In the Name of GOD

بسم الله الرحمن الرحيم
I.R of Iran National Report on Regional Action Plan to combat dust and sand storm
Outline of Presentation

1. Introduction – Dust Storm in Iran
2. Environmental Analysis of Dust Storm in IRAN
4. Impact Analysis of the Dust
5. National Actions of I.R of IRAN for Dust Storm Management
6. Regional and International Actions on DUST
7. Implementation the Air Quality Management System Through a Regional Framework
8. Concluding Remarks
1- Introduction

Occurrence of Sever Dust Phenomenon with Different Specialties and its Gradual Development to South West, West, North West and Central Provinces of Iran from 2004
Dust over Iraq
Dust Storm Monitoring
July 2009
The Main Reasons of Dust Occurring in the Region

- Atmospheric instability in Syria, Iraq, Kuwait, and Saudi Arabia deserts.
- The lack of appropriate plant coverage.
- Decrease of precipitation and air humidity.
- Destroy of forest areas and ranges in region countries.
- Changing of air pressure and storm blow from Iraq, Syria, and Saudi Arabia deserts.
The Main Reasons of Dust Occurring in the Region

- Locating in Arid and Semi Arid region of the world and existence of huge deserts
- Locating in geographical latitude and global dust belt
- Climate Change and intensify of drought phenomenon
The dust movement in direction prevailing wind and toward west south of Iran.
The relationship between particles size and subsidence speed

![Graph showing the relationship between particles size (micrometers) and wind speed (millimeters/sec). The graph displays a positive correlation, with wind speed increasing as particles size increases.]
PM10 = 2100 µg/m³
04-07-2009

Kermanshah

PM10 = 90 µg/m³
14-10-2009
Dust Storm in Booshehr
Outline of Presentation

1. Introduction – Dust Storm in Iran
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6. Implementation the Air Quality Management System Through a Regional Framework
7. Concluding Remarks
# Pollutant Standard Index

<table>
<thead>
<tr>
<th>PSI</th>
<th>CO (ppm) 8hr</th>
<th>O3(ppb) 1hr</th>
<th>NO2(ppb) 1hr</th>
<th>SO2(ppb) 24hr</th>
<th>PM10(μg/m³) 24hr</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
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<td>30</td>
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<td>1200</td>
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<td>500</td>
<td>1600</td>
<td>800</td>
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<tr>
<td>500</td>
<td>50</td>
<td>600</td>
<td>2000</td>
<td>1000</td>
<td>1000</td>
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</tbody>
</table>
### Dust Data

**PM10 concentrations** *(micro grams per cubic meter)*

<table>
<thead>
<tr>
<th>City</th>
<th>City population 2000</th>
<th>PM10 Concentration 1999</th>
<th>PM10 Concentration 2008-2009</th>
<th>Max PM10 (In Dust Phenomenon 2009)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ahwaz</td>
<td>943,666</td>
<td>81</td>
<td>301</td>
<td>9360</td>
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<tr>
<td>Bandar-e-Abbas</td>
<td>436,889</td>
<td>100</td>
<td>165</td>
<td>482</td>
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<td>Bushehr</td>
<td>160,184</td>
<td>61</td>
<td>126</td>
<td>1348</td>
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<tr>
<td>Dezful</td>
<td>230,117</td>
<td>63</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Ilam</td>
<td>155,792</td>
<td>52</td>
<td>---</td>
<td>2600</td>
</tr>
<tr>
<td>Kermanshah</td>
<td>758,273</td>
<td>59</td>
<td>---</td>
<td>1154</td>
</tr>
<tr>
<td>Khoramabad</td>
<td>315,972</td>
<td>66</td>
<td>---</td>
<td>2623</td>
</tr>
<tr>
<td>Masjed Soleyman</td>
<td>124,425</td>
<td>75</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Orumiyeh</td>
<td>451,558</td>
<td>75</td>
<td>---</td>
<td>1425</td>
</tr>
<tr>
<td>Sanandaj</td>
<td>309,073</td>
<td>57</td>
<td>---</td>
<td>2603</td>
</tr>
<tr>
<td>Tabriz</td>
<td>1,328,504</td>
<td>69</td>
<td>---</td>
<td>923</td>
</tr>
</tbody>
</table>
Number of Days With Dust (July 2009)
Difference Observed Number of Days with Dust in Jun 2009 with Long Term Average
Difference Observed Number of Days with Dust in Jun 2008 with Long Term Average
Maximum Concentration of Dust ($\mu$ gr/m$^3$) in Critical Provinces of Iran - 2005
Maximum Concentration of Dust ($\mu$ gr/m$^3$) in Critical Provinces of Iran - 2006
Maximum Concentration of Dust ($\mu$ gr/m$^3$) in Critical Provinces of Iran - 2007

