

## CHAPTER 7

### SUSTAINABILITY OF LIVELIHOODS OF RURAL PEOPLE IN THE STUDY AREA

Sustainable livelihood (SL) is an approach that considers various factors and processes that either limit or enhance poor people's ability to make a living in an economically, ecologically, and socially sustainable manner. This approach considers some important components of poverty such as vulnerability and social exclusion, which are not discussed in the traditional poverty definitions (DFID, 1999; Krantz, 2001). Though the oil industries have brought several changes in the livelihoods of the nearby villagers by generating different earning opportunities for them, it is equally important to examine how far the present livelihoods are sustainable in those areas.

Therefore, in this chapter, by considering the sustainable livelihood approach of the Department for International Development (DFID), a study is conducted on the sustainability of livelihoods of the rural people inhabiting the oil villages and control villages of operational areas and nearest villages and control villages of operational headquarters. For that a sustainable livelihood index (SLI) is constructed by taking into consideration the five capitals or assets of sustainable livelihood of DFID, viz.; financial capital, physical capital, human capital, natural capital and social capital.

Moreover, to examine the issues related to the impact of the oil industry on the sustainable livelihoods of the local rural people, six focus group discussions (FGD) have been conducted in six different locations of oil operational areas of ONGC and OIL. These FGDs help to understand the issues of livelihood sustainability in the study area from the villagers' perspectives.

#### 7.1 Measuring the Sustainable Livelihood Index (SLI)

The SLI is one of the popular indices for measuring the sustainability of livelihoods. Many previous studies have developed the SLI following the guiding principle of the sustainable livelihood framework defined by DFID which focuses on livelihood as an integrated function of five livelihood capitals in the context of stress, shock, and seasonality (Sarker et. al., 2020a), i. e.:

Livelihood=f (Financial, physical, human, natural and social capital)

These five capitals are considered major components of SLI. To construct the major component indices, several sub-components or indicators of each capital are selected based on extensive literature review and field observations. The major steps followed for constructing the SLI are as follows:

**Step-1:** The sub-component indicators ( $S_v$ ) are normalized to a value between 0 and 1 by using any of the two formulae:

$$Index_{sv} = \frac{S_v - S_{min}}{S_{max} - S_{min}} \quad \text{----- (i)}$$

$$Index_{sv} = \frac{S_{max} - S_v}{S_{max} - S_{min}} \quad \text{----- (ii)}$$

If the sub-component indicator ( $S_v$ ) is positively associated with sustainable livelihoods, then equation (i) is used for normalization and if  $S_v$  is negatively associated with sustainable livelihoods, then equation (ii) is used. The main reason for applying the normalisation process in each sub-component indicator is that they have different measurement units. By using the normalization process, all indicators can be transformed as unit free. (De & Das, 2020)

**Step-2:** After following the normalization process, equation (iii) is used to estimate the index of each major livelihood capital.

$$LC_v = \frac{\sum_{i=1}^n Index_{sv}}{n} \quad \text{----- (iii)}$$

where  $LC_v$  represents the value of livelihood capital for each village/area. The  $Index_{sv}$  represents sub-component index value and  $n$  is the number of sub-components in each livelihood capital.

**Step-3:** After estimating the value of five livelihood capital indices, the value of SLI is calculated by using the following formula:

$$SLI_v = \frac{\sum_{i=1}^5 w_{LC_i} LC_{v_i}}{\sum_{i=1}^5 w_{LC_i}} \quad \text{----- (iv)}$$

Or,

$$SLI_v = \frac{w_f F + w_p P + w_h H + w_n N + w_s S}{w_f + w_p + w_h + w_n + w_s} \quad \text{----- (v)}$$

where  $w_f$ ,  $w_p$ ,  $w_h$ ,  $w_n$  and  $w_s$  are weights of the five livelihood capitals, viz., financial (F), physical (P), human (H), natural (N) and social (S) capitals, respectively. By considering the previous studies, the present study used equal weighting for all five capital indices in the calculation of the composite index of sustainable livelihoods (SLI) (Pandey et. al., 2017; Alam et. al., 2018; Sarker et. al., 2020a; Sarker et. al. 2020b; Zhang & Fang, 2020; Hahn, Riederer & Foster, 2009). The value of  $SLI_v$  ranges from 0 and 1, and a larger value of  $SLI_v$  indicates that the concerned village is more sustainable than the other villages which score a lower value of  $SLI_v$ .

The selected major components and sub-components of SLI are listed in table 7.1.

**Table 7.1**  
**Selected components of SLI**

<b>Major Components (Livelihood capitals)</b>	<b>Sub-components</b>	<b>Relation with SL</b>	<b>Sources</b>
Financial capital	Per capita income (in rupees)	+	Sarker et. al. (2020)
	Livelihood diversification index	+	Zhang & Fang (2020)
	The average number of income sources	+	Zhang & Fang (2020), Pandey et. al. (2017), Sarker et. al. (2020)
	Average distance nearest financial institutions (in kilometres)	-	Sarker et. al. (2020)
	Average distance to the nearest town (in kilometres)	-	Zhang & Fang (2020)
	The average number of bank accounts in the households	+	De & Das (2020), Alam et. al. (2018)
	Percentage of households above the poverty line	+	De & Das (2020), Singh & Hiremath (2010), Zhang & Fang (2020),
	Per capita paddy production (in quintal)	+	Singh & Hiremath (2010), Alam et. al. (2018)
Physical capital	Percentage of households having pucca housing	+	Gaungdong et. al. (2014)
	Percentage of household having own vehicle 4 wheeler	+	Gaungdong et. al. (2014)
	Percentage of households having a motorcycle	+	Gaungdong, et. al. (2014)
	Percentage of households with drinking water facility within premises	+	Zhang & Fang (2020), Alam et. al. (2018)
	Percentage of households with irrigation facility	+	Zhang & Fang (2020),
	Percentage of households having motorised agricultural assets (like a tractor, power tiller, pump set, etc.)	+	Sarker et. al. (2020), Zhang & Fang (2020)

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**Table 7.1**  
**Selected components of SLI**

<b>Major Components (Livelihood capitals)</b>	<b>Sub-components</b>	<b>Relation with SL</b>	<b>Sources</b>
Human	Percentage of population (only 6 years above age) who completed schooling up to class 10	+	Zhang & Fang (2020), Alam et. al. (2018), De & Das (2020),
	Average dependency ratio	-	Pandey et. al. (2017), Alam et. al. (2018), Hahn, Riederer & Foster (2009)
	Percentage of working age population having technical education	+	
	Average distance to the nearest health centre (in kilometres)	-	Alam et. al. (2018), Hahn, Riederer & Foster (2009)
	Percentage of households reported any case of serious illness in the last three years	-	Alam et. al. (2018), Hahn, Riederer & Foster (2009)
Natural	Average Land holding (in hectare)	+	Sarker et. al. (2020)
	Average Agricultural land (in hectare)	+	De & Das (2020), Zhang & Fang (2020)
	Average Paddy Productivity (quintle per hectare)	+	De & Das (2020)
	The average Livestock population ratio	+	Pandey et. al. (2017), Zhang & Fang (2020)
	Percentage of households confronting land acquisition	-	Pandey et. al. (2017)
	Percentage of households with agricultural land affected by oil exploration	-	Pandey et. al. (2017)
Social	Percentage of households having SHG membership	+	De & Das (2020), Zhang & Fang (2020), Sarker et. al. (2020), Alam et. al. (2018)
	Percentage of households in which female members participate in economic activity	+	Alam et. al. (2018), Sarker et. al. (2020), De & Das (2020),
	Average distance to the nearest social institution (in kilometres)	+	Pandey et. al. (2017)
	Average gender ratio (% of females)	+	
	Percentage of households with female head	+	Alam et. al. (2018), Hahn, Riederer & Foster (2009)
	Percentage of households who celebrates the culture, and traditions of their forefathers	+	Sosa & Keenam, (2001)

## 7.2 Performance of the sample villages on each capital index

The results of the sustainable livelihood capital indices, viz., financial, physical, human, natural and social capital index, and overall sustainable livelihood index (SLI) for all categories of villages of different study locations are represented in table 7.2. In this section, a discussion on the performance of the villages on each capital index is presented.

