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Research article

CHALLENGES OF OIL INSTALLATIONS DEVELOPMENT FOR RURAL AREAS. A CASE STUDY OF IRAN

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ABSTRACT: The oil industry has conflicts which centre around such concerns as widespread environmental degradation, human displacement, inadequate compensation for loses imposed in the oil producing communities and inadequate community level involvement which often leads to alienation between state and the indigenous population. The aim of this research was investigating the challenges of oil installations development for rural areas from the view point of Lavan Island residents in Iran. The research was conducted in the form of survey study. The population of the study included the rural resident in Lavan Island. The necessary data for this research was collected squarely by 135(with the use of Cochran formula) rural resident in Lavan island were sampled by using 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 0.921, social 0.890, culture 0.894, infrastructural 0.965 and environmental 0.860 respectively. The results of this research showed that the oil industry could be had negative impacts for rural areas. The results of factor analysis showed that the negative impacts of oil industry development in Lavan Island included to: infrastructural, social, cultural, environmental and economical factors that five factors have explained 67% of total variance.
Keywords: Rural areas, Oil industry, Negative impacts, Lavan island, Iran.

INTRODUCTION

In order to achieving the goal of rural sustainable development in most developing countries, which promotes social and economic development of local communities, the rural areas cooperatives face with limitations. As a developing country, Iran has 65 000 villages with about 22 million people living in rural areas. They are living under poverty line [3]. Proponents of oil believe that countries lucky enough to have ‘‘black gold’’ can base their development on this resource [1]. They point to the potential benefits of enhanced economic growth and the creation of jobs, increased government revenues to finance poverty alleviation, the transfer of technology, the improvement of infrastructure, and the encouragement of related industries. But the experience of almost all oil-exporting countries to date illustrates few of these benefits [4]. To the contrary, the consequences of oil effects tend to be negative, including slower than expected growth, barriers to economic diversification, poor social welfare indicators, and high levels of poverty, inequality, and unemployment [7]. The exploitation of oil has a profound regional and local impact, and from the standpoint of the majority of the local population, this impact is alarming. Zhao and et al (2012) was studied the effects of household energy consumption on environment and its influence factors in rural and urban areas, the result of research showed that energy is the essential material basis of economic and social development. However, the large number of energy consumption leads to a serious threat to climate change, environmental pollution and human health [10].

Result of Terry Lynn (2004) studied showed that the original residents who may not have been able to share in oil benefits increasingly clash with ‘‘newcomers,’’ as they see their own ways of life greatly disrupted [7].

Wang and et al (2008) was studied rural industries and water pollution in China. Result of research showed that pollution by rural industry is related to the type of industrial activity [8]. The major polluters include an array of industries such as oil installations that produce large quantities of wastewater, adding nitrogen, phosphates, phenols, cyanide, lead, cadmium, mercury, and other pollutants to the near rural residential areas. In this research investigated the water, air, noise, solid and other pollution in rural areas in China [5].

Also the result of Yuanan and Hefa [9] research showed that widespread pollution of surface water resulted largely from increased pollutant discharges from industrial, municipal, and agricultural sources, excessive water abstraction from the environment, and poor water resources management and enforcement of pollution control regulations [9].

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 and 4 km with the approximate area of 76.8 square kilometers, 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 [6].

Fig. 2: the map of lavan Island in Iran

Fig. 1: the map of Iran

METHODOLOGY

The study was performed in the south region of Iran, in the Lavan Island. The study was carried out with field research approach and the questionnaires designed for rural resident who were living in study area. The necessary data for this research was collected squarely by 135(with the use of Cochran formula) rural resident in Lavan island were sampled by using random sampling method. The validity of research tool was obtained by idea of experts. Data were collected from structured interviews and field observation to examine the reliability of the questionnaire a pilot test was conducted with 135 samples. And Cronbachs Alpha coefficients for likert type scales were calculated. Reliability of the questionnaire was determined by Chronbach Alpha test. Alpha value is in range 0 to 1 so that internal reliability of items is found through this coefficient. If this coefficient is zero, it will show full unreliability of items and if it is one, it will show full reliability. If alpha value is more than 0.7, questions and items are suitable for testing the concept or the related variable. According to table 1 it is found that questions and items of the questionnaire is higher than 0.7. For this reason, it is scientifically valid to describe and test relations of variables.

Table 1. Reliability analysis (Alpha).

Scale Name	No. of items in the scale	Alpha value
Economic factor	12	0.921
Social factor	23	0.890
Cultural factor	6	0.894
Physical factor	5	0.860
Environmental Factor	17	0.965

To determine the appropriateness of data and measure the homogeneity of variables that attracting farmers to group activities, the Kaiser-Meyer-Olkin (KMO) and Bartlett's test measures were applied. These statistics show the extent to which the indicators of a construct belong to each other. KMO and Bartlett's test got for these variables show that the data are proper for factor analysis as showed in Table 2.

