

International Workshop on Community Level Adaptation to Climate Change,
Dhaka, Bangladesh, 16-18 January 2005

Reflection on Tunisian water resources adaptation to Climate change



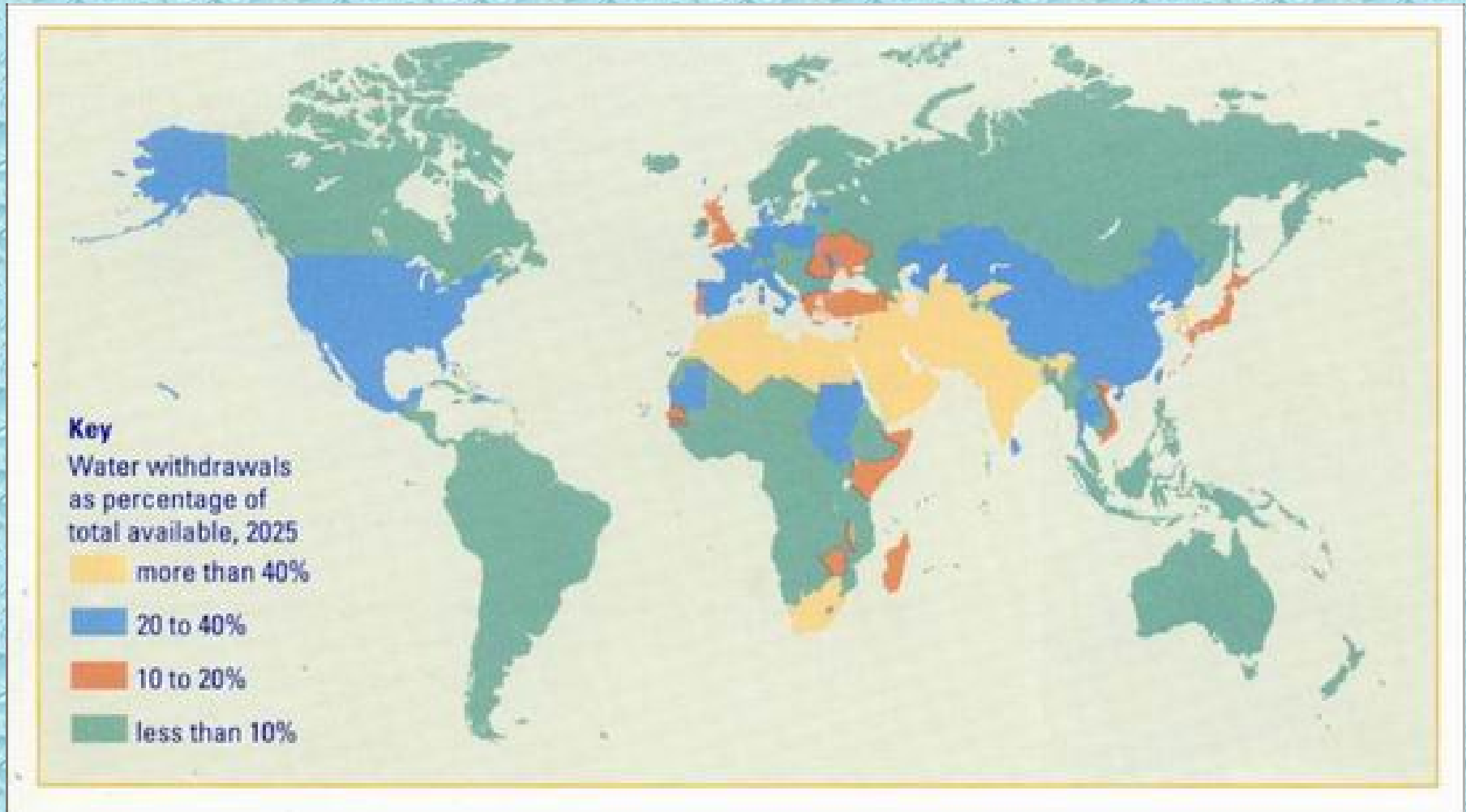
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Introduction