**Table 7.2**

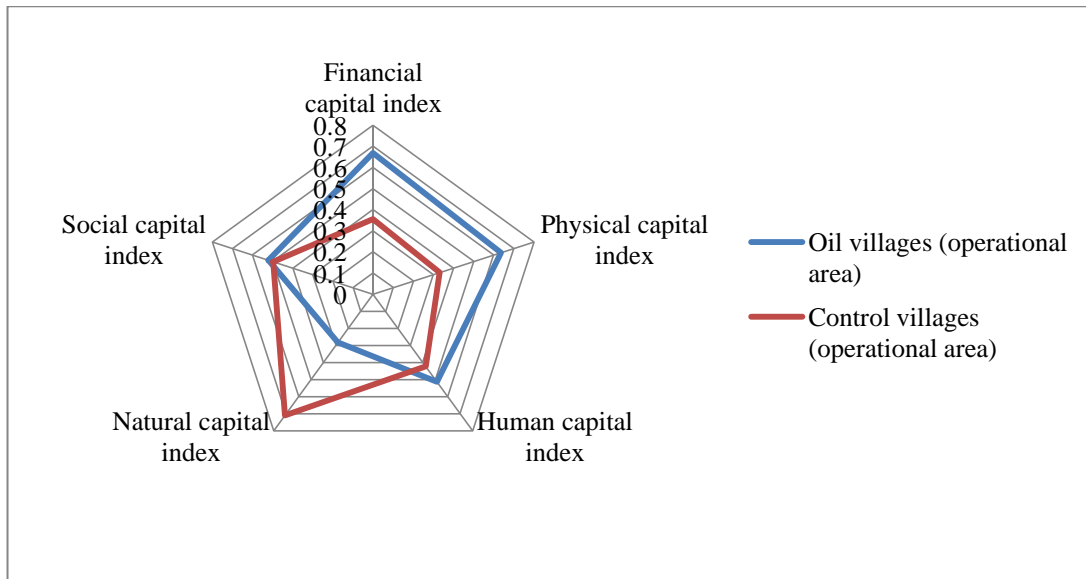
**Value of livelihood capital indices and SLI for all categories of villages**

Category of villages	Financial capital index	Physical capital index	Human capital index	Natural capital index	Social capital index	SLI
Oil villages (operational area)	0.669	0.637	0.513	0.283	0.522	0.525
Control villages (operational area)	0.354	0.332	0.422	0.709	0.498	0.463
Nearest villages (operational headquarter)	0.646	0.436	0.489	0.443	0.663	0.536
Control villages (operational headquarter)	0.323	0.267	0.349	0.591	0.580	0.422

