

# ABSTRACT

## 1. Introduction

Assam, a state in India's North-East, has a glorious history of oil exploration from where India's journey of the oil industry started in 1889, during British colonial rule. Currently, ONGC and OIL are the two major industries dealing with oil and gas extraction in the state. It should be noted that the majority of their operations are concentrated in the rural areas of the state. It was expected to have its relation with the life and livelihood of the neighbouring rural people, in addition to the revenue generation to the state. So, in the present study, an attempt has been made to discuss the impact of the oil industry on rural livelihood in Assam.

## 2. Research gap

Despite having a long history of crude oil exploration and petroleum production, there is a dearth of previous research related to the oil industry and its impacts on rural livelihood in India. A few studies have been done on the coal mining industry-induced impact on local rural livelihood and such studies were geographically limited to Orissa and West Bengal. In the context of Assam, there is a dearth of previous research considering the impact of the oil industry on the sustainable livelihoods of the local community which seems to be a major concern at present at the global level. Therefore, there is a scope of research to examine the impact of the oil industry of Assam on the local rural livelihoods including the aspects of livelihood sustainability.

## 3. Objectives

The main objectives of the study are-

- i) To assess the impact of ONGC and OIL on the livelihood of rural people in the study area.
- ii) To examine the nature and extent of rural livelihood diversification in the study area and to identify the influencing factors thereof.
- iii) To study the sustainability of livelihoods of rural people in the operational area of ONGC and OIL

#### **4. Significance of the study**

Ensuring improved livelihood is one of the basic goals of the nation. One important aspect of the present study is that it has been carried out by using the sustainable livelihood approach of DFID (1999) which has superiority over the traditional poverty definitions. It helps to understand the impacts of oil exploration on five livelihood capitals of rural households and to identify the vulnerability context arising out of oil extraction. Besides, the present study constructs the sustainable livelihood index by considering some important sub-indicators which would help to understand the status of sustainable livelihoods in the villages of oil operational areas. This study bears significance from the policy implications point of view. It will provide some input to the policymakers to deal with the livelihood challenges generated by oil exploring industries. It is expected that this study will help to fill the void of research, prescribe necessary policies for local rural livelihood development, and pave the way for future research.

#### **5. Methodology**

The study was based on both primary and secondary data. Primary data was collected with the help of a structured questionnaire from the respondents of the sample households. Moreover, focus group discussions (FGDs) were conducted with the communities of the study area to get qualitative information related to the objectives of the study. The study area of the present research is located in the Sivasagar, Dibrugarh and Tinsukia districts, where the oldest operational areas of ONGC and OIL in Assam have been functioning. The DFID (1999) approach of sustainable livelihood was used to examine the impact of the oil industry on rural livelihood. Simpson's index of diversification was used to examine the status of livelihood diversification in the study area, and a Tobit regression analysis was done to identify the influencing factors of livelihood diversification. To study the sustainability of livelihoods in the study area, the sustainable livelihood index is estimated.

## 6. Major findings

### 6.1 Objective 1

During the study, a mixed impact on the five livelihood capitals of rural households was observed.

- i) A large percentage of the population of oil villages is engaged in non-farm work rather than farm work, and they generate demand for farm products of the control villages. As a result, the average farm income of the sample households in the control villages is greater than that of the oil villages. In the case of the operational headquarters, however, the mean farm income in the nearby villages is higher than in the control villages. Because the urban areas surrounding the operational headquarters generate demand for agricultural products, farmers in nearby villages can sell their products at a higher price.
- ii) The physical capital index estimates that the sample households of the oil villages under operational areas and the nearby villages of the operational headquarters have more physical wealth than their respective control villages.
- iii) The ONGC and OIL have created numerous risks to human health. Contamination of drinking water sources due to oil spillage, air and sound pollution from drilling operations, mud pumps, power generators, vehicular movement, cranes, and material handling equipment, among other things, have increased the health risk of people living in oil villages.
- iv) The average land holding of the oil village sample households (0.89 hectares) was found to be less than that of the control villages (1.25 hectares). Furthermore, the average amount of land used for agricultural work was estimated to be lower in the oil villages than in the control villages.
- v) Almost 51.69 per cent of the oil village sample households have faced land acquisitions by ONGC and OIL in recent years for the purpose of establishing group gathering stations (GGS) or oil collection stations (OCS), drilling oil wells, and installing oil pipelines. The total land acquisition of sample households in the oil villages was estimated to be 19.29 per cent of the total land owned prior to acquisition.
- vi) The average land holding of the sample families in the oil villages was reduced as a result of land acquisition. Before the land acquisition, the average land holding of

the sample families was 1.32 hectares, which was reduced to 1.07 hectares after the oil companies acquired their lands. ONGC and OIL acquired an average of 0.26 hectares of land from 229 oil village sample households.

