FASTER

Farmers' Adaptation and Sustainability in Tunisia through Excellence in Research

2nd FASTER SPECIALIZED TRAINING

on Climate change effects on water & land management in the Mediterranean

22-26 March 2021 (ONLINE)

AGENDA

Innovative mitigation to climate change and increasing demands

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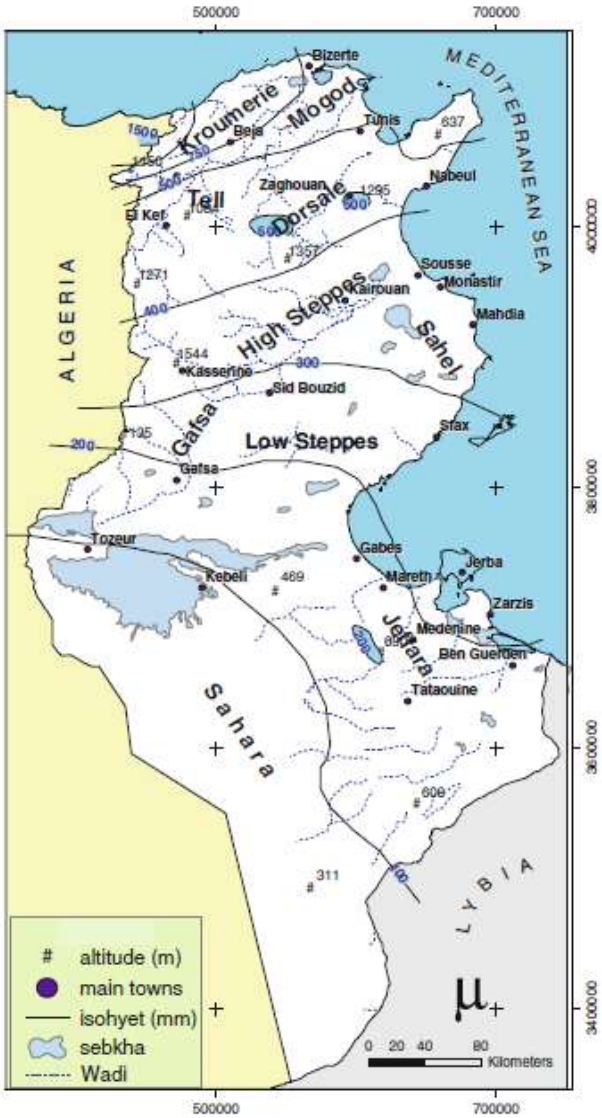
Monday 22nd March 2021	
11:00-11:30	Innovative mitigation to climate change and increasing demands
11:30-12:00	Facilitated debate
12:00-12:30	Explanation of tasks to do & Wrap up

