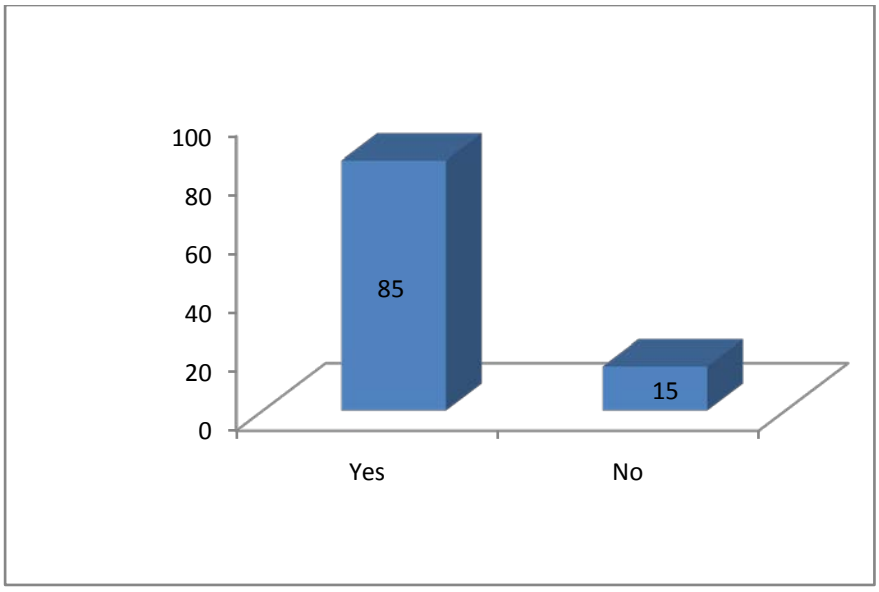

Figure 4.5 Awareness about global warming

Table 4.5 reveals the aspect of awareness of respondents about the global warming in the present study. 85 per cents of the respondents were well about the global warming effect in the environment while 15 per cent of the respondents were not aware about the global warming and the effect of the global warming in the environment.

Table 4.6 Awareness about carbon emission reduction

Awareness	Frequency	Per cent
Yes	42	70.0
No	18	30.0
Total	**60**	**100.0**

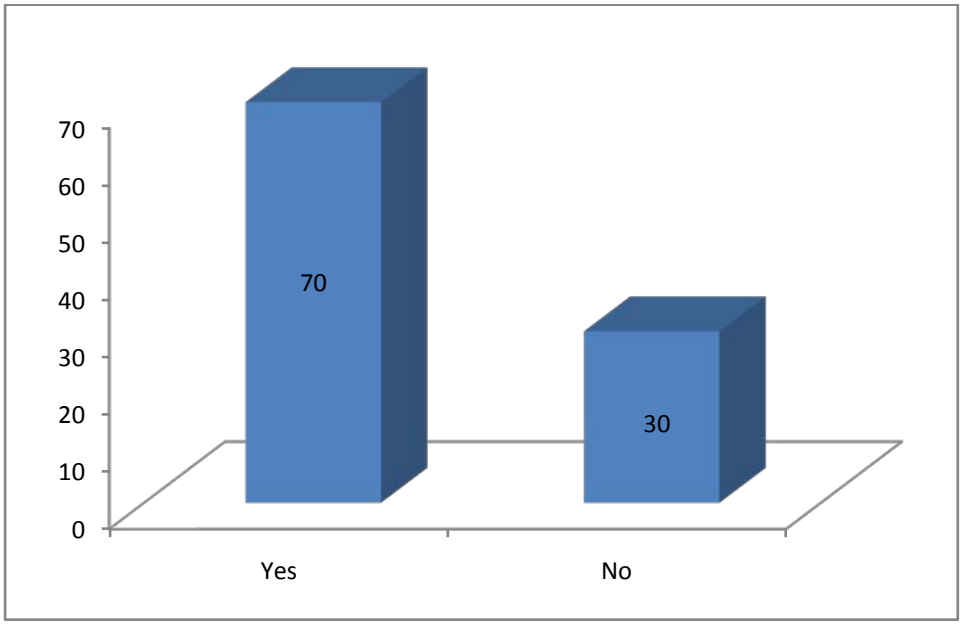

Figure 4.6 Awareness about carbon emission reduction

Above tabular distribution in the present study presents the distribution about the awareness factor of Carbon Emission Reduction in the respondents. 70 per cents of the respondents were well aware about the carbon emission reduction while 30 were not aware about the Carbon Emission Reduction factor in the environment.

