



Prospects of Oil Palm Plantation in Mizoram, India

V. P. Sati* • L. Vangchhia

Department of Geography and Resource Management, Mizoram University (Central), Aizawl 796004, Mizoram

ARTICLE INFO

Article history:

Received 30 September 2016

Revision Received 19 December 2016

Accepted 25 January 2017

Key words:

Oil palm plantation; cereal crop;
marginal farmers; Mizoram

ABSTRACT

Traditional agriculture, dominated by shifting cultivation, is the main occupation of rural people of Mizoram. Output from which is very insufficient. Thus, a number of people suffer from poverty and malnutrition. However, climate and landscape support oil palm plantation. This study examines prospects of oil palm plantation in Mizoram. We gathered data from primary sources through case study of eight villages. Out of total households, we surveyed 173 households (12.4%). We used a structured questionnaire and interviewed head of the households. The study shows that income from oil palm plantation is comparatively higher (about 50%) than the income from cereal farming. It also shows that the marginal farmers see the future prospects of oil palm plantation sustainable, if all measures related to its plantation are appropriately taken place.

1. Introduction

Oil palm (*Elaeis guineensis*) is an important vegetable crop, contributes about 30% of the global production of vegetable oil. It also supports economic development of tropical countries. Its cultivation began in about 1910, initially in Indonesia, Malaysia and Africa and slowly spread in other tropical regions. (Tailliez 2005) Oil palm grows mainly in the tropical regions of the world and Indonesia and Malaysia dominate in its production. Similarly, other tropical countries have potential in growing it and producing vegetable oil. Oil palm plantation (OPP) covers about 15 million ha across the world (FAO 2009). The extracted oil palm has various uses as food, household products and biodiesel production. In India, OPP began in 1977 in Kerala. It spreads in other southern states of India such as Tamil Nadu, Andhra Pradesh, Karnataka, Orissa and West Bengal. Meanwhile, it could not get momentum in terms of its production and productivity. In north east India, Mizoram state has potential to cultivate oil palm and it has already started its plantation recently (from 2005) in its seven districts – Aizawl, Mamit, Kolasib, Serchhip, Saiha, Lunglei and Lunglei except Champhai district.

OPP in Mizoram mainly characterises small holdings and it has resulted in replacement of traditional *jhum* lands. The state government has launched innovative programs of agricultural development through its new land use policy and OPP is one amongst its objectives. A study of implication of OPP was carried out by several researchers (Koczberski et al. 2001; Koczberski 2007). Fitzerbert et al. (2008), Koh and Wilcove (2008) and Butler and Laurence (2009) reported that forest degradation is due to expansion of oil palm in forest areas in the tropical regions and emphasis that it is the major threat to environmental degradation. Meanwhile, some studies on OPP show that its cultivation is environmentally sustainable (de Vries et al. 2010). Once established, it can be managed in a sustainable manner. The state of Mizoram has primitive economy where agricultural practices along with livestock farming dominate in all the economic activities. A large proportion of population is engaged in practicing agriculture and rearing livestock as both shares 50% of the total workforce. However, output from traditionally grown crops is considerably less; even it is not enough to meet two times food grain need and thus; a large group of people are living below poverty line/chronic poverty and are undernourished.

*Corresponding author: sati.vp@gmail.com

Landscape of Mizoram state is fragile, which is prone to frequent landslides and therefore, rate of soil erosion is high. Forest products are largely unused due to various reasons such as they are very dense and remotely located. As a whole, abundant natural resources are unused. Oil palm has potential to increase economy and income. In Mizoram, OPP started in 2005. Mizoram state has potential of 101,000 ha land to grow oil palm in seven districts. Champhai district does not have any farm for OPP. Meanwhile, only 23,358 ha land is used for its cultivation. It involves 10,800 farmers from 225 villages in its plantation (DoA&GoM 2015). OPP is economically viable and if all the issues related to it are kept in mind, OPP may be a promising sector to increase economy and income. The objective of this study is to focus on prospects of OPP in Mizoram. It compares the output from both cereal farming and OPP and describes the people's perception on OPP and the problems related to it.

