

**RANKING INDUSTRIAL ESTATE IN TERMS OF THEIR EFFECTS ON DISADVANTAGED AREAS
(CASE STUDY: SISTAN AND BALUCHESTAN)**

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ABSTRACT

Industrial estates are phenomena which will be manifested in a near future in the country. Establishment of these estates brings about positive and negative economic, social, environmental, and skeletal– infrastructural consequences in their respective areas. Sistan and Baluchestan province has 38 industrial estates and areas, some of which are located in disadvantaged areas. Thus, investigating effects of these estates on disadvantaged areas is the main purpose of the current research work. Descriptive – analytical research method was applied. Data were collected using library sources and data were analyzed using AHP method based on interviews with experts in Delphi. To this end, 10 industrial estates were selected from 8 underdeveloped areas of Sistan and Baluchestan province and they were compared and ranked in terms of having positive effects and minimization of negative effects in v areas using AHP method. According to the results, Zabol Industrial estate and Ramshar Industrial estate were selected as the best sites with weight scores of 0.220 and 0.174, and Sarbaz Industrial estate and Konarak Industrial estate were selected as the worst sites in terms of eliminating deprivation from surrounding areas with weight scores of 0.025 and 0.030.

KEYWORDS: AHP, disadvantaged areas, industrial estates, Life quality, Ranking, Sistan and Baluchestan.

INTRODUCTION

Reduction of deprivation and regional inequality is an important issue in most developing countries due to economic and political consequences (Fotros and Beheshti, 2006). Life quality is under influence of great regional inequalities in these countries which is rapidly growing in most cases (Misra, 1979). Concept of industrialization in economic literature is considered as key for rapid economic development through which it is possible to realize a future with better manufacturing facilities, increased employment opportunities, renovation of economic activities and finding suitable place in international arena (Varzboom Consulting Engineers, 2003). Experiences indicate rapid industrial growth is an important tool for achieving standards of living, income, and employment, and essentially changing social and economic conditions is realized only through rapid development of industry sector and services sector. To this end, history of the last hundred years in developing countries is evidence for attempts of many governments for industrialization.

Establishment of industrial estates and areas in third world countries and developing countries after World War II is one these attempts with initially was carried out aiming at tackling the problems of unemployment, migration to cities, inflation and dealing with environmental pollutions (Baroughi Bonab, 1998). However, it has many positive and negative consequences on surrounding areas including increased income and employment for residents, reducing immigration, increasing rural infrastructure facilities, enhanced recreational amenities, increased environmental pollutions, and increased crime (Eftekhari and Taherkhani, 2002; Rezvani *et al.*, 2010; Tavakol and Nozari, 2012; Riahi and Pashazadeh, 2012).

According to previous research works on development levels of Iranian provinces, Sistan and Baluchestan province is considered as the most disadvantaged province (Eslami, 2012; Sheykh Beygloo, 2011; Mirghafouri *et al.*, 2010; Jamali *et al.*, 2009). Thus, studies related to “development effects in disadvantaged areas” can be useful for this province. Establishment of industrial estates and construction of various manufacturing units in them in recent years pave the way for industrial development of this province. The main hypothesis in this work is that emergence and entrance of large and medium industries causes changes in social, economic, and environmental aspects for residents. Many theoretical approaches consider changes resulting from technology and advanced industry entrance as positive. Thus, industry and technology is factor of development and change. One of the main issues in third world countries regarding transfer of great industries and complex technologies is controlling its consequences so that it is directed toward optimal direction.

The main research question is that which industrial estates in disadvantaged areas of Sistan and Baluchestan province have better performance in increasing positive effects and decreasing negative effects on surrounding areas? In order to answer this question, a kind of ranking should be provided from these estates. Thus, current work ranks industrial estates located in disadvantaged areas of Sistan and Baluchestan province in terms of positive influence and reducing negative consequences on surrounding disadvantaged areas. Ranking industrial estates allows comparison of them and thus it is useful in improving their performance.

Purpose of Study

The main purpose of study includes: ranking industrial estate of Sistan and Baluchestan province in terms of eliminating deprivation of surrounding areas. In addition, understanding characteristics of the province's industrial estates and areas is the minor research purpose.

