OIL PALM CULTIVATION AND RURAL LIVELIHOOD IN KOLASIB AND MAMIT DISTRICTS, MIZORAM

BY

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DEPARTMENT OF SOCIAL WORK

Submitted

In partial fulfillment of the requirement of the Degree of Doctor of Philosophy in Social Work of Mizoram University, Aizawl

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CERTIFICATE

This is to certify that the thesis **"Oil Palm Cultivation and Rural Livelihood in Kolasib and Mamit Districts, Mizoram"** submitted by K. Vanlalhruaizela for the award of the degree of Doctor of Philosophy in Social Work is carried out under my guidance and incorporates the student's bonafide research and this has not been submitted for award of any degree in this or any other university or institution of learning.

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DECLARATION

I, K. Vanlalhruaizela, hereby declare that the subject matter of this thesis is the record of work done by me, that the contents of this thesis did not form basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any degree in any other University/Institute.

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CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

A.D	:	Anno Domini
AAY	:	Antyodaya Anna Yojana
AH & VETY	:	Animal Husbandry and Veterinary
AMDP	:	Accelerated Maize Development Programme
APL	:	Above Poverty Line
BADP	:	Border Area Development Programme
BAFFACOS	:	Bamboo Flowering and Famine Combat Scheme
BPL	:	Below Poverty Line
C	:	Celsius
CBO	:	Community Based Organization
DFID	:	Department of International Development
DRDA	:	District Rural Development Agency
FAO	:	Food and Agriculture Organization
FFB	:	Fresh Fruit Brunch
FLD	:	Farmer Livelihood Development
GDP	:	Gross Domestic Products
GOM	:	Government of Mizoram
GOI	:	Government of India
Ha	:	Hectare
IDS	:	Institute for Development Studies
IFAD	:	International Fund for Agricultural Development
IISD	:	International Institute for Sustainable Development

IWMP	:	Integrated Watershed Management Programme
Km	:	Kilometre
KVK	:	Krishi Vigyan Kendra
LPG	:	Liquefied petroleum gas
LSC	:	Land Settlement Certificate
MGNREGA	:	Mahatma Gandhi National Rural Employment Guarantee Act
MHIP	:	Mizo Hmeichhe Insuihkhawm Pawl
MLA	:	Mizoram Legislative Assembly
MUP	:	Mizo Upa Pawl
MZP	:	Mizo Zirlai Pawl
MZsRLM	:	Mizoram State Rural Livelihood Mission
MzWDA	:	Mizoram Watershed Development Agency
NAFED	:	National Agricultural Cooperative Marketing Federation of India
NEDP	:	New Economic Development Policy
NEI	:	North East India
NERLP	:	North-East Rural Livelihood Project
NGO	:	Non Governmental Organization
NLUP	:	New Land Use Policy
NMOOP	:	National Mission on Oilseeds and Oil Palm
NOVOD	:	National Oilseeds and Vegetable Oils Development Board
NPDP	:	National Pulses Development Project
NRC OP	:	National Research Centre for Oil Palm

NRLM	:	National Rural Livelihoods Mission
NSS	:	National Sample Survey
NSSO	:	National Sample Survey Organization
OPAE	:	Oil Palm Area Expansion
OPDP	:	Oil Palm Development Programme
OPPO	:	Oilseeds Production Programme
PDS	:	Public Distribution System
PHT	:	Post Harvest Technology
PIPs	:	Policies, Institutions and Processes
PMGAY	:	Pradhan Mantri Gramin Awaas Yojana
PRA	:	Participatory Rural Appraisal
R&D	:	Research and Development
RKVY	:	Remunerative Approach for Agriculture and Allied sector Rejuvenation
RKVY	:	Rashtriya Krishi Vikas Yojana
S.G.S.Y	:	Swarnjayanti Gram Swarozgar Yojana
SAGY	:	Sansad Adarsh Gram Yojana
SD	:	Sustainable dvelopment
SFCI	:	State Farms Corporation of India
SHG	:	Self- Help Groups
SIRD	:	State Institute of Rural Development
SLA	:	Sustainable Livelihoods Approach
SLA	:	Sustainable Livelihoods Approach
SLMC	:	State Level Monitoring Cell

SPSS	:	Statistical Package for the Social Sciences
TMO	:	Technology Mission on Oilseeds
TRIFED	:	Tribal Cooperative Marketing Federation of India
UPC	:	United Pentecostal Church
US	:	United States
YMA	:	Young Mizo Association

CHAPTER I

INTRODUCTION

The present study attempts to assess the role of oil palm cultivation in promoting rural livelihoods and living conditions in Kolasib and Mamit Districts, Mizoram.

1.1 Rural Development and Oil Palm Cultivation

Rural development is a strategy designed to improve the socio-economic conditions of rural communities by implementing different programmes. It is an attempt to uplift the people who are living in poverty by generating income activities and creating assets for strengthening infrastructure. It promotes livelihood security and tries to improve the standard of living in rural areas. According to Robert Chambers "Rural development is a strategy to enable a specific group of people, poor rural women, and men, to gain for themselves and their children more of what they want and need. It involves helping the poorest amongst those who seek a livelihood in the rural areas to demand and control more of the benefits of rural development" .(see RChambers, 1983, p.147). The vision of rural development is to improve the socio-economic conditions of the rural community and to uplift the people who are living below the poverty line. The mission is providing wage employment, self-employment through income-generating activities and also to create permanent assets for strengthening the rural infrastructure.

Around the world, the largest segments of poor people settle in rural areas. It was estimated that in 2005 2.6 billion people were living in poverty, that is, on less than US$2 per day, and about 1.4 billion people living in extreme poverty, that is, on less than US$1.25 per day (see World Bank, 2011). The Rural Poverty Report 2011

also shows that despite development over the past 10 years that has lifted more than 350 million rural people out of extreme poverty, global poverty remains a massive and predominantly rural phenomenon, and 1.4 billion still live in extreme poverty in rural areas (see IFAD, 2011). Despite urban migration, it is further predicted that by 2030, a little over one-third of the world's poor population live in rural areas and both poverty incidence and depth of poverty will continue in rural areas (see World Bank, 2007). Such global figures hide large regional and national variations but show the magnitude of global poverty, and rural poverty in particular.

India, being a home for a large number of poor and malnourished people, is projected to overtake the largest population, China within the next forty years. The problems of unemployment and poverty remain one of the major challenges particularly in remote villages with a high concentration of tribal communities and rural poor. As per the national sample survey office, the persons below the poverty line from 2011 to 2012 were estimated at 25.7 percent in rural areas, 13.17 percent in urban areas and 21.9 percent for the country as a whole (see NSS 68th round 2011-12). The total population of rural areas comprises 70 percent in the country where 60 percent of the rural workforce remains primarily involved in agriculture (see Himanshu, 2011). The economy of the country grew faster than expected at 5.7% in April to June 2014. The growth in GDP was much higher in the first quarter from 4.6% in the previous quarter and is the fastest expansion in over two years. In recent years, the slowdown in employment has been a serious concern. According to the National Sample Survey Office data, the numbers of persons in the workforce increased from 398 million in 1992 to 2000 to 458 million in 2004 to 2005, an increase of nearly 60 million (nearly equally divided between the agriculture and

non-agriculture sectors) or 15% in five years. Further, this increased to 473 million from 2011 to 2012, an increase of 15 million or 3.3 percent over seven years (see NSS 68th round 2011-12).

The majority of the population who lived in rural areas is associated with poverty, unemployment, inequality and other socio-economic problems. Since the beginning of the plan, the approach to rural development has been an important concern in the development strategy. The growth rate in rural population has declined substantially due to the decline in fertility rates, migration and reclassification of villages as urban units. The real India is rural India in which nearly 79 percent of the population lives and 69 percent depend on agriculture for livelihood. Nearly 30 percent of the population is still below poverty line and more than 30 million persons are unemployed. Thus, the scene of the rural area is dominated by small and marginal farmers, landless laborers and the poor. Targeting these vulnerable sections and improving their livelihood and making them more productive is the basic objective of rural development programmes in the country (see Das, 2004).

In the context of Mizoram, the census of 2011 shows that the total population of the state was 10, 91,014 and the growth percentage is 22.78% while the country (India) has recorded the growth percentage as 17.64%. Of the total population, about 5, 61,977 persons live in urban areas while 5, 29,037 persons live in rural areas. In urban areas, 2, 81,020 are males while the other 2, 80,957 are females while in rural areas, the state has 2, 71,319 male population and 2, 57,718 female population (Provisional population totals- Mizoram; census of India 2011). A total of 27,598 households are living below the poverty line in 2015. According to the Economic Survey Mizoram, 2016-17, the growth of the state reached around 9 percent average

annual growth rate during 2011-12 to 2015-16. The total State Domestic Product for the year 2015-16 is Rs.13277.78 crore against Rs.11559.33 crore in 2014-15 indicating a growth rate of 9.18 percent. The national growth rate is calculated at 7.6 percent for the same period. The State Per Capita Income has increased by 11.27 percent as it increased to Rs. 95317 in 2015-16 from Rs. 85659 in 2014-15 while the National Per Capita Income for the year 2015-16 is estimated at Rs. 9323. The rate of growth in employment opportunities is far below the growth rate of population in the state. It is estimated that the growth rate of population has been 2.2 while the rate of employment opportunities may be less than 0.5 percent (see GOM, 2014).

Rural development in Mizoram started mainly with a focus on agriculture. Majority of the people depended on agriculture and practiced jhum cultivation. With the advent of British missionaries, cash crops, cereals, potato, and rubber plantation were introduced but due to lack of financial support, administrative coordination and technical guidance it was unsuccessful. So, jhum cultivation continued as a dominant feature of the rural economy. After independence, the agriculture sector received increasing attention and agriculture development took a new turn with the establishment of community development blocks in the district in 1953. From 1957 to 1958 district agriculture officer post was created with the introduction of different agricultural schemes. During the first two five year plans (1951-61) attention was laid mainly on agriculture in the state. In the third five year plan (1961-66), an emphasis was given towards the development of means of communication, agriculture, and marketing of agricultural products. But due to the outbreak of insurgency in 1966, all development works were stalled. The fourth five-year plan (1969-74) also gave high priority to agriculture and allied activities. But these

programmes also suffered a serious setback due to village regrouping for security reasons. Before the state attained the status of the union territory, it had nine community development blocks which were re-demarcated into twenty blocks after it attained union territory. The Directorate of Rural Development was established in1972 and all the blocks started functioning under this. During the fifth Five Year Plan (1974-74) agriculture, community development, and rural development were given priority and the Sixth Five Year Plan (1980-85) implemented the Integrated Rural Development Programme. The Seventh Five Year Plan (1985-90) may be regarded as the first plan for Mizoram when the state was conferred statehood in 1987. During the insurgency, there were no meaningful development works launched in the state, so one may say that the planning process started only with effect from the Seventh Five Year Plan (see Das, 2004). Till now, the government of the state has implemented different programmes to tackle rural poverty and problems. Besides the centrally sponsored schemes, the state government launched various schemes like BAFFACOS (2005-06) and NLUP in 1990-91 to promote livelihood and reduce shifting cultivation. Most of the programmes implemented by the Department are meant for poverty alleviation, reduction of unemployment or to give additional employment to people living in rural areas to enhance their livelihood security (see GOM, 2016).

In the state, the Department of Rural Development is headed by a senior Cabinet Minister and is supported by a Parliamentary Secretary, who is a sitting MLA. There is a Secretary to the Government of Mizoram as the head of the Administrative Department i.e. the Secretariat. State Level Monitoring Cell and Internal Audit Cell (SLMC & IAC) is part and parcel of the Secretariat engaged in

monitoring of works under the Rural Development Department. The Directorate is headed by a Director who executes functions as the apex line department at the State level. State Institute of Rural Development (SIRD) has been established at Aizawl. At the districts, there are the District Rural Development Agencies (DRDAs) whose governing board is chaired by the Deputy Commissioner and has a full-time Project Director. At the Block level, there is a Block Development Officer. In the state, all schemes and programmes are being implemented through a network of 26 Rural Development Blocks and 8 District Rural Development Agencies. There are various departments and institutions under the department like Directorate of Rural Development, The Administrative Department, State Level Monitoring Cell and Internal Audit Cell, District Rural Development Agencies, Rural Development Block, State Institute of Rural Development and Panchayati Raj and Social Audit Unit (GOM, 2016).

Different rural development programmes are being implemented in Mizoram that includes:

1. Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA):

The objective is to provide 100 days of wage employment in a financial year to every household whose unemployed adult members are willing to do unskilled manual labor. The main objective is to enhance livelihood security and improve the purchasing power of the rural people, whether or not they are below the poverty line.

In Mizoram, the first implementation started in Lawngtlai and Saiha Districts during the year 2006-07 and covered all the other districts in 2008. So far 1.7 lakh Job card was issued in the state (GOM, 2004, 2016).

2. National Rural Livelihoods Mission (NRLM)

The main objective of NRLM is to reduce poverty by building strong grassroots institutions for the poor. These institutions enable poor households to access gainful self-employment and skilled wage employment opportunities, resulting in an appreciable increase in their incomes, on a sustainable basis.

To implement the NRLM programme in Mizoram, the Government has formed a society called the Mizoram State Rural Livelihood Mission (MzSRLM) having registration No.MSR 385 of 18.08.2011. The cumulative number of Self Help Group (SHGs) formed up to the year 2015-2016 was 736 of which 280 SHGs are under Kolasib district and 456 SHGs are under Serchhip district (GOM, 2004, 2016).

3. Integrated Watershed Management Programme (IWMP)

The main objectives of the IWMP are to restore the ecological balance by harnessing, conserving and developing degraded natural resources such as soil, vegetative cover, and water. The outcomes are the prevention of soil run-off, regeneration of natural vegetation, rainwater harvesting and recharging of the groundwater table. This enables multi-cropping and the introduction of diverse agro-based activities, which help to provide sustainable livelihoods to the people residing in the watershed area. In Mizoram, the programme is implemented by the Rural Development Department under which the Mizoram Watershed Development Agency (MzWDA) is the State Level Nodal Agency (GOM, 2004, 2016).

4. Border Area Development Programme (BADP)

The BADP main objective is to meet the special development needs of the people living in remote and inaccessible areas situated near the international border and to bridge the gaps in the physical and social infrastructure of such areas. The aim is to transfer the border areas by ensuring multifaceted development and to saturate

the border areas with the entire essential infrastructure through a convergence of schemes and participatory approach. Border Area Development Programme (BADP) was implemented in Mizoram in 1993-1994 and it covered 4 (four) R.D Blocks then along the Indo-Bangladesh border. In 1997-1998 the programme was extended on the eastern side of Mizoram bordering Myanmar. According to Statistical Abstract of Mizoram, 2015, during 2014-15 there were 511 works undertaken with an expenditure of Rs. 3,515.55 (in lakhs) (GOM, 2004, 2016).

5. Pradhan Mantri Gramin Awaas Yojana (PMGAY)

Pradhan Mantri Gramin Awaas Yojana (PMGAY), previously known as Indira Awaas Yojana (IAY), is a social welfare flagship programme to provide financial assistance for construction and restructure of rural households who are living below the Poverty Line. It is funded on cost-sharing basis between the Government of India and the State Government in the ratio of 90:10 for the Northeast States. A number of 404 houses were constructed with an expenditure of Rs.391.32 lakhs during 2015-2016 (GOM, 2004, 2016).

6. Sansaad Adarsh Gram Yojana (SAGY)

Sansad Adarsh Gram Yojana (SAGY) is a village development project launched by the Government of India in October 2014, under which each Member of Parliament will take the responsibility of developing physical and institutional infrastructure in three villages by 2019. The goal is to develop three Adarsh Grams or model villages by March 2019, of which one would be achieved by 2016. Thereafter, five such Adarsh Grams (one per year) will be selected and developed by 2024. In Mizoram, the Chief Secretary, Government of Mizoram is the Chairman while the Commissioner & Secretary, Rural Development Department is the Member-

Convener and Commissioner, Finance Department and Secretary of different Departments are the members (GOM, 2004, 2016).

7. Mission Antyodaya

The main objective of Mission Antyodaya is to eradicate poverty from selected 50,000 rural areas in India by the year 2022. The Mission seeks to converge government interventions with Gram Panchayats as the basic unit for planning by following a saturation approach by pooling resources - human and financial - to ensure sustainable livelihoods. It is a State-led initiative for rural transformation to make a real difference based on measurable outcomes to the lives of 1,00,00,000 households in 5,000 rural clusters and 50,000 Gram Panchayats in 1,000 days. In Mizoram, 183 villages are selected under the Scheme (GOM, 2004, 2016).

8. NLUP and Oil Palm Cultivation in Mizoram

New Land Use Policy is a flagship programme of Mizoram which has been implemented since January 14th, 2011. It is a courageous and ambitious political vision adhered by the Government of Mizoram during Congress' ministry. The overall objective is to improve the livelihood of vulnerable groups mainly jhumia families in a sustainable manner through improved management of their resource base in a way that contributes to protecting and restoring the environment. The total number of families to be aided through the project is 1, 35,000 families. The criteria of selection of beneficiaries are based on the household annual income where families with regular and sufficient income from the Government and public or private sectors were ineligible as well as those families running businesses or having a steady income from other sources (GOM, 2004, 2016).

The broad and primary aims and objectives are as follows:

- Provide sustainable income to farming families who comprise nearly three-fourths of the total population of Mizoram by weaning them away from the destructive and unprofitable shifting cultivation practice
- Provide urban poor with livelihoods by encouraging small scale industries and petty trades
- Converging schemes funded by the Government of India (Centrally Sponsored Schemes) to NLUP for better utilization of funds and avoidance of duplication of work
- Land reclamation and forestation by introducing permanent farming systems and land reforms
- Environment protection and restoration through various means such as an expansion of rain catchment areas for recharging rivers, springs, and underground water, encouraging rearing of domestic animals and poultry for increased meat production to discourage hunting to protect the fauna, etc.

Different livelihood activities (trades) are carried out by eight lines department which includes Agriculture Department, Horticulture Department, Sericulture Department, Fishery Department, Environment and Forests Department, Soil and Water Conservation Department, AH and Veterinary Department and Industry Department. Besides these, two other departments - Rural Development and Land Revenue and Settlement Department were designated as facilitating departments to provide infrastructure and expertise in the demarcation of lands allotted to beneficiaries respectively (GOM, 2004, 2016).

Oil Palm Cultivation is one of the types of trades/activities that the beneficiaries of the scheme can opt for. During the initial period (2013-2014), the

area of oil palm cultivation was increased to to17,588 hectares from 959 hectares through NLUP. The scheme has helped in improving the cultivation of oil palm and increasing production. The record shows that till 2014, 2290 households benefited under the scheme. The total area of oil palm cultivation under NLUP accounts for 16 percent of the total area cultivated in the state. Among the beneficiaries, Lunglei district comprises the highest number of beneficiaries. Champhai and Saiha show no record of beneficiaries. In the second phase (2013) there were 102 beneficiaries in Kolasib district (sample district) and 184 beneficiaries in Mamit district (sample district). The total numbers of beneficiaries recorded were 1300 households. The amount given for assistance was recorded as 22.90 crores. This was given in installments among the beneficiaries (see GOM, 2015). The implementation of the New Land Use Policy (NLUP) plays an important role in promoting oil palm cultivation in the state. There was a substantial increase in terms of area, production and farmers after the implementation. This also helped in weaning them away from the destructive and unprofitable shifting cultivation practice (GOM, 2004, 2016).

Besides these, there are various other rural development programmes in the state which include the state schemes. The important state schemes are New Economic Development Policy (NEDP), Rural Housing Scheme and NEC Funded Projects. As the new government came up in 2018, different initiatives are being taken in the state.

There are many differences in the social and economic conditions between the rural and urban community in Mizoram. This has been reflected in the various schemes and programmes run by the Central and state government. Due to this, there is an emerging improvement in the rural socio-economic conditions and upliftment of

rural poor. The state government promotes different income-generating activities and strengthen infrastructure in rural areas. While development takes place in these areas, there are also some loopholes and barriers in the process which must be taken into consideration for successful and sustainable development.

Oil palm cultivation and processing have been identified as a potential win-win rural development strategy by two recent World Bank reports (2007, 2011). It has been argued that oil palm can alleviate poverty and contribute to secure access to food through increased income by generating employment in poor regions (see World Bank, 2007; FAO, 2010).

Oil palm also known as *Elaeis guineensis* is a tropical forest palm native to West and Central Africa, which is grown in plantations. The cultivation was first illustrated by Nicholas Jacquin in 1763. It has high oil content and produces 3-8 times more oil than any other tropical or temperate oil crop from a given area. Oil can be extracted from both the seed and the fruit. From the outer mesocarp, oil is extracted in its crude form and palm-kernel oil from the endosperm. There is a contrast in the use of crude palm oil and palm kernel oil. While most crude oil is used in foods, most palm-kernel oil is used in various non-edible products such as cosmetics, detergents, plastics, surfactants, and herbicides. Palm-kernel oil is also used in a broad range of other industrial and agricultural chemicals (see, Wahid et al., 2005). Oil palm is productive for smallholders seeking good returns from low inputs (see, Belcher et al., 2004). In 1997, several tropical developing countries showed rapid growth in the economy because of the cultivation of oil palm. It has been a major contributor to the alleviation of rural poverty. Oil Palm can make valuable contributions to development with good governance. The resulting prosperity may

free people and encourage them to invest in better environmental practices (see, Sayer, et al., 2012). It can be planted on approximately 15 million hectares across the world and the area of plantation has been increasing due to an increase in demand (see, FAO, 2009).

Oil palm originated from Western Africa where it was grown along the rivers. Before written history began, it is presumed that oil palm was eaten by many people in Africa. The archaeological dig in Egypt (3,000 BC) indicates that it was traded to African continent during the time. During the 15th Century, Portuguese also discovered palm oil during their expeditions to West Africa and used later for slaves' food onboard in ships. During the late 18th century, the exportation of palm started by smallholders in Central and West Africa to Liverpool and Marseilles. The industrial revolution also increased the demand for oil palm as it was used for making candles and lubricants for machines. A huge trade in oil palm started after anti-slavery legislation of the 19th century which was used as a replacement to generate profits. By the end of the 19th century, plantations were established by the colonial government in Africa to increase production. In Asia, the plantation was started at the beginning of the 20th century. The Dutch and British were the main colonizers who started commercialization of oil palm. The decline of rubber prices during the late 1950s led Malaysian government to shift in oil palm cultivation which marked a substantial increase in oil palm production in Asia. Indonesia also followed the path of Malaysia at the end of the 1960s and expanded largely in the mid-1980s. Currently, Indonesia and Malaysia are the leading producers of oil palm in the world (see Gelder, 2004).

Indonesia is the largest producer of oil palm in the world. In the country, oil palm employs a large number of people living in the country (see Wakker, 2006; Zen et al., 2006). When wider benefits are taken into consideration, estimation has been made by the industry that the oil palm sector benefits around 6 million people. Many of these people have been rescued from poverty. It has also been beneficial for the country's economic income. The export revenues from oil palm earned Indonesia over more than $12 thousand million in 2007 (see Goenadi, 2008). Oil palm has been used by the Indonesian government as a major vehicle for rural socio-economic improvement (see Potter & Lee, 1998; Zen et al., 2005). The average net income of oil palm smallholders in Indonesia was seven times higher than the average net income of subsistence farmers (see Hardter et al., 1997; Hartemink, 2005).

For many rural communities, oil palm has been a significant source of livelihood improvement. Compared to other agricultural land use options, oil palm offers greater returns to labor. It also offers additional benefits including a shorter fallow period and significantly reduced labor requirements (see Rist, Feintrenie, & Levang, 2010). Evidence showed that for sustainable livelihoods, oil palm cultivation has created a high social and economic value. This has been done without seriously undermining the natural resource base in the immediate terms (see Laschinger, 2013). Oil palm is helping people escape poverty and provides a significant livelihood activity through both 'farming-based' and 'migration-based' strategies (see World Bank, 2007).

Social science scholars have compared the costs and benefits experienced by households and families involved in oil palm cultivation as cultivators and employees (see Obidzinski et al., 2012), and compared different cash crops cultivated by farmers

(see Rist et al., 2010; Belcher et al., 2004). These studies have generally suggested that by providing positive economic returns to local populations, oil palm cultivation can contribute to rural development. However, many negative social impacts have also been identified. The negative impacts are land tenure conflicts, the loss of tenure or access rights and other conflicts resulting from the migration of employees and exploitative labor conditions (see McCarthy, 2010; Sandker et al., 2007). Sustainable livelihood framework may provide a model frame for research that focuses on the sustainability of oil palm cultivation for local livelihoods (see Laschinger, 2013).

Oil palm dominates the global market for vegetable oil as its production has more than doubled in the last decade (see FAO, 2011). In 2005, it overtook soya as the world's main vegetable oil. In 2007/2008, oil palm production topped 41 million tons (see USDA, 2008b). It is grown commercially in at least 43 countries and accounts for almost 10 percent of the world's permanent crop. The global area of productive oil palm cultivation is in the order of 9.1 million hectares, of which 4.5 million hectares are in Indonesia and 3.8 million hectares are in Malaysia. The global production of oil palm was about 41.1 million tons in 2007/2008 (see USDA, 2008b). The projected annual global demand for biodiesel is 24 thousand million liters by 2017, up from nearly 11 thousand at the end of 2007 and less than 1 thousand million in 2000 (see FAO, 2008).

Oil palm has been the most rapidly expanding crop between 1990 and 2007 in South-east Asia. In Latin America, the expansion of oil palm started in the early 2000s (see FAO-STAT, 2011; Janssen & Rutz, 2011). It has been suggested that the first oil palm introduced to Asia came from the Americas. In Africa, oil palm had been introduced sometime between the 14th and 17th centuries (see Poku, 2002).

Other sources have contradicted this suggestion. There are also suggestions that oil palm came to Asia via Mauritius (see RMRDC, 2004). In the nineteenth century, oil palm was introduced to the Asia Pacific region from West Africa, initially as an ornamental. The Dutch brought it to Indonesia in 1848. The British brought it to Malaysia in 1875 and the Germans brought it to Papua New Guinea in 1894 (see Cramb & Curry, 2012).

In the Asia Pacific region, there has been a rapid expansion of oil palm cultivation. This has given rise to complex economic, social and environmental issues. These issues vary in their relative importance across the region. One of the complex economic issues is the micro-level question of specifying the conditions under which oil palm can provide the greatest contribution to sustainable rural livelihoods (see Barlow, 1986; Zen et al., 2005; McCarthy, 2010; Cramb and Sujang, 2011). Global discussions around sustainability have centered on oil palm cultivation and its producer countries (see Nathapol & Deunden, 2011).

India is the largest consumer of oil palm in the world. It accounts for 18% of world consumption. It is also the largest importer of oil palm. Its import accounts for 45% of world imports. Andhra Pradesh has been the leading palm oil-producing state. Its production accounts for 85% of the country's production. Kerala is the second-largest producer with 10% of the country's production followed by Karnataka which accounts for 2% of the country's production. Oil palm has been commercially cultivated in India since 1990. The Indian Council of Agricultural Research has identified about 5700000 hectares of land suitable for oil palm cultivation in India (Madhavi & Sailaja, 2015; Rethinam, 1992).

In India, the government has been supporting oil palm through subsidies. These subsidies include planting, fertilizers, and micro-irrigation. Various state governments also assist in oil palm development. Several steps have been undertaken by the Union government to increase oil palm production in this country. The major schemes of the government are Oil Palm Development Programme (OPDP) under Technology Mission on Oilseeds and Pulses, and Programme of Oil Palm Area Expansion (OPAE) under Rashtriya Krishi Vikas Yojana (RKVY).

It is estimated that the demand for vegetable oils is expected to rise from the current level of 16 million tons to 22 million tons by 2020 in India. The demand for vegetable oil is more than the demand for domestic production growth with an alarming situation. Oil mills and extraction units face problems regarding low capacity utilization and sickness. The gap between production and consumption of edible oils must be bridged by adopting serious measures in the country. Oil palm is also subjected to some problems viz., fluctuations in production, lack of scientific production technology, price fluctuations, increasing costs, etc. (see Rao, 2013).

The huge demand and imports for domestic consumption necessitates the government to form certain programmes that will increase the production of oil palm in the country. The major programmes or schemes for oil palm promotion and cultivation in India are as follows:

1. Technology Mission on Oilseeds (TMO)

The Technology Mission on Oilseeds was started by the Government of India in 1986 as the first programme on oilseeds. The programme aims to increase the production of oilseeds that will decrease imports and achieve self-sufficiency in edible oils. Later, oil palm, maize, and pulses were brought within the purview of the

Mission. Besides this, the National Oilseeds and Vegetable Oils Development (NOVOD) Board also supplement the efforts of the Technology Mission on Oilseeds by opening new areas for non-traditional oilseeds. This promotes Tree Borne Oilseeds. Different schemes were implemented under Technology Mission on Oilseeds viz. National Pulses Development Project (NPDP), Oilseeds Production Programme (OPP), Accelerated Maize Development Programme (AMDP), Post Harvest Technology (PHT), Oil Palm Development Programme (OPDP) and Oil Palm Development Programme (OPDP) and National Oilseeds and Vegetable Oils Development Board (NOVOD).

To provide flexibility to the States in implementation based on regionally differentiated approach, and to promote diversification as well as a focused approach to the programmes, the schemes of Oilseeds Production Programme, Oil Palm Development Programme, National Pulses Development Project and Accelerated Maize Development Programme of Ninth Plan have been merged into one Centrally Sponsored Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize (IPOPOM) during the 10th Five Year Plan which is being implemented with effect from 1st April 2004. The scheme is being implemented by 14 major growing States for oilseeds and pulses and 15 States for Maize and in 10 States for oil palm. This provides flexibility to the States to utilize the funds for the scheme/crop of their choice. The annual action plan must be formulated by the state governments for consideration and approval of the Government of India. The states have the flexibility to introduce innovative measures or any special component with the extent of 10 percent financial allocation. The private sector can be involved under the State Governments for the implementation of the programme with a financial cap of 15

percent. The flexibility for inter-component diversion of funds is up to 20 percent for non-seed components and the diversion of funds from seed components to non-seed components with the prior approval of the Department of Agriculture and Cooperation. The oilseeds production programme led to the success of increasing the production of oilseeds from 108.30 lakh tones in 1985 to 1986 to 281.57 lakh tons during 2008-09. The production of pulses increased from 128.60 lakh in 1989, to 1990 to 146.62 lakh tons in 2008 to 20009. The area under Oil palm increased from 8,585 ha. at the end of 1992 to1993 to 26,178 ha in 2008 to 2009. The actual production of Fresh Fruit Bunches from 2008 to 2009 is 355,480.36 MTs yielding around 59,007.40 metric tons of Crude Palm Oil (see GOI, 2018).

2. National Mission on Oilseeds and Oil Palm (NMOOP)

The National Mission on Oilseeds and Oil Palm (NMOOP) picture to increase in production of vegetable oils sourced from oilseeds, oil palm, and TBOs from 7.06 million tons to 9.51 million tons by the end of Twelfth Plan (2016-17). The Mission was implemented through three Mini Missions with a specific target. The cost of the interventions proposed under the Mission was in the ratio of 75:25 between the Central and the State Governments, except in case of few ongoing interventions for seed production through Public Sector agencies like NSC, SFCI, SAUs including KVKs, for FLDs, procurement support to NAFED, TRIFED; R&D support for ongoing research projects. Up to 1% of the funds allocated under the Mission will be earmarked at the national and state levels to meet the contingency expenditure including engagement of contractual manpower for monitoring of the implementation of the Mission. The funds are being released to the Departments of Agriculture/Horticulture of the State Governments. The mini-mission 1 on oilseed

covered Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Odisha, Punjab, Rajasthan, Tamil Page Nadu, Uttar Pradesh, West Bengal, Assam, Jammu & Kashmir, Jharkhand, Nagaland, and Tripura. The Mini Mission 2 on oil palm-covered Andhra Pradesh, Chhattisgarh, Goa, Gujarat, Maharashtra, Mizoram, Karnataka, Kerala, Odisha, Tamil Nadu, Arunachal Pradesh, Assam, Bihar, Manipur, Meghalaya, Nagaland, Sikkim, Tripura, and West Bengal. The mini-mission 3 covered Andhra Pradesh, Assam, Arunachal Pradesh, Bihar, Chhattisgarh, Gujarat, Goa, Haryana, Himachal Pradesh, Jammu & Kashmir, Jharkhand, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Manipur, Meghalaya, Mizoram, Nagaland, Odisha, Punjab, Rajasthan, Sikkim, Tamil Nadu, Tripura, Uttar Pradesh, Uttarakhand, and West Bengal (GOI, 2018).

3. Oil Palm Area Expansion Programme (see OPAE):

Since 2011-2012, the programme of OPAE extends the area of Oil Palm cultivation by 60,000 hectares under Rasthrya Khrishi Vikash Yojana (RKVY) to increase the production of Palm Oil by 2.5 to 3.00 lakh tons in the next 5 years**.** This programme provided incentives to oil palm cultivators for identified critical interventions that include planting material, compensation for loss of income of the cultivators during the gestation period, drip irrigation system, pump set, support for intercropping, bore wells/water harvesting tanks, vermin-compost pit, PP chemicals, etc. This is proposed to provide subsidy to entrepreneurs by 50 percent subsidy of the cost of processing plant and equipment limited to Rs. 250.00 lakh per unit of 5MT/hr FFBs capacity through the State Department of Agriculture. The state-wise proposed outlay in lakh is Andhra Pradesh- Rs. 19200.00, Karnataka – 3360.00, Tamil Nadu – 3360.00, Gujarat – 480.00, Orissa – 1776, Mizoram –18l40,

Chattisgarh – 48.00, Maharashtra – 96.00 and ICAR – 200.00 with a total proposed outlay of Rs. 30000.00 lakh (see GOI, 2018).

Recently in the NorthEast region, the cultivation of Oil Palm had been tried in Assam, Tripura, and Mizoram with considerable success. R.M Reddy (2004), Principal Scientist from National Research Centre for Oil Palm (NRC-OP), Andhra Pradesh, studied the suitability of agro-climatic conditions and water availability required for oil palm cultivation and has recommended that "Climate and soil conditions in southern Mizoram with low elevation and gentle slope are quite suitable for oil palm cultivation". Hence, the growth of the existing plants is quite promising (see Reddy, 2004).

In the context of Mizoram, the geo-climatic condition is favorable for oil palm cultivation. A high-level committee headed by K.L. Chadha identified potential areas for oil palm cultivation of 61,000 ha with a gentle slope (25-33 percent). Later, another committee headed by Dr. P Rethinam identified another potential area of 40,000 ha with a total of 1,01,000 ha potential areas for oil palm cultivation in Mizoram. The state government placed oil palm cultivation as a part of an action programme to generate income and mitigate environmental degradation. A large scale for oil palm cultivation was passed during the 10th plan period. The rate of FFBs is Rs.5.50 per kg. fixed by Price Fixation Committee. The plantation was first started in Rotlang, Lunglei District and Thingdawl, Kolasib District of Mizoram in 1999-2000 with 5,000 and 7,000 seedlings respectively with promising results in the state. The leading Oil Palm grower is Mr. Ramtinchawma, Nalzawl, Mamit District who started planting in 2007 covered the total area of 16 Ha. He had sold 185 tons of FFBs during 2013 earning Rs.8,82,640.00 which was purchased by the Company i.e.

Godrej Agrovet Ltd at Collection Centre @ Rs 5.50 per Kg. This is the highest production of FFBs recorded in the state of Mizoram in a year. This may demonstrate that Oil Palm production potential is available in Mizoram. There are also numbers of other beneficiaries in the state (see GOM, n.d.).

In the state, the Ministry of Agriculture & Cooperation has sanctioned Oil Palm Development Programme under Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize (ISOPOM) since 2005-2006 to promote oil palm cultivation at the cost-sharing of 75:25 between Central and State Government till 2011-2012. Under Rashtriya Krishi Vikas Yojana (RKVY for Oil Palm Area Expansion) from 2011-12 to 2012-13 and National Mission on Oilseeds and Oil Palm (NMOOP) from the year 2014-2015 oil palm development programme was taken up in the state. Besides this, The Mizoram Oil Palm (Regulation of Production & Processing) Act, 2004 was passed in Mizoram Legislative Assembly on 2nd December 2004. The Act contains 26 sections. The state government has signed M.O.U with reliable Companies for Oil Palm Development. The implementing partner Companies are Godrej Agrovet Ltd which will be set up in Kolasib & Mamit District signed on 14th Sept 2005, Ruchi Soya Industries Ltd which will be set up in Lunglei & Lawngtlai District signed on 3rd October 2006 and 3F Oil Palm Agrotech Pvt. Ltd which will be set up in Aizawl, Serchhip & Saiha District signed on 7th March 2006. The three companies have initiated and established their nurseries in their districts. The main provisions undertaken were supplying of planting materials to the farmers and buy the fruit from the farmers which are under their coverage. But so far, only one industry was set up in the state under Godrej Agrovet Ltd. for Kolasib & Mamit District. Under the Oil Palm Act, 2004, there are established Price Fixation Committee to fix the rate of

Fresh Fruit Bunch. Presently, it is fixed at Rs. 5.50 per Kg and the price of the exotic seedling is Rs. 85.00 while that of the indigenous is Rs. 65.00 per seedling (see GOM, n.d.).

The Flagship programme of the state government i.e. New Land use Policy (NLUP) has also identified oil palm cultivation as one of the crops to be cultivated under the programme. It is undertaken by the Agriculture Department with a view of enhancing incomes and economic sustainability of the rural poor (see, GOM, 2015). Under NLUP, a total of 2290 farmers were selected for oil palm cultivators and the area under cultivation is 2759 ha which accounts for 15 percent of the total area under oil palm cultivation till 2014. Under the National Mission on Oil Seeds and Oil Palm, the proposed area for Oil Palm Cultivation for the year 2014-15 to 2016-17 is 5700 ha in 2014-15, 5400 ha in 2015-16 and 4600 ha in 2016 -17. An addition of 25,000 ha will be covered during the 12th Five Year Plan and is estimated that Fresh Fruit Bunch (FFB) will be 1,35,000 MT with a value of about Rs.100 crore (see, MES, 2014-15). The area under cultivation is being increased from its initiation to the present (see GOM, n.d.).

Oil palm is one of the most expanding equatorial crops in the world of which the total area of cultivation is nearly one-tenth of the world's permanent cropland (see FAO, 2007). Oil palm cultivation is promoted as a strategy of rural development in many countries and across different regions of the globe. It is also being promoted by the state government in Mizoram.

1.2 Overview of Literature

There is copious literature on social and economic aspects of oil palm cultivation in different countries and regions (see, Laschinger, 2013; Rist, Janssen, &

Rutz, 2011; Feintrenie & Levang, 2010; Goenadi, 2008; Poku, 2002; Koczberski, 2001; Casson, 2000; Sukumar, 1999, etc.).

There are studies on oil palm and rural livelihoods (see Cramb & Curry, 2012; Rist, Feintrenie & Levang, 2010; Koczberski, 2005; Anglo et.al, 2014; Dano, 2013; Sayer, et. al., 2012; Rist et.al, 2010). There are many studies which focus on the oil palm cultivation on the socio-economic development (see Zen & Barlow, 2005; Damoah, 2012; Owolarafe & Arumughan, 2007; Okungbowa. et.al, 2014; Ajani et.al, 2012). There are studies on sustainable oil palm cultivation also found (see Potter, 2016; Mahat, 2012; Pehnelt & Vietze, 2009; Ibitoye & Jimoh, 2014; Gilbert, 2013; P.A. Onoh & C.A Onoh, 2012; Barison, 2007; Agwu, 2006; Aijeh & Patrick, 2013; Bonsu et.al, 2009).

Some studies could also be found on the factors contributing to the adoption of oil palm cultivation (see Anaglo et. al., 2014; Gunn, 2009) and the farmers' perception on oil palm cultivation (see, Chuks, 2013). The impacts of oil palm cultivation on biodiversity has also caught the attention of many researchers (see, Wilcove & Koh, 2010; Sheil et.al. 2009; Izah, Angaye, and Ohimain, 2016; Petrenko, Paltseva & Searle, 2016; D.S. Wilcove and L.P. Koh, 2010; Ritcher, 2009)

Divergent literature could also be found on livelihood (see, De Haan, 2012; Moreda, 2012; Agrawal, 2008; Bird & Shepherd, 2003; Francis, 2002; Bryceson, 2000). Some studies focus on the sustainable livelihood (see De Haan, 2012; Valdes et.al, 2011; Haidar, 2009; Toner, 2003; Kollmair, & Gamper,2002; Carney, 2002; DFID, 1999; Hussein & Nelson 1998; Scoones, 1998). There are studies which attempt to understand the rural vulnerability could also be seen (see Kimani & Bhardwaj, 2015; Kaushik & Sharma, 2015; Kimani et.al, 2015; Moreda, 2012;

Holmes & Jones, 2011; Agarwal, 2008; Dercon et.al, 2005; Francis, 2002; Slater, 2002).

In current literature, only a few studies are focusing on the impacts of oil palm cultivation in rural livelihood and a comprehensive study covering the social and cultural change, health effects, food security, and environmental degradation is needed (see Colchester & Jiwan, 2006; Casson, 2000). Besides, various reports on the impacts differ which are disseminated by companies and NGOs and are highly conflicting. These studies are mostly based on anecdotes or a small number of selected cases. Objective research is limited (see, Shiel et al., 2009). Social research on the effects of oil palm cultivation in the households 'well-being lacks comprehensive assessment as most of these studies have focused on producers and community levels (see Mingorria et. al., 2014).

In India, there are several programmes for promoting oil palm cultivation under the Union government like Oil Palm Development Programme (OPDP) under Technology Mission on Oilseeds and Pulses, Oil Palm Area Expansion (OPAE) under Rashtriya Krishi Vikas Yojana (RKVY) during 2011-12 and National Mission on Oilseeds and Oil Palm (NMOOP) from the year 2014-2015. Different studies could be found in India but they mostly focus on the agro-climatic conditions, constraints and prospects, productivity rate, and technological development (see Madhavi & Sailaja, 2015; Rao, V.N., 2013; Rethinam, 1992; Rao, M.V., 2009). The broader social and livelihood implications of biofuel cultivation remain poorly understood (see CIFOR 2008; Rist et al. 2009).

The studies on the role of oil palm cultivation in promoting rural livelihoods are a few. A comprehensive assessment is needed to fill this gap. There are only a

few empirical studies on oil palm cultivation in North East India and even less in Mizoram. In the context of Mizoram, there is an emerging literature on agro-climatic conditions and water availability for oil palm cultivation (see Reddy, 2004) as well as the environmental effects of Oil Palm cultivation (see Raman, 2014). The performance of oil palm growers was also studied (see Khawlhring, 2016). There is a need to study the impact of oil palm cultivation on rural livelihoods and how rural livelihood assets contribute to the adoption of oil palm cultivation. There is also a need to cover oil palm cultivation from a broad perspective by using the sustainable livelihoods framework.

The overview of the literature on oil palm cultivation shows that it has become a popular strategy of promoting sustainable livelihood in different regions and attracts the attention of researchers in different contexts. This literature helps us in identifying and understanding the theoretical, conceptual, operational and methodological issues in the study of oil palm cultivation and livelihood. However, the major gap in the literature is that oil palm cultivation as a strategy of promoting sustainable livelihood has not been probed adequately in the Indian context. The literature on the effectiveness of this strategy in promoting rural livelihood is highly inadequate in India, especially in its North East region. The present study tries to fill these gaps.

1.3. Theoretical Framework: Sustainable Livelihood Framework

A theory acts as a framework for understanding the phenomenon and events in society. It is an assumption or proposition that explains something and is based on general principles. It also helps to make predictions and draw a hypothesis. The present study uses the Sustainable Livelihood Framework to understand the

dynamics of oil palm cultivation and to construct a hypothesis. It draws its inspiration from earlier studies (see Laschinger, 2013).

The origin of sustainable development is widely recognized in the UN Conference on Human Environment which was held in Sweden, 1972. The concept was popularized and gained its momentum by the introduction of the Brundtland Commission on Environment and Development, 1987 and the United Nations Conference on Environment and Development, 1992. The concept formed its basis as the first international attempt to achieve sustainable development by forming plans and strategies. The study and understanding of famine and food insecurity during the 1980s popularized the term sustainable livelihood.

The concept of sustainable livelihood has been an important topic of discussion and debate for poverty eradication and rural development. Ian Scoones (1988) of the Institute for Development Studies (IDS) proposed a modified definition of sustainable livelihoods:

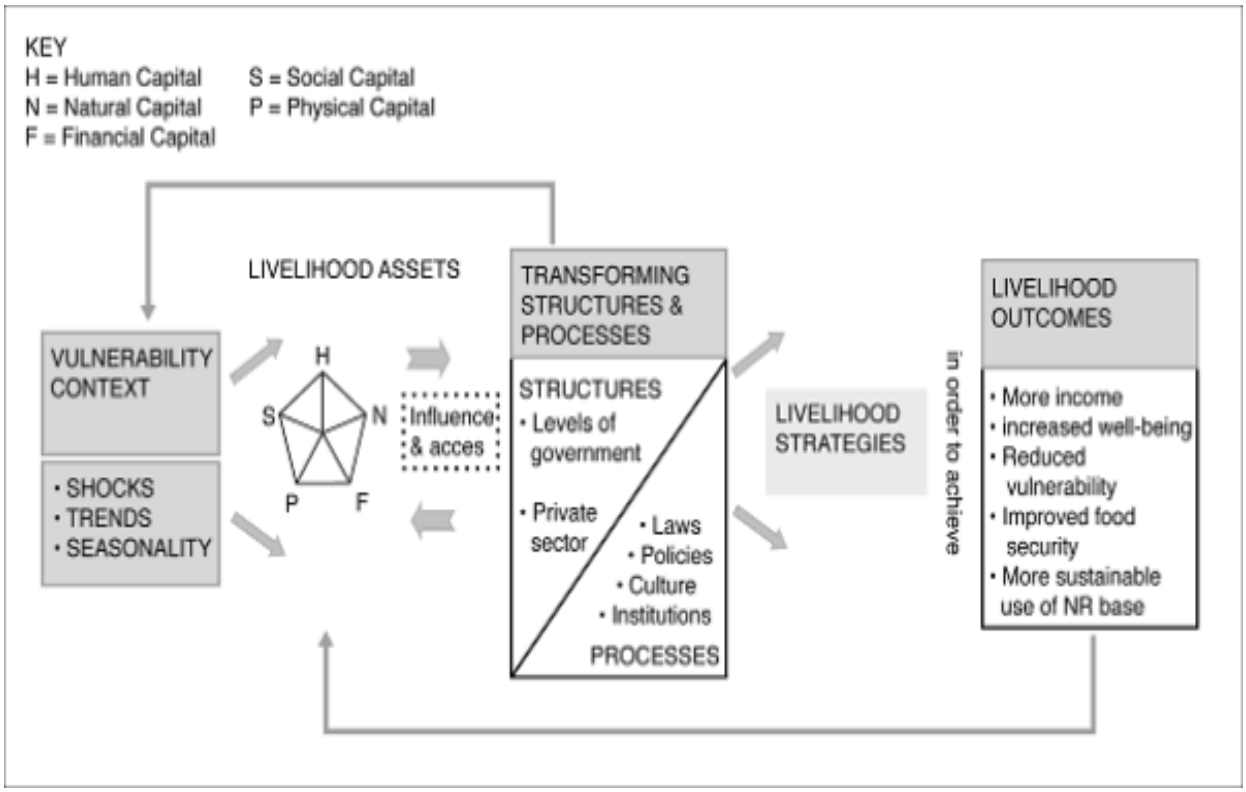
"*A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks; maintain or enhance its capabilities and assets, while not undermining the natural resource base*." (see Scoones, 1988, p. 5).

Sustainable Livelihood approach helps in formulating developmental activities and acts as a guideline for practitioners. The approach directs the way of thinking about the objectives, scope, and priorities for development which place people and their priorities at the center of development. It encompasses different components of livelihood and tries to empower the poor to build their opportunities,

supporting their access to assets, and developing an enabling policy and institutional environment. It focuses on poverty eradication and promoting sustainable livelihoods.

The 'Sustainable Livelihoods Approach' (SLA) adopted by the Department for International Development (DFID) in the late 1990s (building on work by IDS, IISD, Oxfam and others) have been widely used by different organizations and practitioners to suit a variety of contexts, issues, priorities, and applications. DFID's main objective is to eliminate poverty in poorer countries by underlying core principles. The application of the approach is flexible and adaptable to different local settings. The framework tries to understand how people operate within a vulnerability context and how they draw on different types of livelihood assets or capital. The framework has certain core principles like a people-centered approach, holistic view of livelihood factors and process, dynamic view of livelihood strategies, relying on building strength; macro and micro linkages as well as socio-economic and environmental sustainability.

1.1 Figure: Sustainable Livelihoods Framework



Source: Department for International Development of the United Kingdom

The Sustainable Livelihood Framework underlies certain components that include livelihood assets, vulnerability context, livelihood strategies, policies, institutions and processes, and livelihood outcomes.

