

CHAPTER 8

CONCLUSION

Since the second half of the 1990s, there has been an increase in the importance of livelihood research. The Institute of Development Studies (IDS) at the University of Sussex and the United Kingdom's Department for International Development (DFID) collaborated on a novel approach to livelihood research for poverty reduction. The current study was also carried out by the DFID sustainable livelihood framework, which includes five major livelihood capitals (financial, physical, human, natural, and social) that are critical for dealing with vulnerable contexts and achieving sustainable livelihood outcomes. The present study has focused on the sustainable livelihood issues of local rural communities arising out of the oil exploration activities of ONGC and OIL in Assam. This chapter has been devoted to presenting a summary of the research. It has been classified into four sections. Section 8.1 provides objective-wise major findings of the study. Section 8.2 presents the contribution of the study to the existing body of knowledge. Section 8.3 gives policy implications of the study, and Section 8.4 specifies the scope of future research.

8.1 Major findings of the study

The major findings of the present research have been summarised objective-wise as follows:

Objective 1

The first objective was to assess the impact of ONGC and OIL on rural people's livelihoods in the study area. This objective was met by investigating the impact of ONGC and OIL on five livelihood capitals identified by DFID (2001). The following are the key findings from Objective 1:

- i) During the study, a mixed impact on the five livelihood capitals of rural households was observed. The nature of the impacts varies depending on the operational area and operational headquarters of ONGC and OIL under consideration.
- ii) ONGC and OIL were expected to significantly increase average household income and per capita income in the operational area's oil villages, as well as nearby villages of the operational headquarters. The independent sample t-test, on the other hand, finds no

significant difference in mean household income and per capita income between oil villages and control villages in ONGC and OIL operational areas. In the case of operational headquarters, Nazira and Duliajan, the difference in average household income and per capita income between nearby and control villages is found to be statistically significant. The field observation revealed that the operational headquarters and its adjacent growth centres (i.e., Nazira and Duliajan towns) have a greater forward effect in terms of diverse and high-income earning opportunities in the nearby villages, whereas such forward effects are found to be comparatively less in the oil villages.

iii) Another field observation is that a large percentage of the population of oil villages is engaged in non-farm work rather than farm work (Table 4.3), and they generate demand for farm products from 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.

iv) It was observed that the percentage of households having larger share of non-crop income to total household income is higher in the oil villages of operational areas and the nearby villages of the operational headquarters than in their respective control villages. It implies that the non-crop sector has played an important role in generating livelihoods for people living near oil operational areas and headquarters.

v) 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. ONGC and OIL have caused an occupational shift from farm to non-farm in the oil villages and surrounding villages, resulting in an increase in physical wealth holding and standard of living.

vi) In terms of human capital, there is no marked difference in educational attainment between oil villages and control villages of the operational area, as well as nearby villages and control villages of the operational headquarters of ONGC and OIL. During the field survey, it was found that the coverage of CSR benefits for human capital formation is very limited in the study area. Such CSR programmes were seen to benefit a small number of people in the study area. Furthermore, the ongoing skill-based

programmes seem to be irregular, and many deserving women and youth are excluded from such training due to information lag.

vii) 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, has increased the health risk of people living in oil villages.

viii) Land is a valuable natural asset in rural areas because agriculture is the primary source of income for many households in the study area. 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. Some of the reasons for such observations can be attributed to ONGC and OIL acquiring land in oil villages for various operational activities. Furthermore, their agricultural land has been impacted by crude oil leaks and wastages from oil pipelines, oil collection stations or group gathering stations, and oil drilling sites. Again, the availability of non-farm occupations, such as casual job opportunities in oil villages, encourages many households to move away from agriculture and toward non-agricultural work.

ix) Almost 51.69 per cent of the oil village sample households have faced land acquisitions by ONGC and OIL in recent years to establish group gathering stations (GGS) or oil collection stations (OCS), drill oil wells, and install 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 before acquisition.

x) 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.

xi) 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 hectare). And after the acquisition of land

by the oil companies, the number of marginal landholders has increased in the oil villages.

xii) 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. Almost 61 per cent of oil village sample households in operational areas reported that ONGC and OIL activities had a negative impact on their agricultural fields.

xiii) 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 hurt many aspects of social capital.