Table 2. 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
0.690	5403.1	0.000

KMO= 0.690 was got and because this value is larger than 0.5, it is concluded that the number of samples is suitable for factor analysis since KMO value is between 0 and 1 and the closer to one , the higher the sample validity. According to the above table, Bartlett's test of sphericity was got to be 2885.3 with significance p=0.000 and because this value is significant, 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 analyze the data. The main object of this technique is to classify many variables into a few factors based on relationships among variables. For this purpose, 20 variables were selected for analysis.
Factor analysis is a statistical method that is based on the correlation analysis of multi-variables. The purpose is to cut most variables to a lesser underlying factors that are measured by the variables. Factors are formed by grouping the variables that have a correlation with each other. There are mainly four stages in factor analysis [2].
a. First solution: Variables are selected and an inter correlation matrix is generated for including all variables. An inter-correlation matrix is a k (where k equals variables) array of the correlation coefficients of the variables with each other. When correlation between the variables is weak, it is not feasible for these variables to have a common factor, and a correlation between these variables is not studied. Kaiser–Meyer–Olkin (KMO) and Bartlett's tests of sphericity (BTS) are then applied to the studied variables to validate if the remaining variables are factorable. The KMO value should be greater than 0.5 for a satisfactory factor analysis. BTS, on the other hand, should show that the correlation matrix is not an identity matrix by giving a significance value smaller than 0.001.
b. Extracting the factors: A parts (factors) is extracted from the correlation matrix based on the first solution. In the first solution, each variable is standardized to have a mean of 0.0 and a standard deviation of 71.0. So, the eigenvalue of the factor should be greater than or equal to 1.0, if it is to be extracted.
c. Rotating the factors: Sometimes one or more variables may load about the same on more than one factor, making the interpreting of the factors ambiguous. So, factors are rotated to clarify the relationship between the variables and the factors. When various methods can be used for factor rotation, the Varimax method is the most commonly used one.
d. Naming the factors: Results are then derived by analyzing the factor load of each variable. Proper names are given to each factor by considering the factor loads [2].

RESULT

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 Eigen values of less than one. This is the rule of thumb when conducting Principal Component Analysis (PCA) using a correlation matrix. Because PCA uses the earlier communalities of one, it tends to inflate factor loadings, which makes identification of patterns relatively easier. In factor analysis sum of squares of factor loadings (eigenvalue) shows the relative importance of each factor in explaining the total variance. Three factors were suggested by the criterion of Eigen values. According to Table 3 eigenvalues for factor 1 through 5 are 4.290, 3.455, 3.203, 3.028 and 1.956, respectively. The true factors that were retained explained 67% of the total variance. The percentage of trace (variance explained by each of the three factors) is also shown in Table 3.

Table 3. Number of extracted factors, eigenvalues and variance explained by each factor.

Factors	Eigenvalue	% of variance	Cumulative % of variance1
1	4.290	20.561	20.561
2	3.455	17.602	38.163
3	3.203	11.709	47.872
4	3.087	10.283	58.155
5	1.956	8.821	66.976

The varimax rotated factor analysis is shown in Tables 4-8. In determining factors, factor loadings greater than 0.50 were considered for be significant. The first factor, i.e., infrastructural factor explained 21% of the 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 "infrastructural factor". Eigenvalue of this factor is 4.29, which is placed at the first priority in rural industrialization. In this factor, five variables were loaded significantly. These variables include: lack of suitable development of transport services, lack of suitable development of ICT services, lack of suitable development of health services, lack of suitable development of housing, lack of suitable development of public roads.

Table 4. Variables loaded in the first factor using Varimax rotated factor analysis

Name of factor	Variables loaded in the factor	Factor loadings
Infrastructural factor	Lack of suitable development of transport services	0.876
	Lack of suitable development of ICT services	0.857
	Lack of suitable development of health services	0.738
	Lack of suitable development of housing	0.691
	Lack of suitable development of public roads	0.615

The second factor associated mostly with the variables about social factor. So, this factor can be named as the "social factor". The eigenvalue for this factor is 3.455 which explained 17.6% of the total variance (see in Table 3). In this factor, four variables were loaded significantly. These variables include: decrease of security, increased rural migration, decrease of informal education, migration of skilled and unskilled workers.

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

Name of factor	Variables loaded in the factor	Factor loadings
Social factor	Decrease of security	0.845
	Increased the rural migration	0.797
	Decrease of informal education	0.791
	Migration of skilled and unskilled workers	0.704

The name assigned to the third factor is the "cultural effects". This factor with an eigenvalue of 3.203 explains 10.7% of the total variance. In this factor, four variables were loaded significantly. These variables include: the increase of inequality, the increase of addiction, increasing piracy, lack of suitable development printing press and local radio and television.

