

## **Political Effects Resulting from Dust Storms in Tigris and Euphrates Basins**

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### **Abstract**

The dust phenomenon is spread across the Tigris and Euphrates river basins, as a hazard resulting from the human and environment interaction. The phenomenon has various aspects and one of them is the political one. In this article, the political effects of the dust phenomenon at the Tigris and Euphrates' basins are studied. Using analytic- descriptive method and based on library and filed research data gathering procedures, the research intends to examine this question: "what are the political factors affecting the exacerbation of dust storms at the Tigris and Euphrates' basins?"The obtained results indicate that the phenomenon has caused increases in political discontent, emigration, and national costs, role-playing of the international organizations and has affected the policies of the Middle East countries.

**Keywords:** Dust Storm, Political Effects, Tigris and Euphrates Basins.

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## **1. Introduction**

For a long time ago, Dust storms are considered as an ordinary event in arid regions of the world, particularly at the deserts. But these years, the phenomenon has widespread and has become a significant problem because of the climate changes and wide environmental destructions resulting from human activities.

The dust phenomenon has affected wide areas of the South East region of Asia. The phenomenon, no matter it is caused by natural and continental terms or human activities, has quite displayed its destroying disservices at fields of health and sanitary, environment, natural resources, and social and economic activities. The importance and necessity of recognizing such phenomenon and the effective factors of the occurrence, in order to negate consequences on human health, dispositioning high costs to the societies and governments, and also substantial damages to the natural resources, agriculture, lack of security, disorders in flights, disruption in the function of the economic enterprises and industries, decrease in the single and social performance, the effects and approaches to encounter and decrease the harmful damages of dust storms is absolutely observed (Yaghoot Hardani, 2012: 2). Using library and field findings, the article intends to investigate political effects resulting from dust storms in the River Basins of Tigris and Euphrates.

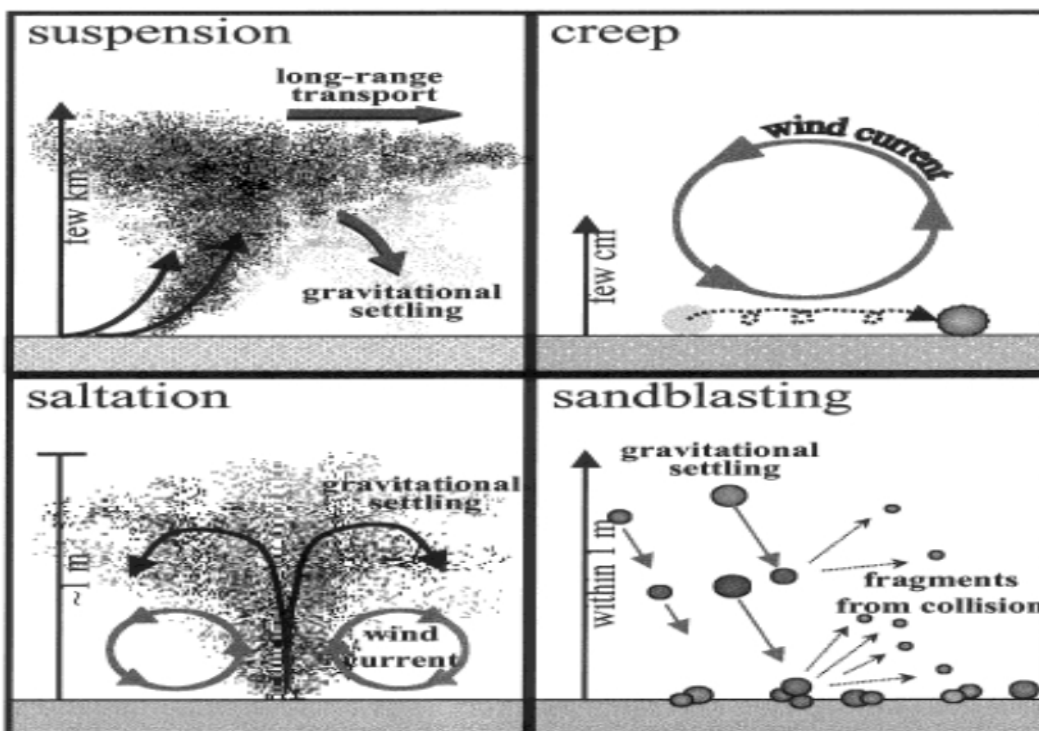
## **2. The definition of concepts and variables**

### **2.1. The dust phenomenon and the formation process**

In the scientific and professional resources, dust refers to the very small and light particles of silt, clay or sand moved long distances by wind erosion and desertification by the wind. When the wind blows slowly and mildly, there is no sign of movement, but when the power of the wind reaches to the threshold, the particles begin to vibrate. By the increase in the speed of the wind, some particles are removed from the surface and pushed into the airflow. When such pressure is entered, the particles affect the surface.

Therefore, a chain reaction begins. After they are separated from the ground, the movement would depend on size, shape and density of the particles. These three factors are called a suspension, saltation, and creeping. Suspension includes dust particles with a diameter less than 0.1 millimeters, and clay particles with a diameter of 0.002 millimeters, in small size and low density. The little soft dust particles and can be moved up to 6 kilometers in height and 6000 kilometers away. They, with a diameter of 1.0 millimeters, are suspended in the atmosphere and do not lead to reduce visibility overall so they are not emerged as a real dust storm. Since saltation particles (with a diameter between 0.5 to 0.01 millimeters) are very large, they get temporarily separated from the ground. The remaining particles (above 5.0 millimeters in diameter) creep. They are so large that get separated from the ground up and creep. Coarse sands with a diameter of 0.5 to 1.0 millimeter only creep. Sands in medium size, with a diameter of 0.25 to 0.5 millimeter salt. Since these particles affect the Earth's surface, they launch other particles move. So is the movement of about 80 to 50 percent of all kinds of soils. That rarely reaches more than 30 centimeters in height and the transmission distance is not more than a few meters (Squires; 2013: 17-18).