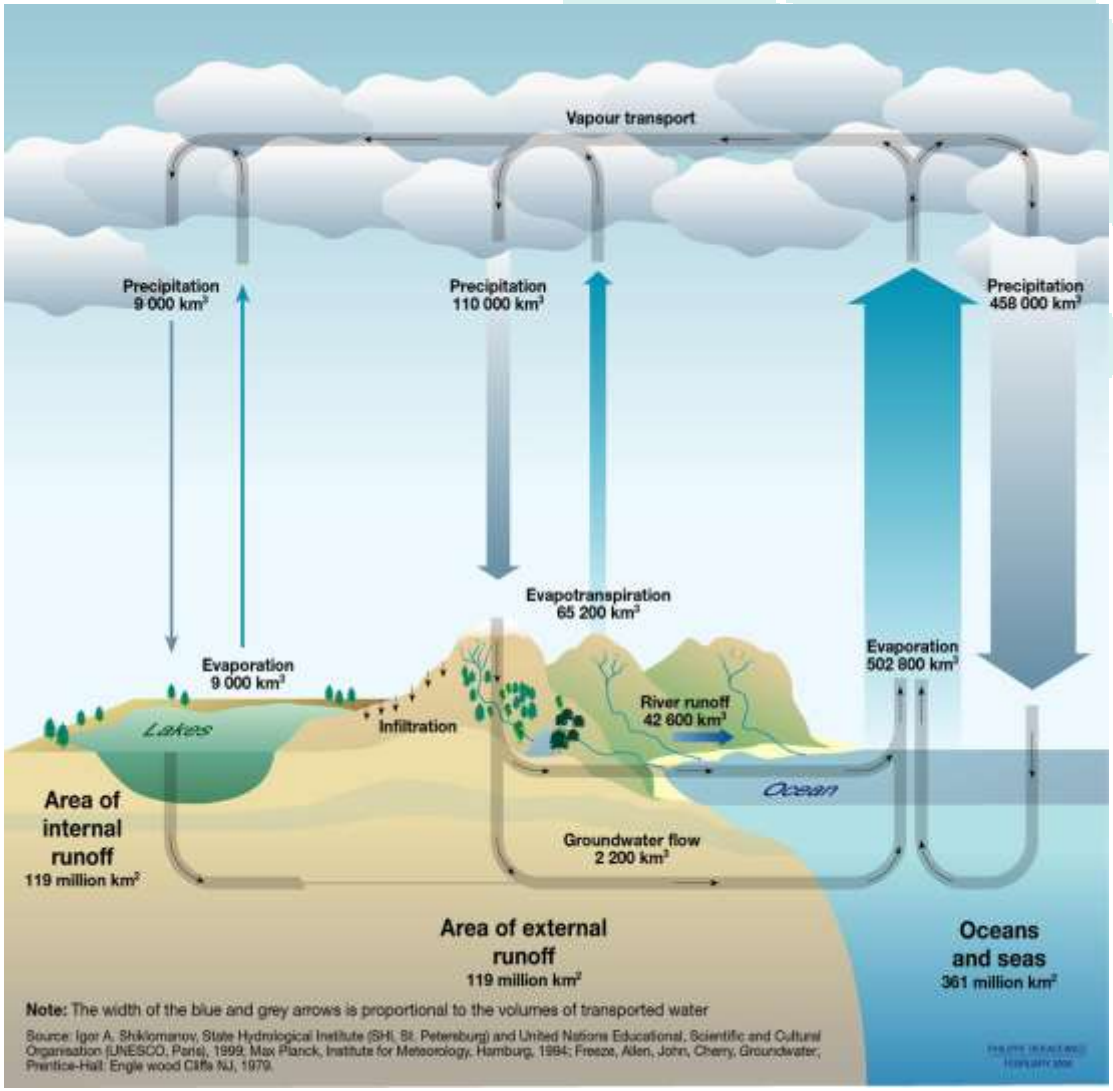
Warmer climate and less rainfall

- Increasing demand for water
- Water demand in agriculture will be affected more heavily than in other sectors
- Changing ecotypes and climatic zones
- Less productive capacity
- Needs for adaptive capacity