Table 4.7 Awareness about Clean Development Mechanism

Awareness	Frequency	Per cent
Excellent	24	40.0
Good	18	30.0
Moderate	11	18.3
Fair	7	11.7
Total	**60**	**100.0**

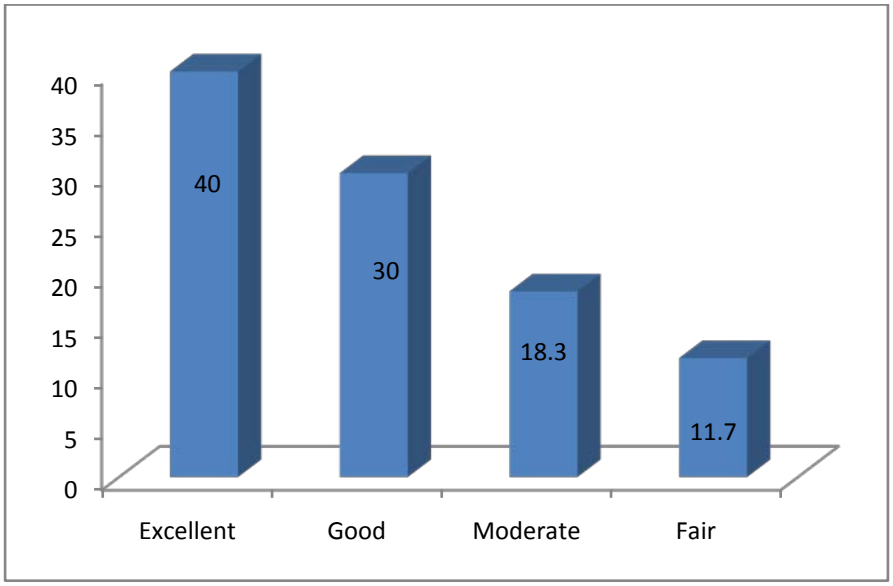

Figure 4.7 Awareness about Clean Development Mechanism

Table 4.7 represents the graphical and tabular distribution of the awareness factor of the Clean Development Mechanism among the respondents of the present study. 40 per cent of the respondents were having excellent knowledge about the clean development mechanism,30 per cents had good awareness factor ,18.3 per cent were moderately aware about the fact and 11.7 per cent of the respondents were have fair knowledge about the clean development mechanism.

Table 4.8 Aspect considered for the CDM project

Source: Field survey, 2018

Statements	Strongly disagree	Disagree	Neutral	Strongly	Strongly agree	TWS	Rank	Mean	Std. Dev.
I believe that the pollution level of the environment get reduced by the CDM project.	0	0	2	27	31	269	I	4.48	0.56
The project is eco friendly according to me	0	0	20	9	31	251	II	4.18	0.91
the project has positive impact on human well being	0	9	9	13	29	242	III	4.03	1.11
I believe that the CDM project does not make the environment a safer place	31	22	7	0	0	96	X	1.60	0.69
According to me the project is able to create employability	22	13	25	0	0	123	IX	2.05	0.89
I believe that project helps in reducing poverty	0	27	27	0	6	165	VIII	2.75	0.89
The project helps in the improvement of quality of life	0	17	37	6	0	169	VII	2.81	0.59
I believe that this project has an impact on resource sustainability	0	6	16	38	0	212	IV	3.53	0.67
According to me the people must be persuaded and educated about the project	0	20	27	11	2	175	VI	2.91	0.80
According to me the project need to be transparent	16	9	7	16	12	179	V	2.98	1.52

While analyzing the aspects of the Clean Development Management various aspects were segregated and framed to know the popularity or rnk of the aspects which affects the people physically emotionally and on the demographical levels. This analysed with the help of Total Weighted Score method and it is clearly indicated that largely respondents believes that clean developments projects are able to reduce the pollution level from the environment followed by the fact that project is Eco friendly and having positive impact on human well-being. While considering the resource sustainability it was ranked on the 4^{th} rank with the help of Total Weighted Score method.