Livelihood Assets

The livelihood approach places people at the center and tries to understand their strengths which are called assets or capitals. It is important to identify these strengths and use them to achieve sustainable livelihood. The first capital is human capital that includes skills, knowledge, health, and ability to work followed by social capital that includes social resources, including inform networks, membership of formalized groups and relationships of trust that facilitate co-operation in the second. The third capital is natural capital that includes resources such as land, soil, water,

forests, and livestock. Fourthly, physical capital that includes basic infrastructure, new technologies and access to water. The last capital is the financial capital that includes savings, credit, and income from employment, trade, and remittances.

Vulnerability Context

Vulnerability context includes the external environment within which people exist that is characterized as insecurity and risks in the well-being of individuals, households, and communities. Vulnerability refers to defenselessness, insecurity, and exposure to risk, shocks, and stress and indicates exposure to contingencies and the inability to cope with them. Vulnerability is not synonymous with poverty. It has two sides which include an external side of risks, shocks, and stress to which an individual or household is subjected to and the internal side which is defenselessness that refers to lack of means to cope without damaging loss.

Livelihood Strategies

Livelihood strategies are the livelihood activities undertaken by people to achieve livelihood outcomes. People take up different livelihood activities to generate income and reach their livelihood goals. The approach attempts to identify the strategies and determinants behind people's decisions and to reinforce the positive aspects of these strategies and reduce barriers.

Policies, Institutions, and Processes (PIPs)

The livelihood strategies not only depend on people's capitals and vulnerability context but also the inter-related issues of social relations, quality of service, the system of governance, resource access institutions, policy issues and role of social and political organization. The policies and institutions play a crucial role in

shaping any livelihood strategies and therefore assessing these institutions and policies is an important task in this approach.

Livelihood Outcomes

Livelihood outcomes are the achievements of livelihood strategies. It is the potential outcomes and the goals to which people aspire. The approach tries to understand these efforts and support them to achieve their goals. The goals can include increasing income and well-being, reducing vulnerability and improving food security as well as the sustainable use of natural resources.

The livelihood framework helps in encouraging thinking outside the box and develop a better understanding of the poor people's livelihood condition. It gives freedom to practitioners to look into a wide and comprehensive context and to be more process-oriented. It encompasses the micro, mezzo and macro level and helps in understanding the relationship between different components. It assesses the sustainability of different livelihood activities and helps in developing a more rational and sustainable livelihood. The framework also reveals how sustainable livelihoods are achieved in different contexts through access to a range of livelihood resources which are combined in the pursuit of different livelihood strategies (see Scoones, 1998; DFID, 1999; Haidar, 2009).

1.4. Statement of the Problem

Oil palm cultivation is being promoted in Mizoram by the state government to enhance the livelihood and living conditions of the people and mitigate environmental degradation. The plantation was started in the year 2004, covering all districts except Champhai district. The climate and soil of Mizoram having low elevation and gentle slopes are said to be suitable for cultivating oil palm.

There is no research-based evidence available on the livelihood and ecological impact of oil palm cultivation in Mizoram. The present study tries to provide a comprehensive understanding of the bearing of oil palm cultivation on rural livelihood and living conditions in Mizoram. It attempts to probe into the role of oil palm cultivation as a strategy of rural livelihood promotion in Mizoram. It will make use of the Sustainable Livelihood Framework (see Chambers and Conway, 1992) to understand rural vulnerability context, patterns of livelihood assets and their bearing on the adoption of oil palm cultivation. Drawing inspiration from this theoretical framework, it will also try to comprehend the role played by governmental and private organizations to promote oil palm cultivation in the state. It will also probe into the impact on rural ecology and living conditions.

The findings of the study will be useful for planners, policymakers, voluntary organizations and social workers at multilevel who are concerned with issues in livelihood promotion and rural development. It will develop a better understanding and show direction for developmental intervention for promoting rural livelihood. It will also benefit social workers by providing relevant information and appropriate intervention strategies at the micro, mezzo and macro level.

1.5. Chapter Scheme

The present study has been organized into eight chapters. The first chapter presents the scenario of rural development and oil palm cultivation in the global, Indian and Mizoram contexts. An overview of the literature, theoretical framework and statement of the problem were also presented. The second chapter presents a review of the existing literature on oil palm cultivation and rural livelihood and it also presents the research gaps in detail. The third chapter describes the profile of the

study area and presents the objectives, hypotheses and research design of the study. The fourth chapter presents the vulnerability context of the sample villages. The fifth chapter describes the socio-economic structural bases of rural households studied. The sixth chapter describes the patterns of livelihood and living conditions of rural households studied. The relationship between the livelihood assets and living conditions are also discussed in this chapter. The seventh chapter presents the sequence and determinants of adoption of oil palm cultivation. The perception of farmers on the impact of oil palm on rural ecology is also discussed in this chapter. In addition, the results of testing of the hypotheses of the present study are discussed. The last chapter summarizes the findings of the study and offers recommendations for policy and practice.

CHAPTER II

REVIEW OF LITERATURE

A literature review explores other works that were already carried out in the field of the study. It is an important step in any research and helps to identify the substantive, theoretical, methodological, conceptual and operational gaps in the literature. Hence, reviews of related studies are presented in this chapter. The present chapter is divided into six sections. The first section presents the review of studies on Sustainable Livelihood while the second chapter is concerned with studies on rural vulnerability context. In the next section sustainable oil palm cultivation is reviewed followed by livelihood and oil palm cultivation in the fourth section. The living conditions and oil palm cultivation is reviewed in the fifth section. Lastly, studies on ecology and oil palm cultivation are reviewed.

2.1. Studies on Sustainable Livelihood

R. Chambers and G.R. Conway (1992) explored the concept of sustainable livelihoods in the context of rural areas. The paper outlined in the 21st-century livelihoods will be needed by perhaps two or three times the present human population. It comprises people, their capabilities and their means of living, including food, income and assets where tangible assets consist of resources and stores, and intangible of claims and access. The paper discussed that livelihood is environmentally sustainable when it maintains or enhances the local and global assets on which livelihoods depend and is socially sustainable when it can cope with and recover from stress and shocks, and provide for future generations. The paper also mentioned that future generations are not included in our decision making but will outnumber us, so new concepts and analysis are needed for policy and practice. The

implications include personal environmental balance sheets for the better off, and for the poorer, policies and actions to enhance capabilities, improve equity, and increase social sustainability.

I. Scoones (1998) described a framework for analyzing sustainable livelihoods, explained concerning five key indicators where it shows how, in different contexts, sustainable livelihoods are achieved through access to a range of livelihood resources (natural, economic, human and social capitals) which are combined in the pursuit of different livelihood strategies (agricultural intensification or intensification, livelihood diversification, and migration). It stated that central to the framework is the analysis of the range of organizational and institutional factors that influence sustainable livelihood outcomes. The paper concluded by expressing some of the practical, methodological and operational implications of a sustainable livelihoods approach.

L. Krantz (2001) attempted to introduce an approach to poverty reduction. The paper outlined that Sustainable Livelihood is an attempt to go beyond the conventional definitions and approaches to poverty eradication which were too narrow as they focused only on certain aspects or manifestations of poverty and did not consider other vital aspects of poverty such as vulnerability and social exclusion. Recently it was recognized that more attention must be paid to the various factors and processes which either constrain or enhance poor people's ability to make a living in an economically, ecologically, and socially sustainable manner. The concept offers a more coherent and integrated approach to poverty. The paper illustrated how the approach has been used by certain international development agencies in the real field. It also presented a critical analysis of the strength and its weaknesses. It

concluded that complementary action is required in different sectors and all projects need to define their target and participant groups and show what impact they will have on poverty.

M. Cahn (2003) outlined critical comments on a sustainable livelihood framework in the context of the rural study. The paper stated that the framework is not a solution for all development but only a guide to thinking and offers a considerable guideline for researchers and practitioners. This could help study rural development and poverty alleviation. The framework is still a discussion in terms of its weakness and strength. The success and reliability of using this framework largely depend on the context of the study, the realities, sensitivity and how it is adopted. The advantage of this framework is that it identifies what people have rather than what they did not have in the first place. The diversity of livelihood strategies could be also identified using this framework whether it is of household level, community level or national level. The main concern of this approach is its complexities. Many researchers have been using this approach from different disciplines to study livelihood and poverty alleviation. But the reality and nature of these issues can differ across regions like the difference of Pacific regions and Asian regions. Further, gender is not mentioned in the published frameworks which can be its limitations.

A. Toner (2003) believes that while sustainable livelihoods 'thinking' is potentially valuable in advancing our understanding of the complexity and socially embedded nature of people's lives, the frameworks and principles are too eager to codify this complexity and to produce toolboxes and techniques to change the internal management of development interventions. The paper offered an analysis of two interventions that apply aspects of sustainable livelihood approaches based on

the study in Tanzania. Though the interventions proved much good practice, both are fundamentally limited in their potential for sustainable impact. The paper also outlined the importance of the external context within which an intervention exists and explores some of the limitations faced by development agencies in trying to 'manage' sustainability. The major strength of SLAs is their recognition that institutional arrangements can shape and constrain the livelihoods strategies that people can follow and a better understanding of how institutions are created and evolve is required in both theoretical and practical treatments of such approaches.

D.F. Bryceson (2004) explored the concepts of livelihoods, sustainability and poverty alleviation regarding recent rural economy survey findings in sub-Saharan Africa, policies in the international development policy arena during the last 20 years, and South Africa's rural history. An argument is made that the processes of de-agrarianisation and depeasantization have accelerated in association with the implementation of structural adjustment policies. The study indicated a decline in peasant commodity production, an increase in non-agricultural income diversification, the proliferation of multi-occupational households, accelerating rural class stratification and growing poverty. The sustainable rural livelihood approach acknowledges a structural change in rural areas but has not yet fully analyzed the depth of ongoing change and the policy scope needed to deflect rural poverty.

K. Hussein and J. Nelson (2004) attempted to explore how institutional arrangements determine rural people's entitlements, provide the setting within which they construct their livelihoods, and determine who gains and losses in the struggle to maintain livelihoods based on the study in four countries viz., Bangladesh, Mali, Ethiopia, and Zimbabwe. The paper proposed that rural people construct their

livelihoods by three main strategies which include agricultural intensification, livelihood diversification, and migration. The natures of livelihood diversification in different contexts were outlined which include sometimes a means to enable accumulation for consumption and investment, sometimes employed to help spread risk, or to cope with temporary crises, sometimes an adaptive response to longer-term declines in income or entitlements, due to serious economic or environmental changes beyond local control and others. The paper concluded that livelihood diversification is normal for most people in the majority of rural areas and non-agricultural activities are critical components of the diversification process. Livelihood diversification has pursued a mixture of motivations, and these vary according to context and the character of livelihood diversification is dependent primarily upon the context within which it is occurring. Lastly, the paper also expressed that the poorest rural groups probably have the fewest opportunities to diversify in a way that will lead to accumulation for investment purposes.

C. Dakson and T. Binns (2009) probed into the importance of cultural values in attaining rural livelihood sustainability drawn upon field-based research in two villages in Central Sri Lanka. The study identified that although sustainable livelihood approach is very useful it does not adequately address traditional cultural values, and frequently perceives culture as a constraint in understanding livelihood opportunities and planning future development trajectories. It supported livelihood perspective as a pragmatic approach under which cultural knowledge and traditions can be explicitly treated as resources in the context of achieving sustainable community development. It showed how the extent to which these cultural complexities and rural lives are interconnected in terms of both livelihood choices

and opportunities and in building up various livelihood assets in the shape of human, social, natural, financial and physical capital. It stated that livelihood perspectives help in developing a better understanding of how culture is conceptualized and incorporated into the process of community development.

O.A. Valdes, Rodriguez and A. Perez-Vazquez (2011) discussed the meaning and methodologies of sustainable livelihood approaches (SLA) which is an applied strategy for rural development. The paper outlined how the approaches have been developed by different organizations to achieve better perspectives thereby applying their methodology. A comparative analysis is carried out which reveals the purposes, strengths, and weaknesses. However, despite the different approaches utilized by different organizations, they have a common objective which is to develop human groups in situation of social disadvantage and the eradication of poverty

L.J. De Haan F(2012) outlined the livelihood approach and its subsequent critical analysis and evolution. The paper discussed the basis of the original livelihood approach in its development cooperation context around the turn of the millennium. The popularity of it in academic research and the criticism are explained. It stated that the neglect of power relations was an important flaw in the initial livelihood approach. The paper explained how the subsequent generation of livelihood studies managed to come to integrate with that shortcoming and how it developed an understanding of the operation of power in livelihood strategies that can enable development interventions to effectively contribute to livelihood enhancement. It also criticized the current livelihood research for limiting itself to the production of a series of studies presenting almost endless variations of local livelihoods. The paper also argued that the livelihood approach starts a new line of

studies and the line of its studies should aspire to formulate broader generalizations through meta-analysis and comparative research, which may eventually challenge the existing theories.

2.2. Studies on Rural Vulnerability Context

The linkage between vulnerability and livelihood has been studied by many researchers in the developmental field. This recognition has led many researchers to represent rural livelihoods as a constructed form of a portfolio of resources or activities (see Ellis 1996; Unni 1996).

Berkes and Jolly (2001) analyzed the adaptability and resilience in socio-ecological change based on the case study from Inuvialuit people of Sachs Harbor in the western Canada Arctic which is a small community. The study examined the adaptability to climate change and their capacity to deal with it. The study found that a shift in land-based activities is a short term response to climate change which is an important coping strategy. The study also found out the cultural and ecological adaptations among the Inuvialuit community who lived in a highly uncertain and variable environment. Based on the findings, the study offered suggestions on how various communities could adapt to different climate change. Theories and practice could be combined to generate a new approach for adaptations. The short term responses include exchanging species and adjusting the hunting practices like when, where and how. Flexibility in seasonal hunting patterns, diversifying hunting activities that were permitted by traditional beliefs, sharing food and other resources, and community trade were long term responses.

E. Francis (2002) conducted a case study in the North West province of South Africa, where she examined how, and why, rural livelihoods have changed in one of

the former 'homelands' over the past four decades. The study focused on the nature and extent of the differentiation processes and the resources that have been critical in the process. It discussed the major risks which people face in pursuing their livelihoods and their responses to such risks. The factors identified for these risks include institutions governing resource access and contract enforcement, together with labor and commodity markets. Responses were taken in the form of livelihood diversification, between activities and across space, putting a premium on access to information and social networks, as well as to the state while the others have responded to risk by clustering around a person with a regular income. The study suggested that policy interventions to promote poverty reduction must combine support for the generation of livelihoods with institutional reform to reduce vulnerability to risk.

R. Slater (2002) scrutinized the changing pattern of livelihood of black South African peoples under the apartheid transition to democracy. The paper identified the process of differentiation and how the people responded to the changing livelihood opportunities and related risks and insecurity which are associated with different institutional and socio-economic changes. The study revealed that in search of new employment, those who have capital resources can begin trading and household circumstances and social relations became increasingly significant differentiating factors, as households attempted to diversify their livelihood activities. The study suggested there is a need to recognize the diverse range of households livelihoods and to focus on integrated rather than sector-based planning for rural development. There is also a need to improve infrastructure for equitable access to liable institutions and for securing land tenure among the rural poor.

S. Dercon et al., (2005) attempted to examine the vulnerability context to different types of shocks based on the study in Ethiopia. The study used a rural household survey that characterized the nature, frequency, and severity of climatic, economic, health and other shocks faced by the region. The study revealed how different shocks affect households, which are the dominant shocks and which shocks have a worse impact on households. The findings showed that drought shocks and illness shocks are the most dominant shocks and female households, illiterates of the head in the household are reported to have a much bigger impact of drought shocks.

A. Agrawal (2008) outlined that it is essential to attend the historical repertoire of strategies used by rural populations to understand the role of institutions in the future adaptation of rural livelihoods to climate change, especially by poorer and more marginal groups. The paper identified a framework to view the relationship between rural institutions, adaptation owing to climate variability and change, and livelihoods of the rural poor. Using the existing literature on risks and livelihoods, the paper proposed five major classes of adaptation practices available to the rural poor in varying measures depending on their social networks, access to resources, and asset portfolios: mobility, storage, diversification, communal pooling, and exchange. It suggested that attention must be paid to civil society or micro-level institutions in crafting national responses to climate change. Close integration of different institutional arrangements is also likely critical for enhancing the effectiveness of adaptation practices. Adaptation interventions and investments will not achieve much success without greater attention to local institutions and their role in adaptation efforts and how local and external institutions can be articulated in the context of adaptation.

R. Holmes and N. Jones (2011) outlined the vulnerability of poor households to economic and social shocks and stresses such as indebtedness due to economic, social or life-cycle events, food insecurity, health problems, productivity loss, lack of access to inputs, information, and markets, gender discrimination in ownership of assets and discrimination in the labor market. To reduce risk and vulnerability a well-designed social protection programmes is useful by building resilience to shocks and stresses. The paper focused on a subset of social protection programmes which aim to tackle rural poverty and food insecurity and to promote agricultural productivity based on two case studies of public works programmes in Ethiopia (PSNP) the Productive Safety Net Programme and India (MGNREGS). The study analyzed the extent of what the programmes consider gender-specific risks and vulnerabilities in the design and implementation. The study revealed that in India poor rural households have limited investment in agriculture infrastructure and limited access to resources. The two case studies revealed several findings that can be used to inform policy dialogues on public works initiatives in other contexts as well as highlighting some key policy areas in the design and implementation of public works programmes which can support a more positive impact on gender equality and the effectiveness of public works programmes.

T. Moreda (2012) studied argued that household livelihood vulnerabilities should not be conceived as ‘discrete’ events caused by external factors such as drought although which impact has been long recognized. The internal factors were also linked to vulnerabilities of long term instability in socio-economic and political processes; land degradation, land scarcity and fragmentation, landlessness, and particularly tenure insecurity. These resulted in declining land access, rising

livelihood vulnerability, and hampering agrarian and rural change. In addition to its impact on land conservation, the lack of tenure security tends to trap the rapidly growing population to subsist on the continuously dwindling land resources. This entrapment limits the expansion of the non-farm sector and constrains agriculture, contributing to a vicious circle of poverty and livelihood vulnerability. Livelihoods are evolving in complex ways in response to mounting challenges and changing opportunities. Consequently, households tend to engage in many diversified livelihood activities of which seasonal migration is a typical example. The studies set out to explore the nexus between vulnerability, land, livelihoods, and migration through examining the underlying causes of vulnerability, such as access to and control of land, land tenure relations, population growth and resulting livelihood strategies to understand why vulnerability and livelihood insecurity persists in the study areas.

N.K. Kimani and S.K. Bhardwaj (2015) examined people's perceptions and adaptations to climate change and variability in the mid-hills of Himachal Pradesh, India. The study inferred that nearly ninety percent of the people perceived rise in temperature of the region and a decreasing trend in the amount of rainfall. The people living in mid-hills responded to the rise in temperature and decrease in rainfall by shifting to other crops, varieties, early planting, and other cultural measures. The main barriers to adaptation include limited knowledge on adaptation measures, lack of access to early warning information, the unreliability of seasonal forecast and high cost of adaptation in the region. The study demonstrated that education of the household head, farming experience, off-farm income, access to credit and extension

services as factors that enhance adaptive capacity to climate change in the area. Hence, policy formulation to address these factors was outlined.

G. Kaushik and K.C. Sharma (2015) explored changes in climate and rural livelihoods adaptation and vulnerability in Rajasthan. The state climate ranging from semi-arid to sub-humid and natural depletion of resources has already experienced the consequences of climate change. The paper stated that the region is expected to become worse with increased in temperature, the intensity of rainfall events, and increased variability in space & time of monsoon rains being consistently projected for the region. The government also promotes livelihood for sustainable development where livelihoods of the rural poor are directly dependent on environmental resources like land, water, forests and are vulnerable to weather and climate variability. The study recommended that local coping strategies and traditional knowledge need to be used in synergy with government and local interventions. The interrelationships between water, agriculture, forests, and pastures must be integrated into the solution. Lastly, there exists a great potential for policies and schemes to be employed synergistically towards building true adaptive capacity for the rural communities.

S.K. Kimani, et al., (2015) stated that climate change is one of the major expected threats to sustained economic growth which leads to extended poverty in semi-arid regions of sub-Saharan Africa. The highest vulnerability areas include the health sector, food production, biodiversity, water resources, and rangelands. The paper stated that climate change will likely increase the temperature of many parts of the world in the future which will result in severe drought conditions in many parts of the world. This will further bring a profound and negative impact on the livelihoods

of many rural and urban areas which could lead to changes in land use. It is estimated that eastern regions of Africa are vulnerable where they will experience reduced average rainfall exposing agriculture to drought stress and a rise in temperature. With this, the situation will be worsened by the interaction of multiple stresses factors occurring at various levels, which will negatively impact agricultural productivity. It concluded that reduced vulnerability to climate variability and change and promotion of climate resilience requires the development of investments in support of reducing poverty, enhancing biodiversity, increasing yields and lowering greenhouse gas emissions.

2.3. Studies on Sustainable Oil Palm Cultivation

A.G. Agwu (2006) analyzed to what extent the adoption of improved oil palm production and processing technologies in Arochukwu Local Government Area of Abia State, Nigeria. Five town communities were randomly selected out of 12 autonomous communities. The sample includes fifty oil palm farmers which were randomly selected. To collect data structured interview schedule was used. The seven-step adoption model was used to determine the extent of adoption. For data analysis, a Likert-type scale was used to find out major constraints to the adoption of the practices, making 2.0 as a cut-off point. The study found that a substantial majority of oil palm farmers were male as they were owners of the farm traditionally. However, women played an important role in the processing of fruit and selling it. The paper stated that among the oil palm farmers, majorities of them were literate which could have a positive relation to the adoption of oil palm cultivation. The mean years of experience in oil palm cultivation were worked at 14 years. Majorities of them owned land between 0.1 – 5.9 ha which is being used for oil palm cultivation

and most of them belong to farmer's organizations. These lands for oil palm cultivation were acquired in different ways like purchase, lease in, inheritance and pledge. The capitals required for oil palm cultivation was mainly financed by using their private savings. The main reasons for adopting oil palm cultivation were due to its high yielding in nature and the production of good quality fruits. Majorities of the farmers perceived that extension education is needed to improve the cultivation of oil palm in the region. The findings also demonstrated that four technologies viz. use of mechanized mills for processing oil palm fruits, planting of leguminous cover crops in palm plantations, use of insecticides and use of herbicides had very low adoption levels among the farmers. Extension agents were the most preferred and most important information source on improved oil palm technologies. The main constraint to adopt improved technologies was a lack of finance. The study recommended the need for the provision of subsidies and financial support to farmers to enable them to pay for the necessary farm inputs.

Y. Basiron (2007) described Palm oil production through sustainable plantations based on the study in Malaysia. The paper stated that industry in Malaysia is one of the most organized agricultural sectors around the world. The focus has been changed to its sustainability and accepted standards. Due to its plant physiology of high productivity and efficient carbon assimilation the oil palm has a natural head in fulfilling sustainability indicators. The advancement in technology has increased production and yields and now becomes a sustainable and renewable raw material for the world’s food. It raised the standard of living and generates income and a key plank of the sustainability platform. Different stakeholders have joined hands with oil palm industries to get a certification of sustainable oil palm

production that can be traced. The question of sustainability has led to the formation of a Round Table on Sustainable Palm Oil (RSPO). There are numbers of oil palm companies that are members of the body. The Round Table on Sustainable Palm Oil has formulated different principles and criteria for sustainability and yet to introduce certification for full trace traceability. The conservation of forests and maintaining ecology is the prime objective. There will be an increasing demand for land as population increases and income from oil palm production is still higher than that of productive forests. Due to this, the government has implemented a policy to stop deforestation. The oil palm is eco-friendly in its nature as compared to other oil seeds and the higher yield of tenfold. It also used less land to produce consumable oils than other plantations. The big industries have to register themselves and act accordingly to produce oil palm. The competition of oil palm production shows that it will still be a significant source of sustainable and renewable raw material for food, bio-fuel and oleo-chemical in industries in the future.

F. Olagunju (2008) studied the processing of oil palm in Southwestern Nigeria. The economic impact of this processing was focused on. The paper stated that hydraulic hand press was the main technique used in oil palm processing. The study revealed that the processing of oil palm in the region was very profitable and increases their income. The regression test showed that the cost of extraction and the cost of palm fruit was negatively correlated while the cost of extraction and net return was positively correlated. The main challenge that hinders profitability was extraction and transportation costs. The study offered suggestions to improve the road conditions and minimize transportation problems as well as to maximize access to resources and material. Cooperative society must be formed among the processors.

This will strengthen them in accessing modern technologies and equipment and thus reduce the extraction cost. Electricity must be regular and pipe-borne water should be provided. The supply of machinery by the government in subsidized rates would also be much helpful for the processors. The Nigerian Institute of Oil Palm Research (NIFOR) should also be restructured and revamped as it is currently unproductive, inefficient and unsustainable.

A.M. Bonsu, D.P.K. Amengashie and S. Gyasie (2009) assessed the structure of the labor market and demand for hired labor for oil palm production in the western region of Ghana. The study was a cross-sectional that selects oil palm farmers randomly to describe the structure and labor market. The factors that led to hiring labor in oil palm cultivation were identified. For analysis of data, regression technique was employed in the study. The study found out that various types of labor including hired labor (daily labor, salaried labor, and contract labor), family labor, ex-change labor, and communal labor are employed in the land. The relationship between the type of labor employed in the land and the size of land or farm shows that farmers employing labor only for maintenance have larger landholding. Regarding types of labor, family labor was used during harvesting, pruning and weeding while hired labor were used mainly for slashing and carrying of fresh fruit bunch. The distribution of labor shows a type of small scale agriculture production. Contract labors were 14 percent, salaried labor of 11 percent and used of fertilizer in the production of 30 percent. Regression analysis shows that the village wage rate, the value of investments in other inputs, higher educational attainment and the size of oil palm farm has significant and positive influences on oil palm farmers' demand for hired labor. Distance between farm and home was negatively significant. It was

suggested that farmer's need for labor must be based on economic considerations such as farm size, village wage rate, the structure of labor of the farmers and cost of other productive inputs. The activities that can be mechanized by oil palm farmers were carrying fresh fruit bunch and slashing but this may bring retrenchment of female and male hired labor.

G. Pehnelt & C. Vietze (2009) paper discussed the European policy on oil palm production. It covers different perspectives on how oil palm is sustainable. The biodiversity and economic contribution of oil palm were assessed. Special attention was also drawn on the concern of oil palm in politics regarding the EU. They stated that the energy obtained by the residuals in the production process is much more favorable than other biofuels. It is also much more efficient compared to other crops. With contrast to recent campaigns and the perception among European citizens, the production of oil palm is not a prime factor for deforestation in tropical countries. The biodiversity in oil palm cultivation is also much higher than in most monocultures in the EU. The EU should reform the existing policy, calculate the objective and non-discriminatory concerning its GHG emissions saving values and support. It is an important factor in economic growth and development.

Levang, Riva, and Orth (2010) paper explored the conflicts of oil palm in Indonesian based on West Kalimantan, Indonesia. The paper presented that the NGOs' initiatives and perceptions towards oil palm are not valid in which they referred oil palm as an evil crop. The paper explained that oil palm is not responsible for land grabbing and displacement but can be a good opportunity for income generation. The approach adopted to defend indigenous communities is not the right approach. The source of the problem lies in the power relations that controlled the

land and production. There is a need for people's participation through the implementation of free, prior and informed consent to reduce the conflicts. The need for NGOs' involvement to support sustainable productions that supports the desire of local communities was also highlighted.

M.P. Djik (2012) paper discussed the sustainable development of oil palm through a partnership approach. He stated that for developing an economy, the partnership is very important. This is also true in oil palm marketing where it needs continuous market access. These arrangements to ensure access and sustainable production faced various problems and it very complex. This diversity and complexity is a challenge for arranging such a partnership. Therefore, Malaysia withdraws from the partnership due to perceived conflict of interest between the two Asian partners and inequality of treatment to Malaysia. The paper stated that partnerships must start in the right way and fulfill the conditions to be a success. The contribution of the current partnership is indirect in terms of its contribution to sustainable oil palm production. It is possible to improve global value chains through partnerships and supplements evidence to demonstrate the success and failure of such attempts.

S.B.A. Mahat (2012) studied the palm oil industry from the perspective of sustainable development based on the case study of the Malaysian oil palm industry. The dissertation stated that the demand for consumable oil has been largely increased since the last decade. This is due to the increasing population with increasing consumers. Oil palm becomes one of the important vegetable oil to meet this requirement which has been traded around the world of million tones in a year. The industry in Malaysia has grown substantially and produced different items such as

palm kernel, cake crude palm oil, palm kernel oil, biofuel products, and oleo-chemical to meet the needs of food and non-food industry around the world. This has led to the issue of sustainable development and various criticisms. The industry of oil palm in South Asia regions was questioned by international non-government agencies around the world on the issues of sustainability. Malaysia also faced certain criticisms and negative comments as oil palm were largely grown in the country since long years back. The industries in Malaysia were studied regarding its sustainability and assessed the existing policies and their impacts on the environment. A qualitative approach was used in the study which employed case study as well as literature in the form of secondary data. The study found that the government in Malaysia has taken certain steps to promote sustainable oil palm production. A minimum of 17 major regulatory frameworks regulated the industry to monitor and administer the issue of land, pesticide, environment and wildlife protection. The National Biofuel Policy was introduced with regards to the economic perspective to strengthen the contributions of oil palm in the country's economy and promote renewable energy that is not harmful and consumes less energy. Regarding the social perspective, the production in oil palm became an important mechanism to alleviate poverty and augment income. Recommendations and policy implications were made to focus more on the downstream sector which is yet to be captured and there is a need to introduce new independent accreditation organizations with other countries that will strengthen the industry from different issues about sustainability.

P.A. Onoh and C.A. Peter-Onoh (2012) studied the adoption of improved oil palm production technologies among farmers in Aboh Mbaise local government area of Imo state. This study was prompted by a decrease in the level of oil palm

production in the area. An interview schedule was used to collect data for the study. A statistical tool of simple percentages was used to represent data. Regression analysis was also used for the study. The study revealed that oil palm production was dominated by the male farmers in which majority of them were within the ages of 41-50 years. Most of the farmers were uneducated. The adoption of improved technology was poor and processing was commonly done locally. None of the farmers used chemical weed control. Gender, educational level, total farm size amongst other variables had a positive relationship to the adoption of improved technology while age and house-hold size had negative effects. Major constraints were also identified which include small farm size, lack of funds, poor extension contacts amongst others. The study recommended for governments to strengthen the informal education programmes, motivate extension personnel for increased efficiency and cause banks to increase their lending to the agricultural sub-sector.

D. Gilbert (2013) highlights the key actors and prospects of oil palm and its industry in Ghana where it plays an important role in its economy and government policy. The Ministry of Food and Agriculture supported the out-grower scheme in collaboration with donor agencies. Fund was also given by World Bank as a separate project under the Ministry of Trade and Industry for micro, small and medium enterprises. The industrial sub-sector consisted of medium and large scale oil palm mills. Scientific research and innovations by the Oil Palm Research Institute supported the industry. The prospects of oil palm cultivation are great in Ghana and the anticipated gains from the industry should be balanced against the potential social and environmental impact of commercial oil palm development and palm oil industry.

Ajieh and P. Chuks (2013) examined farmers' perception of priority in oil palm production and processing which was carried out in Aniocha South Local Government Area of Delta State, Nigeria. Among the farmers, majority of them were male and women were mainly involved in the processing and marketing of oil palm fruits. The average size of landholding was 2.6 ha which shows that majority of the farmers were smallholder oil palm farmers. The study inferred that nine priority areas are crucial to increase oil palm production and processing namely, credit facilities for oil palm farmers; favorable land tenure policy; establishment of agrochemical and fertilizer companies; building of mechanized processing mills at strategic locations; providing ready markets for oil palm products; favorable pricing system for oil palm products; and sponsoring of research on high yielding varieties and low-cost processing techniques. The study recommends that the priority areas identified by this study should guide future efforts by the government in revitalizing oil palm production and processing and oil palm farmers should be sensitized by the agricultural extension agency on the need to use improved production techniques. Further, research that focuses on high yielding practices and low cost in processing must be carried out to improve the cultivation of oil palm and minimize the challenges.

R. Anwar, R.P. Sitorus, A.M. Fauzi and W. Widiatmaka (2014) assessed the technical culture and productivity of Oil Palm in East Kalimantan Province among five oil palm enterprises. The study collected primary data using observation and measurement and secondary data using reports of the economic activities of the enterprises. Among the five plantations, ten percent were studied to be observed and measured. The technical application of agronomy was categorized as nursery,

immature plants and mature plants. The study found out that key technical culture applications at the nursery stage did not comply with technical standards recommended which led to the loss of yields around fifteen percent in a year. This failure in the application of technical culture also caused loss of yields in immature plants. Also, the misapplication of technical culture could even result in yield losses. From the analysis of productivity, it was found that the average productivity of the plantations was 12.66 tons/ha/ye or 78.96 percent of the potential baseline productivity. The productivity was still low considering the potential standard of productivity of the land and was assumed due to noncompliance with the recommended standards of technical culture.

Ibitoye and S. Jimoh (2014) assessed the economic analysis of oil palm marketing in Dekina local government area of Kogi State, Nigeria. Random sampling was used to select one hundred twenty-five oil palm sellers among the five major markets which were purposively selected. A questionnaire was used to collect data for analysis. For data analysis, statistical tools of simple mean, frequency and percentages were used. Besides, Shepherd Futrel model, Bivariate correlation, gross margin, and a five-point Likert type of scale were used. These were presented in the form of tables. The study revealed that females constituted a majority (96%) of oil palm sellers and the oil palm market was largely integrated. The income from oil palm was high and was profitable. Besides this, the market revealed a low marketing efficiency of 18 percent. This was determined by the high marketing cost associated with palm oil marketing. The study recommended that rural infrastructure must be improved and marketing incentives must be encouraged by the government to reduce the costs associated with the business. Financial inclusion and financial institutions

must be strengthened by the government to give loans to tackle the problems of lack of capital and stabilization of prices to make an efficient marketing system. Rural development must be promoted by the government that involves marketing activities with various provisions like infrastructural development, transportation, and processing of oil palm. They should also make rules and regulations to protect the welfare of the retailers that can include restrictions of traders, licensing and market regulation. Administration and monitoring of prices at different levels thereby setting minimum prices, fair prices for consumers and fix the rate for commissioners should be promoted to allow competitive markets. Overall it was found that oil palm marketing in the Dekina local government area was largely integrated, profitable and viable and is worth sustainable.

A.U. Santosa (2014) summarize the report of workshop on the theme of "Towards Sustainable and Productive Palm Oil Sector of Indonesia. The main purpose of this workshop is to build general understanding and awareness on supply chain of palm oil sector in Indonesia and its impacts. It attempts to identify the best practices and initiatives to halt deforestation in the palm oil sector, highlight existing policy, economic and technical obstacles and seeking potential collaborative solutions that government, business, and civil society can work on leading into a sustainable and productive palm oil sector, which is able to respond to its rapidly growing demand and promote sustainable economic growth that benefits people, while also preventing further deforestation and degradation of forest. The discussion acknowledged the importance of oil palm industry which acts as the main producers that provides global market and its impact in macro economy especially in alleviating poverty and augmenting income. The mechanisms and initiatives to ensure oil palm

cultivation were mentioned which stated that Indonesian oil palm industry has already adhere to sustainable principles. There were also measures taken recently to promote sustainability by various measures like RSPO, ISPO and POIG. In achieving sustainable palm oil, the greatest challenge faced is the complicated issues related to spatial planning and forest boundaries in Indonesia, which One Map initiatives tried to address considering also there is a new plantation law in the picture. The discussion also mentioned that following sustainability standards and guidelines is necessary to participate in global market and gain trust. The challenges to ensure traceability is legal certainty were also pointed out. In another panel, there was also a discussion whether enough consumers would buy sustainable products as the price will be more expensive. There was a recommendation that several companies should come together and commit to selling sustainable products with slightly more expensive price, to create equal competition.

S. Mingorria, G. Gamboa, B. Lopez, and E. Corbera (2014) highlighted that oil palm has become one of the most rapidly expanding. Many countries are adopting oil palm cultivation as a strategy of rural development and aim at generating employment and producing both export commodities and biofuels. They analyzed the socio-economic implications of oil palm cultivation based on a study in Polochic valley, Guatemala. For data collection, participant observation, semi-structured interviews, and land-time budget analysis were used. The study revealed how oil palm cultivation increases rural income and decreases maize production. Although maize production was declined, it still shows higher degrees of food security and oil palm farmers are also still consuming it. The study found out that while income from

oil palm cultivation could be profitable, basic materials required for a good life, food security, freedom of choice and social relationships can be deteriorated.

Z. Zen, C. Barlow and Gondowarsito (2016) discussed interventions to promote smallholder oil palm and their socio-economic development in Indonesia. They stated that the Indonesian state has taken oil palm cultivation as a prime moving force for rural socio-economic improvement. The programs of NES/PIR by the government of Indonesia success in many ways for oil palm farmers. They also highlighted some of the loopholes and challenges in the process. In the previous scheme, the smallholders of oil palm had direct control over their land and gain an advantage. They also had an advantage as they have utilized modern agronomic and harvesting practices so that they can do well even under poor governance. Due to the Asian financial crisis, the policy had changed thereby introducing partnership models and decentralization. The local government has the power to pursue certain initiatives. They are now able to work with companies in terms of land arrangements and benefit-sharing. In most cases, the local government did not have enough budget and commitment which led to poor management and direction. So with the general replacement to a joint venture and partnership models, the companies have gained power overproduction. Oil palm companies gained direct control over production while small scale farmers faced different challenges. The benefit-sharing arrangements lack transparency and were in favor of the plantations. The smallholders were minimized by using them as laborers in the plantation. The replacement by large scale plantations can yield higher productivity but the main profit goes to companies and government while the smallholders remain poor. These profits are gain by the government in the form of taxes. In contrast to this, the earlier

approach gave direct responsibility to smallholders and control over the production. Due to the changes in this approach, the smallholders are declining in the region. But some smallholders successfully integrated into the earlier schemes and benefitted from the experience and examples which led to high yield and raised their standard of living. But the majority of the poor villagers did not make use of schemes due to the absence of effective extension services and still plant low yield trees with little improvement in crop cultivation. Targeted micro-interventions were the most successful schemes that try to address the incomplete markets for credit and information. Oil palm presents a lucrative investment opportunity and is being extended at a rapid pace. The study suggests that the NES scheme must be continued for the poor with some adjustments. A recommendation was made that poor and small farmers must practice intercropping in the earlier stage of oil palm cultivation. Measures must be also taken to abolish the unfairness of land acquisition by the central and state government. The study also recommends financial assistance for smallholdings by the central government. This fund can be provided in the form of a special fund. Besides these, the role of state and other policy actors is crucial to improve the socio-economic improvements of smallholders in the region. The initiative to be effective remains a challenge.

Ernah, P. Parvathi and H. Waibel (2016) outlined the adoption of sustainable oil palm practices by smallholder farmers in Indonesia. They stated that Indonesian Sustainable Palm Oil (ISPO) was introduced in the country which is mandatory for all large scale oil palm producers. Although this is not mandatory for smallholder farmers, some of their cropping patterns followed the guidelines of ISPO. In regard to this, a study was conducted among smallholders in Merangin district in the

province of Jambi, Sumatra. A panel data of three years among 233 smallholder oil palm was used and defined the usage of ISPO. The intensity of using ISPO was also assessed by Poisson Regression. The study offered suggestions for policy implications. They mentioned that although ISPO practices are not known by smallholder, several smallholder farmers use the pattern of ISPO to manage their crops. But they used only which will be beneficial to them and the remaining ISPO practices are not utilized. The intensity of using ISPO was determined by household characteristics. Therefore the government must take into consideration the heterogeneous nature of rural people to implement ISPO standard successfully among smallholder oil palm farmers. Besides awareness generation, technical and financial provision is required. This can also be done from past experiences of a similar approach. A large scale implementation of ISPO could be an intermediate step to achieve international recognition of sustainable oil palm cultivation.

Potter (2016) discussed the alternative pathways for smallholder oil palm in Indonesia. The paper tries to identify the methods and techniques that are friendly to smallholder and applicable in the context of Indonesia. The condition of smallholder oil palm in Indonesia is not favorable and the regulatory body like the Roundtable on Sustainable Palm Oil role in the certification of oil palm products is increasingly applicable to smallholders. It is based on the larger work that involves a comparison of oil palm development in Southeast Asia of selected countries of Latin America and West Africa. Although methods and techniques used in other regions are not easily transferable, alternative pathways were suggested to improve the independent smallholder in Indonesia. Firstly, mix cultivation and cropping with oil palm must e promoted without necessarily striving for the highest yields. Secondly, small

competing mills must be increased that will provide inputs and extension services to these independent smallholders or designed to meet the need for cooking oil and soap. Thirdly, the role of cooperatives in Indonesia must be widened to engage in alternative activities or to diversify their livelihoods. This suggestion or pathways already exist partially in Indonesia smallholder. But it is not widespread in the region and was completely rejected by the companies of plantations. Although cooperatives are also familiar to independent smallholders there function is still very limited. These cooperatives were introduced to take up the financial arrangements between estates and their tied smallholders, but authentic cooperative management and democracy of an oil palm property among smallholders are few. An alternative approach must also include ways to certify groups of organic growers, similarly as a specialist group of Arabica coffee growers are certifies in Aceh and Sulawesi.

S.S Maesaroh, A.I. Suroso and I.I. Pahan (2017) conducted a study to determine the factors that affect the moratorium policy and its effect on the national production of palm oil. Interview was conducted among 14 experts who were selected using purposive sampling method. In-depth interviews with pair wise comparison questionnaire were used to collect data. The final data was analyzed using Analytical Network Process (ANP), consisting of three stages (model construction, model quantification, and analysis). The study found that law enforcement, sustainability, conflict resolution, deforestation and land conversion were factors that influence the success of the moratorium. The paper stated that law enforcement has a very crucial role in the success of moratorium policy implementation because legal compliance is the foundation for the sustainability of oil palm production generated. Palm oil sustainability and its principle in regards to

economic, social, and the environment are largely based on the legal compliance. Sustainability and conflict resolution can be achieved if the law is upheld and regulated. The enforcement of laws also plays an important role to prevent deforestation and land conversion which is regarded as the main factor of greenhouse gas emissions in Indonesia. Therefore the challenges identified in these factors indicate that the moratorium cannot be done optimally. The success of law enforcement to the sustainability principle will be the conflict resolution in the society and will reduces deforestation and land conversion.

2.4. Studies on Rural Livelihood and Oil Palm Cultivation

B. Belcher, N. Rujehan, and R. Achdiawan (2004) compared the financial returns from the cultivation of oil palm, rubber and rattan. The financial costs and benefits of the principal land use in two districts of Kalimantan province, Indonesia was assessed. Farmers were interviewed who were purposively included in the sample. The study inferred that oil palm cultivation was most profitable with regard to land use per area. Rattan cultivation was less attractive from a financial perspective. Some farmers even stop cultivating rattan and start looking for other livelihood activities. But some farmers still cultivated rattan as inputs requirements are low and yield a high ratio of benefits to costs. Rattan cultivation also provides financial stability and functions as an important source of savings and insurance. From the villages studied, rubber cultivation was dominant in one village due to limitations of land and displaced rattan cultivation. Oil palm cultivation has displaced large areas of rattan cultivation and is expected to continue in the future. The processors of oil palm play an important role in this regard. The main reason was also due to the high economic returns of oil palm cultivation. On the other hand,

rattan cultivation also supplies a valuable export industry. The study stated that there is a scope to improve rattan gardening that will increase its benefits. The values must be recognized and incorporated in planning and policymaking.

O.K. Owolarafe and C. Arumughan (2007) conducted a study on the plantation and production of oil palm among contract growers in the states of Andhra Pradesh and Tamil Nadu, India. A structured questionnaire was used to collect data of ninety-six plantations out of hundred plantations. The size of plantations, age of plantation, maintenance practices, cost, and profitability, were assessed. The study revealed that majority (68 %) plantations were in between the range of 6 to 10 years and substantial plantations were a small scale of 1to5 ha. Majority of the farmers possessed their land by inheritance while the remaining purchased it. The cost of plantation depends upon the location of land which results in the availability of labor and easy access to land. Irrigation, weeding and fertilizer application was done satisfactorily by the farmers. The expenditure on fertilizer was very huge as compared to other expenditures. Almost all of the farmers used manual labor for farm operations and loan was taken by majority of them. Fruit harvesting was done in a well-organized way to ensure the quality of production. Although farmers benefited from the schemes, there were still some challenges like pest infestation of fruit, water stress and lack of funds. The stock point of fruits was also far from the land which was also a problem for farmers. However, majority of the farmers were still satisfied with the existing scheme.

L. Feintrenie, W.K. Chong and P. Levang (2010) paper discussed the livelihood impacts of oil palm development in Indonesia, based on lessons learned from Bungo district, in the province of Jambi. The advantages and disadvantages of

oil palm cultivation were analyzed by using a socio-economic survey. There was a conflict between the companies and smallholders mainly on the issue of land tenure and lack of leadership among smallholders. With regard to profit, the independent smallholders of oil palm gained more benefits than other crops cultivator as it was highly competitive in the region. Before the arrival of oil palm, livelihoods in the district depended mainly on rice cultivation for self-consumption and rubber cultivation for cash income which were mostly replaced by oil palm cultivation. The three determining factors include the direct profitability of smallholdings, the technical characteristics of the crop including less labor, the high return on investment, and the partnerships with big companies and banks, that bring a number of advantages. It has generated job opportunities and augmented income to the local people and the possibility to vary their cash crops. Although there were some conflicts related to oil palm plantations, local people are willing to convert large portions of their land into oil palm cultivations. This improved the livelihood conditions of the local people and migrants. They prefer to cultivate their own land rather than selling their land to the companies. The agrarian transformation is taking place in the region and become more urbanized and industrialized.

M.V. Prasad, A. Sarkar and J. Jameema (2010) paper discussed the performance of oil palm production technologies based on the study of three major states growing oil palm in India viz., Andhra Pradesh, Karnataka and Goa. To understand the adoption pattern and to enumerate various constraints in adoption of improved production technologies, the study interviewed 516 respondents. The study found that a large number of the oil palm growers were marginal (31.59%) and small farmers (27.91%). A substantial proportion of the respondents (74.61%) were

following basin method of irrigation with four to seven days interval (29.84%) to irrigate the palms and more than eighty per cent of the farmers were applying farmyard manure. Majority of the respondents were applying lower doses of Nitrogen (54.07%), Phosphorus (42.64%) and Potassium (34.69%) and majority of the farmers were not applying micronutrient fertilizers. Some farmers (34.69 %) were applying fertilizers in 2 split doses. The paper stated that efforts are required to put for sustained area expansion and also required to increase the productivity of the plantations. They advised to switch over from basin irrigation to drip irrigation for efficient utilization of water resources and it is advised to give frequent irrigations with less quantity of water in case of basin irrigation. They also advised to apply the fertilizers based on leaf nutrient analysis and soil test values. The imbalance application of major and micronutrients could be avoided by the judicial and rational application of fertilizers along with required quantity of organic manures. An uninterrupted power supply is also required to make best use of micro irrigation systems.

L. Rist, L. Feintrenie and P. Levang (2010) assessed the livelihood impacts of oil palm cultivation in Indonesia from selected districts and provinces among the rural farmers. The study found that many smallholders have benefited substantially from the higher returns to land and labor afforded by oil palm but district authorities and smallholder cooperatives play key roles in the realization of benefits. The main livelihood activity in the region was rice cultivation which was replaced by oil palm cultivation. This was due to the direct profit from oil palm cultivation, fewer labor requirements, good return in investments and the existence of companies as a partnership. The introduction of oil palm has generated new employment

opportunities for the local farmers and substantially increase their income. The main beneficiaries were independent smallholder oil palm farmers. It has improved the livelihood conditions of local people and migrants and large conversion of land into oil palm plantations that happened in the region. The paper stated that conflicts between communities and companies have resulted almost entirely from lack of transparency, the absence of free, prior, and informed consent and unequal benefit-sharing, and have been exacerbated by the absence of clear land rights. There was also strong opposition from NGOs against oil palm cultivation on the basis of its negative impacts on the ecology. Among the sample villages, the study found that where development schemes were rather similar the livelihood outcomes were often very different. Farmers frequently sold their land to companies rather than developing a smallholding leaving them without a source of agricultural income, or with such income significantly reduced. The manager of the smallholder also gains benefits by cooperating with the companies. In some cases, they also play an important role to negotiate for better prices for smallholder while another of them use the position for personal gain and benefits. The study also observed that oil palm cultivation contributes significantly to improve the livelihood of rural communities. The cultivation of oil palm has larger returns than other cultivation in terms of investing labor. However, the subject of oil palm remains controversial as some agencies are against it. Specific recommendations were made to improve the present situation and foster the establishment of smallholder friendly production regimes.