Review of Literature

Review of literature indicates that there is no research which studies directly ranking of industrial estates in terms of deprivation elimination. Most domestic studies are related to investigation of effects of industrial estates on surrounding areas, some of which are mentioned here.

Baroughi Bonab (1998) investigated effects of construction of industrial estates on Tabriz city and provided strategy and policy for industrial estates. Riahi and Pashazadeh (2012) studied effects of industrial estates on living quality of rural residents of Garmsi City and found job security, changes in housing conditions, changes in the pattern of food consumption and durable goods, and participation level are significant impacts of industrial estates on rural workers. Motiee Langroodi and Najafi Kani found most development indexes including consumption patterns, housing, insurance, satisfaction and job security, training, motivation, and sustainability show significant changes in villages. Findings by Younesian *et al.* (2009) on impacts of environmental health of industrial estates in two options (lack of implementation; implementation of the projects without environmental health considerations and implementation; implementing projects with imposition of methods for adverse effects) was investigated with distinguishing construction phase and operation, which implementation choice with outcome (+252) was accepted following reduction of adverse effects.

Theoretical Framework

Industrialization: it means technologic evolution in order to provide better living quality for present and future generations (Huq, 1994).

Industrial Area: it is an area which is allocated for establishment of industrial units by the government and which is divided into sections and it is sold or rented (Zadboom Consulting Engineer, 1991).

Industrial Estate: various definitions have been provided for industrial estate, main of which include:

- Establishment of a collection of industrial activities with each other which are connected and similar manufacturing activities are conducted (Ejlali, 1994).
- UNIDO Definition: industrial estate is a land with specific area which is selected according to industrial locating regulations based on strategy of the country's industrial estates development. Infrastructure facilities and needed service activities are created in relation with the type of industrial activity, which are relegated to the applicants for industrial units within preparation or after preparation.
- Definition by Bylaw of Industrial Estate Regulation: industrial estate is a land with specified area which encompasses a collection of industries and provides infrastructure facilities and welfare services considering type and size of the estate and combination of industrial activities for owners of industries (Iran Small Industries and Industrial Estates Organization, 2014).

Industrial estate and area provides various sizes of development motives, while they have basic differences. Distinction between industrial estate and industrial area is that industrial estate not only is responsible for development activity, providing land and services, but also it organizes continuity of industries' activities and creates services which act as factors for absorption of industries' establishment. Industrial areas are most suitable for medium and large manufacturing units which allow construction of most facilities due to their scale and do not need for participation in development of infrastructural facilities with other manufacturing units. Industrial estates are most suitable for small

and medium industries, since development of infrastructural facilities and welfare services by single industrial units is not economical and needs concentration (Baroughi Bonab, 1998). Industrial estates and areas facilitate regional development process through industrial decentralization (Rezvani *et al.*, 2010). In Iran before Islamic Revolution, industrial areas were mostly considered for establishment of industries. After Islamic Revolution, with establishment of Iran Industrial Estates Corporation, industrial estates were planned for accumulation of industrial programs.

Effects and Consequences of Establishment of Industrial Estates and Areas: many studies have been conducted on development of industrial estates and areas and their impacts on geographical spaces (Floyand, 2007; franco Sotte and Roberto Esposti, 2002; Rizwanul, 1987; Lee, 2001). For example, Dunmade considered effects and consequences of these areas in four aspects, technical, economic, Scio – political and environmental aspects (Dunmade, 2002). Creating job opportunities, increased income for residents, reduced migration and increased welfare and infrastructure facilities in surrounding residential places are among its consequences (Rezvani *et al.*, 2010). In addition, some authors paid more attention to negative environmental effects. Severe environmental changes resulting from establishment of industries and technologies bring about irreversible losses and damages (Tavakol, 2011).