Moreover, the data was further analyzed with the help of Mean and Standard deviations, revealing that larger respondents were agreeing on positive side of the Clean Development Management projects. Though Standard deviation being moderate stating that people or respondents had scared or distracted views on various aspects. Thus may have been stated that positive outcomes are many but negative sides could also have been integrated in many ways so that all problems can be rectified in the benefit of the human being. Therefore it may have been suggested that government agencies along with the local people and various co-operative organizations which are taking care of the CDM projects and forests must come forward in order to address various positive and negative outcomes as revealed and observed in the above illustration.

Table 4.9 Impact of CDM on following factors

Statements	Very Low	Low	Neutral	High	Very high	TWS	Rank	Mean	Std. Dev.
Employment	15	17	26	0	2	137	VIII	2.28	0.95
Economy of Himachal Pradesh	7	33	14	4	2	141	VII	2.35	0.89
Tourism	9	7	23	12	9	185	V	3.08	1.23
Earnings	29	21	0	8	2	113	IX	1.88	1.15
Water catchments	0	24	2	18	6	156	VI	3.26	1.10
Clean air	0	0	9	41	10	241	III	4.01	0.56
Clean water	0	0	22	34	4	222	IV	3.70	0.59
Clean environment	0	0	13	26	21	248	I	4.13	0.74
Health of the villagers	0	7	6	21	26	246	II	4.10	1.00

Source: Field survey, 2018

In reference to evaluate the Impact of CDM on following factors that influence or attract respondents most, it was analyzed in the following illustration with the help of Total Weighted Score method. It concluded that largely respondents agreed on the impacg of CDM projects on the environment in the positive way, largely respondents believe that CDM projects have contributed in the clean environment in their region closely followed by health of the villagers were influenced by the CDM projects. While considering the clean air and clean water, they are ranked in the 3rd and 4th position respectively. But on the contrary mean and standard deviation was also analysed for the study of the impact of CDM projects on various factors. Common uniformity of responses were noted in clean air (std. Deviation= 0.56) thus it may have been state that degree of the impact of CDM in various factors is very high. One of the most visible strength of the project irrespective of its components was people's receptive behaviour. A high motivated level was found amongst farmers/villagers to support the project activities. This was higher in high altitude villages. A community participant is one of the basic underlying socio-cultural identities of the hill people and is visible in day to day activities. Maintenance of irrigation channel, common property resources, support lands, grazing lands, opens grazing by animals and crop harvesting/threshing are traditional farming activities where community participation was found, Sharing of bulls for land ploughing and field preparation was also prevalent in many villages. The operationalisation of project activities through participatory approach was, in fact, a part of culture of the hill people and has added to their capacity building by villager's routine life. Success was therefore automatically expected if respondent's belongingness is generated for the CDM development. It was pleasing to see its success implementation in the field.

Table 4.10 SWOT analysis

Strengths	Weaknesses
• Livelihood needs are fulfilled • Visible impact on long term • Pre-dominance of the women • Assured returns • Traditional ethos and wisdom of respondents	• Lack of system research • Based on the individual beneficiaries • Major emphasis on the environment/ forestry • Lack of overall awareness
Opportunities	**Threats**
• Greater scope of the interventions • Sufficient internal input • Receptive and motivated beneficiaries	• May result in inequalities among beneficiaries • Least discussed components in policy meetings • Problem of continuity as it was an external aided project

Livelihood Enhancement

The project is consistent with the Country Assistant Strategy (CAS) of the bank which aims to support better management of watershed while enhancing the livelihood opportunities of the poor. In support of project development objectives, the component of Enhancing Mountain Livelihood aims at income augmentation through promoting value addition in crop and livestock and non timber forest products produced and support off farm economic activities of selected vulnerable and landless households.

In contrast to the able land development, it will focus on demand side, marketing and establishing linkages between farmers and buyers. Given the watershed is a land based approach, this component will reach out to poor women and vulnerable groups-typically the landless. In order to scale up the production level, quality enhancement, promote value addition in crop, livestock, and non -timber forest products (NTFPs) produced in the Project area, sub projects are being formulated under these components.

i) The strategy of the project is to expand the reach of already developed and growing sectors to project villages/beneficiaries e.g. horticulture etc.,

ii) Developing skills/commodity production in these villages and providing linkage to the existing marketing companies/boards.

iii) To linkup beneficiaries at higher level, cutting out village middlemen to ensures better returns.

iv) Piloting new crops/commodities/products that have market potential e.g. herbal medicine, high value vegetables, organic farm products etc. after systematic techno-market feasibility by Marketing Coordinator before up-scaling.

