Social and Environmental Impact Assessment of the Lube Oil Plant in Azzawiya Refinery Company

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ABSTRACT

Social and environmental impact assessment is important to evaluate the environmental effects due to development activities. This paper is designed to determine the outcome of this intervention in the ecosystem, in order to minimize the negative effects and enhance the positive ones. In this way, action will be taken to protect and improve the environment. Azzawiya Refinery Company is planning to develop and improve the Lube Oil Plant. It is planning to change the metal cans to plastic ones and increase production lines and the plant productivity to 100000 ton instead of 40000 ton per year. A descriptive deductive environmental impact assessment study of the Lube Oil Plant development was conducted. The study consisted of a disk study, site visits, and field survey. The study population of the Lube Oil Plant at Azzawiya Oil Refinery is totaling 250 employees distributed among the various plant coordination's. Moreover, a questionnaire was designed to express the opinions of the sample element and the number of participants in the filling of the questionnaire (sample) was about 25% of the total study population. SPSS program was used to analyze the data. The results showed various negative impacts and some positive ones. The negative impacts are easy to mitigate. The suggested development will have a positive impact on internal and external societies. The researchers recommend the mitigation of the negative impacts and the implementation of the Lube Oil Plant development.

Keywords:Azzawiya Refinery; Social and environmental impact assessment; Lube Oil Plant; Development activities.

1. Introduction

The site is located in the industrial area of Azzawiya city, on the Mediterranean coast, 45 km west of Tripoli, the Libyan capital. The site is located in the Oil Refinery approximately 3 km west of Azzawiya city. The Lube Oil Plant is part of the Libyan National Oil Corporation (NOC).

Lube Oil Plant in Azzawiya Oil Refinery Company is witnessing a series of developments. The purpose of this study is to identify the expected potential environmental and social impacts of the project. This process aims to make recommendations for the mitigation of the negative impacts and enhancement of the positive ones. It is important to bring about harmony between the aimed developments and the social environment.

Assessment of the social impact is one of the topics that need to be researched and studied, especially during the development or the establishment of projects. This importance comes from the influence of the surrounding on the health and productivity of the employees. Given that, the social impact assessment reveals social risks and suggests appropriate ways to mitigate expected negative impacts and enhance the positive ones. In other words, building human being capacity to respond and interact with the various surrounding variables. From here, the study problem is highlighted to identify the social impacts on the working society in the mixing oil factory.

In contrast, there are several methodological proposals for assessing the social impacts of products and production chains using a variety of characterisation procedures that gauge the various social aspects of those products. One of them is the Social Life Cycle Assessment Methodology (SLCA) notwithstanding its procedures, and characterisation methods of impact categories and subcategories are still under development [1].

Environmental Impact Assessments (EIAs) are unique in that they do not require adherence to a predetermined environmental outcome, but rather they require decision makers to account for environmental values in their decisions and to justify those decisions in light of detailed environmental studies and public comments on the potential environmental impacts [2].

The objectives of (EIAs) of a proposed development project are varied from direct objectives and long-term goals. The most important objectives are protection of the environment and public health, design projects appropriately to achieve sustainable development, minimize the negative impacts of new projects on the environment by finding ways and means to reduce and mitigate the negative impacts and promote the positive ones, achieving a degree of follow-up and monitoring through applicable laws and regulations, increasing the environmental awareness among the society and assisting decision-makers in the continuation, modification or suspension of any projects [3].

Furthermore, (EIAs) are the pre-project standard for outlining potential environmental and social risks related to large-scale mining. Incomplete or disingenuous EIAs mask the potential social, environmental and economic impacts of large projects [4].

This formulation of social impact is informed by following several principles to the field. The right to participate at all levels of the policymaking process as equal partners, the right to self-representation and autonomy, and the right to political, economic, and cultural self-determination [5].

Provide and Collect qualitative and quantitative social, economic and cultural data sufficient to usefully describe and analyse all reasonable alternatives to the action. To ensure those research methods, data and analysis consider the integrity of collected data [6]. To examine the possible misrepresentation of project risks, this article analyses a social impact assessment for the development of Lube Oil Plant in Azzawiya Oil Refinery Company.

The lube oil plant has multiple divisions and manufacturing processes and a number of employees exceeding 250. The objectives of this study are to emphasize that the environment is a priority for development and infrastructure projects and make recommendations to reduce the potential negative impacts and enhance the positive ones. Also, the study focuses on the identification of the social impact, which may occur due to the development of the plant. It is important to assist management and stakeholders and local authorities to identify the environmental, social and economic effects of the work. To Know the social consequences on workers of the mixing oil plant and communities in the early stage of planning and development of the project. In addition, it also presents the expected potential effects as well as make recommendations on the appropriate procedures and plans to mitigate negative impacts.

