



An Environmental Management Pattern for Food Industries Located in Area Coastal Using SWOT Method, Case Study (KOSAR Cultivated and Industrial Factory)

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KOSAR, Cultivated and Industrial Factory, with an area about 6 hectares, is located near the beach in the north of IRAN (RAMSAR). This factory is considered as a convertible industry (Converting low quality citrus fruits into juice) and most of its operation is done during harvesting season. This factory releases its sewage into the sea through channel without any suitable refinement or management. Due to the great importance of the seashore and its organisms, this research was carried out to investigate a proper environmental management in the factory above mentioned. In this research, SWOT (Strength, Weakness, Opportunity and Threat) considered as an important method in environmental management method was used. By this method and field studies, the internal weakness and strength of the area also the external opportunities and threats were specified. Consequently some strategies were taken to eliminate the weakness and threats also to strengthen the strength points and opportunities. The strategies categorized were scored according to their priorities and regarded in the environmental management of area.

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1. Introduction

Coastal resources are valuable natural gifts that should be managed for the present and future generation. Coastal areas provide people with recreational, physical and environmental facilities and integrated management of the coastal area attempts to keep the optimized balance among people's uses of the sea resources based on specified

objectives. Destruction of coastal ecosystem in these areas due to economic development is increasingly growing.

Considering stable consuming and non-consuming uses, coastal ecosystems are so valuable, but as they're being used improperly, they are in danger of destruction (Dayson, 2004).

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Therefore, establishing different industries in coastal strip, due to the lack of an effective environmental management, and authorities' lack of background to factories harmful effects on coastal areas, have caused so many problems (Fahimi, 2001).

Because of the sensitive of the coastal areas, it's recommended to:

- 1- Emphasize on establishing clean industries in these areas.
- 2- Protect it against polluting industries (like protected areas).

Industrial development and using new technologies have an influential role in environment pollution so that they have affected the economic

and social effects of industrial development. (Hoben et al., 1999). The most important problem of industrial development is the presence of industrial sewage. The studies and observations have shown that most of the sewage refineries in Iran have either stopped working after a short period of time or are working with the least output. The factors causing these deficiencies include:

- 1- Inefficient management of refineries due to the authorities' lack of knowledge about the principle of sewage refinement.
- 2- Lack of notice of the authorities to refineries' management.
- 3- The architects' failure to take enough care of refineries construction and lack of choosing suitable method to refine the sewage (Karbasi, 2007).