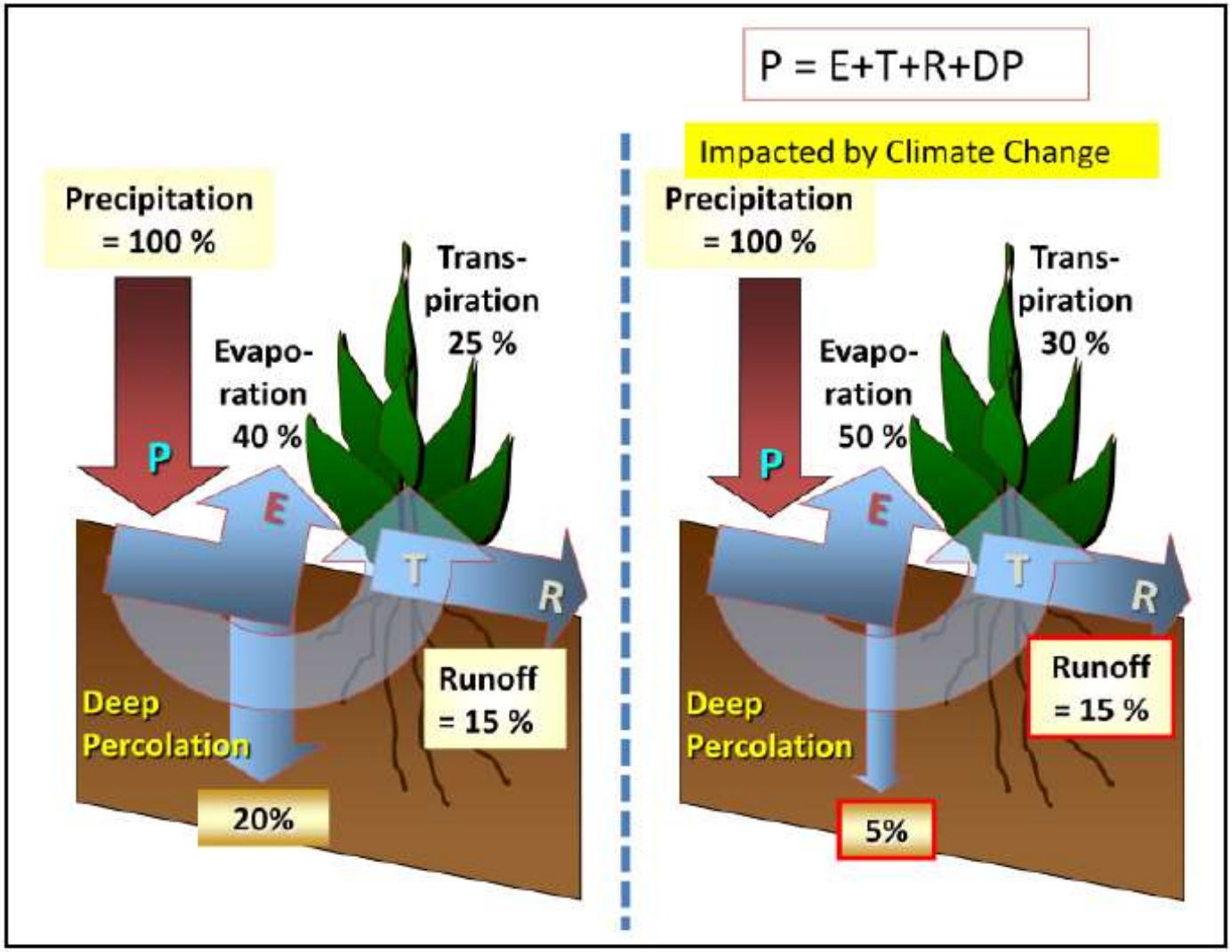


Source: Omrani and Ouessar (2012)

Renewable water



Changing water balance in warmer climate



Source: Jnad and Prinz (2013)

Adaptation concepts and options

Strategies that take climate change and variability into account (planned adaptation, e.g., FAO) or those with goals that are not specifically climate related, but that improve resilience to climate change as an additional effect (autonomous adaptation, e.g., IWRM).

Source: Wilk and Wittgren (2009)

Adaptation to more erratic rainfall in rainfed agriculture

(1) Higher water demands of people, crops, and livestock due to higher temperature need to be met by increase in catchment area and/or by increasing runoff coefficients on catchment areas and/or by a higher water use efficiency, supplemented by an increase in storage volume.

(2) Higher rain intensities and more erratic rainfall demand a larger catchment-to-cropping-area ratio and a strengthening / raising of water harvesting structures (bunds, dams, walls).

(3) Adaptation to more/larger floods can be achieved by increasing size of structures for water diversion, for impoundment and spill of excess water.

Source: Jnad and Prinz (2013)

IWRM Principles

- Water is a finite and vulnerable resource
- Participatory approach
- Role of women
- Social and economic value of water
- Integrating economic efficiency, social equity, and economic and environmental sustainability

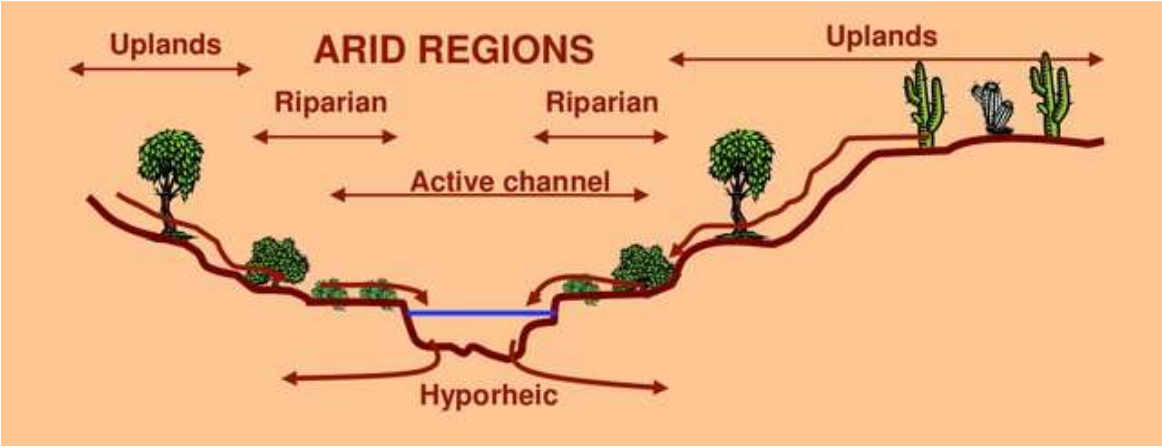
Increasing water supply and ecosystem services