**Figure 1:** Schematic representation of the process of production and movement of dust particles resulting from wind blowing from the bed of the Earth to the troposphere.



Conditions of land covering is directly related to the occurrence of dust storms. Dust is affected by moisture, and at last the seasonal rainfall. These factors have been strongly influenced by overgrazing, deforestation, over-exploitation of water resources in the origin regions of dust storms during later decades. Therefore, they have led to serious consequences, such as quick degradation of land and spreading desertification (Economic and Social Commission for Asia and The Pacific, 2004: 3)

## 2.2. The political consequences of the dust phenomenon

The dust phenomenon has different aspects and one of its aspects is the



political one. Since political geography is the science to study the political aspect of the region, the field is to study the political aspects of dust (Hafeznia, 2013). In fact, on the one hand the political factors influence dust exacerbation, and on the other hand the political consequences resulting from the aggravation phenomenon are observed. Increasing political discontent, immigration, national costs, the role of international organizations and influencing the relations of the regional countries are among these consequences. The following is a brief explanation of each of these concepts:

### **2.2.1. Political discontent**

Satisfaction is the positive and pleasure sense of the person towards the circumstances he personally lives. Usually, to measure satisfaction, it is established in the important fields of life, such as Housing, health, family relationships, income and jobs. Satisfaction is considered as a positive and pleasant attitude of a person with joy, happiness and a sense of well-being through the various conditions of life. Discontent is the opposite concept of consent: a sense of pessimism, unpleasantness and misery about the conditions surrounding his life. Discontent is classified in terms of subjects and discussed issues into three general categories that are as follows:

(A) Discontent with living conditions, (b) job discontent, (c) discontent with the performance of government (political discontent).

Political discontent speaks of complaints, criticisms, pessimism and negative feelings, attitudes of doubt, uncertainty and complain about the political situations (and at the center, the realm or the government). In general, it represents the citizens' attitudes about the deployed political and government system (Islamic Parliament Research Center, 1999).

### **2.2.2. Emigration**

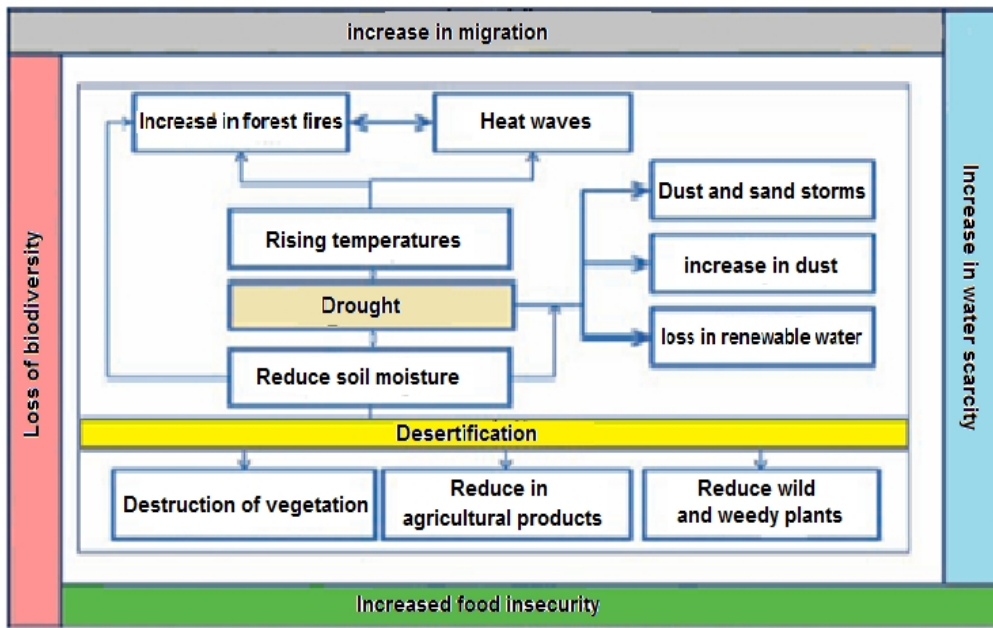
Literally, migration means leaving the mainland and residence in another country temporarily or permanently. Definition of immigration in the

demography of the United Nations dictionary reads: "Immigration is a form of geographical mobility or spatial mobility of human beings that can be permanent and near-permanent (Zanjani, 1999: 212).

Immigration has a variety of causes and reasons. In general, they are social, political and security, economic, cultural, religious and natural environmental factors.

Potential environmental factors, such as topography, slope, temperature, precipitation, and water and land capability, have a significant impact on the volume of migration and making villages empty. This structural weakness of these communities has led them to inability of coping with natural factors such as drought, floods, earthquakes, water shortages, landslides and soil erosion. Finally, people have been beaten by natural conditions and unfavorable factors and were forced to emigrate and abandon their settlements (Mahdavi and et al., 2004: 207). Climate change such as rising sea levels and melting glaciers in the world is very likely to occur by general uncertain impacts. The effects of climate change on migration and environmental issues of migration could be predicted in recent decades (Reuveny, 2007: 656). Figure 2 mentions the drought and its consequences, including increases in migration.