2. Methodology

2.1 Study Area

Mizoram state lies in the northeast India, borders with Myanmar in the east and south and Bangladesh in the west

(international), Assam and Manipur in the north and Tripura in the west delimit its national boundary. It is a hilly state, characterises fragile landscape that leads to high rate of soil erosion and frequent landslides. It has 21087 km² areas, shares 0.64% of the country's geographical area. Mizoram stretches between 21° 58' - 24° 35' N and 92° 15' - 93 ° 29' E, is remote and economically underdeveloped state. Average altitude of Mizoram ranges from 500 m to 1000 m, with the maximum altitude of 2157 m. Average family size is 4.7 whereas literacy rate is 72% among the households we studied. Literacy rate is comparatively higher meanwhile education level is low as average 2 persons are graduates from each village. In terms of educational and other development amenities, these villages has (average of each villages) 7.2 water points, 1.2 fair price shops, 3.1 public latrine, 2.8 Aanganwadi centres, 1.5 primary schools, 1 middle and high school each. Location of these villages varies from the roadside to eight km from it whereas all villages are located remotely as their average distance from the urban center is about 35 km. Road condition is not good. Temperature varies from 13°C to 35°C, depending upon the location of villages. Average annual rainfall is 250 cm while average annual humidity is 72%. Every village has at least one medical sub-center. Salient features of the villages are given in table 1.

Table 1. Salient features of case study villages

Villages	Area (km ²)	Altitude (m)	Terrain	Soil	Forest
Buhchangphai	2	139	Plain	Sand	Open bamboo
Bukvannei	10	148	Semi Plain	Sand	Open bamboo
Khamrang	2.5	114	Gently hill	Sand	Mixed forest
Mualkhang	1.5	507	Hill	Red Clay	Mixed forest
Dapchhuah	5	103	Gently hill	Mud	Mixed forest
Nalzawl	3	107	Semi plain	Mud and clay	Mixed forest
Rawpuichhip	3	724	Hill	Clay	Mixed forest
Rulpuihlum	1	983	Hill	Clay	Mixed forest

Source: Field survey, 2016

2.2 Data Collection and Survey Method

This study was carried out using both qualitative and quantitative methods. Data was gathered from the primary sources through household level survey. We selected eight villages of two districts (four villages from each district) and surveyed total 173 households (12.4% of the total households) (Table 2). The households we surveyed are involved both in cultivation of cereal crops and OPP. A structured questionnaire was framed and questions were raised on economic viability of OPP. We interviewed the people about suitability and viability of OPP whether its practices should be continued.

3. Result

In this section, we described characteristics of oil palm farmlands; area, production and productivity; income from cereal crops and OPP; differences in income from both crops and people perceptions on OPP.

3.1 Characteristics of Oil Palm Farmland

The households we studied have 179 farmlands devoted for OPP. Most of the farmlands are situated along the river sites. Average distance of farmlands from villages is 2.6 km. About 68.5% farmlands have proper water supply and about 72.4% farmlands lie in wetland (Table 3).

Table 2. Households level information

Village	Total Household	Surveyed HHs	Surveyed HHs (%)	Main workers (%)
Buhchangphai	282	20	7.1	80
Bukvannei	107	19	17.8	78.9
Khamrang	163	20	12.3	70
Mualkhang	106	13	12.3	100
Dapchhuah	230	30	13	93.3
Nalzawl	107	29	27	89.7
Rawpuichhip	306	20	6.5	75
Rulpuihlim	90	22	24.4	68.2
Total	1391	173	12.4	82.1

Source: Field survey, 2016

Table 3. Characteristics of farmlands (n=8)

Variables	Mean value	Std. deviation
Distance of farmlands from village (km)	2.6	1.9
Farmlands have proper water supply (%)	68.5	12.3
Farms lie in wetland (%)	72.4	16.2

Source: Field survey, 2016

3.2 Area, Production and Yield of OPP

Table 4 shows village wise area (ha), production (kg) and yield (kg/ha) of OPP. The highest area under OPP is in village Dapchhuah (37) followed by Nalzawl (34), Khamrang (29) and Rawpuichhip (28). The lowest area under OPP was recorded in Mualkhang (9) and Rulpuihlim (12). Total area under OPP is 190 ha (11.2% of total area of villages). We recorded 176,747 kg production. It varies from 383 kg lowest in Khamrang to 66000 kg highest in Dapchhuah. Yield of crops was 6802 kg/ha with highest (1834 kg/ha) in Buhchangphai and lowest (13kg/ha) in Khamrang.

