Managing Scarce Water Resources in Agriculture; Towards a paradigm change

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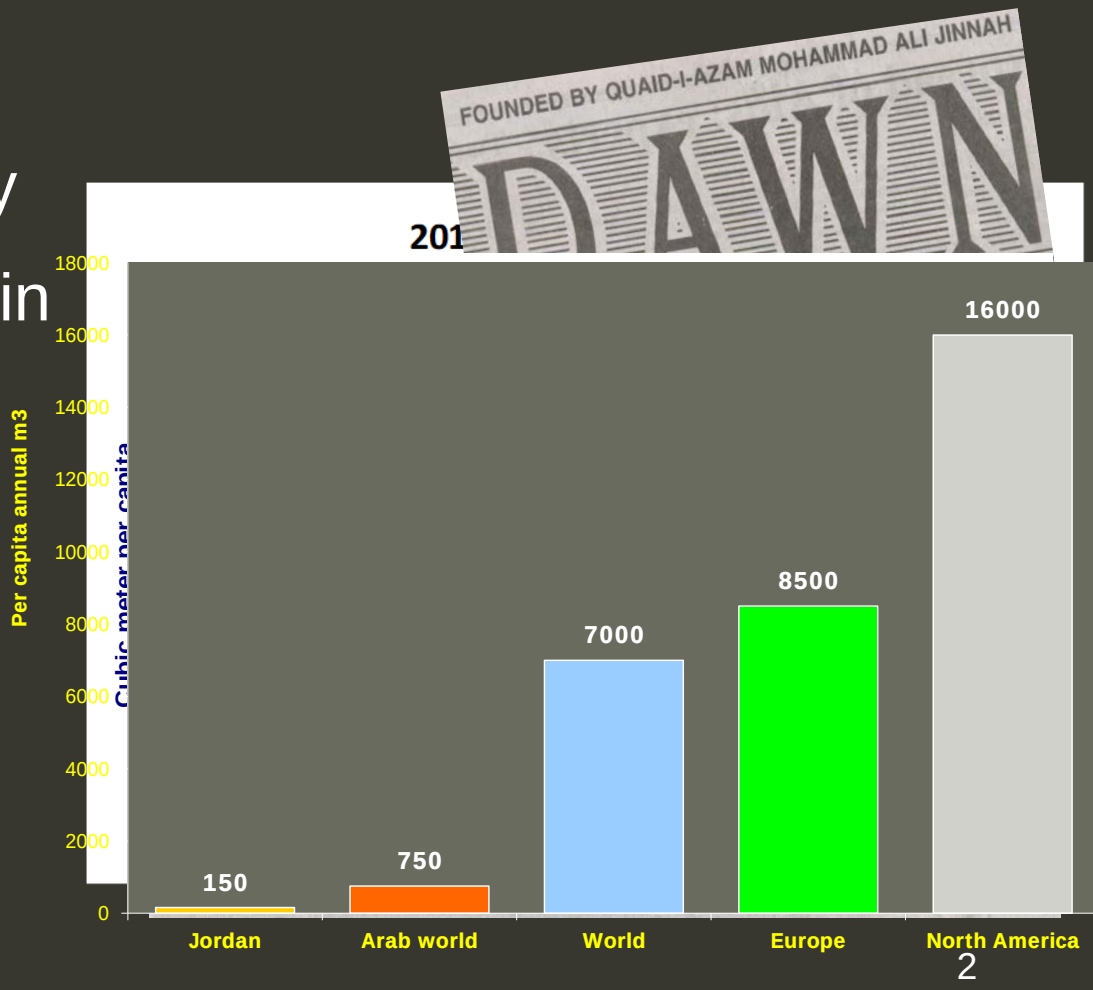
Science for resilient livelihoods in dry areas

Water scarcity intensifying

- Many countries with chronic water scarcity
- Water for agriculture in dry areas is declining
- Climate change adds to the problem
- Consequences



New water … limited !!!!

- Surface, mostly tapped
- Ground, over exploited
- Marginal-quality, small amounts, environment, health (important in Jordan)
- Desalination, costly, environment, transport
- Water transfer, cost and politics