Concentration ($\mu$ gr/m$^3$)

- $>3000$
- $2001 - 3000$
- $501 - 2000$
- $150 - 500$
- $<150$
Maximum Concentration of Dust ($\mu$ gr/m$^3$) in Critical Provinces of Iran - 2008

Concentration ($\mu$ gr/m$^3$)

- $>$3000
- 2001 - 3000
- 501 - 2000
- 150 - 500
- $<$150
Maximum Concentration of Dust (µ gr/m3) in Critical Provinces of Iran - 2009
Deviation ( % ) on Dust Maximum Concentration With Limit of Standard in Critical Provinces of Iran (2005)

Limit of Standard for Maximum Concentration = 150
Deviation (%) on Dust Maximum Concentration With Limit of Standard in Critical Provinces of Iran (2006)

<table>
<thead>
<tr>
<th>Deviation %</th>
<th>Color</th>
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<tr>
<td>&gt;1000</td>
<td>Brown</td>
</tr>
<tr>
<td>501 - 1000</td>
<td>Red</td>
</tr>
<tr>
<td>101 - 500</td>
<td>Orange</td>
</tr>
<tr>
<td>1 - 100</td>
<td>Yellow</td>
</tr>
<tr>
<td>0 &amp; &lt; 0</td>
<td>White</td>
</tr>
</tbody>
</table>

Limit of Standard for Maximum Concentration = 150
Deviation (%) on Dust Maximum Concentration With Limit of Standard in Critical Provinces of Iran (2007)

Limit of Standard for Maximum Concentration = 150
Deviation ( % ) on Dust Maximum Concentration With Limit of Standard in Critical Provinces of Iran ( 2008 )

Limit of Standard for Maximum Concentration = 150

Deviation %
- >1000
- 501 - 1000
- 101 - 500
- 1 - 100
- 0 & < 0
Deviation ( % ) on Dust Maximum Concentration With Limit of Standard in Critical Provinces of Iran (2009)

Limit of Standard for Maximum Concentration = 150

Deviation %
- >1000
- 501 - 1000
- 101 - 500
- 1 - 100
- 0 & < 0
Dust Phenomenon Occurrence Days Number in Different Cities in 2007

<table>
<thead>
<tr>
<th>Cities</th>
<th>Number of Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>Zanjan</td>
<td>13</td>
</tr>
<tr>
<td>Ahvaz</td>
<td>32</td>
</tr>
<tr>
<td>Ilam</td>
<td>9</td>
</tr>
<tr>
<td>Kermanshah</td>
<td>28</td>
</tr>
</tbody>
</table>
Dust Phenomenon Occurrence Days Number in Different Cities in 2008

- Shiraz: 13
- Khorram Abad: 42
- Shahr-e-Kord: 3
- Zanjan: 20
- Tabriz: 25
- Ahvaz: 59
- Sanandaj: 6
- Ilam: 35
- Kermanshah: 107

Cities
Dust Phenomenon Occurrence Days Number in Different Cities in 2009
Dust Phenomenon Occurrence Days in Different Cities in 2010 (Up to August)

- Shiraz: 6
- Hamedan: 8
- Khorram Abad: 22
- Zanjan: 5
- Ahvaz: 37
- Oromieh: 1
- Sanandaj: 7
- Ilam: 17
- Kermanshah: 15
Maximum Dust Concentration in Different Cities in 2006

- Ahvaz: 1890 µg/m$^3$
- Ilam: 2489 µg/m$^3$
- Kermanshah: 464 µg/m$^3$

Concentration (µg/m$^3$)
Maximum Dust Concentration in Different Cities in 2007

Cities

Concentration (µg/m³)