Table 4. Area, production and yield of OPP, 2015

Village	Area (ha)	Production (kg)	Yield (kg/ha)
Buhchangphai	24	44390	1834
Bukvannei	16	3361	212
Khamrang	29	383	13
Mualkhang	9	9500	1032
Dapchhuah	37	66000	1803
Nalzawl	34	41013	1206
Rawpuichhip	28	6100	216
Rulpuihlim	12	6000	483
Total	190	176747	6802

Source: Field survey, 2016

3.3 Analysis of Income from Cereal Crops and OPP

We analyzed income from cereal crops and OPP in the study villages (Table 5). Total annual income (Million Rs.) earned from cereal crops by the households of all villages was 8.3. At village level, Buhchangphai earned the highest income from cereals (1.8) followed by Khamrang (1.5) and Rulpuihlim (1.3). Dapchhuah village earned the lowest income from cereal *i.e.* 0.3 which is followed by Rawpuichhip (0.6) and Mualkhang (0.8). In terms of Income from OPP, Khamrang village earned the highest income (2.9) followed by Buhchangphai (2.1) and Nalzawl (1.9). The lowest income is earned from OPP by village Rawpuichhip (0.6) followed by Mualkhang (0.8). Further, we analyzed the difference in income in both crops. We observed that total benefit from OPP is 50.6%. At village level, two villages Mualkhang and Rawpuichhip have earned similar income from both crops. Dapchhuah village earned the highest income from OPP *i.e.* 433% followed by Nalzawl village which is 111%. Other villages earned from 9.1% to 93.3% more income.

3.4 People's Perception in OPP

We interviewed people for their opinion on OPP (Table 6). These questions are related to environmental and economic impacts of OPP. The first question was does OPP degrade soil quality? 34.3% (mean) farmers respond yes. About water quality 5.6% farmers respond yes, it degrades water quality. About 66% farmers respond that overall environmental quality degrades due to OPP. At the meantime, all farmers who are involved in OPP respond that it supports livelihood as its economic potential is higher than cereals.

Table 5. Analysis of income (in million Rs) from cereal crops and OPP, 2015

Village	Income from cereal crops	Income from OPP	Difference	Difference (%)
Buhchangphai	1.8	2.1	0.3	16.7
Bukvannei	1.1	1.2	0.1	9.1
Khamrang	1.5	2.9	1.4	93.3
Mualkhang	0.8	0.8	0	0
Dapchhuah	0.3	1.6	1.3	433
Nalzawl	0.9	1.9	1	111
Rawpuichhip	0.6	0.6	0	0
Rulpuihlum	1.3	1.4	0.1	7.8
Total	8.3	12.5	4.2	50.6

Source: Field survey, 2016

Table 6. People's perception in OPP (n=173)

Variables (value is given in %)	Mean value	Std. Deviation
Does OPP degrade soil quality?	34.3	31.7
Does OPP degrade water quality?	5.6	15.9
Does OPP degrade overall environmental quality?	66	21.6
Does OPP support livelihood?	100	0

Source: Field survey, 2016

3.5 Government/Company Assistance to Start OPP

We asked several other questions to farmers of OPP regarding government/company assistance to start OPP (Table 7). The farmers received government assistance for clearing of land, construction of water tank and pipes for water supply. Other assistances were a lump sum amount for starting OPP, free insecticide, free fertilizer and subsidy in bank loan. Finally we asked them whether they want to continue OPP in future and is OPP suitable, more than 70% people responded yes (Table 7).