Objective 2

The second objective was to investigate the nature and extent of rural livelihood diversification in the study area, as well as to identify the major factors driving rural livelihood diversification. The following are the main findings:

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. It was found that the percentage of households with more earning sources (i.e. 5—9) is higher in oil villages and nearby villages of the oil industry. In contrast, a large proportion of households in the control villages have fewer income earning sources (i.e. 1—4 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) The percentage contribution of the non-farm sector to the total household income of the sample families is 73.22 per cent on average in the oil villages, compared to 63.82 per cent in the control villages. However, the difference between the nearby and control villages of the operational headquarters is negligible.

iv) 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 than in their respective control villages.

v) When compared to their respective control villages, the maximum percentage of households in the oil, 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.

vi) Two regression models were estimated to identify the influencing factor of livelihood diversification in operational areas and operational headquarters. According to the results of regression model-I, factors such as 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.

vii) The regression result of model-II, on the other hand, 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.

Objective 3

Objective 3 intended to examine the sustainability of rural people's livelihoods in the operational areas of ONGC and OIL. The following are the key findings:

- i) The sustainable livelihood index (SLI) was calculated to measure the sustainability of livelihoods by incorporating five major component indices. When compared to their respective control villages, the oil villages of operational areas and the villages closest to operational headquarters scored higher in the financial capital, physical capital, human capital, and social capital index.
- ii) The natural capital index value of operational headquarters oil villages and nearby villages' 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 a decrease in agricultural productivity lower 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 as cash. So, the number of ONGC and OIL employees in the oil villages has gone down. Nowadays, ONGC and OIL outsource most of their work to private companies and these private companies offer temporary jobs with low salaries.
- 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) Some FGD participants showed their concern about the negative impact of oil exploration on their indigenous occupations such as paddy cultivation, and sericulture caused by environmental pollution.

vii) Industry-community conflict was one of the important issues in the study area that affects many aspects of social capital. Such conflict mainly arises due to procedural delay in compensation.

viii) The respondents of the oil villages were found unhappy with some CSR initiatives of the ONGC and OIL in their locality. They argued that some major issues like the provision of safe drinking water, skilling local youths and women, etc. were not adequately addressed. They expressed their concern about the lack of proper implementation, monitoring and management of CSR initiatives in their locality.

ix) The vulnerability contexts such as land acquisition, a decrease in agricultural productivity, loss of indigenous occupation, temporary and low-paid jobs, and environmental pollution have brought challenges to some SDGs such as poverty eradication, inequality reduction, gender equality, decent work and economic growth, good health and well-being.

8.2 Contribution to the body of knowledge

i) The oil industry is one of the oldest industries in Assam and its operational activities are spread mainly in rural areas. But, the research on the impact of oil industries on rural livelihoods at the national and state level was very scanty. Although a few research at the national level dealt with the rural livelihood issues caused by the coal industry only (Mishra, 2009; Das, 2015; Behera, 2015; Hota & Behera, 2016), there is a dearth of research relating to the impact of the oil industry on rural livelihoods. Moreover, at the regional level, a few research have been found which addressed the socio-economic impact of oil industries in Assam; but these studies were found restricted to the issues such as direct employment and revenue generation of oil companies (Kalita, 2006), sociological impacts of oil industries (Sarma, 2007) and production behaviour of oil industries of Assam (Chakrabarty, 2010). No studies have examined the impact of oil industries on the local community by applying the sustainable livelihood framework, which is regarded as a better approach compared to the traditional poverty definitions (Lasse Krantz, 2001). Thus, the present study has filled the void of research in that area.

- ii) It has discussed the impacts of the oil industry on the five livelihood capitals of the local community such as financial, physical, human, natural and social capital. It has identified the vulnerability contexts linked with sustainable livelihoods of the oil villages. These vulnerability contexts pose some challenges to achieving livelihood sustainability. So, the present study is expected to help the oil companies to understand such vulnerabilities and to streamline their CSR initiatives according to the local community's requirements for removing such livelihood barriers and searching for 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 will give 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.