Source: Researcher's calculation from the field data

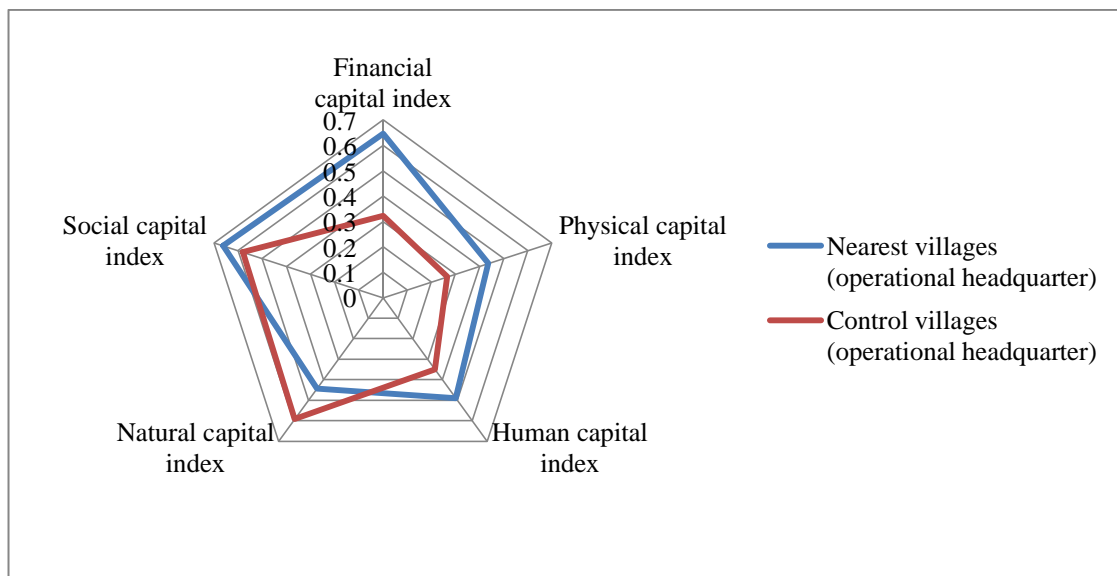
**Figure 7.1**

**Spider diagram of capital indices for the oil and control villages of operational areas**



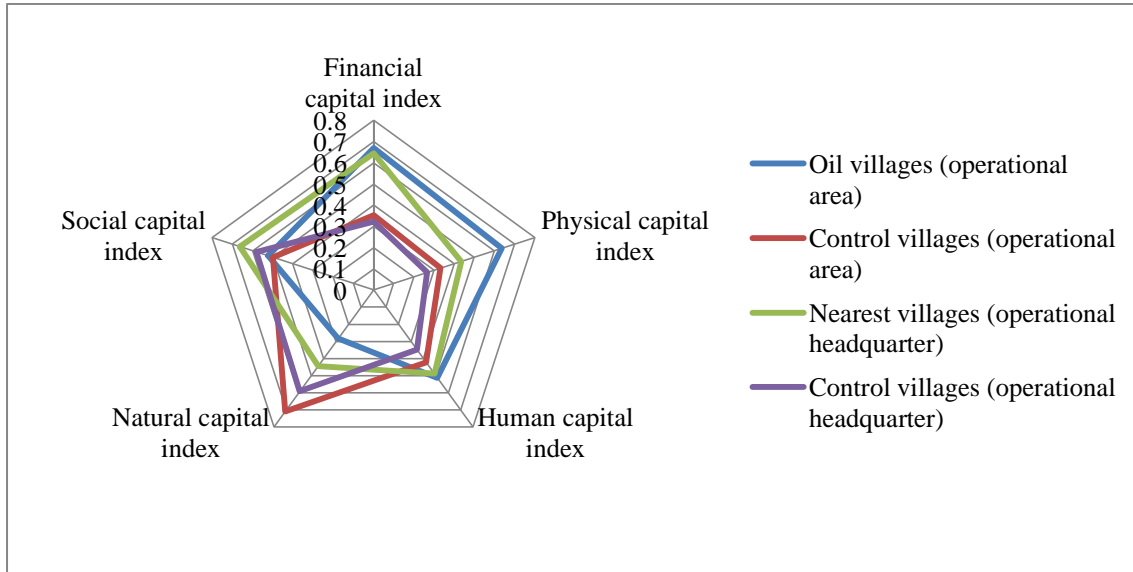
**Figure 7.2**

**Spider diagram of capital indices for the nearest and control villages of operational headquarters**



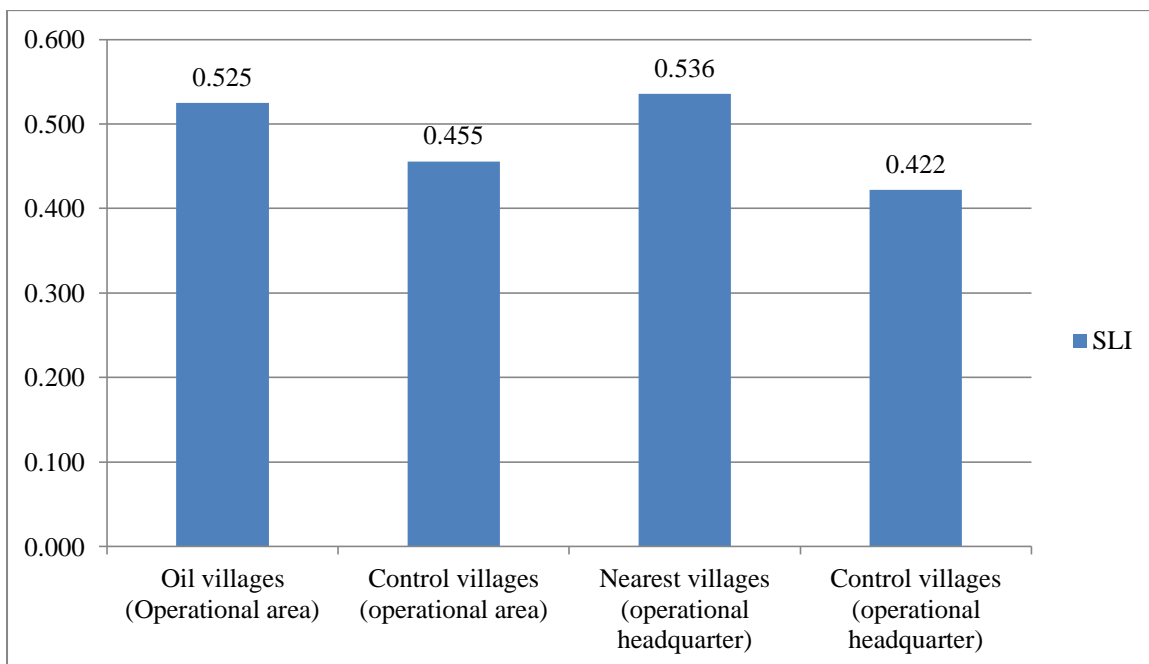
**Figure 7.3**

**Spider diagram of capital indices for all categories of villages in the study area**



**Figure 7.4**

**Overall SLI for all categories of villages in the study area**





**i) Financial capital index**

In the present study, the financial capital index is calculated based on eight sub-indicators, viz.: per capita income, livelihood diversification index, number of income sources, distance to the nearest financial institutions, distance to the nearest town, number of bank accounts in the households, percentage of households above the poverty line, and per capita paddy production.

Household income is one of the important components of financial capital. It enables the households to manage a secured livelihood by way of adopting different strategies. From the field observation, it is observed that the per capita income is much higher in the nearest villages than in its control villages (see figure 5.2 in chapter 5). The households of the nearest villages have many opportunities to get engaged in non-farm work because the average distance from their homes to the urban centres is comparatively less. However, the per capita income of the oil villages is not significantly different from that of its control villages.

Another important component associated with financial capital is livelihood diversification which ensures the households find multiple ways to increase income and reduce risk. Ellis (1997) stated that to survive and enhance their living standards, rural households build a diversified portfolio of activities and social support skills. Chambers (1997) also opined that poor individuals must diversify their sources of income to exist in a risky and uncertain world. From the field observation it is observed that the extent of diversification is more in the oil villages and nearest villages of operational area and operational headquarters, respectively, as compared to their respective control villages (see tables 6.2, 6.3, 6.5, 6.6 in chapter 6). The availability of different employment opportunities in the oil villages and nearest villages of operational areas and operational headquarters increases the livelihood diversification of the families in those villages. The increased livelihood diversification helps these villages to achieve a better score in the financial capital index.

Another reason for securing a higher value in the financial capital index by the oil and nearest villages are the less average distance from home to the nearest financial institutions. Financial institutions provide many facilities to the households, such as saving and credit facilities, which are very essential for formulating livelihood strategies. On average the distance from home to the nearest financial institution is 3.58 kilometres

in oil villages as against 6.44 kilometres in the control villages of operational areas. Similarly, it is 2.29 kilometres in the nearest villages as against 6.86 kilometres in the control villages of operational headquarters. Due to proximity to the nearest financial institutions, the average number of bank account holders per family is larger in the oil and nearest villages as compared to their respective control villages.

Moreover, the percentage of households above the poverty line is found to be higher in the oil as well as nearest villages as compared to their control villages. It indicates that the possession of financial capital by the households is more in those villages than in the control villages.

Contrary to this, the per capita paddy production of each household is found to be less in the oil villages of operational areas and nearest villages of operational headquarters than in the control villages. This may happen due to the diversification of livelihoods from farm to non-farm activities in the oil villages and nearest villages of operational areas and headquarters, respectively.

Overall, it is observed in table 7.2 as well as in figure 7.3 that the oil villages of operational areas and the nearest villages of operational headquarters have scored a higher value in the financial capital index as compared to their respective control villages. The financial capital index value is 0.669 for the oil villages of operational areas as against 0.354 for its control villages. Similarly, it is 0.646 for the nearest villages of operational headquarters, but the same is 0.323 for its control villages. It indicates that the households living in the oil villages of the operational area as well as in the nearest villages of operational headquarters have higher access to the financial capital.

## **ii) Physical capital index**

Physical capital consists of the necessary infrastructure and producer goods to sustain livelihoods. The lack of specific types of infrastructure is regarded as a core dimension of poverty. The absence of adequate access to physical assets such as water and energy leads to deterioration of human health as well as wastage of time in non-productive works such as the collection of water and fuel wood (DFID, 1999). In the present study, considering the regional relevance and literature review, six components of the physical capital index have been selected, viz.: percentage of households having pucca housing, percentage of households having two-wheeler motorized vehicles, percentage of households having four-wheeler motorized vehicles, percentage of

household with drinking water facility within premises, percentage of household with irrigation facility, and percentage of households having modern agricultural assets (like the tractor, power tiller, pump set, etc.).

From the field survey, it is found that in the oil villages of operational areas the percentage of households having pucca housing is 34.54 per cent, but it is only 23.79 per cent in its control villages. A similar finding is observed in the case of operational headquarters also. In its nearest villages, 31.52 per cent of households have pucca housing as against only 23.60 per cent in its control villages.

Possession of motorised vehicles by rural households reduces transportation time. It helps them to move out of their villages to other places in search of jobs. The percentage of households having two-wheeler motorized vehicles is found to be 37.92 per cent in the oil villages which is greater than the percentage of households (24.18%) having the same type of vehicles in the control villages. In the operational headquarters also, a higher percentage of households in the nearest villages (38.61%) possess such physical assets as compared to the control villages (35.34%). However, the possession of four-wheeler motorised vehicles is less among the households in the study area. Only 10.77 per cent of households in the oil villages of the operational areas own four-wheeler motorized vehicles, while it is only 4.79 per cent in the case of the control villages. Similarly, the percentage of households owning this asset is 11.30 per cent in the nearest villages of operational headquarters, contrary to 7.47 per cent households of in its control villages.