O. Ibitoye, A.O. Akinsorotan, N.T. Meludu and B.O. Ibitoye (2011) identified the factors affecting oil palm production in Ondo state in Nigeria. The paper stated that the civil war and discovery of crude oil had negatively affected the production of

oil palm in Nigeria. The price became higher and scarcity was observed in the region. From the predominant oil palm producing areas, a number of 150 respondents were selected using a purposive sampling method. Rainforest and the derived savannah zones were selected for the study. A structured questionnaire was used to collect data and was analyzed with the help of computer packages of SPSS. To calculate and represent data, simple statistics tools like frequency counts, means, standard deviation, and percentages were used. In addition, inferential statistics such as chi-square, Pearson correlation and T-test were also employed to test the significance of the relationship and differences of different variables. Moreover, regression analysis was also used. The study found that majority of the cultivators was males and from the age group of 41-60 years. The household composition shows that majority of them were married and lived with dependents. The average area of cultivation was below 10 ha of land and most of them did not attend training organized for cultivators. Information was mainly disseminated through extension services, radio, and neighbors. The main challenge identified was the supply of seedlings. It was found that human capital has a significant relationship with the yield of oil palm. The paper concluded that the farmers of oil palm cultivation did not want to use improved hybrid planting materials from organization nurseries. They stated that these agencies did not sell to them a quality and mature seeds but only try to pretend themselves as selling improved hybrid seedlings. With regard to the fruiting stage, this has been significantly tested. The farmers were also complaining about the measuring container for selling fruits which were very irregular. Overall, the cultivation of oil palm improved the livelihood conditions of the farmers although they faced certain challenges. The study offered suggestions to educate the farmers about the seedlings

which must be established well in the nursery before transplanting it to the land. Improved hybrid seedlings in the nursery must also be investigated and studied to prevent further problems. Cooperatives societies should also be formed by the farmers to improve their conditions along with the intervention from the government. With all these, it is perceived that oil palm cultivation will contribute more to the livelihood of the farmers.

R. Cramb and G.N. Curry (2012) wrote a paper on the expansion of oil palm cultivation in Asia–Pacific region. They stated that this expansion has important implications in rural livelihoods transformations. It happened in different forms within and between countries that depend on local context involving regional flows of labor and capital, global environmental impacts and efforts to build international governance structures. The paper is based on comparative case studies of seven studies to presents the diversity and complexity of the process. The paper highlighted that the introduction of oil palm in colonized countries has made a huge impact that reduced the forest cover areas and improved the livelihood conditions of the settlers in those regions. The cultivation of oil palm helps people to escape from poverty. However, there are different environmental impacts of oil palm cultivation. Thus, there is a need for more research to assess how the economic, social and environmental issues are negotiated and played at different levels. This will help in the understanding of how to develop sustainable oil palm cultivation and improve rural livelihoods across different regions and mitigate the environmental impact.

S. Budidarsono, S. Dewi, M. Sofiyuddin & A. Rahmanullah (2012) made an assessment on the socio-economic impact of palm oil production. This assessment was done base on the production of oil palm in Indonesia which is the leading

producer country. A household survey was conducted to analyze the livelihood conditions of oil palm farmers in 78 villages out of 8 provinces. Secondary data was also used in the study. The study revealed that the adoption of oil palm cultivation as a primary occupation was not high when a comparison was made between different households in a specific region. Among the oil palm cultivators, the determinants of oil palm cultivation include the existence of market links before oil palm development, working as a tandem program with transmigration, demographic and socio-cultural characteristics, tenure systems and biophysical characteristics. The comparison between oil palm cultivator villages and non-cultivator of oil palm villages inferred that oil palm cultivator villages were more populated than non-cultivator of oil palm villages. However, there was no significant difference regarding the birth rates and death rates. Conversely, in-migration was significantly higher in oil palm cultivator villages than non-cultivator of oil palm villages. The percentage of men in oil palm cultivation villages was also significantly higher than the non-cultivator of oil palm villages. The attainment and accessibility of elementary education show no significant differences while distances to secondary schools, hospitals, and other medical services were significantly higher in oil palm cultivator villages than non-cultivator of oil palm villages. The study draws indications that oil palm cultivator villages were mostly in distant places and were not given preferences in developments by the governments. However, oil palm cultivator villages showed lower rates of malnutrition but lower per capita health insurance for poor families and per capita services for poor people compared to non-cultivator of oil palm villages. With regard to industry and economic opportunities, oil palm cultivator villages were much better than non-cultivator of oil palm villages.

Shops, minimarkets, and the hotels were also more in oil palm cultivation villages than non-cultivator of oil palm villages. In addition, cooperatives and village unit cooperatives were also higher in number in oil palm cultivator villages than non-cultivator of oil palm villages. The study also revealed than majority of the households replaced their livelihood activity by adopting oil palm cultivation. There was also a substantial increase in household income through oil palm cultivation. This increase was even thirteen times higher among some oil palm farmers. The secondary occupation was also observed among these farmers. The paper concluded that oil palm cultivation has significantly contributed to socio-economic conditions positively.

K. Obidzinski, R. Andriani, H. Komarudin, and A. Andrianto (2012) study the impact of oil palm cultivation in Indonesia. The study revealed that the customary land users perceived negative livelihood changes due to land transfer for oil palm cultivation. The conversion of land into oil palm cultivation reduces the income from forest-based and access to sources of food. Some respondents perceived that land conversion into oil palm has a positive impact that includes infrastructural development like schools, health centers, and religious places. The study also observed that livelihood was improved in site one of the study and this was not entirely due to oil palm cultivation but income from off and on-farm activities. They received compensation as communal ownership of land was taken away and were given land for oil palm cultivation. As the years go by there were conflicts of land between the two parties due to lack of transparency and mismanagement. In site two of the study, companies acquired land from the native people by promising those better roads and other infrastructures, establish plasma plantations, etc. The

companies also promised to give a job and compensations for the land lost. However, the job provided was only unskilled work and the livelihood declined after it. But some respondents stated that their livelihood improved and these respondents were mainly smallholders. Site three inferred that only little respondents improved their livelihood due to expanding in oil palm cultivation. The substantial remaining livelihood declined as livelihood based on forests and its resources decreased. The study offered different suggestions to improve the present situations in the study areas.

E. N. Ajani, E.A. Onwubuyam and H.U. Nwalieji (2012) assessed oil palm cultivation and processing among rural women in Enugu North Agricultural Zone of Enugu State, Nigeria. The respondents obtained palm oil, palm kernel, palm kernel oil, palm wine, brooms, baskets; livestock forage and fuelwood from oil palm production which was mostly from women cooperative society. Cooperative societies were an important mechanism in which majority of the respondents obtained oil palm fruits through it. The remaining obtained oil palm fruits by buying while the remaining few obtained from their own production. This indicates that majority of them did not own oil palm farms. They were motivated to join cooperatives as it is the main source of oil palm fruits. They observed that a hundred percent of the respondents used their legs in processing oil palm fruits. They also used hand pressing and hydraulic pressing machines besides this. The paper stated that traditional methods of oil palm processing which is unhygienic, tedious and time-consuming were still practiced in the area. Fermentation in the course of processing was also used by majority of the respondents along with sterilization and clarification. With regard to labor requirements, majority of the respondents stated

that household members were the main source of labor followed by hired labor, exchange labor and help from relations. Majority of these households could produce more than 20 liters of palm oil which could be a good source for their income and survival. Overall, there were several benefits which include augmenting income, purchase of household basic needs and payment of school children fees. This implies that women's involvement in oil palm cultivation and processing empowered them economically. However some challenges were also found viz., processing machine, high cost of labor, poor extension services, use of a poor variety of oil palm seedlings, lack of storage facilities, lack of improved varieties/cultivars, poor access to good road network for easy transportation of produce and others. The study recommends that appropriate labor-saving technologies should be developed to reduce the challenges thereby increasing productivity.

J. Sayer, J. Ghazoul, P. Nelson and A.K. Boedhihartono (2012) paper stated that oil palm is a highly profitable crop adapted to the humid tropics and the area devoted to this crop is likely to expand significantly in the future. Although it can have environmental effects, when well managed it has a positive carbon balance and when grown in a landscape mosaic it can play a role in biodiversity conservation. Oil palm cultivation has driven high economic growth in several tropical developing countries and plays an important role in the alleviation of rural poverty. Under good governance, oil palm can make valuable contributions to the development and the resulting prosperity may free people to invest in better environmental practices. The large area of degraded land can be used for oil palm cultivation to increase production, improve yields and provide incentives to motivate smallholders. The paper made recommendations to ensure sustainable oil palm cultivation that includes

promoting yield intensification which will reduce the necessity for area expansion; promoting smallholder organizations to redress the balance of power in mutual agreements and good governance in terms of smallholder tenure security and forest conservation. The expansion of oil palm is mainly driven by demand and the consumer. Thus, consumer behavior is very important to achieve sustainability and equity.

C. Laschinger (2013) study reports on the results of research undertaken to assess the role of oil palm cultivation for local livelihoods in the sub-district of Karaket in Thailand. Karaket has recently experienced substantial uptake of oil palms by independently operating smallholder farmers which served as an interesting case to explore the main outcomes of oil palm cultivation for local livelihoods; regarded to operate in a system at the interface with the social and the ecological. The study showed that oil palm cultivation has created high social and economic value for sustainable livelihoods without seriously undermining the natural resource base in the immediate term. Oil palm cultivators have invested their profits from oil palm cultivation to strengthen their own assets like in the areas of education, health, hiring labor, etc. It strengthens their financial asset which is very important for their survival and raises the standard of living. The cultivators were highly satisfied with the income generated from oil palm cultivation. The study revealed that multiple interrelations between the contextual, governance, resource, and resource user system have created values, and if beneficial system interrelations are strengthened, sustainability may be secured. It may also be argued that such smallholder-dominated oil palm cultivation may set a good example and serve as an initial learning platform for how palm oil can be cultivated in a way that contributes to beneficial livelihood

outcomes. The study suggested there is a need for capacity building and extension education among farmers to increase production and gain maximum benefits from oil palm cultivation.

G. Dano (2013) reviewed commercial oil palm cultivation in Ghana. The paper stated that among the member of the genus Elaeis with regard to production and economic yield the African oil palm is the most important one. In Ghana, the total area of cultivation of palm oil is estimated at around 305,758 hectares. Commercial agriculture is restricted to the forest zones where the climate is ecologically suitable for oil palm plantation. There are three major scales of production recognized for commercial oil palm cultivation. They include large industrial plantations with large-scale processing mills and a network of smallholder and out-grower farmers, medium-scale plantations with medium-scale industrial mills with a network of out-growers and small private farmers cultivating less than 10 hectares. The Oil Palm Research Institute of the Council for Scientific and Industrial Research supported the industry with scientific research and technological innovations. Oil palm cultivation in Ghana has great potential if t is backed up with good investments like input in capital, research-oriented, and policy intervention. This can be supported by government and corporate bodies. Different challenges of socio-economic and ecological issues must also be addressed which can be an obstacle for oil palm development. The rules of tenants and agreements relating to oil palm cultivation are also very complex and there is a need to reframe appropriate tenancy rules and arrangements that may enhance the profits and motivates to invest more in farm production. The support from institutions is very important in Ghana which will motivate and encourage smallholder farmers and processors to utilize

modern tools and technology. This will increase the production of oil palm and augment their income. Lastly, the existence of a change in climate and variation needs to be studied and investigated to promote oil palm cultivation.

E.R. Cahyadi and H. Waibei (2013) paper scrutinized the impact of oil palm industries in poverty alleviation among contract farmers in Indonesia. A simple random sampling technique was used to collect data among 245 smallholders of contract farmers and non-contract farmers in Jambi province, Sumatra. The study found out that there was a difference in the socio-economic conditions among contract farmers and non-contract farmers. The size of land possession, household income, and other assets was much larger among contract farmers than non-contract farmers. The input in oil palm by contract farmers was also larger than non-contract farmers which resulted in higher yields and income. These contract farmers were mainly the indigenous people of the area and migrants were less likely to adopt contract farming. Contract farming was also significantly associated with the household head, size of oil palm land, indigenous status and planting period. It was also positively correlated to household income among contract farmers. In addition, income was also generated from off-farm activities and rubber plantation. The model used in the study inferred that the participation of poor households in contract farming was negative. It was also found those households having weak manpower were discriminated from contract farming to make arrangements. Overall, the paper concluded that contract farming has improved the standard of living and raise household income. The study offered suggestions that policymakers and companies must restructure the contract policy to ensure more income and higher yield by

smallholders. Further, the paper also supplemented that contract farming can increase dependency among these farmers which will make them more vulnerable to shocks.

S. Mingorria , B. Gamboa, and B.M. Lopez (2014) outlined that oil palm has become one of the most rapidly expanding crops in the world and many countries have promoted its cultivation as part of a broader rural development strategy that aimed at generating paid work and producing both export commodities and bio-fuels. On the other hand, oil palm expansion has often occurred at the expense of ecosystems and subsistence agriculture, and on lands riddled with tenure conflicts. They analyzed the implications of the combined effect of labor in oil palm plantations and land access on households, and discuss how these implications affect human well-being in two indigenous communities of the Polochic valley, Guatemala. They revealed how oil palm cultivation increases incomes for plantation workers' households, but decrease the productivity of maize cultivation by combining participant observation, semi-structured interviews, and land-time budget analysis at the household level. The cultivation of oil palm also reduced the time that household members have available for other activities and, particularly reduces women's resting time. Conversely, households that engaged in maize cultivation show higher degrees of food security and women can allocate more time to social activities. They made argument that while working for an oil palm cultivation can increase specific elements of the basic material conditions for a good life, other aspects such as food security, health, freedom of choice, and social relationships can become deteriorated.

Ibitoye and S. Jimoh, (2014) assessed oil palm marketing in Dekina Local Government Area of Kogi State, Nigeria. Based on the sizes and volume of trade in palm oil, five markets were purposively chosen for the study. From these markets,

125 respondents were randomly selected. Interviews and questionnaires were used to collect primary data besides secondary data. To analyze data, statistics of mean, standard deviation, frequency distribution, and percentages were used. In addition, shepherd-futrell model, bivariate correlation and 5-point Likert-scale were also employed. The analysis revealed that 96 percent of palm oil marketers were female and 42 percent were in the age group of 41 to 50 years which is an active and productive age group. Majority of them were also married and attained formal education. The average year of marketing experience is fifteen years and only eight percent were wholesalers. This was due to the huge capital required to start a business. Palm oil marketing was profitable as the total revenue is greater than the total variable cost and the marketing efficiency of the sellers was observed to be low due to low capital investment. Price fluctuation, inadequate capital, and too many retailers were the main constraints identified. The high cost of transportation, poor communication, poor storage facilities, and low quantity production had no significant effect on marketing. However, it was found that oil palm marketing in the area was highly integrated, profitable and viable. Policy implications were made on promoting agricultural marketing activities through the provision of physical infrastructures, credit linkage, and rules for protecting the interests of retailers.

J.N. Anaglo, S.D. Boateng and F.K.M. Sawnzy (2014) examined the influence of the adoption of improved oil palm production practices on the livelihood assets of oil palm farmers in Kwaebibirem district of Ghana. Overall 120 oil palm farmers were randomly selected in the region. This region was selected as it is the major oil palm producing area in the country. These farmers were individual farmers who started oil palm plantation in 2000. They harvested after four years of

cultivation. A structured questionnaire was used to collect data. The study revealed that indicators viz. education level, size of landholding had a significant relationship with the adoption of improved oil palm production practices. However, the age of farmers, gender and experience on farming did not have a significant relationship with the adoption of improved oil palm production practices. In addition, the study observed significant differences among farmers who adopted improved oil palm technology than the non-adopters. The adopters were acquiring more physical assets, social capital, financial assets, and human capital. The indicators used were houses and household appliances, increased income and savings, participation in group activities and the ability to pay children's school fees respectively. The paper stated that adopting improved oil palm production practices will enhance the livelihood assets of the farmers. The farmers having well assets will likely to diversify in other livelihood activities and adopt other innovations to acquire more livelihood assets. Recommendations were made to include more under extension services and to encourage farmers to improved oil palm production farming practices which will also improve their assets or capitals.

2.5. Studies on Impact and Challenges of Oil Palm Cultivation

K. O. Soyebo1, A. J. Farinde1 and E. D. Dionco-Adetayo (2005) investigated the constraints militating against oil palm production in the central Local Government Area (LGA) of Osun State, Nigeria which was carried out in eight selected villages in Ife Central Local Government Area (LGA). A random sampling technique was used to select the respondents. To collect data, a structured interview schedule was used. The socio-economic characteristics challenges inhibiting oil palm plantation and method of production were assessed. In addition, a key informant

interview was also used to develop a better understanding among the head of the village. The study revealed that almost all the farmers growing tree crops were producing oil palm in wild state. With regard to the challenges of oil palm cultivation, the major factor limiting oil palm cultivation was land. Some farmers experienced problems in funding and the remaining few had faced climatic problems. Most of the farmers also stated that they did not receive proper knowledge and information that are required for oil palm cultivation and did not get government support. Based on the group discussion, the study concluded that tenancy right makes it hard for the tenant to cultivate oil palm. The land is communally owned and land inheritance is followed. Due to this the size of land became small and cannot grow oil palm. The tenants can only grow food and annual crop. The attitude of landowners is negative due to the involvement of hard work. Most of the beneficiaries were inherited from their parents. The long period of maturity and fruiting is a problem for the farmers. It is hard for them to cultivate new plants or crops as the land was inherited. A crisis in the community was also a challenge for the farmers. For processing the fruits, none of the farmers use hand-operated press and power operated mill. Most of them could not afford this machine due to poverty. The paper concluded that the farmers were in charge of oil palm existing in the wild groves. The study recommended that the extension workers should intensify efforts to educate the farmers on improved oil palm production management practices. The farmers should be motivated to form cooperative societies to solve the tripartite problems of inadequate information and cultivation knowledge about oil palm, lack of funds and lack of land, by pooling their resources together. The groups formed can be made use as mediums, targets and change agents.

S. Vermeulen and N. Goad (2006) conducted a study in Johor, the largest palm oil-producing state in Malaysia and stated that smallholder farmers are very important and determine the future of the oil palm industry in terms of sustainability and credibility. Smallholders constituted around 40 percent of oil palm producers in Malaysia and Indonesia which are the leading producer. The paper highlighted the present situation of smallholders and suggests measures to alleviate their challenges. Smallholders are taken as households who owned land of less than 50 ha for oil palm cultivation. Among the smallholders, supported smallholders achieved higher yields than independent smallholders as they received support in the form of quality seed and others. But the independent smallholders also have the opportunity to yield larger due to higher investments. Independent smallholder was selected which constitutes three hundred households. The study revealed that oil palm cultivators were from the age group of 45 to 76 years. This was due to the low opportunity from off-farm activities. The labor requirements were mainly provided by family members. Modern machinery was also not used by most of the cultivators. The available power cart was rent out by the owners. Due to insufficient fertilizer and the absence of a joint estate system, there was no high production among the cultivators. The farmers were vulnerable in certain ways as there was no capital and collateral available to them. They faced challenges and constraints like ownership status, capital inputs; the flow of information and the need for balancing with other crops. The smallholders and plantations faced social challenges mainly of the security and legitimacy of their landholdings, labor availability and effects on wider communities. The smallholders experienced certain other challenges and constraints like to maximize their potentiality from oil palm production while maintaining local choice and autonomy.

The challenge of land ownership is also a big challenge. There was uncertainty and disagreement over a land tenure that is widespread. This also turned into violence sometimes. The companies and government even go beyond legislation to settle disputes and conflicts. In addition, smallholders cannot take loans as they were not entitled based on the conditions and requirements set by the financing institutions. Further, smallholder farmers faced problems in accessing genuine information such as the price policy, market opportunity, site management, and technical aspect as well as the rights and alternatives under the national law or formal agreements. The problem of food security and balancing with cash crops also exists. The market system is also a risk for independent smallholders as there was fluctuation in the price. At present, the main challenge is how to spread and share good practice broadly. The real success will be seen in action from different stakeholders that include smallholders and their association, plantation and milling companies, government agencies, traders and retailers, third parties, financial institutions, NGOs and insurance organizations are developed and extended which will ensure sustainability and equity in the production of oil palm.

D.S. Ugwu (2009) studied the problems and prospects of commercial small and medium scale cocoa and oil palm production in Cross River State, Nigeria. The study employed a purposive random sampling technique to select a firm based on different criteria. The study attempted to identify the problems and examine the prospects for the commercialization of small and medium scale cocoa and oil palm production in the state. The study found that most of the cocoa and oil palm enterprises in the state are small to medium scale in size and mostly inherited the former government plantations which are sub-divided and given to private producers.

Regarding the processing, there are a good number of palm oil extraction technologies of different sizes as well as palm kernel and palm kernel oil extraction mills in the state. The market of palm oil involves interstate trade from Cross River State to Abuja, Lagos and various parts of the northern states of Nigeria. The constraints identified include the use of low yielding varieties, limited land for cocoa and oil palm cultivation, high cost of establishing nurseries and plantations, high cost of labor, unavailability of skilled and unskilled labor, fluctuations in market prices, lack of market information, spoilage and low-quality products. The study concluded that there is a good opportunity to develop and commercialize cocoa and oil palm. In light of this, the study offered suggestions to improve the production. The institutions that are confined in research must be funded adequately and the information must be passed inclusively. This will increase the quantity and quality of production. Infrastructure in rural areas must be developed by the government through donor agencies. A public-private partnership must also be strengthened that will motivate the private sector to supply inputs, technical and extension as well as strengthening the market system. Lastly, credit linkage must also be promoted in terms of loans and micro-credit as well as conducting training for capacity building.

A.K. Ntsiful (2010) seeks to examine the effectiveness of corporate out-grower oil palm plantation schemes as a poverty alleviation tool in Ghana. The paper stated that along with the implementation of different schemes, the implementation of out-grower oil palm schemes by corporate entities has emerged as a development initiative to supplement the state provision of micro-credit to reduce poverty in Ghana. Beneficiary partnerships were formed with rural communities and corporate entity's support in different ways. The findings of the study show that the schemes

have generally contributed to the participants' accumulation of financial, physical and human capitals which are a useful tool to come out of the poverty trap and have a positive impact on the communities within which they are developed and are seen as partner for development in their operational area. The schemes have a significant positive impact on the livelihood of the respondents and an increase in assets possessions which protect them against risk and vulnerability. The financial capitals of the beneficiaries have increased significantly as financial assistance was given under the scheme. The loan was also given to them under specific guidelines. Besides the positive impacts, the schemes are confronted with constraints that militate against their development which ought to be addressed to make them more vibrant as poverty intervention mechanisms.

J.A. Akangbe, G.B. Adesiji, S.B. Fakayode, and Y.O. Aderibigbe (2011) identified the constraints and the needs of training of oil palm fruit processors in Nigeria by taking Afijio Local Government Area of Oyo State, Nigeria. A case study was used for the study. A total of 160 households of oil palm farmers from four towns were selected with the help of a two-stage sampling technique. To analyzed data, the statistical tools of descriptive statistics were used and present in the form of frequency distribution, percentages and mean. The study found that the main extractors of oil palm were aged women and have no formal education. The mean age was 54 years. These women have experience of oil palm extracting about 35 years on average. Most of them have a secondary occupation in the form of petty trades. Overall, 60 percent of them possess lands by inheritance and 50 percent have access to less than thirty bunches for extraction activities. A substantial portion of 80 percent transported the fruit to the extraction place by head loads. The remaining few

used bicycles and vehicles for transporting fruit. The extraction was primarily done by traditional methods and this practice is inefficient and unhygienic. The assessment on the needs of training shows that training on clarification, skimming, mixing and sterilization operations during oil palm extraction are needed. The study also concluded that there is no need for training on the boiling of fruits, digestion chopping, and storage operations. With regard to the gap result, it was found that the lack of tasks can be addressed with the help of training the performers of the task as all tasks scores were below average. The constraints identified were poor and inefficient transportation systems as they have to carry by head loads. This was followed by a lack of labor and no link with external agents. In the light of these, the study offered suggestions for restructuring the infrastructure, training, credit linkage and cooperative formation.

World Growth (2011) paper stated that Indonesia is the largest exporter oil palm and second-largest producer and the existing industries in the country generate large employment opportunities and social development. This is also an important means of income augmentation and economic development for rural poor. Although it is expected to grow larger, the anti-oil palm campaign will have negative effects on it. In the country, agriculture contributes only 14 percent to its GDP but provides employment over 41 percent of its population. They are mainly oil palm cultivators from rural areas. In a country where half of the population resides in rural areas and over 20 percent below the poverty line, oil palm provides an incomparable activity of poverty alleviation. With the increasing demand for oil palm globally, it is the most promising economic prospects for Indonesia. On the other hand, measures taken to restrict clearings of forests cover for oil palm cultivation will reduce the availability

of fertile land and the policy of governments should try to increase production and not implement anti-growth policies. The large productivity gap between the actual and achievable yields of palm oil cultivation is a significant challenge. Therefore this gap must be reduced.

ITS Global (2011) highlighted that oil palm production and industry has the potential to generate substantial income in Papua New Guinea. It accounts for around 39 percent of export and provides income for around 160,000 people living in rural areas. The production must still be increased as around 40 percent still lives below the national poverty line, unemployment, illiteracy with high levels of child mortality and population growth. Therefore a vibrant oil palm industry had the potential to foster economic growth and raise the living conditions of these people. The country depends heavily on agriculture for its economy and there is a necessity to extend agricultural activities. The existing performance is still below its potential. Oil palm is the most relevant option in the agricultural sector. The other countries that produce oil palm are also declining which can be an advantage for the country. The global demand will also keep on increasing which is another advantage. Besides these, the country has an advantage due to its suitable soils and climate, available land and adequate rainfall for oil palm production. The employment, revenue, and export sales are expected to increase with greater growth in the oil palm industry.

C.O. Amponsaha, L. Vissera, S. Adjei-Nsiahb, P.C. Struikc, O. Sakyi-Dawsond and T.J. Stomphc (2012) conducted an action research programme to improve the processing practices of small-scale oil palm fruit processors in the Kwaebibirem District of Ghana. The paper stated that Ghana produces 2000000 metric tons of oil palm in a year. About 60 percent was contributed by small scale

processors. There is an insufficiency of fats and oils needed for industrial and household consumption in the country. A substantial quantity of oil palm produced by these small sale processors cannot be used by large scale industries as it does not meet the requirements in terms of quality. There is a need to scrutinize the situation and find ways to improve the quality of production. Data was collected using semi-structured interviews, key informants interview and focus group discussions. The study has assessed the processing practices of small-scale oil palm fruit processors in six purposively selected sites in the district. The findings include storage of loosened fruits for long periods before boiling, disposal of effluent into drains, use of spent tiers for boiling fruits and no clarification of the oil. Majority of the processors store oil palm fruits for 1 to 3 weeks before processing, possibly allowing some fermentation, to increase extractability and reduce labor costs which may reduce the quality of palm oil by increasing the levels of free fatty acids. A cross-disciplinary research approach is needed to effectively address these complex issues and search for integrative solutions that are well embedded in the current local processing practices which will ensure that the processors can take advantage of an opportunity to access a remunerative market, for improved livelihoods. The processing of oil palm in small scale innovation is inferred as a multiple-scale, multi-stakeholder and interdisciplinary process.

A.R. Damoah (2012) conducted a study on the impacts of oil palm promotion schemes in Mpohor Wassa East district of Ghana. The Benso Oil Palm Plantation smallholder farmer scheme includes different provisions for oil palm promotion. It tried to assess the extent to which the scheme is benefiting the beneficiaries and the community. The study was descriptive in design and data was collected from 200

smallholder oil palm farmers including the scheme manager. The study found that incomes of farmers were being improved and had translated into higher access to health care, education, and food security for the households of smallholders. The production of oil palm fruits is also increasing among smallholders but there was a fluctuation in the production. The relation between yield and income of farmers shows a positive correlation which indicates that incomes of the farmers increase along with the increase in yield. The income from oil palm contributes around 51 percent of their household income. Income from smallholders was higher among female smallholders than male smallholders. The paper concluded that income from smallholder oil palm farmers could contribute significantly to household income and improved the socio-economic conditions of the households. However, several challenges were also identified including a low understanding of technical details; low pricing of oil palm leading to reduced incomes confronted the scheme. They were supported through loan facilities and subsidies, as well as helping improve on the prices offered for the oil palm fruits. The study recommended the scheme of BOPP to review deduction from farmers' gross incomes.

J.S.H. Lee, J. Ghazoul, K. Obidzinski and L.P. Koh (2014) stated that the oil palm industry in Indonesia faces several challenges in its bid to adopt more sustainable practices. The main challenges were to find a way to increase the production among smallholder oil palm and to promote benefit sharing with the local communities. The determining factors of these challenges are not well known in the region. In the light of this, they surveyed in 15 villages in Sumatra, Indonesia. The study inferred that decreasing monthly harvesting rotation of oil palm smallholdings decreases oil palm yield and the independent smallholder households receive lower

gross monthly incomes. The harvesting rotation and type of smallholder management are important constraints on oil palm yields and incomes of smallholders. The study made certain recommendations viz. prioritizing agricultural extension on best management practices for independent smallholders and improving access to oil palm mills to lower marketing costs of fresh fruit bunch for independent smallholders. The past experiences proved the need for stronger institutional structures, greater mobilization of farmers into cooperatives, and better resources to manage credit for smallholders. The study concluded that combine factors under the agronomy of oil palm smallholdings and the supportive environment for smallholder oil palm development best show the differences in both household incomes and smallholder oil palm yields. From the findings, the study recommends to give priority to an agricultural extension on best management practice for the independent smallholder and to improve the utilization of oil palm mills that will lower the market cost of fresh fruit bunch for the independent smallholder. Although the existing policy and agricultural extension are effective, the approach should be made based on the past policy of agricultural extension for the smallholder farmer. Besides these, mobilization of farmers into cooperatives, strengthening the institution and better management of resources are required.

V.N. Rao (2013) paper attempts to address some of the important issues oil palm cultivation in the State of Andhra Pradesh. He stated that India is the largest consumer and importer of oil palm in the world and Andhra Pradesh has been the leading palm oil-producing state in the country. The study tries to assess the production of oil palm, the existing market system, and financial problems. The study used primary and secondary data and select oil palm cultivators from the region of

Krishna and West Godavari districts. The final data were analyzed using statistical tools of ANOVA, chi-square, and correlation. The study inferred that even the government supports oil palm cultivation there are still problems like low productivity, price fluctuations, insufficient processing facilities, lack of suitable technologies. Majority of the farmers were small and marginal farmers and hold land of 2 hectares. Most of them used the basin method for irrigation and there is a need to aware the farmers to use micro-irrigation. There is a high fluctuation of oil palm price that is fixed by the price fixation committee. The farmers faced challenges to adjust themselves with the frequent change of price. Although the government provides a financial provision of Rs 5000 per ton under the Market Intervention Scheme of Minimum Support Price, the farmers felt this is insufficient and demand Rs 8000 per ton as the capital and expenditure of oil palm cultivation is increasing. The cultivation of oil palm steadily increased the area of cultivation and there is a need to extend the area of cultivation according to the requirements. The fertilizer, manures, and micronutrients like boron and magnesium are limited and did not meet the recommended dose. There is a need to take initiative and efforts towards this. The paper concluded there is a need to focus more on innovative growth strategies such as marketing of high-grade derivatives, biomass utilization and branding of palm oil as a healthy cooking medium. The existing schemes of the central government should be made use to develop and improve oil palm cultivation in their respective zones in order to introduce modern technology and innovations. Harvesting machines must be provided as it is difficult for the aged farmers and the tax on oil palm must be exempted under VAT. Entrepreneurs should play an important role in oil palm development in their respective allotted zones for effective transfer of production

technologies and all thrust areas shall be taken care of through the cooperation of all agencies.

R.N. Nkongho, L. Feintrenie and P. Levang (2013) assessed the strength and weaknesses of the smallholder oil palm in Cameroon. Out of seven industrial mill supply basins, four mills were selected for the study. As different people involved in oil palm production the studied categorized them as villagers, non-natives, company workers, and elites. The criteria used were based on income level, place of origin, social status, past and present work with any of the oil palm agro-industries. Due to the heterogeneous population, it was divided into subgroups and a random sampling technique was used in each subgroup. Primary data was collected using a semi-structured interview schedule and semi-guided discussions. Overall from different subgroups, a total of 176 persons were interviewed in the study. The study revealed that almost cent percent of the producers were headed in their family and the majority of them were males. Majority of oil palm producers were older in terms of age with the remaining of younger age. The main constraints identified were access to capital and customary rights to land. These problems were faced by a younger age in the region. Majority of the respondents bought land for oil palm cultivation which can be one of the challenges. The capital for oil palm cultivation was met mainly through their personal savings in banks followed by bank loans, cooperatives and grants from the government. A substantial portion of the farmers could not use fertilizer as it was expensive. The plants were also affected by different diseases which were also a problem for the farmers. With regard to labor requirements, majority of them used family labor, and the rest hired native workers and migrant workers. The non-industrial sector of oil palm provides a potential source of income, development, and

employment in rural areas. The intercropping and diversification of livelihood became an important coping strategy. It also helps to minimize environmental damage, prevents soil erosion and ensures food security. There was a better profit when artisanal extraction of oil is carried out by adding value to fresh fruit bunch. The non-industrial oil palm also has little effect on the environment although there were little initiatives by the government. As financial linkage is a challenge, few institutions made provisions to give loans at low-interest rates with a no refund scheme up to four years.

A. Okungbowa1, C. I. Oghorodi1, and E.I. Omofonmwan (2014) analyzed the marketing channel, cost, and return of oil palm in Ethiopia East Local Area of Delta State. They also covered the socio-economic characteristics and constraints of oil palm cultivation. The study employed a structured questionnaire that was asked to hundreds of farmers that were selected randomly. The data collected was analyzed using descriptive statistics and budgetary analysis. The result shows that majority of the respondents were educated have attained at least a secondary education. They suggested that new technology can be easily transferred to this area as most of them are literate. They also stated that marketing is practically done by well-experienced traders. Regarding marketing, the wholesalers were involved in purchasing, transportation, packaging, and storage of oil palm and they used to sell it to the retailer or directly to the consumers. The average profit made by the marketers is N18, 742.5 per ton of oil palm and the rate of return on investment shows that for every naira invested, a profit of ten kobos is made. However, the farmers also faced certain challenges and constraints in producing oil palm. Majority of the farmers have inadequate capital to expand oil palm cultivation which was followed weak

market facilities, high cost of transportation, instability of price and so on. Overall, although there were different challenges and constraints, the study concluded that oil palm cultivated in the area is economically profitable to the region and to oil palm farmers.

Schwarze, et al (2015) scrutinized the factors influencing smallholder crop choice of oil palm and rubber in Jambi, Indonesia. Data were collected using observations, semi-structured interviews, key informants interviews, focused group discussions and tools like mapping, timelines and comparative cultural study. To analyze data different econometric methods were employed. The effect of risk attitude on production decisions and oil palm acreage was examined. The study inferred that the increasing plantations of oil palm in Jambi lowland had considerably changed the land use pattern. There was an increase in land use more than tenfold in a decade. Overall, majority of the land i.e. fifty-two percent were used for rubber plantation and thirteen percent were used for oil palm plantation with a decreasing forest cover of ten percent in 2012. Among the 697 farmers interviewed, thirty-five percent were oil palm cultivators. Comparing the average age of maturity, rubber plots was 19 years while oil palm was 12 years. With regard to financial investment, the expenditure on oil palm cultivation was almost four times higher than rubber cultivation due to higher fertilizer and herbicides applications. Regarding labor requirements, rubber cultivation was more than four times higher as compared to oil palm cultivation. The labor requirement in rubber cultivation was much more flexible than in oil palm cultivation due to the perishable nature of oil palm. Oil palm cultivation had advantages over rubber cultivation due to higher returns to labor and the shorter immature phase of oil palm. On the other hand, returns to land for rubber

were one-third higher than for oil palm. It was also found that il palm production is capital intensive while rubber production is labor-intensive. Oil palm farmers were found to be moderate risk-averse or risk-neutral farmers, cultivated more area and own more land and have more formally titled land compared to rubber cultivators. The challenges of oil palm cultivators include the supply of seedlings, agricultural expertise, manpower, and investment. The reasons to adopt oil palm cultivations were higher returns to labor and shorter immature phase of oil palm. It was also stated that rubber cultivation appears to be more secure as it had been an established crop for many years.

R. Cramb (2016) paper outlined the political economy of large scale oil palm development in Sarawak region. Sarawak region experiences a rapid expansion of oil palm plantation. This has led to the transformation of the agricultural economy to semi-subsistence smallholding to the domination of private large scale estates. In the history of Sarawak, large scale capitalist or estates played only a minor role in the economy. Due to the rising demand for oil palm globally in 1981, a dual agriculture economy was created in the region. It was promoted by Mahmud and promulgated a policy that focuses on delivering extensive tracts of state and customary land to private estates and hiring low wage labor from Indonesia and minimizing the potential for smallholder expansion. The main change was the transfer of land to the big estate sector, which constitutes nearly 80 percent of the oil palm area. This created an opportunity for surplus extraction and patronage through the allocation of land leases, business contracts, consultancies, shareholdings and so on. Forest cover and agricultural land conversion into oil palm plantation in the area can be an inexorable process of expending agriculture that is determined by global economic

forces. Overall the analysis of the political economy of large scale oil palm development in Sarawak region shows that it is a process with different outcomes and pathways, which involves contestation between actors and community spheres. It is ultimately influenced by the exercise of political, ideological, legal and economic power to redistribute access to land and forest resources.

2.6. Studies on Ecology and Oil Palm Cultivation

K. Hayashi (2007) scrutinized the impact of oil palm industries in Indonesia. The paper outlined that the plantations and processing of oil palm generate different kinds of biowastes that are harmful to the environment. Fell palm trunk, palm fronds at felling and annual pruning are the main types of biowastes generated in the plantations. In the factory different kinds of biowastes such as empty fruit bunch, fibers and shells and oil palm mill effluent are also produced. Based on these, business on oil palm in Indonesia was analyzed by a factory visit survey. Material balance and impact on the environment were discussed concerning the oil palm business, especially for plantations, transportation, and crude palm oil mill stages. The recent approach to utilize and manage these bio-wastes generated by crude palm oil mills was also covered. In addition, suggestions were provided to improve the conditions of the existing approaches. The total amount of biowastes generated in plantations and crude palm oil was also presented in brief. With regard to crudes palm oil production process, the study divided into two parts. The natural resources such as fuel, water, electricity, and raw materials are the first part of inputs. The second part is output which is further categorized into products including crude palm oil and palm kernel and solid wastes including fiber, shell, gases, etc. It was found that most of the oil palm factory in Indonesia used the same kinds of crude palm oil

production process. Most of the factories studied tried to use zero-waste emission but many environmental impacts must be taken into consideration. Water and air pollution are happening due to the processing of oil palm y these factories. CO2 was also largely emitted due to the transportation of oil palm fruits. Burning of fibers in a factory rather than using electricity also must be considered. The study suggested developing a material balance sheet from the plantation stage to the refinery stage to get a clear picture of the existing conditions as it was not well maintained in the regions. The companies must also maintain information systems to understand the environmental impact of oil palm cultivation. There is also a way to utilize the biowastes effectively which must be taken into consideration.

B. Ritcher (2009) explored the environmental challenges and controversy of oil palm cultivation by using case studies from Malaysia, Indonesia, and Myanmar. The paper outlined that oil palm cultivation caused environment problems like monocultures, loss of biodiversity and climate change but as well social issues caused by lack of workers' rights and diverse conflicts with indigenous people. Due to increasing demand, the production still increases and have given pressure to the government to form a policy that is sustainable and environmentally friendly. The paper suggests for sustainable palm oil production, effective monitoring, and control system of the currently existing commitments is required. This would involve all stakeholders and indigenous people as a directly concerned group. Indonesia and Malaysia as the largest producing countries of oil palm also need to keep in mind the importance of economic diversification in order to avoid becoming too dependent on the palm oil sector.

D.S. Wilcove and L.P. Koh (2010) assessed the threats to biodiversity from oil palm cultivation. They mentioned that oil palm cultivation is the greatest immediate threat to biodiversity in Southeast Asia. Although different initiatives are being taken by environmentalists, the oil palm cultivation is still expanding in the region. The paper outlined that there are some harsh social, economic and ecological realities to those who are concerned about the effects of oil palm cultivation on biodiversity. These include oil palm production is very profitable, it is used in many products that are simply processed and directed so prohibition will be impossible and there is still an increasing demand for oil palm. The cultivation of oil palm also plays an important role in poverty alleviation and income augmentation. In order to prevent the threats posed by oil-palm agriculture to biodiversity, environmentalists must change the behavior of the palm oil business through (i) regulations to curb undesirable activities (e.g., a ban on converting forests to oil palm); (ii) financial incentives to promote desirable behavior (e.g., production of certified, sustainable oil palm); (iii) financial disincentives designed to discourage undesirable behavior (e.g., consumer pressure on major manufacturers and retailers to use palm oil that does not come from plantations created at the expense of forests); and (iv) the promotion of alternative, more biodiversity-friendly uses of forested land that might otherwise be converted to oil palm. There is no single best strategy for dealing with the oil-palm crisis in Southeast Asia as all of the present approaches have weaknesses and strengths. So a mixture of regulations, incentives, and disincentives targeted at all sectors of the oil-palm industry is necessary to protect the region's rapidly disappearing forests. The provision of incentives to oil palm farmers can promote better and responsible behavior to oil palm farmers. A complete prohibition on the

use of forest land will not be effective, there is a need to pressurize the government of Southeast Asia to ban forest conversion and demand a sustainable product by the major importer of oil palm are necessary. The question is whether these can happen fast enough before the crisis happens.

Norwana et.al. (2011) outlined the local impacts of oil palm expansion in Malaysia based on the case study in Sabah state. Household surveys were conducted in four villages neighboring the estates and falling within *Mukim* Sapi, namely Toniting, Bintang Mas, Ulu Sapi and Lidong in Malaysia. They also used focus group discussions (FGDs) for the study. The study indicates that Sapi estates were covered by forest before they were converted into oil palm cultivation. The remote sensing analysis shows that in 1979 the plantation area was still covered by forest but after 1991 the area was converted to cultivation of oil palm and in 2005 it was entirely used for oil palm cultivation. This also endangered the animals and species living in the region. Most animals have to shift to another place as majority of the area was used for oil palm cultivation. The perceived impact of oil palm shows differentiation in the findings as it was largely determined by the respondent's dependency level on natural resource and their location. They also responded that due to oil palm cultivation they were forced to hunt and encroach in protected areas as it is the source of their livelihood. This had many effects on the ecosystem of the areas. Due to insufficient information on the history of land use, government approach and socio-economic characteristics the study is limited. It is also limited in terms of depth and scope with issues such as land tenure and ownership as well as quantitative socio economic comparisons before and after oil palm cultivation. Even

so, the findings revealed that there is a scope for improvement in both the social and environmental practices, particularly of large oil palm estates.

K.M. Carlson et.al. (2012) stated that agriculture based on industries are widely increasing which led to decrease in many tropical forest areas. The paper examined the effects of oil palm plantations based on the issues of land cover, carbon flux, and agrarian community lands in West Kalimantan, Indonesian Borneo. Under-five scenarios, an assessment was made using a spatially explicit land change/carbon bookkeeping model and parameterized with the use of high-resolution satellite time series and inform by socio-economic surveys, the previous and project future plantation expansion were taken. The main cause of deforestation was forest fire which occurs between1989 to 2008. It was followed by a net expansion of 69 percent from 2007 to 2008. The plantation of oil palm directly caused the deforestation of 27 percent as a whole and 40 percent of peatland deforestation. With regard to plantation land sources, it exhibits distinctive temporal dynamics that constitute 81 percent forest on mineral soils from 1994 to 2001 and shifting of 69 percent peatlands. There was vast development potential revealed by plantation leases. In the year f 2008, leases spanned 65 percent in the region that includes 62 percent on peatlands and 59 percent of community-managed lands and 10 percent of lease area was planted. The community and regional lands of 35 percent and 40 percent are deforested and cleared for oil palm cultivation thereby emitting 26 percent of net carbon emissions. There was a decline of 4 percent of intact forest cover area and the emissions from peatlands increases by 38 percent.

Faruk et.al. (2013) outlined that oil palm cultivation is increasing in South East Asia regions. This results in a decrease in species diversity in the region. The

information regarding this is very few in anuran diversity. Therefore an attempt was made to study the differences of anuran biological diversity between the oil palm cultivation area and forest cover area. The study also tries to find out if the difference in biological diversity has an impact on the environment in its region. A hypothesis was formulated which states that biological diversity is lower in oil palm cultivation and that cultivation supports a larger proportion of disturbance tolerant species than forest. A comparison was made regarding the richness of species, abundance and the composition of communities between oil palm cultivation and forest areas and the kinds of sites in the forest and oil palm cultivation. They were assessed based on the characteristics of streams, riparian and terrestrial between oil palm cultivation regions and forest cover regions. The study found that differences were not found in all the cases or indicators made in the study. However, the study inferred that composition in the community differs largely between oil palm cultivation regions and forest cover regions. The community in anuran oil palm cultivation consists of species that prosper in disturbed regions. The main species found in oil palm cultivation regions were species that are common and need little conservation efforts. The study concluded that using various management strategies, oil palm cultivation areas can be an important area for supporting the life of many species that can live in secondary forests.

M. Gatto, M. Wollni and M. Qaim (2015) carried out a village survey in the lowland regions of Jambi province that have been most affected by land-use changes over the decades which are one of the hotspots of Indonesia's recent oil palm boom. A survey was done in the lowland districts which were randomly selected. A total of hundred villages were selected again under these districts. To collect data, structured

questionnaires and group interviews were used. The result shows that Oil palm has not been a major driver of deforestation but oil palm growth occurs in locations with ongoing logging activities, so indirect effects on deforestation are possible. In terms of the drivers of the oil palm expansion and related other land-use changes, the results show that socioeconomic and policy factors play a key role. The results do not allow statements on whether the oil palm expansion in Jambi is good or bad due to the limitations of the study. To draw such conclusions, there is a need for a comprehensive analysis of the economic, social, and environmental impacts which is not the focus of the study. But the study revealed that factors of socio-economic and policy played a significant role in understanding land use patterns at the local level. Due to this, the findings of the study go beyond spatially explicit analyses with satellite data that also assess land-use trajectories. A better understanding of socio-economic and policy factors is necessary to design sustainable land-use policies.

S.C. Izah, C.N. Angaye, and E.I. Ohimain (2016) outlined the environmental impacts of oil palm processing in Nigeria. The paper stated that Nigeria is one of the largest producers of oil palm with a total production of 930 thousand metric tonnes domestically and accounts for 1.5% of global output approximately. As the cultivation of oil palm has improved the livelihood and standard of living in Nigeria, the negative impacts on the environment are little discussed in the country. Due to oil palm cultivation and processing, it has several negative impacts that include deforestation (clearing), soil erosion and fertility, water cycle disruption and pollutions associated with fertilizer use, pollution due to emissions from combustion, POME discharged and unused solid wastes. Thus, the paper assessed the impact of oil palm cultivation on the environment in Nigeria. It was revealed that the

processing of oil palm emitted three waste streams that include gaseous (pollutant gases), liquid (palm oil mill effluent i.e. POME) and solid (palm press fiber, chaff, palm kernel shell and empty fruit bunch). These wastes were used by boilers of oil palm mill in a small quantity while the rest were discharged in the environment with limited management. The impact on soil properties by palm oil mill effluent and the emission from burning solid wastes in oil palm processing exceeded the allowable limits stipulated by the Federal Ministry of Environment/Department of Petroleum Resources. The paper offered suggestions to introduce biotechnological applications for wastes treatment. The emissions in the air could be managed by drying the biomass properly prior to use as boiler's fuel. The wastes also could be managed by converting to a different range of value-added products and different bioenergy.

C. Petrenko, J. Paltseva & S. Searle (2016) paper states oil palm is the most widely used vegetable oil due to its high yields, low cost, and stability. The production of oil palm is also being increased globally along with the growth of population which increases demand and different policies of governments that promotes oil palm cultivation. Indonesia is the largest producer country which accounts for almost half of the global production. On the other hand, the cultivation of oil palm has severe environmental and social consequences besides the growth in industries. The area under agriculture is limited globally as the cultivation of oil palm increases thereby replacing other crop cultivation and forest cover. This led to the depletion of tropical forests and biodiversity as well as destroyed the old-growth rainforest. Air pollution is also increased due to the growth in industries. Further, Indonesia's rainforest grows on carbon-rich peat-land, destroys biodiversity and affects the climate. Southeast Asia is a region where different biodiversity hotspots

are found and are also unique in terms of its geographical and other characteristics. However, the tropical forests in this region are being destroyed rapidly as compared to other regions of the world. Indonesia as the leading producer of oil palm lost 0.84 Mha (approx) of its primary forest covers from 2000 to 2012. This exceeds the deforestation rates in Brazil and half of these were caused by oil palm cultivation. The biodiversity loss is a huge problem as Indonesia's rainforest supports many plants even in a single hectare. More than half of the rainforest is also endemic in this region. The rare species like orangutan which is found only Sumatra and Borneo is also declining due to deforestation. The marine ecosystem is also being depleted in this region. The cultivation of oil palm may not be responsible for all the biodiversity lost but it can be observed that it is depleting biodiversity more than any other crop in that region. The pollution caused by emissions from deforestation and oil palm mill is also a great concern.