2. Materials and Methods

The population study of the Lube Oil Plant at Azzawiya Oil Refinery is 250 employees distributed among the various plant coordinations. The questionnaire distributed to the factory workers, and the number of participants in the filling of the questionnaire (sample) was about 25% of the total population.

Table 1 presents the general details of the studied sample. The upper row consists of characteristics, details, number, percentage, and the total of the sample. The characteristic consists of gender, age, education level, and years of experience. The gender is male or female, the age is divided into five ranges starting with less than 20 and ending with more than 50 years. The academic level consists of the conclusion of preparatory school, technical diploma, higher technical diploma, BSc, and master degree. The work experience ranges from less than five years to more than thirty years. The sample is 100% male and the age range is 31.7% more than 50 years and 1.6 less than 20 years. About 27% of the sample holds a high technical diploma.

Table 1: *general details of the study sample*

Characteristics	Details	Numbers	Percentage	Totals
Gender	Male	63	100%	
	Female	0	0%	
Age	Less than 20	1	1.6%	
	20-30	18	28.6%	
	31-40	13	20.6%	
	41-50	11	17.5%	
	More than 50	20	31.7%	
Scientific qualification	Preparatory school	8	12.7%	
	Technical Diploma	39	61.9%	
	Bachelor	8	12.7%	63
	High technical Diploma	8	12.7%	
	Master	0	0%	
Years of experience	Less than 5 years	17	27%	
	5-10	8	12.7%	
	11-15	5	7.9%	
	16-20	5	7.9%	
	21-25	10	15.9%	
	26-30	8	12.7%	
	More than 31	10	15.9%	

3. Theory and Calculation

The questionnaire form is used as an instrument to gather the necessary information for the study. It was designed based on local and international standards and confirmed through comparison with previous research studies. It was used in the following data analysis process:

- Quintet Likert scale to measure the phrases the four pivots of the study.
- In front of each phrase was located one of the following lists of indicators: very high / high / medium / low / doesn't exist. For the purpose of analysis, each phrase of thepreceding statements were given grades, from one to five to be processed statistically, see Table 2.
- The questioner's data were processed and analysed using the program (IBM SPSS Statistics 19). It includes a descriptive statistical analysis method which contains frequency distribution, percentage of the questionnaire answers. The arithmetic mean and the standard deviation were used to indicate the results distribution and values dispersion.

Table 2:*Assessment Term Classification*

Very high	High	Medium	Low	Doesn't exist
5	4	3	2	1

4. Results and Discussion

Table 3 shows the arithmetic mean and standard deviation which are used to measure the positive impact of the Lube Oil Plant. The answer with the most frequency was the phrase (respect and appreciation by coworkers) with a mean of 3.94 and a standard deviation of 0.93. This indicates the importance of the employees' incorporeal appreciation, the type of their daily social life and the harmony of the plant workforce. The last ranked answer with the least arithmetic mean and standard deviation of 2.19 and 1.19, respectively, is the phrase (increasing green areas). This indicator shows the importance of increasing the green areas due to its importance on the personnel comfort which would reflect on the plant productivity. The rest of the answer's ranks are shown in Table 3 that refers to the importance of the positive social impact of the plant pivot.

Table 3: *Arithmetic mean and stand deviation of impact positive factory pivot*

	Paragraphs of Positive Impact	Arithmetic mean	Standard deviation
1	Raising the level of economic activity in the region	3.32	1.27
2	Creating employment opportunities for the people of the region	3.17	1.21
3	Attracting new investment within the region	2.78	1.28
4	Introducing new health services	2.48	1.24
5	Increasing the attention to the environmental aspect of the preservation of pollution	2.63	1.27
6	Increasing green areas	2.19	1.19
7	of my job with my personal abilities	3.40	0.96
8	Proportionality of your monthly salary you're your experience qualification and nature of your work.	3.48	0.84
9	The distance between your location and home	3.70	0.84
10	Respect and appreciation by coworkers	3.94	0.93

Table 4 shows the arithmetic mean and standard deviation used to measure the level of the pivot of the work environment of Lube Oil Plant. The first ranks were taken by the phrases of (feel the noise resulting from the factory machines) with a mean and standard deviation of 4.21 and 1, respectively and (the company provides a periodical medical checkup) with a mean of 4 and standard deviation of 0.94, respectively. It indicates the necessity of the applying mitigation measurement to reduce such an impact.