Accessibility to safe drinking water helps rural households in maintaining their health and its availability of it within their premises reduces the consumption time required to access it. So, the percentage of households having safe drinking water is included as one of the important sub-components of the physical capital index. From the field observation, it is found that the access to safe drinking water within premises is comparatively high in the case of the oil villages than in the control villages of the operational area. 41.70 per cent of households in oil villages as against 33.35 per cent of households of the control villages of operational areas have safe drinking water facilities within their premises. On the other hand, 21.94 per cent of households of the nearest villages as against 9.84 per cent of households of the control villages of operational headquarters have a such facility within their premises.

Since agriculture was reported as one of the oldest sources of livelihood in the study area, it was expected that the holding of modern agricultural implements along with irrigation facilities will enhance their livelihoods. But, from the field survey, it is observed that the percentage of households owning modern agricultural implements as well as irrigation facilities is very less in the sample villages. The percentages of households with irrigation facilities in the oil villages and control villages of operation areas are nearly identical, 3.49 per cent and 3.47 per cent, respectively, while they are 2.38 per cent and 1.82 per cent in the nearest villages and control villages of operational headquarters, respectively. In the case of modern agricultural implements, 15.69 per cent of oil village households owned such assets, compared to 11.38 per cent of control village households in operational areas. Similarly, 13.01 per cent of households in the nearest villages owned these types of agricultural tools, compared to 9.58 per cent of households in the control villages. Although many researchers have observed a positive effect of industrialization and urbanization on the agriculture sector of surrounding areas through substitution effect (i.e. substituting traditional methods of cultivation) and investment effect (i.e. investment in modern agricultural technology) (Lucey, 1968; Winfield, 1973), such type of effect is very low in the study area.

Table 7.2 and figure 7.3 shows the overall achievements of different categories of villages in terms of physical capital. The physical capital index in oil villages is estimated to be 0.637, while it is only 0.332 in control villages of the operational areas. Again, in the operational headquarters, the value of the physical capital index is found to be 0.436 for the nearest villages, contrary to 0.267 for the control villages. This indicates that the achievement of oil villages and nearest villages in terms of the physical capital index is higher compared to their respective control villages. Such results may be attributed to the field observations that the ONGC and OIL have generated employment opportunities for the households inhabiting the oil operational areas under study. Similarly, the operational headquarters of ONGC and OIL in Nazira and Duliajan, respectively, have resulted in the development of two urban centres in those two locations, which provide many non-farm employment opportunities to the households of surrounding villages. With industry employment in oil companies and non-farm employment in urban centres, many households in oil villages and nearby villages have gained the ability to own physical assets.

### iii) Human Capital index

Human capital comprises the skills, knowledge, ability to labour, and good health that enable people to pursue various livelihood strategies and achieve their livelihood goals. It is one of the important livelihood capitals required to make proper use of the other four livelihood capitals also (DFID, 1999). For the present study, the selected sub-components of human capital are the percentage of the population (only 6 years above age) who completed schooling up to class 10, average dependency ratio, percentage of working age population having technical education, the average distance to the nearest health centre (in kilometres), and percentage of household reported any kind of serious illness in the last three years.

Education plays a vital role in increasing skills and knowledge which is very essential to choose an appropriate livelihood strategy. From the field study, it is found that the percentage of the population completing school education up to class 10 is 70.35 per cent in the oil villages, compared to 67.42 per cent in the control villages of operational areas of ONGC and OIL. In the operational headquarters, the same figure is 69.84 per cent in the nearest villages contrary to 64.42 per cent in the control villages. It implies that in comparison to the control villages, the oil villages and nearby villages have a higher percentage of people who have completed school up to class ten. Contrary to this, the expansion of technical education is observed to be very low in all categories of villages in the study area.

The dependency ratio is estimated by dividing the number of dependents aged 0 to 14 and over 65 by the total population aged 15 to 64. This demographic indicator compares the number of people of non-working age to the number of people of working age. A household with a lower dependency ratio has a higher capacity to supply more labour for earning livelihoods for the family. In the present study, the dependency ratio is found to be 47.32 per cent in the oil villages and 44.59 per cent in the control villages of operational areas, while it is 42.14 per cent in the nearest villages and 50.58 per cent in the control villages of operational headquarters. The dependency ratios of all categories of villages are found to be almost closer to the national level dependency ratio of 49 per cent.

Human health is one of the important sub-components of human capital. To maintain good health for the rural people, the provision of adequate health facilities in

their vicinity is very essential. The average distance from the nearest health centres in operational areas is only 4.55 kilometres in the oil villages, compared to 6.42 per cent in the control villages. The same statistics are 3.15 in the nearest villages and 4.75 in the control villages of the operational headquarters. While constructing the human capital index, a household with serious illness is also considered as another sub-component. From the field survey in operational areas, it is observed that 9.67 per cent of households in oil villages and 9.64 per cent households of in control villages have reported serious illnesses suffered in the last three years. Similarly, in the operational headquarters, the percentage of households who reported any case of serious illness during the last three years is 11.30 in the nearest villages, contrary to 10.20 per cent in the control villages.

By combining all the sub-indicators discussed above, the human capital index is presented in table 7.2 for all the sample villages located in different areas under study. Like the financial capital index and physical capital index, the value of the human capital index is found to be larger in the case of the oil villages of operational areas and the nearest villages of operational headquarters compared to their respective control villages. It is 0.513 for the oil villages, compared to 0.422 for its control villages, while the same is 0.489 for the nearest villages compared to 0.349 for its control villages.

#### **iv) Natural Capital Index**

Natural capital refers to the natural resource stocks that are used to generate livelihood resources. It is essential capital for those who make their living entirely or partially from resource-based activities such as farming, fishing, and so on. For rural households land is an important source of livelihood because it allows them to build homes and cultivate crops. So, the possession of land is taken as an important component of natural capital.

From the field survey, it is found that the average land holding of households is 0.89 hectares in the oil villages and 1.27 hectares in the control villages in operational areas. Lesser land possession by the households of oil villages may be attributed to the observation that almost 51 per cent of households of these villages have confronted land acquisition for oil exploration activities of ONGC and OIL. On the other hand, the average land held by each household in the nearest villages of operational headquarters is 0.67 hectares, compared to 0.92 hectares in the control villages.

In the case of paddy productivity, the oil villages and the nearest villages have scored a lower value than their respective control villages. It is reported that crude oil leakage from pipelines that are passing through agricultural fields causes heavy damage to paddy production in some villages of oil exploration areas. Nearly, 61 per cent of households in oil villages of operational areas have reported that their agricultural fields were affected by the activities of ONGC and OIL. In the case of livestock production too, the control villages are ahead of the oil and nearest villages. Loss of livestock and poultry due to the exposure to wastages from oil wells has been reported by the villagers during the field survey.

By estimating the natural capital index by combining all the selected sub-components discussed above, it is found that the index value (0.283) of oil villages is far below the other three categories of villages in the study area. In the case of the control villages of operational areas, it is 0.709. The nearest villages (0.443) of operational headquarters are also observed lagging the control villages (0.591) regarding performance in the natural capital index. Such findings indicate that the possession of natural assets about other livelihood assets is lower in oil and nearest villages than in control villages.

#### **v) Social Capital Index**

In the context of the sustainable livelihood framework, social capital refers to the social resources on which people rely to achieve their livelihood goals. People can build social capital by developing networks and connecting. It can be generated in rural households through membership in more formal social groups, which helps to develop relationships of trust, reciprocity, and exchange. Social capital enables people to participate in innovations and knowledge sharing among them, lowering transaction costs and improving economic performance such as income and savings growth, etc. (DFID, 2001). Ellis (2000) defines social capital as social relations. According to him, the social positioning of individuals and households within society is influenced by factors such as gender, caste, class, age, ethnicity, and religion, which create constraints on individuals' courses of action.

