

PRESENTATION OVERVIEW

- National circumstances
- Long-term projection of temperature and precipitation in Iran
- Direct adverse impact of climate change on:
 - Water resource
 - Agricultural products and food security
 - Coastal and low land areas
 - Public health
- Impact of response measures by Annex-B countries on the economy of Iran.

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Vulnerability of Iran's Economy to Climate Change

National Climate Change Office
Department of Environment
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by:

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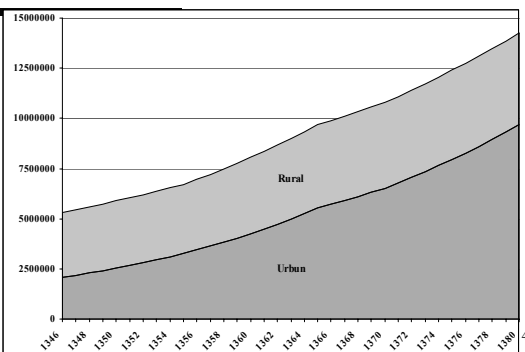
UNFCC Workshop on Economic Diversification

18-19 October, 2003

Tehran, Iran

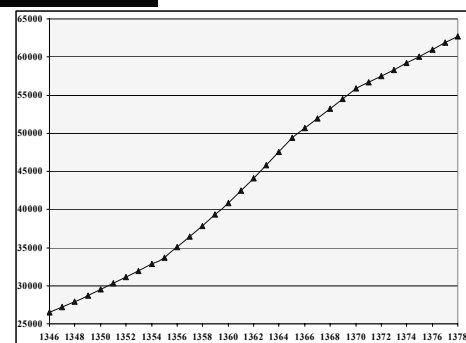
National Circumstances (II)

Trend of urban & rural household between 1968-1998



National Circumstances (I)

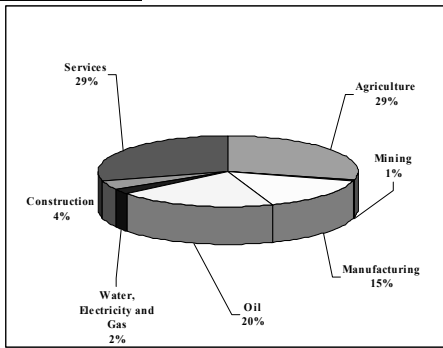
Trend of population growth between 1968-1998 ('000 person)



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National Circumstances (IV)

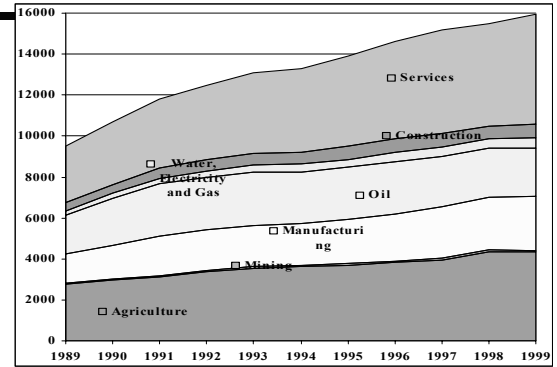
Share of different economic sub-sectors in GDP in 1990 (%)



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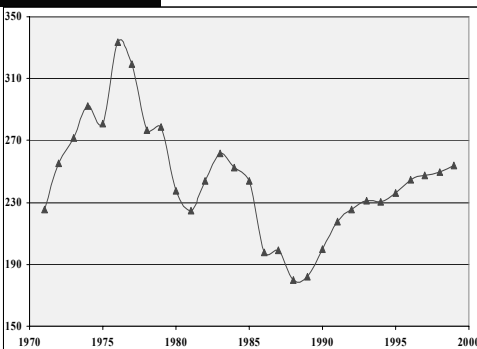
National Circumstances (III)

Trend of GDP growth by sector (bn. Rials- at constant 1982 prices)



National Circumstances (VI)