- vii) The acquisition of land by ONGC and OIL had a significant impact on the marginal and smallholders of oil villages. Out of the total 229 sample households confronted with land acquisition, 55.02 per cent are marginal landholders (less than one hectare) and 34.50 per cent are small landholders (1.0-2.0 hectares). And after the acquisition of land by the oil companies, the number of marginal landholders increased in the oil villages.
- viii) Leakage of crude oil from oil rigs, GGS, OCS, and pipelines passing through agricultural fields harmed crops, livestock, and natural resources. The magnitude of such losses increases during the summer months as crude oil spreads through water across a large crop area.
- ix) During the research, some negative effects on social capital were observed. Loss of traditional occupations due to excessive air pollution caused by oil companies, gender disparities in employment, the conflict between the oil industry and local communities, and manipulating community leaders to stop such agitations were just a few of the issues that harmed many aspects of social capital.

## **6.2 Objective 2**

- i) Income source diversity was found to be higher in the oil villages of the operational area and the nearby villages of the operational headquarters than in their respective control villages. In comparison to the control villages, the operational areas and operational headquarters of ONGC and OIL provide more opportunities for neighbouring rural households to earn from a variety of sources.
- ii) According to the study, there seem to be currently very few people in the oil villages who are directly employed by ONGC and OIL. Rather, the private companies that ONGC and OIL outsourced various exploration tasks to have created more job opportunities for locals. This has resulted in a shift in employment to the non-farm sector. However, such jobs are typically temporary and low-paying. The operational headquarters of ONGC (at Nazira) and OIL (at Duliajan) also contributed to the growth of urban centres, which provided many non-farm employment opportunities to the nearby villages.

- iii) By estimating the Simpson index of diversification (SID), it is found that the extent of livelihood diversification is greater in the oil villages of operational areas and nearby villages of the operational headquarters than in their respective control villages.
- iv) When compared to their respective control villages, the maximum percentage of households in the oil villages, as well as nearby villages, fall into the categories of moderate ( $0.26 \leq \text{SID} \leq 0.50$ ) and high diversification ( $0.51 \leq \text{SID} \leq 0.75$ ). This indicates that there are more opportunities for diversification of livelihood in the oil villages of operational areas and nearby villages of operational headquarters than in the control villages.
- v) According to the results of regression model-I, family size, education, technical education, physical asset index, CSR benefit, female work participation, land holding, and locational dummy (1=oil villages, 0=control villages) have a positive impact on livelihood diversification in operational areas, whereas dependency ratio and distance to the nearest bank have a negative impact.
- vi) On the other hand, the regression result of model-II indicates that variables such as family size, technical education, membership in formal social organisations, female work participation, land holding, and locational dummy (1=nearby villages, 0=control villages) have positively influenced the livelihood diversification of the sample households living in the operational headquarters, whereas the distance to the nearest town has a negative impact.

### **6.3 Objective 3**

- i) By measuring the sustainable livelihood index (SLI), it was observed that the oil villages of operational areas and the nearby villages of operational headquarters scored higher index values in the financial capital, physical capital, human capital, and social capital index, compared to their respective control villages.
- ii) The natural capital index value of operational headquarters oil villages and nearby villages of operational headquarters was found to be lower than that of their respective control villages. The oil villages scored significantly lower on the natural capital index. Land acquisition, crop and livestock loss due to oil leakage, and lower agricultural productivity worsen the natural capital index score of oil villages.