Multi Criteria Decision Making Techniques: these techniques are considered as management tools and are classified into two classes: MODM and MADM. MODM are utilized for designing, while MADM are used for selecting superior alternative (Sabeti Saleh, 2009). Multi-criteria techniques and group decision making have extensive applications in the literature and allow evaluation of alternatives in several aspects for decision makers (Chi and Liang, 2007). Using this method, several alternatives are analyzed and prioritized. In addition to alternatives, there are several indexes which should be examined in relation with each alternative. Also, Multi-criteria decision making deals with decision matrix (Asgharpour, 2006; quoted in Darvish Motavali *et al.*, 2012). Analytic Hierarchy Process: it is one of the most efficient decision making models and multi-criteria planning which was developed by Saaty in 80s (Ahmadi, 2001). AHP simplifies complex problems and solves them (Ghodsipour, 2002).

MATERIALS AND METHODS

Methodology

Purpose of current research is development – applied and descriptive – analytical method was used. Data collection was done based on library sources. In addition, AHP was used for data analysis. Weights were allocated using expert ideas. That is, first, criteria and aspects of ranking were specified with review of literature. Then, aspects were scored using Delphi method in the form of interview with experts familiar to the subject. Finally, the output was provided as ranking of province's industrial estates. Sample size was specified based on Delphi method which usually includes assessment groups with 9 members. Thus, three groups with nine members of experts familiar to the research subject and area under study were selected, and interviewed, which include: A. experts of Industrial Estates Corporation of Sistan and Baluchestan province, professors of the university in urban and rural planning field, experts from Iran Small Industries and Industrial Estates Organization. Results taken from Delphi interview were used for ranking the factors. Expert Choice 11 software was used for calculating scores.

Location

Sistan and Baluchestan province with 187,502 km² area and a population of 2,534,327 in south east of the country is considered as the largest province of Iran. It is located in 25 degree and 3 min to 31 degree and 29 min of North latitude and 58 degree and 49 min to 63 degree and 20 min of East longitude (Statistical Center of Iran, 2009). With encompassing 11.4 percent of total area of the country it inhabited 3.37 percent of country's population and thus it is one of the least dense provinces (Statistical Center of Iran, 2011). This province has 300 km coastline bordering with the Gulf of Oman in the south and 1,100 km of land border and it is limited by Khorasan province to the north, and Afghanistan and Pakistan in the east and Kerman and Hormozgan provinces in the west (Afrakhteh, 2004). According to the recent national divisions, this province has 14 towns, 36 urban centers, 40 districts, 102 rural districts and 8,908 villages (Statistical Center of Iran, 2009).

Characteristics of Province's Industrial Estates and Areas

Sistan and Baluchestan province includes 29 industrial estates and areas; 10 industrial estates and 8 industrial areas are in list of less-developed regions by Ministry of Economic Affairs and Finance and Ministry of Industry, Mine and Trade. In order to reduce problems of artisans and transfer of pollutant units to non-residential areas of cities, as well

as creating and strengthening infrastructure for artisans, construction of workshop units in province's industrial estates initiated since 1998. There are 58 units under construction in the province (with over 95 percent physical progress), which is about 2 times of national average (35). In addition, the number of completed workshop units in the province's industrial estates is 160 units which is 2 times of national average (80) (Sistan and Baluchestan Province's Industrial Estates Corporation, 2014).

Table 1. Characteristics of industrial areas and estates in Sistan and Baluchestan Province

Industrial Area			Industrial Estate			
No.	Name	Area (hectare)	Being in list of disadvantaged areas	Name	Area (hectare)	Being in list of disadvantaged areas
1	Zehak	10	*	Zahedan- Mirjaveh	933	-
2	Baris	5.5	*	Zahedan- Kambozia	864	-
3	S.	11	*	Workshop estate	74	-
4	Pasabandar	20	*	Zabol (Mohammad Abad)	78	*
5	Dalghan	20	*	Ramshar	200	*
6	Nagor	20	*	Khash	200	*
7	Khash	-	-	Iranshahr Bampour	320	*
8	Nok Abad	15	*	Iranshahr workshop	5.2	*
9	Zabol	20	*	Saravan	200	*
10	Adimi Zabol	-	-	Sarbaz	100	*
11	Nosrat Abad	-	-	Nikshahr	100	*
12	Nariman	-	-	Chabahar	600	*
13	Mirjaveh	50	-	Konarak	250	*
14	Bonkar	-	-			
15	Sankandy	-	-			
16	Dost Mohammad	-	-			

Source: Sistan and Baluchestan Province's Industrial Estates Corporation, 2014

RESULTS AND DISCUSSION

Criteria Identification

In the first step, research criteria should be extracted. Considering research literature, overall six criteria were selected for ranking. Each criterion includes multiple sub-criteria which are shown in Table 2.