Community Empowerment

H.P. Mid Himalayan Watershed Development Project is a repeater project of IWDP except for its implementation arrangement. IWDP model focused on project created Village Development Committees which often disappeared after the culmination of project. H.P. MHWDP is consistent with the Harayali Guidelines of watershed Development. The project is being implemented through Gram Panchayat.

The project has empowered the communities through capacity building, transfer of decision making powers and resources and Communities are involved from the very beginning of the process of identification of problems, their possible solution, preparation of plan, implementation of activities, monitoring & evaluation and sustainability of assets created. Project is actively providing full support to build up the capacity of the communities by organizing trainings, workshops, meetings and exposure visits. Some of the project activities are being implemented through Gram Panchayats. GIA is provided by the project for implementation of the activities. At GP level different local groups i.e. Self Help Groups, Common Interest Groups, Users Groups and community Based Organizations are being involved in the implementation of project activities: As a result communities are feeling empowered.

Revenue through Bio-Carbon

Bio-Carbon Sub-Project Forest & Afforestation activities are important Carbon sinks, influencing climate by absorbing CO2 from atmosphere, the most prevalent and important Green House Gas (GHG), & storing carbon in wood, litter, leaves, roots & soil. The area under forest in Himachal Pradesh is estimated to be 14683km2 as per Forest Survey of India report 2013. Area under open forest accounts for 13.71per cent of the total forest area & there is a scope for afforestation activities. The HP Mid-Himalayan Watershed Development Project HP MHWDP was implemented in the mid and high hills range of 600 to 1800 meters by the Government of Himachal Pradesh with the assistance of World Bank, covering 11 watershed divisions falling in 10 districts. The Bio Carbon reforestation Project under Carbon Development Mechanism is an additional component of the HP MHWDP. The project has been registered with UN body (UNFCCC) on March 4, 2011. The project aims to protect

watersheds, enhance tree cover, conserve biodiversity, improve livelihoods and generate carbon revenue. The project is being implemented in 139 Gram Panchayats (GPs) covering 3216 ha of degraded land. The focus is on reforestation for which the farmers are receiving cash incentive by being a potential seller of carbon credits.

Sustainability

Social inclusiveness approach is there in the project, as communities are involved in planning, implementation and monitoring of project activities. In case of institutional sustainability, the project is being implemented through local governance (Gram Panchayats) instead of project created local bodies. The Gram Panchayats have constitutional validity. Secondly the Village Level Institutions i.e. Users Groups, Self Help Groups, Common Interest Groups etc. are involved in the project activities. After culmination of the project the project financed assets will be owned by the Users Groups who will be responsible for operation and maintenance of created assets under the overall guidance of GPs.

The empowerment plan for each Gram Panchayat will be prepared for each Gram Panchayat for each asset and operation and maintenance and corresponding beneficiary contribution required to cover this cost. In case of environmental sustainability, project is ensuring that the developmental is achieved without comprising the environment. The hallmark of the Integrated Watershed Development is to conserve soil and water in a sustainable manner with a focus on productivity. Under this project, different interventions are being adopted such as Integrated Pest Management, use of compost, promotion of organic farming etc. to ensure environmental sustainability.

Transparency

The Ministry of Rural Development is committed to empower Panchayati Raj Institutions and has been impressing upon the State Government to Develop necessary financial and administrative powers to the PRIs for self Governance particularly in planning, implementation and management of economic development activities in rural areas. Watershed Development has been included in the list of the subjects to be devolved to the PRIs. A new initiative called Hariyali was launched on 27th Jan., 2003 which seeks to empower the PRIs both administratively and financially in the implementation of Watershed Development Programmes of the Ministry of Rural Development. The Ministry of Rural Development modified the existing provisions and brought the new initiative. The H.P. Mid Himalayan

Watershed development Project is a repeater of Integrated Watershed Development (IWDP-II) except for implementation arrangements. Project preparation considered whether to continue with the IWDP model that focused on project created Village Development Committees or to implement through local governance (GPs). The later was chosen because it is consistent with Haryali Guidelines for watershed Development and powers devolved to GPs and strengthening GP capacity is more likely to yield sustainable impact than building ad hoc village a committee which may disappear once the project concludes.