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Introduction



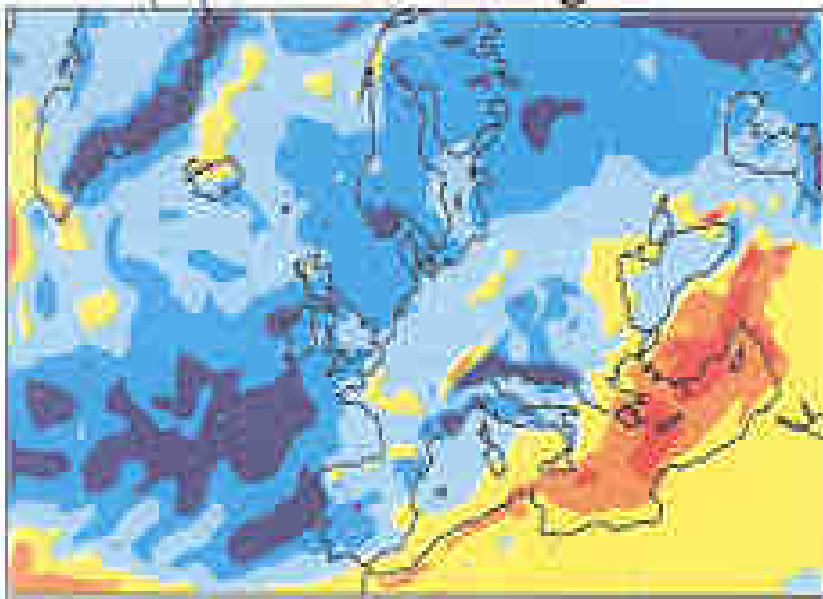
Reflection on Tunisian water resources adaptation to climate change

Introduction

- Like most countries affected by aridity: water resources are the most precious environment good.
- In 1995: water resources are evaluated to 528 m³/capita/year (hydrological stress situation)
- According to socio-economic pressure: situation in 2025 more alarming (< de 500 m³/capita/year)

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Climate change over Mediterranean



- **Global change over Mediterranean:**
 - change in temperature, greater than average global warming
 - Change in extreme events frequency
- **Conclusion: expect decrease in stream flow and ground water resources**

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Water resources situation

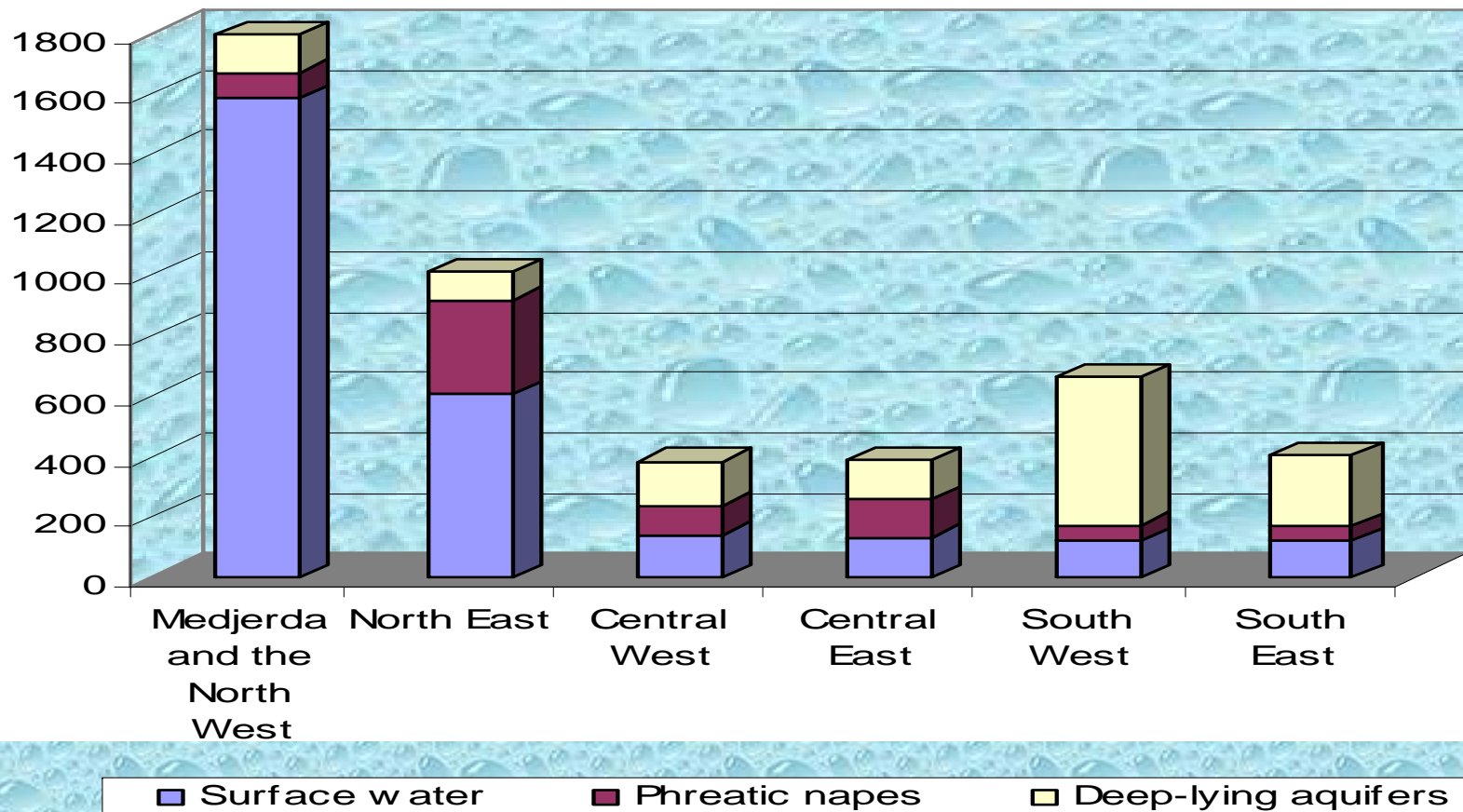
The annual average
rainfall is estimated to
36 000 Mm³/year,
which is distributed:

- from 400 to 1000
mm/year, in the North
- from 200 to 400
mm/year, in the
Center
- less than 200 mm/year,
in the South

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Water resources situation

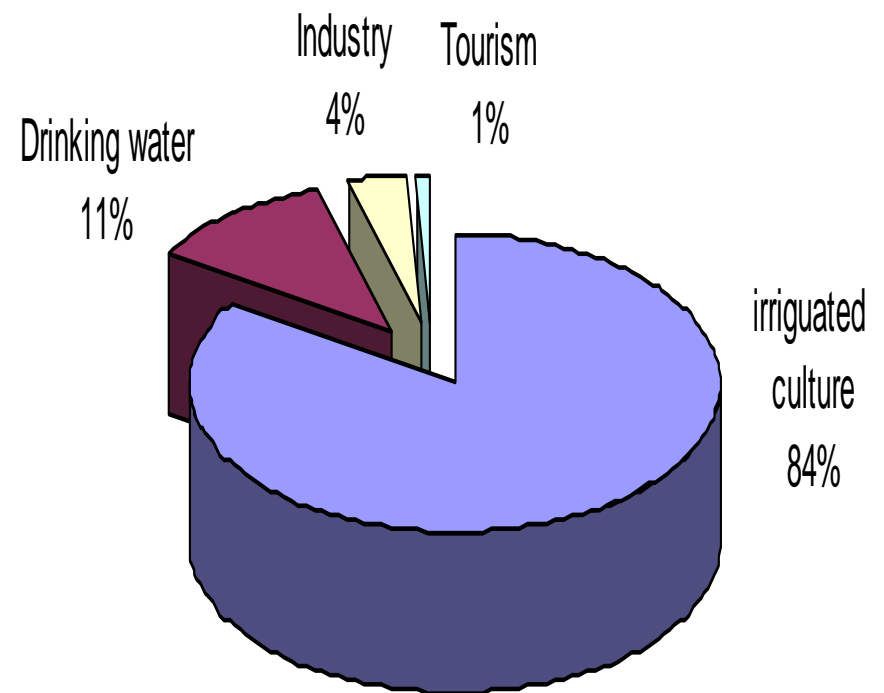
Potential water resources allocation (total flow)
by hydrological basins (year 1996)



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Water resources situation: Other aspects

- **Water demand:** characterized by irrigated culture allocation (84 %)
- **Water quality:** little pollution problem and salinity problem (south)
- **Little use of the no conventional water**
- **Little use of artificial recharge**



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Sensitivity to climate change

- **Main characteristics: aridity and high variability**
- **Main sensitivities:**
 - **Surface water resources variability exacerbated by climate change**
 - **A higher evaporation rate amplified by climate change**
 - **Increase in hydrological budget deficit**
 - **Damaging of water quality**

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Some aspects not prioritizing climate change and adaptive strategy

- Over a time horizon less than 20 years: climate change impacts will be small relative to other pressures
- Greater discrepancy between
 - Water resources is a common concern with a greater socio-economic importance
 - climate change is a new issue with no sufficient assessment of impacts
- Lack of quantitative assessment of impacts, risk and degree of vulnerability: priority to regional and national level, lack of tools.