- Zanjan: 524
- Ahvaz: 8360
- Ilam: 3055
- Kermanshah: 771

460 µg/m³
Maximum Dust Concentration in Different Cities in 2008

<table>
<thead>
<tr>
<th>Cities</th>
<th>Concentration (µg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shiraz</td>
<td>821</td>
</tr>
<tr>
<td>Khoram Abad</td>
<td>2600</td>
</tr>
<tr>
<td>Shahr-e-Kord</td>
<td>364</td>
</tr>
<tr>
<td>Zanjan</td>
<td>724</td>
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<tr>
<td>Tabriz</td>
<td>315</td>
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<tr>
<td>Ahvaz</td>
<td>8860</td>
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<tr>
<td>Sanandaj</td>
<td>3970</td>
</tr>
<tr>
<td>Ilam</td>
<td>328</td>
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<tr>
<td>Kermanshah</td>
<td>1311</td>
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</table>

Concentration (µg/m³)

Cities
Maximum Dust Concentration in different cities in 2009

<table>
<thead>
<tr>
<th>Cities</th>
<th>Concentration (µg/m³)</th>
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</thead>
<tbody>
<tr>
<td>Tehran</td>
<td>517</td>
</tr>
<tr>
<td>Shiraz</td>
<td>1388</td>
</tr>
<tr>
<td>Hamedan</td>
<td>3050</td>
</tr>
<tr>
<td>Khoram Abad</td>
<td>3000</td>
</tr>
<tr>
<td>Shahr-e-Kord</td>
<td>557</td>
</tr>
<tr>
<td>Zanjan</td>
<td>586</td>
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<tr>
<td>Tabriz</td>
<td>630</td>
</tr>
<tr>
<td>Ahvaz</td>
<td>995</td>
</tr>
<tr>
<td>Oroomieh</td>
<td>2867</td>
</tr>
<tr>
<td>Sanandaj</td>
<td>2998</td>
</tr>
<tr>
<td>Ilam</td>
<td>2817</td>
</tr>
<tr>
<td>Kermashah</td>
<td>150µg/m³</td>
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</table>
Maximum Dust Concentration in Different Cities in 2010 (Up to August)

<table>
<thead>
<tr>
<th>Cities</th>
<th>Concentration (µg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shiraz</td>
<td>433</td>
</tr>
<tr>
<td>Hamedan</td>
<td>713</td>
</tr>
<tr>
<td>Khoram Abad</td>
<td>1600</td>
</tr>
<tr>
<td>Zanjan</td>
<td>1426</td>
</tr>
<tr>
<td>Ahvaz</td>
<td>10000</td>
</tr>
<tr>
<td>Oromieh</td>
<td>1747</td>
</tr>
<tr>
<td>Sanandaj</td>
<td>1817</td>
</tr>
<tr>
<td>Ilam</td>
<td>2581</td>
</tr>
<tr>
<td>Kermanshah</td>
<td>3000</td>
</tr>
</tbody>
</table>

Concentration range: 50 µg/m³
Maximum Dust Concentration in Ahvaz

Years

Concentration (µg/m³)

- 2004: 1910 µg/m³
- 2005: 2505 µg/m³
- 2006: 1890 µg/m³
- 2007: 8360 µg/m³
- 2008: 8860 µg/m³
- 2009: 6900 µg/m³
- 2010: 10000 µg/m³

50µg/m³
Maximum Dust Concentration in Zanjan

- 2007: 524 µg/m³
- 2008: 724 µg/m³
- 2009: 586 µg/m³
- 2010: 1426 µg/m³

Concentration (µg/m³)
Maximum Dust Concentration in Kermanshah

Concentration (µg/m³)

- 2006: 464
- 2007: 771
- 2008: 1311
- 2009: 2817
- 2010: 3000

Maximum dust concentration: 150 µg/m³
Maximum Dust Concentration in Ilam

<table>
<thead>
<tr>
<th>Year</th>
<th>Concentration (µg/m³)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>2618</td>
</tr>
<tr>
<td>2006</td>
<td>2489</td>
</tr>
<tr>
<td>2007</td>
<td>3055</td>
</tr>
<tr>
<td>2008</td>
<td>3970</td>
</tr>
<tr>
<td>2009</td>
<td>2998</td>
</tr>
<tr>
<td>2010</td>
<td>2581</td>
</tr>
</tbody>
</table>
Dust Phenomenon Occurrence Days Number in Zahedan

Years

Number of Days

- 2008: 9
- 2009: 98
- 2010: 38
Maximum Concentration of Dust in Zahedan

- 2008: 4103 µg/m³
- 2009: 6500 µg/m³
- 2010: 5912 µg/m³

Yearly concentration of dust compared to the maximum allowed concentration of 150 µg/m³.
Impact of dust on health and sanitation