Therefore, to construct the social capital index for the study area, the selected indicators are the percentage of households having memberships in formal social organizations, the percentage of households with female members who participate in



economic activity, the average distance to the nearest social institution, gender ratio (% of females), and percentage of households with female household-head. It is expected that these components will be helpful to assess social relations and equity.

From the field observation, it is found that the percentage of households having memberships in formal social organizations is the lowest in the oil villages (65.69 per cent) as compared to the control villages (68.41 per cent). On the other hand, it is observed to be a bit higher in the nearest villages (88.46 per cent) than its control villages (86.21 per cent). The average distance from home to the nearest social institutions such as religious institutions, clubs, youth organizations, etc. are found to be almost the same for all categories of villages. Again, regarding female work participation, it is reported that 79.58 per cent of households' female members participate in economic activities, compared to 76.24 per cent in the control villages. On the other hand, the same statistics are found to be lower in the nearest villages (71.08 per cent) of operational headquarters compared to its control villages (88.56 per cent). The average gender ratio as a percentage of females is less than 50 per cent (i.e., 48.96 per cent) in the oil villages indicating the presence of a slight male-favoured gender gap. There are no such gaps in other categories of villages in the study area. The percentage of households with a female household head is 8.63 per cent in oil villages, compared to 6.09 per cent in its control villages. Similarly, it is 8.31 per cent in the nearest villages, compared to 5.36 per cent in its control villages. Moreover, the celebration of culture and traditions plays an important role in improving social networks and relations in rural areas. A maximum of the rural households of all the sample villages reported that they have been regularly celebrating the culture and traditions of their forefathers.

After calculating the social capital index, considering the above sub-components, it is found that the oil villages (0.522) and the nearest villages (0.663) have scored higher index values than their respective control villages (i.e., 0.498 and 0.580, respectively.)

### **7.3 The Sustainable Livelihood Index**

The SLI for all categories of villages is presented in figure 7.4. Both, the oil villages and the nearest villages have scored comparatively a higher value of SLI than their respective control villages. The score of SLI for the oil villages is observed to be 0.525 as against 0.455 for the control villages of the operational areas. Likewise, the nearest villages of the operational headquarters have scored 0.536 in SLI as against 0.422



scored by the control villages. The SLI values suggest that the oil villages and the nearest villages are more sustainable as compared to their respective control villages.

However, by calculating the five livelihood capital indices, it is observed that the achievement of each category of villages is different in each capital index. It is clear from the spider diagram (figure 7.3) that the achievement of the oil villages of operational areas of ONGC and OIL, in terms of financial and physical capital is much ahead of the control villages. But they are much lagged in terms of achievement in natural capital compared to the control villages. Conversely, the control villages of operational areas are rich in natural capital but their achievements in financial and physical capital are observed to be lower as compared to the oil villages. The reason for such findings can be supported by the field observations that the ONGC and OIL have generated different employment opportunities, directly or indirectly, for the people of the oil villages. So, getting a job in the oil companies helps the people of the oil villages to accumulate more financial and physical capital; but at the same time, they have to suffer some vulnerability contexts in terms of natural resource loss such as land acquisition by the oil companies, decrease of soil productivity, damage of crops, and loss of livestock. Similarly, in the operational headquarters, the achievement of the nearest villages in terms of financial and physical capital is much higher than in the control villages. Such observations suggest that the oil companies have been playing a positive role in generating important livelihood capitals, viz., financial and physical, in the neighbouring villages.

#### **7.4 Impact of Oil Industry on Livelihoods Sustainability of Neighbouring Rural People –A Qualitative Analysis based on the FGDs**

DFID (1999) opined that the full diversity and richness of livelihoods can be understood only by qualitative and participatory analysis at a local level. Therefore, in this section, to discuss the issues related to the impact of the oil industry on the livelihood sustainability of the rural community, a qualitative approach has been applied. The analysis has been conducted through focus group discussions with the local rural people. This kind of qualitative study is very essential in livelihood studies to find out the vulnerability contexts that hinder the process of achieving sustainable livelihood outcomes. Some of the major vulnerability contexts related to sustainable rural livelihoods in the study area have been identified during the field survey. These are land

acquisitions, a threat to indigenous occupation, occupational change and occupational sustainability,

The selected villages for FGD are Dehingia Konwar Gaon (Lakwa oilfield), Chutia Gaon (Gelakey oilfield) and Bhatiyapar (Rudrasagar oilfield) under ONGC operational areas; and Balipara Sasoni (Naharkatiya oilfield), Baghjan (Barekuri-Baghjan oilfield) and Khumtai Gaon (Moran oilfield) under OIL operational areas. These villages are very close to the oil exploration operations of ONGC and OIL.

The participants of the FGDs were invited from different occupational backgrounds such as farmers, government service holders, ONGC or OIL employees, private sector employees, wage earners, Self-help group members, unemployed youths, and housewives. Conversation with the participants was made in the local language, i.e., Assamese. The FGDs in the ONGC oil villages were conducted in November, 2019, and the oil villages of OIL were completed in December 2020. The key issues discussed in the FGDs are listed in table 7.3.

**Table 7.3**  
**Key issues of focus group discussion**

Sl No.	Key points
1	Present Occupational pattern
2	Employment opportunities by ONGC or OIL
3	Land acquisition by ONGC
4	Impact of oil exploration on agriculture
5	Impact of oil exploration on the environment
6	Impact of oil exploration on health
7	The oil industry and community relation
8	Corporate social responsibility (CSR) initiatives
9	Impact of oil exploration on Socio-cultural issues
10	Future expectations from ONGC

### 7.4.1 Findings of FGDs

#### i) Occupational pattern and employment opportunity

Farmers, government employees, employees of public sector undertakings, private sector employees, business and self-employment, agricultural labourers, and daily wage earners are the most common occupations found in the study areas. The private sector employs the greatest number of people (30.64 per cent) in the oil villages. The occupational pattern of the study area's population has already been discussed in Chapter 4.

According to FGD participants, the number of permanent ONGC and OIL employees in the oil villages is rapidly declining. However, the private companies associated with oil exploration create many jobs in the sample oil villages. At present, it seems that the ONGC and OIL are less capable of generating diverse employment opportunities for their local people except for the low-paid casual jobs under private companies.

A senior citizen from Lakwa (age 70 years) expressed that ONGC and OIL had discontinued offering jobs as compensation instead of land acquisition. They now offered monetary compensation for such an acquisition. He says,

*During the 1960s, while ONGC just started its operation in our locality, the company offered permanent jobs to the local people whose lands were acquired by it. But, currently, no person, even if their lands are acquired by the company, can get jobs at ONGC. Now the company gives compensation for acquired land in the form of cash to the affected household. This is not good. It would have been better if the affected families get a job for their lost land.*

A retired person of ONGC, age 68, further adds:

*Many ONGC job holders, including me, who were recruited earlier as compensation for land acquisition, are now retired. At present, the number of permanent job holders from our locality is very few. Only, a few youths are temporarily working under private companies or contractors who are dealing with ONGC under contractual assignments.*

According to the villagers, ONGC offered jobs as compensation for acquired land to avoid any agitation or protests from the local community. The oil companies stopped offering jobs after they had acquired enough land in the 1960s and 1970s. A similar situation is observed in the oil villages of OIL operational areas. Youth with technical qualifications and those without any qualifications are now finding work in private companies as skilled, semi-skilled, and unskilled workers.