Source: Research theoretical grounds and findings, 2014

Following identification of criteria, five steps were carried out for analyzing data and ranking industrial estates of Sistan and Baluchestan province using AHP.

1. Determining the hierarchy
2. Explaining the significance coefficients of criteria and sub criteria
3. Determining significance coefficients of alternatives
4. Determining final score (priority) of alternatives
5. Calculating incompatibility factor using Expert Choice software

Step 1: Creating hierarchical structure

The first step in AHP is creating a graphical representation of the problem, which shows purpose, criteria and alternatives. Converting the problem to a hierarchical structure is the main part of AHP since complex problems are simplified compatible to human mind and nature (Zebardast, 2001).

Table 2: Criteria and sub-criteria for ranking industrial estates

Criterion	Sub-criterion
Culture and Education	Increased levels of public culture, literacy and education, increased cultural and artistic facilities and services
Physical – infrastructural	Improved quality of housing in terms of equipment and facilities, enhancing infrastructure facilities such as paved roads, highways, better drinking water, expediting travel to the provincial capital, Internet, banking services
Employment and Earnings	Creating new jobs for inhabitants, variety of jobs for residents, increased job security, increased income
Population	Reduced migration to large cities in the province and surrounding provinces, creating willingness to remain in the villages
Health and welfare	Improving health services, lack of negative effects on emergence of diseases, increased recreational facilities in the countryside
Environmental	Less pollution level in the environment, improved quality of rural environment, and promoting innovative methods of waste collection and disposal, having no effect on drinking water resources in residents

