EFFECTS OF OIL EXPLORATION ON RURAL RESIDENT WELFARE: A CASE STUDY OF IRAN

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Development of oil industry as one of the modern strategies to deal with poverty and unemployment along with activities such as agriculture and manufacturing industries in villages can be an important strategy for the development of village and prevention of rural migration to cities. The aim of this research was investigation of the effects of oil exploration on rural resident welfare (Lavan Island). The research was conducted in the form of a survey study. The population of the study included two sectors: the managers and rural residents in Lavan Island. The necessary data for this research were collected from by 135 (with the use of Cochran formula) rural residents in Lavan Island, they were sampled by using a random sampling method. The reliability of questionnaire was calculated by Cronbach Alpha coefficient for different sections after conducting a pilot study for each structure separately calculated: economic factor 0.96, social - 0.944, and culture - 0.928, respectively. The results of this research showed that the oil industry could improve the rural development process in rural areas: improve the employment, education, family relationship, and better access to water and electricity. The factor analysis results showed that the positive effects of oil industry development could be: economic, social, cultural, and physical factors. These four factors have explained 62% of total variance.

Keywords: *oil exploration, rural resident welfare, poverty, factor analysis, Iran.*

Introduction

Oil as the main raw material and energy supply in the world is important. This industry as a new strategy for tackling unemployment with such activities as agriculture and manufacturing industries in village could be an important strategy for the development of villages and prevention of migration of villagers to cities. Today, the oil industry development is the main subject for economic–social development programme in such a developing country as Iran. Rural developments in Iran, especially after the land reform led to a massive migration to the cities and the decline of traditional rural activities. Therefore, drawing attention to these facts is inevitable recommendation and it requires the use of new strategies to generate income supplement activities in villages, such as using the industry. The petroleum industry has also been plagued by operational conflicts which centre around such concerns as widespread environmental degradation, human displacement, and inadequate compensation for loses imposed in the oil producing communities, and inadequate community level involvement which often leads to alienation between the state and the indigenous population (Ebegbulem et al., 2013). Oil and gas incomes have a strategic role in the structure of the Iranian economy. Holding 11% of the world's oil reserves and being the second largest producer within the Organisation of Petroleum Exporting Countries (Table 1), Iran both affects the international oil market and is broadly affected by it. Iran's economy relies heavily on crude oil export revenues, representing about 80-90% of total export earnings and 40-50% of the government annual budgets. The sales of oil amount to about 20% of the GDP of Iran. The unique role of oil revenues in the structure of government budgets and social security programmes distinguishes the Iranian economy from other economies. Development of the oil installations would contribute to the local economy by providing employment opportunities, monies to local contractors, and recycled revenues through the local economy. Indirect impacts could occur as a result of the new economic development (e.g. new jobs at businesses that support the expanded workforce or that provide project materials). Depending on the source of the workforce, local increases in population could occur (Bulent et al., 2010). Apart from the income and employment benefits to individuals, communities and regions, the income generated for central government is used directly in the provision of government services such as health, education, and welfare. Development of an oil or gas field also could potentially affect property values. Available definitions and concepts highlight the central point that rural development is about improving the welfare and productivity of rural communities, the scope and process of improving the quality of participation of rural people in that process,

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Table 1. Global crude oil supply and disposition (2008–2035)

	2008	2009	2015	2020	2025	2030	2035	Annual growth (%) (2009–2035)
OPEC SSA	4.2	4.1	5.1	5.2	5.1	5.1	5.3	1.00
Global production	81.6	79.6	84.2	85.1	87.5	91.5	97.2	0.80

Source: *Baumller et al., 2011*

Fig. 1. The map of Iran

Fig. 2. The map of Lavan Island in Iran

and the structure, organisation, and interactions and facilities which make this possible (Ocheni, Nwankwo, 2012). Miao examined impact of rural industrialisation on the rural-urban transition in China by the analysis of regional uneven development among provinces, and concluded that the fast industrialisation of rural areas had brought on many radical transformations of rural space in China, especially on the formation of new rural economic, social, and geographical spaces; and the uneven development of rural-urban transition (Chang-Hong, 2000). Yet, the result of Terry Lynn (2004) showed the original residents who might not have been able to share in oil benefits (Terry Lynn, 2004). Sigurdson indicated in a country like China that they make a considerable contribution to the economic development with surplus labour and a shortage of capital. At the same time, rural industry plays an important role in the social transformation of the Chinese countryside and contributes considerably to rectifying the imbalance between urban and rural areas. Rural industrialisation may have a limited impact on the employment pattern (Xu, Tan, 2002).

Research areas

Lavan Island is considered as one of the main petroleum regions in the Persian Gulf. The approximate length and width of the island is about 24 km and 4 km with the approximate area of 76.8 square kilometres, respectively. Lavan oil field consists of four fields, namely, Salman, Resalat, Reshadat, and Balal with a production capacity of 105 thousand barrels per day. Boosting investment and also population growth are leading to rapid industrial blooming in this area. At present, Lavan Island has more than 3100 inhabitants. The Iranian Offshore Oil Company (IOOC), Lavan Oil Refining Company, Lez village, military facilities, and other sources including domestics are located there (Shams et al., 2013).

