



## Impact of Environmental Factors on the National Security of Iran – A Case Study of Arak

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### Abstract

The Arak Alumina Plant (Iralco) is located in the city of Arak in Central Province, Iran. The industry is of great social, economic, and political importance only for this province but for Iran as a whole. On the other hand, the industry is one of the environmental challenges of the province and the country. Hence, it is a typical case for understanding the relationship between national security and environmental problems. The following paper is the first attempt to set an example on how to deal with such issues. There is a growing perception that environmental degradation, inequitable access to natural resources and hazardous materials increase the probability of conflict and thereby pose a risk to human rights and even national security. This environmental security research seeks to facilitate a process to motivate action to advance and protect local peace and the environment at the same time. The following research focuses on assessing environmental problems in Iralco, which threaten security, societal stability and peace, human health and sustainable livelihoods within the country and the city of Arak. The results show the positive effect of the close collaboration of Government, security and environment offices, environmental and security experts and even local NGOs. Also, this research has carried out assessments for understanding the linkages between the environment and security in the political and socio-economic aspects of Iralco in Arak. The research also contributes to increasing the perception of the interdependency of natural resources, socio-economic development and political stability in Iran and other similar local industrialized regions.

**Keywords:** Air pollution, National security, Aluminum plant, Arak.

### تأثیر عوامل زیست محیطی بر امنیت ملی ایران (مطالعه موردی شهر اراک)

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### چکیده

صنایع آلومینیوم اراک در استان مرکزی قرار دارد. این صنعت از نظر اقتصادی، صنعتی، سیاسی و استراتژیک نه تنها برای این استان بلکه برای کشور اهمیت دارد و از طرفی به عنوان یکی از چالش های زیست محیطی اراک و کشور مطرح است. بررسی تهدیدات و فرصت های زیست محیطی این صنعت و اثرات آن بر امنیت محلی و ملی به عنوان موضوع این پژوهش برای نخستین بار مورد بررسی قرار گرفت تا بتوان از آن بعنوان الگویی برای سایر نقاط کشور سود جست. پرسش اساسی در این پژوهش این بود که تخریب منابع زیست محیطی ناشی از فعالیت آلومینیوم اراک چه تأثیری بر امنیت ملی کشور دارد. در نهایت با ایجاد رابطه منطقی در فرآیند سه مولفه محیط زیست، توسعه و صنعتی شدن و امنیت ملی، شرایطی فراهم گردد تا هم روند توسعه و محیط زیست حفظ گردد و هم مردم با امنیت روانی در حوزه های اقتصادی، اجتماعی، سیاسی، اشتغال و معیشت در یک رفاه نسبی زندگی نمایند. بنابراین در این پژوهش این فرضیه مطرح شد که عدم رعایت استانداردهای زیست محیطی باعث وقفه در فعالیت کارخانه آلومینیوم اراک گشته و این امر منجر به بیکاری، بحران های امنیتی، اقتصادی، اجتماعی، سیاسی، کارگری شهر اراک خواهد شد. نتایج این پژوهش نشان داد که چالش های زیست محیطی در یک منطقه نظیر اراک نه تنها بر امنیت این شهر بلکه بر امنیت ملی نیز تأثیر دارد.

**کلمات کلیدی:** آلودگی هوا، امنیت ملی، کارخانه آلومینیوم، اراک.

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## Introduction

One of the major challenges and concerns of Iran and the world is to preserve the environment and reduce its degradation in the process of development and industrialization. Urban and industrial developments in human societies have forced the utilization of resources and the environment in virgin Nature (Vazir Daftari, 2000; Nasiri, 2000). Moving towards sustainable development requires serious attention to be paid to current developments in order to protect the environment and sustainable security and provide a positive interaction between them (Dabelko, 1996; Koltzoff, 2000; Levy, 1995 and Romm, 1992). The experiences of developed countries and developing trends over the last two decades explain the fact that, for maintaining the capability and capacity of the environmental movement and preventing an accelerated political crisis, social security is essential for a country's environment. This view ensures a balance between the components of power and opportunity of development for sustainable security and national interests (Ahmadi, 2005; Dodds *et al.*, 2005 and 2009).