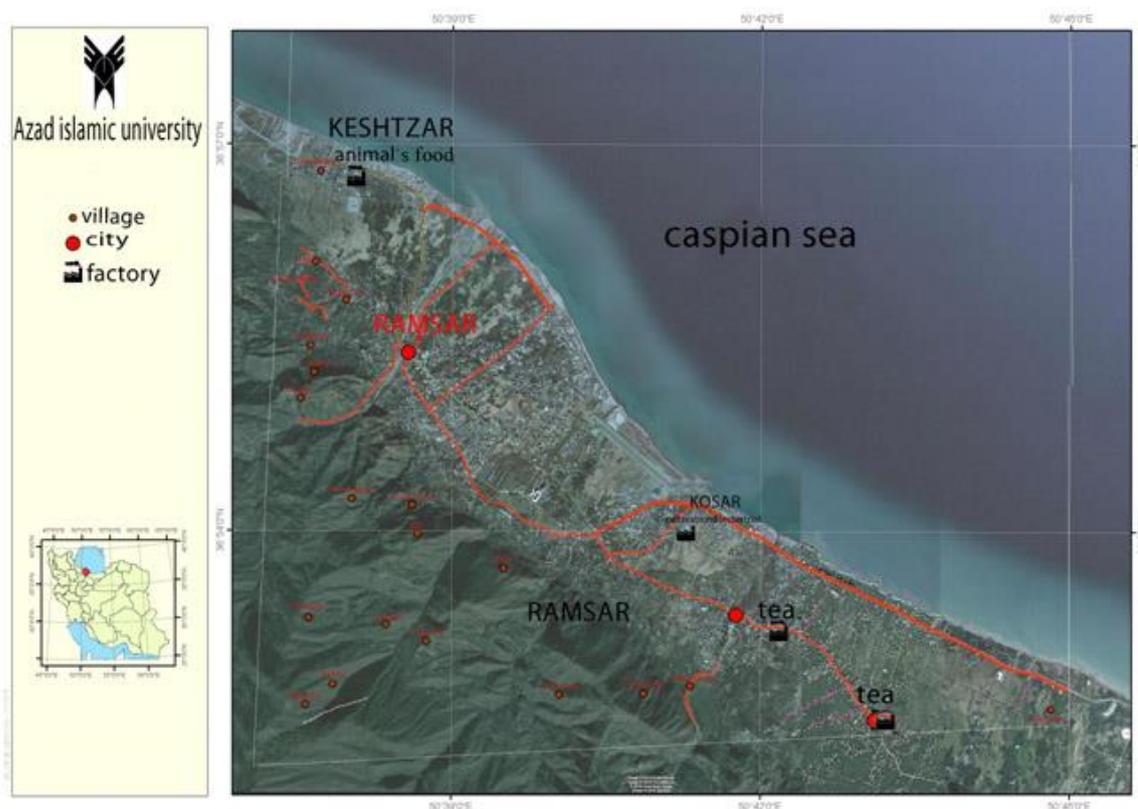


Fig. 1: Satellite image of the region

2. Materials and Methods

This research has been done through library and field studies and compiling the experience of local people and environmental experts. Consequently weakness and strength point, opportunities and threats arises from establishment of this factory

which is situated near the coastal area have been studied.

Data analysis has also been done using results of internal factor evaluation matrix, external factor evaluation matrix and SWOT matrix. The objective of analytical SWOT method is to specify weakness and strength points, threats and opportunities in the

environment, consequently removing weakness and threats and then promote opportunities and strength (Mafi, 1998).

Steps in providing internal factors evaluation matrix:

After examining the internal factors, the most important factor are listed the total of these factors should be from 10 to 20. They should include the weakness and strength of the factory. To provide this matrix the following steps have been done:

1- Strength points and then weakness are written.

2- A coefficient is given to these factors. The given coefficient to each factor from zero (not important) to one (very important) represents its partial important. The factor with the most functional effect

should have the highest coefficient. The total of these coefficients should be equal one (Mehdi Pour, 2004).

3- Each of these factors is given scores from 1 to 5: (1) Represents basic weakness, (2) A little weakness, (3) intermediate strength, (4) upper intermediate strength and (5) is for so high strength.

4- To specify the final score of each factor, the coefficient of each factor is multiplied by its score.

5- The total of find scores of each factor is worked out and final score is determined (Mirkia, 1997).

All of these steps are the same for external evaluation matrix. But in this matrix instead of weakness and strength point (internal factor), threats and opportunities (external factors) were considered (Moharamnezhad, 2006).

Table 1: Internal Factors Evaluation Matrix

No.	Strength points(S)	Weigh (0-1)	Current state score (5-1)	Weighted score
S1	Having a modern FMC machine to change wet residues into animals' food.	%75	5	0/375
S2	Taking parts the employees in educational classes for increasing their knowledge practical experience.	%56	2	0/112
S3	Having a formulation sector to control the products	%66	3	0/198
S4	Having refinery to reduce harmful effects of produced sewage.	%84	3	0/252
S5	Having a cold place to keep concentrated products and so on.	%47	4	0/188
S6	The possibility establishing and setting up the machineries of production line with gas fuel.	%56	3	0/168
Weakness points (W)				
W1	Financial problems for purchasing an OPERATOR machine for optimized use of orange peel oil and reducing it in the sewage.	%75	4	0/300
W2	Management weakness and the lack of experts to manage the refinery and control the sewage.	%66	4	0/264
W3	The lack of environmental knowledge regarding important values of coastal environment and its organisms.	%84	4	0/168
W4	Failure establishes an environmental sector for monitoring environment activities in the factory.	%75	5	0/375
W5	Causing a bad smell and an unpleasant scenery at the seashore.	%75	4	0/300
W6	Releasing the sewage containing oil and detergents with high PH, BOD and COD into the sea.	%84	4	0/336
W7	Releasing the sewage into the sea through a channel.	%84	4	0/336
W8	Using gasoil fuel instead of gas in starting the production line.	%66	2	0/132
Total		1		

Table 2: Strategies Matrix

No.	Strength points (S)	No.	Weakness points (W)
S1	Having a modern FMC machine to change wet residues into animal's food.	W1	Financial problems for purchasing an OPERATOR machine for optimized use of orange peel oil and reducing it in the sewage.
S2	The employees' take part in educational classes for increasing their knowledge practical experience.	W2	Management weakness and the lack of experts to manage the refinery and control the sewage.
S3	Presence of environmental standards for sewage drain.	W3	The lack of environmental knowledge regarding important values of coastal environment and its organisms.
S4	Having refinery to reduce harmful effects of produced sewage.	W4	Failure establishes an environmental sector for monitoring environment activities in the factory.
S5	Having a cold place to keep concentrated products and soon.	W5	Causing a bad smell and an unpleasant scenery at the seashore.
S6	The possibility establishing and setting up machineries of production line with gas fuel instead of gasoil.	W6	Releasing the sewage containing oil and detergents with high PH, BOD and COD into the sea.
		W7	Releasing the sewage into the sea through a channel.
		W8	Using gasoil fuel instead of gas in starting the production line.