**Figure 2:** The impact of drought and its consequences (Erian, Katlan et al., and 2010: 4)



### 2.2.3. National (public) costs

General costs are the central government, local governments, organizations and public institutions' costs (Collins dictionary; 2013, the free dictionary; 2013). Central government of Great Britain considers costs and public expenses based on four factors of pension, Healthcare, Education, defense and welfare (UK public spending; 2103).

### 2.2.4. International organizations

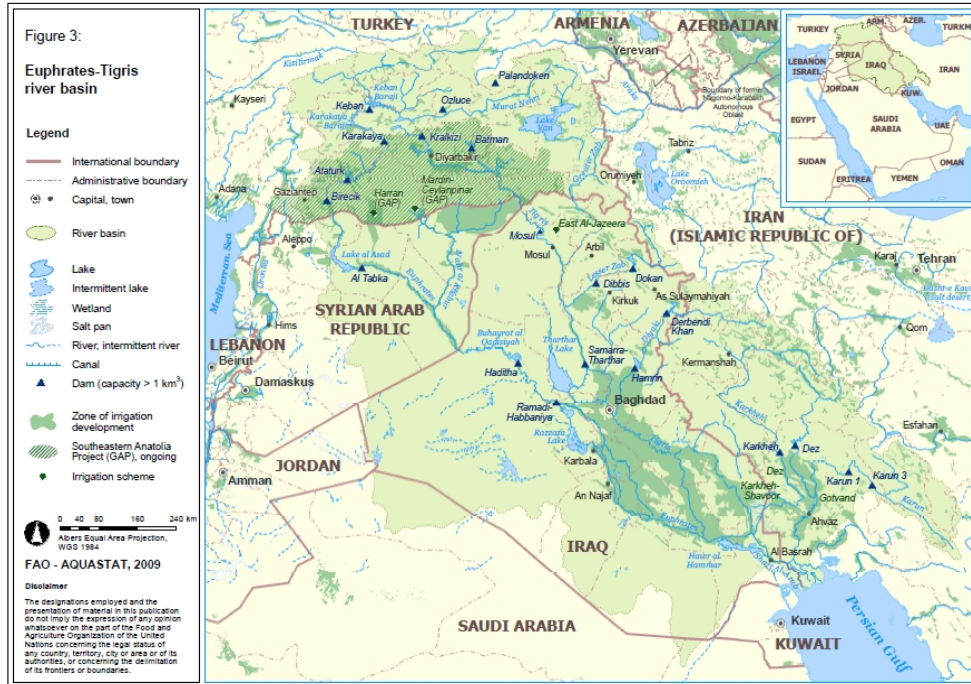
International organization refers to the community of nations that have come together to achieve specific goals, according to a geopolitical structure with special features and agents with the principle of mutual rights and equality of nations and governments. International organizations are classified in terms of philosophy, quiddity, size, shape, activities and other factors. These

organizations have been expanding due to the development of mutual needs and structural and functional correlations (Hafeznia, 2012: 105-106). Development of international laws has been remarkable in the institutional and organizational fields. Today, thousands of institutions, both global and regional, UN and non-UN, governmental and non-governmental, are active in the field of environment. By institutionalization of the environmental protection, development of environmental regulations and mechanisms of environment protection is carried out by these institutions (Firouzi, 2005).

### **3. The ecology of Tigris and Euphrates' river basins**

The Tigris and Euphrates river basins are cross-border and international basins for an area of 879790 square kilometers and among the countries of Iraq (46 percent), Turkey (22 percent), Iran (19 percent), Syria (11percent), Saudi Arabia (9.1 percent) and Jordan (03/0 percent). The basins are spread from the high northern and western mountains to southern and eastern plains. Two-thirds of the way of the rivers passes through the highlands of eastern Anatolia in Turkey and Syria valleys and Iraq plateaus, before reaching the plains of Mesopotamia. Tigris and Euphrates are reunited near Al-Qurnah (in Iraq) which is called Shatt al-Arab and it terminates to the Persian Gulf. However, both rivers are connected upstream by several channels.

Figure 3: Tigris and Euphrates river basin (FAO, 2014).



Euphrates River originates in the highlands of eastern Turkey, between Lake Van and the Black Sea, and is made by the two main branches under the titles Murat and Karasu. Then it enters Syria from Karkamis, which is located down on Birlikin Turkey. 28 percent of the Euphrates basin is in Turkey, 17 percent in Syria, 40 percent in Iraq, 15 percent in Saudi Arabia, and only 0.03 percent in Jordan. Euphrates River is 3,000 kilometers in length, divided between Turkey (1230 kilometers), Syria (710 kilometers), and Iraq (1060 kilometers). 62 percent of the basin is located in Turkey, and the other 38 percent is in the Syria. Turkey is contributing to 89 percent, and Syria for 11 percent of the annual flow. The rest of countries share negligible percent.