8.3 Policy implications of the study

- i) The study has revealed that land acquisition by the ONGC and OIL affected the small and marginal farmers inhabiting their operational areas. Presently, for their acquired lands, the oil companies compensate the households by paying cash, instead of jobs that were offered earlier. Their compensated money was found exhausted within a short period. The economic theory suggests that the marginal propensity to consume is very

high in case of the low-income earners. Therefore, the compensation should be provided as a combination of cash and income-generating capital assets. Moreover, they should have been provided with adequate training for the proper management of their compensated funds and necessary training for making them efficient to carry on alternative sustainable livelihood activities. In short, the compensation should be in the form of a package consisting of cash plus capital assets, including training in fund management and training for alternative livelihood activities.

ii) The present study has divulged that the oil exploration of the ONGC and OIL has brought many negative impacts on the rural livelihoods of the local community. For example, many households have suffered from the negative impact of oil exploration on indigenous livelihoods such as paddy cultivation, sericulture etc. Therefore, those affected households should have been provided with alternative livelihood options through which they can make their livelihood sustainable. Based on previous experience and knowledge that the local people have, production of the high-value agricultural products/crops, and livestock may be one of the important enterprises for ensuring their earnings.

iii) The ONGC and OIL should provide the facility of technical education for the youths in their operational areas. This will increase the employability of the local youths to get a job at ONGC and OIL. The oil companies may provide sponsorship for the local youths by collaborating with industrial training institutes (ITI), polytechnic institutes, and engineering institutes for pursuing technical education.

iv) The ONGC and OIL have created a male-favoured gender imbalance in employment in the study area. The ONGC, OIL and their outsourced companies were found to recruit mostly male workers from the study area for their field-based works. 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. Agriculture, poultry farming, livestock, handloom etc. are some occupations which are traditionally practised by the rural women in the study area. Proper training for rural women in such occupations will make their livelihood profitable.

v) Assam has ample scope for the development of rural tourism. It may be an alternative livelihood strategy for the rural households of the study area. The oil companies may

adopt the model village concept which will help to develop rural tourism. This will increase the employment of the local rural youths.

vi) ONGC and OIL may carry on major research projects in collaboration with leading research institutions to find ways of minimising the negative impacts of oil exploration and appropriate strategies for the development of sustainable livelihood. Participatory research may be one of the ways to identify the local community's livelihood issues and to provide solution to such issues. This will help to reduce industry community conflict in the locality.

8.4 Scope for future research

i) The present study has discussed the impact of the oil industry on rural livelihoods considering the sustainable livelihood approach. 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. This will help to redesign agriculture-based livelihoods in the affected areas.

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. Multidisciplinary research will add more value to livelihood research.

iii) CSR initiatives of ONGC and OIL are important policies which aim at the development of the local people by providing them various benefits to formulate alternative livelihood strategies. It can play an important role in livelihood generation for the affected rural households. During the field survey, it is reported that there is a lack of proper implementation, monitoring and management of CSR schemes in the study area. 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.

To sum up, the present research has focused on three basic objectives. First, by examining the impact of oil industries on the livelihoods of the local rural community, a mixed impact on the five livelihood capitals has been observed during the study. The major vulnerability contexts arising out of the oil exploration in the study area are land acquisition, agricultural land pollution and crop loss, water pollution, air pollution, sound

pollution, loss of traditional occupation, only temporary or contractual jobs for the local people, and industry-community conflicts. Second, by estimating the livelihood diversification index it has been observed that sample households of oil villages in operational areas and nearby villages of operational headquarters have more diverse income sources than their respective control villages. Finally, by estimating the sustainable livelihood index, it is found that the oil villages and the nearest villages scored a higher SLI value than their respective control villages. Another significant finding is that the oil villages of the operational areas of ONGC and OIL are far ahead of the control villages in terms of financial and physical capital. They lag far behind the control villages in terms of achievement in natural capital. Since the oil companies receive profit from oil production and the government receives royalty at the expense of livelihood risks of the local rural community, they should play an active role in minimizing such risks.