- Expansion of rainwater harvesting to improve rainfed cultivation and groundwater recharge
- Adoption of water transfer schemes
- Restoration of aquatic habitats and ecosystem services
- Increased storage capacity building reservoirs
- Increased reuse of waste water and marginal water
- Desalination

Source: Wilk and Wittgren (2009)

Improving flood protection

- Construction of flood protection infrastructure
- Enlargement of riparian areas (flood plains and streambanks)
- Increased upstream storage
- Restoration and maintenance of wetlands
- Improved flood forecasting



Illustration; G. Zaimes

Source: Wilk and Wittgren (2009)

FAO guidelines to achieve sustainable agriculture and food systems

(1) Improving the efficiency of resource use,

(2) Conserving, protecting, and enhancing natural resources,

(3) Protecting and improving rural livelihoods,

(4) Enhancing resilience of people, ecosystems and communities, and

(5) Responsible and effective governance mechanisms.

Source: FAO (2018)

Agricultural options

- Development and modernization of rainfed agriculture
- Mulch-based cropping systems
- Agroforestry systems
- Crop management
- Soil management
- Water management
- Pest and disease management
- Biotechnology

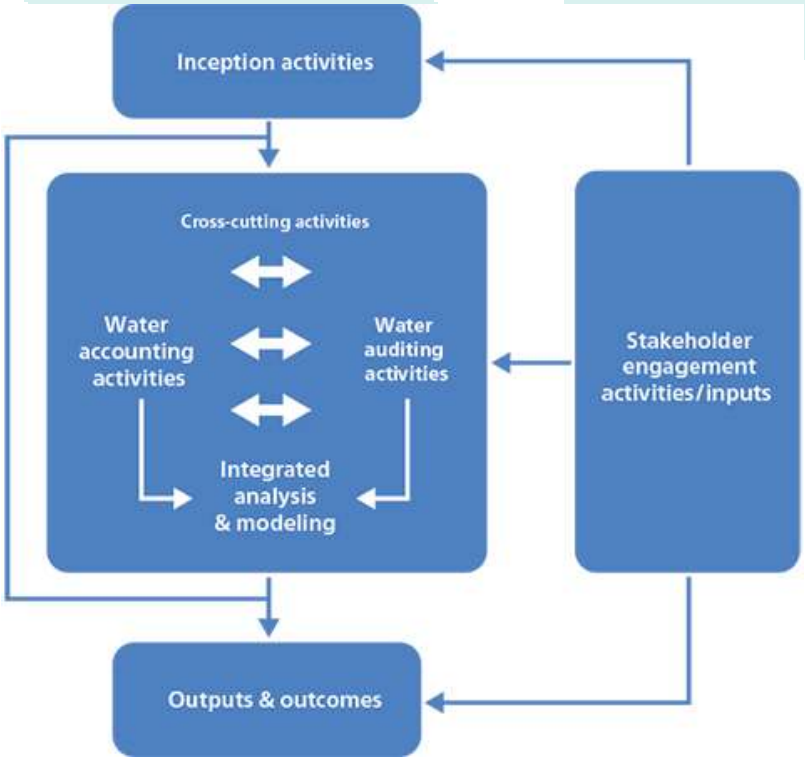
Climate smart agriculture (CSA)

- CSA aims to facilitate the evolution of agricultural systems in the face of a rapidly changing climate.
- CSA approach involves integrating the need for adaptation and the potential for mitigation into the planning and implementation of agricultural policies, planning, and investments.
- CSA approach is the emphasis on food security and poverty reduction as the priority in developing countries through enhanced capacity of their agrifood sectors and institutional and technological innovations.

Source: FAO (2018)

Water accounting and auditing

Water accounting and auditing (WA&A) is a vital component of planning procedures for water resource management, particularly under conditions of water scarcity and in the face of increasing risks and uncertainties.