• Increase of kids, adult & devotee health risk
• Increase patient reference to hospitals from 20% to 60%
# Particulate Matter and Health Impacts

<table>
<thead>
<tr>
<th>Index Values</th>
<th>Levels of Health</th>
<th>Cautionary Statements</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 – 50</td>
<td>Good</td>
<td>None</td>
</tr>
<tr>
<td>51 - 100</td>
<td>Moderate</td>
<td>Unusually sensitive people should consider reducing prolonged or heavy exertion</td>
</tr>
<tr>
<td>101 – 150</td>
<td>Unhealthy for sensitive groups</td>
<td>People with heart or lung disease, older adults, and children should reduce prolonged or heavy exertion</td>
</tr>
<tr>
<td>151 – 200</td>
<td>Unhealthy</td>
<td>People with heart or lung disease, older adults, and children should avoid prolonged or heavy exertion. Everyone else should reduce prolonged or heavy exertion</td>
</tr>
<tr>
<td>201 – 300</td>
<td>Very unhealthy</td>
<td>People with heart or lung disease, older adults, and children should avoid all physical activity outdoors. Everyone else should avoid prolonged or heavy exertion</td>
</tr>
<tr>
<td>301 - 500</td>
<td>Hazardous</td>
<td>People with heart or lung disease, older adults, and children should remain indoors and keep activity level low. Everyone else should avoid all physical activities outdoors.</td>
</tr>
<tr>
<td>Year</td>
<td>Accident number (day)</td>
<td>Max concentration (mg/m³)</td>
</tr>
<tr>
<td>------</td>
<td>----------------------</td>
<td>---------------------------</td>
</tr>
<tr>
<td>2001</td>
<td>6</td>
<td>2010</td>
</tr>
<tr>
<td>2002</td>
<td>10</td>
<td>2560</td>
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<td>2003</td>
<td>11</td>
<td>3600</td>
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<td>2004</td>
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<td>3440</td>
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<td>2007</td>
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<td>8360</td>
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<td>2008</td>
<td>55</td>
<td>9360</td>
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<tr>
<td>2009</td>
<td>49</td>
<td>6200</td>
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<tr>
<td>total</td>
<td>202</td>
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# Health Aspect Daily Exposure to Dust (PM)

<table>
<thead>
<tr>
<th></th>
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<tr>
<td>Khozestan</td>
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<td>9360</td>
<td>38554</td>
<td>13332</td>
<td>2461</td>
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<td>Hormozgan</td>
<td>1,480,786</td>
<td>165</td>
<td>482</td>
<td>13061</td>
<td>4516</td>
<td>834</td>
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<td>Bushehr</td>
<td>914,519</td>
<td>126</td>
<td>1348</td>
<td>8066</td>
<td>2789</td>
<td>515</td>
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<td>Ilam</td>
<td>555,799</td>
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<td>2600</td>
<td>4902</td>
<td>1695</td>
<td>313</td>
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<td>Kermanshah</td>
<td>1,891,612</td>
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<td>1154</td>
<td>16684</td>
<td>5769</td>
<td>1065</td>
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<td>Lorestan</td>
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<td>2623</td>
<td>15316</td>
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<td>978</td>
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<td>West Azarbaijan</td>
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<td>1425</td>
<td>25962</td>
<td>8978</td>
<td>1657</td>
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<td>Kordestan</td>
<td>1,453,135</td>
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<td>2603</td>
<td>12817</td>
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<td>818</td>
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<td>East Azarbaijan</td>
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<td>117</td>
<td>923</td>
<td>32154</td>
<td>11119</td>
<td>2052</td>
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</table>
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National Actions of I.R of IRAN

• Ratification of Rule of Procedure on “Preparedness and Combat with Adverse Effects of Dust Phenomenon in Country” in 19 articles, 2 chapters and 3 programs including: short term, middle term and long term in 28 July 2009 at Iran Parliament.
National Actions of I.R of IRAN

I. R. of Iran Government Delegate the Authority to Head of Iran Environment Protection Organization (EPO)
Actions of EPO of IRAN

• Allocation of budget, installation and set up air pollution monitoring stations for dust regional analysis
• Monitoring and measurement of dust situation
• Public awareness and public preparedness for combat to dust phenomenon
• Prepare of development program of measurement system with using of advanced technologies
Emergency and Short Term Actions of I.R of IRAN

• Doing special actions about control and reduce the Dust Storms, such as biological and mechanical (Mulch) operations, … by related organizations.