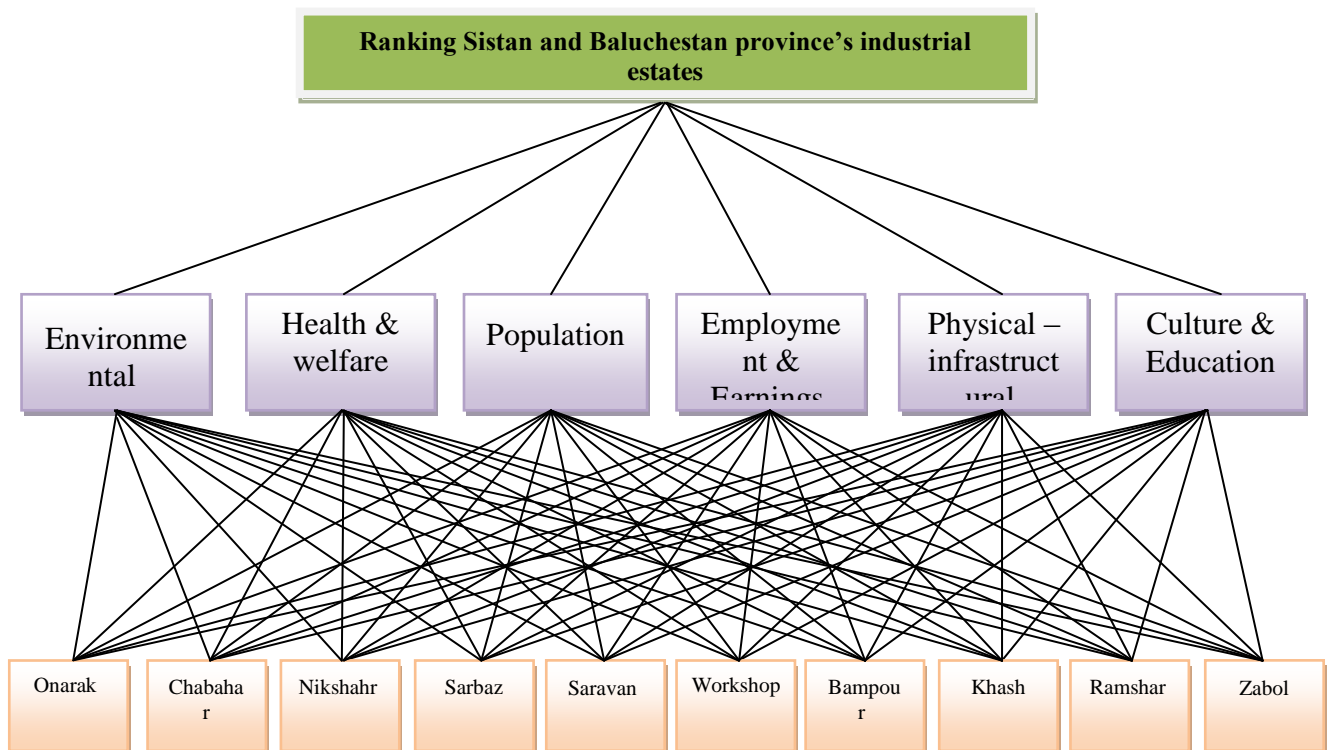


Figure 1. Ranking criteria and alternatives

A three-level hierarchy is observed in this figure. Level 1 indicates the purpose, which is ranking industrial estates in Sistan and Baluchestan province. In level 2, six criteria are considered including Culture and Education, Physical – infrastructural, Employment and Earnings, Population, Health and welfare, and Environmental criteria. Level 3 includes industrial estates located in disadvantaged areas of the province, which were selected from province industrial estates (n = 10).

Step 2: Calculating weight in AHP

In AHP, firstly elements are compared in pair-wise manner and pair-wise comparison matrix is formed. Then, relative weight of elements is calculated using the matrix. Thus, all criteria can be compared in pair-wise manner. The basis for judgment in the comparison is Saaty's 1-9 scale, superiority of criterion i toward criterion j (a_{ij}) is determined based on this scale and considering aim of investigating strength.

Table 3: Saaty's 1-9 scale (numerical scales for pair-wise comparison of criteria)

Score (strength of importance)	Definition	Explanation
1	Equal importance	Two criteria are equally involved in achieving the goal.
2	weak importance	
3	average importance	Experience and judgment show slight importance of one criterion over another one.
4	More than average importance	
5	strong importance	Experience and judgment show strong importance of one criterion over another one.
6	Stronger importance	
7	very strong or fixed importance	An important criterion is very important compared to other.
8	very very strong importance	
9	maximum importance	The importance of one criterion over another is of the highest possible.
Opposite of above cases: if criterion i takes one of above figures when compared to j, then j has opposite value when compared to i.		

Source: Saaty et al., 2003

Pairwise comparisons are recorded in a $n \times n$ matrix (here 6×6). Judgment matrix of pair-wise comparison is denoted as $A = a_{ij}$. It should be noted comparison matrix in AHP is a reciprocal matrix. As referred in Saaty's 1-9 scale, if preference of employment and earnings criterion over population criterion is 5, then preference of population criterion over employment and earnings will be $\frac{1}{5}$. In other words, figures of comparisons are specified as follows:

1. figures 1 shows the Saaty's 1-9 scale
2. opposite of these figures

Geometric mean is used in this work. In this method, the elements of each row are calculated and the resulting vector is normalized (i.e. each value is divided by the sum) to obtain the weight vector. As seen in Table 4, employment and earning criterion is considered as the most important criterion for ranking estates according the idea of Delphi group's experts.

Table 4: Matrix for index weights versus ranking of estates

	Culture and Education	Physical – infrastructural	Employment and Earnings	Population Health and welfare	Environmental	Environmental	Weights
Culture and Education	1	6	7	5	4	5	0.025
Physical – infrastructural	1.6	1	5	5	5	5	0.152
Employment and Earnings	1.7	1.5	1	3	6	5	0.431
Population	1.5	1.5	1.3	1	5	5	0.055
Health and welfare	1.4	1.5	1.6	1.5	1	6	0.078
Environmental	1.5	1.5	1.5	1.5	1.6	1	0.258