Source: FAO (2018)

Water accounting and auditing

Strategies addressing water scarcity must be based on a **thorough understanding of the water balance**, including water supply and demand and its spatial and temporal dimensions. The aim of WA&A is to **make better use of water-related information** when matching and adapting coping strategies to differing biophysical and societal contexts.

Source: FAO (2018)

Keys in water accounting

- Reliable observations (remote sensing + ground truth)
- Modeling to fill data gaps
- Modeling to improve longer-term seasonal forecasts and to develop more effective forecasts of slow onset events such as drought

Jessour, tabias (Maghreb) in wadis

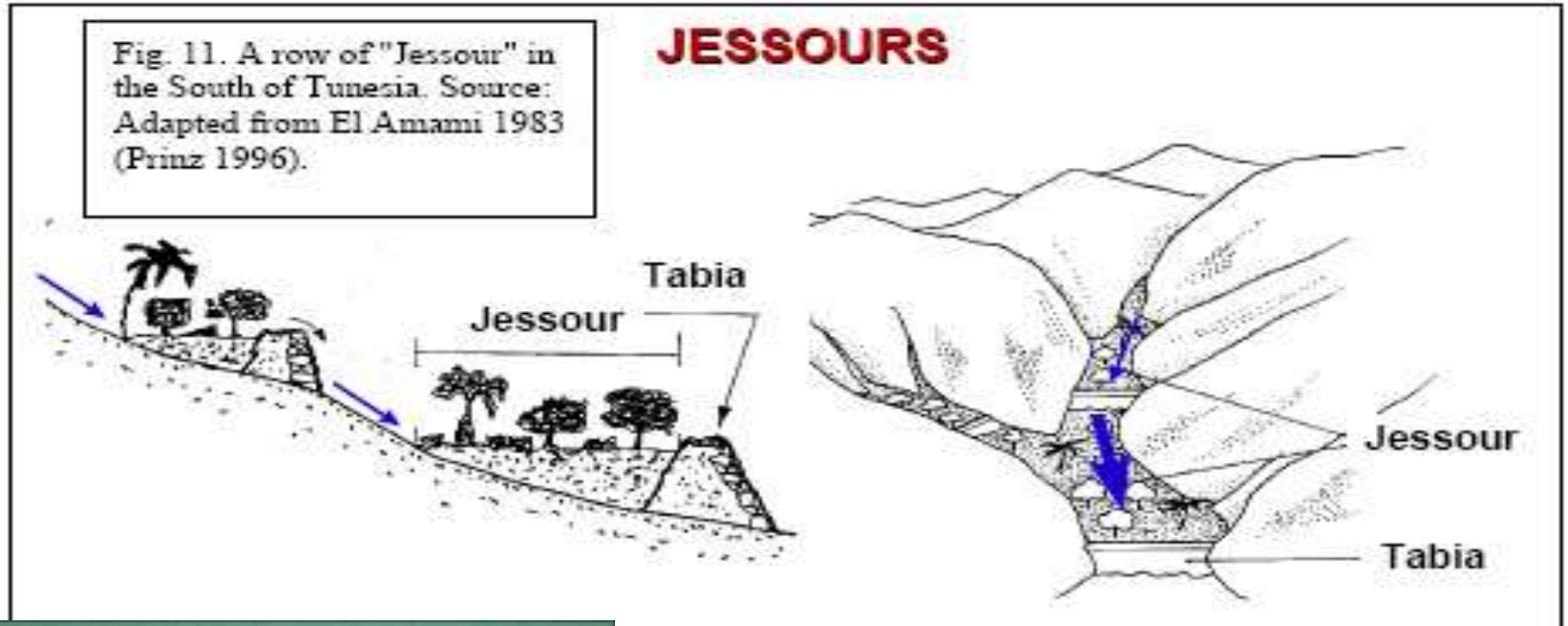


Fig. 11. A row of "Jessour" in the South of Tunesia. Source: Adapted from El Amami 1983 (Prinz 1996).