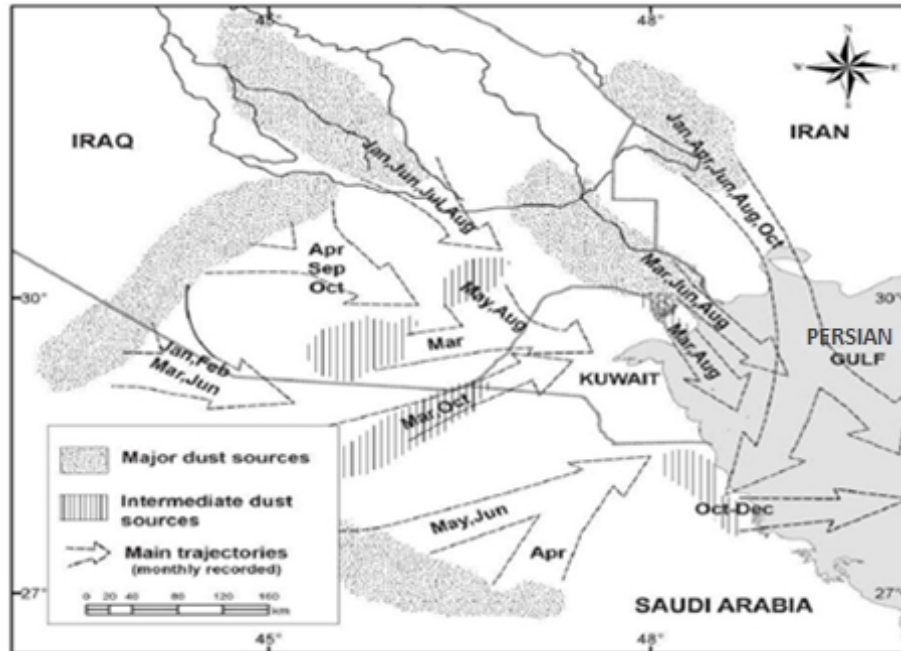
The source of Tigris River is in Eastern Turkey. The length of Tigris

River is 1850 kilometers, of which 400 kilometers are in Turkey, 32 kilometers of the border between Turkey and Syria, and 1418 kilometers in Iraq. 12 percent of Tigris basin is in Turkey, 0.2 percent in Syria, 54 percent in Iraq and 34 percent is located in Iran. Turkey provides the annual water volume of Tigris River for 51 percent, so do Iraq for 39 percent and Iran for 10 percent (Food and Agriculture Organization of The United Nations, 2014).

**4. Centers of dust production in The Tigris and Euphrates river basins**

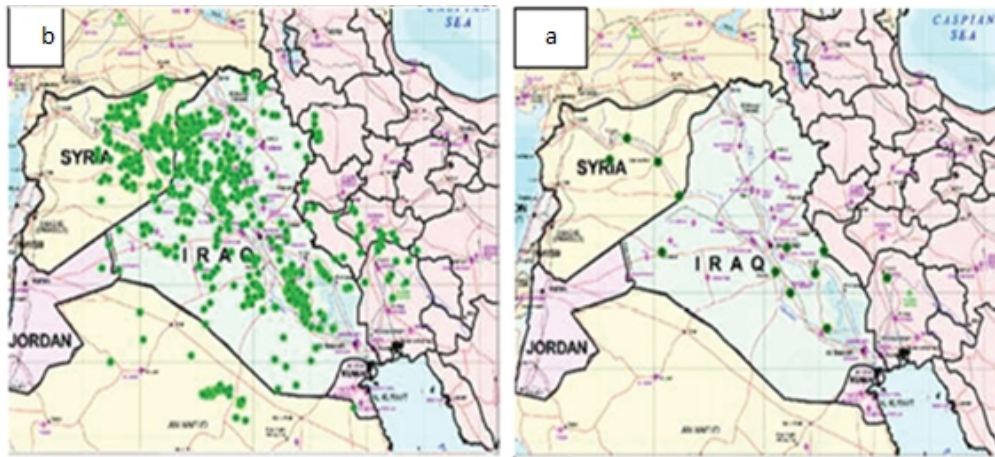
An article was published in 2012 by Al-Dousari and Al-Awadhi, reporting the main sources of dust and showing the storms route at northwest of the Persian Gulf.

**Figure 4:** The primary and secondary dust sources and routes at northwest of the Persian Gulf (Al-Dousari and Al-Awadhi, 2012).



In the article under the title "Statistical analysis of the dust phenomenon in the western half of Iran ", researched by Azizi and the partners, dust centers in the deserts of Iraq and Syria are shown, based on the results obtained from figure 4a which Wilkerson produced in 1989. Figure 4b also shows the satellite images taken between the years 2005 and 2008, which mentions that the number of dust centers has increased, especially in the North West of Iraq and East Syria. These maps show dust centers in West Iran. By comparing figure 4 in years, it is observed that the number of dust centers were few in the west of Iran, but has increased some in 2008 because of natural and human causes. Therefore, like these studies, new sources of dust could be seen in the East of Iraq and North West Syria(Azizi and et al, 2012: 127).

**Figure 5:** (a) the spatial distribution of dust centers in 1989; (b) the spatial distribution of dust centers in 2009 (Wilkerson)



## 5. The research Methodology

This research studies the political implications caused by the phenomenon of dust in the Basins Rivers of Tigris and Euphrates. So, the method of researching is the analytic- descriptive. The method of data gathering for the variable of political discontent is the Field Research method (questionnaire).

The method of data gathering for Political participation and immigration variables is combined method (questionnaire, text reading, note-taking, reading statistics by using tables, and map Reading). The method for National cost variables and role-playing of countries in the region is the library studies (text reading and note-taking, reading statistics, map Reading, figure reading and Document reading). For political discontent and migration variables, a questionnaire was adjusted for the statistical population of Khuzestan and Ilam provinces, on behalf of the area population. The questionnaire was performed by 334 people in Khorramshahr, Abadan, Susangerd, Bostan, Musian, Dehloran, Mehran, IlamRumaila and Om-al-Debs villages. To assess the effects of dust on political discontent and migration, a single-sample T-test was used.