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Issues to prioritising adaptation response

- **fragile balance: operating water-demand water.**

	<i>reference year (1996)</i>	<i>2010</i>	<i>2020</i>	<i>2030</i>
<i>Operating water</i>	2767	3300	3106	3121
<i>Demand water</i>	2528	2689	2721	2760



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Key assumptions for adaptation strategy

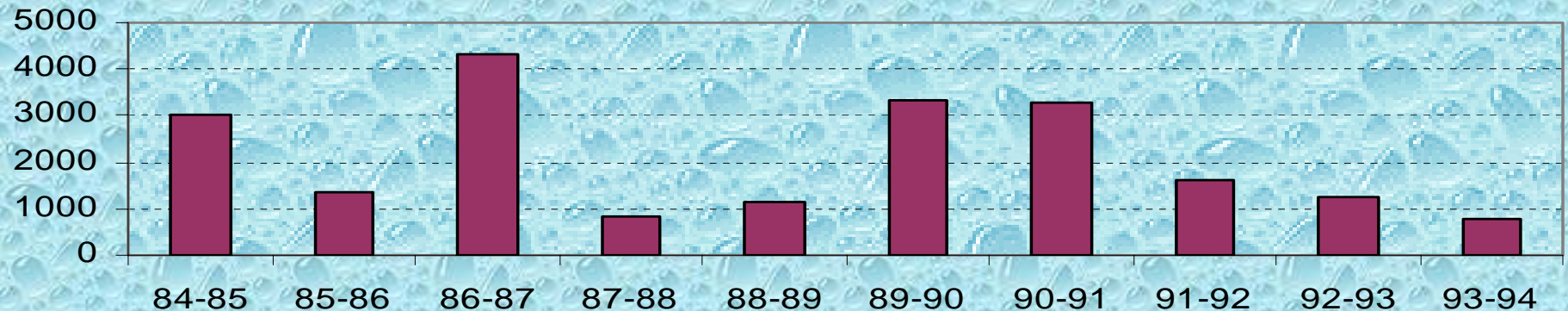
- **Adaptation to hydrological extreme events:
drought management**
- **Water quality :**
 - higher water temperature and increased
pollutant load from runoff
 - infection by sea water intrusion

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Key assumptions for adaptation strategy

- **Storage capacity and regulation**

**Figure (3) : Surface potential water resources evolution
(in millions cubic)**



With an average reference of 2700 Mm³/year, the available quantities are

- ✓ 2230 Mm³/year, one year over two,
- ✓ 1500 Mm³/year, one year over five,
- ✓ 1250 Mm³/year, one year over ten,

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Key assumptions for adaptation strategy

- Higher cost of new water resources mobilization
- Irrigated agriculture: competitiveness

Local practices and knowledge:

- ✓ homogeneous with environment
- ✓ sustainable
- ✓ implemented at the local scale



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Up Approach based on simples actions

- “No regrets” and low cost, no cost measures
 - current supply-side approaches
 - some demand-side options, available to make
 - some anticipatory and precautionary options
- **Institutional arrangement:**
 - hydrological watch: arrangement between Agriculture Ministry and Meteorological institute
 - regional Committee on struggle against flood: flexibility and appropriate arrangement

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Conclusion

- **Future adaptive strategy should consider key assumptions such :**
 - storage and regulation capacities
 - water quality degradation
 - peasant practices
 - higher cost of new water resources mobilization
- **Need to produce scientific information and quantitative assessment on impacts, risk and vulnerability related to the regional and national level, with emphasis on change in the range of climate variation and frequency and severity of extreme events**

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Conclusion

- Tunisia has some adaptive capacities, especially to ability to implement integrated water resources management which enhance adaptive potential to climate change
- *However, the improvement and strengthened of the national water resources strategy is the best way to adapt and response to climate change*

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Conclusion

- Each country has
 - Theirs national considerations and constraints
 - Their priorities
- It is difficult to implement adaptative strategy to each sector (agriculture, water resources, forestrie, ...others)
- We need to define a sustainable Development Approach and integrate climate change adaptation concerns in this approach

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