Jessour in series

View of an area with a number of *jessours* in Tunisia. (M. Ben Zajed)

Banquettes (Central Tunisia)

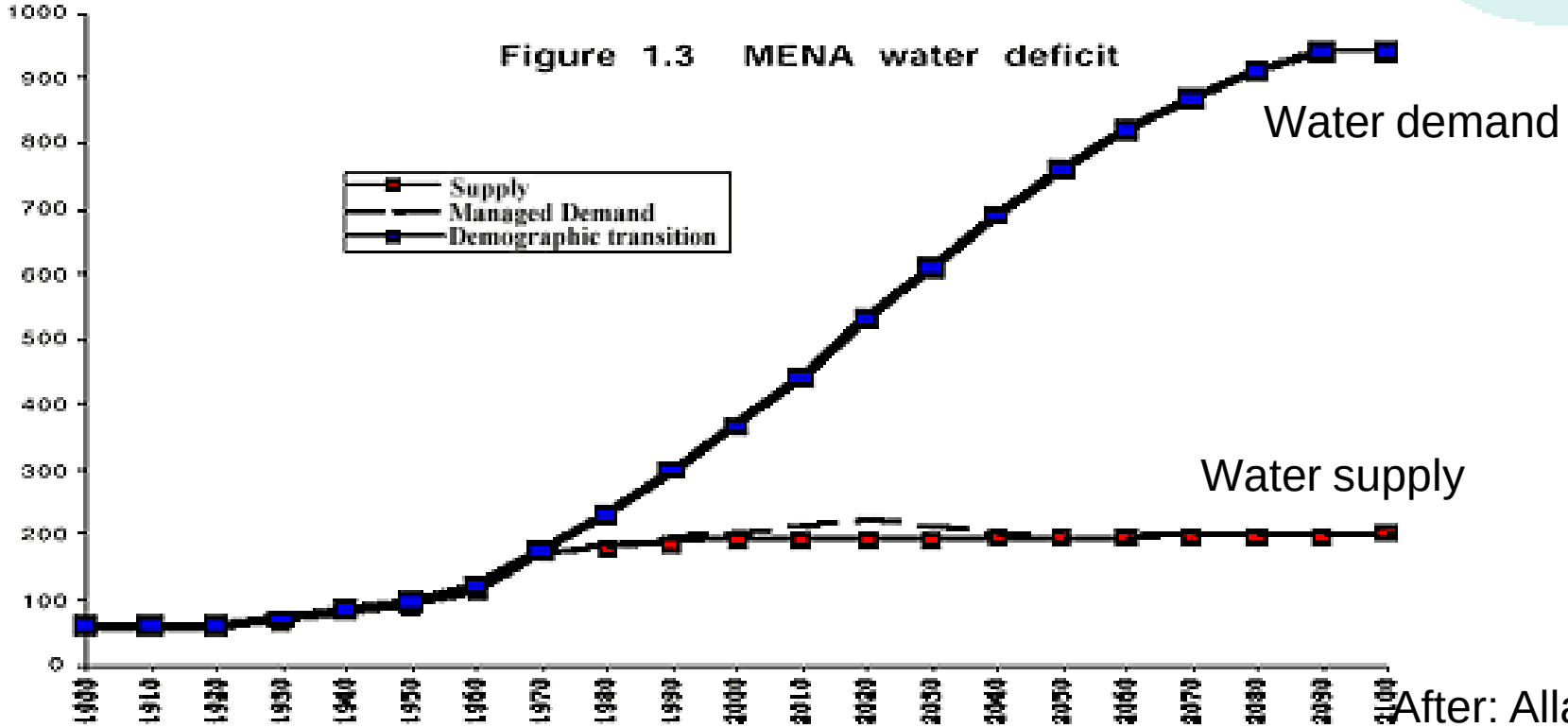
Barriers to adaptation

- Impaired water vision
- Separated strategies and lack of agreements
- Institutional barriers
- Knowledge bias
- Gender bias
- Uncertainty
- Lack of participation
- Financing

Source: Wilk and Wittgren (2009)