Methodology

The study was carried out with field research approach and the questionnaires designed for rural resident who lived in the study area. The necessary data for this research were collected squarely from 135 (with the use of Cochran formula) rural residents in Lavan Island. They were sampled by using a random sampling method. The validity of research tool was obtained by the idea of experts. Data were collected from structured interviews and field observation and a pilot test was conducted with 25 samples to examine the reliability of the questionnaire. Cronbachs Alpha coefficients for Likert type scales were calculated. Reliability of the questionnaire was determined by Chronbach alpha test (Table 2). Alpha value is in range from 0 to 1, so that the internal reliability of items is found through this coefficient. According to Table 2, it is found that questions and items of the questionnaire are higher than 0.7. For this reason, it is scientifically valid to describe and test relations of variables. The Kaiser-Meyer-Olkin (KMO) and Bartlett's test measures were applied to determine the appropriateness of data and to measure the homogeneity of variables. These statistics show the extent to which the indicators of a construct belong to each other. KMO and Bartlett's test shows that the data are proper for factor analysis as showed in Table 3. KMO= 0.693 was got and as this value is larger than 0.5, it is concluded that the number of samples is suitable for the factor analysis. According to the above table, Bartlett's test of sphericity was calculated to be 2885.3 with significance p=0.000, and thus, this value is significant.

Table 2. Reliability analysis (Alpha)

Scale Name	No of items in the scale	Alpha value
Economic factor	12	0.919
Social factor	23	0.885
Physical factor	5	0.860
Cultural factor	6	0.894

Table 3. KMO measure and Bartlett's test to assess appropriateness of the data for factor analysis

KMO	Bartlett's test of sphericity	
	Approx. chi- square	Sig
0.693	1502.3	0.000

Table 4. Number of extracted factors, Eigenvalues and variance explained by each factor

Factors	Eigenvalue	% of variance	Cumulative % of variance
1	3.702	23.10	23.10
2	2.837	17.26	40.36
3	1.742	10.96	51.32
4	1.396	10.86	62.18

It is concluded that the factors have not been classified well and the questions in each factor have congeneric correlative factor with each other. Factor analysis was applied as the main statistical technique to analyse the data. The main object of this technique is to classify many variables into a few factors based on relationships among variables. Therefore, 13 variables were selected for the analysis. There are mainly four stages in factor analysis:

1) first solution: variables are selected and an inter correlation matrix is generated for including all variables;
2) extracting the factors: parts (factors) are extracted from the correlation matrix based on the first solution;
3) rotating the factors: sometimes one or more variables may load about the same on more than one factor, making interpreting of the factors ambiguous;
4) naming the factors: results are then derived by analysing the factor load of each variable. Proper names are given to each factor by considering the factor loads (Emin et al., 2007).

Results

The results of this research showed that the oil industry could improve the rural development process in rural areas. The Kaiser criterion (1960) was used for selecting underlying factors or principle components explaining the data. In this study, the number was decided by leaving out components with corresponding Eigenvalues of less than one. This is the rule of thumb when conducting Principal Component Analysis (PCA) using a correlation matrix. Since PCA uses the earlier communalities of one, it tends to inflate factor loadings, which makes identification of patterns relatively easier. In factor analysis, the sum of squares of factor loadings (Eigenvalue) shows the relative importance of each factor in explaining the total variance. According to Table 3, Eigenvalues for factor 1 to 4 are 3.702, 2.837, 1.742 and 1.396, respectively. The true factors that were retained explained 61.45% of total variance. The percentage of trace (variance explained by each of the three factors) is also shown in Table 4.

The factor analysis results showed that the positive effects of oil industry development could include: economic, social, cultural, and physical factors, since these four factors have explained 62% of total variance. Social factors included: improvement of education, improvement of Internet services, and improvement of the charity services. Economic factors included: coming of the skilled workers to the region, oil industry employment, and improvement of public investment. Cultural factors included: decrease of conflict and improvement of the family relationships. Physical factors included: improvement of the access to fresh water and improved access to electricity.

The varimax rotated factor analysis is shown in Tables 5-8. In determining factors, factor loadings greater than 0.50 were considered to be significant. The results of this research showed that three factors explain 62% of total variance of components, i.e. the positive effects of oil installations on rural resident welfare. These factors include the social, economic, cultural, and infrastructure effects.

The first factor, i.e., social factor explained 23% of total variance and 5 variables were loaded significantly. These variables are presented in Table 4. A relevant name for this on loading's pattern is the "Social factor". Eigenvalue of this factor is 3.702, which is placed at the first priority in the positive effects of oil installations on rural resident welfare.