## **6. Results**

The main aim of the collected library and field-based research data is to answer the main question of the article about migration, political discontent, national costs and political relations of involved countries with dust, and international organizations at the Tigris and Euphrates basins variables.

### **6.1. The library-based data**

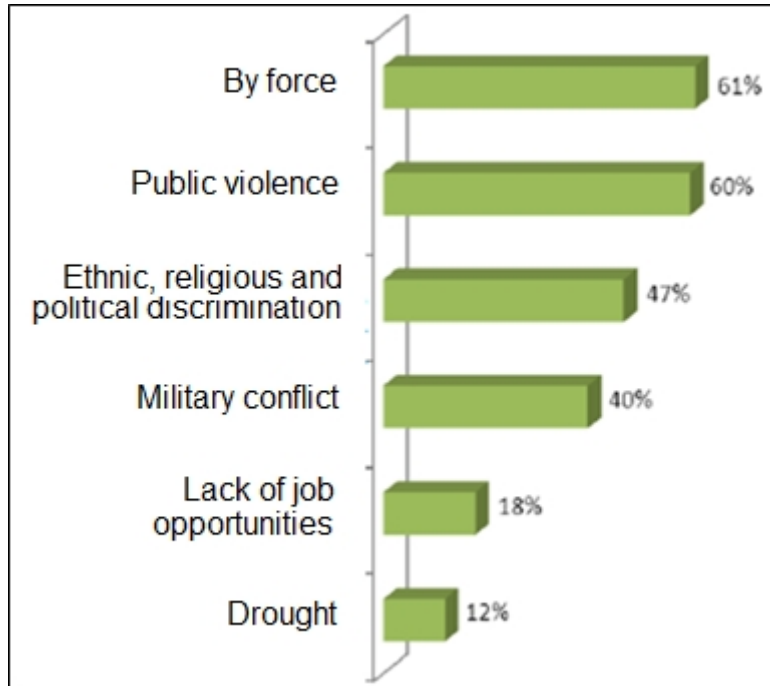
#### **6.1.1. Emigration**

##### **6.1.1.1. Immigration in Iraq:**

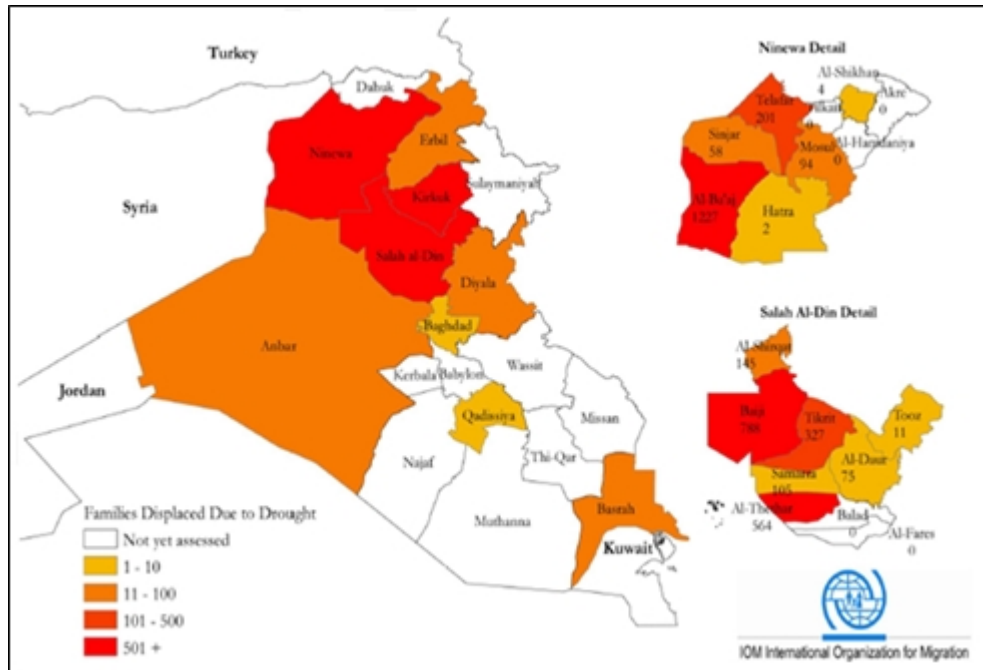
International Organization for Migration (IOM) has experienced migration in monitoring program of Iraq in several stages, the first two important stages are from January 2009 to November 2010 (Stage IV) and November 2010 to June 2012 (stage V). In the fourth stage, over 188000 immigrants were observed. In the fifth stage, technical teams visited more than 2800 locations, interviewed with more than 29000 families, and obtained more than 2000 reports (IOM Iraq, 2012: 3). According to Figures4 to 8, 12 percent of the reasons of households' migration were the drought.



**Figure 6:** The main reasons for internal migration of families in Iraq



**Figure 7:** Immigrations caused by drought in Iraq, 2010 (IOM, 2010)



International Organization for Migration (IOM) has reported that 4263 families, or 25578 persons, migrated due to drought in Iraq in 2010. More than 80 percent of those who cited the drought phenomenon as the reason for their migration, were from Salah ad Din and Nineveh provinces. IOM studies indicate that migration is because of the drought in southern Iraq; especially those living in wetlands (IOM, 2010:1). Salah ad Din and Nineveh provinces of Iraq have the greatest migrations caused by drought. These provinces are at the dust production center in northern Iraq (DarvishiBolorani, 2012: 127).