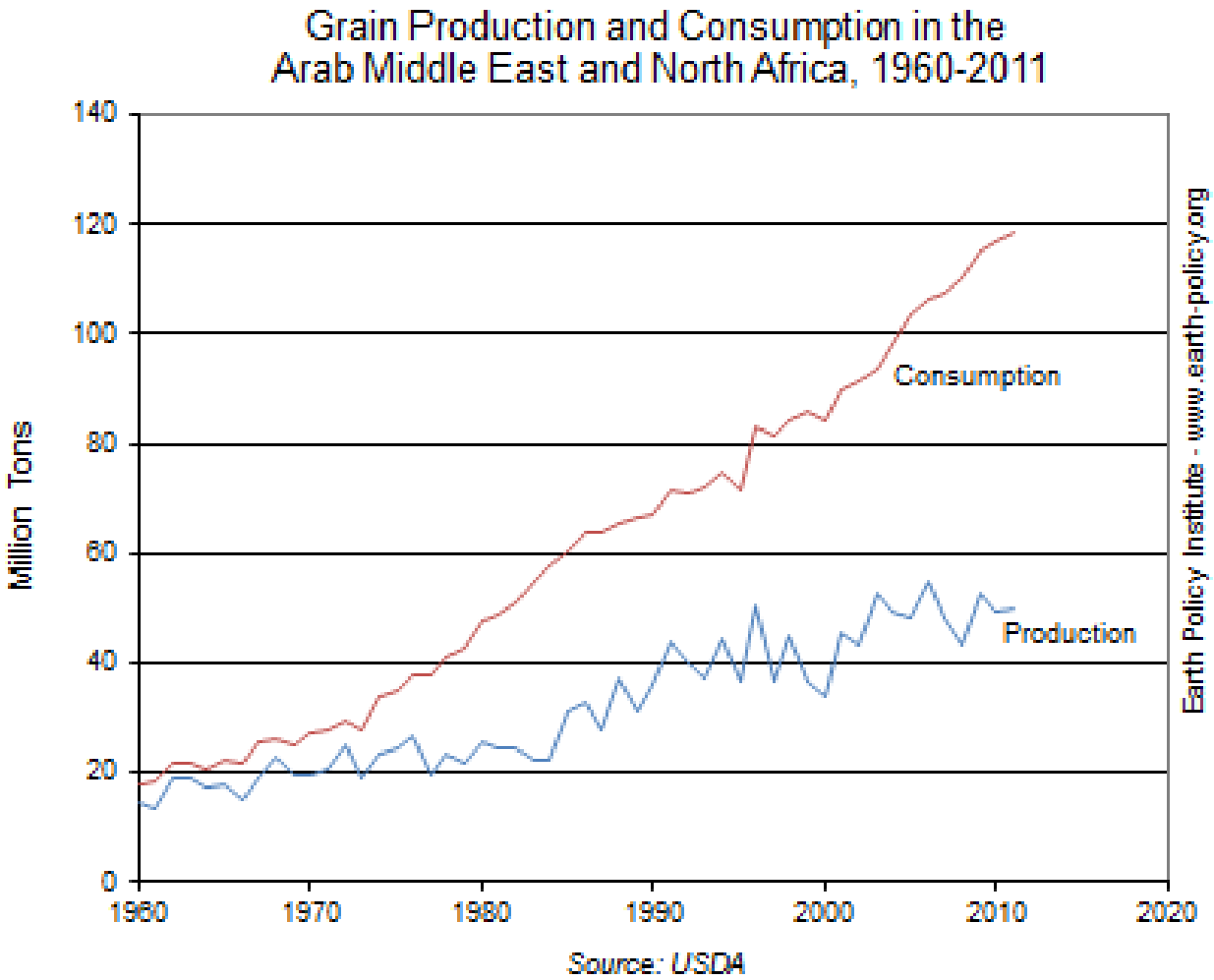
Systems approach in adaptive measures

- Demand management
- Supply management



After: Allan (1997)

Cereal & wheat import Middle East



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Questions for discussion

- Can you give examples of adaptation measures that you have a personal experience of?
- Do you see climate adaptation as a feasible for example in agriculture?
- Other examples of adaptation and mitigation to climate change?

Afternoon exercizes

- Work in suggested group formations (same groups for whole week).
- Select a basin or area to work with throughout the week.
- For each day of the course, write and add 1-2 pages including figures/photos, to include each day´s exercizes into one document per group.
- At latest 29th March send the entire document to:

  ronny.berndtsson@tvrl.lth.se stating group members on first page.

You will receive feedback based on this document and the pass of the course.

Exercise today

- For you specific basin, describe general hydrological properties, landuse, and the type of scarcity and how it may change in future.
- Describe using text and figures what type of adaptation measures have been implemented or suggest yourself. potential adaptation (e.g., for soil and water in agriculture).
- This will serve as a general introduction to the basin and a basis for the continuing exercises throughout the week.

That´s all for now!

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