External factors		Strategies			
No	Opportunities (O)	No.	SO Strategies	No.	WO Strategies
01	Helping to economy of the area.	S01	Considering possibility of starting the machineries of the production line with gas instead of gasoil, by advertising on juice containers they can be introduced as green products.	W01	Using suitable environmental rules and regulation to prevent the transfer of sewage into the sea.
02	The possibility of using domestic refining systems.	S02	Considering the factory use of refinery to reduce the harmful effects of sewage, domestic refining system can be used.	W02	Preparing a bed for increasing the knowledge and experimental skills of students of this field, and getting practical solutions from them to manage refinery and control the sewage
03	Presence of environmental standards for sewage drain.	S03	Regarding the presence of environmental standards for sewage drain, by equipping the formulation sector of the factory, the amount of sewage pollution can be reduce to a specified degree within the existent standards.	W03	Using environmental standards for sewage drain to minimize gathering of high PH material or material contains oil and detergents, At the sea bed.
04	Preparing a bed for increasing knowledge and experimental skills of the students of this field.	S04	Having the employees take part in educational classes for increasing their knowledge and practical skills, then becoming familiar with up to date environment rules and regulations in order to take more care about the coastal environment.	W04	Measuring the existent parameters of the factory sewage regularly by the conservational organization and compelling factory to establish an environmental sector to monitor its activities.
05	The possibility of using environmental adverts on juice container in order to introduce them as green products.	S05	Using FMC machine for converting citrus fruit's residue into animal's food, afterward making income farmers and the factory.	W05	Using environmental adverts on juice containers to introduce them as green products then increasing authorities, employees and the people's care about the environment.
06	Converting low quality fruits into concentrated products and making income for farmers.				
07	Preparing job opportunities in direct and indirect ways in harvesting and production season.				
08	Presence suitable environmental rules and regulations for coastal areas.				

Table 3: Continued

No.	Threats (T)	No.	ST-Strategies	No.	WT-Strategies
T1	The lack of allocating loan from the government for establishing refining system in the factory.	ST1	With having the employees and authorities take part in educational classes, and increasing their knowledge and skills also becoming familiar with the up to date refining methods, the danger of locating factory near the coastal area can be noticeably reduced.	WT1	With supplying credit and allocating loan from the government, the factory financial problem for purchasing operator machine and establishing refining systems can be eliminated.
T2	Considering environmental fines from conservation organization.	ST2	With an efficient management for refinery (minimizing the amount of sewage pollution and as a result reducing the fines), the factory's authorities can be forced to allocate a part of the factory net profit to reduction of harmful environmental effects.	WT2	With improving the management and using experts in refinery management, the number of environmental Fines can be noticeably reduced.
T3	Location of the factory near coastal region.	ST3	Equipping the formulation sector with a wide range of equipment for constant control of the pollution factors and the produced sewage, and as a result using encouraging rules (considering expenses as tax expenses).	WT3	With notifying the authorities and employees of the environmental importance and emphasizing on great importance of coastal environment, any threatening factors against coastal environment can be reduced to a great extent.
T4	Failure to consider a part of the factory net profit to decrease harmful environmental effects.	ST4	Using FMC machine or something like that to convert the wet residue into animal food in order to decrease the amount of factory waste material in the environment so that the authorities can be convinced to supply credit or allocate loan for purchasing such machineries to minimize destruction of the environment.	WT4	With efficient refining of the sewage and reuse of that in washing, lavatories and.... The amount of it's releasing into the sea will be decreased or totally stopped. With highlighting the great importance of that for authorities they can be convinced to allocate a part of the factory profit to this task.
T5	Failure to consider reducing as acceptable tax expenses (lack of encouraging rules).			WT5	With establishing an equipped environmental section within the factory, any activities against the environment can be prevented, and as a result advantages from encouraging rules can be gained.