H.P. MHWDP is initiating and supporting the process of building and strengthening self reliant for self-managed and sustainable local institutions that work for the rural poor. These institutions, including GPs, SHGs, UGs and CIGs etc., will provide platforms to manage the natural resources and promote their livelihoods, improve their bargaining power and create a safety net for the downward risks for the poor. Efforts are being made through capacity building of these institutions which includes enhancement of knowledge, skills and capability to perform effectively. It is more of positive thinking and problem solving ability than merely identifying the problem. It involves. A comprehensive, need based training plan is prepared, after assessing training needs, that targeted the state, sub-watershed and micro watershed levels. It also includes training and capacity building programme for Gram Sabha, Gram Panchayat, Budget Committee, Works Committee, Panchayat Secretary/Panchayat Sahayak, Para-Accountant, Up Gram Sabha, Ward Member and Common Interest Group (CIG)/User Groups. Initial scepticism on involving local government has faded away and project staff appreciates the decision to implement the project through GPs. It is due to the project that there is a substantial improvement in the quorum of Gram Sabha Meetings. There is a continued commitment among the project staff over the benefit of implementing the project through GPs. The project activities have started in around half of the selected Gram Panchayats and Rs 41.62 lakh has been transferred to GPs for implemementation of different project activities. The User Groups are taking wide range of local development activities under the project such as C/o foot paths, bridges, Cement Masonry structure, check Dams, masonry dams potable water supply, minor irrigation schemes, village ponds, baowlies, Kuhals. Community plantations etc.

Chapter 5

SUMMARY AND CONCLUSIONS

The concerned study on "Impact of CDM (Clean Development Mechanism) through Carbon Crediting and Carbon Financing on the Livelihood of Beneficiaries in Himachal Pradesh" was undertaken in order to understand farmers' opinion on various marketing systems used for apple crop, to highlight different factors and forces affecting efficiency of apple marketing channels and to identify various problems and constraints faced by growers while adopting modern marketing systems. "

The study revealed the following results:

- It was revealed that from the study that largely male respondents were taken into sample representation, since male respondents were keen and enthusiastic about revealing Clean Development Mechanism future aspects. As far as the age status of respondents were concerned, majority of respondents were the age group lies in the distribution of 21- 30 which is 41.7 per cent, 30 per cent are of the age group of above 45, 16.7 per cent are of the age group 31-45 and 11.7 per cent are the age group less than 20 years. In reference to the educational qualification of the respondents, maximum no. of respondents were graduates , 35 per cents of the respondents were of senior secondary level, 15 per cent of the distribution shows matriculation , 6.7 per cents respondents were having educational qualification of doctorate and 3.3 per cents were post doctorate.
- In reference to the aspect of awareness of respondents about the global warming in the present study, majority of the respondents were well aware about the global warming effect in the environment while 15 per cent of the respondents were not aware about the global warming and the effect of the global warming in the environment.
- While observing the Awareness about carbon emission reduction, it was revealed that largely respondents were well aware about the carbon emission reduction while only few respondents were not aware about the Carbon Emission Reduction factor in the environment.
- As far as the Awareness about Clean Development Mechanism is concerned, majority of the respondents were having excellent knowledge about the clean development mechanism, 30 per cents had good awareness factor ,18.3 per cent were moderately

aware about the fact and 11.7 per cent of the respondents were have fair knowledge about the clean development mechanism.

SUGGESTIONS

Present study indicated that largely respondents believe that Clean Developments Projects are able to reduce the pollution level from the environment followed by the fact that project is Eco friendly and having positive impact on human well-being, thus accordingly following suggestions were made:

- It may have been suggested that government agencies along with the local communities and various co-operative organizations which are taking care of the Clean Development Management and forests must come forward for increased impact of project.
- Women must be included to a large extent not only in the execution stage but also in the planning and the monitoring of the project.
- The benefits sharing should be more beneficial toward the local people and other stake holders.