Inconsistency= 0. 26

Step 3: Determining weight of alternatives

Following specifying weight of criteria, alternatives should be weighted. In this step, priority of alternatives in relation with each criterion is judged. The basis for judgment is Saaty's scale. However, in comparison of alternatives with criteria or sub criteria it is not significant which alternative is more important; rather it is significant which alternative is more preferred. Tables 5- 10 indicate weight of alternatives. Following table gives relative scores of alternatives based on culture and education criterion. Zabol's Mohamad Abad Industrial Estate with score of 0.276 has the rank 1 and Nikshahr Industrial Estate with score of 0.223 has the rank 2. This evaluation was also done for other criteria.

Table 5: Matrix for weight of alternatives in terms of culture and education criterion

	Zabol	Ramshar	Khash	Bampour	workshop	Saravan	Sarbaz	Nikshahr	Chabahar	Konarak	Weights
Zabol	1	4	6	3	5	2	8	2	7	8	0.267
Ramshar	1.4	1	2	1	1	2	4	4	4	6	0.088
Khash	1.6	1.2	1	3	1	3	3	5	1	3	0.046
Bampour	1.3	1	1.3	1	2	2	6	4	4	6	0.1
workshop	1.5	1	1	1.2	1	3	5	4	2	4	0.062
Saravan	1.2	1.2	1.3	1.2	1.3	1	6	2	5	7	0.145
Sarbaz	1.8	1.4	1.3	1.6	1.5	1.6	1	6	2	1	0.021
Nikshahr	1.2	1.4	1.5	1.4	1.4	1.2	1.6	1	6	7	0.223
Chabahar	1.7	1.4	1	1.4	1.2	1.5	1.2	1.6	1	2	0.033
Konarak	1.8	1.6	1.3	1.6	1.4	1.7	1	1.7	1.2	1	0.02

Inconsistency= 0.3

In terms of physical – infrastructural criterion, Zaabol's Mohamad Abad Industrial Estate with weight score of 0.231 has highest preference score considering calculations.

Table 6: Matrix for weight of alternatives in terms of physical – infrastructural criterion

	Zabol	Ramshar	Khash	Bampour	workshop	Saravan	Sarbaz	Nikshahr	Chabahar	Konarak	Weights
Zabol	1	3	5	3	3	2	4	2	2	7	0.231
Ramshar	1.3	1	3	1	1	2	3	4	5	4	0.148
Khash	1.5	1.3	1	3	1	3	2	2	1	3	0.067
Bampour	1.3	1	1.3	1	2	2	3	1	2	2	0.123
workshop	1.3	1	1	1.2	1	2	2	3	3	3	0.065
Saravan	1.2	1.2	1.3	1.2	1.2	1	3	1	3	4	0.134
Sarbaz	1.4	1.3	1.2	1.3	1.2	1.3	1	3	1	1	0.039
Nikshahr	1.2	1.4	1.2	1	1.3	1	1.3	1	2	2	0.095
Chabahar	1.2	1.5	1	1.2	1.3	1.3	1	2	1	2	0.066
Konarak	1.8	1.4	1.2	1.2	1.3	1.4	1	1.2	1.2	1	0.033

Inconsistency= 0.8

Table 7 shows scoring preference of selected alternatives based on employment and earning criterion. Zabol Industrial Estate with weight score of 0.336 have priority over other alternatives.

Table 7: Matrix for weight of alternatives in terms of employment and earning criterion

	Zabol	Ramshar	Khash	Bampour	workshop	Saravan	Sarbaz	Nikshahr	Chabahar	Konarak	Weights
Zabol	1	7	5	3	7	4	8	6	8	9	0.336
Ramshar	1.7	1	4	3	2	3	4	2	4	6	0.139
Khash	1.5	1.4	1	2	2	3	3	6	1	3	0.051
Bampour	1.3	1.3	1.2	1	2	1	6	7	5	7	0.047
workshop	1.7	1.2	1.2	1.2	1	3	5	4	2	3	0.05
Saravan	1.4	1.3	1.3	1	1.3	1	5	1	5	6	0.107
Sarbaz	1.8	1.4	1.3	1.6	1.5	1.5	1	6	7	3	0.024
Nikshahr	1.6	1.2	1.6	1.7	1.4	1	1.6	1	5	6	0.145
Chabahar	1.8	1.4	1	1.5	1.2	1.5	1.7	1.5	1	3	0.06
Konarak	1.9	1.6	1.3	1.7	1.3	1.6	1.3	1.6	1.3	1	0.041

Inconsistency= 0.23

Following table gives matrix of weights of selected sites in terms of population and migration criterion. As observed, Zabol Industrial Estate with score of 0.578 has preference in this regard.