**6.1.1.2. Immigration in Syria:**

One of the most obvious effects of drought was a significant increase in immigration due to loss of livelihood and lack of sufficient income to buy

food in 2009. Statistics of migration was between 40000 to 60000 households. Only 36000 households have migrated from the Al-Hasakah province. Communities living in areas affected by drought suffered from severe water shortages, for example, many wells and rivers dried up. Inappropriate nutrition, heat, and dust storms had harmful effects on their health. The impacts of drought, which are loss of income and livelihoods, reduction in food intake, food shortages that were experienced by thousands of the rural areas, increases in malnutrition and problems related to Health, led to a large-scale migration in areas under the effects of drought(UN, 2009: 1-12). One of the consequences of drought was an increase in migration from of the North West areas and the steppes to the urban areas in Syria, which brought high pressure to services and endurance of the society (Erian, and Nashawatii, 2010).

#### **6.1.2. Increase in national (public) costs**

Dust storm continued for several weeks and with very high concentrations, which covers large areas, can interfere in people's daily activities, directly or indirectly. This is not just about Iran, but other countries in the region, especially Iraq and Syria are heavily influenced by the damages caused by the dust storms. Over the past few years, the dust storms have made the harmful effects that are as follows:

- Public Holidays in schools frequently repeated recesses of schools,
- Closure of airports, industries, etc;
- Damages to water resources, energy resources, telecommunications lines, etc;
- Increases in incidence of lung, eye, skin and respiratory diseases;
- Degradation of agricultural lands, meadows and forests, especially in the areas of Zagros forests;
- Reduction in agricultural, livestock and beekeeping production (The Iranian Department of Environment, 2013).

Office of Research and Standards of Regional Electric Company in

Khuzestan has investigated in a report as "A review of the effects of dust on the electricity industry in Khuzestan province", the damages and costs of this phenomenon on different sectors of the electricity industry in Khuzestan in 1392. Below, some of these damages are pointed.

**Table 1:** Total credits required for organs, organizations dealing with dust in national management plan (1391-1395) (The Iranian Department of Environment, National Plan Management dust storm during the years 2012- 2017).

	Organ/ organization/ ministry	Credit Requirements (dollars)
1	Environmental organization	<b>13109</b>
2	Forest, Rangeland and Watershed organization	<b>162259</b>
3	Meteorological Organization	<b>5486</b>
4	Ministry of Health and Medical Education	<b>70496</b>
	Total cost	<b>251350</b>

### **6.1.3. The effects on foreign policy and relations with the countries of the region involved in dust phenomenon and the role of international organizations**

In recent years, the dust crisis was followed by a range of consultations and the travelling of the working groups at the regional countries, especially Iran and Iraq. According to the dust source as a cross-border phenomenon, a bilateral and regional cooperation has been one of the main strategies to reduce vulnerability and to help the people of the region. To reach that point, the Islamic Republic of Iran has had political movements and a bilateral and multilateral specialized negotiation with the countries of the region in recent years, as follows:

- 1) Iraq to sign a memorandum on cooperation with Iran, Iraqi environmental delegation to come to Iran on February 2009;
- 2) Signing bilateral cooperation between Iran and Iraq to deal with the dust, on July 2009;
- 3) The Iranian delegation to Syria to sign a memorandum on cooperation

with Syrian Minister of Environment, on October 2009;

4) The Iraqi delegation to sign the regional cooperation document, on November 2009;

5) The Iranian delegation to Iraq to sign the document of implementing the mutual understanding between Iran and Iraq, on March 2010;

6) Attending the four-lateral meeting of Turkey, Iran, Iraq and Syria in Ankara, Turkey, concerning the dust and the environment, on May 2010;

7) The fourth bilateral meeting of Iran and Iraq to sign the cooperation document in Tehran, on August 2010;

8) Meeting of experts of the region preparing the action program to encounter the dust phenomenon in Tehran, on September 2010;

9) Holding the second meeting of ministers of environment of Iran, Turkey, Iraq, Syria and Qatar in Tehran on 29 September 2010. The result of the meeting was provisioning the document of regional action programs in four fields of the environment, the air quality, meteorology and wilderness;

10) Establishment of an interim regional secretariat in Tehran to coordinate regional countries to carry out the agreement, the transfer of scientific and technological experiences, and the prevention against the dust phenomenon;

11) Delegation of a Panel of Experts of the Islamic Republic of Iran to Iraq to follow up the mutual implementation agreements, which led to the signing of a Memorandum of Understanding, on May 2010. The main provisions are as follows:

- a. Mulching as pilot around Karbala City to the extent of 500 hectares,
- b. Desertification of the amount of one million hectares in Iraq for 5 years,
- c. Preparation of the action program of desertification by the Islamic Republic of Iran and sending with Iranian experts for implementations in Iraq,
- d. Organizing training terms as "dust environmental management and confronting desertification" for Iraq and Syria experts in Khuzestan province.