A young man of Lakwa, age 27 years, with a certificate in technical education and has been working in a private company for the last seven months says,

*I am working in a private company that deals with ONGC contracts. Many of my friends of similar age are also working in such different private companies in our locality. I am paid around rupees nine thousand only per month for my eight hours of service per day. In contrast, a permanent employee of ONGC who performs similar works draws more than forty thousand rupees per month. I think, I am low-paid. It is not enough to meet my day-to-day family expenses.*

A salary of Rs. 9000/- per month translates to Rs. 300/- per day; a very low income for a person with technical qualifications. Besides, with rising inflation, it is difficult for anyone to maintain a basic standard of living. The discrimination in the payment structure between the ONGC or OIL and the private operators for similar job descriptions has created dissatisfaction among the youth. However, this is the reality for most of the youth who work in various jobs for private oil companies in the study areas.

An industry can create three types of employment in the locality: direct, indirect and induced effect (Lucey 1968; Meller & Marfán 1981; McNicoll 1984). The FGDs revealed that opportunities for indirect or ancillary employment in the study area were very weak. Pratibha Chetia (name changed), age 39, a woman representative in gram panchayat spoke about the initiative undertaken by the oil companies like ONGC and OIL for generating self-employment for women in her village.

*Two years back, ONGC gave grants-in-aid to some self-help groups (SHG) in our locality to rear livestock. Our SHG was also a beneficiary of that scheme. But the women were not able to carry on it. Because many of us do not know how to rear livestock or poultry scientifically*

*and profitably. Moreover, the incident of livestock death due to uncovered oil fields and waste liquid is also very common.*

There is a need for instituting proper skill-based training programmes and provisions for self-employment generation schemes. Moreover, the coverage of such beneficiaries of such schemes should be increased by ONGC and OIL through their corporate social responsibility programmes. Generally, residential colonies of an industry indirectly benefit neighbouring areas. Though ONGC did have a residential colony in Lakwa, it was later shifted to the urban locations of the district. One person living in the nearby villages of Lakwa oilfield says,

*Earlier a few people of Lakwa started some small businesses nearby the Lakwa ONGC colony. The market was quite good at that time. But, when ONGC shifted the colony to Narira town and Sivasagar town, the market become depressed, and sales come down. Now, you will find many shops remain closed every day.*

As mentioned earlier, ONGC and OIL outsource most of their work to private sector companies and contractors. Previously, several local youths were able to get contractual work from the ONGC for various jobs. However, with increasing competition from rich contractors and private companies, the local youth are unable to win the tenders. A person who was an ONGC contractor expressed,

*When I was dealing with ONGC contracts, there were five categories of contractors from Grade-I to Grade V. Generally, Grade I, II and III contractors deal with high-value contracts, while Grade IV and V contractors deal with low-value contracts. Many youths of our locality were able to get Grade IV and V contracts from ONGC. But, nowadays, there are no contracts available for Grade IV and V contractors. We do not know the reason why it happens. But we only know that our youths who dealt with contractual works with ONGC become income-less as they do not have more money to win the tender of Grade I or II contracts.*

## **ii) Land acquisition**

Land is one of the important assets for the livelihood of rural people. So, the land acquisition creates vulnerable contexts for the local people in achieving sustainable

livelihoods outcome. It is observed that a significant number of agricultural lands in the study area are acquired by ONGC and OIL for drilling, construction of pipelines, the building of gas gathering stations (GGS), offices and colonies in the study area. As discussed in chapter 5, a total of 229 sample households of the oil villages have confronted land acquisitions by these oil companies in different years, which is 51.69 per cent of the total sample households of the oil villages (table 5.9). The main impact of such land acquisition is the decrease in average land holding of the sample families in the oil villages. A farmer, age 51, of Gelakey oilfield expresses his dissatisfaction due to land acquisition.

*My one bigha land has been acquired by ONGC very recently. They will give me compensation in the form of cash very soon. Though I shall be paid a huge amount of money, I am still not happy. I had only two bighas of agricultural land, of which one bigha has been acquired. If my land were not acquired, it might give more livelihood security to me, my sons, daughters, and their next generations too.*

This reflects the dissatisfaction of many households whose inherited lands have been acquired by the company for national development without making sufficient arrangements for the local affected households to achieve permanent livelihood security. It is observed that the households who were paid cash by ONGC or OIL as compensation for their acquired lands spent money on purchasing less productive assets.

### **iii) Impact on environment and health**

Oil exploration of ONGC and OIL has resulted in environmental damage in their operational areas. Many households in the villages have been affected by air, water, soil, and sound pollution. People living closer to the oil wells, GGS, and pipelines are further exposed to pollution. The environmental pollution has had repercussions on agriculture and the health of the local people in the district. The leakage of crude oil from pipelines, oil fields, GGS, and OCS has affected the production of paddy and other crops. According to the villagers, the company ignores the oil leakages that severely damage their crop fields. A farmer said,

*ONGC officials seem to be paying less importance to proper management and monitoring of oil pipelines passing through our paddy fields. When crude oil leaks, it burns a large plot of crop area and especially in*

*summer it spreads very quickly through the water. Our efforts in cultivation become meaningless.*

A lady further added,

*Not only paddy fields, but it affects our livestock too. Most of their oil wells remain uncovered with proper fencing. Many Livestock and poultry of our villagers died due to contaminated water.*

Another farmer raised another important issue:

*Our paddy production has reduced due to the flaring of unused natural gas at the GGS. We also suspect that the production of local fruits, nuts etc. is decreasing gradually only because of air pollution from the oil company.*

It is to be noted that the issue of decreasing production due to the flaring of natural gas has already been observed by agricultural scientists in the Gelakey area. They stated that flaring of natural gas causes high light intensity and increases light hours which causes a delay in flower initiation, reduction of panicle length, a smaller number of grains per panicle and more grain sterility (Sharma, Hazarika, Kalita & Sharma, 2011).

Environment pollution has affected sericulture (*Muga* and *Eri*) in the Lakwa area which was one of the indigenous occupations before oil exploration started in that area. According to the villagers of Lakwa oilfield it was a very profitable occupation inherited by their forefathers. Now, they feel that *muga* and *eri* rearing would have given more economic empowerment to the women of their locality.

A FGD participant from Barekuri village of Tinsukia district who is a small tea grower by occupation pointed out how tea cultivation is severely affected by the oil exploration in his locality:

*I currently grow tea on eight bighas of land. Along with tea, I used to also grow other crops like betel nuts, black peepers, betel leaf, oranges, etc., like many other growers in our village do. Flaring of natural gas leaves a black coat on plant leaves when it is burned in the closest OCS (Oil Collecting Stations). As a result, the plant's health has suffered. The tea factory owners pay less money for tea leaves coated with dark layers of crude oil mixed ash when we go to sell our tea leaves.*

Not only air pollution, but sound pollution also creates lots of mental stress and sleeplessness among households close to GGS and oilfields. The use of sound polluting machines and sound amplifiers for the workers day and night makes the overall environment chaotic and stressful for the local people.

Most of the oilfields under study are also close to some eco-sensitive zones such as reserve forests, wetlands, and rivers. Throwing of waste to the nearby river, and leakages from pipelines and oil wells of ONGC and OIL have affected natural habitats.