• Operate and Enhance the systems of the Dust Storm monitoring, measuring, analysis, and early warning.

• Emergency actions for development and equip of emergency centers in regions critically affected by dust phenomena.

• Inform of quality situation and air pollution.
• Zagros and Alborz are the two main Mountain ranges in the country.

• It forms desert basins like the Dasht-e Kavir, and the Dasht-e Lut, in the central and east part of the country.

• The main plains are formed along the coast of the Caspian Sea and at the northern part of the Persian Gulf.
Policies & Programs for Desertification Control & Sand Dune Fixation in Iran
STABILITY MODEL OF DESERTS IN IRAN

Sustainability of land resources
Sustainability of water resources
Sustainability of Flora
Sustainability of Fauna
Sustainable Land Management (SLM)
Management practices and executive programs

Risk Management

- Management and restoration of marginal wetlands inside Deserts
- Runoff Management
- Forest Management in deserts
- Protection and support
- Physical and chemical stabilization

Crisis Management

- Construction of living and non-living windbreak
- Biological Rehabilitation
- Interaction
- Control, supervision and evaluation
- Education and Extension

Forest Management in Deserts
List of the Projects under
The National Plan of Desert Management in Iran
DURING STUDIES:

• Main components of the study are:

1- **Identification** of the Wind erosion hot points

2- **Determining Severity** of desertification

3- **Capacity building**

4- Preparing **required plans** at national and provincial level
Combating desertification and controlling sand and dust through the implementation of various projects including Construction of living and non living windbreak, Mulch spraying combined with planting and windbreak constructing (Biochemical method, Biomechanical method and Biological method).
The importance of existence of windbreaks around farms

Average amount of wind erosion in farm lands of and in plains like desert areas is equal to 10-15 t/h/y Narmashir and Jask is up to 600 t/h/y 10% of the hot points inside Iran are farmlands which amount of their damages is 40% If during the windbreak operation in 10 years the amount of reduction in erosion be 5 ton/ha, crop production will increase 15 to 20%. By maintaining farmlands fertility, usage of manure and chemical fertilizers will be reduced 2.4 and 0.09 tons per year. 20 percent decrease in evapotranspiration is equal to 600 million cubic meters of water saving
Living wind break
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Regional and International Actions on DUST

• Setting up common meetings with regional countries as below:
  • Visit of Iraqi Environment Delegations to Iran in 2008
  • Visit of Iran Environment Delegations to Iraq on July in 2009
  • Visit of Iraqi Environment Delegations to Iran on November in 2009
Regional and International Actions on DUST

- Visit of Iran Environment Delegations to Syria on December in 2009
- Visit of Iran Environment Delegations to Iraq on March in 2010
- Negotiation and Cooperation with International Organization such as: UNEP UNDP FAO UNISDR GEF UNCCD
Signing of Regional Cooperation Documents as below:

- Environmental MOU (26 January 2008); Iran-Iraq
- Action Plan for implementation of the MOU (5 July 2009); Iran-Iraq
- Wrap up of the visit of the Iraqi delegation (18 November 2009);
- Environmental MOU (November 2009) Iran-Syria
- Implementation Program (2 March 2010) Iran-Iraq
1. Introduction – Dust Storm in Iran
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7. Implementation the Air Quality Management System Through a Regional Framework
Air Quality Management System: Real-Time Monitoring and Modeling for Dust/PM10/2.5
Dust/PM10/2.5 Modeling

- Prognostic meteorological modelling, up to 10 day forecasts, stochastic (ensembles)

- Dynamic emission models for
  - Wind erosion/entrainment
  - Pyrogenic sources (traffic, industry, households)
  - Activities (mining, construction, unpaved roads)

- 3D transport modeling: nested 3D Eulerian (grid) models (e.g., CAMx) for regional, national, local scales (two-way coupling): PM concentration, deposition

- Real-time data assimilation from monitoring

Monitoring, Assessment, Early warning
Schematic Design of Air Quality Management System

NCEP, NOAA

GFS global forecasts
6 hourly, mesoscale

land cover
soil data
soil moisture

MM5/WRF 3D nested grid meteorology
hourly (max. 240 hour forecasts)
ensembles, 2 min frequency distribution

Emission model:
wind erosion
re-entrainment

Emission model:
pyrogenic
activities

Dynamic emission matrices
(nested grids)