- 12) Signing a memorandum of understanding with Iraq beside Ahwaz training course to implement the desertification process at the level of 7 thousand hectares in seven Iraqi provinces;
- 13) Holding a five-day "Dust Storms International conference" in Meteorological Organization, on October 2009;
- 14) Cooperating to hold up "the dust" International Conference at Ramin University, on January 2012;
- 15) Cooperating to hold up "the dust Scientific International Conference" in Kermanshah, on days 24 to 26 May 2012;
- 16) Meeting of the Organization Head to the Secretary of the Convention of Confronting desertification (Mr. Luc Nakaja of Benin) to convince Iraq to implement international commitments, on April 2012;
- 17) Meeting with representatives of UNEP UND to participate in desertification operations in Iraq;
- 18) The fourth meeting of the UNAMI head in Tehran on the implementation of desertification in Iraq, on July 2012;
- 19) Attendance at the expert meeting in Abu Dhabi of the regional fund, on May 2013;
- 20) Designing and planning "air pollution educational workshop" for 30 Iraqi experts;
- 21) Pursuing to establish a national committee for dust and drought in Iraq, under Prime Minister Supervision (established);
- 22) Preparing a draft of the Iraqi desertification pilot project by FAO;
- 23) The high-level panel delegation headed by the deputy of the president and deputy head of the Environmental Protection Agency and Department of Energy, Roads and Urban Development and etc. to Iraq and signing an agreement on cooperation in confronting desertification, meteorology, education, conservation and restoration of wetlands, on October 2012;
- 24) Holding a coordination meeting with Dr. Haddad the UNEP Regional Representative and head of UNAMI about the draft of the regional action

plan prepared by UNEP, on 12 November 2012;

25) Holding the first session of the Special Committee to follow up the implementation of the Memorandum of Understanding in Iran, with Iraq's Deputy Minister of Environment, the Technical Consultant and the head of climate change and environment of Iraq, as the formal members, and with Dr. Haddad the UNEP Regional Representative and head of UNAMI in Iran and Iraq, on days 2 to 5 February 2013, in Tehran;

26) Introduction of Empowering companies in the field of a forestation, desertification, monitoring and etc. to the Ministry of Environment of Iraq;

27) The appointment of the critical active centers and areas affected by dust storms to implement the environment pilot projects by the United Nations in the Islamic Republic of Iran;

28) Preparing a draft of the confronting program against desertification in the country to take advantage of the GEF facilities;

29) Making preparations for establishing a regional common fund, UNEP at the center;

30) Identifying the hot spots of dust and presenting to UNEP (National Secretariat and regional organizations dealing with environmental dust, 2013).

## **6.2. Field Research findings**

The Sample size of the second questionnaire is 343 persons of Khuzestan and Ilam. The questionnaire was completed by these people in cities of Khorramshahr, Abadan, Susangerd, Bostan, and Rumaila and Om-al-Debs villages in Khuzestan province, and cities of Musian, Dehloran, Mehran and Ilam in Ilam province. The frequency distribution of the Statistical population is 55.1 and 49.9 percent for the provinces of Khuzestan and Ilam respectively. Also, the Table 2 shows the distribution of the sampling population of the studied areas.

**Table 2:** The frequency distribution of the sampling population in the studied area

Settlements	frequency	Percent
Khorramshahr	40	12
Abadan	39	11.7
Rumaila	27	8.1
Susangerd	37	11.1
Bostan	28	8.4
Om-al-Debs	13	3.9
Musian	40	12
Dehloran	37	11.1
Mehran	35	10.5
Ilam	38	11.4

## 7. Analysis

### 7.1. Analysis of the library findings

#### 7.1.1. Immigration:

In one view, dust is caused by desertification and drought and the resulting migration caused by dust is because of desertification and drought.

In 2012, 12 percent of 188000 Iraqi were displaced due to drought. In 2010, 4263 households (25578 persons) immigrated because of drought in Iraq.

One of the consequences of drought in Syria is the increased migration from the North West and the steppes of Syria to the urban areas, which has brought high pressure on services and the community constancy.

In 2009, one of the most obvious effects of drought was a significant increase in immigration, because of the living and the lack of sufficient income to buy food. Statistics for migration was different from 40000 to 60000 families, only 36000 households migrated from the Al-Hasakah



province.

In general, the dust as a consequence of desertification and drought, has led to displacement and migration of families exposed to the phenomenon. Also, the experts and elite of the areas affected by dust migrate to other cities to escape the adverse effects, such as lung disease, and to have cleaner air.

**7.1.2. National (public) costs:**

Dust phenomenon has brought lots of damage costs for many families and citizens. Increased incidence of lung, eye, skin and respiratory diseases, degradation of agricultural lands, meadows and forests, especially in Zagros forests, and reduced agricultural production, livestock and beekeeping are only a part of the damage caused by dust.

Dust has also brought costs, obligations and responsibilities for government organizations. For an example, in order to control, cope with and manage the dust phenomenon, some duties and responsibilities are created to the Parliament, Vice-President, Department of Environment, Ministry of Agriculture, Ministry of Energy, Ministry of Foreign Affairs, Ministry of Education, IRIB, Ministry of Health, treatment and Medical education, Meteorological Organization, and Forest, Rangeland and Watershed Organization. Besides, the phenomenon has caused the closure of schools and offices, cancellation of airline flights, reduced visibility for drivers and accidents, damages to industrial infrastructure, communication and so on as yet.

**7.1.2. Political relations between countries and the role of international organizations:**

The crisis of the dust phenomenon has brought a range of consultations and travels of the working groups to the regional countries, especially Iran and Iraq in recent years.

According to the cross-border dust sources, bilateral and regional

cooperation are one of the most important strategies to help countries of the region to reduce the risks and vulnerabilities. In this connection, the Islamic Republic of Iran has held up political movements and professional bilateral and multilateral negotiations with the countries of the region. As an example, eight agreements have been signed by Iran and Iraq from January 2008 to June 2011 in recent years.

Furthermore, the dust phenomenon also led to international organizations role, such as the United Nations Environment Program (UNEP), UNDP, FAO, Global Environment Institute (GEI), the United Nations Representative in Iraq (UNAMI) and the International Water Institute of Stockholm (SIWI).