**Table 7.4**

**Eco-sensitive zones nearby the oilfields of ONGC of OIL**

<b>Oil fields</b>	<b>Nearby Eco-sensitive zones</b>
Gelakey	Gelakey Reserve Forest, Naamdang River
Lakwa	Lakwa Reserve Forest, Desang River
Rudrasagar	Na-pukhuri, Bhatiyapar tank, Rupahi Beel
Naharkatiya	Sasoni-Merbeel, Dihing River
Baghjan	Maguri-Matapung beel, Dibru-Saikhuwa National Park, Brahmaputra River

Source: Field survey

A man from Lakwa stated:

*The ONGC used to throw their waste into the Desang River as a result of which the fish population has gone down. Now the villagers cannot eat fish from the river because a crude oil mixed smell comes out of it.*

The gas explosion and subsequent fire outbreak at an oil well in the Baghjan oilfield is another incident which has brought many negative impacts on natural and human capital. Many houses and their crops were found burnt and the villagers were evacuated from their homes. One woman from the affected area said

*Our houses, betel-nut and leaf trees, tea plantations, and banana plantations were all burnt down. We were evacuated to a temporary*



*camp for more than a week. This incident during the COVID-19 pandemic has left us with a lot of losses.*

A local youth of the Baghjan area has shown his concern about the negative impact of fire outbreaks and oil spillage on the biodiversity of the Maguri-Matapung wetland. He stated,

*The Maguri-Matapung Beel was mostly filled with crude oil. Fish and other aquatic species were killed by crude oil contamination in the water. River dolphins were also discovered dead. The oily smoke created a black coating on the leaves of the trees in the distance also.*

#### **iv) Industry and local community relation**

The industry-community conflict was found in all the six oilfields under study. The villagers had to plead with the ONGC and OIL for compensation for their crop and livestock loss. This was also very time-consuming because of procedural delay; hence, very often the villagers did not bother to file claims for loss of small assets.

A villager expressed,

*We the villagers must demand getting any kind of compensation from ONGC. We must go to the ONGC officials many times leaving our important household work. The villagers go for road blockades, hostile to CISF personnel to avail compensation and another benefit through CSR schemes.*

During the focus group discussion in Rudrasagar, a villager spoke about a land dispute under judicial custody. Seven families were involved in a dispute against the ONGC regarding compensation.

*After the setting up of Rudrasagar GGS by ONGC, we face many disturbances such as air pollution, sound pollution, and so on. We complained, and they agreed that they rehabilitate us to another place and give proper compensation for our property. But still, they are doing nothing and we have moved to the court for justice. We are still living amidst all kinds of pollution – air, sound and so on.*

### v) Corporate social responsibility

Corporate social responsibility (CSR) initiatives are an opportunity to build a good relationship between the company and the local community. According to the Company Act, 2013, every private limited or public limited that either has a net worth of Rs. 500 crores or a turnover of Rs. 1000 crores or net profit of Rs. 5 crores is bound to spend at least two per cent of its average net profit for the immediately preceding three financial years as for the development of the local area as corporate social responsibility initiatives (Ministry of Corporate Affairs, 2019). The ONGC and OIL have taken up several projects in Assam as CSR initiatives in the field of health, sanitation, education, infrastructure and skill development.

In this section, an attempt has been made to understand the perception of the villagers towards the CSR policy of ONGC and to know the proper implementation of CSR schemes in the study areas. A senior citizen of Lakwa acknowledged,

*One benefit to our locality from ONGC is the free electricity supply. Almost a thousand households are getting free electricity through ONGC. They gave us one ambulance which is operating. Sometimes they conduct health camps, but not regularly. Sometimes donate to cultural programmes, schools, Namghar community halls, and so on.*

The same person further said,

*... But, the main roads, via which the ONGC heavy vehicles run, remain damaged for a long time. Then the villagers put up a road blockade and protested, as they are bound to repair the roads.*

In contrast to the Lakwa oilfield, the people of Gelakey and Rudrasagar oilfield seemed quite unhappy with ONGC, as the CSR expenditures in their locality were very less. A participant from Gelakey revealed,

*The road condition from Nazira (headquarter of ONGC Assam Asset) to Gelakey is horrible. This is because of ONGC heavy vehicles. We, the people of Gelakey have suffered for a long time. We have demanded free electricity, free LPG, and community halls, among others. but they ignore it. I think it is their responsibility to give us minimum facilities after creating so much pollution in our villages.*

A lady representative of Gelakey Gram Panchayat said,

*ONGC is giving streetlights to the towns of the districts, but we the affected people are living in darkness. This is what is happening in our district in the name of the CSR scheme. Moreover, ONGC should provide some alternative livelihood opportunities for our people as it has affected our agriculture, livestock and many traditional occupations. I have not heard about any initiatives such as skill development training, self-employment opportunities from ONGC in our villages”*

These observations indicate the unhappiness of the villagers with the CSR schemes of the ONGC despite huge allocations of funds to the district. Some of the local problems such as safe drinking water, skilling local youth, and so on, are not adequately addressed. The villagers also stated that there is a lack of proper implementation, monitoring and management of CSR schemes in their locality. Moreover, there is an information lag between ONGC and the villagers regarding CSR policy and schemes.

#### **7.4.2 Is their livelihood sustainable? - A discussion on the FGDs findings**

The findings of the focus group discussions with the local people of three different oilfields in the Sivasagar district bring out several important pictures related to employment and occupation, environment, health, corporate social responsibility and industry-community relation.

Generally, industrialization helps in regional development through its spread effects such as the direct employment effect, indirect employment effect and induced employment effect (Lucey, 1968; Meller and Marfan 1981; McNicoll, 1984). In the study area, however, the direct employment effect was found to be very limited. Earlier, the ONGC and OIL offered direct employment was offered to the family members whose lands were acquired by the oil companies. Later, as the oil companies finished acquiring the required lands for carrying out their operations, they suspended the policy of offering jobs as compensation and instead gave monetary compensation. Most of the locals, especially the youth take up low-paying temporary jobs with private companies contracted by the ONGC and OIL.

On the other hand, the indirect effect of industrialization that generates indirect employment and income in the neighbouring area with a multiplier effect has also been unsatisfactory. Such a case has been observed in the Lakwa ONGC oilfield. The relocation of the ONGC residential colony from Lakwa to the town area resulted in reduced unemployment and income from the neighbouring villages.

Such weak induced employment and income effect is observed by Lucey (1968) while studying the impact of industry on rural communities of Western Ireland. Another reason for the limited indirect and induced employment effects in the neighbouring rural area is the mismatch between the operational requirement of the oil companies and the supply capabilities of the local people of the study area. So, the scope of generating indirect employment is limited, as the oil industries do not use the local inputs to extract oil. McNicoll (1984) in his study on the impact of the oil industry in a Scottish rural area, and Gana (1978) in his study on the regional development process in Northern Nigeria also observed the generation of less amount of indirect employment due to limited use of local inputs by these industries.

Agriculture is the main livelihood source for a large percentage of the population of the study area, but this sector seems vulnerable due to the oil operations of ONGC and OIL. The villagers reported that leakage of crude oil from oil rigs and pipelines was a common incident in their locality. Soil degradation due to oil leakage and flaring of natural gas causes a reduction in crop productivity in the study area. Some scientific and laboratory research conducted in Lakwa, Gelakey and Rudrasagar oilfields has revealed that the plants cannot survive in the oil-contaminated soil. Oil contamination decreases the water holding capacity of soils, hydraulic conductivity and soil bulk density in the surrounding areas of the oil rigs. Besides, the rice grains cultivated in these areas have been found to have a much higher concentration of some metals such as iron, manganese, lead, zinc, and nickel, as compared to the grains grown in uncontaminated soils (Devi, 1996). Moreover, a study conducted in the Gelakey oilfield reveals that the flaring of natural gas also caused a reduction in crop productivity (Sharma, Hazarika, Kalita & Sharma, 2011). These scientific results indicate the risk of agriculture-based livelihood of the villagers inhabiting those areas.