3. Results and Discussion

3.1. First priority strategies

In examining internal weakness and strength and also external opportunities and threats, after analysis of the data in table QSPM, qualified strategies for improving the area have been presented. The purposes of all these factors strengthen of strong points and opportunities and then decreasing or omitting weakness points and threats in the region. Among the suggested strategies, the eight of them placing at the first priority include:

1- WT- With notifying the authorities and employees of the environmental importance and emphasizing on great importance of coastal environment, any threatening factors against coastal environment can be reduced to a great extent.

2- WO4- Using environmental adverts on juice containers to introduce them as green products then increasing authorities, employees and the people's care about the environment.

3- WT5- With establishing an equipped environmental section within the factory, any activities against the environment can be prevented, and as a result advantages from encouraging rules can be gained.

4- WO1- Using suitable environmental rules and regulation to prevent the transfer of sewage into the sea.

5- WO3- Using environmental standards for sewage drain to minimize gathering of high PH material or material contains oil and detergent at the sea bed.

6- WO5- Using environmental adverts on juice containers to introduce them as green products then increasing authorities, employees and the people's care about the environment.

7- WT4- With efficient refining of the sewage and reuse of that in washing, lavatories and so on, The amount of it's releasing into the sea will be decreased or totally stopped. With highlighting the great importance of that for authorities they can be convinced to allocate a part from the factory profit to this task.

8- WO2- Preparing a bed for increasing the knowledge and experimental skills of students of

this field, and getting useful solutions from them to manage refinery and control the sewage.

3.2. Second priority strategies

9- WT1- With supplying credit and allocating loan from the government, the factory financial problem for purchasing operator machine and establishing refining systems can be eliminated.

10- WT2- With improving the management and using experts in refinery management, the number of environmental penalties can be noticeably reduced.

11- S03- Regarding the presence of environmental standards for sewage drain, by equipping the formulation sector of the factory, the amount of sewage pollution can be reduce to a specified degree within the existent standards.

12- S05- Using FMC machine for converting citrus fruit's residue into animal's food, and then making income for farmers and the factory.

13- S04- Having the employees take part in educational classes for increasing their knowledge and practical skills, then becoming familiar with up to date environment rules and regulations in order to take more care about the coastal environment.

14- ST2- With an efficient management for refinery (minimizing the amount of sewage pollution and as a result reducing the fines), the factory's authorities can be forced to allocate a part of the factory net profit to reduction of harmful environmental effects.

3.3. Third priority strategies

15- ST3- Equipping the formulation sector with a wide range of equipment for constant control of the pollution factors and the produced sewage, and as a result using encouraging rules (considering expenses as tax expenses).

16- ST4- Using FMC machine or something like that to convert the wet residue into animal food in order to decrease the amount of factory waste material in the environment so that the authorities can be convinced to supply credit or allocate loan for purchasing such machineries to minimize destruction of the environment.

17- S02- Considering the factory use of refinery to reduce the harmful effects of sewage, domestic refining system can be used.

18- ST1- With having the employees and authorities take part in educational classes, and increasing their knowledge and skills also becoming familiar with the up to date refining methods, the danger of locating factory near the coastal area can be noticeably reduced.

19-SO1- Considering possibility of starting the machineries of the production line with gas instead of gasoil, by advertising on juice containers they can be introduced as green products.

4. Conclusion

According to the obtained results using SWOT method and considering the current state of the region, there are some suggestions to eliminate weakness points and threats then to promote the strength points and opportunities of the area which include:

1. Promoting environmental awareness in employees and authorities of the factory.
2. Making the employees take part in educational classes and get acquainted with environmental rules and regulations.
3. Establishing an equipped environmental section in the factory to monitor the activities.

4. Using environmental adverts on juice container to introduce them as green products.
5. Starting the machineries of the production line with gas instead of gasoil for helping the environment for cleaning the environment.
6. Using homemade refining system for sewage refining.
7. The regular control of the conservational organization over the execution of the regulations.
8. Improving the management and using experts to promote the refinery's efficiency.
9. Efficient refining of the produced sewage and reusing it for preventing it's discharging into the sea through channels.
10. Organizing some trips to this factory for students, and encouraging them to do surveys in order to use their useful solutions.
11. Assigning special budget for supplying credit and allocating loan to remove factory weakness and purchasing equipment to reduce the pollution.
12. Doing existent regulations related to pollution and coastal environment.
13. By encouraging methods (such as including the part of spent expenses for reducing pollution within the factory tax expenses).
14. Decreasing pollutant parameters of the sewage using existing environmental standards.



Fig. 2: Image the Sewage Discharging Channel Toward the Sea Near the Factory Entrance.



Fig. 3: Release the Sewage into the Sea Without Entering to the Refinery.

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