Yuliani et.al. (2018) outlined that despite the forest reform movement in 1998 in Indonesia, deforestation is still increasing in the region. Kalimantan in Indonesia experienced the highest rate of deforestation but some local people are against deforestation and conversion of forests to oil palm plantation. Based on this, the study assessed two communities who try to protect their land and forests. Semi-structured interview schedules and key informants interview were used to collect data. To identify the respondents, a snowball sampling technique was employed. The study revealed that community response to illegal logging and conversion to oil palm cultivation was largely motivated by the history and policy of land use, culture and economic context. There was good participation and initiatives from women. The communities were aware of oil palm cultivation through their relatives who were

working in oil palm mills and plantations. They also learned the negative effects of oil palm cultivation through them. Oil palm companies visited them and promised to build infrastructure and generate income if they allowed them to convert their land into oil palm plantations. Most of the villagers opposed to this proposal as they have already learned from their neighboring villages. The companies still try to make use of some influential individuals and leaders in the village to convince others to let them cultivate oil palm in their village. They also paint a negative image of NGOs who are working towards environment protection. However, all these efforts failed as the villagers were consistent in their rejection. They said that we will live with economic limitations than surrender our land for oil palm cultivation. The paper concluded that these villages were a battleground in which local people put a continuing effort to save the traditional practices and rights over land. The efforts and proposals made by companies to convert their land into oil palm cultivation were not still in success in the regions.

Tarigan et.al. (2019) highlighted the role of oil palm biomass recycling on soil fertility in palm oil plantations. The paper stated that the cultivation of oil palm produces a huge amount of biomass such as frond and truck, empty fruit branch that can be recycled directly in the plantation to increase the fertility of soils. The study identified the impact of this biomass in terms of the chemicals, biological and physical characteristics. The study inferred that fresh application of an empty fruit branch can alternate the parameters of soil in adjacent to the kinetics of the decomposition of the empty fruit branch and the production of nutrients. The paper gives an example by stating that the pH of soil increases during 18 months after adding an empty fruit bunch as compared to the initial period. The potassium content

of the soil increases substantially after adding an empty fruit branch. Frond recycling during harvesting and pruning also renews the chemical and physical characteristics of soils whether they were applied on heaps between palms or spread on harvesting paths in which soil erosion and runoff were reduced. Fronds in inter-rows by a systematic distribution reduces run-off of rainwater by more than thirty percent and five percent on gentle slopes. Then the loss of soil erosion was also decreased by sixty-five percent that depends on the slope intensity. The loss of nutrients in soil was also reduced subsequently. The application of an empty fruit bunch into the soil also revealed that the physical fertility of the soil was improved. The infiltration rates of rainwater and soil humidity were improved due to this application. The study also observed a decrease in soil resistance to penetration and improvement of the soil aggregate stability. In addition, the application of frond spreading in inter-rows and empty fruit branches shows a positive result to the biological activity of soils such as fauna feeding activity using the bait-lamina test system and earthworm's population.

The overview of the literature shows that oil palm cultivation has become an important strategy for promoting rural development across different regions. The main reasons for adopting oil palm cultivation are direct returns of investments, high yielding and continuing demand. The cultivation of oil palm also has a different environmental impact in the form of biowastes and pollution which is a global issue and debate. From different studies, the main challenges and constraints faced by oil palm cultivators are transportation, technical knowledge, inefficient market system and lack of capital. There are also different suggestions to improve the conditions of oil palm farmers as well as to cultivate oil palm sustainably. In addition, government interventions and policies are very important to improve the cultivation of oil palm

and minimize the problems of smallholder oil palm farmers. With regard to methodologies, most studies were based on a quantitative approach by using an interview schedule and questionnaires to collect data. Random sampling technique was also widely used. Papers based on secondary data were also found in a large number. For analysis of data, simple statistical tools and different tests were used.

Thus, literature helps us in identifying and understanding the theoretical, conceptual, operational and methodological issues in the study of oil palm cultivation and rural livelihoods. However, some major gaps in the literature could be identified.

Firstly, oil palm as a strategy of promoting rural livelihoods or development has not been probed adequately in the Indian context. Most of the studies were based on the leading producers of oil palm like Malaysia, Indonesia and Nigeria. The literature on this strategy is scanty in India, especially in the North East region. In the context of Mizoram, the literature on agro-climatic conditions for oil palm cultivation (see Reddy, 2004) and the environmental impact of oil palm cultivation (see Raman) could be found. An empirical study of the performance of oil palm cultivators was also identified (see Khawlhring, 2016). However, literature focusing on the impact of oil palm cultivation on rural livelihoods was rare. The linkage between rural livelihood assets and the adoption of oil palm cultivation was also not found. Moreover, a comparison between oil palm cultivators and non-cultivators of oil palm among rural households was also not found in the existing literature. Hence, there is a need to study oil palm cultivation from a broad perspective among oil palm cultivators and non-cultivators of oil palm in the state.

Secondly, most studies on oil palm cultivation and rural livelihoods do not adopt the Sustainable Livelihood Framework for understanding the complexity and dynamics of oil palm cultivation. There is a need to adopt this framework to understand the vulnerability context of oil palm farmers; their livelihood assets and how it links to the adoption of oil palm cultivation as well as the outcomes. This will help in developing a better understanding of the dynamics and complexity of oil palm cultivation in the state.

Thirdly, most studies have only used a quantitative method for data collection. There is a need to combine quantitative and participatory methods to understand the process and context. Participatory methods such as social mapping, timeline, service and opportunities map and seasonality diagram will enrich the reliability and inclusiveness of the study.

Lastly, most studies have been carried out by economists, sociologists, agricultural scientists, and developmental agencies while social workers have not contributed adequately in this area. There is a need to study from social work perspectives which will add suggestions for policy implications and develop intervention strategies at different levels.

This chapter has presented a review of literature on oil palm cultivation and rural livelihood across different regions. It has also highlighted the research gaps in the literature. In light of these, the next chapter presents the setting of the present study, the research problem as well as the methodological aspects of the present study.

CHAPTER III

METHODOLOGY

A sound methodology plays a vital role in achieving its objectives in any research. The success of research depends largely on the methods and tools adopted by the researchers. These methods and operational frameworks must also suit the local context of the study. To accomplish these, the present study attempts to adopt the methods and techniques scientifically and objectively to present reliable data, facilitate analysis of data systematically and draw valid inferences. The chapter has been presented in four sections. The first section deals with the profile of the study area while the second section outlines the objectives of the study. The third section presents the hypotheses of the study and the last section describes the methodological aspects of the present study in terms of research design, sampling, and methods of data collection, data processing and analysis, and limitations of the study.

3.1. The Setting: Profile of the Study Area

The setting of the present study deals with the profiles of the state and the selected district with the villages for the study. The villages studied were presented based on secondary data and Participatory Rural Appraisal. Participatory methods such as timeline, service and opportunities map and social mapping were used. Timeline was conducted among MUP (Elderly Association) while service and opportunities map, and social mapping was conducted among community leaders.

3.1.1. The State of Mizoram

Mizoram is one of the states in north-east India which lies between 92°.15’ to 93°.29’ East longitude and 21°.58’ to 24°.35’North latitude. The name, Mizoram” is derived from *Mi* which means people and *Zo* which means belonging to the people of

Mizoram and *Ram* which means land. So Mizoram means "land of the Mizos" and originally belong to Mongoloid stock who speaks the languages of Tibeto- Burmese family. There was no proper record of their origin and was traced that the original inhabitants reached the land from 1600 A.D to 1700 A.D. from China. The conflicts between clans and ethnic groups led to the formation of chieftainship which was later abolished in 1955 under the Lushai Hills Act 1954 (Acquisition of chief right). In the late 1980s, official administration started where the Lushai Hills was divided between Assam and Bengal and was merged into a district known as Lushai Hills under a Superintendent in the later 1898. Insurgency took place by the uprising of "Mizo National Front" under the leadership of their charismatic leader, Lal Denga, who was outlawed in 1966 for the demand for statehood. It gave birth to a new arena for the Mizos, where Lushai Hills attained Union Territory on 21st January 1972 and later got Statehood on 20th February 1987. According to the Statistical Handbook of Mizoram 2016, the state has a total population of 10,97,206 (2011 census). The total geographical area is 21,081 Sq.km with a density of a population of 52 persons per square kilometers. The total sex ratio is 976 in which the urban population consists of 571771 while the rural population consists of 525435. The growth rate of the population in the decade is 23.48% (2001-11) while it was 29.18 percent in the last decade. There are eight district capitals and the state capital is Aizawl.

The state has a moderate climate with an influence of south-west monsoon enriched by numerous natural beauties as well as rich cultural heritage. The temperature during summer varies from 12.34℃ to 34.21℃ and 12.34℃ to 22.41℃ during winter. The topography of the state has a distinctive character due to the rugged and steep nature and a sharp difference in the mountain ranges as compared to

other ranges in the country. The average height of the hill in the west is 1000m and 1300m in the east. There are also some points where it reaches up to 2000 m. The highest mountain is called Phawngpui or Blue Mountain with a height of 2605m that lies in the southeast region.

One of the important social changes occurred in the state was the advent of Christian Missionaries during the 19th century. Besides propagating their religion, education and other social development happened rapidly in the state. They also introduced Roman script for the Mizo language and formal education. On the other hand, the state is still facing many socio-economic challenges and several schemes and programmes are being implemented to tackle these problems.

The state has been promoting oil palm cultivation which is reflected in various schemes and policies. This becomes an important factor for generating employment and augmenting income in rural areas.

3.1.2. The Districts

The two districts selected for the study are Kolasib and Mamit districts. They are the two leading producers of oil palm in the state. The two districts put together accounts for 55.83 percent of the total area of cultivation in the State. The potential area for oil palm cultivation in Mamit district is 18500 hectares and 17350 hectares in Kolasib district. Under the agreement, Godrej Agrovet Ltd. established Palm Oil Mill at Bukvannei, and the extraction of palm oil was started since 2014. It was recorded that the total purchase amounted to 8,742 metric tons till 2014 from both the districts. The oil extraction was started in 2014. During 2014 and 2015, a total quantity of 5,718 MT was procured out of which 5,500 MT was processed in the mill for extraction of Palm Oil (see GOM. 2015).

Kolasib district is one of the eight districts of the state Mizoram, India. The boundary of the district includes Hailakandi district of Assam state in the north and northwest and Aizawl district on the east and Cachar district of Assam state on the northeast. According to the Statistical Handbook of Mizoram 2016, the total area is 3025 Sq. Km with a total population of 86,365. Male consists of 44,828 while female consists of 41,536 with a sex ratio of 927 which is a lower than the state sex ratio of 976. It is the third least populous district in the state. The growth rate of the population is 37 percent with a population density of 29 persons per Sq. Km. There are three blocks under the districts. The rural population consists of 37,077 while urban population consists of 46,878.

Mamit District with its headquarters at Mamit was etched out from the erstwhile Aizawl District under Mizoram Government in 1998. According to the 2011 census Mamit district has a population of 85,757 with a density of population of 28 inhabitants per square kilometer. The growth rate of population over the decade 2001-2011 was 36.59 percent with a sex ratio of 924 females for every 1000 males and a literacy rate of 85.96 percent. The main tribes in Mamit include Mizo, Chakma, and Reang in which Mizo tribes comprise the majority. The District is Famous for abundant production of orange for which the district is often called “The Orange garden of Mizoram”. There are three blocks under this district. The rural population consists of 71,465 while the urban population consists of 14,899.

3.1.3. Khamrang Village (Distant Village), Kolasib

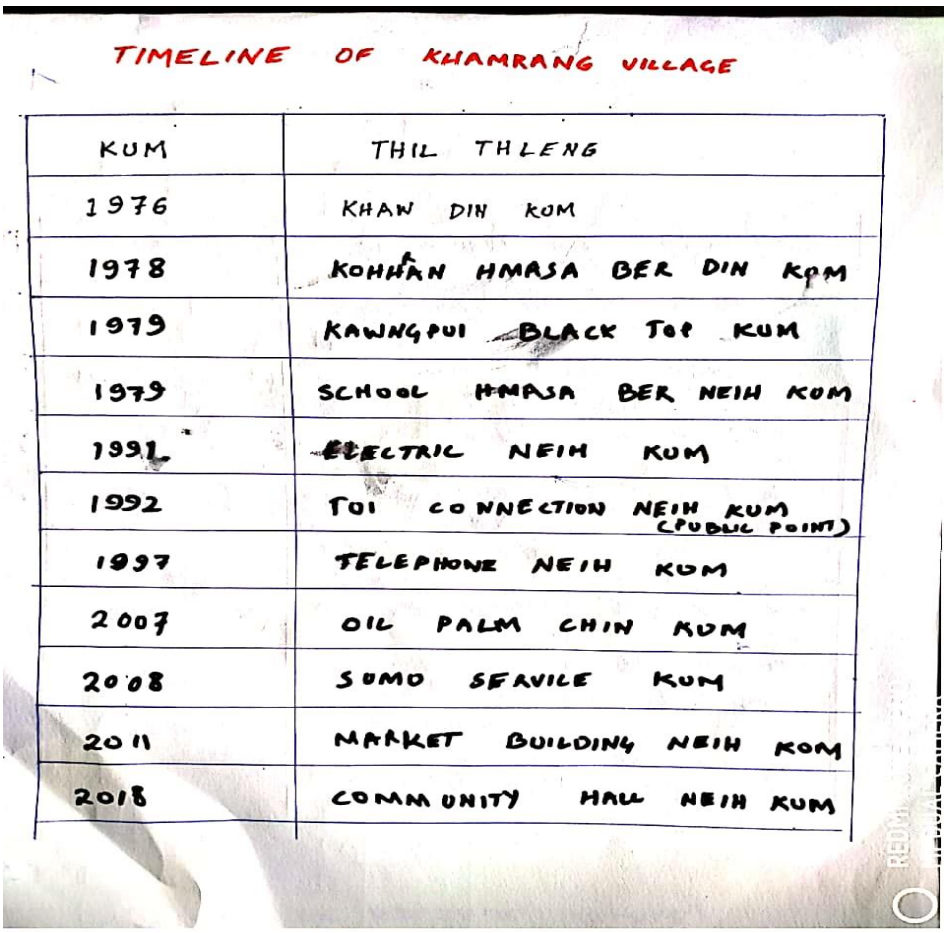
Khamrang is a medium size village located in the Tlangnuam RD Block of Kolasib district. It represents a distant village of Kolasib district. The distance from its district headquarter, Kolasib is 43 kilometers. According to Census 2011, the total

household is 163 with a total population of 633. Kawnpui is the nearest town to Khamrang which is approximately 20km away. Out of the total population, male consists of 331 while female consists of 302. The sex ratio is 109. The population of children between up to 6 years is 136 which constitutes 21 percent of the total population of the village. The sex ratio of Khamrang is 912 which is lower than the state sex ratio of 976. The child sex ratio is 838 that is lower than the state of 970. Regarding the literacy rate, it is 98 percent which is higher than the state literacy rate of 91 percent. The total workers are 188 in which male comprises of 164 and females of 24 in numbers. There are 170 main workers and 18 marginal workers. As per the constitution of India, Khamrang village is administrated by the Village Councils who are elected by the people in the village (see Census, 2011).

The first settlement of Khamrang village can be traced back to the year 1976. In 1978, the first church was established in the village. The road was blacktop in 1979 and the first school was also functioned in this year. Electricity was provided in the year 1991 and had a public water point in 1992. The first telephone was owned back in 1997 by one villager. Regarding oil palm cultivation, the first plantation was started in 2007. The first maxi cab services started back in 2008. The village had a market building in 2011 and a community hall in 2018. With regard to services and opportunities, the state capital Aizawl is 46 km away from the village. The district headquarters and district commissioner office is 43 km from the village. The nearest college was also located in this area i.e. Kolasib. From the village, the national highway is 2 km away. The town of Kawnpui plays an important role for Khamrang village. The nearest accessible hospital, police outpost and agriculture office were all in Kawnpui. The approximate distance of agriculture land was 2 km and oil palm

land of 3 km. The village is located on the top of Sairang Road and most of the areas were used for oil palm cultivation. The quarry beside the village also plays an important role for their survival. Oil palm stock point was located within the village and many farmers also planted oil palm in the settlement area. There are three denominations and four community-based organizations viz., YMA, MUP, MHIP, and MZP operating in the village. Agriculture was the main occupation in the village.

Figure 3.1. Timeline of Distant (Khamrang) Village, Kolasib



TIMELINE OF KHAMRANG VILLAGE

KUM	THIL THLENG
1976	KHAN DIN KUM
1978	KOHHRAN HMASA BER DIN KUM
1979	KAWNGPUI BLACK TOP KUM
1979	SCHOOL HMASA BER NEIH KUM
1991	ELECTRIC NEIH KUM
1992	TUI CONNECTION NEIH KUM (PUBLIC POINT)
1997	TELEPHONE NEIH KUM
2007	OIL PALM CHIN KUM
2008	SUMO SEAVILE KUM
2011	MARKET BUILDING NEIH KUM
2018	COMMUNITY HALL NEIH KUM

Figure 3.2. Services and Opportunities map of Distant (Khamrang) Village, Kolasib

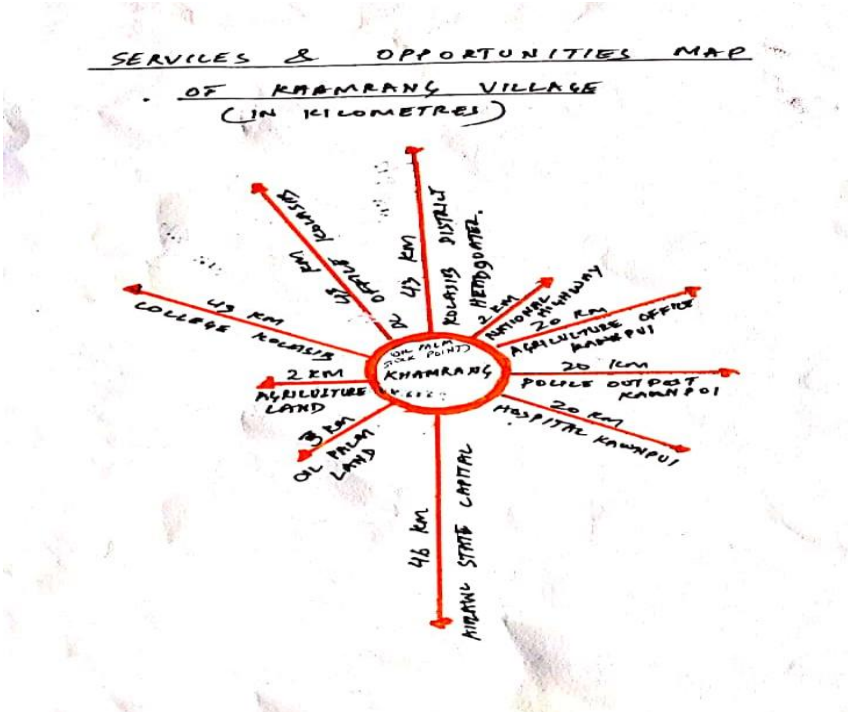
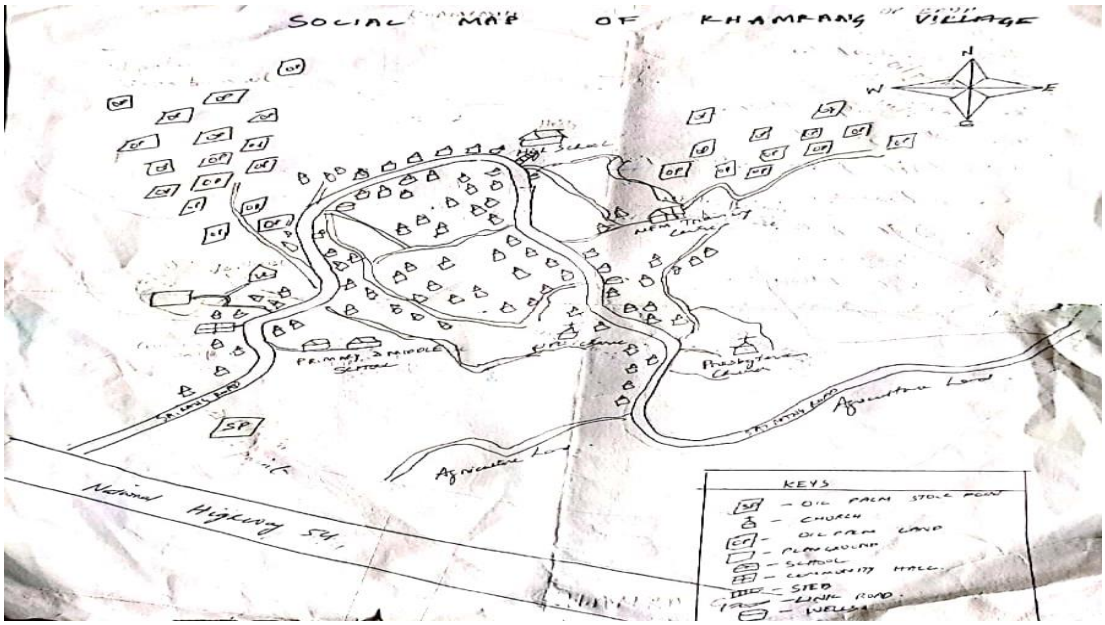


Figure 3.3. Social Map of Distant (Khamrang) Village, Kolasib



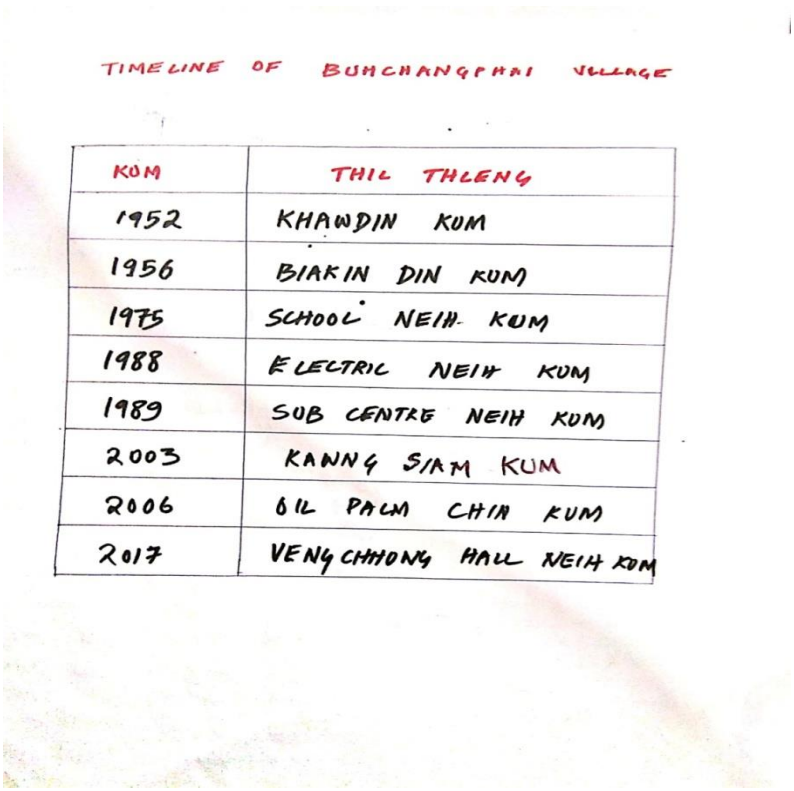
3.1.4. Buhchangphai Village, Kolasib: Proximate Village

Buhchangphai is a medium-sized village that represents the proximate village of 282 households. It is located in the Bilkhawthlir R.D block of Kolasib district with a distance of 22 kilometers from its district headquarter. The total population is 1401 consisting of 733 males and 668 females (2011-12 census). It is situated 14km away from its sub-district headquarter Bilhkawthilr. Children between the ages of 0 to 6 years are 78 which constitute 21 percent of the total population. The average sex ratio is 911 that is lower than the state sex ratio of 976. The child sex ratio is 838 lower than the state of 970. The literacy rate is 75 percent which is lower than the state of 91 percent. Male literacy is 80 percent while the female literacy rate is 71 percent. There are 560 total workers of which 345 are males and the remaining 215 are females. Main workers consist of 553 while marginal workers consist of 7 workers. As per the Constitution of India and the Panchayati Raj Act, Buhchangphai village is administered by Sarpanch (Head of Village) who is the elected representative of the village (see Census, 2011).

The first settlers arrived in the village in the year 1952 and established the first church in 1956. The first school functioned in the year 1975 which was a primary school. The village was electrified in 1998 and inaugurated sub-center in the year 1989. The road was blacktopped in the year 2003 but is now in a bad condition during the survey. Oil palm cultivation was started in 2006 and community hall was opened in 2017. The village is 100 km away from the state capital Aizawl. The district headquarters Kolasib is 22 km which is also the location of the nearest college and the District Commissioner office. Bilkhawthlir town is one of the most important resource centres for the village. The nearest High school, higher secondary

school, hospital, bank and police outpost were all located in this area. The average distance of agriculture land from the village is 7 km and oil palm land of 6 km. Oil palm stock point was located outside the village area of 5 km away. Buhchangphai village is located near the Assam border and covered most of its area by forest. There are four denominations existing in the village and have four community-based organizations viz., YMA, MHIP, MZP, and MUP. The tourist lodge was also located near the village. Most of the settlers in the village are cultivating oil palm and oil palm mill was located near the village at Bukvannei.

Figure 3.4. Timeline of Proximate (Buhchangphai) Village, Kolasib


TIMELINE OF BUHCHANGPHAI VILLAGE

KUM	THIL THLENG
1952	KHAWDIN KUM
1956	BIAKIN DIN KUM
1975	SCHOOL NEIH KUM
1988	ELECTRIC NEIH KUM
1989	SUB CENTRE NEIH KUM
2003	KANNG SIAM KUM
2006	OIL PALM CHIN KUM
2017	VENG CHHONG HALL NEIH KUM

Figure 3.5. Services and Opportunities Map of Proximate (Buhchangphai) Village, Kolasib

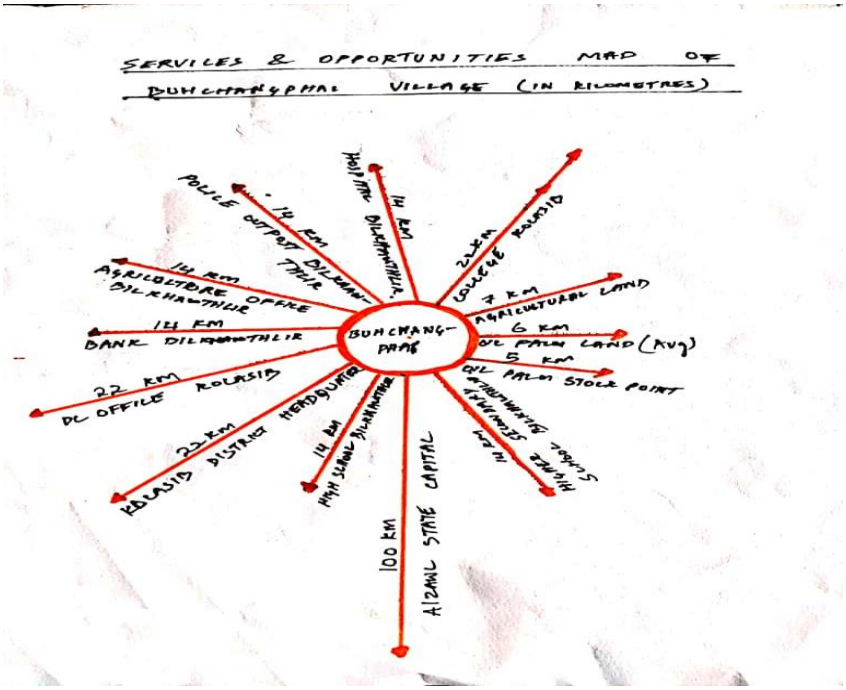
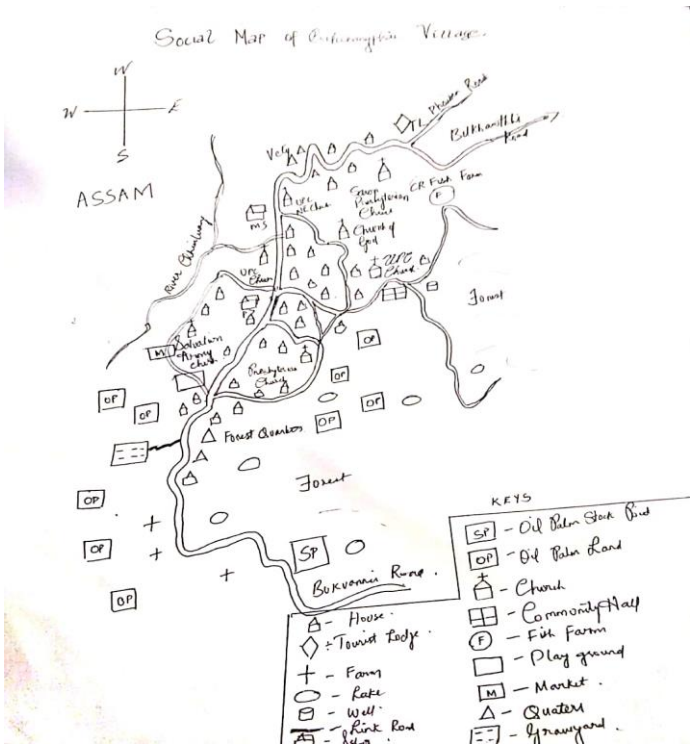


Figure 3.6. Social Map of Proximate (Buhchangphai) Village, Kolasib



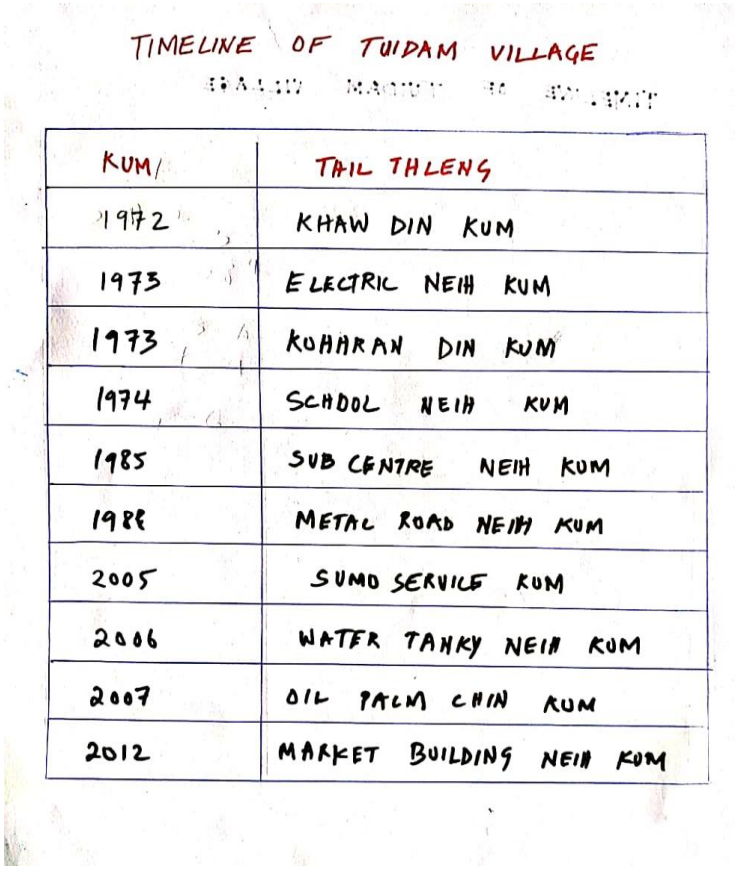
3.1.5. Tuidam Village, Mamit: Distant Village

Tuidam is a medium size village and represents the distant village of Mamit district. It is located in Zawlnuam Tehsil of Mamit district in Mizoram, India. It is located 8km away from sub-district headquarter Kawrthah and 36 km away from district headquarter Mamit. Tuidam has a total population of 1,695 peoples. There are about 335 houses in Tuidam village. There are 870 males and 825 females. The population of children up to 6 years is 248 which constitutes 15 percent of the total population of the village. The sex ratio of Tuidam is 948 that is lower than the state sex ratio of 976. Conversely, the child sex ratio is 984 which is higher than the state child sex ratio of 970. Regarding the literacy rate, it is 99 percent which was higher than the state literacy rate of 91 percent. The total workers are 803 in which male comprises of 435 and females of 368 in numbers. There are 771 main workers and 32 marginal workers. As per the constitution of India, Tuidam village is administrated by the Village Councils who are elected by the people in the village (see Census, 2011).

The first settlement of Tuidam village can be traced back to the year 1972. Subsequently, in 1973, the village was electrifie. The first church was also constructed in this year. The first school was functioned in the year 1974 and had a sub-center in 1985. The road was blacktopped in 1988 and the first maxi cab was serviced in 2005. In 2006, a water tank was constructed in the village. The first plantation of oil palm was back in 2007. The market building was inaugurated in 2012. With regard to services and opportunities, the state capital Aizawl is 120 km away from the village. The district headquarters and district commissioner office is 36 km from the village. The nearest college was also located in this area i.e. Mamit.

The town of Kawrthah plays an important role for Tuidam village. The nearest accessible hospital, police outpost and agriculture office were all located in Kawrthah. The approximate distance of agriculture and oil palm land was 5 km. Oil palm cultivation is the predominant occupation in the village. The oil palm stock point was 5 km away from the village. There are four denominations and four community-based organization viz., YMA, MUP, MHIP, and MZP operating in the village. The majority of people engage in agriculture as their primary source of income.

Figure 3.7. Timeline of Distant (Tuidam) Village, Mamit



TIMELINE OF TUIDAM VILLAGE

KUM/	THIL THLENG
1972	KHAW DIN KUM
1973	ELECTRIC NEIH KUM
1973	KUHHRAN DIN KUM
1974	SCHOOL NEIH KUM
1985	SUB CENTRE NEIH KUM
1988	METAL ROAD NEIH KUM
2005	SUMO SERVICE KUM
2006	WATER TANKY NEIH KUM
2007	OIL PALM CHIN KUM
2012	MARKET BUILDING NEIH KUM

Figure 3.8. Services and Opportunities Map of Distant (Tuidam) Village, Mamit

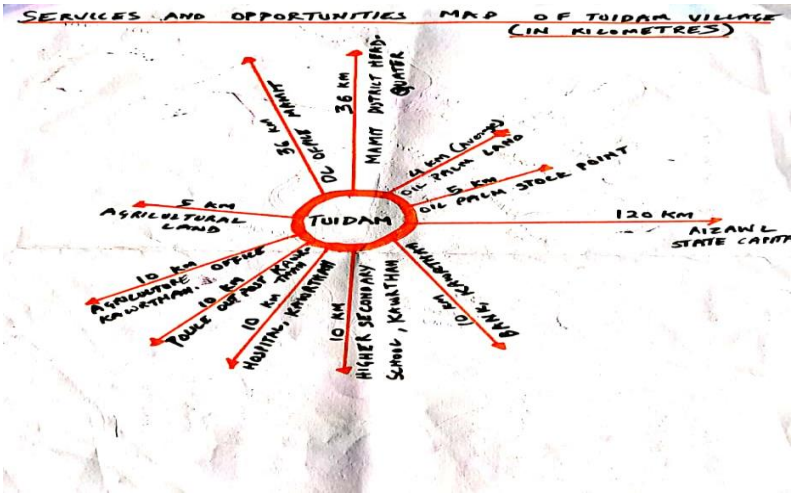
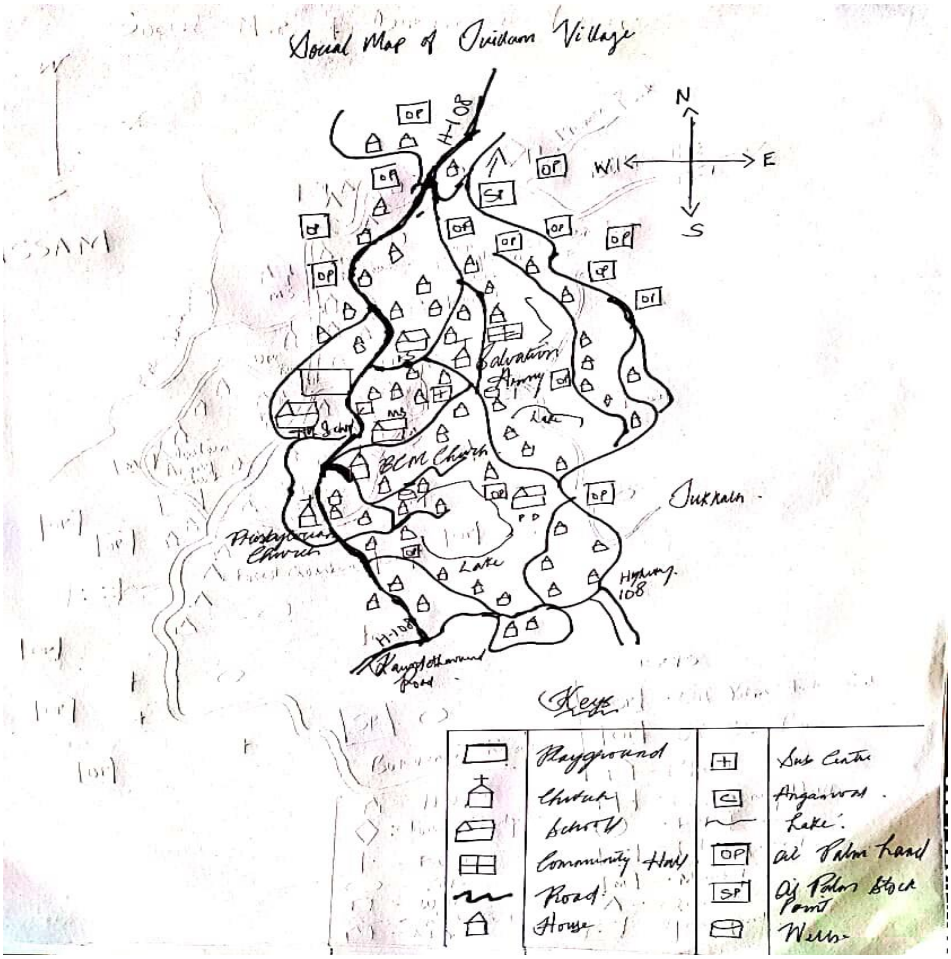


Figure 3.9. Social Map of Distant (Tuidam) Village, Mamit



3.1.6. Nalzawl Village, Mamit: Proximate Village

Nalzawl is a medium size village located in Zawlnuam RD block of Mamit district. It represents a proximate village of Mamit district. The distance from its district headquarters Mamit is 25 kilometers. According to Census 2011, the total household is 107 with a total population of 449. Mamit is the nearest town to Nalzawl. Out of the total population, male consists of 232 while female consists of 217. Children between the ages of 0 to 6 years are 78 which constitute 17 percent of the total population. The average sex ratio is 935 lower than the state sex ratio of 976. The child sex ratio is 1229 that is higher than the state of 970. The literacy rate is 77 percent which was lower than the state of 91 percent. Male literacy is 79 percent while the female literacy rate is 74 percent. There are 171 total workers of which 122 are males and the remaining 49 are females. Main workers consist of 131 while marginal workers consist of 40. As per the constitution of India, Khamrang village is administrated by the Village Councils who are elected by the people in the village (see Census, 2011).

The first settlers arrived in the village in the year 1972 and established the first church in 1973. The village was also electrified in this year. The first school functioned in the year 1974 which was a primary school. Sub center was inaugurated in the year 1985. The road was accessible by vehicles in the year 1988. The first maxi cab started in the year 2005 and had a public water point in the next year 2006. Oil palm cultivation was started in 2007 and market building was opened in 2012. The village is 110 km away from the state capital Aizawl. The district headquarters Mamit is 25 km which is also the location of the nearest college and the District Commissioner office. Mamit town is one of the most important resources for the

village. The nearest High school, higher secondary school, hospital, bank, and police outpost were also all located in this district headquarters. The average distance of agriculture land from the village is 8 km and an oil palm land of 7 km. Nalzawl village is located at a low level from the sea and is accessible by link road from the main road. The road condition is very bad and is not accessible by vehicles most of the time. There are four denominations existing in the village and have four community-based organizations viz., YMA, MHIP, MZP, and MUP. Most of the villagers cultivated oil palm cultivation and the oil palm stock point was located on the main road which is 6 km approx. from the farm.

Figure 3.10. Timeline of Proximate (Nalzawl) Village, Mamit

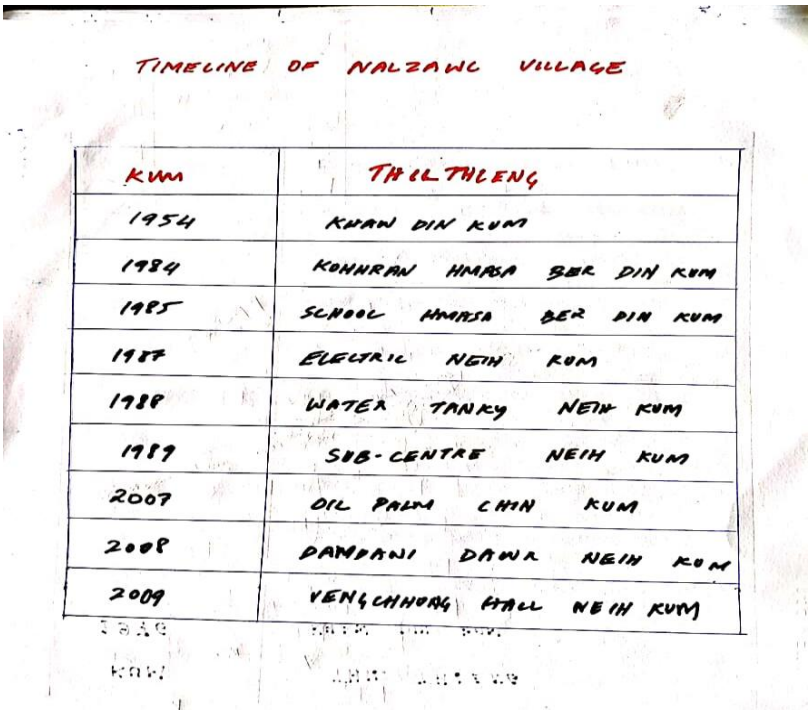


Figure 3.11. Services and Opportunities Map of Proximate (Nalzawl) Village, Mamit

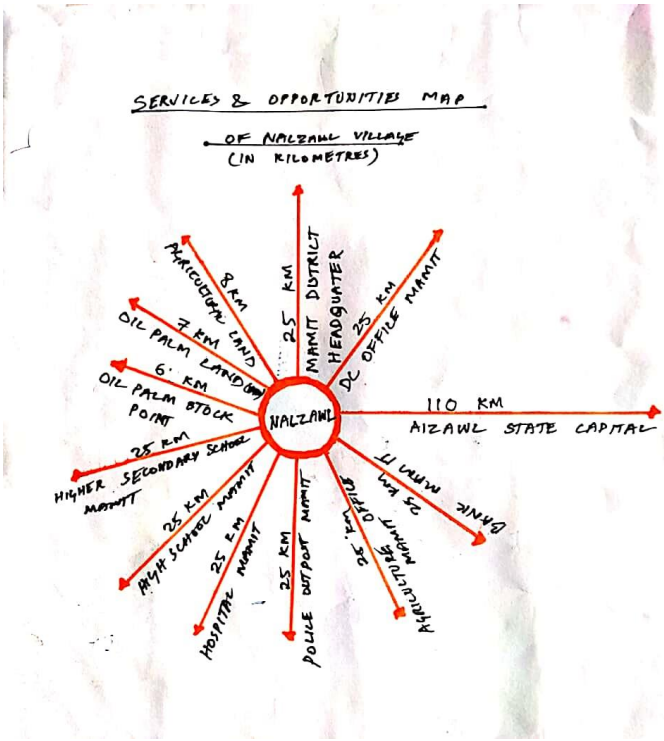
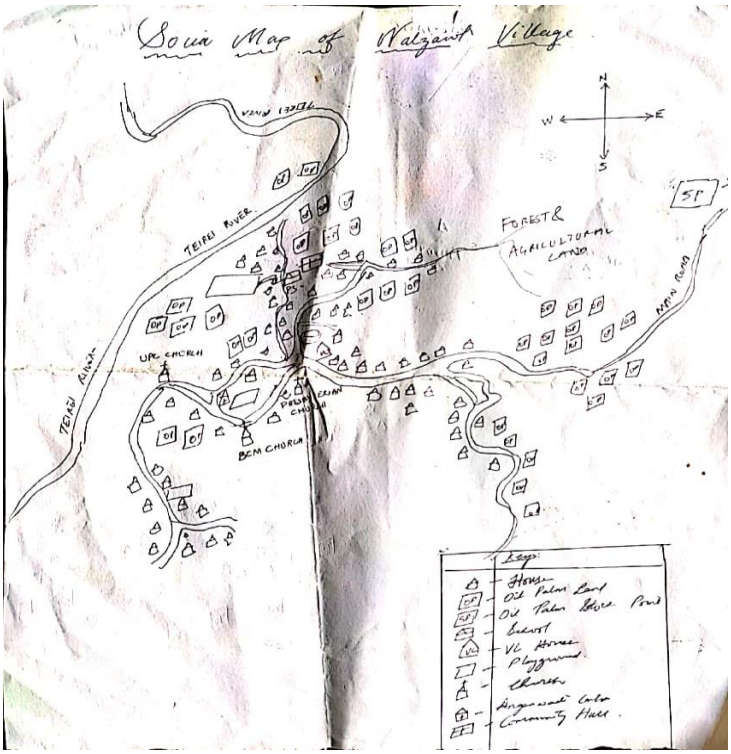


Figure 3.12. Social Map of Proximate (Nalzawl) Village, Mamit



3.2. Objectives

The following are the objectives of the present study

1. To understand rural vulnerability context in Mizoram.
2. To probe into the patterns of rural livelihood assets in Mizoram.
3. To understand the role played by government and private organizations in promoting oil palm cultivation in Mizoram.
4. To determine the factors contributing to the adoption of oil palm cultivation in Mizoram.
5. To examine the impact of oil palm cultivation on the living conditions of rural households in Mizoram.
6. To understand the people's perception of the impact of oil palm cultivation on rural ecology in Mizoram.

3.3. Hypotheses

The following hypotheses are formulated to provide focus to the present study.

1. The volume of livelihood assets viz., natural, physical, human, and social capital endowment of household is directly related to the adoption of oil palm cultivation.
2. The cultivation of oil palm is positively related to the household's living conditions in rural Mizoram.

The first hypothesis draws its inspiration from the Sustainable Livelihood Framework (see Laschinger, 2013; Chambers and Conway, 1992).

The second hypothesis draws its inspiration from earlier studies (see Sayer, et. al., 2012; Zen & Barlow, 2005).

3.4. Research Design

The present study is cross-sectional in nature and descriptive in design. Oil palm cultivators and non-cultivators of oil palm households were compared in different dimensions of livelihood and living conditions. It is mainly based on the quantitative data collected through field survey with pretested structured household interview schedule.. In addition, the participatory methods were used to understand the social and ecological context of vulnerability in the sample villages.

3.4.1. Sampling

The unit of study was household and all the rural households in Kolasib and Mamit districts constitute the population of the present study. A multi-stage sampling procedure was followed to select, blocks, villages, and households. Kolasib and Mamit districts were purposively chosen whose population constitutes about 7.65 percent and 7.87 percent of the state population respectively (2011 census). Representative blocks were chosen from both the districts based on the concentration of oil palm cultivators. From the selected blocks, two villages each were chosen based on the geographical location; one distant and one proximate village from the district headquarter respectively. These villages were also the leading producers of oil palm in the blocks. In each of the villages, the lists of households of very poor (AAY), poor (BPL) and non-poor (APL) were identified among oil palm cultivators and non-cultivators of oil palm. They were identified based on the Village Council records and with the help of CBOs. In each of the category, systematic random sampling was used to select the households for the study.

The overall sample size of the study was 233 households. From Kolasib district, 73 households were selected from Buhchangphai (proximate) village while 58 households were selected from Khamrang (distant) village. From Mamit district, 54 households were selected from Tuidam (distant) village and another 48 households were selected from Nalzawl (proximate) village. From all of these households, 119 non-cultivators of oil palm and 114 cultivators of oil palm were taken. Almost equal proportions of oil palm cultivators and non-cultivators of oil palm were taken from each village. The number of households in a particular village depends upon the number of oil palm cultivators in which the village having a larger number of oil palm cultivators represents more households while the village having fewer oil palm cultivators represents less number of households.

3.4.2. Tools of Data Collection

To conduct livelihood research successfully and be effectively linked to policy, it must include both quantitative and qualitative methods (see Murray, 2000; 2002). This is because livelihood is a complex and multi-faceted phenomenon and a combination of these methods will frequently yield greater insight than either used in isolation (see White, 2002). Accordingly, the present study used both quantitative and participatory methods for data collection.

Before conducting the survey, a pilot study was conducted in the selected villages. Key informant interviews and participatory techniques like social mapping, seasonality diagram, services and opportunities map and timeline were used to understand the context in the sample villages. These were conducted among MUP (Elderly Association) and community leaders in the village.