The field of national security challenges is divided into military, political, economic, social and environmental issues (Tajik, 2005). It has been predicted that the most conflicts, crises and even wars between nations and governments in the future will be about natural resources and environmental challenges (local, regional and global). Environmental challenges depend on certain factors, such as reducing the role of natural resources as a cause of unstable politics

and security and environmental degradation as a cause of wars and a threat to human health.

The rate of environmental degradation has a direct impact on reducing power, and so the most recent aspect of national security is the issue of resources and environmental security. This approach has entered into the areas of international relations and the affairs of national and international associations, and even of individuals, as a result of rapidly increasing population and decreasing resources as well as destroying the valuable habitats and uncontrolled spread of industrial and mining pollution (Kargar, 2004). Also, it is one of the main factors in achieving justice in global environmental protection (Mohammadi, 1996; Blake, 2011). By the end of 1980s, environmental challenges had become a part of national security and justice issues. Environmental issues in our country are therefore affected by this development (Dabir Siaghi, 2004; Rabiei, 2004).

## Materials and Methods

The environmental data for this research was collected from the Central Province of Environmental Protection Agency of Iran, Iralco Company, and other national reports by universities and the Office for Political and International Studies. The data processing was conducted using statistical software such as SPSS. In this research, the main question is: what is a reasonable relationship between environmental development and national security (Ramezani, 2008)? In other words, what are the noticeable challenges and what means exist for reducing conflict. At first, indicators related to

environmental opportunities and threats have been discussed. Then, the relationships between each of the indices of development and industrialization as well as environmental standards and consideration of economic, political, social and security challenges at the local and national levels have been studied. This article sets out the results of this research in the area of the environmental pollution of Iralco and its impacts on local and national security.

## Results

The ultimate goal here is to follow security strategies which consist of three layers: individual, social and national security. Without any doubt, the environment is recognized as a new and effective aspect of national security, with environmental changes reflecting global and security features. Thus, there is a direct correlation between the level of the environmental degradation and national power. Iran plays an important role in the world's environment given that it possesses 1 percent of the world's land mass, 1 percent of the world's population and 10 percent of the world's specific biodiversity.

Nowadays, with regard to globalization, industrialization, population growth, migration, and the formation of cities polluted on a large scale, the challenges and concerns of environmental degradation have increase and its relationship with national security is becoming more evident. Arak is one of these contaminated cities of Iran with many environmental challenges and security concerns.

National security consists of integrated local securities. So, any social, political and environmental vulnerability in one area (e.g. Arak) will directly affect the whole national security. Population growth and migration from other provinces to Arak, as the fourth industrial pole in the nation and among the eight most polluted cities of the country, has caused disruption to healthy environmental conditions and, so, has become a concern and created serious social and security challenges for the province. Not being in compliance with environmental standards has usually caused Iralco to shut down. Since the factory is considered as one of the most important economic and industrial centers in the province, its closure has led to unemployment and to security, social and economic crises in Arak, thus causing a negative impact on national security.

As mentioned above, the role of industrial pollution has not been evaluated quantitatively and so its share in the emission rate and as a security threat cannot be expressed quantitatively. Some reasons, such as high economic value and the strategic position of this industry, the employment rate (3,500 direct jobs and 200,000 indirect jobs), and a one trillion USD annual turnover have caused all actions against the company's pollution to be carefully considered in an undisclosed manner. Subsequently, the following suggestions as effective strategies for protecting environment, reducing pollution and concerns along with the need for development and stable employment are proposed:

- 1) The need for rapid implementation of Arak's Pollution Reduction Plan, as approved by the Cabinet in 1386 (2007/8).
- 2) Evaluation of the company's share of pollution in Arak and its comparison with other sectors.
- 3) Rapid transfer of anode-producing and baking workhouses to the city's environs.
- 4) Resolving workplace health and safety problems, providing labor security and welfare and making the company's environment, especially its workhouses and transport system, healthy.
- 5) Reduction of polluting gases and particles from the chimneys of the firing furnaces.
- 6) Transporting industrial waste from Arak to other regions of the province.