It also shows the employees satisfaction with the good measurements taken by the plant management related to the health care. This item can be enhanced or continues as it is. The least rank with arithmetic mean and standard deviation of 2.30, was taken by the answer with the phrase (there are regular meetings between managers and staff to exchange views on the work). This item should be mitigated by increasing the number of meetings between the plant management and the staff for brainstorming and finding ways to better the work environment and raise the productivity. The rest of the answer's ranks are presented in the above-mentioned Table. These results indicate the importance of the pivot of the work environment on environmental impact assessment.

Table 4:*Arithmetic mean and stand deviation of the working environment pivot*

	Working environment	Arithmetic mean	Standard deviation
1	Feel respiration difficulty when I return home	2.54	1.12
2	Dealing with plant oils in a safe manner	2.80	1
3	Feel unpleasant orders emitted from the factory	3.97	1.24
4	Bothered from the factory location	2.81	1.12
5	I think the plant damages to the property of the residents	2.97	1.19
6	Bother to clean the car from contaminants	2.91	1.11
7	I feel the noise resulting from the factory machines	4.21	1
8	Accidents and injuries working level	2.87	0.82
9	Air pollution affects here on your daily activates	3.30	1.05
10	You believe that air pollution can cause many diseases	3.87	0.88
11	Safety equipment for plant workers are provided	2.94	1
12	Commitment to the factory workers in wearing safety equipment	2.81	0.76
13	The company provides periodical medical checkup	4	0.94
14	Availability of training programs for workers to deal with oils and hazardous materials	2.42	1.17
15	Availability of training programs to deal with the machinery in a safe manner	2.42	1.10
16	Availability of safety signs inside the factory	3	0.91
17	Availability of an emergency plan in the factory	2.87	1.10
18	There are good places for Rest	2.53	1.11
19	Availability of praying area	3.50	0.88
20	Availability of transportation of staff to and from the work site	3.10	1.10
21	Availability of free meals	3.21	1.10
22	Periodic meetings between managers and staff to exchange views and ideas about the work improvement	2.30	1

Table 5 shows the pivot of environmental awareness where the answer with the phrase (do you believe that the procedures and decisions taken by the company's or plant management are enough to reduce air pollution), came with the highest arithmetic average of 2.59 and standard deviation of 0.85. This item indicates that the management is doing a good job on this issue that needs to be enhanced. The answer with the phrase (verification of neighboring human health) ranked last with a mean of two and a standard deviation of 1.0. This gave a logical impact because it is not part of the management duty to take care of the neighboring resident's health. The ranks were less dispersed in this pivot which indicates the importance of the environmental awareness.

Table 5:*Arithmetic mean and stand deviation of the pivot environmental awareness*

	Environmental awareness items	Arithmetic Mean	Standard deviation
1	You believe that the laws and procedures taken by the management are enough to reduce air pollution	2.59	0.85
2	You made complaints about the pollution in the factory area	2.32	1.10
3	You are satisfied with management contribution in reducing pollution	2.39	0.89
4	Verification of Human health of the plant neighboring residents.	2	1
5	Availability of environment training courses for the plant personnel.	2.10	1

Table 6 provides the results of the plant development pivot. The items (do you consider a good step from the administration conducted an environmental impact assessment before development of the plant?) and (are you against the development of the factory?) ranked first with a mean of 4.0 and standard deviation of 0.99 and arithmetic mean of 1.98 and standard deviation of 1.59, respectively. The sample indicates the direction of the study that the majority agrees on the stage of assessing the social and environmental impact before the start of the project. It indicates the interest and high expectation of the workers to improve their working environment. The second item related to the employees' opinion about the factory development, they are not against the development because of the expectation of the positive impact on their income and better working environment. This positive feedback would help the administration in the development phase and would also reflect on the personnel productivity.

Table 6:*Arithmetic average and standard deviation of the plant development pivot*

	Plant development items	Arithmetic mean	Standard deviation
1	The development of the factory will contribute to attract new investments within the region	3.94	1.10
2	The development of the factory will contribute to enter the services of the New Health	3.71	1.11
3	The development of the factory will contribute to the reduction of accidents and injuries of workers	4	1.10
4	The development of the factory will contribute in the employment	3.81	1.24
5	The development of the factory will increase the severity of pollution	3.31	1.24
6	The development of the factory effect human health	3.	1.26
7	Do you consider it a good step of the department to conduct an environmental impact assessment prior to the development of the Factory?	4	0.99
8	Are you against the development of the factory?	1.98	1.59

5. Conclusions

The study analysed the environmental aspects and negative social effects that may result from the project during the decommissioning, implementation and operation stages. The team has found out that all of the negatives impacts need easy measurements to mitigate and therefore they cannot be considered as an obstacle to implement the Lube Oil Plant development. This development has more benefits for the society or, in other words, it has positive social impacts and it is recommended to be executed.

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