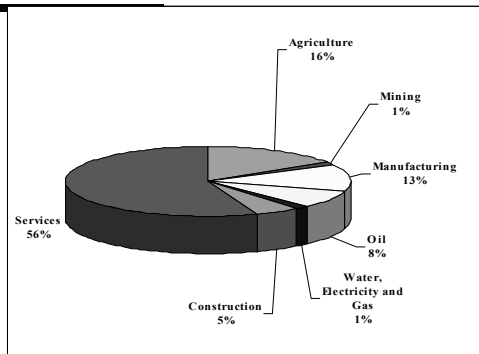
Trend of per capita GDP (,000 Rial-constant 1982 prices)



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National Circumstances (V)

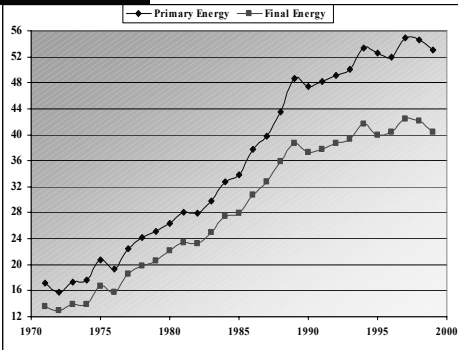
Share of different economic sub-sectors in GDP in 2000 (%)



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National Circumstances (VIII)

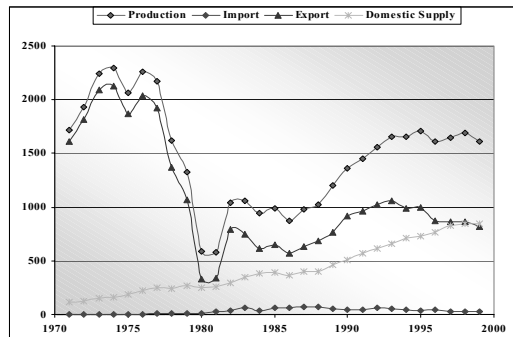
Trend of energy intensity
(BOE/Mn. Rial - at constant 1982 prices)



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National Circumstances (VII)

Trend of primary energy production, domestic supply, import and export (MBOE)



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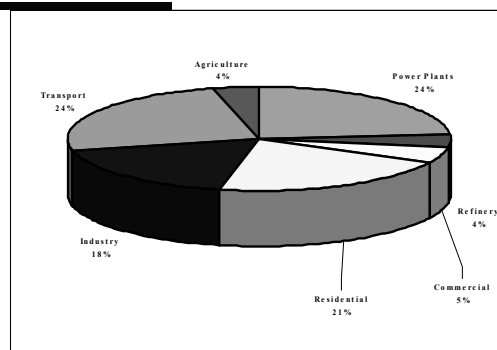
Long-term projection of temperature and precipitation in Iran

The selective combinations of two GCMs (HadCM2 and ECHAM4), three IPCC emission scenarios, and three different climate sensitivities, represent the following temperature and precipitation changes in long-term (2100).

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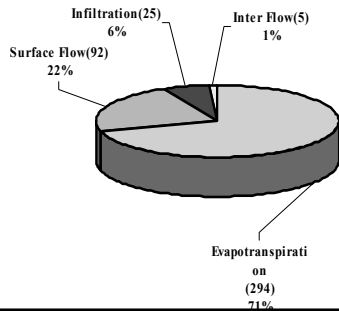
National Circumstances (IX)

Share of different sectors in the total energy demand in 2000 (%)



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Vulnerability (Water resource)
Water balance and total precipitation in the country (billion cubic meters)



Long-term projection of temperature and precipitation in Iran

Temperature :

- 1°C to 1.5°C at low emission rate.
- 4.1°C to 5°C if the emission rate maintains at the present level.
- 5.9°C to 7.7°C at high emission rate.

Precipitation:

- -11% to 19.1% of the baselines for low emission rate,
- -30.9% to 50% of the baselines for medium emission rate,
- -58% to 80% of the baselines for high emission rate.