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Dr Y S Parmar University of Horticulture and Forestry,
Nauni, Solan 173230
Department of Business Management

Title of Project	**:**	Impact of CDM (Clean Development Mechanism) through Carbon Crediting and Carbon Financing on the Livelihood of Beneficiaries in Himachal Pradesh
Name of the Student	**:**	Shubham Ranaut
Admission Number	**:**	H-2016-30-MBA
Major Advisor	**:**	Dr Krishan Kumar
Specialization 1	**:**	Marketing
Specialization 2	**:**	Finance
Degree Awarded	**:**	MBA
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ABSTRACT

CDM (Clean Development Mechanism) is used as a tool to combat the climate change and support development. participating in the mechanism has raised overall awareness about low carbon solution and leverages capital for climate-friendly projects in host countries it has also provided opportunities to support basic development needs and broader socio- economic co-benefits such as improving energy access and energy services. Himachal Pradesh is working for sustainable development for to eradicating the effect of carbon emission. Thus this project is also a progression towards the sustainable development by adapting the descriptive research design. The research was conducted among beneficiaries of Himachal Pradesh. Simple mathematical, statistical tools, SWOT analysis and TWS method was used to carry out the study. Majority of the respondents were well aware about the global warming effect in the environment. Government agencies, local communities and various co-operative organizations which are taking care of the Clean Development Management and forests must come forward for increased impact of project.

Signature of Advisor
(Dr Krishan Kumar)

Signature of Student
(Shubham Ranaut)

Countersigned

Professor and Head
Department of Business Management
Dr Y S Parmar University of Horticulture and Forestry,
Nauni- 173230, Solan (H.P)

Questionnaire

Q.1 Age of the respondent

A. Less than 20 years B. 21 – 30 years

B. 31 – 45 years C. Above 45 years

Q.2 Gender

A. Male B. Female

Q.3 Educational qualification

A. Matriculation B. Senior secobndary level

B. Graduate C. Post graduate

D. Doctorate

Q.4 Mention your family size

A. Single B. Joint family

C. Nuclear family

Q.5 Are you aware about the global warming?

A. Yes B. No

Q.6 Are you aware about the carbon emission reduction?

A. Yes B. No

Q.7 Awareness about the CDM project

Excellent	Good	Moderate	Fair	Poor

Q.8 Aspects considered for the CDM Project (Please tick wherever applicable) (1- Strongly Disagree, 2- Disagree, 3- Neutral, 4- Agree, 5- Strongly Agree)

Sr. no.	Statements	1	2	3	4	5
1	I believe that pollution level of the environment get reduced by the CDM project					
2	The project is eco friendly according to me					
3	The project has positive impact on human well-being					
4	I believe that the CDM project does not make the environment a safer place					
5	According to me the project is able to create employability					
6	I believe that project helps in reducing poverty					
7	The projects helps in the improvement of the quality					

	of life					
8	I believe that this project has an impact on resource sustainability					
9	According to me the people must be persuaded and educated about the project					
10`	According to me the project need to be transparent					

Q.9 What according to you is the impact of CDM on the following? Please tick on the appropriate impact level.

Particulars	Very low	Low	Neutral	High	Very high
Employment					
Economy of Himachal Pradesh					
Tourism		`			
Earnings					
Water catchments					
Clean air					
Clean water					
Clean environment					
Health of the villagers					

- What type of interventions is made? Please mention

- How these interventions have been made?

- Are these interventions successful (Yes/ No) Why

- What was the earlier status of the selected land parcel before interventions?

- What is the existing status of the selected land parcel after the interventions?

- Is this a good impact (Yes/ No) Why

- What were the expectations?

- Were the expectation fulfilled (Yes/ No) Please justify

- What type of benefits you are expecting?

- Who are the stakeholders?

- What will be the mechanism of benefit sharing?

- Have you received any benefits in terms of monetary gains? Yes / No . If yes how much per month

  ---

- Have you any expectations for monetary benefits? If yes how much

  ---

- Do you think your expectations will be met in future?

- How are you planning to spend the rise in income?

- How yours livelihoods are going to change?

- Will there be any change in crop systems?

- Will there be any change in the livestock rearing?

- Will there be any change in the irrigation support / facilities?

- Any other visualized change in the livelihood security ?

- Any other impact on the employment generation?

- Any generation of cash generation activity.

- Any impact on women empowerment ?

- Any other idea you are interested to share?

Thanks