Table 5. Variables loaded in the first factor using Varimax rotated factor analysis

Name of factor	Variables loaded in the factor	Factor loadings
Social factor	Improved higher education	0.822
	Improved informal education	0.791
	Improved primary education	0.760
	Improved Internet services	0.665
	Improved charity services	0.650

Table 6. Variables loaded in the second factor using Varimax rotated factor analysis

Name of factor	Variables loaded in the factor	Factor loadings
Economical factor	Skilled workers coming to the area	0.829
	Improved employment	0.818
	Improved investment	0.696
	Improved indigenous employment	0.619

Table 7. Variables loaded in the third factor using Varimax rotated factor analysis

Name of factor	Variables loaded in the factor	Factor loadings
Cultural factor	Reduced conflict between indigenous	0.925
	Improved family relationships	0.740

Table 8. Variables loaded in the third factor using Varimax rotated factor analysis

Name of factor	Variables loaded in the factor	Factor loadings
Physical factor	Improved access to electricity	0.759
	Improved access to fresh water	0.551

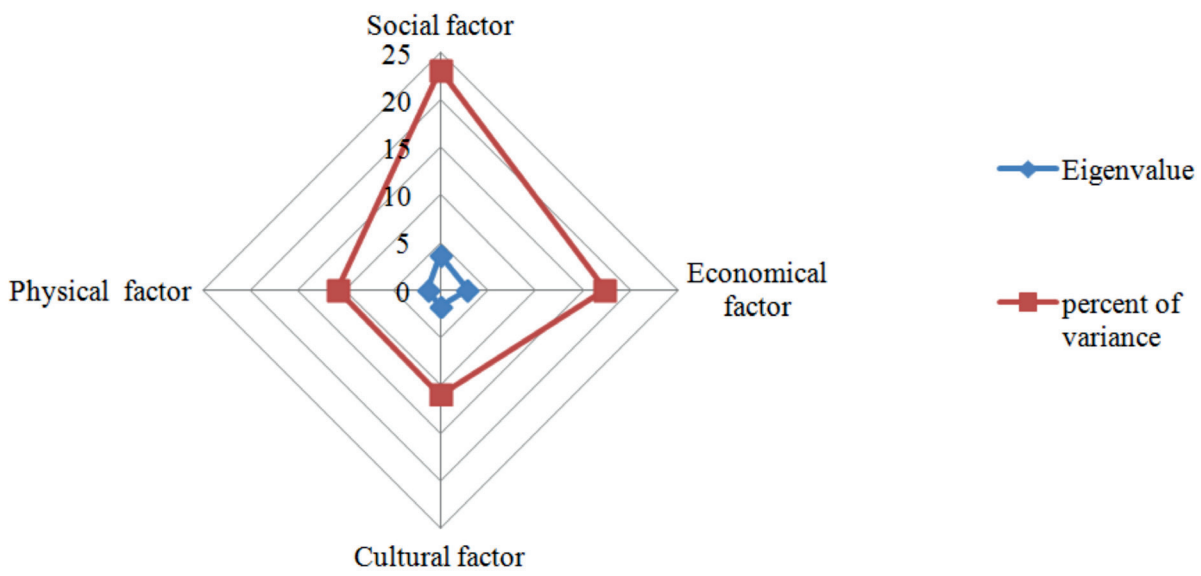

Fig. 3. Effects of oil exploration on rural resident welfare in Lavan Island

The Social factor with 23% is the most important positive effects of oil installations on rural resident welfare. In this factor, five variables were loaded significantly. These variables include: improved higher education, improved informal education, improved primary education, improved Internet services, and improved charity services in this area.

The second factor associated mostly with the variables is economic factor. So, this factor can be named as the "Economic factor". The Eigenvalue for this factor is 2.837, which explained 17% of total variance (Table 5). The economic factor with 17% is the important positive effects of oil installations on rural resident welfare. In this factor, four variables were loaded significantly. These variables include: skilled workers coming to the area, improved employment, improved investment, and improved indigenous employment (Table 6).

The name assigned to the third factor is the "Cultural effects". This factor with an Eigenvalue of 1.742 explains 11% of total variance (Table 7). In this factor, two variables were loaded significantly. These variables include: reduced conflict between indigenous and improved family relationships.

The name assigned to the fourth factor is the "Physical effects". This factor with an Eigenvalue of 1.396 explains 10% of total variance (Table 8). The Physical factor with 10% is the important positive effect of oil installations on rural resident welfare. In this factor, two variables were loaded significantly. These variables include: improved access to electricity and improved access to fresh water.

Although, the results of research showed that the development of oil exploration could have positive impact on the rural resident welfare, it seems that the important question for future research is to investigate, which method can be developed to evaluate the effects of oil exploration on rural resident welfare from the rural resident viewpoint or which environmental risks can occur from oil exploration development in rural areas.

Discussion

The factor analysis result showed that the positive effects of oil industry development could include: economic, social, cultural, and physical factors and these four factors have explained 62% of total variance. Results of research showed that the development of oil industry in rural areas would provide the direct and indirect economic benefits, direct impact such as improvement of income and development in rural areas by providing goods and services to oil companies. The ongoing development of the oil industry is supported by, and has made a substantial contribution to, infrastructure development in rural areas. The study period also show a range of further investments in education and training, beyond the infrastructure, increased intake into the oil and gas funding. The result of research suggested the oil exploration in Iran should improve physical and social infrastructure, more equitable distribution of resources, improved local governance, effective conflict management mechanisms, and better environmental management in rural areas.

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