The field survey was conducted with the help of a pretested and structured household interview schedule during the year, 2018. For the construction of Household Interview Schedule, mobile survey software suite called KoBo Toolbox (http://www.kobotoolbox.org/) was used. Kobo collect an android application was used to canvas the schedule. Before the final survey, it was pretested in the villages and a few modifications were made in the light of it. The final survey was then conducted on the sample households of the four villages.

3.4.3. Data Processing and Analysis

The quantitative data collected through field survey was processed with the help of computer packages of Microsoft excel and SPSS. For analysis of quantitative data, cross-tabulation, simple percentages, ratios, averages, and independent t-test were used. To test hypotheses, Correlation Coefficients were used.

3.4.4. Limitations of the Study

The main limitation of the study is that the household's information regarding living conditions and value of assets may not be accurate as most of the households do not maintain proper accounts of income and expenditure. The amount of income and expenditure was also irregular among the sample households as they did not have monthly regular income which may affect the accuracy of the data. The other limitations may be regarding some of samples where the head of the house was not available as respondent during data collection. This can affect the accuracy of the data as some members of the family are not well aware of the questions being asked. However, the researcher has put all the effort to maximize the accuracy of the information gathered to a greater extent as possible.

In the present chapter, the profile of the study area covering its physical, social and economic setting of the study area was discussed. The objectives and hypotheses of the study were also presented. The methodological aspects of the study were also included by highlighting various aspects of the research design viz. sampling, methods of data collection and data processing and analysis. In addition, the limitations of the present study were outlined. The next chapter attempts to present the vulnerability context of the sample villages by using the Participatory tool of seasonality diagram.

CHAPTER IV

RURAL VULNERABILITY CONTEXT

In the previous chapter, the methodology and profile of the study areas were presented. This chapter attempts to present the vulnerability context whereby the selected villages are discussed. This chapter has been presented in two major sections. The first section discusses the rural vulnerability context and the second section deals with the vulnerability context of the sample villages.

4.1 Rural Vulnerability Context

Assessing vulnerability context is the first task in livelihood analysis which is one of the components of the Sustainable Livelihood Framework. Vulnerability refers to defenselessness, insecurity, and exposure to risk, shocks, and stress and indicates exposure to contingencies and the inability to cope with them. It is not synonymous with poverty. A vulnerability has two sides which include an external side of risks, shocks, and stress to which an individual or household is subjected to and the internal side which is defenselessness that refers to lack of means to cope without damaging loss. Loss can occur in many ways like becoming or being physically weaker, economically impoverished, socially dependent, and humiliated or psychologically harmed (see Chambers, 2006). It is also defined as "a human condition or process resulting from physical, social, economic and environmental factors, which determine the likelihood and scale of damage from the impact of a given hazard" (see UNDP, 2004).

There are different types of vulnerability that affect people in different ways. For instance, natural shocks may have a more adverse effect on agricultural activity than on urban employment. The changes in international commodity prices will also

affect those who depend on such commodities for their livelihood but have a little direct effect on those who produce for, or trade-in, the local market. Understanding the nature of the vulnerability is a key step in sustainable livelihoods analysis.

The effects of vulnerability vary between people depending on the context and components of their vulnerability. In the domain of livelihood study, the aim is to identify those trends, shocks, and aspects of seasonality that are important to livelihoods rather than trying to develop a full understanding of all dimensions of the Vulnerability Context. It is necessary to identify the impacts of these factors and how these negative aspects can be reduced (see DFID, 1999).

4.2 Vulnerability Context of the Study Area

This section presents the vulnerability context of the sample villages by using the participatory method of seasonality diagram. It draws its inspiration from earlier livelihood studies (see Lalrinkima, 2014; Vanlalhruaizela, 2016). Seasonality diagram is one of the tools in Participatory Rural Appraisal (PRA) which is a visual method that shows the distribution of seasonal varying phenomena such as production activities, economic activities, problems, illness/disease, migration, resources, and natural events/phenomena over time (see DFID, 1999). In this study, it covers the effects of seasonality regarding climate change, food security, workload, health status, availability of resources and other issues. It was taken from January to December where the characteristics were divided into four levels viz., (i) '0' represents null/not applicable, (ii) '1' represents 'low', (iii) '2' represents 'medium' and (iv) '3' represents 'high' (see Table 4.1, 4.2, 4.3 and 4.4). It attempts to cover the vulnerabilities that are related to pursuing their livelihood. This will help identify the potentiality and impediment of oil palm cultivation in the state from a livelihood

perspective. The vulnerability contexts taken in chart paper were represented in the form of tables for interpretation.

4.2.1. Khamrang Village (Distant Village), Kolasib

The study reveals that rainfall started by May which gradually increases and reached its peak in July, August and September. It declines by October and shows no rainfall in December. The dry season started from January to its highest point which gradually decreases and shows no drought from June to September. It gradually increases again starting by October. The village experiences hot season from March to September and its maximum temperature occurs in May and June. Regarding landslides, it occurs during the rainy season from June to October. As it lies in the hilly area, the village does not experience flood throughout the entire year. The two characteristics viz., agriculture and workload show a similar pattern that reaches its maximum from March to May and October. It was lowest in December as it is the month of the great festival for Christian. The pattern also revealed that the majority of households depend on agriculture for their survival. Household expenditure was highest in March, July, November, and December. This was largely determined by the expenditure on education and Festival. The expenditure was lowest in January, May, and October. Household income was highest in February, March, and November. The other months except January and October were all at the lowest level. Further, this was also determined by agriculture as a majority of them depend on it for their livelihood. Food availability shows a medium level of availability in almost all months except July to October. An adequate level of availability was not observed in the entire year. The Public Distribution System (PDS) also shows no highest level of availability and a similar pattern was identified with food

availability. Regarding health conditions, people are vulnerable during February, March, April and the rainy season. The highest level of vulnerability was not found in the village. There was a huge transportation problem during the rainy season and became a problem throughout the year although it was lower in some months. Concerning animal husbandry, there was no significant change in the months throughout the year. Lastly, there was a lack of labour during November and December while the other months show a medium level of availability (see Table 4.1).

4.2.2. Buhchangphai Village (Proximate Village), Kolasib

The first indicator rainfall shows that it started by May which gradually increases and reached its peak in July, August and September and declines by October and shows no rainfall in December. Regarding dry season, it started from January to its highest point which gradually decreases and shows no sign from May to September. It gradually increases again starting by October and reaches its peak again in December. The hot season was experienced from March to September and its maximum temperature occurs from April and July. Regarding landslides, it occurs during the rainy season from June to November. The village does not experience flood throughout the entire year. The two indicators viz., agriculture and workload almost show a similar pattern which reaches its maximum from January to May and decreases from July to September. After this, it reaches its peak again and is lowest in December. This was largely affected by agricultural related works. Household expenditure and income also show a similar pattern which was highest in March and by the end of the year. Expenditures on education and Christmas festival largely determine the household expenditure while incomes form agriculture determines the

household income. Food availability shows a medium level of availability almost throughout the year which also shows a similar pattern with the Public Distribution System (PDS). Medium level of availability was found from January to May which declined from the next month and rose again in October. With regard to the health condition, people are vulnerable during February, March, April, September, and October. The highest level of vulnerability was not found in this particular village. There was a huge transportation problem in the village which occurred during the rainy season and became a problem throughout the year although it was lower in some months. The village was not accessible by road during the rainy season due to the occurrence of landslides. Animal husbandry was preferable from January to May and also at the end of the year. The last indicator shows that there was a lack of labour throughout the year and shows no availability in December (see Table 4.2).

4.2.3. Tuidam Village (Distant Village), Mamit

The study shows that rainfall started by May which gradually increases and reached its peak in July to September. It declines in October and shows no rainfall in December. The dry season reached its peak in January and decreased in the next month. No dry period was observed from May to September. It gradually increases again starting by October and reaches its peak again in December. Regarding the hot season, it was experienced from March to August and its maximum temperature occurs in May. There were landslides during the rainy season and shows no occurrence in other seasons. There was no flood in the village as it lies in the hilly area. Agriculture and workload show a similar pattern which reaches its maximum from March to May and October. It was low in December and January. Regarding household expenditure, it was highest in March, November, and December. This was

largely determined by the expenditure on education and Festival. The household income was highest in February, March, and November. Food availability shows a medium level of availability in almost all the months except August to October. An adequate level of availability was not found in the village. The Public Distribution System (PDS) shows the highest level of adequacy during April, May, and November. There was a lack of Public Distribution System (PDS) from August to October mainly due to inaccessible roads in the rainy season. With regards to health, people are most vulnerable during March and October and the other months show an irregular distribution. Similarly, with other villages, huge transportation problems occurred during the rainy season and became a problem throughout the year although it was lower in some months. With regard to animal husbandry, there was no significant change throughout the year. Lastly, there was no adequate labour throughout the year which was lowest from November to January (see Table 4.3)

4.2.4. Nalzawl Village (Proximate Village), Mamit

It was found that rainfall started in May which gradually increases and reached its peak in July and August. It declines in the subsequent month and shows no rainfall from November to April. The dry season reaches its peak in January which gradually decreases and shows no drought from May to September. It increases again by October and reaches its peak again in December. The village experiences hot season starting from March to October and its maximum temperature from May to August. A landslide occurred during the rainy season and was not accessible most of the time. The village does not experience flood throughout the year. The two characteristics viz., agriculture and workload almost show a similar pattern that reaches its maximum from February to May and then in October. With

regard to household expenditure, it was highest in March, July, November, and December. This was determined by the expenditure on education and the Festival. The expenditure was lowest from May to October. Household income was highest in February, March, November, and December. The other months except January were all at the lowest level. Food availability shows a medium level of availability from October to April while the other months show the least availability. An adequate level of food availability was not observed in the village. The Public Distribution System (PDS) shows the highest availability in November to January and decreases in the subsequent months where it reaches the lowest available in June. The health problem was highest in March and October and decreases during May to August and November. Regarding health conditions, people are vulnerable during February, March, April and rainy season. The highest level of vulnerability was not found in the village. There was a huge transportation problem in the village throughout the year which was more intense during the rainy season. Livestock farming was most preferable in January and was not preferred from June to September. Lastly, there was a lack of labour almost throughout the year and shows no availability in December (see Table 4.4).

The overall findings demonstrate that seasonality has a significant impact on rural vulnerability. Low rainfall was accompanied by drought and hot season while heavy rainfall brings landslides that increase their vulnerability. Among the four villages, two of the villages in these areas were not accessible by vehicles during rainy seasons which pose a great problem for the villagers. For oil palm cultivators, this can be a huge problem as oil palm fruits must be transported to the stock point by their own expense to sell it. They have to ship the heavy fruits by head load as their

farm was not accessible by vehicles during this season. This also affects the supply of goods and services in the villages as they entirely depend on road transportation for their imports. The supply of the Public Distribution System (PDS) and the level of food availability also indicate insecurity of food in the villages. In most cases, household income and expenditure show similar patterns which may demonstrate that there were no proper savings among the households. Oil palm cultivation can be an important source of supplementing their income in the future which will increase 14their purchasing power and saving habits. With regard to floods, all the villages did not experience it since flatlands are negligible within the village areas. The prevalence of diseases and health problems also varies among the villages. There is a need to strengthen health care services in the villages which will have a positive impact on pursuing their livelihood activities. With regard to the availability of labour, it can be concluded that there was no adequate labour in the villages. As oil palm cultivation is labour intensive, this is a major constraint for development of oil palm cultivators during planting, pruning, and harvesting. However, as oil palm cultivation is being promoted in the state by evidence-based, a more inclusive approach with need-based provisions will ensure the sustainability of oil palm cultivation in the state.

This chapter presented the vulnerability context of the sample villages using the seasonality diagram. It is represented in the form of tables for interpretation. The next chapter will discuss the socio-economic structural bases of the sample households.

Table 4.1 Seasonality Table of Khamrang Village

Sl. No	Particulars	January	February	March	April	May	June	July	August	September	October	November	December
1	Rainfall	0	0	0	0	1	1	3	3	3	2	1	0
2	Dry period	3	2	1	1	1	0	0	0	0	1	2	3
3	Hot season	0	0	1	2	3	3	2	1	1	0	0	0
4	Drought	2	2	2	2	2	1	0	0	0	0	1	1
5	Landslides	0	0	0	0	0	1	2	3	3	3	0	0
6	Flood	0	0	0	0	0	0	0	0	0	0	0	0
7	Agriculture Workload	2	2	3	3	3	2	2	1	3	3	2	1
8	Others workload	2	3	3	3	3	2	2	2	2	3	3	1
9	Household expenditure	1	2	3	2	1	2	3	2	2	1	3	3
10	Household Income	2	3	3	1	1	1	1	1	1	2	3	1
11	Food availability	2	2	2	2	2	2	1	1	1	1	2	2
12	PDS Availability	2	2	2	2	2	2	2	1	1	1	2	2
13	Health Problems	1	2	2	2	1	1	1	1	2	2	2	1
14	Transportation Problems	2	2	1	1	1	1	1	3	3	3	2	2
15	Livestock farming	2	2	2	2	2	2	2	2	2	2	2	2
16	Labor availability	2	2	2	2	2	2	2	2	2	2	1	1

Table 4.2 Seasonality Table of Buhchangphai Village

Sl. No	Particulars	January	February	March	April	May	June	July	August	September	October	November	December
1	Rainfall	0	0	0	0	1	2	3	3	3	2	1	0
2	Dry period	3	2	2	2	0	0	0	0	0	2	2	3
3	Hot season	0	0	1	3	3	3	3	2	1	0	0	0
4	Drought	3	3	2	2	2	1	1	1	1	2	3	2
5	Landslides	0	0	0	0	0	1	2	3	3	3	2	0
6	Flood	0	0	0	0	0	0	0	0	0	0	0	0
7	Agriculture Workload	2	3	3	3	3	3	2	2	2	3	2	1
8	Others workload	3	3	3	3	3	2	2	2	2	3	3	1
9	Household expenditure	2	2	3	2	1	1	1	1	1	1	3	3
10	Household Income	2	3	3	2	1	1	1	1	1	1	3	3
11	Food availability	2	2	2	2	2	1	1	1	1	2	2	2
12	PDS Availability	2	2	2	2	2	1	1	1	1	2	2	3
13	Health Problems	1	2	2	2	1	1	1	1	2	2	1	1
14	Transportation Problems	3	2	2	2	2	2	2	3	3	3	3	3
15	Livestock farming	2	2	2	2	2	1	1	1	1	2	2	2
16	Labor availability	1	1	1	1	1	1	1	1	1	1	1	0

Table 4.3 Seasonality Table of Tuidam Village

Sl. No	Particulars	January	February	March	April	May	June	July	August	September	October	November	December
1	Rainfall	0	0	0	0	1	2	3	3	3	2	1	0
2	Dry period	3	2	1	1	0	0	0	0	0	1	2	3
3	Hot season	0	0	1	2	3	2	1	0	0	0	0	0
4	Drought	2	2	2	2	1	0	0	0	0	0	1	1
5	Landslides	0	0	0	0	0	1	2	3	3	2	0	0
6	Flood	0	0	0	0	0	0	0	0	0	0	0	0
7	Agriculture Workload	1	2	3	3	3	2	2	1	3	3	2	0
8	Others workload	1	3	3	3	3	2	2	1	2	3	3	1
9	Household expenditure	1	2	3	2	1	1	1	2	2	1	3	3
10	Household Income	2	3	3	1	1	1	1	1	1	1	3	2
11	Food availability	2	2	2	2	2	2	2	1	1	1	2	2
12	PDS Availability	2	2	2	3	3	2	2	1	1	1	3	2
13	Health Problems	1	2	3	2	1	1	1	1	2	3	1	1
14	Transportation Problems	2	2	2	1	1	1	1	3	3	3	2	2
15	Livestock farming	1	2	2	2	2	2	2	2	2	2	2	2
16	Laboravailability	1	2	3	2	2	2	2	2	2	2	1	1

Table 4.4 Seasonality Table of Nalzawl Village

Sl. No	Particulars	January	February	March	April	May	June	July	August	September	October	November	December
1	Rainfall	0	0	0	0	1	2	3	3	2	2	0	0
2	Dry period	3	2	2	2	0	0	0	0	0	1	2	3
3	Hot season	0	0	1	2	3	3	3	3	2	1	0	0
4	Drought	3	3	2	2	2	1	0	0	0	2	3	2
5	Landslides	0	0	0	0	0	1	2	3	3	3	2	0
6	Flood	0	0	0	0	0	0	0	0	0	0	0	0
7	Agriculture Workload	2	3	3	3	3	2	2	2	3	3	2	1
8	Others workload	2	3	3	3	3	2	2	2	2	3	3	1
9	Household expenditure	2	2	3	2	1	1	1	1	1	1	3	3
10	Household Income	2	3	3	1	1	1	1	1	1	1	3	3
11	Food availability	2	2	2	2	1	1	1	1	1	2	2	2
12	PDS Availability	3	2	2	2	2	1	1	1	1	2	3	3
13	Health Problems	1	2	3	2	1	1	1	1	2	3	1	2
14	Transportation Problems	2	3	3	2	2	2	3	3	3	3	3	3
15	Livestock farming	3	2	2	2	2	1	1	1	1	2	2	2
16	Laboravailability	1	1	1	1	1	2	2	2	1	1	1	0

CHAPTER V

SOCIO-ECONOMIC STRUCTURAL BASES OF HOUSEHOLDS

In any livelihood study, the basic question is always concerned with the demographic and structural bases of the population. The present chapter attempts to answer these questions based on the comparative analysis of oil palm cultivators and non-cultivators of oil palm. The chapter is presented in three broad sections. The first section describes the demographic structural bases of the respondents and members of the sample households. The second section describes the social structural bases of the respondent households, while the last section is devoted to the discussion on the economic structural characteristics of the sample households across the four villages surveyed.

5.1. Demographic Structural Bases

Demography mainly includes a demographic grouping based on age, gender, and social class. In this section, the results of the analysis of the demographic characteristics of the respondents and members of the sample households are discussed. The first subsection presents the demographic composition of the respondents while the second subsection deals with the demographic composition of the members of the surveyed households. The third subsection presents the social structural bases of the family.

5.1.1. Demographic Profile of Respondents

In this subsection, the demographic characteristics of the respondent viz., gender, age group, marital status, and educational status were discussed (see table 5.1).

Gender plays a pivotal social structural variable that governs human relations in every society which is more so in the Mizo society of patriarchal structure. Among the respondents, a little more than one-sixth (61%) were males and a little less than two-fifths (39%) were females. Among the non-cultivators of oil palm, there were 51 (42.9%) female and 68 (57.1%) male respondents while there were 40 (35.1%) female and 74 (64.9%) male respondents among the oil palm cultivators. There were more females among non-cultivators of oil palm than oil palm cultivators while there were more males among oil palm cultivators than non-cultivators of oil palm (see table 5.1).

Age is an important demographic variable that connotes the vigour and productivity of an individual; and subsequently the earning capacity. In the study, the respondents were categorized into youth (18-35), middle-aged (36-59) and old (60 and above). Overall, a little more than half (51.1%) belonged to the middle age group which was followed by the old age group (27.9%) and youth age group (21%). Between the cultivators of oil palm and non-cultivators of oil palm, youth constitutes 31.9 percent among the non-cultivators and 9.6 percent among the cultivators of oil palm. With regard to the middle age group, there were more respondents among the non-cultivators (52.1%) than the oil palm cultivators (50%). Conversely, old age group were less among non cultivator (16%) than oil palm cultivators (40.4%). A similar pattern was observed between the oil palm cultivators and non-oil palm cultivators (see table 5.1).

Marital status is another important demographic variable that denotes the prestige a person holds in traditional societies. This is also evident in the Mizo society. The study categorized the marital status as unmarried, married, divorced and

widowed. On the whole, the majority (79%) were married followed by divorced (9.4%), widowed (7.3%) and unmarried (4.3%). A substantial proportion of respondents were married in both the cultivators and non-cultivators of oil palm while there were only few who were unmarried. Specifically, the comparison between oil palm and non-cultivators of oil palm shows that there were 5 each of unmarried respondents among the cultivators of oil palm and non-cultivators of oil palm. Majority of the respondents among the non-cultivators (80.7%) and cultivators (77.2%) were married. Among the non-cultivators, 7.6 percent were divorced while more than a tenth (11.4%) was divorced among the oil palm cultivators. The number of widows was almost similar among the non-cultivators (7.6%) and cultivators of oil palm (7%). The pattern of distribution was also similar between the oil palm cultivators and non-cultivators of oil palm (see table 5.1).

Education is one of the basic needs of human beings. It is one of the components of human capital in the Sustainable Livelihood Framework as a determinant of sustainable development (see Carney, 1998; Scoones, 1998). The importance cannot be overemphasized. The educational status of adult members has been divided into six categories viz. Illiterate, Primary (1-5), Middle (5-8), High School (9-10), Higher Secondary (11-12) and Higher Education (13 and above). Overall, more than two-fifth (45.9%) have access to education till Primary school which was followed by Middle school level of education (29.2%). The remaining comprises of high school level (13.3%), illiterate (8.6%), higher secondary level (2.6%) and higher education (0.4%). A tenth of non-cultivators (10.1%) and a lesser number of cultivators (7%) were found to be illiterate. Two fifth (40.3%) of non-cultivators attended education till the primary level while more than half (51.8%) of

oil palm cultivators attended the same. Among the non-cultivators, almost a third (30.3%) of respondents attended till the middle level while 28.1 percent of oil palm cultivators accounted for the same. Regarding the high school level of education, 16 percent of cultivators 10.5 percent of non-cultivators had reached high school level of education. The higher secondary level shows lower representation where 3.4 percent of non-cultivators and only 1.8 percent of cultivators accounted for this level. However, there were no respondents who attended higher education among the non-cultivators of oil palm while there was 1 (0.9%) respondent among the cultivators of oil palm. Although there were differences in proportion, a similar pattern was observed between the oil palm cultivators and non-oil palm cultivators (see table 5.1).

5.1.2. Demographic Profile of members of Sample Households

There were 514 family members among the non-cultivators of oil palm and 208 family members among the cultivators of oil palm with a total of 437 members. Overall, more than half (54.8%) of the members of surveyed households were males and the rest were females. Females accounted for 44.6 percent of the non-cultivators and 45.9 percent of the cultivators of oil palm in the sample households. Males constitute 55.4 percent among the non-cultivators of oil palm and 54.1 percent among the cultivators of oil palm. Although the number of males was a little higher among the non-cultivators of oil palm, a similar pattern was observed between the oil palm cultivators and non-cultivators of oil palm (see table 5.2).

Since a larger number of the surveyed household members belong to youth and children age groups, unmarried were highest in numbers (48.3%) followed by married (44.3%). The few remaining were divorced (5.2%) and widowed (2.3%).

There were 19 (3.7%) divorced among the non-cultivators of oil palm and 31 (6.8%) divorced among the cultivators of oil palm. More than two fifths (43%) among non-cultivators of oil palm and less than half (45.7%) among oil palm cultivators were found to be married. A little more than half (51%) among non-cultivators of oil palm and less than half (45.3%) among oil palm cultivators were found to be unmarried. There were 12 (2.3%) widowed among the non-cultivators of oil palm and 10 (2.2%) among the cultivators of oil palm. Unmarried were highest among non-cultivators of oil palm while married were highest among oil palm cultivator households (see table 5.2).

Regarding age group, the sample households were categorized into five age groups viz. children (below 13), adolescent (14-17), youth (18-35), middle (36-59) and old (60 and above). On the whole, the age group of youth was highest (31.3%) followed by children (24.9%), middle-age group (24.4%), old age (11.7%) and adolescents (7.7%). Among the children, more than one fourth (31.7%) belongs to non-cultivators of oil palm households and less than a fifth (17.2%) belongs to cultivators of oil palm households. Among adolescents, 8.6 percent were non-cultivators of oil palm and 6.6 percent were cultivators of oil palm. Among the youth, more than one fourth (30.9%) and (31.8%) were non-cultivators of oil palm and cultivators of oil palm respectively. Among the middle-aged, a little more than a fifth (22%) were non-cultivators of oil palm and more than one fourth (27.2%) were cultivators of oil palm. Lastly among the old, 6.8 percent were non-cultivators of oil palm and 17.2 percent were cultivators of oil palm. Overall, the numbers of children were highest among non-cultivators of oil palm while youth were highest among oil palm cultivator households (see table 5.2).

5.1.3. Structural Bases of Family

Family is the first institution and plays an important role in every society. The structure of a family implies how a family is organized based on roles, power, and hierarchies. In this sub-section, indicators like type, form, size, and gender of the head are used to describe the structural bases of family.

The type of family was categorized into joint, nuclear and single. On the whole, the majority (64.4%) belongs to the nuclear family which was followed by single family (18.5 %) and joint family (17.2%). The pattern of distribution show differences with earlier studies (see Zaitinvawra & Kanagaraj 2008, Sailo, 2014). The difference was in the higher percentage of a single-family than joint family. Further, a single-family was higher among the oil palm cultivators than the non-cultivators of oil palm (see table 5.3).

The next indicator is the form of a family that is based on family cohesion. It was categorized into broken, reconstituted and stable families. The study revealed that the majority (88%) belong to a stable family. This was followed by broken family (11.6%) and reconstituted (0.4%) families. Less than a tenth of non-cultivators of oil palm households (8.4%) were from broken family whereas less than a fourth (14.9%) of oil palm cultivators comprises the same. There was only 1 (0.8%) household who belongs to the reconstituted family among the non-cultivators of oil palm while there was no reconstituted family among the oil palm cultivator households. A majority (90.8%) of both non-cultivators of oil palm and cultivators of oil palm (85.1%) belong to stable families. A similar pattern was seen in both the cases except in reconstituted family which was not found among oil palm cultivators (see table 5.3).

The size of the family is the third indicator in the study. It largely determines the availability of labour in agricultural pursuit and other allied activities of rural areas. The study classified the size of the family into small (1-3 members), medium (4 -5 members) and large (6 and above members). Almost half (47.2%) were living in a medium-size family and more than a third (35.2%) lives in a small size family. The remaining (17.6%) were living in a large size family. A little more than two fifths (42%) of non-cultivators of oil palm lived in small size family while more than one fourth (28.1) of oil palm cultivators comprises the same. More than two-fifth (42.9%) of non-cultivators of oil palm were living in the medium-size family while a little more than half (51.8%) of oil palm cultivators lived in the same. Less than a fifth (15.1%) of non-cultivators of oil palm and a little more than a fifth (20.2%) of oil palm cultivators were living in large size family. The pattern of distribution was also similar between the oil palm cultivators and non-cultivators (see table 5.3).

Mizo society is a patriarchal society and has a significant implication for livelihood (see Laltlanmawii, 2005). On the whole, large majorities (87%) were male-headed and the remaining (13%) were female-headed. A similar pattern of distribution was observed in earlier studies in Mizoram (see Laltlanmawii, 2005; Zaitinvawra, 2014). Comparing the oil palm cultivators and non-cultivators of oil palm, the male-headed family was a little higher in the oil palm cultivator's households (see table 5.3).

5.2. Social Structural Bases

Social structure refers to the patterned social arrangements that are both emergent and determinant of the actions of the individuals in society. It can be defined as the organized pattern of the relationship of the people. The social

structural characteristics of the sample households discussed in this section include sub-tribe and denomination (see table 5.4). In *Mizo* society, there are different sub-tribes and clans. Further, they were divided into ruling and common clan. A clan can be described as a division of a tribe by tracing descent from a common ancestor.

For the study, sub-tribes of Lusei, Ralte, Hmar, Lai, and Paihte were identified. Overall, other sub-tribes were highest (34%) followed by Lusei (32%), Hmar (16%) and Ralte (15%). A few of Paihte (3%) and Lai (1%) were also found in the villages. Among the non-cultivators of oil palm, other sub-tribes were highest (35.3%) followed by Lusei (31.9%), Hmar (15.1%), Ralte (10.9%), Paihte (5%) and Lai (0.8%). A little difference was observed in the pattern among the cultivators of oil palm in which others sub tribes and Lusei formed majorities (31.6%) followed by Ralte (18.4%), Hmar (16.7%), Paihte (0.9%) and Lai (0.9%) respectively (see table 5.4). The result was largely affected by the high number of *Reang (Bru), Chakma* and other migrants living in the areas.

With regard to religion, Christianity was dominant in the state. To develop a better understanding, the study categorized into different denominations viz., Presbyterian, Baptist, UPC (Mizoram), UPC (NE), Salvation Army, Seventh Day Adventist, IKK and others. Overall Presbyterian was highest in numbers (37%) as it lies in the northern area of Mizoram which is Presbyterian dominated areas. This was followed by Baptist (15%), Salvation Army (14%), UPC (Mizoram) (13%), UPC (NE) (9%), Seventh Day Adventist (8%), others (43%) and IKK (0.4%). Among the non-cultivators of oil palm, Presbyterian was highest (39.5%) followed by Baptist (16.8%), Salvation Army (12.6%), UPC (Mizoram) (11.8%), UPC (NE) (10.9%), Seventh Day Adventist (7.6%) and others (0.8%). Among the cultivators of oil palm,

Presbyterian was highest (33.3%) followed by Salvation Army (15.85), UPC (Mizoram) (14.9%), Baptist (13.2%), Seventh Day and others (7.9%) each, UPC (NE) (6.1%) and IKK (0.4%) respectively. There was not much difference in the pattern between the oil palm cultivators and non-cultivators of oil palm (see table 5.4).

5.3. Economic Structural Bases

The economic structural bases are discussed at the individual and household levels in the study. Dependency, socio-economic category, ownership of the house, type of house and Job Card under MGNREGS were discussed.

The first economic structural variable i.e. dependency shows that more than half (53%) were dependent and the rest (47%) were earner. Comparing the oil palm cultivators and non-cultivators of oil palm, earners were higher in oil palm cultivator households (55%) than non-cultivators of oil palm (39%). Overall the dependency ratio was 1.14 which suggest that for every earner there was one dependent (see table 5.5)

The socio-economic characteristics reveal the class position of the household and can be construed as a reliable measure of social class in Mizoram (see Zaitinvawra and Kanagaraj, 2008). The socio-economic category is divided into three classes viz. very poor- AAY (Antyodaya Anna Yojana), poor- BPL (below poverty line), and non-poor- APL (above poverty line). The present study indicates that almost half (48%) belong to the below poverty line followed by above poverty line (30%) and very poor (23%). Comparing the oil palm cultivators and non-cultivators of oil palm, there was an equal proportion at below the poverty line while above

poverty line was higher among the oil palm cultivator's households. In contrast, AAY was lower among oil palm cultivators households (see table 5.5).

With regard to ownership of the house, a large majority (94%) lived in their own house while the remaining (6%) lived in rented houses. A similar pattern was observed between the oil palm cultivators and non-cultivators of oil palm where almost cent percent (99.1%) of oil palm cultivators lived in their own house while 89.1 percent of non-oil palm cultivators lived in their own house (see table 5.5).

The types of the house were categorized as kutcha, pucca and semi pucca for the study. On the whole, it was found that a huge majority (94%) live in kutcha house which was followed by pucca (5%) and semi pucca (3%). The pattern of distribution was also similar between the oil palm cultivators and non-cultivators. Among non-cultivators of oil palm, 93.3 percent lived in a kutcha house while 91.2 percent of oil palm cultivators lived in a kutcha house. Residence in pucca house was accounted for by 3.4 percent of non-cultivator households and 6.1 percent of oil palm cultivator households. Those living in semi pucca houses accounted for 3.4 percent of non-cultivator households and 2.6 percent of oil palm cultivator households (see table 5.5).

With regard to job card holders under MGNREGS, on the whole, almost cent percent (98%) have job cards under MGNREGS while the remaining few (2%) did not have job cards under MGNREGS. Households who did not have job card were mainly who migrated recently to the village. Comparing the oil palm cultivators and non-cultivators of oil palm households, the number of job cardholders was higher among the oil palm cultivators (99.1%) as compared to non-cultivator households (97.5%). There were 3 households of non-cultivators of households who did not have

job cards while there was only 1 household of oil palm cultivators who did not have job cards (see table 5.5).

This chapter discussed the demographic, social and economic structural bases of the respondents and members of the sample households. Overall oil palm cultivator households were better in most cases than non-cultivators of oil palm. Keeping in mind, the next chapter will attempt to discuss the pattern of livelihood and living conditions.

Table 5.1 Demographic Profile of the Respondents

Sl. No	Characteristic	Cultivating Oil Palm		Total
		No	Yes	
		n = 119	n = 114	N = 233
I	**Gender**			
	Female	51 (42.9)	40 (35.1)	91 (39.1)
	Male	68 (57.1)	74 (64.9)	142 (60.9)
II	**Age Group**			
	Youth (18 -35 Years)	38 (31.9)	11 (9.6)	49 (21.0)
	Middle(36 - 59 Years)	62 (52.1)	57 (50.0)	119 (51.1)
	Old (60 and Above)	19 (16.0)	46 (40.4)	65 (27.9)
III	**Marital Status**			
	Unmarried	5 (4.2)	5 (4.4)	10 (4.3)
	Married	96 (80.7)	88 (77.2)	184 (79.0)
	Divorced	9 (7.6)	13 (11.4)	22 (9.4)
	Widowed	9 (7.6)	8 (7.0)	17 (7.3)
IV	**Education Status**			
	Illiterate	12 (10.1)	8 (7.0)	20 (8.6)
	Primary (1 - 5)	48 (40.3)	59 (51.8)	107 (45.9)
	Middle (6 -8)	36 (30.3)	32 (28.1)	68 (29.2)
	High School (9 -10)	19 (16.0)	12 (10.5)	31 (13.3)
	Higher Secondary (11 - 12)	4 (3.4)	2 (1.8)	6 (2.6)
	Higher Education(13 and Above)	0 (0.0)	1 (0.9)	1 (0.4)

Source: Computed Figures in parentheses are percentages

Table 5.2 Demographic Composition of Members of Sample Households

Sl. No	Characteristic	Cultivating Oil Palm		Total N = 967
		No n = 514	Yes n = 453	
I	**Gender**			
	Female	229 (44.6)	208 (45.9)	437 (45.2)
	Male	285 (55.4)	245 (54.1)	530 (54.8)
II	**Marital Status**			
	Divorced	19 (3.7)	31 (6.8)	50 (5.2)
	Married	221 (43.0)	207 (45.7)	428 (44.3)
	Unmarried	262 (51.0)	205 (45.3)	467 (48.3)
	Widowed	12 (2.3)	10 (2.2)	22 (2.3)
III	**Age Group**			
	Children (Below 13 Years)	163 (31.7)	78 (17.2)	241 (24.9)
	Adolescents (14 – 17 Years)	44 (8.6)	30 (6.6)	74 (7.7)
	Youth (13 -35 Years)	159 (30.9)	144 (31.8)	303 (31.3)
	Middle(36 - 59 Years)	113 (22.0)	123 (27.2)	236 (24.4)
	Old (60 and Above	35 (6.8)	78 (17.2)	113 (11.7)

Source: Computed Figures in parentheses are percentages

Table 5.3 Structural Bases of Family

Sl. No	Characteristic	Cultivating Oil Palm		Total
		No	Yes	
		n = 119	n = 114	N = 233
I	**Type of Family**			
	Joint	16 (13.4)	24 (21.1)	40 (17.2)
	Nuclear	83 (69.7)	67 (58.8)	150 (64.4)
	Single	20 (16.8)	23 (20.2)	43 (18.5)
II	**Form of Family**			
	Broken	10 (8.4)	17 (14.9)	27 (11.6)
	Reconstituted	1 (0.8)	0 (0.0)	1 (0.4)
	Stable	108 (90.8)	97 (85.1)	205 (88.0)
III	**Size of Family**			
	Small(<= 3.00)	50 (42.0)	32 (28.1)	82 (35.2)
	Medium(4.00 - 5.00)	51 (42.9)	59 (51.8)	110 (47.2)
	Large(6.00+)	18 (15.1)	23 (20.2)	41 (17.6)
IV	**Gender of Head**			
	Female	17 (14.3)	14 (12.3)	31 (13.3)
	Male	102 (85.7)	100 (87.7)	202 (86.7)

Source: Computed Figures in parentheses are percentages

Table 5.4 Social Structural Bases

Sl. No	Characteristic	Cultivating Oil Palm		Total
		No	Yes	
		n = 119	n = 114	N = 233
I	**Sub tribe**			
	Lusei	38 (31.9)	36 (31.6)	74 (31.8)
	Others	42 (35.3)	36 (31.6)	78 (33.5)
	Hmar	18 (15.1)	19 (16.7)	37 (15.9)
	Ralte	13 (10.9)	21 (18.4)	34 (14.6)
	Paite	7 (5.9)	1 (0.9)	8 (3.4)
	Lai	1 (0.8)	1 (0.9)	2 (0.9)
II	**Denomination**			
	Baptist	20 (16.8)	15 (13.2)	35 (15.0)
	IKK	0 (0.0)	1 (0.9)	1 (0.4)
	Others	1 (0.8)	9 (7.9)	10 (4.3)
	Presbyterian	47 (39.5)	38 (33.3)	85 (36.5)
	Salvation Army	15 (12.6)	18 (15.8)	33 (14.2)
	Seventh Day	9 (7.6)	9 (7.9)	18 (7.7)
	UPC (Mizoram)	14 (11.8)	17 (14.9)	31 (13.3)
	UPC (NE)	13 (10.9)	7 (6.1)	20 (8.6)

Source: Computed Figures in parentheses are percentages

Table 5.5 Economic Structural Bases

Sl. No	Characteristic	Cultivating Oil Palm		Total
		No	Yes	
		n = 514	n = 453	N = 967
I	**Earner/Dependent**			
	Dependent	313 (60.9)	204 (45.0)	517 (53.5)
	Earner	201 (39.1)	249 (55.0)	450 (46.5)
	Earner Dependent Ratio	*1.55*	*0.81*	*1.14*
II	**Socio- Economic Category**	**n = 119**	**n = 114**	**N = 233**
	AAY	32 (26.9)	21 (18.4)	53 (22.7)
	APL	30 (25.2)	39 (34.2)	69 (29.6)
	BPL	57 (47.9)	54 (47.4)	111 (47.6)
III	**Ownership of House**			
	Owned	106 (89.1)	113 (99.1)	219 (94.0)
	Rented	13 (10.9)	1 (0.9)	14 (6.0)
IV	**Type of House**			
	Kutcha	111 (93.3)	104 (91.2)	215 (92.3)
	Pucca	4 (3.4)	7 (6.1)	11 (4.7)
	Semi Pucca	4 (3.4)	3 (2.6)	7 (3.0)
V	**Job Card under MGNREGS**			
	No	3 (2.5)	1 (0.9)	4 (1.7)
	Yes	116 (97.5)	113 (99.1)	229 (98.3)

Source: Computed Figures in parentheses are percentages

CHAPTER VI

PATTERNS OF RURAL LIVELIHOOD AND LIVING CONDITIONS

The previous chapter presented the structural bases of the households. The present study was inspired by the Sustainable Livelihood Framework (see Chambers and Conway, 1992; Scoones, 1998). This framework is used to understand the pattern of livelihood assets by comparing the cultivators of oil palm and non-cultivators of oil palm. The framework emphasizes people, assets, and activities rather than on sectors and performance which is the conventional point of entry to policy. It also helps in generalizing the statements of rural livelihoods particularly of the poor which can be taken up for evaluating different livelihood projects and poverty alleviation (see Ellis, 1999). This chapter is divided into three sections. The first section is devoted to the patterns of rural livelihood assets while the second section describes the living conditions of the villages surveyed. The last section will attempt to analyze the relationship between livelihood assets and living conditions of the sample villages.

6.1. Patterns of Livelihood Assets

In the Sustainable Livelihood Framework, livelihood assets include different forms of capital viz., natural capital, physical capital, financial capital, human capital and social capital (see Chambers and Conway, 1992; Scoones, 1998; DFID, 2000b). The livelihood assets serve as the basis for rural survival and diversifying their livelihood strategies. The framework reveals how sustainable livelihoods are achieved in different contexts through access to a range of livelihood resources which are combined in the pursuit of different livelihood strategies like migration and agricultural intensification (see Haidar, 2009).

6.1.1. Patterns of Natural Capital

Natural capital refers to resources such as land, water, soil, livestock and forests which is directly linked to the occupation to produce food, income, and shelter. The possession of natural capital is one of the factors that determine the livelihood security and sustainability of the rural economy. Natural capital becomes an important asset to those who derive their livelihoods from resource-based activities (see DFID, 1999; Petersen and Pedersen, 2010). It includes all the acquired and possessed assets by individuals or households for production. Among natural asses, land is an important capital in rural areas as it is the main source of income and survival for rural people. Besides land, livestock is another important natural asset of rural people since the history of mankind. There is always a close relationship between man and livestock which is also evident in Mizo society. It is an important source to supplement and augment rural income. Keeping these in mind, the present study assessed the possession of land and livestock to understand the natural assets of rural households.

In the present study, different kinds of land possession viz., temporary pass, periodic land pass, land settlement certificate and land leased in was used. These were selected based on the pilot study conducted. It was found that land as natural capital is predominant for both the cultivators of oil palm and non-cultivators of oil palm. The mean size of landholding was larger among the cultivators of oil palm (13.1 acres) than the non-cultivators of oil palm (8.8 acres). Overall the total mean size of landholding among the cultivators of oil palm and non-cultivators of oil palm was 10.9 acres with a standard deviation of 7.8 acres. With regard to land holding under temporary pass, the average size of landholding among non-cultivators of oil

palm was 2.8 acres while it was 5 acres among the cultivators of oil palm. Landholding under periodic land pass shows that it was 1.8 acres among the non-cultivators of oil palm and 4.5 acres among the cultivators of oil palm. Regarding the landholding under land settlement certificate (LSC), it was 2.4 acres among the non-cultivators of oil palm and 2.9 acres among the cultivators of oil palm. The landholding under leased in also shows 1.9 acres among the non-cultivators of oil palm and 13.1 acres among the cultivators of oil palm. All these dimensions show that landholding under different kinds was higher among the oil palm cultivators than non-cultivators of oil palm. In regard to kinds of landholding, the temporary pass was highest (3.9 acres) followed by periodic land pass (3.1 acres), land settlement certificate (LSC) (2.6 acres) and land leased in (1.3 acres) subsequently. The pattern of distribution was also similar between the non-cultivators of oil palm and cultivators of oil palm (see table 6.1).

The size of landholding was further categorized into marginal (less than or equal to 3.09 acres), small (between 3.10 acre to 10.91 acres), medium (10.92 acres to 18.73 acres) and large (more than or equal to 18.74 acres). It was found that less than a fifth (18.5%) of non cultivators has marginal size of landholding while there was only one household (0.9%) of oil palm cultivator who possessed the same. With regard to small size of landholding, a little more than half (51.3%) non cultivator and less than half (46.5%) oil palm cultivator possessed it. A little more than a fifth (21%) non cultivators has medium size of landholding and more than one fourth (31.6%) oil palm cultivators have the same. Lastly, less than a tenth (9.2%) of non-cultivators owned large size of land while more than a fifth (21.1%) owned the same. Overall, small size of landholding was highest (48.9 %) followed by medium size of

landholding (26.2 %), large size of landholding (15 %) and marginal size of landholding (9 %). Comparing the oil palm cultivators and non-cultivators of oil palm, oil palm cultivators were having a larger size of landholding than non-cultivators of oil palm (see table 6.2).

To assess the possession of livestock, pig, poultry birds, cow, goat/sheep, and fish were taken. The mean numbers of livestock possessed show that fish was highest in numbers (5.3) followed by poultry birds (4.6), pig (0.6) and lastly of cow and goat/sheep of 0.1 each. The possession of fish shows highest in number as fish is owned in large number even by a single household. The finding also did not reveal the number of households who possessed livestock. The pattern of distribution was similar between the non-cultivators of oil palm and cultivators of oil palm. Comparing the oil palm cultivators and non-cultivators of oil palm, non-cultivators possessed more livestock than oil palm cultivators (see table 6.3).

On the whole, the mean value of natural assets worked out at Rs 355119 among the non-cultivators and Rs 827561 among the cultivators of oil palm. The total mean of natural assets was Rs 586271. Between the oil palm cultivators and non-cultivators of oil palm, the mean value of land among the non-cultivators was Rs 232815 which was lower than the oil palm cultivators (Rs 618509). Conversely, livestock value was lower among the cultivators of oil palm (Rs 4325) than the non-cultivators (Rs 4783). The mean value of house plot among the non-cultivators of oil palm was Rs 117521 which was lower than the cultivators of oil palm (Rs 204728). The total mean was highest on land (Rs 421524) followed by house plot (Rs 160189) and livestock (Rs 4559). The pattern of distribution was also similar between the non-cultivators of oil palm and oil palm cultivators (see table 6.4).

6.1.2. Patterns of Human Capital

The second dimension is human capital which refers to the competence and knowledge of a person. It includes a broad aspect such as skills, ability to work, good health, working capacity, and vice versa. This is very important to pursue one's livelihood and largely determines the success and failures of their livelihood activities. The possession of human capital serves as a source of life sustenance. Human capital implies the ability to work, knowledge, skills and good health that together enable people to pursue different livelihood strategies and achieve their livelihood objectives (see DFID, 1999). Lack of human capital can be a barrier to pursue their livelihood and utilize resources.

The present study used the mean age of household members, the standard deviation of age; the proportion of earners and the mean years of adult education as indicators of human capital. The mean age of household members was calculated to be 33 years which was significant for both non-cultivators (29.15 years) and oil palm cultivators (37.46 years). The standard deviation of age shows 16.50 among the non-cultivators of oil palm and 17.22 among the oil palm cultivators with a total of 16.85 which was not significant. With regard to the proportion of earners, the average proportion of earners in non-cultivators of oil palm households was 0.47 while it was 0.25 in oil palm cultivator households. The t' value worked out at -4.4 which was significant for both non-cultivators and oil palm cultivators. The mean proportion of earners, on the whole, was 0.54 which indicated that half of the members of households were earners. The last indicator i.e. mean years of adult education shows a significant difference between the non-cultivators of oil palm and oil palm cultivators. The mean years of adult education was a little higher for oil palm

cultivators (7 years) as compared to non-cultivator households(6 years) (see table 6.5).

6.1.3. Patterns of Physical Capital

Physical capital serves as an important indicator of the quality of life and living conditions. It includes the basic infrastructure (water, transport, shelter, energy, and communications) and the production equipment which enables people to pursue their livelihoods (DFID, 1999; Carney, 2002). In the present study, physical capital comprises of house value, vehicles, television, mobile phones, washing machine, LPG connection, sewing machine, iron box, and transistor/ radio.

On the whole, the mean value of household assets worked out at Rs. 300138 which was higher among the oil palm cultivators (Rs.407427) than the non-cultivators of oil palm (Rs 197356). Among the physical assets, the value of the house was highest (Rs 201421) followed by vehicles (Rs 12489), television (Rs 7968), mobile phone (Rs 6231) and others. The pattern of distribution was similar between the cultivators and non-cultivators of oil palm. The mean value of the household was Rs 137672 among the non-cultivators of oil palm and Rs 286360 among the cultivators of oil palm with a total mean of Rs 210421. Vehicles mean value was Rs 8739 among the non-cultivators of oil palm which was lower than the cultivators of oil palm of Rs 16404. With regard to television, the mean value was higher among the oil palm cultivators (Rs 8785) than the non-cultivators of oil palm (Rs 7185). The mean value of the mobile phone was also higher among the oil palm cultivators (Rs 7461) than the non-cultivators of oil palm (Rs 5053). Similar cases were also found in all the other dimensions. This may indicate that with the increase in income generated from oil palm cultivation, the purchasing power also increases.

It is also important to note that these do not reveal the number of assets as it was calculated in terms of their value in Rupees (see table 6.6).

6.1.4. Patterns of Financial Capital

Financial capital refers to the financial resources that people possessed. These can include the income of the household, access to credit and savings. It implies the financial resources that are owned by the households and which are readily available for consumption and productive purposes that sustain life (see Kollmair and Gamper, 2002). It is considered as the most versatile of all the assets and the least available to the poor (DFID, 1999). In the present study, the pattern of household saving and household debt was taken to understand the pattern of the financial capital of the household.

Household saving was classified as savings in a Nationalised bank, cash in hand, money lent to friends and relatives, self-help groups, private banks, insurance, and money lenders. Overall, household saving works out at Rs 32102 which was substantially higher among the oil palm cultivators (Rs 51452) than the non-cultivators of oil palm (Rs 13566). The predominant form of saving of the sample households was in nationalized banks (81%) followed by cash in hand (12.1%), money lent to friends and relatives (4.6%), self-help group saving (1%), private banks (0.9%) and insurance agencies (0.3%) respectively. Saving in the form of money lenders was not observed in the study. A similar pattern was observed between the cultivators and non-cultivators of oil palm. Saving on nationalized banks was Rs 10154 among the non-cultivators of oil palm and Rs 42549 among the cultivators of oil palm. Non-cultivators of oil palm households have Rs 2536 cash in hand while oil palm cultivator households have Rs 5295 cash in hand. The debt from

friends and relatives was Rs 805 among the non-cultivators of oil palm and Rs 2175 among the cultivators of oil palm. Saving in Self Help Group (SHGs) was Rs 68 among the non-cultivators of oil palm and Rs 595 among the cultivators of oil palm. Non-cultivators of oil palm households have no savings in private banks while cultivators of oil palm households have Rs 614 on average. On the whole, the savings among cultivators of oil palm were much more than savings among non-cultivators of oil palm which indicates that oil palm cultivation has significantly contributed to household income (see table 6.7).