## Discussion

### *A. Environmental Challenges of Arak*

Arak is surrounded by mountains and so it generally experiences temperature inversion from autumn to winter, with consequent high levels of air pollution. Also, the Mighan wetland is located at 5 kilometers to the Northeast of the city. The wetland is the source of dust in summers and a source of fog in winters. There are several industrial plants as well as Iralco inside and in the vicinity of Arak. According to official statistical data, there are about 3000 industrial units in the province of which 1000 units are located in Arak. The most important of them are Arak Aluminum Plant, Arak Machine, the Wagon Production Plant, Avangan Factory and Road Construction Machine Plant. The natural, climatic and industrial pollution have resulted in the phenomenon of heavy smog and an environmental crisis in Arak, a serious

security issue not only for that province but also for the whole country (Sadough, 2005 and 2007).

Moreover, industrial wastewater penetrating the ground and surface water, domestic and hospital waste disposal, lack of a sewage treatment system, low green spaces and gardens, inharmonious urban development, population growth, and heavy traffic in this city have all caused the city to be one of the eight most polluted cities in Iran (Figs. 1-3). During the last years, Iralco was shut down by local environmental office owing to the increase in air pollution and public protests. Iralco's authorities believe that the plant's share in air pollution is very low compared to the various other polluting sources, such as other industrial plants and means of transportation. But, people and media believe that Iralco is the most important polluting factor.

### *B. Environmental challenges of Iralco*

Arak Aluminum Plant (Iralco Company) is located in the city of Arak in an area covering 232 hectares with a production capacity of 120,000 tons annually. It employs about 3,500 people directly and about 200,000 people in related industries. The economic and financial turnover of the company amounts to billions of dollars per year. These are some reasons for the strategic position to this industry, not only in this small province but also in the whole country.

Air pollution emissions from the plant measure about 2,200 million cubic meters per year which means that each citizen of Arak is breathing more than 5 cubic/meter of polluted air per year (Tables No. 1 and 2). Equally, the effluent and solid waste from its industries and

urban areas make Arak one of the most polluted cities in Iran. There have been some efforts to reduce the rate of contamination in recent years, such as creating 120 hectares of green space and using gas instead of diesel fuels; however, officials believe that the company's share in pollution compared with that of other sectors has been exaggerated and reflects political and social issues. For example, they claim that there are no accurate tools for measuring and determining the

share of contamination and pollution in Arak. About 50 percent of Arak's air pollution belongs to automobiles and the other 50 percent is emitted by 400 small industrial units and 20 large industrial plants, such as Iralco. On the other hand, the dominant wind direction in Arak is 370 degrees west, based on 10-year-wind rose from the city to the factory, which compounds the problem (Ramezani, 2008).

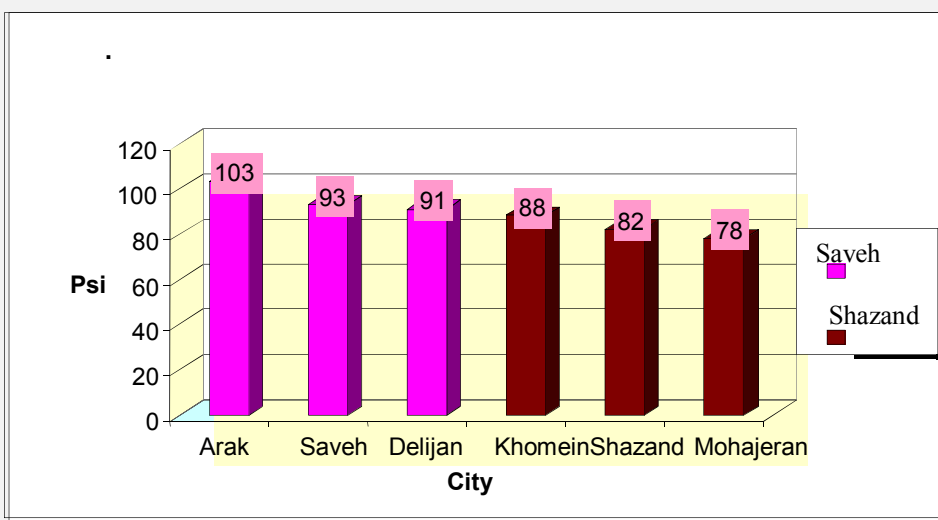


Figure 1. Air pollution in different cities of Central Province on 2008 (Ramezani, 2008).