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

Name of factor	Variables loaded in the factor	Factor loadings
Cultural factor	Increase of addiction	0.695
	Increasing piracy	0.613
	Lack of suitable development printing press	0.546
	Lack of suitable development of local radio and television	0.512

The name assigned to the fourth factor is the "environmental effects". This factor with an eigenvalue of 3.087 explains 10.3% of the total variance. In this factor, five variables were loaded significantly. These variables include: the increase of groundwater, noise, air, and soil and seawater pollution

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

Name of factor	Variables loaded in the factor	Factor loadings
Environmental factor	Increase the groundwater pollution	0.664
	Increase the noise pollution	0.604
	Increase the air pollution	0.560
	Increase the soil pollution	0.551
	Increase the seawater pollution	0.543

The name assigned to the fifth factor is the "economical effects". This factor with an eigenvalue of 1.956 explains 8.8% of the total variance. In this factor, there variables were loaded significantly. These variables include: the lack of animal husbandry development, lack of suitable development of pearling and lack of adequate investment in the private sector.

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

Name of factor	Variables loaded in the factor	Factor loadings
Economical factor	lack of animal husbandry development	0.629
	lack of suitable development of pearling	0.609
	lack of adequate investment in the private sector	0.567

DISCUSSION

The results of this research showed that the oil industry could be having negative impacts on rural development process in rural areas. The factor analysis result showed that the negative impacts of oil installations development in Lavan Island included to: infrastructural, social, cultural, environmental and economical factors that five factors have explained 67% of total variance. In infrastructural factors loaded: lack of suitable development of transport services, lack of suitable development of ICT services, lack of suitable development of health services, lack of suitable development of housing, lack of suitable development of public roads.

In social factors loaded: decrease of security, rural migration, decrease of informal education, migration of skilled and unskilled workers. In cultural factors loaded: the increase of inequality, the increase of addiction, increasing piracy, lack of suitable development printing press and local radio and television. In environmental factors loaded: the increase of groundwater, noise, air, and soil and seawater pollution. In economic factors loaded: the lack of animal husbandry development, lack of suitable development of pearling and lack of adequate investment in the private sector. (Fig. 3).

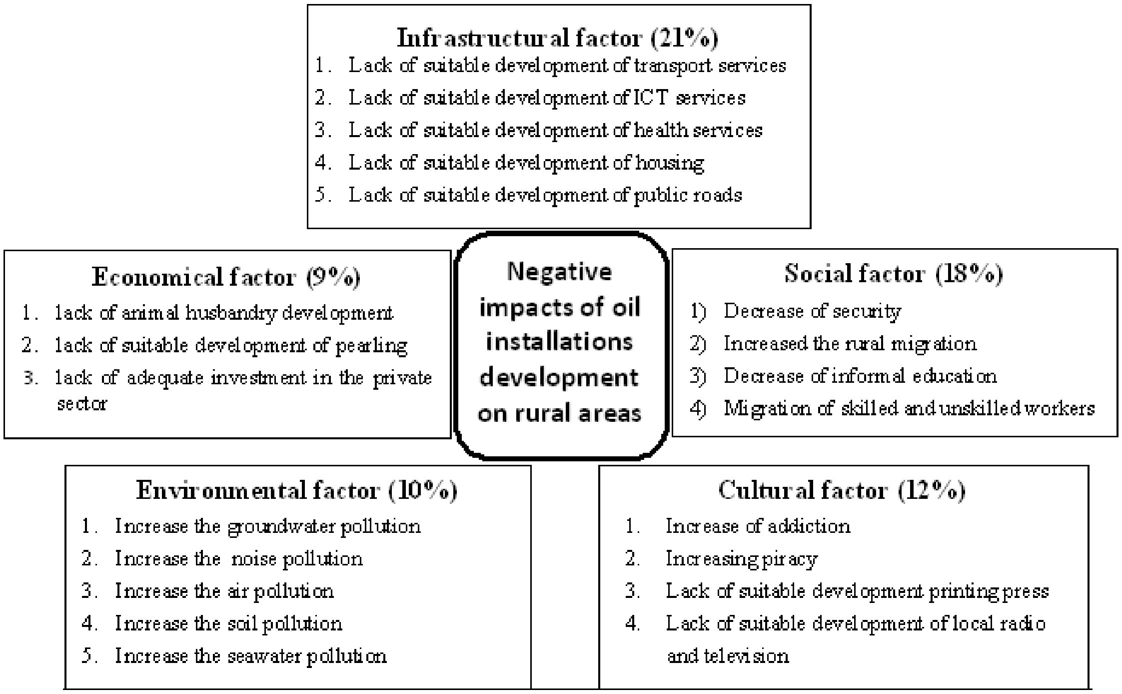

Fig. 3: Negative impacts of oil installations development on rural areas

Reforms in policy and institutional frameworks can help improve the use efficiency of resources and reduce pollution. It is expected that Iran should be able to continue the oil industrial development and sustain its economic growth while adequately protecting the environment and public and social health.

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