Household debt has been calculated in terms of debt in Nationalised banks, money lent to friends and relatives, self-help groups, private banks, insurance, cooperatives, and money lenders. On the whole, household debt was calculated at Rs 2742 which was higher among the non-cultivators of oil palm (Rs 4360) than the oil palm cultivators (Rs770). Most of the household debt was from nationalized banks (81%) followed by debt from friends and relatives (12.1%), self-help groups (4.6%), money lenders (1%), insurance agencies (0.9%) and private banks (0.3%) respectively. There was a large difference of the amount of debt from nationalized banks which shows Rs 4269 among non-cultivators and Rs 439 among oil palm cultivators. On the other form of debt, only small differences in amounts were observed between the non cultivators and oil palm cultivators. However, it was little higher among the non-cultivators in almost all the cases. In addition, a small amount of debt from money lenders and insurance was found among the oil palm cultivators while it was not found among the non-cultivators of oil palm (see table 6.8).

Overall, the mean of household saving was calculated as Rs 32102 and household debt as Rs 26637. Household saving was substantially higher among the

oil palm cultivators while household debt was higher among the non-cultivators of oil palm (see table 6.9).

6.1.5. Patterns of Social Capital

The next dimension in livelihood assets in the sustainable livelihood framework is social capital. In the discussion of development around the world, social capital was included as a new dimension (see Chopra, 2002). The concept of social capital implies participation in a group, association, organization, union (formal or informal) that broadly includes the relations and networks of the society. It focuses on the functioning, services, and resources provided as well as the relationship between various groups. Robert Putnam (1993) defines social capital as "the set of resources that inhere in family relations and community social organizations" and to features such as "trust, norms, and networks that can improve the efficiency of society by facilitating coordinated actions." It is also described as a social structural resource and capital asset that are important for an individual for production and makes it possible to achieve certain ends that are attainable when it is absent. Further, social capital implies the ability to build a relationship to gain trust and reciprocity by individuals and groups that stick to common agreed norms and sanctions as well as the ability to work together and with other organizations (Ostrom, 1992; Pretty & Ward, 2004). Associations and entrepreneurial behavior in the form of social capital can influence the degree of cooperation locally and beyond and thus influence people's ability to adjust in times of change.

In a sustainable livelihood framework, social capital refers to the social resources that people utilize in pursuing their livelihood. Networking and connecting either by horizontal or vertical plays an important role to develop social capital which

builds trust and dynamics in the group to work successfully. It will also help in expanding to a wider organization and institution or formalized group that has certain rules and norms to be followed. For instance, including in a group or association can enhance people's access to and influence over other institutions like the relationship that develops through kinship and other relations (see DFID, 1991).

In the present study, the social capital endowment of the household is assessed in terms of two dimensions viz., participation in community and political participation. The first dimension is participation in the community which is very imperative in Mizo's society. There are different groups and associations existing in the state which are formal and informal. It is a close-knit society and participation in certain groups determines the status and identity of a person. In the present study, participation in Community Based Organization (CBOs) such as Church, YMA (youth association), MHIP (women's association), MUP (elderly association), games and sports, voluntary works, SHGs were taken. The participation in these CBOs was rated in a four-point scales viz., always (3), mostly (2), sometimes (1) and never (0). The average taken from this analysis was taken as the level of participation in CBOs.

The study found that participation in voluntary work was highest (2.6) which is not peculiar in Mizo society. This was followed by participation in Churches (2.2), YMA (1.5), MHIP (1), MUP and SHGs (0.3 each) and games and sports (0.2). Overall, the participation in CBOs worked out at 1.2 on an average. This indicated that they did not participate regularly in CBOs. Comparing the oil palm cultivators and non-cultivators of oil palm, the average participation was a little higher among oil palm cultivators than non-cultivators of oil palm. It almost followed a similar

pattern between the oil palm cultivators and non-cultivators of oil palm (see table 6.10).

The second dimension i.e. political participation implies the influence of politics on people and their interest. In the present study, political participation was assessed in terms of the frequency of vote in the general election. The participation was also rated in a four-point scales viz., always (3), mostly (2), sometimes (1) and never (0). The average taken from this analysis was taken as the level of participation in CBOs. The elections of MP (Member of Parliament), Assembly (MLA) and VC (Village Councils) were taken. On the whole, political participation worked out at 2.7 on an average which implies that the rate of political participation is high among the households. The rate of participation in Village Council elections was predominant while the rate of participation in MP and MLA election were the same. It followed an exact similar pattern between the oil palm cultivators and non-cultivators of oil palm and may be deduced that type of cultivation is not relevant to political participation (see table 6.10).

On the whole, the mean of livelihood assets viz., natural, physical and financial capital was calculated as Rs 857048 which was higher among the cultivators of oil palm (Rs 1184307) than the non-cultivators of oil palm (Rs 543540). The value of natural assets was highest (Rs 586271) followed by physical assets (Rs 300138) and Financial capital (Rs 29361). The distribution of these assets was also higher among the oil palm cultivators than the non-cultivators of oil palm (see table 6.11).

6.1.6. Patterns of Relationship among Livelihood Assets

The possession of livelihood assets determines the success of livelihood activities. People who owned more livelihood assets will have more livelihood options and are likely to achieve more livelihood outcomes. The present study discusses the patterns of relationships among different livelihood assets (see table 6.12). The livelihood assets such as natural capital, physical capital, financial capital, mean years of age, standard deviation (SD) of age, the proportion of earners, Mean Years of Adult Education, standard deviation (SD) of Adult Education, Participation in CBOs and Political Participation were computed using Pearson's Correlation.

The computation shows that physical capital was positively correlated to natural capital which indicates that as physical capital increases; natural capital also tends to increase. However, financial capital was negatively correlated to natural capital and physical capital. This means that as the financial capital of households increases, natural capital and physical capital will decrease. The next indicator, mean years of age was positively correlated to natural capital but not significant to physical capital and financial capital. This means that the higher the age of household members, the possession of natural assets will increase. The standard deviation of age shows positive correlation only to natural capital while the proportion of earners shows positive correlation only to mean years of age. This means the higher the deviation of age in the household, the higher the number of natural capital owned. The mean years of age will also increase with an increase in the proportion of earners. The mean year of adult education was positively correlated to natural capital, physical capital, financial capital and mean years of age. It was significant at 5 percent level on natural capital and mean years of age while it was significant at 1

percent level on physical capital and financial capital. This shows that as the level of education increases, natural capital, physical capital, financial capital and mean years of age also increase. The standard deviation of adult education was positively significant to natural capital, the standard deviation of age and mean years of adult education which means an increase in adult education will also increase natural capital, the standard deviation of age and mean years of adult education. The participation in CBOs was positively correlated to all viz., natural capital, physical capital, mean years of age, the standard deviation of age, proportion of earners, mean years of adult education and standard deviation of adult education except for financial capital in which it was negatively correlated. This indicated that the more participation in CBOs, the other assets increases. Lastly, political participation was positively significant only to participation in CBOs which revealed that as participation in politics increases, participation in CBOs also increases (see table 6.12).

6.2. Patterns of Living Conditions

In the study, the livelihood outcomes of households are studied in terms of their living conditions. A livelihood outcome is the last dimension of Sustainable Livelihood Framework (see Carney, 1998; Scoones, 1998). This refers to the goal to which people aim, the outcome of pursuing their livelihood strategies. In order to increase the well being and reduce vulnerability, people try to achieve multiple livelihood outcomes by selecting strategies that are available to them. The present study computes annual household income and monthly household expenditure to understand the patterns of livelihood outcomes. This first subsection is devoted to

present the annual household income and the second subsection presents a discussion on monthly household expenditure.

6.2.1. Patterns of Annual Household Income

Household income is a dependable measurement of economic development and is the first indicator of the living conditions of the household. It indicates the standard of living of households. In the present study, households derived their incomes from different sources. The sum of these incomes was analyzed to understand the living conditions of the households. The sources of income included in the study were oil palm cultivation, MGNREGS, government service, non-agricultural labor, other crop cultivation, livestock rearing, agricultural labor, skilled labor, and business. On the whole, the annual average household income worked out at Rs 93369. Among different sources of income, more than one-fourth (Rs 31%) was drawn from oil palm cultivation. This was followed by MGNREGS (16%), government service (14%). The income that is drawn from non-agricultural labor and other crop cultivation was 8 percent each. Livestock rearing comprises 7 percent, agricultural labor (6%), skilled labor (5%) and business (4%) respectively. Income from government sectors was not high due to little inclusion of government employees among the sample households. Comparing the oil palm cultivators and non-cultivators of oil palm, MGNREGS contributes highest among the non-cultivators of oil palm and income from oil palm contributes the highest among the oil palm cultivators. Income generated from other crop cultivation was also much higher (18%) among the non-cultivators of oil palm. Income derived from the business was lowest (5%) among the non-cultivators of oil palm while income

derived from skilled labor was lowest (1%) among the cultivators of oil palm (see table 6.13).

6.2.2. Patterns of Monthly Household Expenditure

Assessing household expenditure is useful for measuring poverty and living conditions. The present study considered monthly household expenditure as another indicator of the living conditions of the household. It will be discussed in this subsection.

To understand the monthly household expenditure, it was categorized as food and non-food components. It is expected that the share of food expenditure will be higher than non-food expenditure if the income of the household is higher than their expenditure according to the law of Engel. In the present study, it was found that the average share of food expenditure was lower (34%) than the non-food expenditure (66%). The expenditure on non-food was largely determined by the huge expenditure on education and tobacco/betel nut consumption. Besides this, most of the food consumed was their own agricultural produce. The overall household expenditure was worked out at Rs 5009 which was higher (Rs 5638) among the oil palm cultivator than the non-cultivators of oil palm (Rs 4407). The expenditures on food and non-food were also higher among oil palm cultivators than the non-cultivators of oil palm. The pattern of distribution was however found to be similar between the oil palm cultivator and the non-cultivators of oil palm (see table 6.14).

The analysis of patterns of living conditions of households shows that income and expenditure of households is low in the villages. Between the oil palm cultivators and non-cultivators of oil palm, it was higher among the oil palm cultivators. Therefore, it can be inferred that oil palm cultivators play an important role in

supplementing and augmenting the income of households. In addition, the possession of livelihood assets was also higher among the oil palm cultivators.

6.3. Relationship between Livelihood Assets and Living Conditions

The pattern of relationship between Livelihood Assets and Living Conditions was computed by a statistical tool of Pearson's R. The computation revealed that natural asset was significant at 1 percent level to annual household income and monthly expenditure which means that an increase in natural capital will also increase the household annual income and monthly expenditure. The physical asset was also positively correlated to annual household income and monthly expenditure. However, the financial capital assessed in terms of savings and debt shows a negative correlation to living conditions. This may indicate that when household savings and debt increase, there is a decrease in household income and expenditure. This may be due to the irregular source of income and lack of saving habits among the households. The mean age of household members and the proportion of earners did not have a significant relationship to annual household income and monthly expenditure. The standard deviation of the age was positively correlated to monthly expenditure but not in annual household income. With regard to mean years of adult education, it was positively correlated to both annual household income and monthly expenditure. It can be inferred that the higher the education level of adult members in households, there will be an increase in the annual household income and monthly expenditure. The standard deviation of education was also positively correlated to monthly expenditure but not in the case of annual household income. The participation of household members in CBOs was significantly correlated to monthly expenditure and annual household income positively. The annual household income

and monthly expenditure were also positively correlated with each other. This means that an increase in annual household income will also increase the monthly expenditure (see table 6.15).

In the present chapter, an attempt has been made to discuss the patterns of household livelihood assets and living conditions. The relationships between different variables were also discussed. The next chapter will focus on oil palm cultivation and its impact on rural livelihoods.

Table 6.1 Form of Land Possessions

Sl. No		Cultivating Oil Palm				Total N = 233	
		No n = 119		Yes n = 114			
		Mean	SD	Mean	SD	Mean	SD
1	Temporary Pass	2.8 (31.4)	2.8	5.0 (38.1)	6.2	3.9 (35.4)	4.9
2	Periodic Land Pass	1.8 (19.9)	3.6	4.5 (34.6)	4.5	3.1 (28.5)	4.3
3	Land Settlement Certificate (LSC)	2.4 (27.1)	3.9	2.9 (22.2)	5.2	2.6 (24.3)	4.6
4	Land Leased In	1.9 (21.5)	5.9	0.7 (5.0)	2.1	1.3 (11.8)	4.5
5	Size of Land Holding	8.8 (100)	7.3	13.1 (100)	7.7	10.9 (100)	7.8

Source: Computed Figures in Parentheses are percentages

Table 6.2 Size of Land Holding

Sl. No		Cultivating Oil Palm		Total N = 233
		No n = 119	Yes n = 114	
1	Marginal (<= 3.09)	22 (18.5)	1 (0.9)	23 (9.9)
2	Small(3.10 - 10.91)	61 (51.3)	53 (46.5)	114 (48.9)
3	Medium(10.92 - 18.73)	25 (21.0)	36 (31.6)	61 (26.2)
4	Large(18.74+)	11 (9.2)	24 (21.1)	35 (15.0)
5	**Total**	**119 (100)**	**114 (100)**	**233 (100)**

Source: Computed Figures in Parentheses are percentages

Table 6.3 Livestock Possession

Sl. No	No of Livestock	Cultivating Oil Palm				Total N = 233	
		No n = 119		Yes n = 114			
		Mean	SD	Mean	SD	Mean	SD
1	Pig	.3	.6	.24	.50	.3	.6
2	Poultry Birds	1.3	4.6	1.16	4.73	1.2	4.6
3	Cow	.0	.0	.03	.21	.0	.1
4	Goat/ Sheep	.0	.2	0.00	.00	.0	.1
5	Fish	8.0	55.6	2.46	12.45	5.3	40.7

Source: Computed Figures in Parentheses are percentages

Table 6.4 Patterns of Natural Capital

Sl. No		Cultivating Oil Palm				Total N = 233	
		No n = 119		Yes n = 114			
		Mean	SD	Mean	SD	Mean	SD
1	Land	232815 (65.6)	406604	618509 (74.7)	832579	421524 (71.9)	677534
2	Livestock	4783 (1.3)	8735	4325 (0.5)	8522	4559 (0.8)	8616
3	House Plot	117521 (33.1)	113898	204728 (24.7)	310065	160189 (27.3)	235231
4	Natural Assets	355119 (100)	478769	827561 (100)	936075	586271 (100)	774202

Source: Computed Figures in Parentheses are percentages

Table 6.5 Patterns of Human Capital

Sl. No	Human Capital	Cultivating Oil Palm				Total N = 233		t'
		No n = 119		Yes n = 114				
		Mean	SD	Mean	SD	Mean	SD	
1	Mean Age	29.15	15.01	37.46	13.20	33.22	14.72	**-4.5**
2	Standard Deviation of Age	16.50	6.97	17.22	7.70	16.85	7.33	-0.7
3	Proportion of Earners	0.47	0.23	0.61	0.25	0.54	0.25	**-4.4**
4	Mean Years of Adult Education	6.10	2.70	6.71	3.07	6.40	2.89	-1.6
5	Standard Deviation of Education	2.30	1.77	3.12	3.29	2.70	2.65	***-2.4***

Source: Computed Figures in Parentheses are percentages

6.6 Patterns of Physical Capital

Sl. No	Physical Assets	Cultivating Oil Palm				Total N = 233	
		No n = 119		Yes n = 114			
		Mean	SD	Mean	SD	Mean	SD
1	House	137672 (69.8)	172639	286360 (70.3)	702155	210421 (70.1)	510728
2	Vehicles	8739 (4.4)	23697	16404 (4.0)	30862	12489 (4.2)	27645
3	Television	7185 (3.6)	5988	8785 (2.2)	5845	7968 (2.7)	5960
4	Mobile Phone	5053 (2.6)	4075	7461 (1.8)	6794	6231 (2.1)	5691
5	Washing Machine	3207 (1.6)	5056	4872 (1.2)	5634	4021 (1.3)	5400
6	LPG Connection	3501 (1.8)	2834	4077 (1.0)	4060	3783 (1.3)	3492
7	Iron Box	646 (0.3)	599	673 (0.2)	539	659 (0.2)	570
8	Sewing Machine	187 (0.1)	762	494 (0.1)	1240	337 (0.1)	1034
9	Water Connection	234 (0.1)	890	209 (0.1)	885	221 (0.1)	886
10	Transistor/Radio	8 (0.0)	83	24 (0.0)	163	15 (0.0)	128
11	Physical Assets	197356 (100)	237964	407427 (100)	794208	300138 (100)	589155

Source: Computed Figures in Parentheses are percentages

Table 6.7 Household Saving

Sl. No	Form of Saving	Cultivating Oil Palm				Total N = 233	
		No n = 119		Yes n = 114			
		Mean	SD	Mean	SD	Mean	SD
1	Nationalized Banks	10154 (74.8)	46632	42549 (82.7)	115158	26004 (81.0)	88480
2	Cash in hand	2536 (18.7)	3862	5295 (10.3)	7652	3886 (12.1)	6165
3	Friends and relatives	805 (5.9)	3678	2175 (4.2)	9413	1476 (4.6)	7107
4	Self Help Groups	68 (0.5)	532	595 (1.2)	3433	326 (1.0)	2440
5	Private Banks	0 (0.0)	0	614 (1.2)	5028	300 (0.9)	3523
6	Insurance	0 (0.0)	0	224 (0.4)	1367	111 (0.3)	961
7	Money Lenders	0 (0.0)	0	0 (0.0)	0	0 (0.0)	0
8	Household Saving	13566 (100)	48234	51452 (100)	118681	32102 (100)	91673

Source: Computed Figures in Parentheses are percentages

Table 6.8 Household Debt

Sl. No	Form of Debt	Cultivating Oil Palm				Total N = 233	
		No n = 119		Yes n = 114			
		Mean	SD	Mean	SD	Mean	SD
1	Nationalized Banks	4269 (74.8)	37037	439 (82.7)	3854	2395 (81.0)	26619
2	Friends and Relatives	761 (18.7)	2255	595 (10.3)	1616	679 (12.1)	1966
3	Self Help Groups	361 (5.9)	1686	275 (4.2)	1360	319 (4.6)	1533
4	Money Lenders	0 (0.5)	0	39 (1.2)	421	19 (1.0)	295
5	Insurance	0 (0.0)	0	18 (1.2)	135	9 (0.9)	94
6	Private Banks	0 (0.0)	0	0 (0.4)	0	0 (0.3)	0
7	Cooperatives	0 (0.0)	0	0 (0.0)	0	0 (0.0)	0
8	Household Debts	4630 (100)	37034	770 (100)	4097	2742 (100)	26637

Source: Computed Figures in Parentheses are percentages

Table 6.9 Patterns of Financial Capital

Sl. No	Financial Capital	Cultivating Oil Palm				Total N = 233	
		No n = 119		Yes n = 114			
		Mean	SD	Mean	SD	Mean	SD
1	Household Saving	13566	48234	51452	118681	32102	91673
2	Household Debts	4630	37034	770	4097	2742	26637

Source: Computed Figures in Parentheses are percentages

Table 6.10 Pattern of Social Capital

Sl. No	Social Capital	Cultivating Oil Palm				Total N = 233	
		No n = 119		Yes n = 114			
		Mean	SD	Mean	SD	Mean	SD
I	**Participation in CBOs**						
	Churches	2.1	0.5	2.3	0.5	2.2	0.5
	YMA	1.4	0.6	1.7	0.6	1.5	0.6
	MHIP	0.8	0.8	1.2	0.8	1.0	0.8
	MUP	0.3	0.8	0.4	0.8	0.3	0.8
	Games and Sports	0.1	0.3	0.3	0.6	0.2	0.5
	Voluntary Works	2.5	0.6	2.7	0.5	2.6	0.5
	SHGs	0.2	0.6	0.4	0.9	0.3	0.8
	Participation in CBOs	1.1	0.3	1.3	0.4	1.2	0.3
II	**Political Participation**						
	Assembly	2.7	0.4	2.7	0.5	2.7	0.5
	Village Council	2.8	0.4	2.8	0.4	2.8	0.4
	Political Participation	2.7	0.4	2.7	0.4	2.7	0.4

Source: Computed Figures in Parentheses are percentages

6.11 Patterns of Livelihood Assets

Sl. No		Cultivating Oil Palm				Total N = 233	
		No n = 119		Yes n = 114			
		Mean	SD	Mean	SD	Mean	SD
1	Natural Assets	355119 (65.3)	478769	827561 (69.9)	936075	586271 (68.4)	774202
2	Physical Assets	197356 (36.3)	237964	407427 (34.4)	794208	300138 (35.0)	589155
3	Financial Capital	-8936 -(1.6)	16778	-50682 -(4.3)	118251	-29361 -(3.4)	85973
4	Livelihood Capital	543540 (100)	612110	1184307 (100)	1342163	857048 (100)	1082135

Source: Computed Figures in Parentheses are percentages

Table 6.12 Patterns of Relationship among Livelihood Assets: Pearson's R

Code	Livelihood Assets	Va01	Va02	Va03	Va04	Va05	Va06	Va07	Va08	Va09	Va10
Va01	Natural Capital	1									
Va02	Physical Capital	.355**	1								
Va03	Financial Capital	-.258**	-.713**	1							
Va04	Mean years of Age	.193**	.040	-.054	1						
Va05	SD of Age	.196**	.072	.005	-.095	1					
Va06	Proportion of Earners	.117	-.024	-.041	.600**	-.108	1				
Va07	Mean years of Adult Education	.144*	.265**	-.174**	-.160*	-.002	-.053	1			
Va08	SD of Adult Education	.133*	.096	.018	.007	.271**	.050	.433**	1		
Va09	Participation in CBOs	.359**	.227**	-.134*	.212**	.216**	.200**	.223**	.137*	1	
Va10	Political Participation	.050	.071	.026	.052	.022	.036	.085	.053	.189**	1

Source: Computed ** P < 0.01 * P < 0.05

6.13 Patterns of Annual Household Income

Sl. No		Cultivating Oil Palm				Total N = 233	
		No n = 119		Yes n = 114			
		Mean	SD	Mean	SD	Mean	SD
1	Oil Palm Cultivation	0 (0.0)	0	59184 (49.4)	95748	28957 (31.0)	73105
2	MGNREGS	14286 (21.0)	3337	15658 (13.1)	18655	14957 (16.0)	13253
3	Government Service	6261 (9.2)	40689	20263 (16.9)	74305	13112 (14.0)	59837
4	Non-Agricultural Labour	10471 (15.4)	16625	5842 (4.9)	11782	8206 (8.8)	14614
5	Other Crop Cultivation	11899 (17.5)	17511	4053 (3.4)	9815	8060 (8.6)	14776
6	Livestock Rearing	6134 (9.0)	10830	6667 (5.6)	20306	6395 (6.8)	16142
7	Agricultural Labour	8798 (12.9)	17202	2404 (2.0)	6554	5670 (6.1)	13479
8	Skilled Labour	6597 (9.7)	18039	1667 (1.4)	8916	4185 (4.5)	14503
9	Business	3529 (5.2)	10300	4140 (3.5)	11685	3828 (4.1)	10980
10	Annual Household Income	67975 (100)	45368	119877 (100)	126093	93369 (100)	97299

Source: Computed Figures in Parentheses are percentages

Table 6.14 Patterns of Monthly Household Expenditure

Sl. No		Cultivating Oil Palm				Total N = 233	
		No n = 119		Yes n = 114			
		Mean	SD	Mean	SD	Mean	SD
1	Food	1498 (34.0)	1300	1890 (33.5)	2194	1690 (33.7)	1800
2	Non-Food	2909 (66.0)	1669	3747 (66.5)	2289	3319 (66.3)	2036
3	Monthly Household Expenditure	4407 (100)	2202	5638 (100)	3242	5009 (100)	2822

Source: Computed Figures in Parentheses are percentages

Table 6.15 Livelihood Assets and Living Conditions: Pearson's R

Sl. No	Livelihood Assets	Annual Household Income	Monthly Household Expenditure
1	Natural Capital	.277**	.291**
2	Physical Capital	.367**	.241**
3	Financial Capital	-.341**	-.145*
4	Mean Years of Age	.000	.021
5	Standard deviation of Age	.078	.156*
6	Proportion of Earners	.063	.032
7	Mean Years of Education	.297**	.442**
8	Standard deviation of Education	.085	.183**
9	Participation in CBOs	.150*	.351**
10	Political Participation	-.053	.113
11	Annual Household Income	1	.273**
12	Monthly Household Expenditure	.273**	1

Source: Computed ** P < 0.01 * P < 0.05

CHAPTER VII

OIL PALM CULTIVATION AND RURAL LIVELIHOOD

In agriculture study, the pattern of cropping and plantation is always a concern. Besides the impact on livelihood and economy, the negative effect on the environment and biodiversity is also taken into question. In light of these, the present chapter attempts to answer these questions based on the analysis of oil palm cultivators among the sample households across the four villages surveyed. The chapter is presented in six sections. The first section is devoted to the sequence of oil palm cultivation and the second section describes the determinants of oil palm cultivation. The third section will attempt to analyze the perceived impact of oil palm cultivation on rural ecology. The fourth section will focus on the social and economic impact of oil palm cultivation. The fifth section will examine the relationship between oil palm cultivation and livelihood assets. The last section will also compute the relationship between oil palm cultivation and living conditions.

7.1. Sequences of Oil Palm Cultivation

Among all the perennial crops, oil palm is one of the highest oil yielding crops. It is grown in humid tropical areas and is most preferable in the temperature ranges from 22℃ to 24℃ (minimum) and 20℃ to 33℃ (maximum) with an annual rainfall of 2500 to 4000 mm. The land for oil palm cultivation must be free from weed and must be plowed and supplement with organic matter. It is mostly planted from June to December. The seed from a nursery should be at least 12 to 15 months old, one meter in height and 12 to 13 functional leaves before plantation. It should be planted in a triangular pattern with a space of 9 meters to each other. In one hectare of land, around 145 oil palms could be planted. Intercropping could also be done on

the land. The flowering started 14 to 18 months after plantation and an initial period of yielding from 4 to 8 years. The life span of oil palm trees is around 25 years (see Reddy, 2015).

In the present study, the number of trees, area under cultivation and trees per acre were taken based on the sequences of plantations. Out of the total 114 oil palm cultivators, it was found that there were five sequences of plantations. The plantation was mainly started in the year 2007 and the next plantation depends on the availability of seedlings. It was found that there were 23 cultivators who started the first plantation. This was followed by 52 cultivators in the second plantation, 26 cultivators in the third plantation, 9 cultivators in the fourth plantation and 4 cultivators in the fifth plantation. This indicates that there are still new oil palm plantations in the study areas. Most of these cultivators also continued the plantations till the fifth plantation. Regarding the number of trees planted, the average number of trees planted in the first plantation was 229 trees. It was increased to 322 trees in the second plantation, 519 trees in the third plantation, 659 trees in the fourth plantation and 801 trees in the fifth plantation respectively. There was an increase in the number of trees planted in each sequence. With regard to mean area under cultivation, oil palm was planted in 3 acres in the first plantation which was followed 4 acres in the second plantation, 6 acres in the third plantation, 8 acres in the fourth plantation and 10 acres in the fifth plantation. The area under plantation increased due to the increase in the number of trees planted. The mean of the tree planted per acre shows that it was 79 trees per acre in the first plantation with an increase of 82 trees per acre in the second plantation and 92 trees per acre in the third plantation. It was decreased in the fourth plantation of 86 trees per acre and 80 trees per acre in the fifth

plantation (see table 7.1). The number of trees suggested is around 145 in one hectare (see, Reddy, 2015) which is around 60 trees per acre. This is much less than the number of trees planted per acre (84 trees) by the respondents. This may be due to the topography differences and limitations of land to cultivate oil palm.

7.2. Determinants of Oil Palm Cultivation

Oil palm cultivation is one of the important livelihood activities that have contributed substantially to poverty alleviation across different regions. Due to its profitable and high yielding characteristics, it is being considered as a source of augmenting rural income and economic development (see Chaichee, 2007; Feintrenie, Chong & Levang, 2010). In the context of Mizoram, Mizoram Oil Palm (Regulation of Production & Processing) Act was passed in 2004 which introduced oil palm cultivation in different regions. The Ministry of Agriculture and Cooperation also made provision of oil palm development program under Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize (ISOPOM) with a cost-sharing of 75:25 between Central and State government. The provisions under Rashtriya Krishi Vikas Yojana (RKVY for Oil Palm Area Expansion) and National Mission on Oilseeds and Oil Palm (NMOOP) also plays an important role in oil palm promotion in the state. Oil palm mill was set up in the state that must buy all the fruits at a price which shall not be less than the price fixed by the government. However, among the three companies to be set up under the agreement, only Godrej Agrovet Pvt. Ltd established oil palm mill in the state. As they are an important channel in the marketing system, the quantity of oil palm production and farmers' motivation largely depends on their performance. In light of these, the determinants and factors contributing to oil palm cultivation were assessed in the present study.

In the present study, the determinant of oil palm cultivation was assessed in terms of the source of motivation, factors of motivations, the support given and source of assistance/finance. With regard to the source of motivation, Godrej Company was the main source of motivation (96%) followed by the Agriculture Department (76%) and District Rural Development Agency (15%) (see table 7.2). From the field visit, it was observed that Godrej Company did not receive enough Fresh Fruit Bunch to be processed in the mill which led them to motivate farmers to plant more oil palm trees. Besides Godrej Company, government agencies also play an important role in promoting oil palm cultivation in the villages.

The factors of motivation was also assessed which include the benefits of oil palm cultivation told by these agencies to cultivate oil palm. Majority (76%) stated that an increase in income was the main factor for oil palm cultivation. This was followed by good market/ available market (74%) and fertility of oil palm (73%) respectively (see table 7.2). However, it was observed that the level of motivation decreased among oil palm cultivators in the later stage. This was due to the long periods of maturity which resulted in late fruiting as compared to other cash crops. The low price of oil palm fruits and transportation problems also de-motivates oil palm cultivators in the study areas.

Regarding the support given by different agencies, the free supply of seedlings was highest (100%) in which all the cultivators received seedlings in free. There were also cultivators who received financial aid of 78 percent and agricultural implements of 66 percent. A few cultivators (4%) also received assistance in the form of loan arrangements for cultivation (see table 7.2). Nevertheless, some farmers responded that the quality of seedlings was not good and was inadequate to plant in

large scale. There was high level of dependency towards the government and companies in cultivating oil palm as they introduced oil palm in these areas.

Support given to oil palm farmers were by the agencies who promote oil palm cultivation in the regions. These include the Agriculture Department (93%), followed by Godrej Company (86%) and District Rural Development Agency (14%) respectively (see table 7.2).

7.3. Perceived Impact of Oil Palm Cultivation on Rural Ecology

Agriculture based on industries is widely increasing which led to a decrease in many tropical forest areas (see Carlson et al., 2012). Oil palm cultivation is the greatest immediate threat to biodiversity in Southeast Asia. Although different initiatives are being taken by environmentalists, its cultivation is still expanding in the region (see Wilcove & Koh, 2010). Oil palm cultivation causes environment problems like monocultures, loss of biodiversity and climate change but as well as social issues caused by lack of workers' rights and diverse conflicts with indigenous people. Due to increasing demand in production, it gives pressure to the government to form a policy that is sustainable and environmentally friendly (see Ritcher, 2009). Fell palm trunk, palm fronds at felling and annual pruning are the main types of bio-wastes generated in the plantations. In the factory different kinds of bio-wastes such as empty fruit bunch, fibers and shells and oil palm mill effluent are also produced (see Hayashi, 2007). The huge amount of biomass such as frond and truck, empty fruit branch can be recycled directly in the plantation to increase the fertility of soils. A fresh application of an empty fruit branch can alternate the parameters of soil adjacent to the kinetics of the decomposition of the empty fruit branch and the production of nutrients. Frond recycling during harvesting and pruning also renews

the chemical and physical characteristics of soils whether they were applied on heaps between palms or spread on harvesting paths in which soil erosion and runoff was reduced (see Tarigan et al., 2019)

The negative impact of oil palm cultivation in the environment has been a discussion around the world. Different NGOs play a dominant role in alerting the international community on the negative impact and social unfairness of oil palm development (see Wakker, 2000 & Marti, 2008). The cultivation of oil palm may contribute to rural income and socio-economic development among the smallholder farmer. However, without proper monitoring and policy implication there can be social and environmental consequences (see Schwarze et al., 2016).

In the present study, the perceived impact of oil palm cultivation on rural ecology was assessed based on different dimensions such as deforestation, effects on other crops beside it, effect on soil fertility and no effect on the ecology. These dimensions were formulated based on the pilot study conducted and were used to understand the perceived impact of oil palm cultivation on rural ecology. Among the dimensions used, effect on other crops was the highest (40%) perceived impact as majority of the farmers practiced intercropping in their land. This could decrease the productions of other cash crops and traditional crops if oil palm is planted in large scale. There is a need to balance oil palm cultivation and other crops as majority of the rural people still solely depend on their own productions for consumptions This was followed by no effect on the ecology (39%) which indicates that many of the cultivators were unaware of the negative impact of oil palm cultivation although it is a major concern around the world. Some farmers even perceived that it has a positive impact rather than a negative impact as it provides food for wild animals and makes

the environment pleasant and calm. This was again followed by negative effect on soil fertility (17%) and deforestation due to oil palm cultivation (4%) respectively (see table 7.3). Although deforestation due to oil palm cultivation is a major concern around the world, it is perceived as the lowest impact among the dimensions used in the study.

7.4. Social and Economic Impact of Oil Palm Cultivation

Oil palm expansion has important implications for rural livelihoods transformations. It happened in different forms within and between countries that depend on local context involving regional flows of labor and capital, global environmental impacts and efforts to build international governance structures. The introduction of oil palm in colonized countries has made a huge impact that reduced the forest cover areas and improved the livelihood conditions of the settlers in those regions as well as helps them to escape poverty (see Cramb & Curry, 2012). Many countries are adopting oil palm cultivation as a strategy of rural development and aim at generating employment and producing both export commodities and bio-fuels (see Mingorria et al., 2014).

In the study, the social and economic impact of oil palm cultivation was assessed. To analyze the impact, different indicators were used that include working hours by men in the family, household investment in agriculture, household income from agriculture, cost of cultivation, household expenditure, men wage laborers employed in the farm, households savings, housing conditions, working hours by women in the family, households prestige in the community, women wage laborers employed in the farm, household debt, household prestige in Church, households participation in community, household's participation in Church. The level of impact

was divided into different scales viz., very much decreased (-2), decreased (-1), no change (0), increased (1) and very much increased (2).

To understand the level of impact, the average and standard deviation were taken. It was found that the mean of working hours by men in the family, household investment in agriculture, household income from agriculture, cost of cultivation, household expenditure, men wage laborers employed in the farm, household savings and housing conditions all worked out at the scale of 1 which indicates that the level of impact was increased in these indicators. Specifically, the level of impact was highest in the indicator of working hours by men in the family with a standard deviation of .551. This means that on the whole, the impact of oil palm cultivation was highest on the working hours by men in the family which further indicates that men were the main workers in oil palm farms. This was followed by household investment in agriculture, household income from agriculture, cost of cultivation, household expenditure, men wage laborers employed in the farm, household savings and housing conditions subsequently. The other indicators such as working hours by women in the family, household prestige in community, women wage laborers employed in the farm, household debt, household prestige in Church and households participating in the community falls at the scale of 0 which shows that there was no change in these indicators by practicing oil palm cultivation. Among these, the average of hours by women in the family and household prestige in the community was highest followed by women wage laborers employed in the farm, household debt, household prestige in Church and households participating in the community. The last indicator, household participation in Church shows a negative result of -1 which indicates that household participation in Church was decreased among oil

palm cultivators (see table 7.4). This may be due to the huge investment of labour required in oil palm cultivation. Overall, the mean calculated shows that oil palm cultivation has no highest impact on the social and economic conditions based on the scales used. This may be due to the high proportion of youth and middle age groups among oil palm cultivator households (see table 5.2) which indicates higher proportion of workers in the households. Therefore, oil palm cultivation could not have high impact on different activities of the households. Moreover, as oil palm cultivation is only done in a small scale, the social and economic impact could not be high among the sample households.

7.5. Livelihood Assets and Oil Palm Cultivation

Oil palm cultivation has created high social and economic value for sustainable livelihoods without seriously undermining the natural resource base in the immediate term. The cultivators have invested their profits from oil palm cultivation to strengthen their own assets like in the areas of education, health, hiring labor, etc. It strengthens their financial asset which is very important for their survival and raises the standard of living. Multiple interrelations between the contextual, governance, resource, and resource user system have created values, and if beneficial system interrelations are strengthened, sustainability may be secured (see Laschinger, 2013).

The first hypothesis of the present study reads that “the volume of livelihood assets viz., natural, physical, human, and social capital endowment of the household is directly related to the adoption of oil palm cultivation.” This hypothesis draws inspiration from the sustainable livelihood framework and earlier studies (see Laschinger, 2013; Chambers and Conway, 1992).

To understand the patterns of relationship between oil palm cultivation and livelihood assets, the area under oil palm cultivation, a number of trees and palm trees per acre were taken. The livelihood assets viz., natural assets, physical assets, financial capital, mean of age, the standard deviation of age, the proportion of earners, mean years of adult education, the standard deviation of adult education, participation in CBOs, political participation, monthly household expenditure, and annual household income were also taken. These two sets of variables were computed using the statistical tool of the Pearson Correlation Coefficient (Pearson's r).

The computation of the relationship between livelihood assets and oil palm cultivation shows that natural capital was not significant to the area under oil palm cultivation, number of oil palm trees and palm trees per acre. This means that with the increase in natural capital, there was no significant increase in the area under oil palm cultivation, the number of oil palm trees and palm tree per acre.

The second livelihood dimension, physical capital shows that it was positively correlated to the area under oil palm cultivation which indicates that with the increase in physical capital, there was an increase in the area of oil palm cultivation too. However, physical capital was not significantly correlated to the number of oil palm trees and palm trees per acre.

The third dimension, financial capital was negatively correlated to the area under oil palm cultivation and the number of oil palm trees which means that an increase in financial capital will result in a decrease of the area under oil palm cultivation and the number of oil palm trees planted. As financial capital was assessed in terms of household monthly savings and debts, this could have an effect

on the result being analyzed. Moreover, income from oil palm cultivation was mainly used for non-recurring expenditures like buying household assets and renovating houses that may not included in the computation.

The fourth dimension is human capital. With regard to mean years of age and standard deviation of age, both were not significant to the area under oil palm cultivation, the number of oil palm trees and palm tree per acre. The proportion of earners was negatively correlated to the number of oil palm trees and palm trees per acre. This may indicates that diversification of livelihood has taken place among oil palm cultivator households. The other indicators of human capital dimensions such as mean years of adult education, the standard deviation of adult education, participation in CBOs, political participation and monthly household expenditure were all not significant to the area under oil palm cultivation, the number of oil palm trees and palm trees per acre. This shows that with the increase in mean years of adult education, the standard deviation of adult education, participation in CBOs, political participation and monthly household expenditure there was no significant increase in the area under oil palm cultivation, the number of oil palm trees and palm trees per acre (see table 7.5).

Thus the volume of livelihood assets natural, physical, financial, human and social capital have no uniform relatioship with adoption of oil palm cultivation assesed in terms of number of oil palm treas, area under oil palm cultivation or oil palm trees per acre. Only Physical capital has positive realtionship with the indicators of adopion of oil palm cultivation. Hence, the first hyptoehseis that “the volume of livelihood assets viz., natural, physical, human, and social capital endowment of the

household is directly related to the adoption of oil palm cultivation" has been rejected.

7.6. Oil Palm Cultivation and Living Conditions

The second hypothesis the present study reads that "the cultivation of oil palm is positively related to the household's living conditions in rural Mizoram." This hypothesis draws its inspiration from earlier studies (see Sayer, et. al., 2012; Zen & Barlow, 2005). Most of these studies demonstrated that oil palm cultivation significantly increase household incomes and expenditures.

In the present study, to analyze the relationship between oil palm cultivation and living conditions, the area under oil palm cultivation, the number of oil palm trees and palm trees per acre were again taken. The monthly household expenditure and annual household income were also taken to represent the living conditions of households. Pearson Correlation Coefficient (Pearson's r) was used for the computation. It was found that the area under oil palm cultivation was significantly correlated to annual household income which indicates that the increase in the area of oil palm cultivation will increase the annual income of the households. On the other hand, the area under oil palm cultivation was not significant related to monthly household expenditure. The number of oil palm trees cultivated was also positively correlated to annual household income. This means that with the increase of oil palm trees planted, there was an increase in the income of the households. However, there was no significant relationship between the number of trees planted and household monthly expenditure. The area under oil palm cultivation and palm tree per acre also show no significant relationship to monthly household expenditure and annual household income (see table 7.6). Overall it can be concluded that the area under oil

palm cultivation and the number of oil palm trees planted have contributed significantly to the household income of the sample villages. As income from oil palm cultivation was mainly used for non-recurring expenditures like buying assets and renovating houses, the computation could not have a positive impact since household expenditures was taken as monthly expenditure which have low probability to include in the computation.

As the area under oil palm cultivation and number of oil palm trees cultivated are significantly positively related to the household income of the sample household that the second hypothesis of the present study that "the cultivation of oil palm is positively related to the household's living conditions in rural Mizoram." has been accepted.

In this chapter, the sequence of oil palm cultivation and determinants of oil palm cultivation were presented. The perceived impact of oil palm cultivation on rural ecology was also discussed. In addition, the impact of oil palm cultivation on the socio-economic conditions was presented. Further, the relationship between oil palm cultivation and livelihood assets as well as the relationship between oil palm cultivation and living conditions were computed. The next chapter will summarize the findings of the present study and offer suggestions based on the findings.

Table 7.1 Sequence of Oil Palm Cultivation

Sl. No	Plantations	Number of Cultivators N=114	Number of Trees		Area Under Oil Palm		Palm Tree Per Acre	
			Mean	SD	Mean	SD	Mean	SD
1	First	23	229	72	3	1	79	19
2	Second	52	322	109	4	1	82	18
3	Third	26	519	168	6	2	92	21
4	Fourth	9	659	168	8	2	86	12
5	Fifth	4	801	183	10	1	80	17
	Total	**114**	**392**	**196**	**5**	**2**	**84**	**19**

Source: Computed

Table 7.2 Determinants of Oil Palm Cultivation

Sl. No	Determinants	Frequency N = 114	Percent 100
I	**Source of Motivation**		
	Goodrej Company	109	96
	Agriculture department	87	76
	DRDA	17	15
II	**Motivation Factors**		
	Increase Income	87	76
	Good Market	84	74
	Fertile soil suitable for cultivation	83	73
II	**Support Given**		
	Free Supply of Seedlings	114	100
	Distribution of Cash	89	78
	Supply of Agricultural Implements	75	66
	Arranging Loans	5	4
III	**Source of Finance**		
	Agriculture Department	106	93
	Goodrej Company	98	86
	DRDA	16	14

Source: Computed

Table 7.3 Perceived Impact of Oil Palm Cultivation

Sl. No	Problems	Frequency	Percent
		N = 114	100
1	Effect on other crops beside it	45	40
2	No effect	44	39
3	Effect on soil fertility	19	17
4	Deforestation	13	4

Source: Computed

Table 7.4 Social and Economic Impact of Oil Palm Cultivation

Sl. No	Livelihood and living conditions	N=114	
		Mean	SD
1	Working hours by men in the family	1.36	.551
2	Household Investment in Agriculture	1.08	.302
3	Household Income from Agriculture	1.03	.387
4	Cost of Cultivation	.94	.306
5	Household Expenditure	.82	.382
6	Men wage Labourers employed in the farm	.79	.572
7	Household Savings	.73	.553
8	Housing Conditions	.55	.550
9	Working hours by women in the family	.43	.609
10	Households Prestige in Community	.35	.497
11	Women wage Labourers employed in the farm	.27	.447
12	Household Debt	.15	.446
13	Households Prestige in Church	.15	.446
14	Household's Participation in Community	-.25	.432
15	Household's Participation in Church	-.54	.518

Source: Computed

Table 7.5 Livelihood Assets and Oil Palm Cultivation: Correlation Matrix

Sl. No	Livelihood Assets	Area Under Oil Palm	Number of Trees	Palm Tree Per Acre
1	Area Under Oil Palm	1	.893**	.030
2	Number of Trees	.893**	1	.447**
3	Palm Tree Per Acre	.030	.447**	1
4	Natural Assets	.033	.040	.047
5	Physical Assets	.202*	.126	-.017
6	Financial Capital	-.417**	-.317**	.033
7	Mean Age	-.161	-.172	-.052
8	Standard Deviation of Age	.131	.143	.102
9	Proportion of Earners	-.161	-.234*	-.264**
10	Mean Years of Adult Education	-.086	-.104	-.023
11	Standard Deviation of Adult Education	-.059	-.017	.137
12	Participation in CBOs	-.083	-.125	-.048
13	Political Participation	-.031	-.104	-.155

Source: Computed ** P < 0.01 * P < 0.05

Table 7.6 Oil Palm Cultivation and Living Conditions: Correlation Matrix

Sl. No	Oil Palm Cultivation	Monthly Household Expenditure	Annual Household Income
1	Area Under Oil Palm	.009	.353**
2	Number of Trees	-.006	.382**
3	Palm Tree Per Acre	.016	.120
14	Monthly Household Expenditure	1	.159
15	Annual Household Income	.159	1

Source: Computed ** P < 0.01 * P < 0.05

CHAPTER VIII

CONCLUSION

The present study aims at assessing oil palm cultivation and rural livelihood in Kolasib and Mamit districts, Mizoram from a Sustainable Livelihood Framework perspective. The study employed qualitative and quantitative methods to collect data. The present chapter attempts to summarize the results of the analysis from the previous chapters in an integrated manner. The chapter is presented in three broad sections. The first section will present the main findings of the study while the second chapter is devoted to the conclusion. The last section will focus on the implication of the study for policy formulation, social work practice, and further research.

8.1. Findings

This section summarizes the findings of the present study which is divided into four sub sections. The first sub-section presents the vulnerability context of the sample villages while the second sub-section will discuss the socio-economic structural bases of households. The third subsection presents findings of the patterns of rural livelihood and living conditions while the last sub-section is devoted to oil palm cultivation and rural livelihood.

8.1.1. Vulnerability Context of the Sample Villages

Vulnerability context is one of the components of Sustainable Livelihood Framework which is also the first task in livelihood analysis. There are different types of vulnerability that affect people in different ways. Seasonality diagram which was used in the present study is one of the tools in Participatory Rural Appraisal (PRA) which is a visual method that shows the distribution of seasonal varying

phenomena such as production activities, economic activities, problems, illness/disease, migration, resources, and natural events/phenomena over time (see DFID, 2000). In the study, it covers the effects of seasonality regarding climate change, food security, workload, health status, availability of resources and other issues. It was taken from the month of January to December.

The study of vulnerability context in 4 (four) villages reveal more or less similar patterns. The overall findings demonstrate that seasonality has a significant impact on rural vulnerability. Low rainfall was accompanied by drought and hot season while heavy rainfall brings landslides that increase their vulnerability. Among the four villages surveyed, two of the villages were not accessible by road transportation during rainy seasons which pose a great problem for the villagers. This further affects the supply of goods and services in the villages as they entirely depend on road transportation for their imports. The supply of the Public Distribution System (PDS) and the level of food availability also indicate insecurity of food in the villages. In most cases, household income and expenditure show a similar pattern which may demonstrate that there were no proper savings among the households. This was largely affected by agriculture and Christmas festival. All the villages do not experience floods since flatlands are negligible within the village areas. The prevalence of diseases and health problems also varies among the villages. With regard to the availability of labour, it can be concluded that there was no adequate labour in the villages.

8.1.2. Socio-Economic Structural Bases of Households

In any livelihood study, the basic question always concerns the demographic and structural bases of the population. Demography mainly includes a demographic

grouping based on age, gender, and social class. In this subsection, the results of the analysis of the demographic characteristics of the respondents and members of the sample households are discussed. The first dimension, gender plays a pivotal social structural variable that governs human relations in every society which is more so in the Mizo society of patriarchal structure. Among the respondents, the majority were males while the rest were females. Among the non-cultivators households, female respondents were little higher than males while male respondents were substantially higher among the oil palm cultivators. Age is an important demographic variable that connotes the vigour and productivity of an individual, and subsequently the earning capacity. In the study, the respondents were categorized into youth, middle and old age groups. Overall, a little more than half belonged to the middle age group which was followed by the old age group and youth age group. Between the cultivators of oil palm and non-cultivators, youth respondents were higher among the non-cultivators than oil palm cultivators. Conversely, the respondents of the middle age group were lower among the non-cultivators than oil palm cultivators. The respondents of the old age group were also lower among the non-cultivators oil palm cultivators than oil palm cultivators. Marital status is another important demographic variable that denotes the prestige a person holds in traditional societies. The study categorizes marital status as unmarried, married, divorced and widowed. On the whole, the majority were married followed by divorced, widowed and unmarried. Comparing the cultivators of oil palm and non-cultivators of oil palm, there was an equal number of unmarried respondents. With regard to married respondents, it was higher among the non-cultivators of oil palm than the cultivators of oil palm. The number of divorced respondents is lower among the non-cultivators of oil palm than

the cultivators of oil palm. The number of widows among the respondents almost shows an equal percentage between the non-cultivators of oil palm and the cultivators of oil palm. Education is one of the basic needs of human beings. The study found that more than two-fifth of sample population have access to Primary level of education which was followed by Middle level of education. The remaining comprises of high school level, illiterate, higher secondary level, and higher education respectively. The number of illiterates was higher among the non-cultivators of oil palm than the cultivators of oil palm. However, household members attending till primary level and high school level were lower among the non-cultivators of oil palm than oil palm cultivators. In contrast, household members attending till middle and higher secondary level of education were higher among the non-cultivators than oil palm cultivators. Lastly, there were no respondents who attended higher education among the non-cultivators while there was one respondent among the oil palm cultivators who attended the same. Although there were differences in proportions, almost a similar pattern was observed between the oil palm cultivators and non-oil palm cultivators.