Vulnerability (Water resource)
Variation of runoff with respect to the variation of temperature and rainfall in selected main basins

Basin Name	Temp. (T)	Precipitation(P)				
		-40%	-10%	P	+10%	+40%
Aras	0	-52.2	-15.2	0.0	16.8	77.2
	+1	-53.1	-18.1	-3.8	11.9	68.2
	+6	-56.4	-28.4	-17.0	-6.1	34.1
Karkhe	0	-60.7	-18.8	0.0	21.5	102.5
	+1	-62.3	-23.9	-6.7	12.9	86.9
	+6	-67.9	-41.7	-30	-18.0	28.6

Vulnerability (Water resource)

Sea level rise and infiltration of salt water into underground water resources

Increased vaporization from the rivers due to higher temperatures which result in drying out the rivers

Variations in intensity and the magnitude of precipitation (In 53% of the recorded stations flood index has increased)

Decreased volume and deteriorated water quality of underground reservoirs due to drought and increased surface vaporization which result in higher treatment costs

Changes in precipitation from snow to rain and changes in melting patterns

Vulnerability

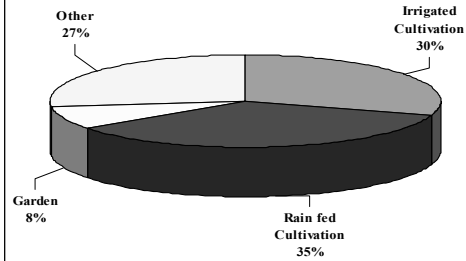
Agriculture and Food Security

- Since 71% of cultivated land is devoted to grains with rain irrigation, climate change has significant adverse impact on food security.
- Recent droughts have resulted in 52,000 billion Rials of damage in agricultural sector and 3,600 billion Rials in water resources
- Reduction of job positions in agricultural sector
- Increased immigration of farmers into the large cities.

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Vulnerability

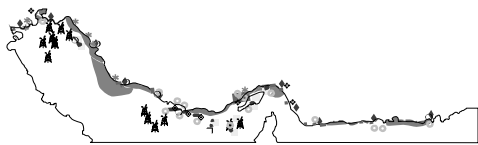
(Agriculture and Food Security)



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Vulnerability

Costal Area & Low Land

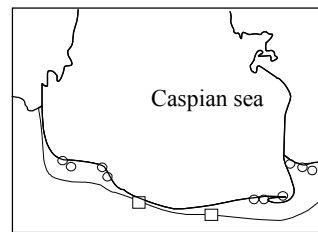


- | | | |
|--|---|---|
| ■ Coastal wetland and mud flats (Daneshkar et al., 1996) | ▲ Iranian oil platform in the Persian Gulf (D.O.E., 1993) | ○ Ecological sensitive areas of the Persian Gulf and Sea of Oman (Daneshkar & Pourakbarlou, 1997) |
| ■ Major shrimping ground (D.O.E., 1993) | ● Marine turtle habitats (Daneshkar et al., 1996) | ○ Protected Area |
| ■ Mangrove forest (D.O.E., 1993) | ◆ Waterbird habitat (Daneshkar et al., 1996) | □ Wildlife shelter |
| ■ Sea grass (D.O.E., 1993) | ◆ Pearl oyster habitat (D.O.E., 1993) | ◆ International wetland |
| ■ Coral reef islands (D.O.E., 1993) | ◆ Pearl oyster fishing ground (D.O.E., 1993) | ◆ Biosphere reserve |
| | * Estuaries (Nabavi et al., 1994) | |

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Vulnerability

Costal Area & Low Land



- | |
|-----------------------|
| ○ Wetland |
| □ Others |
| □ South Caspian shore |

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Vulnerability

Public Health

The following diseases have shown increasing trend in this country:

Malaria
Leishmaniasis
Cholera
Rodents infection

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Vulnerability

Coastal Areas

- The effects of sea level rise are:
 1. Changes in geomorphology of the coastal areas
 2. Damages to oil and gas installations
 3. Salt water intrusion into the drinking water resources
 4. Changes in job market and shift to illegal traffic of goods