CAMx 3D transport model
(nested grid)
FORECAST RUNS

CAMx 3D transport model
(nested grid)
NOWCAST RUNS,
data assimilation

Monitoring
data, sensors,
RADAR, RS

Monitoring
data, sensors,
RADAR, RS

reports, impacts (exposure, visibility)
alerts, early warning
(web, 3G mobile phones)
Architecture

- Real-time monitoring
- Remote data bases
- HPCC
- data bases
- GIS
- expert system
- models

Local client (LAN)

Internet client

Internet (WAN)
Proposed Model Master Domain

Approximately 4,000*4,000 km² with nested grids for:

• sub-regional/national

• local (city) scales

Resolution: 1 km
Monitoring Data time series:

- Air quality observations
- Meteorological variables
- Emission data (major stacks)
- Import of real-time telemetry data
- Used for
  - Real-time data assimilation
  - Model validation (1993/30/EC)
PM10/2.5 modeling:
Main parameters:
• Wind field (speed, direction), turbulence, humidity
• Soil and surface characteristics, particle size distribution, soil moisture, vegetation cover
• Other emission sources: –pyrogenic, economic activities
PM 10/2.5 modeling:

- Explicit particle size classes
- Entrainment model using logarithmic wind speed distribution around the hourly average from prognostic 3D meteorological models (MM5, WRF) Re-suspension with
  - non-linear threshold function and distributed wind speeds
  - land use/humidity dependent loss rates
- Transport model: CAMx R5.10
Design questions:

• Master domain size (countries to include)

• Number, location, extent and resolution of sub-domains (countries, major cities)

• Server configuration:
  – Master server, coordinating individual monitoring networks, data integration and re-distribution? Central or distributed?
  – Modelling: centrally or distributed?
  – Central master domain, distributed sub-domains for both meteorology, PM?
Design questions:

Update and reporting frequencies:

- Monitoring: hourly distribution;
- Meteo forecasts: adaptive;
  - low wind speeds: daily
  - high wind speeds: every 6 hours
- Dust modelling:
  - adaptive forecasts,
  - hourly nowcasts (with real-time 4D monitoring data assimilation)
Related topics and tools:

- Land cover, desertification, reforestation
- Impact assessment, human health, economic damages
- Cost-benefit analysis, multi-criteria optimization
- Climate Change impacts (IPCC scenarios: vegetation, precipitation/soil moisture, storms (frequency, magnitudes ?))
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<td>2. Origin and Source of the Dust Storm in the Region</td>
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<td>3. Environmental Analysis of Dust Storm in IRAN</td>
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<td>8. Concluding Remarks</td>
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Concluding Remarks

- Regional Framework for Cooperation
- Regional Network for dust storm monitoring
- Plant coverage strengthening in direction of dust storms in involved countries
- Establishment of a regional center in order to research, train, and implement combating desertification projects in above mentioned countries with cooperation of the UNCCD
- Organize technical working groups consisting experts to visit affected areas in these countries
Concluding Remarks

• Holding training courses regarding desert management and wind erosion hot points plans
• Identification of Wind erosion hot points and origin of dust in neighbor countries
• Prepare and implement plans to control wind erosion hot points
• Implementation of pilot projects to combat desertification in neighbor countries
• Using international experiences in line with identification of origin and control dust storm
• Signing regional agreement between I.R. of Iran, Iraq, Saudi Arabia, Kuwait, Syria and other countries affected by dust storm in order to benefit international financial resources of international agencies and conventions such as GEF, UNDP, UNCCD
Concluding Remarks

• Training and sharing related experiences and lessons learnt in combating desertification field and sand fixation with other countries
• Report on methodologies to identify the affected areas as well as hot points wind erosion in I.R. of Iran
• Visit the projects in Khuzestan Province including mechanical and biological sand dune fixation activities, planted forests and extra ordinary achievements in desert areas
Thanks for your Kind Attention
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Trend of annual CO density in 2000-2010
Trend of annual PM10 density in 2000-2010

µg/m$	ext{³}$
Trend of annual SO2 density in 2000-2010
Trend of annual NO2 density in 2000-2010
Actions of Health Ministry

• Equip health treatment and emergency centers in West and South-West provinces of Iran.
• Monitoring and assessment of health indexes regarding to dust storm in West and South-West provinces.
• Doing of two research projects about determination of pollution sources and identification and quality of dust storm, with cooperation of universities (to be continue)
• Prepare and compilation of training packages for people in order to self care in dust storm occurrence time.