The demographic profile of members of the sample households shows that there were 514 family members among the non-cultivators of oil palm and 208 family members among the cultivators of oil palm with a total of 437 members. Overall, more than half of the members of surveyed households were males and the rest were females. Females were less among the non-cultivators of oil palm than oil palm cultivators. Conversely, males were more among the non-cultivators than oil palm cultivators. Although there were differences in numbers, a similar pattern was observed between the oil palm cultivators and non-cultivators. Since a larger number

of the surveyed household members belong to youth and children age groups, unmarried were highest in numbers followed by married. The few remaining were divorced and widowed respectively. Between the oil palm cultivators and non cultivators, divorced were higher among oil palm cultivators than non cultivators. More than two fifths of non-cultivators and less than half of oil palm cultivators were found to be married. A little more than half of non-cultivators of oil palm and less than half of oil palm cultivators were unmarried. The number of widowed was almost similar between the cultivators of oil palm and non-cultivators of oil palm. Overall, unmarried were highest among non-cultivators of oil palm while married were highest among oil palm cultivator households. Regarding age group, the sample households were categorized into five age groups viz. children (below 13), adolescent (14-17), youth (18-35), middle (36-59) and old (60 and above). On the whole, the age group of youth was highest followed by children, middle-age group, old age, and adolescents respectively. Among the children, more than one fourth belongs to non-cultivators of oil palm households while less than a fifth belongs to oil palm cultivator households. Among adolescents, there was a higher percentage among the non-cultivators of oil palm than the cultivators of oil palm. In contrast, the percentage of youth was a little lower among the non-cultivators of oil palm than the cultivators of oil palm. The percentage of middle aged group was also lower among the non-cultivators than the oil palm cultivators. Moreover, the percentage of old age groups was also lower among the non-cultivators of oil palm than the oil palm cultivators. On the whole, the number of children was highest among non-cultivators of oil palm while youth were highest among oil palm cultivator households. Overall, there was a higher proportion of earners among oil palm cultivator households.

Family is the first institution and plays an important role in every society. The structure of family implies the way in which family is organized based on roles, power and hierarchies. In this study, indicators like type, form, size and gender of head are used to describe the structural bases of family. The type of family was categorized into joint, nuclear and single. On the whole, majority belongs to nuclear family which was followed by single family and joint family respectively. The pattern of distribution shows differences with earlier studies (see Zaitinvawra and Kanagaraj 2008, Sailo, 2014). The difference was on the higher percentage on single family than joint family. Further, in the present study, single family was higher among the oil palm cultivators than the non-cultivators. The next indicator is the form of family which is based on family cohesion. It was categorized into broken, reconstituted and stable family. The study revealed that majority belongs to stable family. This was followed by broken family and reconstituted family. Less than a tenth of non-cultivators of oil palm households were from broken family whereas less than a fourth of oil palm cultivators comprise the same. There was only one reconstituted family among the non-cultivator households. With regard to stable family, the percentage was higher among the non-cultivators of oil palm than the oil palm cultivators. A similar pattern was almost seen in both the cases except in reconstituted family which was not found among oil palm cultivators. The size of family is the third indicator in the study. It largely determines the availability of labour in agricultural pursuit and other allied activities of rural areas. The study classified the size of family into small (1-3 members), medium (4 -5 members) and large (6 and above members). Almost half were living in medium size family and more than a third lives in small size family. The remaining lived in large size family.

A little more than two fifth of non-cultivators of oil palm lived in small size family while more than one fourth of oil palm cultivators comprises the same. More than two fifths of non-cultivators of oil palm were living in medium size family while a little more than half of oil palm cultivators lived in the same. Less than a fifth of non-cultivators of oil palm and a little more than a fifth of oil palm cultivators were living in large size family. The pattern of distribution was similar between the oil palm cultivators and non-cultivators. Mizo society is a patriarchal society and has a significant implication for livelihood (see Laltlanmawii, 2005). On the whole, a large majority were male headed and the remaining were female headed. Comparing the oil palm cultivators and non-cultivators, male headed family was a little higher in the oil palm cultivators' households. The predominance of male headed family was also found in earlier studies in Mizoram (see Laltlanmawii, 2005; Zaitinvawra, 2014).

Social structure were also assessed which refers to the patterned social arrangements that are both emergent from and determinant of the actions of the individuals in the society. The social structural characteristics of the sample households discussed include sub-tribe and denomination. In Mizo society, there are different sub-tribes and clans. For the study, sub- tribes of Lusei, Ralte, Hmar, Lai and, Paihte were identified. Overall, other sub tribes were highest followed by Lusei, Hmar and, Ralte respectively. A few of Paihte and Lai were also found in the villages. Among the non-cultivators of oil palm, other sub tribes were highest followed by Lusei, Hmar, Ralte, Paihte and, Lai respectively. A little difference was observed in the pattern among the cultivators of oil palm in which other sub tribes and Lusei formed majorities followed by Ralte, Hmar, Paihte and Lai respectively. The finding was largely affected by the high number of *Reang (Bru), Chakma* and

other migrants living in the areas. As Christianity was dominant in the state, denominations were also taken. The study categorized into different denominations viz., Presbyterian, Baptist, UPC (Mizoram), UPC (NE), Salvation Army, Seventh Day Adventist, IKK and others. Overall Presbyterian was highest in numbers as it lies in the northern area of Mizoram which is Presbyterian dominated areas. This was followed by Baptist, Salvation Army, UPC (Mizoram), UPC (NE), Seventh Day Adventist others and IKK respectively. Among the non-cultivators of oil palm, Presbyterian was highest followed by Baptist, Salvation Army, UPC (Mizoram), UPC (NE), Seventh Day Adventist and others. Among the cultivators of oil palm, Presbyterian was highest followed by Salvation Army, UPC (Mizoram), Baptist, Seventh Day, others, UPC (NE) and IKK. There was not much difference in the pattern of distribution between the oil palm cultivators and non-cultivators of oil palm.

The economic structural bases are discussed at the individual and household levels in the study. Dependency, socio-economic category, ownership of the house, type of house and Job Card under MGNREGS were discussed. The first economic structural variable i.e. dependency shows that more than half were dependent and the rest were earners. Comparing the oil palm cultivators and non-cultivators of oil palm, earners were higher in oil palm cultivator households than non-cultivators of oil palm households. Overall the dependency ratio was 1.14 which suggests that for every earner there was one dependent. In regard to socio-economic category, it is divided into three classes viz., very poor- AAY (Antyodaya Anna Yojana), poor- BPL (below poverty line), and non-poor- APL (above poverty line). The present study indicates that almost half belong to below poverty line followed by above poverty line and

very poor. Comparing the oil palm cultivators and non-cultivators, there was an equal proportion at below the poverty line while above poverty line was higher among the oil palm cultivator households. Conversely, AAY were lower among oil palm cultivator households than non cultivator households. With regard to ownership of the house, a large majority lived in their own house while the remaining few lived in a rented house. A similar pattern was observed between the oil palm cultivators and non-cultivators. It shows that almost cent percent of oil palm cultivators lived in their own house while substantial households of non-oil palm cultivators lived in their own house. The types of the house were categorized as kutcha, pucca and semi pucca for the study. On the whole, it was found that a huge majority of households have kutcha houses which were followed by a few pucca and semi pucca. The pattern of distribution was also similar between the oil palm cultivators and non-cultivators. Among non-cultivators of oil palm, a huge majority lived in kutcha house. A similar case was also found among the oil palm cultivator households. The percentages of households living in pucca house were lower among the non-cultivators of oil palm than the cultivators of oil palm. Conversely, the percentage of households living in semi pucca was higher among the non-cultivators of oil palm than the oil palm cultivators. With regard to job card holders under MGNREGS, almost cent percent have job cards under MGNREGS while the remaining few still did not have the cards. The cardholder was higher among the oil palm cultivators than the non-cultivators of oil palm. There were three households of non-cultivators who did not have job cards while there was only one household of oil palm cultivators who did not have job card.

8.1.3. Patterns of Rural Livelihood and Living Conditions

In the Sustainable Livelihood Framework, livelihood assets include different forms of capital viz., natural capital, physical capital, financial capital, human capital and social capital (see Chambers and Conway, 1992; Scoones, 1998; DFID, 2000b). The livelihood assets serve as the basis for rural survival and diversifying their livelihood strategies. Natural capital refers to resources such as land, water, soil, livestock and forests which is directly linked to the occupation to produce food, income, and shelter. The possession of natural capital is one of the factors that determine the livelihood security and sustainability of the rural economy. Possession of land is an important natural capital in rural areas as it is the main source of income and survival for rural people. Besides land, livestock is another important natural asset of rural people since the history of mankind. There is always a close relationship between man and livestock which is also evident in Mizo society. It is very important to supplement and augment rural income. Keeping this in mind, the present study assessed the possession of land and livestock to understand the natural assets of rural households. In the present study, different kinds of land possession viz., temporary pass, periodic land pass, land settlement certificate and land leased in were used. These were selected based on the pilot study conducted. It was found that land as natural capital is predominant for both the cultivators of oil palm and non-cultivators. The mean size of landholding was larger among the cultivators of oil palm than the non-cultivators. Overall the total mean size of landholding among the cultivators and non-cultivators of oil palm was 10.9 acres with a standard deviation of 7.8 acres. With regard to land holding under temporary pass, the average size of landholding among non-cultivators was lower than the cultivators of oil palm.

Landholding under periodic land pass was also lower among the non-cultivators than the cultivators of oil palm. Regarding the landholding under land settlement certificate (LSC), it was again lower among the non-cultivators of oil palm than the cultivators of oil palm. Moreover, the landholding under leased in was lower among the non-cultivators of oil palm than the cultivators of oil palm. All these dimensions show that landholding under different kinds was larger among the oil palm cultivators than non-cultivators. In regard to kinds of landholding, land under temporary pass was highest followed by periodic land pass, land settlement certificate (LSC) and land leased respectively. The pattern of distribution was also similar between the non-cultivators of oil palm and the oil palm cultivators. The size of landholding was further categorized into marginal (less than or equal to 3.09 acres), small (between 3.10 acres to 10.91 acres), medium (10.92 acres to 18.73 acres) and large (more than or equal to 18.74 acres). It was found that there were more households among non-cultivators who owned a marginal size of land as compared to oil palm cultivators. With regard to the small size of landholding, there were a larger number of households among the non-cultivators than the oil palm cultivators. In contrast, the medium size of landholding was lower among the non-cultivators than the oil palm cultivators. Lastly, large size of landholding was also lower among the non-cultivators of oil palm than the cultivators of oil palm. On the whole, the small size of landholding was highest followed by medium size of landholding, large size of landholding and marginal size of landholding respectively. Comparing the oil palm cultivators and non-cultivators of oil palm, oil palm cultivators were having a larger size of landholding than the oil palm cultivators. To assess the possession of livestock, pig, poultry birds, cow, goat/sheep, and fish were

taken. The mean numbers of livestock possessed show that fish was highest in number followed by poultry birds, pig, cow and goat/sheep respectively. The possession of fish shows highest in number as fish is owned in larger number even by a single household. The overall findings did not reveal the value and number of households who possessed livestock. The pattern of distribution was similar between the non-cultivators of oil palm and the oil palm cultivators. Comparing the cultivators and non-cultivators of oil palm, non-cultivators possessed more livestock than oil palm cultivators. On the whole, the mean value of natural assets worked out at Rs 355119 among the non-cultivators and Rs 827561 among the cultivators of oil palm. The total mean value of natural assets between the two was Rs 586271. Between the oil palm cultivators and non-cultivators, the mean value of land among the non-cultivators of oil palm was lower than the cultivators of oil palm. Conversely, livestock value was lower among the cultivators of oil palm than the non-cultivators of oil palm. The mean value of the house plot among the non-cultivators was also lower than the oil palm cultivators. The total mean value was highest on land followed by house plot and livestock. The pattern of distribution was also similar between the non-cultivators and cultivators of oil palm.

The second dimension is human capital which refers to the competence and knowledge of a person. This is very important to pursue one's livelihood and largely determines the success and failure of their livelihood activities. The present study used the mean age of household members, the standard deviation of age, proportion of earners and mean years of adult education as indicators of human capital. The mean age of household members was 33 years in which the t' value was significant for non-cultivators of oil palm and oil palm cultivators. The standard deviation of age

shows a total of 16.85 years. With regard to the proportion of earners, the 't' value was significant for non-cultivators of oil palm and oil palm cultivators. The mean proportion of earners, on the whole, was 0.54 which indicated that half of the household's members were earners. The last indicator i.e. mean years of adult education shows a significant difference for the non-cultivators and oil palm cultivators. The mean year of adult education was higher among the oil palm cultivators than the non-cultivators of oil palm.

The next livelihood capital is physical capital that serves as an important indicator for the quality of life and living conditions. In the present study, physical capital comprises of house value, vehicles, television, mobile phone, washing machine, LPG connection, sewing machine, iron box, and transistor/ radio. On the whole, the mean value of household assets worked out at Rs. 300138 which was higher among the oil palm cultivators than the non-cultivators of oil palm. Among the physical assets, the value of the house was highest followed by vehicles, television, mobile phone, and others. The pattern of distribution was similar between the cultivators and non-cultivators of oil palm. The mean value of the household was lower among the non-cultivators of oil palm than the cultivators of oil palm. The total mean was Rs 210421. Vehicles mean value was also lower among the non-cultivators of oil palm than the cultivators of oil palm. With regard to television, the mean value was higher among the oil palm cultivators than the non-cultivators of oil palm. The mean value of mobile phones was again higher among the oil palm cultivators than the non-cultivators. Similar cases were found in all the other dimensions. This may indicate that with the increase in income generated from oil palm cultivation, the purchasing power of households also increases. However, it is important to note that

these do not reveal the number of assets as it was calculated in terms of their value in Rupees.

Financial capital is another livelihood capital that refers to the financial resources that people possessed. In the present study, the pattern of household saving and household debt was taken to understand the pattern of the financial capital of the households. Household saving was classified as savings in nationalized banks, cash in hand, money lent to friends and relatives, self-help groups, private banks, insurance, and money lenders. Overall, household savings is worked out at Rs 32102 which was substantially higher among the oil palm cultivators than the non-cultivators. The distribution shows that savings in the form of nationalized bank was highest followed by cash in hand, money lent to friends and relatives, self-help group, private banks, and insurance respectively. A similar pattern was observed between the cultivators and non-cultivators of oil palm. Saving on nationalized banks and cash in hand was much lower among the non-cultivators than the cultivators of oil palm. Subsequently, the debt from friends and relatives and savings in self-help group were lower among the non-cultivators than the cultivators of oil palm. Non-cultivators of oil palm have no savings in private banks while cultivators of oil palm have it. On the whole, the saving among cultivators of oil palm was much higher than the non-cultivators which may indicates that oil palm cultivation has significantly contributed to household income. Household debt has been calculated in terms of debt in nationalized banks, money lent to friends and relatives, self-help groups, private banks, insurance, cooperatives, and money lenders. On the whole, household debt was calculated at Rs 2742 which was higher among the non-cultivators than the oil palm cultivators. The highest debt was from nationalized banks followed by debt

from friends and relatives, Self Help Group and others. There was a substantial difference with regard to debt in nationalized banks which was higher among the non-cultivators of oil palm households than the oil palm cultivators. On the other form of debt, there were not many differences between the cultivators of oil palm and non-cultivators but it were little higher among the non-cultivators in almost all the cases. In addition, a small amount of debt from money lenders and insurance was found among the oil palm cultivators while it was not found among the non-cultivators. On the whole, household saving was substantially higher among the oil palm cultivators while household debt was higher among the non-cultivators of oil palm.

The next dimension in livelihood assets is the social capital. In the discussion of development around the world, social capital was included as a new dimension (see Chopra, 2002). In the present study, the social capital endowment of the household is assessed in terms of two dimensions viz., participation in community and political participation. The first dimension is participation in the community which is very imperative in Mizo society. There are different groups and associations existing in the state which are formal and informal. It is a close-knit society and participation in certain groups determines the status and identity of a person. In the present study, the participation in Community Based Organization (CBOs) such as Church, YMA (youth association), MHIP (women association), MUP (elderly association), games and sports, voluntary works, SHGs were taken. The participation in these CBOs was rated in a four-point scales viz., always (3), mostly (2), sometimes (1) and never (0). The average taken from this analysis was taken as the level of participation in CBOs. The study found that participation in voluntary work

was highest that was not peculiar in Mizo society. This was followed by participation in churches, YMA, MHIP, MUP, SHGs, and sports respectively. Overall, the participation in CBOs worked out at 1.2 on an average. This indicated that they did not participate regularly in CBOs. Comparing the oil palm cultivators and non-cultivators, the average participation was a little higher among oil palm cultivators than non-cultivators. It almost followed a similar pattern between the oil palm cultivators and non-cultivators of oil palm. The second dimension i.e. political participation implies the influence of politics on people and their interest. In the present study, political participation was assessed in terms of the frequency of vote in the general election. The participation was also rated in a four-point scales viz., always (3), mostly (2), sometimes (1) and never (0). The average taken from this analysis was taken as the level of participation in CBOs. The elections of MP (Member of Parliament), Assembly (MLA) and VC (Village Councils) were taken. On the whole, political participation shows that the rate of political participation is high among households. The rate of participation in Village Council elections was highest while the rate of participation in MP and MLA election were the same. It followed an exact similar pattern between the oil palm cultivators and non-cultivators of oil palm.

The mean of livelihood assets viz., natural, physical and financial capital was calculated as Rs 857048 which was higher among the cultivators of oil palm than the non-cultivators of oil palm. The value of natural assets was highest followed by physical assets and Financial capital. Social capital and human capital were not analyzed in terms of value and therefore did not represent here. The distribution of

these assets was also higher among the oil palm cultivators than the non-cultivators of oil palm.

The possession of livelihood assets determines the success of livelihood activities. People who owned more livelihood assets will have more livelihood options and are likely to achieve more livelihood outcomes. The present study discusses the patterns of relationships among different livelihood assets. The livelihood assets such as natural capital, physical capital, financial capital, mean years of age, standard deviation (SD) of age, proportions of earners, Mean Years of Adult Education, standard deviation (SD) of Adult Education, Participation in CBOs and Political Participation were computed using Pearson's Correlation. The computation shows that physical capital was positively correlated to natural capital which indicated that as physical capital increases; natural capital also tends to increase. However, financial capital was negatively correlated to natural capital and physical capital. The next indicator mean years of age was positively correlated to natural capital but not significant to physical capital and financial capital. This means that the higher the age of household members, the possession of natural assets will increase. The standard deviation of age shows positive correlation to natural capital while the proportion of earners shows positive correlation to mean years of age. The mean year of adult education was also positively correlated to natural capital, physical capital, financial capital and mean years of age. It was significant at 5 percent level on natural capital and mean years of age and 1 percent level on physical capital and financial capital. This shows that as the level of education increases, natural capital, physical capital, financial capital and mean years of age also increases. The standard deviation of adult education was positively significant to

natural capital, the standard deviation of age and mean years of adult education which means an increase in adult education will also increase natural capital, the standard deviation of age and mean years of adult education. The participation in CBOs was positively correlated to all viz., natural capital, physical capital, mean years of age, the standard deviation of age, proportion of earners, mean years of adult education and standard deviation of adult education except for financial capital in which it was negatively correlated. This indicated that the more participation in CBOs, the other assets increases. Lastly, political participation was positively significant only to participation in CBOs which revealed that as participation in politics increases, participation in CBOs also increases.

In the study, the livelihood outcomes of households are studied in terms of their living conditions. A livelihood outcome is the last dimension of Sustainable Livelihood Framework (see Carney, 1998; Scoones, 1998). The present study computes annual household income and monthly household expenditure to understand the patterns of livelihood outcomes. Household income is a dependable measurement of economic development and is the first indicator of the living conditions of the household. In the present study, households derived their incomes from different sources. The sum of these incomes was analyzed to understand the living conditions of the households. The sources of income included in the study were oil palm cultivation, MGNREGS, government service, non-agricultural labor, other crop cultivation, livestock rearing, agricultural labor, skilled labor, and business. On the whole, the annual average household income worked out at Rs 93369. Among different sources of income, more than one-fourth was drawn from oil palm cultivation. This was followed by MGNREGS, government service, non-

agricultural labor, other crop cultivation, livestock rearing, agricultural labor, skilled labor, and business respectively. Income from government employees was not high due to little inclusion of government employees among the sample households. Comparing the oil palm cultivators and non-cultivators of oil palm, MGNREGS contributes highest among the non-cultivators of oil palm and income from oil palm contributes the highest among the oil palm cultivators. Income generated from other crop cultivation was also much higher among the non-cultivators of oil palm. Assessing household expenditure is useful for measuring poverty and living conditions. The present study considered monthly household expenditure as other indicators of living conditions of households. To understand the monthly household expenditure, it was categorized as food and non-food components. It is expected that the share of food expenditure will be higher than non-food expenditure if the income of the household is higher than their expenditure according to the law of Engel. However, in the present study, it was found that the average share of food expenditure was lower than the non-food expenditure. The expenditure on non-food was largely determined by the huge expenditure on education and tobacco/beetle nut consumption. Besides this, most of the foods consumed were from their own production which reduces the food expenditures. The overall household expenditure worked out at Rs 5009 which was higher among the oil palm cultivator than the non-cultivators. The pattern of distribution was also similar between the oil palm cultivator and the non-cultivators. The analysis of patterns of living conditions of households shows that the standard of living was low in terms of household income and expenditure. Between the oil palm cultivators and non-cultivators of oil palm, it was higher among the oil palm cultivators. It can be inferred that oil palm cultivators

play an important role in supplementing and augmenting the income of households. With regard to possession of livelihood assets, it was also higher among the oil palm cultivators. The pattern of relationship between Livelihood Assets and Living Conditions was computed which revealed that natural asset was significant at 1 percent level to annual household income and monthly expenditure which means that an increase in natural capital will also increase the household annual household income and monthly expenditure. The physical asset was also positively correlated to annual household income and monthly expenditure. However, the financial asset was negatively correlated to annual household income and monthly expenditure. The standard deviation of the age was positively correlated to monthly expenditure but not in annual household income. With regard to mean years of adult education, it was positively correlated to both annual household income and monthly expenditure. It can be inferred that the higher the education level of adult members in households, there will be an increase in the annual household income and monthly expenditure. The standard deviation of education was also positively correlated to monthly expenditure but not in the case of annual household income. The participation of household members in CBOs was significantly correlated to monthly expenditure and annual household income positively. The annual household income and monthly expenditure were also positively correlated with each other. This means that an increase in annual household income will also increase the monthly expenditure.

8.1.4. Oil Palm Cultivation and Rural Livelihood

The pattern of cropping and plantation is always a concern in agricultural study. Besides the impact on livelihood and economy, the negative effect on the environment and biodiversity is also taken into question. In light of these, the study

attempts to answer these questions based on the analysis of oil palm cultivators among the sample households across the four villages surveyed. The number of trees, the area under cultivation and trees per acres were taken based on the sequence of the plantation. Out of the total 114 oil palm cultivators, it was found that there were five sequences of plantations. The plantation was mainly started in the year 2007 and the next plantation depends on the availability or supply of seedlings. The number of new cultivators increased in the second plantations but decreased in the subsequent plantations. However, it shows that there are still new oil palm farmers in the study areas. Most of these cultivators also continued the plantations in the later sequence. Regarding the number of trees planted, the average number of trees planted increased till the fifth plantation with an overall average of 392 trees. The mean area under oil palm cultivation also increases till the fifth plantation with an overall average of 5 acres for plantation. The number of trees planted and area under plantation increased due to the increase in number of farmers and extension of oil palm farms. The mean of trees planted per acre shows no significant differences till the fifth sequence with an overall mean of 84 trees per acres. However, the number of trees suggested is around 145 in one hectare (see, Reddy, 2015) which is around 60 trees per acre. This is much less than the number of trees planted per acre (84 trees) by the respondents. This may be due to the topography differences and limitations of land to cultivate oil palm.

The determinants of oil palm cultivation were assessed in terms of the source of motivation, factors of motivations, the support given and source of assistance/finance. With regard to the source of motivation stated by oil palm cultivators, Godrej Company was the main source of motivation followed by the

Agriculture Department and District Rural Development Agency. From the field visit, it was observed that Godrej Company did not receive enough fresh fruit bunch to be processed in the mill which led them to motivate farmers to cultivate more oil palm. Besides Godrej Company, government agencies also play an important role in promoting oil palm cultivation in the sample villages. The factors of motivation was also assessed which include the things told by these agencies to cultivate oil palm. The study found that that an increase in income was the main factor for oil palm cultivation followed by good markets and fertile soil. However, it was observed that levels of motivation decrease among oil palm cultivators due to the long periods of maturity and late fruiting as compared to other cash crops. The low price of oil palm fruits and transportation problems also de-motivate oil palm cultivators in the study areas. Regarding the support given, the free supply of seedlings was highest in which all the cultivators received seedlings. This was followed by financial aid, agricultural implements and loan arrangement for cultivation. The source of support was mainly from the Agriculture Department followed by Godrej Company and District Rural Development Agency. It was observed that there was high level of dependency towards the government and companies. As, the negative impact of oil palm cultivation in the environment has been a discussion around the world, the study probed into the perceived impact of oil palm cultivation on rural ecology. This was assessed based on different dimensions such as deforestation, effects on other crops beside it, effects on soil fertility and no effect on the ecology. These dimensions were formulated based on the pilot study conducted and were used to understand the impact of oil palm cultivation on rural ecology. As intercropping was practiced by many oil palm cultivators, the analysis show that majority of the households respond

that oil palm cultivation has effects on other crops beside it, which was followed by households who stated that it has no effect on the ecology. As oil palm cultivation has effects on other crops, it could have negative impacts on other cash crops and traditional crops if it is planted in large scale. It was also observed that many of the cultivators were unaware of the negative impact of oil palm cultivation on the environment. Some even perceived that it has a positive impact rather than a negative impact as it provides food for wild animals and makes the surrounding pleasant and calm. Other dimensions i.e. the negative effect on soil fertility and deforestation was perceived only by a few households.

As oil palm cultivation has important implications in rural livelihoods transformations, the present study assessed the social and economic impact of oil palm cultivation among the sample households. Different indicators were used in the study that include working hours by men in the family, household investment in agriculture, household income from agriculture, cost of cultivation, household expenditure, men wage laborers employed in the farm, household savings, housing conditions, working hours by women in the family, households prestige in community, women wage laborers employed in the farm, household debt, household prestige in Church, households participation in community, and household participation in Church. It was found that the mean of working hours by men in the family, household investment in agriculture, household income from agriculture, cost of cultivation, household expenditure, men wage laborers employed in the farm, household savings and housing conditions all worked out at the scale of 1 which indicates that the level of impact was increased in these indicators by adopting oil palm cultivation. Specifically, the level of impact was highest in the indicator of

working hours by men in the family which indicates that men were the main workers in the oil palm farm. This was followed by household investment in agriculture, household income from agriculture, cost of cultivation, household expenditure, men wage laborers employed in the farm, household savings and housing conditions subsequently. The other indicators such as working hours by women in the family, household prestige in community, women wage laborers employed in the farm, household debt, household prestige in Church and household's participation in community falls at the scale of 0 which shows that there was no change in these indicators by practicing oil palm cultivation. Among these, the average of hours by women in the family and household prestige in the community was highest followed by women wage laborers employed in the farm, household debt, household prestige in Church and household participation in the community. The last indicator, household participation in Church shows a negative result of -1 which indicates that household participation in Church was decreased among oil palm cultivators. This may be due to the huge investment of labor required in oil palm cultivation. Overall, the mean calculated shows that oil palm cultivation had no highest impact on the social and economic conditions based on the scales used.

To develop a better understanding, a hypothesis was formulated which stated that “the volume of livelihood assets viz., natural, physical, human, and social capital endowment of the household is directly related to the adoption of oil palm cultivation.” This hypothesis draws inspiration from the sustainable livelihood framework (see Laschinger, 2013; Chambers and Conway, 1992). To understand the patterns of relationship between oil palm cultivation and livelihood assets, the area under oil palm cultivation, the number of trees and palm tree per acres were taken.

The livelihood assets viz., natural assets, physical assets, financial capital, mean of age, the standard deviation of age, proportion of earners, mean years of adult education, the standard deviation of adult education, participation in CBOs, political participation, monthly household expenditure, and annual household income were also taken. The computation of the relationship between livelihood assets and oil palm cultivation shows that natural capital was not significant to the area under oil palm cultivation, number of trees and palm tree per acres. The next livelihood dimension, physical capital shows that it was positively correlated to the area under oil palm cultivation which indicates that with the increase in physical capital, there was an increase in the area of oil palm cultivation too. The proportion of earners and financial capital were negatively correlated to the area under oil palm cultivation and the number of oil palm trees. Conversely, the mean years of age and standard deviation of age were not significant to the area under oil palm cultivation, the number of oil palm trees and palm tree per acres. The other dimensions such as mean years of adult education, the standard deviation of adult education, participation in CBOs, political participation and monthly household expenditure were all not significant to the area under oil palm cultivation, number of oil palm trees and palm tree per acres. However, the study shows that oil palm cultivators have better and higher possessions of livelihood assets than non cultivators. This was only not significant to adoption of oil palm cultivation when computed.

The second hypothesis formulated was "the cultivation of oil palm is positively related to the household's living conditions in rural Mizoram." This hypothesis draws its inspiration from earlier studies (see Sayer, et. al., 2012; Zen & Barlow, 2005). To analyze the relationship between oil palm cultivation and living

conditions, the area under oil palm cultivation, the number of oil palm trees and palm tree per acres were taken. The monthly household expenditure and annual household income were also taken to represent the living conditions of households. It was found that the area under oil palm cultivation was significantly correlated to the annual household. In contrast, the area under oil palm cultivation was not significant to monthly household expenditure. On the other hand, the number of oil palm trees cultivated was positively correlated to annual household income. However, there was no significant relationship between the number of trees planted and household monthly expenditure. The area under oil palm cultivation and palm tree per acres also show no significant relationship to monthly household expenditure and annual household income. Overall it can be concluded that the area under oil palm cultivation and the number of oil palm trees planted have contributed significantly to the household income of the sample villages.

8.2. Conclusion

Oil palm cultivation is promoted as a strategy of rural development in many countries around the globe. It is one of the most expanding equatorial crops in the world of which the total area of cultivation is nearly one-tenth of the world's permanent cropland (see FAO, 2007). In the context of Mizoram, Mizoram Oil Palm (Regulation of Production & Processing) Act was passed in 2004 which introduced oil palm cultivation in the state. Under this Act, oil palm mill was set up by Godrej Agrovet Pvt. Ltd and has been buying oil palm FFB in its region. Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize (ISOPOM) and National Mission on Oilseeds and Oil Palm (NMOOP) also plays an important role in oil palm promotion in the state. In addition, the state scheme of New Land Use Policy (NLUP) also put

oil palm cultivation as one of the trades/activities that the beneficiaries of the scheme can select. With all these, oil palm cultivation in the state is yet to be more successful in the state.

In the present study, the sustainable livelihood framework was used to understand the impact of oil palm cultivation in rural livelihoods. The study probed into the patterns of oil palm cultivation in rural Mizoram of four selected villages and explored the patterns of livelihood assets as well as the living conditions and vulnerability context. In the sample villages, transportation is the main challenge that becomes intense during the rainy season. These villages are inaccessible by road transportation most of the time and landslides due to rainfall increase their vulnerability. This also creates a huge problem for transporting oil palm fruits to stock point. With regard to the demographic profile of members of the sample households, the majority of household members among oil palm cultivators fall in the age group of youth which indicates a higher proportion of earners in the households. This can be a strong point for oil palm cultivator households as it requires huge labor during planting, pruning and harvesting periods. The patterns of livelihood assets also show that oil palm cultivators have more advantages and higher possessions in almost all assets. Further, the annual household income was higher among oil palm cultivators than non-cultivators of oil palm in which income from oil palm cultivation was highest. This implies that oil palm cultivation has been augmenting rural income in the study areas. The relationship between livelihood assets and living conditions also shows that almost all the dimensions of livelihood assets have a positive impact on the living conditions of the households. This demonstrated that

possession of livelihood assets is very important to improve the living conditions of rural households.

In the four villages surveyed, oil palm plantations mainly started in the year 2007 and show five sequences of plantations. Godrej Company established in the region is the main source of motivation to cultivate oil palm along with Agriculture Department and DRDA. The main factors to this motivation are an increase in income, good market, and fertility. Seedlings were given in free to all oil palm cultivators and there were some farmers who received financial aid, agricultural implements and loan arrangements for cultivation. Majority of the farmers perceived that oil palm cultivation has negative effects on other crops when they practiced mixed cropping. Therefore promoting oil palm and neglecting traditional and other cash crops will have negative effects in the future. The cultivation of oil palm must be done in a separate land without disturbing the other crops. There were also some farmers who perceived that oil palm cultivation has no negative effect on the ecology. Although deforestation due to oil palm cultivation is a major concern around the world, it is perceived as the least impact by farmers who were interviewed in the study. However, from an environmental perspective, it may be not wise to halt oil palm cultivation completely as it has been a source of rural income and employment. Therefore, a more sustainable approach without damaging traditional crops can be introduced based on different studies and findings. To supplement this, the social and economic impact of oil palm cultivation in the study shows a positive impact on most of the dimensions used.

The computation of the relationship between livelihood assets and adoption of oil palm cultivation shows no positive correlation except on the case of physical

asset which was positively correlated. It is important to note that this does not mean livelihood asset has no positive impact on oil palm cultivation but is only not significant when tested. However, the computation of the relationship between the cultivation of oil palm and living conditions shows that an increase in the area under oil palm cultivation and numbers of trees resulted in an increase in annual household income.

On the whole, it can be inferred that oil palm cultivation has been augmenting rural income and has raised the standard of living. This was evident from the comparison between oil palm cultivators and non-cultivators of oil palm in terms of their income and possessions of livelihood assets. The area under oil palm cultivation and numbers of trees were also positively correlated to annual household income which supplements it. Another analysis also shows that an increase in livelihood assets possessions has significant effect on the living conditions of households. Therefore, an immediate concern of the government policy needs to focus on increasing rural household access to human, natural, physical, financial, and social capital in order to promote rural development and oil palm cultivation. From the perspective of social work, it can be concluded that oil palm cultivation can be an important strategy for rural livelihood promotion as the primary mission of social work is always enhancing the well being of vulnerable people and alleviating poverty. As social work is also committed to social justice and helping the disadvantaged, it is important to address the livelihood challenges and vulnerabilities of oil palm cultivators and assess the market linkage of oil palm fruits in the region. Lastly, as social workers are deeply committed to sustainable development, the ecological impact of oil palm must also be taken into account. This will ensure the sustainability

of oil palm cultivation and rural livelihood without disturbing the ecology and environment in rural areas.

8.3. Suggestions

The present study is a comparative assessment of livelihood between oil palm cultivators and non-cultivators of oil palm among four villages which aims at offering suggestions for policymakers, planners, voluntary organizations as well as social workers at multilevel concerned with livelihood promotion. Therefore in this section, suggestions based on findings and scopes for future research are presented in two sub-sections.

8.3.1. Promotion of Rural Livelihood and Oil Palm Cultivation

Livelihood promotion has been an important agenda across different regions in rural areas. Among different livelihood activities, oil palm cultivation is also being promoted as a strategy of rural development. This is also evident in Mizoram in which rural people cultivated oil palm to escape poverty and improve their livelihood. Oil palm cultivation is also reflected in the state scheme of NLUP along with other central schemes. This also can help in diversifying rural livelihood as livelihood diversification is an important coping mechanism for household survival in rural areas (see Sailo, 2014 and Zaitinvawra, 2014). In the light of these, the following suggestions are put forward to promote rural livelihoods and oil palm cultivation in Mizoram:

1. Promoting livelihood capitals

It was observed that oil palm cultivator households have better livelihood assets than non-cultivators of oil palm households. The annual household income was also higher among the oil palm cultivator household which suggests that

livelihood capitals must be strengthened and increased in rural areas to promote sustainable livelihood and oil palm cultivation. Further, it was found that an increase in livelihood capitals have significantly increased household income. It was also found that most of the members of sample households depend only on one income source due to lack of skills and livelihood opportunities. The relationship between levels of education and living conditions was also positively correlated. Therefore, capacity building and extension education could enhance the livelihood prospects and their ability to diversify livelihood activities.

2. Better infrastructural facilities

It was observed that infrastructural facilities were inadequate in terms of road, market and storage facilities which hold back the development of oil palm cultivation in the regions. Oil palm Fresh Fruit Bunch (FFB) stock point was far from the farm, which is a huge problem for the cultivators, especially during the rainy seasons. Therefore, infrastructural facilities must be improved to mitigate the problems and ensure sustainable oil palm cultivation.

3. Promotion of financial inclusion

Oil palm takes more than three years to bear fruit and a huge financial investment is required in the process of maturity. The households surveyed were mainly low-income groups and did not have savings at all. This could be a huge problem for oil palm cultivators before the fruiting period. There were also some instances where farmers uprooted oil palm and cultivated annual crops. There is a need to revamp the financial system among oil palm cultivators in rural areas. Credit linkage must be provided as it requires huge financial capital to ensure the maturity of oil palm plants.

4. Promoting physical capital for development

The results of the study revealed that physical capital in terms of possession of household materials has contributed positively to oil palm cultivation. Therefore physical capital must be strengthened to promote oil palm cultivation in the state. Specifically, possession of vehicles plays an important role as oil palm cultivators have to ship oil palm fruits (Fresh Fruit Bunch) by their own expense to the company stock point. The income from oil palm cultivation was also widely used to renovate their houses and buy household assets.

5. Awareness on the impact of oil palm cultivation on ecology

It was found that most of the oil palm cultivators were not aware of the impact of oil palm cultivation on ecology. Some farmers even perceived that oil palm cultivation has a positive impact on the environment rather than a negative impact. There is a need to conduct training and organize awareness campaigns among oil palm cultivators in the state. Different literature and evidence-based practice on sustainable oil palm cultivation can be utilized to promote this. As the current oil palm companies in the state are members of the Roundtable on Sustainable Palm Oil (RSPO), an efficient agency to check their performance and practices may be necessary.

6. Focus on smallholder farmers

The illegal logging of land and exploitation of local farmers by big companies is an important issue in many countries, especially among the leading oil palm producer countries. The study also observed that the price of oil palm fruits fixed by the company and state government is too low when calculating the investments made by the farmers. The stock point of FFB is also far from their land in which they have

to transport it by their own expense. As most of the farmers did not own vehicles, they have to hire it for transporting their fruits and even ship by head loads as some lands were inaccessible by vehicles. Therefore government policy should be more farmers oriented in order to alleviate poverty and augment income among these indigenous people. Minimum Support Price (MSP) and Subsidy may also be necessary.

7. Prevention of Land Alienation

Possession of land is an important asset for rural people as it is the main source of their livelihood and income. This is especially true for a tribal community where there is a close relationship between man and land since the early period. In the present study, as agriculture is still the predominant source of livelihood, land plays an important role among the villagers. It was observed that some of the households sold their land to outsiders who were mainly from Mamit and Kolasib (district headquarters) and Aizawl (state capital). These buyers cultivated oil palm and other cash crops in their lands and employed labor from the village in the form of tenants. Due to this, most of the profits go to these landowners which will be more detrimental in the future for the village. Therefore immediate concern needs to be taken to prevent further loss of landholding by the villagers. Village Council/ Panchayats can be an effective mechanism to prevent this. As Community Based Organizations (CBOs) have great influence in Mizo society, the involvement of these organizations will also be effective.

8.3.2. Suggestion for Further Research

Keeping in mind the present study, some research suggestions are put forward:

1. The state program of Mizoram i.e. New Land Use Policy (NLUP) and other central schemes can be taken up for study. Its role in promoting oil palm cultivation and loopholes may be identified.

2. Although oil palm cultivation is being promoted in the state, the income of rural households is still low and many of them still live Below the Poverty Line. A study focusing on the constraints and challenges in oil palm cultivation could be undertaken.

I. HOUSEHOLD INTERVIEW SCHEDULE

Oil Palm Cultivation and Rural Livelihood in

Kolasib and Mamit Districts, Mizoram

Schedule no:

Research Scholar

Mr. K. Vanlalhruaizela

PhD Scholar

Department of Social Work

Mizoram University

Research Supervisor

Prof. Kanagaraj Easwaran

Professor

Department of Social Work

Mizoram University

District: 1. Mamit 2. Kolasib

I. Profile of the Respondent:

1. Name of the respondent
2. Sex — 1. Male 2. Female
3. Age
4. Village — 1. Tuidam; 2.Nalzawl; 3.Khamrang; 4. Buhchangphai
5. Form of Family — 1. Stable 2. Broken 3. Reconstituted Step 4. Others (specify)
6. Type of Family — 1. Joint 2. Nuclear 3. Single
7. Sub- tribe — 1. Lusei 2. Ralte 3. Hmar 4. Lai 5. Paihte 6. Others (specify)
8. Denomination
9. Type of House — 1. Kutcha 2. Semi Pucca 3. Pucca
10. Ownership of House — 1. Owned 2. Rented
11. Socio- economic status — 1. APL 2. BPL 3. AAY 4. No Category
12. Jo card under MGNREGS — 1. Yes 0. No
13. Type of Cultivators — 1. Non Cultivators 2. Shifting 3. Semi Settled 4. Settled
14. Benefitted under NLUP — 1. Yes 0. No

II. Household Profile:

ID	Name	Age	Sex	Marital Status	Relation to Head	Education	Earner/ Dependent	Occupation Primary	Occupation Secondary
1.									

2.									
3.									
4.									
5.									

III. Please give us the annual household income from different sources:

Sl.No	Source	Annual Household Income
1	Oil Pam Cultivation	
2	Other Cultivation	
3	Agricultural Labour	
4	Business	
5	MGNREGS	
6	Livestock Rearing	
7	Government Service	
8	Skilled Labour	
9	Non-agricultural Labour	

IV. Details of average monthly expenditure of household:

Sl.No	Items	Amount (Rs)
1.	Food	
2.	Electricity	
3.	Water	
4.	Fuel (natural gas)	
5.	Transport	
6.	Recreation	
7.	Clothing	
8.	Alcoholic Beverages	
9.	Pan and Supari	

10.	Tobacco and Smoking	
11.	Health	
12.	Education of Children	
13.	House Rent	
14.	Others (specify)	

V. Details of household savings and debt in rupees:

Sl.No	Form	Savings (Rs)
1.	Cash in hand	
2.	Friends and Relatives	
3.	Money Lenders	
4.	Private Banks	
5.	Nationalized Banks	
6.	Self Help Groups	
7.	Insurance	
8.	Others(Specify)	

VI. Please give me the sources of your household debt.

Sl.No	Form	Savings (Rs)
1.	Friends and Relatives	
2.	Money Lenders	
3.	Private Banks	
4.	Cooperatives	
5.	Nationalized Banks	
6.	Self Help Groups	
7.	Insurance	
8.	Others(Specify)	

VII. Please give me the details of your family assets:

Sl.No	Items	No of Items	Value (Rs)
1.	House		
2.	House Plot		
3.	Land		
4.	Vehicles		
5.	Television		
6.	Mobile phone		
7.	Transistor/ Radio		
8.	Iron		
9.	Sewing Machine		
10.	Water Connection		
11.	Washing Machine		
12.	LPG connection		
13.	Pigs		
14.	Poultry birds		
15.	Cattle		

VIII. Details of land possessed/ owned by your family?

Sl.No	Title	No of Plots	Area (Tins)	Value (Rs)
1.	Land Settlement Certificate			
2.	Periodic Land Pass			
3.	Temporary Pass			
4.	Other (Specify)			

IX. Livestock Owned

Sl.No	Livestock	No	Value of Asset(Rs)
1.	Pig		
2.	Poultry Birds		
3.	Cow		
4.	Goat/Sheep		
5.	Fish		
6.	Others (Specify)		

X. Details of Cultivation

Sl.No	Crop	Area (Tins)	Annual Income
1.	Cereals		
2.	Pulses		
3.	Oil Seeds		
4.	Vegetables		
5.	Fruits		
6.	Oil Palm Tree		
7.	Other Trees		
8.	Others (Specify)		

XI. How frequently the members of your family participate in your community?

Sl.No	Association	Always	Mostly	Sometimes	Never
1.	Churches	3	2	1	0
2.	YMA	3	2	1	0
3.	MHIP	3	2	1	0
4.	MUP	3	2	1	0
5.	Games and Sports	3	2	1	0

6.	Voluntary works	3	2	1	0
7.	SHGs	3	2	1	0
8.	Others (specify)	3	2	1	0

XII. Indicate your family rate of votes in the last election of the following?

Sl.No	Election	All	Most	Some	None
1.	General (MP)	3	2	1	0
2.	Assembly	3	2	1	0
3.	Village Council	3	2	1	0

XIII. Please give us the details of household's Political and Civil Society Organizational Affiliation:

Sl.No	Name	None	Sympathizer(s)	Members	Executive Member(s)	Office Bearer(s)
1.	Political Party	0	1	2	3	4
2.	Churches	0	1	2	3	4
3.	YMA	0	1	2	3	4
4.	MHIP	0	1	2	3	4
5.	MUP	0	1	2	3	4
6.	Games and Sports	0	1	2	3	4
7.	SHGs	0	1	2	3	4
8.	Others (specify)	0	1	2	3	4

XIV. Are you cultivating Oil Palm in your farm?

1. Yes 0. No

XV. Please give us the details of the oil palm cultivation.

Sl.No	Sequence of Plantation	Year	No. of Palm Trees	Tress Per Acre
1	First			
2	Second			
3	Third			
4	Fourth			
5	Fifth			

XVI. Who motivated you start oil palm cultivation?

Sl. No.	Organization/ Agency	Yes	No
1	Goodrej Company		
2	Agriculture Department		
3	DRDA		
4	Others (specify)		

XVII. What were told by them to motivate you to cultivate oil palm?

Sl. No.	Motivation Factor	Yes	No
1	Increase Income		
2	Fertile soil suitable for cultivation		
3	Good Market		
4	Others (specify)		

XVIII. What are the assistances given to you for oil palm cultivation?

Sl. No.	Assistance	Yes	No
1	Free Supply of Seedlings		
2	Distribution of Cash		
3	Arranging Loans		

4	Supply of Agricultural Implements		
5	Others (specify)		

XIX. What were the sources of such financing and assistance for oil palm cultivation?

Sl. No.	Organization/ Agency	Yes	No
1	Goodrej Company		
2	Agriculture Department		
3	DRDA		
4	IWMP		
5	Others (specify)		

XX. Please tell me how oil palm cultivation affected your livelihood and living conditions?

Sl.No	Name	Very Much Decreased	Decreased	No Change	Increased	Very Much Increased
1.	Working hours by women in the family	-2	-1	0	1	2
2.	Working hours by men in the family	-2	-1	0	1	2
3.	Women wage laborers employed in the farm	-2	-1	0	1	2
4.	Men wage laborers employed in the farm	-2	-1	0	1	2
5.	Household Investment in Agriculture	-2	-1	0	1	2
6.	Cost of Cultivation	-2	-1	0	1	2
7.	Household Debt	-2	-1	0	1	2
8.	Household Savings	-2	-1	0	1	2

9.	Household Income from Agriculture	-2	-1	0	1	2
10.	Household Expenditure	-2	-1	0	1	2
11.	Housing Conditions	-2	-1	0	1	2
12.	Household's Participation in Community	-2	-1	0	1	2
13.	Household's Participation in Church	-2	-1	0	1	2
14.	Households Prestige in Community	-2	-1	0	1	2
15.	Households Prestige in Church	-2	-1	0	1	2

XXI. What are the problems created by oil palm cultivation in the ecology and environment of your village?

Sl. No.	Challenges	Yes	No
1	Effect on other crops beside it		
2	No effect		
3	Effect on soil fertility		
4	Deforestation		
5	No idea		
6	Others (specify)		

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ABSTRACT

OIL PALM CULTIVATION AND RURAL LIVELIHOOD IN KOLASIB AND MAMIT DISTRICTS, MIZORAM

BY

K. VANLALHRUAIZELA

Submitted

In partial fulfillment of the requirement of the Degree of Doctor of Philosophy in Social Work of Mizoram University, Aizawl

Introduction

The present study attempts to assess the role of oil palm cultivation in promoting rural livelihoods in Kolasib and Mamit Districts, Mizoram.