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Impact of Response Measures

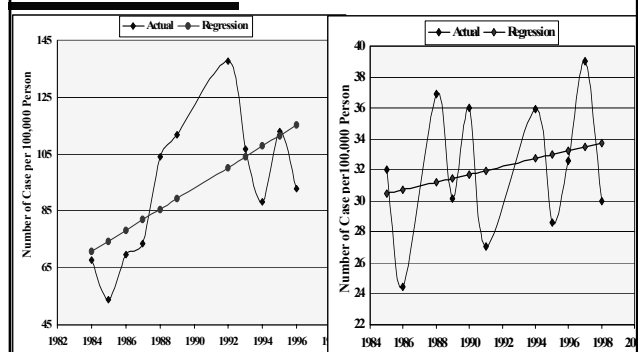
Estimates of adverse effects and the required compensation are based on the results from four scenarios:

- Business-as-Usual (BAU),
- Kyoto Protocol with “no flexible mechanisms” and “no tax adjustment”,
- Kyoto Protocol with “no flexible mechanisms” and “tax adjustments”, and
- Kyoto Protocol with “flexible mechanisms” and “no tax adjustment”.

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Vulnerability (Public Health)

Exposure rate to Malaria(left) & Leishmaniasis in recent years



Impact of Response Measure

World crude oil price under the three policy scenarios *with* participation of the USA (% change from baseline)

Scenarios	2000	2005	2010	2015	2020	2025	2030
No Flexibility							
	-0.13	-0.09	-15.32	-16.09	-16.48	-17.66	-18.35
Tax Cut							
	-0.02	0.06	-7.50	-9.54	-9.63	-9.97	-10.29
Flexibility with CDM							
	-0.09	-0.16	-10.61	-11.33	-11.13	-11.08	-11.16

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Impact of Response Measure

Baseline projections for the crude oil market

	2010	2020	2030
Baseline world oil price (USD per barrel)			
	19.2	20.51	22.14
World demand (mbd)			
	81	97	118
Non-OPEC production (mbd)			
	44	45	46
OPEC share of world oil production (%)			
	46	54	62 ⁵

Impact of Response Measure

Impact on Iran's Economy in "Tax Cut Scenario"

Tax Cut			
	Revenue losses in 2010 (Billions of 1995 USD)	% change in welfare	Cash compensation (Billions of 1995 USD)
With US	-3	1.76	45
Without US	1.6	0.4	0*

*Zero value indicates that no compensation is needed

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Impact of Response Measure

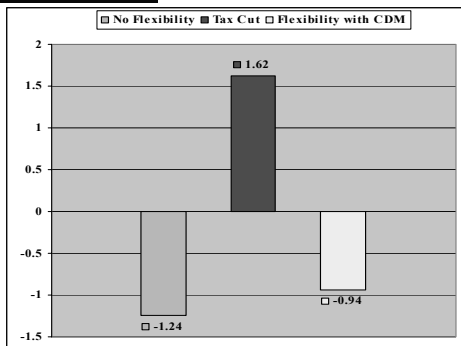
Impact on Iran's Economy in "No Flexibility Scenario"

No Flexibility			
	Revenue losses in 2010 (Billions of 1995 USD)	% change in welfare	Cash compensation (Billions of 1995 USD)
With US	-6.3	-3.1	79
Without US	-1.2	-0.7	20

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Impact of Response Measure

Impact of Response Measures on Iranian Economy (USD billions)



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Impact of Response Measure

Impact on Iran's Economy in "Flexibility with CDM Scenario"

Flexibility with CDM Scenario

	Revenue losses in 2010 (Billions of 1995 USD)	% change in welfare	Cash compensation (Billions of 1995 USD)
<i>With US</i>	-4.5	2.2	57
<i>Without US</i>	-0.9	-0.52	17

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