Table 8: Matrix for weight of alternatives in terms of population criterion

	Zabol	Ramshar	Khash	Bampour	workshop	Saravan	Sarbaz	Nikshahr	Chabahar	Konarak	Weights
Zabol	1	5	5	7	8	3	7	3	1	8	0.246
Ramshar	1.5	1	3	1	4	4	4	2	4	3	0.058
Khash	1.5	1.3	1	3	3	4	3	3	4	5	0.073
Bampour	1.7	1	1.3	1	3	4	4	4	6	5	0.051
workshop	1.8	1.4	1.3	1.3	1	4	3	3	4	4	0.063
Saravan	1.3	1.4	1.4	1.4	1.4	1	3	3	4	3	0.142
Sarbaz	1.7	1.4	1.3	1.4	1.3	1.3	1	4	5	1	0.021
Nikshahr	1.3	1.2	1.3	1.4	1.3	1.3	1.4	1	4	4	0.139
Chabahar	1	1.4	1.4	1.6	1.4	1.4	1.5	1.4	1	8	0.189
Konarak	1.8	1.3	1.5	1.5	1.4	1.3	1	1.4	1.8	1	0.019

Inconsistency= 0.19

The next criterion is promotion of health and welfare in residential places. According to ideas of experts in Delphi group, Ramshar Industrial Estate has the highest score (0.190).

Table 9: Matrix for weight of alternatives in terms of welfare and health criterion

	Zabol	Ramshar	Khash	Bampour	workshop	Saravan	Sarbaz	Nikshahr	Chabahar	Konarak	Weights
Zabol	1	2	2	2	2	2	3	2	4	3	0.113
Ramshar	1.2	1	2	3	4	3	4	2	2	5	0.190
Khash	1.2	1.2	1	3	3	3	6	4	3	3	0.122
Bampour	1.2	1.3	1.3	1	3	2	3	3	3	3	0.067
workshop	1.2	1.4	1.3	1.3	1	3	3	2	3	5	0.098
Saravan	1.2	1.3	1.3	1.2	1.3	1	4	3	3	3	0.093
Sarbaz	1.3	1.4	1.6	1.3	1.3	1.4	1	4	5	1	0.024
Nikshahr	1.2	1.2	1.4	1.3	1.2	1.3	1.5	1	2	3	0.101
Chabahar	1.4	1.2	1.3	1.3	1.3	1.3	1.5	1.2	1	3	0.166
Konarak	1.3	1.5	1.3	1.3	1.5	1.3	1	1.3	1.3	1	0.027

Inconsistency= 0.16

Considering Table 10, Ramshar Industrial Estate with score of 0.260 has better situation compared to other estates in terms of environmental criterion. Thus, it has highest preference score.

Table 10: Matrix for weight of alternatives in terms of environmental criterion

	Zabol	Ramshar	Khash	Bampour	workshop	Saravan	Sarbaz	Nikshahr	Chabahar	Konarak	Weights
Zabol	1	5	3	3	4	5	7	6	6	6	0.155
Ramshar	1.5	1	5	3	4	6	7	6	4	5	0.260
Khash	1.3	1.5	1	2	3	3	4	4	4	4	0.087
Bampour	1.3	1.3	1.2	1	4	3	6	3	4	4	0.071
workshop	1.4	1.4	1.3	1.4	1	3	3	4	3	5	0.055
Saravan	1.5	1.6	1.3	1.3	1.3	1	5	4	5	5	0.106
Sarbaz	1.7	1.7	1.4	1.6	1.3	1.5	1	4	4	2	0.017
Nikshahr	1.6	1.6	1.4	1.3	1.4	1.4	1.4	1	2	3	0.092
Chabahar	1.6	1.4	1.4	1.4	1.3	1.4	1.4	1.3	1	3	0.140
Konarak	1.6	1.5	1.4	1.4	1.5	1.4	1.2	1.3	1.3	1	0.018