Sustainable livelihoods have been increasingly recognised as an important element of sustainable development. Oil palm cultivation is promoted as a strategy of rural development in many countries and across different regions of the globe. Oil palm also known as Elaeis guineensis is a tropical forest palm native to West and Central Africa which is grown in plantations. It produces 3-8 times more oil than any other tropical or temperate oil crop from a given area. Indonesia is the largest producer of oil palm. For many rural communities, oil palm has been a significant source of livelihood improvement. Compared to other agricultural land use options, oil palm offers greater returns to labour. Oil palm cultivation and processing have been identified as a potential win-win rural development strategy by two recent World Bank reports (2007, 2011). It has been argued that oil palm can alleviate poverty and contribute to secure access to food through increased income by generating employment in poor regions (see World Bank, 2007; FAO, 2010). However, a number of negative social impacts of oil palm cultivation and processing have also been identified. The negative impacts are land tenure conflicts, the loss of tenure or access rights and other conflicts resulting from migration of employees and exploitative labour conditions.

In the NorthEast region, the cultivation of Oil Palm had been tried in Assam, Tripura, and Mizoram with considerable success. R.M Reddy (2004), Principal Scientist from National Research Centre for Oil Palm (NRC-OP), Andhra Pradesh,

studied the suitability of agro-climatic conditions and water availability required for oil palm cultivation and has recommended that "Climate and soil conditions in southern Mizoram with low elevation and gentle slope are quite suitable for oil palm cultivation". Hence, the growth of the existing plants is quite promising. In the context of Mizoram, the geo-climatic condition is favorable for oil palm cultivation. A high-level committee headed by K.L. Chadha identified potential areas for oil palm cultivation of 61,000 ha with a gentle slope (25-33 percent). Later, another committee headed by Dr. P Rethinam identified another potential area of 40,000 ha with a total of 1,01,000 ha potential areas for oil palm cultivation in Mizoram. The state government placed oil palm cultivation as a part of an action programme to generate income and mitigate environmental degradation. A large scale for oil palm cultivation was passed during the 10th plan period. The rate of FFBs is Rs.5.50 per kg. fixed by Price Fixation Committee.

Overview of Literature

There is copious literature on social and economic aspects of oil palm cultivation in different countries and regions (see, Laschinger, 2013; Rist, Janssen, & Rutz, 2011; Feintrenie & Levang, 2010, etc.).

There are studies on oil palm and rural livelihoods (see Cramb & Curry, 2012; Rist, Feintrenie & Levang, 2010; Koczberski, 2005, etc.). There are many studies which focus on the oil palm cultivation on the socio-economic development (see Zen & Barlow, 2005; Damoah, 2012; Owolarafe & Arumughan, 2007, etc.). There are studies on sustainable oil palm cultivation also found (see Potter, 2016; Pehnelt & Vietze, 2009; Barison, 2007, etc.).

Some studies could also be found on the factors contributing to the adoption of oil palm cultivation (see Anaglo et. al., 2014; Gunn, 2009) and the farmers' perception on oil palm cultivation (see, Chuks, 2013). The impacts of oil palm cultivation on biodiversity has also caught the attention of many researchers (see, Wilcove & Koh, 2010; Izah, Angaye, and Ohimain, 2016, etc.).

Divergent literature could also be found on sustainable livelihood (see, De Haan, 2012; Bird & Shepherd, 2003, etc.). There are studies which attempt to understand the rural vulnerability could also be seen (see Kimani & Bhardwaj, 2015; Kaushik & Sharma, 2015, etc.).

The overview of the literature shows that oil palm cultivation has become an important strategy for promoting rural development across different regions. The main reasons for adopting oil palm cultivation are direct returns of investments, high yielding and continuing demand. The cultivation of oil palm also has a different environmental impact in the form of biowastes and pollution which is a global issue and debate. From different studies, the main challenges and constraints faced by oil palm cultivators are transportation, technical knowledge, inefficient market system and lack of capital. There are also different suggestions to improve the conditions of oil palm farmers as well as to cultivate oil palm sustainably. In addition, government interventions and policies are very important to improve the cultivation of oil palm and minimize the problems of smallholder oil palm farmers. With regard to methodologies, most studies were based on a quantitative approach by using an interview schedule and questionnaires to collect data. Random sampling technique was also widely used. Papers based on secondary data were also found in a large number. For analysis of data, simple statistical tools and different tests were used.

Thus, literature helps us in identifying and understanding the theoretical, conceptual, operational and methodological issues in the study of oil palm cultivation and rural livelihoods. However, some major gaps in the literature could be identified. Firstly, oil palm as a strategy of promoting rural livelihoods or development has not been probed adequately in the Indian context. Most of the studies were based on the leading producers of oil palm like Malaysia, Indonesia and Nigeria. The literature on this strategy is scanty in India, especially in the NorthEast region. Further, an empirical study based on Mizoram is very rare. Secondly, most studies on oil palm cultivation and rural livelihoods do not adopt the Sustainable Livelihood Framework for understanding the complexity and dynamics of oil palm cultivation. There is a need to adopt this framework to understand the vulnerability context of oil palm farmers; their livelihood assets and how it links to the adoption of oil palm cultivation as well as the outcomes. Thirdly, most studies have only used a quantitative method for data collection. There is a need to combine quantitative and participatory methods to understand the process and context. Lastly, most studies have been carried out by economists, sociologists, agricultural scientists, and developmental agencies while social workers have not contributed adequately in this area. There is a need to study from social work perspectives which will develop a better understanding of the dynamics of oil palm cultivation and show the policy implication. The present study attempts to fill these gaps with a comparative study of oil palm cultivators and non-cultivators of oil palm from four villages in Mizoram.

Theoretical Framework: Sustainable Livelihood Framework

The concept of sustainable livelihood has been an important topic of discussion and debate for poverty eradication and rural development. The

'Sustainable Livelihoods Approach' (SLA) adopted by the Department for International Development (DFID) in the late 1990s (building on work by IDS, IISD, Oxfam and others) have been widely used by different organizations and practitioners to suit a variety of contexts, issues, priorities, and applications. DFID's main objective is to eliminate poverty in poorer countries by underlying core principles. The Sustainable Livelihood Framework underlies certain components that include livelihood assets, vulnerability context, livelihood strategies, policies, institutions and processes, and livelihood outcomes. The present study used this framework to understand the impact of oil palm cultivation on rural livelihood in Mizoram.

Statement of the Problem

Oil palm cultivation is being promoted in Mizoram by the state government to enhance the livelihood and living conditions of the people and mitigate environmental degradation. There is no research-based evidence available on the livelihood and ecological impact of oil palm cultivation in Mizoram. The present study tries to provide a comprehensive understanding of the bearing of oil palm cultivation on rural livelihood and living conditions in Mizoram. It attempts to probe into the role of oil palm cultivation as a strategy of rural livelihood promotion in Mizoram. It will make use of the Sustainable Livelihood Framework to understand rural vulnerability context, patterns of livelihood assets and their bearing on the adoption of oil palm cultivation. Drawing inspiration from this theoretical framework, it will also try to comprehend the role played by governmental and private organizations to promote oil palm cultivation in the state. It will also probe into the impact on rural ecology and living conditions.

Chapter Scheme

The present study has been organized into eight chapters. The first chapter presents the scenario of rural development and oil palm cultivation in the global, Indian and Mizoram contexts. An overview of the literature, theoretical framework and statement of the problem were also presented. The second chapter presents a review of the existing literature on oil palm cultivation and rural livelihood and it also presents the research gaps in detail. The third chapter describes the profile of the study area and presents the objectives, hypotheses and research design of the study. The fourth chapter presents the vulnerability context of the sample villages. The fifth chapter describes the socio-economic structural bases of rural households studied. The sixth chapter describes the patterns of livelihood and living conditions of rural households studied. The relationship between the livelihood assets and living conditions are also discussed in this chapter. The seventh chapter presents the sequence and determinants of adoption of oil palm cultivation. The perception of farmers on the impact of oil palm on rural ecology is also discussed in this chapter. In addition, the results of testing of the hypotheses of the present study are discussed in this chapter. The last chapter summarizes the findings of the study and offers recommendations for policy and practice.

Profile of the Study Area

The two districts selected for the study are Kolasib and Mamit districts in the state of Mizoram. They are the two leading producers of oil palm in the state. The two districts put together accounts for 55.83 percent of the total area of cultivation in the State. The potential area for oil palm cultivation in Mamit district is 18500 hectares and 17350 hectares in Kolasib district. Under the agreement, Godrej

Agrovet Ltd. established Palm Oil Mill at Bukvannei, and the extraction of palm oil was started since 2014. It was recorded that the total purchase amounted to 8,742 metric tons till 2014 from both the districts. The oil extraction was started in 2014. During 2014 and 2015, a total quantity of 5,718 MT was procured out of which 5,500 MT was processed in the mill for extraction of Palm Oil.

Khamrang Village (Distant Village), Kolasib

Khamrang is a medium size village located in the Tlangnuam RD Block of Kolasib district. It represents a distant village of Kolasib district. The distance from its district headquarter, Kolasib is 43 kilometers. According to Census 2011, the total household is 163 with a total population of 633. Kawnpui is the nearest town to Khamrang which is approximately 20km away. Out of the total population, male consists of 331 while female consists of 302. The sex ratio is 109. The population of children between up to 6 years is 136 which constitutes 21 percent of the total population of the village. The sex ratio of Khamrang is 912 which is lower than the state sex ratio of 976. The child sex ratio is 838 that is lower than the state of 970. Regarding the literacy rate, it is 98 percent which is higher than the state literacy rate of 91 percent. The total workers are 188 in which male comprises of 164 and females of 24 in numbers. There are 170 main workers and 18 marginal workers. As per the constitution of India, Khamrang village is administrated by the Village Councils who are elected by the people in the village (see Census, 2011).

Buhchangphai Village, Kolasib: Proximate Village

Buhchangphai is a medium-sized village that represents the proximate village of 282 households. It is located in the Bilkhawthlir R.D block of Kolasib district with a distance of 22 kilometers from its district headquarter. The total population is 1401

consisting of 733 males and 668 females (2011-12 census). It is situated 14km away from its sub-district headquarter Bilhkawthilr. Children between the ages of 0 to 6 years are 78 which constitute 21 percent of the total population. The average sex ratio is 911 that is lower than the state sex ratio of 976. The child sex ratio is 838 lower than the state of 970. The literacy rate is 75 percent which is lower than the state of 91 percent. Male literacy is 80 percent while the female literacy rate is 71 percent. There are 560 total workers of which 345 are males and the remaining 215 are females. Main workers consist of 553 while marginal workers consist of 7 workers. As per the Constitution of India and the Panchayati Raj Act, Buhchangphai village is administered by Sarpanch (Head of Village) who is the elected representative of the village (see Census, 2011).

Tuidam Village, Mamit: Distant Village

Tuidam is a medium size village and represents the distant village of Mamit district. It is located in Zawlnuam Tehsil of Mamit district in Mizoram, India. It is located 8km away from sub-district headquarter Kawrthah and 36 km away from district headquarter Mamit. Tuidam has a total population of 1,695 peoples. There are about 335 houses in Tuidam village. There are 870 males and 825 females. The population of children up to 6 years is 248 which constitutes 15 percent of the total population of the village. The sex ratio of Tuidam is 948 that is lower than the state sex ratio of 976. Conversely, the child sex ratio is 984 which is higher than the state child sex ratio of 970. Regarding the literacy rate, it is 99 percent which was higher than the state literacy rate of 91 percent. The total workers are 803 in which male comprises of 435 and females of 368 in numbers. There are 771 main workers and 32 marginal workers. As per the constitution of India, Tuidam village is administrated

by the Village Councils who are elected by the people in the village (see Census, 2011).

Nalzawl Village, Mamit: Proximate Village

Nalzawl is a medium size village located in Zawlnuam RD block of Mamit district. It represents a proximate village of Mamit district. The distance from its district headquarters Mamit is 25 kilometers. According to Census 2011, the total household is 107 with a total population of 449. Mamit is the nearest town to Nalzawl. Out of the total population, male consists of 232 while female consists of 217. Children between the ages of 0 to 6 years are 78 which constitute 17 percent of the total population. The average sex ratio is 935 lower than the state sex ratio of 976. The child sex ratio is 1229 that is higher than the state of 970. The literacy rate is 77 percent which was lower than the state of 91 percent. Male literacy is 79 percent while the female literacy rate is 74 percent. There are 171 total workers of which 122 are males and the remaining 49 are females. Main workers consist of 131 while marginal workers consist of 40. As per the constitution of India, Khamrang village is administrated by the Village Councils who are elected by the people in the village (see Census, 2011).

Objectives

1. To understand rural vulnerability context in Mizoram.
2. To probe into the patterns of rural livelihood assets in Mizoram.
3. To understand the role played by government and private organizations in promoting oil palm cultivation in Mizoram.
4. To determine the factors contributing to the adoption of oil palm cultivation in Mizoram.

5. To examine the impact of oil palm cultivation on the living conditions of rural households in Mizoram.
6. To understand the people's perception of the impact of oil palm cultivation on rural ecology in Mizoram.

Hypotheses

1. The volume of livelihood assets viz., natural, physical, human, and social capital endowment of household is directly related to the adoption of oil palm cultivation.
2. The cultivation of oil palm is positively related to the household's living conditions in rural Mizoram.

Methodology

The present study is cross-sectional in nature and descriptive in design. Oil palm cultivators and non-cultivators of oil palm households were compared in different dimensions of livelihood and living conditions. It is mainly based on the quantitative data collected through field survey with pretested structured household interview schedule.. In addition, the participatory methods were used to understand the social and ecological context of vulnerability in the sample villages.

The unit of study was household and all the rural households in Kolasib and Mamit districts constitute the population of the present study. A multi-stage sampling procedure was followed to select, blocks, villages, and households. Kolasib and Mamit district. From the selected blocks, two villages each were chosen based on the geographical location; one distant and one proximate village from the district headquarter respectively. These villages were also the leading producers of oil palm in the blocks. In each of the villages, the lists of households of very poor (AAY),

poor (BPL) and non-poor (APL) were identified among oil palm cultivators and non-cultivators of oil palm. They were identified based on the Village Council records and with the help of CBOs. In each of the category, systematic random sampling was used to select households for the study. The overall sample size of the study was 233 households.

The present study used both quantitative and participatory methods for data collection. Before conducting the survey, a pilot study was conducted in the selected villages. Key informant interviews and participatory techniques like social mapping, seasonality diagram, services and opportunities map and timeline were used to understand the context in the sample villages. The field survey was conducted with the help of a pretested and structured household interview schedule during the year, 2018. For the construction of Household Interview Schedule, Open Data Kit kobo tool box was used while Kobo collect an android application was used to canvas the schedule. Before the final survey, it was pretested in the villages and a few modifications were made in the light of it. The final survey was then conducted on the sample households of the four villages.

The quantitative data collected through field survey was processed with the help of computer packages of Microsoft excel and SPSS. For analysis of quantitative data, cross-tabulation, simple percentages, ratios, averages, and independent t-test were used. To test hypotheses, Correlation Coefficients were used.

Results and Discussion

Vulnerability Context of the Sample Villages

Vulnerability context is one of the components of Sustainable Livelihood Framework which is also the first task in livelihood analysis. The study of vulnerability context in 4 (four) villages reveal more or less similar patterns. The overall findings demonstrate that seasonality has a significant impact on rural vulnerability. Low rainfall was accompanied by drought and hot season while heavy rainfall brings landslides that increase their vulnerability. Among the four villages surveyed, two of the villages were not accessible by road transportation during rainy seasons which pose a great problem for the villagers. This further affects the supply of goods and services in the villages as they entirely depend on road transportation for their imports. The supply of the Public Distribution System (PDS) and the level of food availability also indicate insecurity of food in the villages. In most cases, household income and expenditure show a similar pattern which may demonstrate that there were no proper savings among the households. This was largely affected by agriculture and Christmas festival. All the villages do not experience floods since flatlands are negligible within the village areas. The prevalence of diseases and health problems also varies among the villages. With regard to the availability of labour, it can be concluded that there was no adequate labour in the villages.

Socio-Economic Structural Bases of Households

In any livelihood study, the basic question always concerns the demographic and structural bases of the population. Demography mainly includes a demographic grouping based on age, gender, and social class. In this subsection, the results of the analysis of the demographic characteristics of the respondents and members of the sample households are discussed. The first dimension, gender plays a pivotal social structural variable that governs human relations in every society which is more so in

the Mizo society of patriarchal structure. Among the respondents, the majority were males while the rest were females. Among the non-cultivators households, female respondents were little higher than males while male respondents were substantially higher among the oil palm cultivators. Age is an important demographic variable that connotes the vigour and productivity of an individual, and subsequently the earning capacity. In the study, the respondents were categorized into youth, middle and old age groups. Overall, a little more than half belonged to the middle age group which was followed by the old age group and youth age group. Between the cultivators of oil palm and non-cultivators, youth respondents were higher among the non-cultivators than oil palm cultivators. Conversely, the respondents of the middle age group were lower among the non-cultivators than oil palm cultivators. The respondents of the old age group were also lower among the non-cultivators oil palm cultivators than oil palm cultivators. Marital status is another important demographic variable that denotes the prestige a person holds in traditional societies. The study categorizes marital status as unmarried, married, divorced and widowed. On the whole, the majority were married followed by divorced, widowed and unmarried. Comparing the cultivators of oil palm and non-cultivators of oil palm, there was an equal number of unmarried respondents. With regard to married respondents, it was higher among the non-cultivators of oil palm than the cultivators of oil palm. The number of divorced respondents is lower among the non-cultivators of oil palm than the cultivators of oil palm. The number of widows among the respondents almost shows an equal percentage between the non-cultivators of oil palm and the cultivators of oil palm. Education is one of the basic needs of human beings. The study found that more than two-fifth of sample population have access to Primary

level of education which was followed by Middle level of education. The remaining comprises of high school level, illiterate, higher secondary level, and higher education respectively. The number of illiterates was higher among the non-cultivators of oil palm than the cultivators of oil palm. However, household members attending till primary level and high school level were lower among the non-cultivators of oil palm than oil palm cultivators. In contrast, household members attending till middle and higher secondary level of education were higher among the non-cultivators than oil palm cultivators. Lastly, there were no respondents who attended higher education among the non-cultivators while there was one respondent among the oil palm cultivators who attended the same. Although there were differences in proportions, almost a similar pattern was observed between the oil palm cultivators and non-oil palm cultivators.

The demographic profile of members of the sample households shows that there were 514 family members among the non-cultivators of oil palm and 208 family members among the cultivators of oil palm with a total of 437 members. Overall, more than half of the members of surveyed households were males and the rest were females. Females were less among the non-cultivators of oil palm than oil palm cultivators. Conversely, males were more among the non-cultivators than oil palm cultivators. Although there were differences in numbers, a similar pattern was observed between the oil palm cultivators and non-cultivators. Since a larger number of the surveyed household members belong to youth and children age groups, unmarried were highest in numbers followed by married. The few remaining were divorced and widowed respectively. Between the oil palm cultivators and non cultivators, divorced were higher among oil palm cultivators than non cultivators.

More than two fifths of non-cultivators and less than half of oil palm cultivators were found to be married. A little more than half of non-cultivators of oil palm and less than half of oil palm cultivators were unmarried. The number of widowed was almost similar between the cultivators of oil palm and non-cultivators of oil palm. Overall, unmarried were highest among non-cultivators of oil palm while married were highest among oil palm cultivator households. Regarding age group, the sample households were categorized into five age groups viz. children (below 13), adolescent (14-17), youth (18-35), middle (36-59) and old (60 and above). On the whole, the age group of youth was highest followed by children, middle-age group, old age, and adolescents respectively. Among the children, more than one fourth belongs to non-cultivators of oil palm households while less than a fifth belongs to oil palm cultivator households. Among adolescents, there was a higher percentage among the non-cultivators of oil palm than the cultivators of oil palm. In contrast, the percentage of youth was a little lower among the non-cultivators of oil palm than the cultivators of oil palm. The percentage of middle aged group was also lower among the non-cultivators than the oil palm cultivators. Moreover, the percentage of old age groups was also lower among the non-cultivators of oil palm than the oil palm cultivators. On the whole, the number of children was highest among non-cultivators of oil palm while youth were highest among oil palm cultivator households. Overall, there was a higher proportion of earners among oil palm cultivator households.

Family is the first institution and plays an important role in every society. The structure of family implies the way in which family is organized based on roles, power and hierarchies. In this study, indicators like type, form, size and gender of head are used to describe the structural bases of family. The type of family was

categorized into joint, nuclear and single. On the whole, majority belongs to nuclear family which was followed by single family and joint family respectively. The difference was on the higher percentage on single family than joint family. Further, in the present study, single family was higher among the oil palm cultivators than the non-cultivators. The next indicator is the form of family which is based on family cohesion. It was categorized into broken, reconstituted and stable family. The study revealed that majority belongs to stable family. This was followed by broken family and reconstituted family. Less than a tenth of non-cultivators of oil palm households were from broken family whereas less than a fourth of oil palm cultivators comprise the same. There was only one reconstituted family among the non-cultivator households. With regard to stable family, the percentage was higher among the non-cultivators of oil palm than the oil palm cultivators. A similar pattern was almost seen in both the cases except in reconstituted family which was not found among oil palm cultivators. The size of family is the third indicator in the study. It largely determines the availability of labour in agricultural pursuit and other allied activities of rural areas. The study classified the size of family into small (1-3 members), medium (4 -5 members) and large (6 and above members). Almost half were living in medium size family and more than a third lives in small size family. The remaining lived in large size family. A little more than two fifth of non-cultivators of oil palm lived in small size family while more than one fourth of oil palm cultivators comprises the same. More than two fifths of non-cultivators of oil palm were living in medium size family while a little more than half of oil palm cultivators lived in the same. Less than a fifth of non-cultivators of oil palm and a little more than a fifth of oil palm cultivators were living in large size family. The pattern of distribution was

similar between the oil palm cultivators and non-cultivators. **A** large majority were male headed and the remaining were female headed. Comparing the oil palm cultivators and non-cultivators, male headed family was a little higher in the oil palm cultivators' households.

Social structure were also assessed which refers to the patterned social arrangements that are both emergent from and determinant of the actions of the individuals in the society. The social structural characteristics of the sample households discussed include sub-tribe and denomination. Overall, other sub tribes were highest followed by Lusei, Hmar and, Ralte respectively. A few of Paihte and Lai were also found in the villages. Among the non-cultivators of oil palm, other sub tribes were highest followed by Lusei, Hmar, Ralte, Paihte and, Lai respectively. A little difference was observed in the pattern among the cultivators of oil palm in which other sub tribes and Lusei formed majorities followed by Ralte, Hmar, Paihte and Lai respectively. The finding was largely affected by the high number of *Reang (Bru), Chakma* and other migrants living in the areas. As Christianity was dominant in the state, denominations were also taken. The study categorized into different denominations viz., Presbyterian, Baptist, UPC (Mizoram), UPC (NE), Salvation Army, Seventh Day Adventist, IKK and others. Overall Presbyterian was highest in numbers as it lies in the northern area of Mizoram which is Presbyterian dominated areas. This was followed by Baptist, Salvation Army, UPC (Mizoram), UPC (NE), Seventh Day Adventist others and IKK respectively. Among the non-cultivators of oil palm, Presbyterian was highest followed by Baptist, Salvation Army, UPC (Mizoram), UPC (NE), Seventh Day Adventist and others. Among the cultivators of oil palm, Presbyterian was highest followed by Salvation Army, UPC (Mizoram),

Baptist, Seventh Day, others, UPC (NE) and IKK. There was not much difference in the pattern of distribution between the oil palm cultivators and non-cultivators of oil palm.

The economic structural bases are discussed at the individual and household levels in the study. Dependency, socio-economic category, ownership of the house, type of house and Job Card under MGNREGS were discussed. The first economic structural variable i.e. dependency shows that more than half were dependent and the rest were earners. Comparing the oil palm cultivators and non-cultivators of oil palm, earners were higher in oil palm cultivator households than non-cultivators of oil palm households. Overall the dependency ratio was 1.14 which suggests that for every earner there was one dependent. In regard to socio-economic category, it is divided into three classes viz., very poor- AAY (Antyodaya Anna Yojana), poor- BPL (below poverty line), and non-poor- APL (above poverty line). The present study indicates that almost half belong to below poverty line followed by above poverty line and very poor. Comparing the oil palm cultivators and non-cultivators, there was an equal proportion at below the poverty line while above poverty line was higher among the oil palm cultivator households. Conversely, AAY were lower among oil palm cultivator households than non cultivator households. With regard to ownership of the house, a large majority lived in their own house while the remaining few lived in a rented house. A similar pattern was observed between the oil palm cultivators and non-cultivators. It shows that almost cent percent of oil palm cultivators lived in their own house while substantial households of non-oil palm cultivators lived in their own house. The types of the house were categorized as kutcha, pucca and semi pucca for the study. On the whole, it was found that a huge majority of households have

kutcha houses which were followed by a few pucca and semi pucca. The pattern of distribution was also similar between the oil palm cultivators and non-cultivators. Among non-cultivators of oil palm, a huge majority lived in kutcha house. A similar case was also found among the oil palm cultivator households. The percentages of households living in pucca house were lower among the non-cultivators of oil palm than the cultivators of oil palm. Conversely, the percentage of households living in semi pucca was higher among the non-cultivators of oil palm than the oil palm cultivators. With regard to job card holders under MGNREGS, almost cent percent have job cards under MGNREGS while the remaining few still did not have the cards. The cardholder was higher among the oil palm cultivators than the non-cultivators of oil palm. There were three households of non-cultivators who did not have job cards while there was only one household of oil palm cultivators who did not have job card.

Patterns of Rural Livelihood and Living Conditions

In the Sustainable Livelihood Framework, livelihood assets include different forms of capital viz., natural capital, physical capital, financial capital, human capital and social capital. The possession of natural capital is one of the factors that determine the livelihood security and sustainability of the rural economy. Possession of land is an important natural capital in rural areas as it is the main source of income and survival for rural people. Besides land, livestock is another important natural asset of rural people since the history of mankind. There is always a close relationship between man and livestock which is also evident in Mizo society. It is very important to supplement and augment rural income. Keeping this in mind, the present study assessed the possession of land and livestock to understand the natural

assets of rural households. In the present study, different kinds of land possession viz., temporary pass, periodic land pass, land settlement certificate and land leased in were used. These were selected based on the pilot study conducted. It was found that land as natural capital is predominant for both the cultivators of oil palm and non-cultivators. The mean size of landholding was larger among the cultivators of oil palm than the non-cultivators. Overall the total mean size of landholding among the cultivators and non-cultivators of oil palm was 10.9 acres with a standard deviation of 7.8 acres. With regard to land holding under temporary pass, the average size of landholding among non-cultivators was lower than the cultivators of oil palm. Landholding under periodic land pass was also lower among the non-cultivators than the cultivators of oil palm. Regarding the landholding under land settlement certificate (LSC), it was again lower among the non-cultivators of oil palm than the cultivators of oil palm. Moreover, the landholding under leased in was lower among the non-cultivators of oil palm than the cultivators of oil palm. All these dimensions show that landholding under different kinds was larger among the oil palm cultivators than non-cultivators. In regard to kinds of landholding, land under temporary pass was highest followed by periodic land pass, land settlement certificate (LSC) and land leased respectively. The pattern of distribution was also similar between the non-cultivators of oil palm and the oil palm cultivators. The size of landholding was further categorized into marginal (less than or equal to 3.09 acres), small (between 3.10 acres to 10.91 acres), medium (10.92 acres to 18.73 acres) and large (more than or equal to 18.74 acres). It was found that there were more households among non-cultivators who owned a marginal size of land as compared to oil palm cultivators. With regard to the small size of landholding, there

were a larger number of households among the non-cultivators than the oil palm cultivators. In contrast, the medium size of landholding was lower among the non-cultivators than the oil palm cultivators. Lastly, large size of landholding was also lower among the non-cultivators of oil palm than the cultivators of oil palm. On the whole, the small size of landholding was highest followed by medium size of landholding, large size of landholding and marginal size of landholding respectively. Comparing the oil palm cultivators and non-cultivators of oil palm, oil palm cultivators were having a larger size of landholding than the oil palm cultivators. To assess the possession of livestock, pig, poultry birds, cow, goat/sheep, and fish were taken. The mean numbers of livestock possessed show that fish was highest in number followed by poultry birds, pig, cow and goat/sheep respectively. The possession of fish shows highest in number as fish is owned in larger number even by a single household. The overall findings did not reveal the value and number of households who possessed livestock. The pattern of distribution was similar between the non-cultivators of oil palm and the oil palm cultivators. Comparing the cultivators and non-cultivators of oil palm, non-cultivators possessed more livestock than oil palm cultivators. On the whole, the mean value of natural assets worked out at Rs 355119 among the non-cultivators and Rs 827561 among the cultivators of oil palm. The total mean value of natural assets between the two was Rs 586271. Between the oil palm cultivators and non-cultivators, the mean value of land among the non-cultivators of oil palm was lower than the cultivators of oil palm. Conversely, livestock value was lower among the cultivators of oil palm than the non-cultivators of oil palm. The mean value of the house plot among the non-cultivators was also lower than the oil palm cultivators. The total mean value was highest on land

followed by house plot and livestock. The pattern of distribution was also similar between the non-cultivators and cultivators of oil palm.

The second dimension is human capital which refers to the competence and knowledge of a person. This is very important to pursue one's livelihood and largely determines the success and failure of their livelihood activities. The present study used the mean age of household members, the standard deviation of age, proportion of earners and mean years of adult education as indicators of human capital. The mean age of household members was 33 years in which the t' value was significant for non-cultivators of oil palm and oil palm cultivators. The standard deviation of age shows a total of 16.85 years. With regard to the proportion of earners, the 't' value was significant for non-cultivators of oil palm and oil palm cultivators. The mean proportion of earners, on the whole, was 0.54 which indicated that half of the household's members were earners. The last indicator i.e. mean years of adult education shows a significant difference for the non-cultivators and oil palm cultivators. The mean year of adult education was higher among the oil palm cultivators than the non-cultivators of oil palm.

The next livelihood capital is physical capital that serves as an important indicator for the quality of life and living conditions. In the present study, physical capital comprises of house value, four-wheeler, two-wheeler, television, mobile phone, washing machine, LPG connection, sewing machine, iron box, and transistor/ radio. On the whole, the mean value of household assets worked out at Rs. 300138 which was higher among the oil palm cultivators than the non-cultivators of oil palm. Among the physical assets, the value of the house was highest followed by two-wheeler, television, mobile phone, and others. The pattern of distribution was similar

between the cultivators and non-cultivators of oil palm. The mean value of the household was lower among the non-cultivators of oil palm than the cultivators of oil palm. The total mean was Rs 210421. Two-wheeler mean value was also lower among the non-cultivators of oil palm than the cultivators of oil palm. With regard to television, the mean value was higher among the oil palm cultivators than the non-cultivators of oil palm. The mean value of mobile phones was again higher among the oil palm cultivators than the non-cultivators. Similar cases were found in all the other dimensions. This may indicate that with the increase in income generated from oil palm cultivation, the purchasing power of households also increases. However, it is important to note that these do not reveal the number of assets as it was calculated in terms of their value in Rupees.

Financial capital is another livelihood capital that refers to the financial resources that people possessed. In the present study, the pattern of household saving and household debt was taken to understand the pattern of the financial capital of the households. Household saving was classified as savings in nationalized banks, cash in hand, money lent to friends and relatives, self-help groups, private banks, insurance, and money lenders. Overall, household savings is worked out at Rs 32102 which was substantially higher among the oil palm cultivators than the non-cultivators. The distribution shows that savings in the form of nationalized bank was highest followed by cash in hand, money lent to friends and relatives, self-help group, private banks, and insurance respectively. A similar pattern was observed between the cultivators and non-cultivators of oil palm. Saving on nationalized banks and cash in hand was much lower among the non-cultivators than the cultivators of oil palm. Subsequently, the debt from friends and relatives and savings in self-help

group were lower among the non-cultivators than the cultivators of oil palm. Non-cultivators of oil palm have no savings in private banks while cultivators of oil palm have it. On the whole, the saving among cultivators of oil palm was much higher than the non-cultivators which may indicates that oil palm cultivation has significantly contributed to household income. Household debt has been calculated in terms of debt in nationalized banks, money lent to friends and relatives, self-help groups, private banks, insurance, cooperatives, and money lenders. On the whole, household debt was calculated at Rs 2742 which was higher among the non-cultivators than the oil palm cultivators. The highest debt was from nationalized banks followed by debt from friends and relatives, Self Help Group and others. There was a substantial difference with regard to debt in nationalized banks which was higher among the non-cultivators of oil palm households than the oil palm cultivators. On the other form of debt, there were not many differences between the cultivators of oil palm and non-cultivators but it were little higher among the non-cultivators in almost all the cases. In addition, a small amount of debt from money lenders and insurance was found among the oil palm cultivators while it was not found among the non-cultivators. On the whole, household saving was substantially higher among the oil palm cultivators while household debt was higher among the non-cultivators of oil palm.

The next dimension in livelihood assets is the social capital. In the present study, the social capital endowment of the household is assessed in terms of two dimensions viz., participation in community and political participation. The first dimension is participation in the community which is very imperative in Mizo society. There are different groups and associations existing in the state which are

formal and informal. It is a close-knit society and participation in certain groups determines the status and identity of a person. In the present study, the participation in Community Based Organization (CBOs) such as Church, YMA (youth association), MHIP (women association), MUP (elderly association), games and sports, voluntary works, SHGs were taken. The participation in these CBOs was rated in a four-point scales viz., always (3), mostly (2), sometimes (1) and never (0). The average taken from this analysis was taken as the level of participation in CBOs. The study found that participation in voluntary work was highest that was not peculiar in Mizo society. This was followed by participation in churches, YMA, MHIP, MUP, SHGs, and sports respectively. Overall, the participation in CBOs worked out at 1.2 on an average. This indicated that they did not participate regularly in CBOs. Comparing the oil palm cultivators and non-cultivators, the average participation was a little higher among oil palm cultivators than non-cultivators. It almost followed a similar pattern between the oil palm cultivators and non-cultivators of oil palm. The second dimension i.e. political participation implies the influence of politics on people and their interest. In the present study, political participation was assessed in terms of the frequency of vote in the general election. The participation was also rated in a four-point scales viz., always (3), mostly (2), sometimes (1) and never (0). The average taken from this analysis was taken as the level of participation in CBOs. The elections of MP (Member of Parliament), Assembly (MLA) and VC (Village Councils) were taken. On the whole, political participation shows that the rate of political participation is high among households. The rate of participation in Village Council elections was highest while the rate of participation in MP and MLA

election were the same. It followed an exact similar pattern between the oil palm cultivators and non-cultivators of oil palm.

The mean of livelihood assets viz., natural, physical and financial capital was calculated as Rs 857048 which was higher among the cultivators of oil palm than the non-cultivators of oil palm. The value of natural assets was highest followed by physical assets and Financial capital. Social capital and human capital were not analyzed in terms of value and therefore did not represent here. The distribution of these assets was also higher among the oil palm cultivators than the non-cultivators of oil palm.

The possession of livelihood assets determines the success of livelihood activities. People who owned more livelihood assets will have more livelihood options and are likely to achieve more livelihood outcomes. The present study discusses the patterns of relationships among different livelihood assets. The livelihood assets such as natural capital, physical capital, financial capital, mean years of age, standard deviation (SD) of age, proportions of earners, Mean Years of Adult Education, standard deviation (SD) of Adult Education, Participation in CBOs and Political Participation were computed using Pearson's Correlation. The computation shows that physical capital was positively correlated to natural capital which indicated that as physical capital increases; natural capital also tends to increase. However, financial capital was negatively correlated to natural capital and physical capital. The next indicator mean years of age was positively correlated to natural capital but not significant to physical capital and financial capital. This means that the higher the age of household members, the possession of natural assets will increase. The standard deviation of age shows positive correlation to natural capital

while the proportion of earners shows positive correlation to mean years of age. The mean year of adult education was also positively correlated to natural capital, physical capital, financial capital and mean years of age. It was significant at 5 percent level on natural capital and mean years of age and 1 percent level on physical capital and financial capital. This shows that as the level of education increases, natural capital, physical capital, financial capital and mean years of age also increases. The standard deviation of adult education was positively significant to natural capital, the standard deviation of age and mean years of adult education which means an increase in adult education will also increase natural capital, the standard deviation of age and mean years of adult education. The participation in CBOs was positively correlated to all viz., natural capital, physical capital, mean years of age, the standard deviation of age, proportion of earners, mean years of adult education and standard deviation of adult education except for financial capital in which it was negatively correlated. This indicated that the more participation in CBOs, the other assets increases. Lastly, political participation was positively significant only to participation in CBOs which revealed that as participation in politics increases, participation in CBOs also increases.

In the study, the livelihood outcomes of households are studied in terms of their living conditions. The present study computes annual household income and monthly household expenditure to understand the patterns of livelihood outcomes. Household income is a dependable measurement of economic development and is the first indicator of the living conditions of the household. In the present study, households derived their incomes from different sources. The sum of these incomes was analyzed to understand the living conditions of the households. The sources of

income included in the study were oil palm cultivation, MGNREGS, government service, non-agricultural labor, other crop cultivation, livestock rearing, agricultural labor, skilled labor, and business. On the whole, the annual average household income worked out at Rs 93369. Among different sources of income, more than one-fourth was drawn from oil palm cultivation. This was followed by MGNREGS, government service, non-agricultural labor, other crop cultivation, livestock rearing, agricultural labor, skilled labor, and business respectively. Income from government employees was not high due to little inclusion of government employees among the sample households. Comparing the oil palm cultivators and non-cultivators of oil palm, MGNREGS contributes highest among the non-cultivators of oil palm and income from oil palm contributes the highest among the oil palm cultivators. Income generated from other crop cultivation was also much higher among the non-cultivators of oil palm. Assessing household expenditure is useful for measuring poverty and living conditions. The present study considered monthly household expenditure as other indicators of living conditions of households. To understand the monthly household expenditure, it was categorized as food and non-food components. It is expected that the share of food expenditure will be higher than non-food expenditure if the income of the household is higher than their expenditure according to the law of Engel. However, in the present study, it was found that the average share of food expenditure was lower than the non-food expenditure. The expenditure on non-food was largely determined by the huge expenditure on education and tobacco/beetle nut consumption. Besides this, most of the foods consumed were from their own production which reduces the food expenditures. The overall household expenditure worked out at Rs 5009 which was higher among the

oil palm cultivator than the non-cultivators. The pattern of distribution was also similar between the oil palm cultivator and the non-cultivators. The analysis of patterns of living conditions of households shows that the standard of living was low in terms of household income and expenditure. Between the oil palm cultivators and non-cultivators of oil palm, it was higher among the oil palm cultivators. It can be inferred that oil palm cultivators play an important role in supplementing and augmenting the income of households. With regard to possession of livelihood assets, it was also higher among the oil palm cultivators. The pattern of relationship between Livelihood Assets and Living Conditions was computed which revealed that natural asset was significant at 1 percent level to annual household income and monthly expenditure which means that an increase in natural capital will also increase the household annual household income and monthly expenditure. The physical asset was also positively correlated to annual household income and monthly expenditure. However, the financial asset was negatively correlated to annual household income and monthly expenditure. The standard deviation of the age was positively correlated to monthly expenditure but not in annual household income. With regard to mean years of adult education, it was positively correlated to both annual household income and monthly expenditure. It can be inferred that the higher the education level of adult members in households, there will be an increase in the annual household income and monthly expenditure. The standard deviation of education was also positively correlated to monthly expenditure but not in the case of annual household income. The participation of household members in CBOs was significantly correlated to monthly expenditure and annual household income positively. The annual household income and monthly expenditure were also

positively correlated with each other. This means that an increase in annual household income will also increase the monthly expenditure.

Oil Palm Cultivation and Rural Livelihood

The pattern of cropping and plantation is always a concern in agricultural study. Besides the impact on livelihood and economy, the negative effect on the environment and biodiversity is also taken into question. In light of these, the study attempts to answer these questions based on the analysis of oil palm cultivators among the sample households across the four villages surveyed. The number of trees, the area under cultivation and trees per acres were taken based on the sequence of the plantation. Out of the total 114 oil palm cultivators, it was found that there were five sequences of plantations. The plantation was mainly started in the year 2007 and the next plantation depends on the availability or supply of seedlings. The number of new cultivators increased in the second plantations but decreased in the subsequent plantations. However, it shows that there are still new oil palm farmers in the study areas. Most of these cultivators also continued the plantations in the later sequence. Regarding the number of trees planted, the average number of trees planted increased till the fifth plantation with an overall average of 392 trees. The mean area under oil palm cultivation also increases till the fifth plantation with an overall average of 5 acres for plantation. The number of trees planted and area under plantation increased due to the increase in number of farmers and extension of oil palm farm. The mean of trees planted per acre shows no significant differences till the fifth sequence with an overall mean of 84 trees per acres. However, the number of trees suggested is around 145 in one hectare (see, Reddy, 2015) which is around 60 trees per acre. This is much

less than the number of trees planted per acre (84 trees) by the respondents. This may be due to the topography differences and limitations of land to cultivate oil palm.

The determinants of oil palm cultivation were assessed in terms of the source of motivation, factors of motivations, the support given and source of assistance/finance. With regard to the source of motivation stated by oil palm cultivators, Godrej Company was the main source of motivation followed by the Agriculture Department and District Rural Development Agency. From the field visit, it was observed that Godrej Company did not receive enough fresh fruit bunch to be processed in the mill which led them to motivate farmers to cultivate more oil palm. Besides Godrej Company, government agencies also play an important role in promoting oil palm cultivation in the sample villages. The factors of motivation was also assessed which include the things told by these agencies to cultivate oil palm. The study found that that an increase in income was the main factor for oil palm cultivation followed by good markets and fertile soil. However, it was observed that levels of motivation decrease among oil palm cultivators due to the long periods of maturity and late fruiting as compared to other cash crops. The low price of oil palm fruits and transportation problems also de-motivate oil palm cultivators in the study areas. Regarding the support given, the free supply of seedlings was highest in which all the cultivators received seedlings. This was followed by financial aid, agricultural implements and loan arrangement for cultivation. The source of support was mainly from the Agriculture Department followed by Godrej Company and District Rural Development Agency. It was observed that there was high level of dependency towards the government and companies. As, the negative impact of oil palm cultivation in the environment has been a discussion around the world, the study

probed into the perceived impact of oil palm cultivation on rural ecology. This was assessed based on different dimensions such as deforestation, effects on other crops beside it, effects on soil fertility and no effect on the ecology. These dimensions were formulated based on the pilot study conducted and were used to understand the impact of oil palm cultivation on rural ecology. As intercropping was practiced by many oil palm cultivators, the analysis show that majority of the households respond that oil palm cultivation has effects on other crops beside it, which was followed by households who stated that it has no effect on the ecology. As oil palm cultivation has effects on other crops, it could have negative impacts on other cash crops and traditional crops if it is planted in large scale. It was also observed that many of the cultivators were unaware of the negative impact of oil palm cultivation on the environment. Some even perceived that it has a positive impact rather than a negative impact as it provides food for wild animals and makes the surrounding pleasant and calm. Other dimensions i.e. the negative effect on soil fertility and deforestation was perceived only by a few households.

As oil palm cultivation has important implications in rural livelihoods transformations, the present study assessed the social and economic impact of oil palm cultivation among the sample households. Different indicators were used in the study that include working hours by men in the family, household investment in agriculture, household income from agriculture, cost of cultivation, household expenditure, men wage laborers employed in the farm, household savings, housing conditions, working hours by women in the family, households prestige in community, women wage laborers employed in the farm, household debt, household prestige in Church, households participation in community, and household

participation in Church. It was found that the mean of working hours by men in the family, household investment in agriculture, household income from agriculture, cost of cultivation, household expenditure, men wage laborers employed in the farm, household savings and housing conditions all worked out at the scale of 1 which indicates that the level of impact was increased in these indicators by adopting oil palm cultivation. Specifically, the level of impact was highest in the indicator of working hours by men in the family which indicates that men were the main workers in the oil palm farm. This was followed by household investment in agriculture, household income from agriculture, cost of cultivation, household expenditure, men wage laborers employed in the farm, household savings and housing conditions subsequently. The other indicators such as working hours by women in the family, household prestige in community, women wage laborers employed in the farm, household debt, household prestige in Church and household's participation in community falls at the scale of 0 which shows that there was no change in these indicators by practicing oil palm cultivation. Among these, the average of hours by women in the family and household prestige in the community was highest followed by women wage laborers employed in the farm, household debt, household prestige in Church and household participation in the community. The last indicator, household participation in Church shows a negative result of -1 which indicates that household participation in Church was decreased among oil palm cultivators. This may be due to the huge investment of labor required in oil palm cultivation. Overall, the mean calculated shows that oil palm cultivation had no highest impact on the social and economic conditions based on the scales used.

To develop a better understanding, a hypothesis was formulated which stated that “the volume of livelihood assets viz., natural, physical, human, and social capital endowment of the household is directly related to the adoption of oil palm cultivation.” To understand the patterns of relationship between oil palm cultivation and livelihood assets, the area under oil palm cultivation, the number of trees and palm tree per acres were taken. The livelihood assets viz., natural assets, physical assets, financial capital, mean of age, the standard deviation of age, proportion of earners, mean years of adult education, the standard deviation of adult education, participation in CBOs, political participation, monthly household expenditure, and annual household income were also taken. The computation of the relationship between livelihood assets and oil palm cultivation shows that natural capital was not significant to the area under oil palm cultivation, number of trees and palm tree per acres. The next livelihood dimension, physical capital shows that it was positively correlated to the area under oil palm cultivation which indicates that with the increase in physical capital, there was an increase in the area of oil palm cultivation too. The proportion of earners and financial capital were negatively correlated to the area under oil palm cultivation and the number of oil palm trees. Conversely, the mean years of age and standard deviation of age were not significant to the area under oil palm cultivation, the number of oil palm trees and palm tree per acres. The other dimensions such as mean years of adult education, the standard deviation of adult education, participation in CBOs, political participation and monthly household expenditure were all not significant to the area under oil palm cultivation, number of oil palm trees and palm tree per acres. However, the study shows that oil palm cultivators have better and higher possessions of livelihood assets than non

cultivators. This was only not significant to adoption of oil palm cultivation when computed.

The second hypothesis formulated was “the cultivation of oil palm is positively related to the household’s living conditions in rural Mizoram.” To analyze the relationship between oil palm cultivation and living conditions, the area under oil palm cultivation, the number of oil palm trees and palm tree per acres were taken. The monthly household expenditure and annual household income were also taken to represent the living conditions of households. It was found that the area under oil palm cultivation was significantly correlated to the annual household. In contrast, the area under oil palm cultivation was not significant to monthly household expenditure. On the other hand, the number of oil palm trees cultivated was positively correlated to annual household income. However, there was no significant relationship between the number of trees planted and household monthly expenditure. The area under oil palm cultivation and palm tree per acres also show no significant relationship to monthly household expenditure and annual household income. Overall it can be concluded that the area under oil palm cultivation and the number of oil palm trees planted have contributed significantly to the household income of the sample villages.

Conclusion

Oil palm cultivation is promoted as a strategy of rural development in many countries around the globe. In the context of Mizoram, Mizoram Oil Palm (Regulation of Production & Processing) Act was passed in 2004 which introduced oil palm cultivation in the state. Integrated Scheme of Oilseeds, Pulses, Oil Palm and Maize (ISOPOM) and National Mission on Oilseeds and Oil Palm (NMOOP) also

plays an important role in oil palm promotion in the state. In addition, the state scheme of New Land Use Policy (NLUP) also put oil palm cultivation as one of the trades/activities that the beneficiaries of the scheme can select. With all these, oil palm cultivation in the state is yet to be more successful in the state.

On the whole, it can be inferred that oil palm cultivation has been augmenting rural income and has raised the standard of living. This was evident from the comparison between oil palm cultivators and non-cultivators of oil palm in terms of their income and possessions of livelihood assets. The area under oil palm cultivation and numbers of trees were also positively correlated to annual household income which supplements it. Another analysis also shows that an increase in livelihood assets possessions has significant effect on the living conditions of households. Therefore, an immediate concern of the government policy needs to focus on increasing rural household access to human, natural, physical, financial, and social capital in order to promote rural development and oil palm cultivation.

Suggestions

- Promotion of Rural Livelihood and Oil Palm Cultivation
- Promoting livelihood capitals
- Better infrastructural facilities
- Promotion of financial inclusion
- Promoting physical capital for development
- Awareness on the impact of oil palm cultivation on ecology
- Focus on smallholder farmers
- Prevention of Land Alienation
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Suggestion for Further Research

Keeping in mind the present study, some research suggestions are put forward:

1. The state program of Mizoram i.e. New Land Use Policy (NLUP) and other central schemes can be taken up for study. Its role in promoting oil palm cultivation and loopholes may be identified.

2. Although oil palm cultivation is being promoted in the state, the income of rural households is still low and many of them still live Below the Poverty Line. A study focusing on the constraints and challenges in oil palm cultivation could be undertaken.

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