The lack of permanent employment opportunities along with the acquisition of agricultural land of small farmers by ONGC and OIL has precipitated livelihood

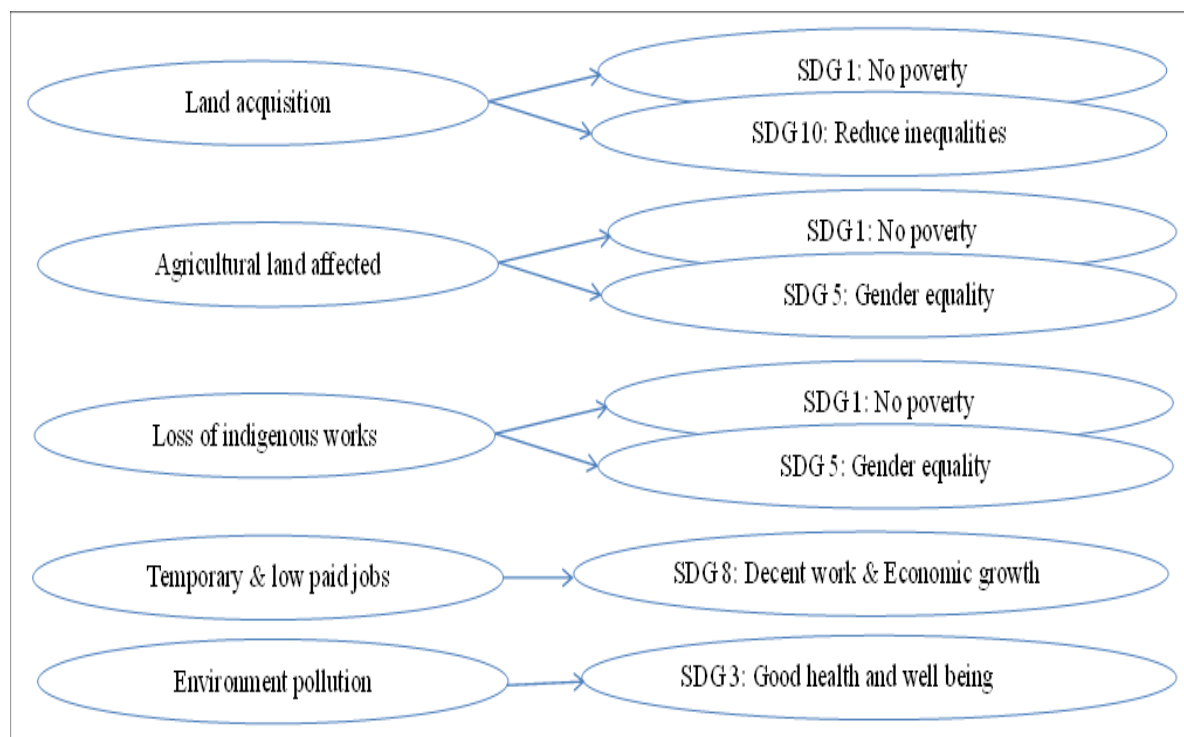
challenges in the neighbouring rural areas. Both the energy industry and agriculture require large tracts of land for development, which can cause conflict between the two. Industrial development at the cost of traditional livelihood sources without provisions for alternative livelihood opportunities can cause considerable environmental and economic damage to indigenous rural communities. Similar situations have been observed in Puerto Rico (Lopez, Aide and Thomlinson, 2001), in China (Jiang, Deng and Seto, 2013) and some other parts of India also (Guha, 2004)).

The villagers of Lakwa oilfield under ONGC also shared their concern about the loss of sericulture because of excessive air pollution caused by the ONGC in their locality. A study carried out by Fentiman (1996) showed that a fishing community lost their traditional occupation because of river pollution caused by industrial waste disposal in the Niger Delta. Consequently, many local people were forced to migrate to other places in search of jobs. Similarly, the possibility of local people migrating from the oil operational areas under study to other places cannot be ruled out, as soil contamination, air pollution, water pollution, etc. threatens indigenous occupations of the local communities.

The relationship between national development and local development is a trade-off that has severe implications for the survival of indigenous occupations. While the country increases its mineral production, the state enjoys the royalties earned at the cost of the livelihoods of local rural communities. The ONGC and OIL have no specific long-term plans for improving education, employment and self-employment opportunities, health security and infrastructure development of the affected local communities in the study area. Mishra (2009) and Hota & Behera (2016) also observed the loss of land and livelihood as a result of coal mining activities in Orissa. Compensation and casual or contractual job arrangements by the oil companies cannot neutralize the negative effects of mineral resource extraction on the local people. Oil exploration by the ONGC and OIL in Assam generates many vulnerable contexts that collide with some of the sustainable development goals (SDGs). Figure 7.5 precisely shows how the vulnerability contexts that originated from oil exploration activities are challenging in achieving the SDGs.

Figure 7.5

## The contradiction between the impacts of the oil industry and SDGs



Source: Field observation

Land acquisition from the local community, without adequate employment arrangements for them, hinders the poverty eradication (SDG 1) and inequality reduction (SDG 10) goals of sustainable development. Moreover, contamination of industrial waste through crude oil leakages from pipelines, GGS and OCS of oil companies and flaring from unused natural gas decreases agricultural productivity. Far from attaining the SDGs, the indigenous and sustainable livelihoods of the local community stand compromised.

Earlier, sericulture was mainly practised by the women of some oil villages, which has disappeared due to excessive air pollution in that area. Thus, the opportunity to work has been taken away from the local rural women. This certainly contradicts the gender equity goal (SDG 5) of sustainable development. Besides, temporary job arrangement in private oil companies at a low salary certainly challenged the SDG goal to provide *decent work and economic growth* (SDG: 8). In addition to this, environmental pollution by ONGC and OIL have brought a lot of challenges in achieving the goal of *good health and well-being* (SDG: 3).

Though it is not the primary duty of the oil companies to work towards accomplishing the SGDs, they can play important role in planning and implementing measures for the sustainable development of the local community. The oil companies can align their CSR policy with that of the SDGs by making organizational changes that contribute to SDGs.

### **7.5 Summing up**

This chapter mainly discussed the impact of the oil industry on the sustainable livelihoods of the study area. In the first part of the chapter, to understand the status of sustainable livelihoods of the villages under study, the SLI is constructed by following the DFID's sustainable livelihood framework. Incorporating 31 subcomponents under five livelihood capital indices, the SLI is calculated for different categories of villages. It is observed that both the oil villages and the nearest villages had 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. On one hand, the ONGC and OIL provided numerous opportunities for the local community to accumulate financial and physical capital through casual or temporary employment arrangements; on the other hand, they exposed the local community to some vulnerability contexts in terms of natural resource loss, such as land acquisition by oil companies, decrease in soil productivity, crop damage, and livestock loss.

The second part of the chapter discussed the livelihood issues of the local rural peoples inhabiting the oil villages of ONGC and OIL under study. The main vulnerability contexts observed during the FGDs were land acquisition, a decrease in agricultural productivity, loss of indigenous occupation, temporary and low-paid jobs, and environmental pollution. These vulnerability contexts contradict some of the sustainable development goals such as poverty eradication, inequality reduction, gender equality, decent work and economic growth, and good health and well-being.

Such findings highlight the need for a specific regional development plan for the areas affected by the oil exploration undertaken by the ONGC and OIL. The CSR initiatives of the company should work towards finding tailor-made solutions to minimize crop loss and generate alternative livelihood options. For example, timely

auditing of agricultural losses and monitoring compensation. A long-term plan can ensure quality education for children, employment generation, health security and infrastructure development. Also, proper implementation of CSR schemes targeted towards the upliftment of the local community will reduce industry community conflict. Considering the rich historical and natural resources in some parts of the study area, the development of rural tourism may be a good opportunity for the oil companies to employ the local youth. The CSR schemes could also work towards the upgradation and commercialization of the local handloom industry. Women can be empowered with skill training in handloom weaving, livestock and poultry farming. Facilitating a market for their products will economically empower local women to take up small ventures.