- iii) The overall SLI was calculated for all types of villages by combining all five livelihood capital indices. SLI values in the oil villages and nearby villages were higher than in their respective control villages. The SLI score for the oil villages is 0.525, compared to 0.455 for the control villages of the operational areas. Similarly, the nearby villages of the operational headquarters scored 0.536 in SLI, compared to 0.422 in the control villages.
- iv) During the FGDs, several livelihood issues caused by the oil exploration of ONGC and OIL were identified. Though earlier ONGC and OIL used to offer permanent jobs to the family member whose lands were acquired by them, now the compensation for acquired land is paid in cash.
- v) Another FGD observation is that some households were found dissatisfied because their inherited lands were acquired by the oil companies for national development without making sufficient arrangements for them to achieve sustainable livelihood security.
- vi) The major vulnerability contexts identified during the FGDs are land acquisition, a decrease in agricultural productivity, loss of indigenous occupation, temporary and low-paid jobs, and environmental pollution which create challenges to some SDGs.

## **7. Contribution to the existing body of the knowledge**

- i) The oil industry is one of the oldest industries in Assam and its operational activities are spread mainly in rural areas. However, research on the impact of oil industries on rural livelihoods is limited to issues such as direct employment and revenue generation, sociological impacts, and production behaviour. Thus, the study has filled the void of research in that area by applying the sustainable livelihood framework.
- ii) The present study has identified the vulnerability contexts associated with the livelihood capitals of the rural community inhabiting near the oil exploration areas of the study areas. This is one of the important contributions of the present study which is expected to help the oil companies to understand and streamline their CSR initiatives to remove livelihood barriers and find alternative livelihoods for the affected rural community.

- iii) The livelihood issues may differ by region or locality. This study has made a significant contribution to understanding the livelihood issues at the local level. So, it will help the oil companies in developing region-specific policies for sustainable livelihood development.
- iv) The present study has developed two regression models to identify the influencing factors of livelihood diversification of the households inhabiting in the oil operational areas and nearby the operational headquarters. These models are expected to help the policymakers to formulate appropriate policies for enhancing livelihood diversification and sustainability of the people inhabiting nearby the oil extractive industries. Further, these models could be used in future research of a similar kind.
- v) Another important contribution of this research is that it constructed the sustainable livelihood Index (SLI) for the oil villages and control villages of operational areas and nearby villages and control villages of operational headquarters, which gives a clear understanding of the magnitude of livelihood sustainability of the concerned villages. Previous studies related to the extractive industry's impacts on rural communities conducted in Assam have not used the sustainable livelihood index to estimate livelihood sustainability. The sub-indicators used in the construction of SLI could be referred to while constructing similar indices in the context of rural community's sustainable livelihoods.

## **8. Policy implications of the study**

- i) The oil companies should compensate households with cash and income-generating capital assets, as well as training for proper management and sustainable livelihood activities.
- ii) To reduce negative impacts on indigenous rural livelihood options, alternative livelihood options can be provided based on previous experience and knowledge of the local people, such as producing high-value agricultural products/crops and livestock.
- iii) The ONGC and OIL may provide the facility of technical education for the youths of their operational areas. This will increase the employability of the local youths to get a job at ONGC and OIL.

iv) The ONGC, OIL and their outsourced companies were found recruiting mostly male workers of the study area for their field-based work. This has created gender inequality in employment. So, for the female people, the oil companies may provide some livelihood strategies based on their skills and knowledge.

### **9. Scope for future research**

- i) Since agriculture is the backbone of the rural economy which has been affected by the oil exploration of ONGC and OIL in the oil villages, extensive research especially focusing on the agriculture sector of those areas may be taken up for further research.
- ii) Further livelihood research may be carried out by incorporating science-based research tools and techniques to address the negative impact on natural capital as well as human capital.
- iii) Since the present study has not extensively discussed the CSR initiatives of ONGC and OIL, a future study can be carried out to assess the role of their CSR initiatives in the livelihood generation of local rural people.

## **KEYWORDS**

**Title of the thesis:** Impact of Oil Industry on Rural Livelihood in Assam – A Study of ONGC and OIL

**Keywords:** Oil industry, Livelihoods, Livelihood capitals, Land acquisition, Sustainable livelihood, Livelihood vulnerability, livelihood diversification, Diversification index, Physical capital index, Sustainable livelihood index, ONGC, OIL, Assam