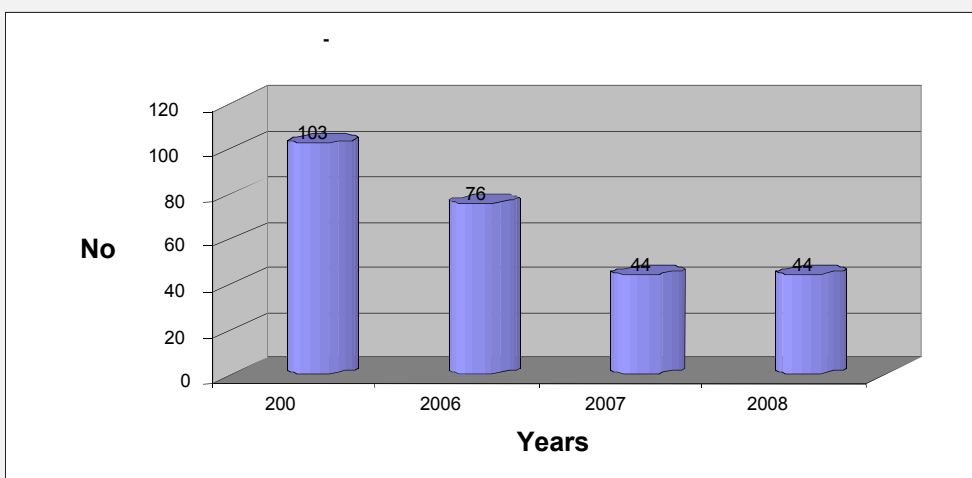
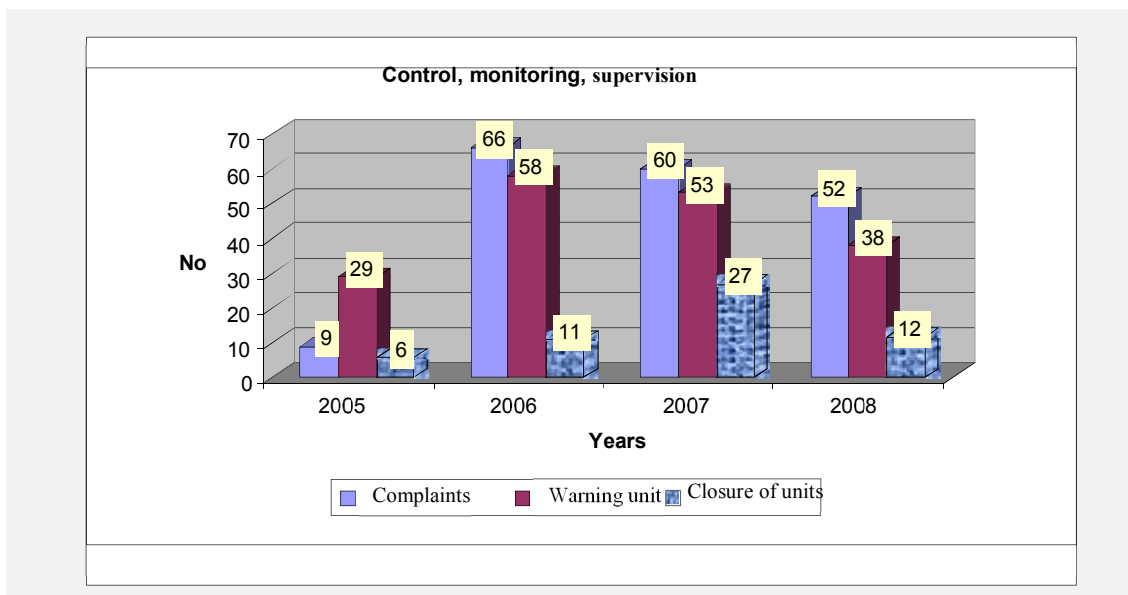


Figure 2. Number of polluting industries in the Central Province in 2005-2008 (Ramezani, 2008).



**Figure 3.** Dealings of the local office environment with polluted industries in Central Province during 2005-2008 (Ramezani, 2008).