### **7.2. Analysis of the findings of the field research**

In the statistical hypothesis testing, the lack of connection between the dust phenomenon and the increasing political discontent and migration is considered as the null hypothesis ( $H_0$ ). So there exists a connection between the dust phenomenon and the increasing political discontent and migration in South-West Asia as the alternative-hypothesis. To achieve the results, a one sample T-test is used to evaluate the effects of the dust phenomenon on political discontent, political participation and immigration. Then it is analyzed.

**Table 3:** The statistical significance of evaluation of the statistical population "The political consequences caused by the dust phenomenon" by the one sample T-test

<b>Political Consequences</b>	<b>The T-statistic</b>	<b>The Average</b>	<b>The Statistical significance</b>	<b>The Moderate</b>
Political discontent	32.900	4.0587	0.000	3
Emigration	8.335	3.6697	0.000	3

**7.2.1. Political discontent**

By comparing the average level of discontent of the sampling population, showing the number of 40587, to the average surface buoy-evaluated, 3, as calculated, it is assumed that the dust phenomenon effects on discontents at the studied fields, due to the statistical significance, less than  $\alpha= 0.05$ . So, based on the theories of the sampling population, the dust effectiveness on discontent is evaluated above average.

**7.2.2. Emigration**

By comparing the average level of immigration, showing the number of 36697, to the average surface buoy-evaluated, 3, as calculated, it is assumed that the dust phenomenon effects on emigrations at the studied fields, due to the statistical significance, less than  $\alpha= 0.05$ . So, based on the theories of the sampling population, the dust effectiveness on emigration is evaluated above average evaluation.

According to the library and documents research findings, it was observed that the library results for the migration, the national costs, political relations between countries and the role of international organizations variables are in accordance with the claim expressed in theory. For the field findings through the questionnaire, the statistical

population has emphasized the claim expressed in the second hypothesis. Therefore, based on the library and field research findings, the search hypothesis was confirmed.

### **8. Conclusion**

In recent years, the Tigris and Euphrates river basins are faced with an increase in dust. The phenomenon has many aspects. Geopolitics, as the science to study the political aspect of region, studies the political aspects of dust phenomenon. The dust phenomenon has different consequences and one of its consequences is the political one. By using library and field findings, it is observed that the phenomenon has increased discontents with government performance and the amount of migration, particularly internal migration in the regional countries. Over recent years, costs and damages to governments, reigns and families have raised in many countries, by increasing the amount of dust. Also, the international organizations started to play roles to confront and control the phenomenon. Whether or not, the phenomenon has affected the countries' political relations.

### **9. Acknowledgment**

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## References

- Al-Dousari, A.M., J. Al-Awadhi, and M. Ahmed, Dust fallout characteristics within global dust storms major trajectories, *Arabian Journal of Geosciences*, doi: 10.1007/s1257-012-0644-0, 2012.
- Azizi and et al (2012). Statistical analysis; Isometropia of dust phenomenon in West of Iran. *Ecology*. 38th [in Persian].
- Darvishi Boloorani, Ali, (2011). External source of dust sweeping in Iran (Report No. 1), Vice President for Science and Technology, Water Technology Development Headquarters, drought and environmental degradation [in Persian].
- Erian, E., B. Katlan, et al. (2010). "Drought vulnerability in the Arab region." Special case study: Syria. Global assessment report on disaster risk reduction. Geneva: United Nations International Strategy for Disaster Reduction.
- Firouzi, Mehdi. (2005). The right to environment, Tehran: Jahad Daneshgahi Publications[in Persian].
- Hafeznia, Mohammad Reza (2006). Principles and Concepts of Geopolitics, Mashhad: Papoli Publications [in Persian].
- IOM International Organization for Migration, IOM Iraq (2012), Displacement Monitoring and Needs Assessment Program Final Report 2012.
- Islamic Parliament Research Center, Office for Social-Policy Studies, Tehran University Institute of Social Studies (1999). Study of political discontent in the urban middle class in Iran, Tehran [in Persian].
- Mahdavi, Masoud and et al. (2004). Physical Geography and unstable factors in the migration of rural Zanjan province, *Geographical Research Quarterly*, No 48 [in Persian].
- National Secretariat and regional organizations dealing with environmental dust. (2011). Dust Management Plan [in Persian].
- Office of Research and Standards Khuzestan Regional Electricity Company (2013). An overview of the electricity industry in Khuzestan dust [in Persian].
- Yaghoot Hardani, Hadi. (2012). Assess the effect of dust on quality of life in rural villages: Case Study village of Ahvaz (Hamidieh) Muster's Thesis, Tarbiat Modares University, Tehran, [in Persian].
- Reuveny, R. (2007). "Climate change-induced migration and violent conflict." *Political Geography* 26 (6): 656-673.
- Wilkerson, W. D., 1991. Dust and Sand Forecasting in Iraq and adjoining countries. Air Weather Service.
- Zanjani, Habibollah. (1999). Migration, Tehran: SAMT publications, [in Persian].

## Internet references:

- Business dictionary, public expenditure, <http://www.businessdictionary.com/definition/public-spending.html>.
- Collins dictionary, public expenditure, <http://www.collinsdictionary.com/dictionary/English/public-expenditure>.

- Food and Agriculture Organization of the United Nations (FAO), Euphrates-Tigris river basin, 2014, <http://www.fao.org/nr/water/aquastat/basins/euphrates-tigris/index.stm>.
- The Free Dictionary, public expenditure, <http://www.thefreedictionary.com/publicexpenditure>.
- UK public spending, public expenditure, <http://www.ukpublicspending.co.uk>.