Table 7. Government/company assistance to start OPP (n=173)

Variables (value is given %)	Mean value	Std. Deviation
Received government assistance	60.9	13.4
Assistance for clearing of land	96.4	4.1
Construction of water tank	55.2	43.3
Pipe for water supply	55.2	43.3
Do you want to continue it?	70.5	10.9
Is OPP suitable?	74.6	19

Source: Field survey, 2016

4. Discussion and Conclusions

In this study, we try to observe whether OPP is suitable for economic development of Mizoram and what is its future prospect. We described socio-economic conditions of villages that we studied. We also analyzed crop productivity of OPP and compared output from both cereals and OPP. The study shows that income from OPP is above 50% higher than the income from traditional crops. It means that growing OPP has potential to future agrarian development of the rural areas. Government supports for OPP is noteworthy and the state government itself desires to promote OPP in the rural areas of Mizoram and it has initiated to do so. A lump sum subsidy is given to OPP practicing farmers and the fact of supporting farmers financially was accepted by the persons who we interviewed. The people's perception about OPP is positive. During a short period of time, farmers started receiving profit from the field of OPP. Thus, more than 70% farmers opined that it is a suitable crop. Although, the profit from OPP is not sustainable now because this practice was started recently and OPP needs a particular time to give output. In Mizoram, OPP started in 2005 meanwhile it needs a substantial time to grow and making benefit from its crops. Some farmers say that now, production is less because the trees are immature and price of products is also low in the market. Further, it is very hard to manage farmlands which are far and where infrastructural facilities are less.

In terms of the future prospects of OPP in Mizoram state, we observed that it is a suitable crop. Because (i) Mizoram has a substantial land in the form of *jhum* lands where OPP can be carried out largely (ii) it has feasible climatic conditions to grow oil palm and (iii) water supply is ample as Mizoram receives rain for about eight months in a year and oil palm farmlands lie mostly along the river sites and wetlands as our study shows. In Mizoram, landscape is fragile and it is not suitable of shifting cultivation. At the meantime, if an acre of land which is used for shifting cultivation to be transferred to OPP, it will help to landscape stability and will enhance livelihoods. Government assistance in terms of supporting farmers through giving subsidies and encouraging them to practice it will be a milestone. Market facilities are essential to promote OPP. Mizoram lies in the remote area, where infrastructural facilities are very minimal. On account of it, there should be a regularity body that will look after market related issues. Oil making factories should be established in Mizoram so that the local unemployed youth can get involved in it to carry their livelihood and farmers who grow oil palm can get benefit out of it.

Koh LP, Wilcove DS (2008) Is oil palm agriculture really destroying tropical biodiversity? *Conserv Letters* 1, 60–64
 Tailliez B, Caliman JP, Verwilghen A, Omont H (2005). *Scientific Research for Sustainable Palm Oil Production, RSPO RT3*. Singapore, p 9

References

- Department of Agriculture, Government of Mizoram, Statistical Book, Aizawl, (2015).
- de Vries SC, van de Ven GWJ, van Ittersum KK Giller KE (2010) Resource use efficiency and environmental performance of nine major biofuel crops, processed by first-generation conversion techniques. *Biomass Bioenergy*, doi:10.1016/j.biombioe. 2010.01.001
- FAO (2009). *Global Forest Resources Assessment, Progress towards sustainable forest management*.
- Fitzherbert EB, Struebig MJ, Morel A, Danielsen F, Brühl CA, Donald PF, Phalan B (2008) How will oil palm expansion affect biodiversity? *Trends Ecol Evol* 23(10): 538–545
- Koczberski G (2007). Loose fruit mamas: creating incentives for smallholder women in oil palm production in Papua New Guinea. *World Dev* 35(7): 1172–1185
- Koczberski G, Curry GN, Gibson K (2001). Improving productivity of the smallholder oil palm sector in Papua New Guinea: a socio-economic study of the Hoskins and Popondetta schemes. The Australian National University Department of Human Geography Research School of Asian and Pacific Studies: Canberra.