**Table 1.** Main sources of pollutants from Iralco company (Ramezani, 2008).

System performance	Control approach	Main pollutant	Pollutant sources
Gas collection efficiency % 98	Dry scrub	Fluoride, dust, sulfur dioxide	Restoration Workshop
Gas collection efficiency % 98	Dry scrub	Fluoride, dust, sulfur dioxide	chimney scrubber workshops
Dirt deflector efficiency 98%	Filter bag	Aerosols and dust	Soils or store-pit and Alumina transport system

**Table 2.** Quality and quantity of pollutants from different units of Iralco (Ramezani, 2008).

New Anode baking	Old Anode baking	Anode making	Restoration	factors
80000-100000 h/m <sup>3</sup>	100000 h/m <sup>3</sup> -80000	178000 h/m <sup>3</sup> -60000	2.5 million h/m <sup>3</sup>	Emissions rate
Old anode baking and other air pollutants SO <sub>2</sub> -CO and particles with chemical origin	Bitumen fumes contain pyridine, Banzopyrenanthracene Florentine, ring shaped hydrocarbon compounds and other (P.A.H)	Intense fumes and coke particles and chemicals	Fluorides & CO-CO <sub>2</sub>	Emissions rate
Same old anode baking	High risk of occurrence of various cancers due to material polycyclic aromatic- skin inclusions- chronic respiratory diseases	skin lesions and Chronic skin diseases	Poisoning - respiratory lesions (lung), stomach discomfort, skin & eye lesions, urinary system problems, ecological waste (plant and animal), acid rain	Environmental impacts
1/5%	1/5%	12%	85%	Share of pollution

Environmental threats from the Arak aluminum factory usually resulted in the local office of the Department of Environment shutting it down at different times. As a consequence of intensified air pollution in 2006/7, part of the plant was shut down again by the Department of Environment office. The closure of 161 melting pots led to about 500 workers being laid off and the company's losses and the rate of loss due to the boiler shutting down have been estimated at more than 50 million dollars. Aside from financial problems and the increased costs of firing 500 workers, this also produced social problems. At this time, the workers also began to register their complaints and so this social challenge turned into a serious political and security issue. In addition, this issue has always had an impact on national security. Of course, strikes and company seizures had other reasons as well, such as the large number of employees, low wages, weak planning and management and the economic status, and social and political dimensions of the plant in the economic, political and even social position that Arak has in Central Province, exacerbating tensions within and outside the factory.

### ***C. Other factors affecting the security of Arak***

Apart from the environmental threats, other factors are affecting the security of Arak, the most important of which are unemployment and labor migration, factors that have aggravated environmental pollution and population density. Development, employment and security variables have a non-linear relationship with

each other, i.e. all three have effect upon each other and are also affected by each other.

Without creating conditions of sustainable development, both job creation and the consolidation of new or existing jobs is very difficult. Without creating jobs, generating continuous and sustainable development will also be incomplete. Without these two factors, security will be subject to sequential threats since Arak's development primarily revolves around the creation of new jobs. These jobs mainly have been formed in the city for 30 to 40 years through massive investment in the public sector. High population growth in Arak confirms that a major part of the jobs created were simple jobs that have attracted the nearby rural population or the lower classes of urban inhabitants.

Naturally, then, any change in the status of sustainability and the stability of jobs causes a serious threat from these social classes who are usually the main source of tension and political and social conflict in the country. The creation of marginalized classes around Arak by the potential for urban growth has created contradictions. Centralized policies and the lack of year-on-year policy-making and land preparation programs have resulted in the concentration of industry in the provincial capital and this, in turn, has created the appropriate grounds for such a crisis. Due to geographical conditions, industry and the position of the city which is located in the center of the country, the city is extremely attractive for migrants and has the highest percentage of migration in the province. These migrations have had various impacts on security and political and economic issues.

Migration is mainly from the rural regions to Arak. Although this migration provides a cheap labor force, it gradually exerts many problems. From an economic point of view it causes inflation, public deficit in foodstuffs, rising prices of housing and goods and illegal buildings and other structures on the outskirts of the city. Also, from the social, cultural, political and security point of view, marginalization of the poor has many negative consequences, such as the illegal demand for water and electricity which is neither planned for nor provided. This situation may cause protests and riots, such as the heavy strikes of 2002/3 (Sadough, 2005 and 2007). The presence of foreign immigrants, such as Afghans and Iraqis of whom about 25,000 are illegal residents, and the presence of foreign workers from European, Asian and other countries as engineers and specialists in foreign firms such as petrochemical, refinery and power plants, also has a noticeable impact in terms of social, economic, and security.

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