Inconsistency= 0.33

Step 4: Determining final score of alternatives and selection of preferred alternative

In this step final score of each alternative is specified from integration of criteria and sub criteria weights in relation with purpose of study as well as weight of alternatives in relation with criteria and sub criteria weights. In order to determine final score, Saaty's hierarchy combination was used, which leads to a priority vector considering all judgments at all hierarchical levels (Zabardast, 2001). Final score is calculated as follows:

$W_k(g_{ij}) \sum_{k=1}^n \sum_{i=1}^M W$: final score (priority) of alternative j

Where:

W_k : significance coefficient of criterion k

W_i : significance coefficient of sub criterion i

g_{ij} : score of alternative j in relation with sub criterion i

Table 1: Square matrix ($W^{n \times n}$) resulting from weights

Zabol	0.267	0.231	0.336	0.246	0.113	0.155	0.025 0.152 0.431 0.055 0.078 0.258
Ramshar	0.088	0.148	0.139	0.058	0.190	0.260	
Khash	0.046	0.067	0.051	0.073	0.122	0.087	
Rampour	0.1	0.123	0.047	0.051	0.067	0.071	
Workshop	0.062	0.065	0.05	0.063	0.098	0.055	
Saravan	0.145	0.134	0.107	0.142	0.093	0.106	
Sarbaz	0.021	0.039	0.024	0.021	0.024	0.017	
Nikshahr	0.223	0.095	0.145	0.139	0.101	0.092	
Chabahar	0.033	0.066	0.06	0.189	0.166	0.140	
Konarak	0.02	0.033	0.041	0.019	0.027	0.018	

Table 12. indicates final results for ranking industrial estates in terms of deprivation elimination from surrounding areas. As observed, Zabol's Mohamad Abad Industrial Estate with weight score of 0.220 was selected as the best industrial estate in this regard. Ramshar Estate with score of 0.174 was selected as the second suitable site. Sarbaz and Konarak Industrial Estates with weight scores of 0.25 and 0.30 were selected as the worst sites. Other sites can be observed in the table below.

Table 12. Final results of ranking industrial estates in Sistan and Baluchestan province

Estate	Zabol	Ramshar	Nikshahr	Saravan	Chabahar	Khash	Bampour	Workshop	Konarak	Sarbaz
W	0.220	0.174	0.121	0.116	0.124	0.074	0.072	0.062	0.030	0.025

Source: research findings, 2013

RESULTS AND DISCUSSION

Industrial estates of Sistan and Baluchestan province were ranked in terms of influence on surrounding disadvantaged areas using AHP in this work. Results indicate Zabol's Mohamad Abad Industrial Estate and Ramshar Industrial Estate with significant score difference to other estates have higher success in deprivation elimination from surrounding areas. Increased employment and income, lowest environmental pollution, improving infrastructure facilities, particularly in rural areas are the most important positive effects of industrial estate establishment. The indirect implication of research findings is that it seems success of studied estates is in relation with development of the towns of these estates, so that Zabol, Ramshar, Nikshahr and Chabahar Industrial Estates have been more successful in deprivation elimination according to expert ideas and they are located in developed towns of the province.

In addition, research findings suggest that emergence of economic, environmental, infrastructural and demographic impacts of industrial estates establishment can be observed in short term according to the expert ideas in interviews. However, its social and cultural aspects such as increased welfare, increased cultural facilities, education and public awareness, which are considered as optimal development indexes are manifested in long term, and it is possible that

negative outcomes of industrialization in these aspects may be severe. It necessitates more future works regarding social and cultural outcomes and effects of industrialization on disadvantaged areas. Also, it is recommended to study effects of industrial estates on disadvantaged areas using quantitative and statistical methods in future works. Qualitative methods and deeper studies especially in social and cultural aspects are also recommended.

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