The challenging equation

More food needed

Less water available

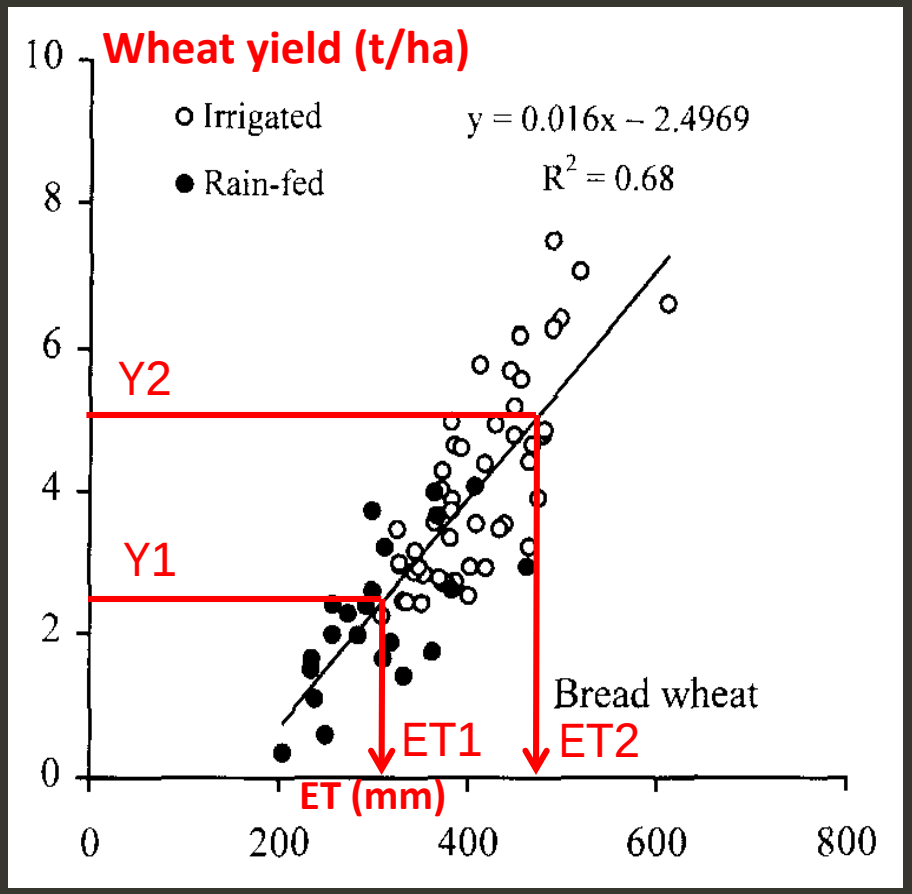
Conventional coping strategies:
Not anymore sufficient !!!

1. Increasing yield (land productivity)
2. Managing demand
3. Improving irrigation efficiency
4. Modernizing irrigation systems

Conventional coping strategies:

1. Increasing yield (land productivity

- The major adopted strategy
- More yield requires more water
- Which is not available



Conventional coping strategies:

2. Managing demand/pricing agr. water

- Not working in this region
  - Politically and socially not feasible
  - Weak Institutions
- Innovative alternatives are needed for any success
  - Unlikely soon

Conventional coping strategies:

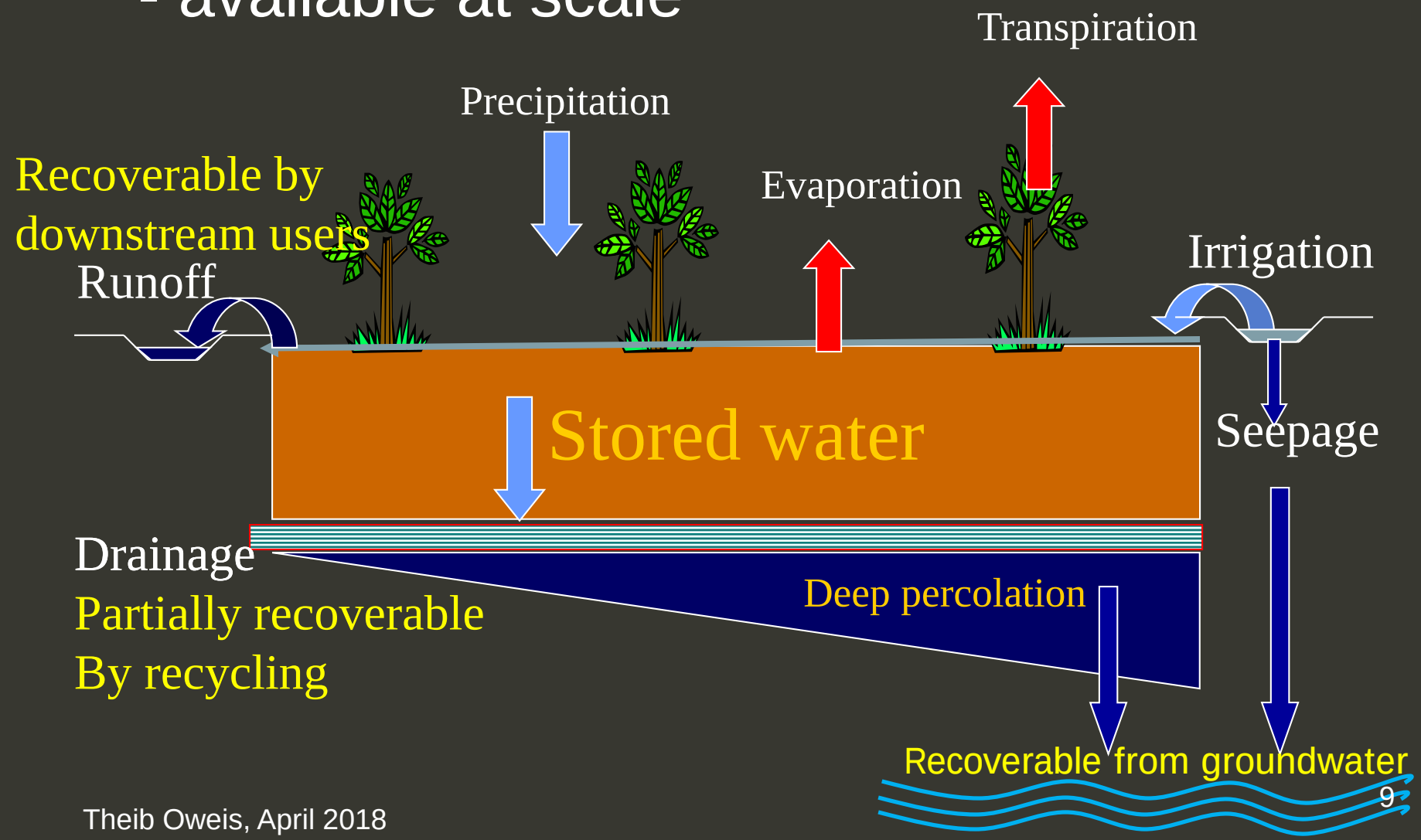
3. Increasing irrigation efficiency

- Modernizing irrigation, drip irrigation etc.
- Improving conveyance systems

- Huge investment
- Little water savings

Efficiency losses are only “paper losses”

- mostly recycled – at cost
- available at scale

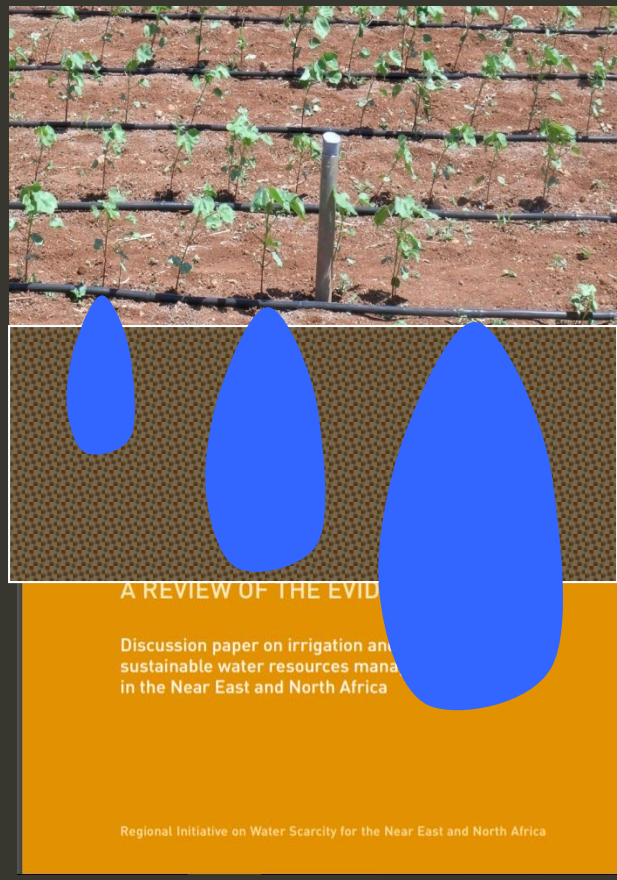


Conventional coping strategies:
4. Modernizing irrigation

- Can irrigation modernization save water?
  - Yes but small amounts

  Savings are limited to evaporation suppression not to modern systems
- Does increasing Irrigation Efficiency from 50% to 80% save 30% water?
  - NO

  Most of the inefficiency losses can be recycled
- FAO latest report: modern systems make no savings & may actually increase water demand
- Modern systems can be inefficient with poor management



Conclusions re:

Irrigation efficiency & modernizing systems

- Efficiency reflects the performance of irrigation systems and not the return to water
- It ignores recoverable losses and wrongly used to judge farm water management
- Huge investment in modernizing irrigation systems aims at water savings, not real !!!
- Modern systems increase productivity for other reasons

Conclusions re:

Irrigation efficiency & modernizing systems

We call for modernizing irrigation systems to increase productivity

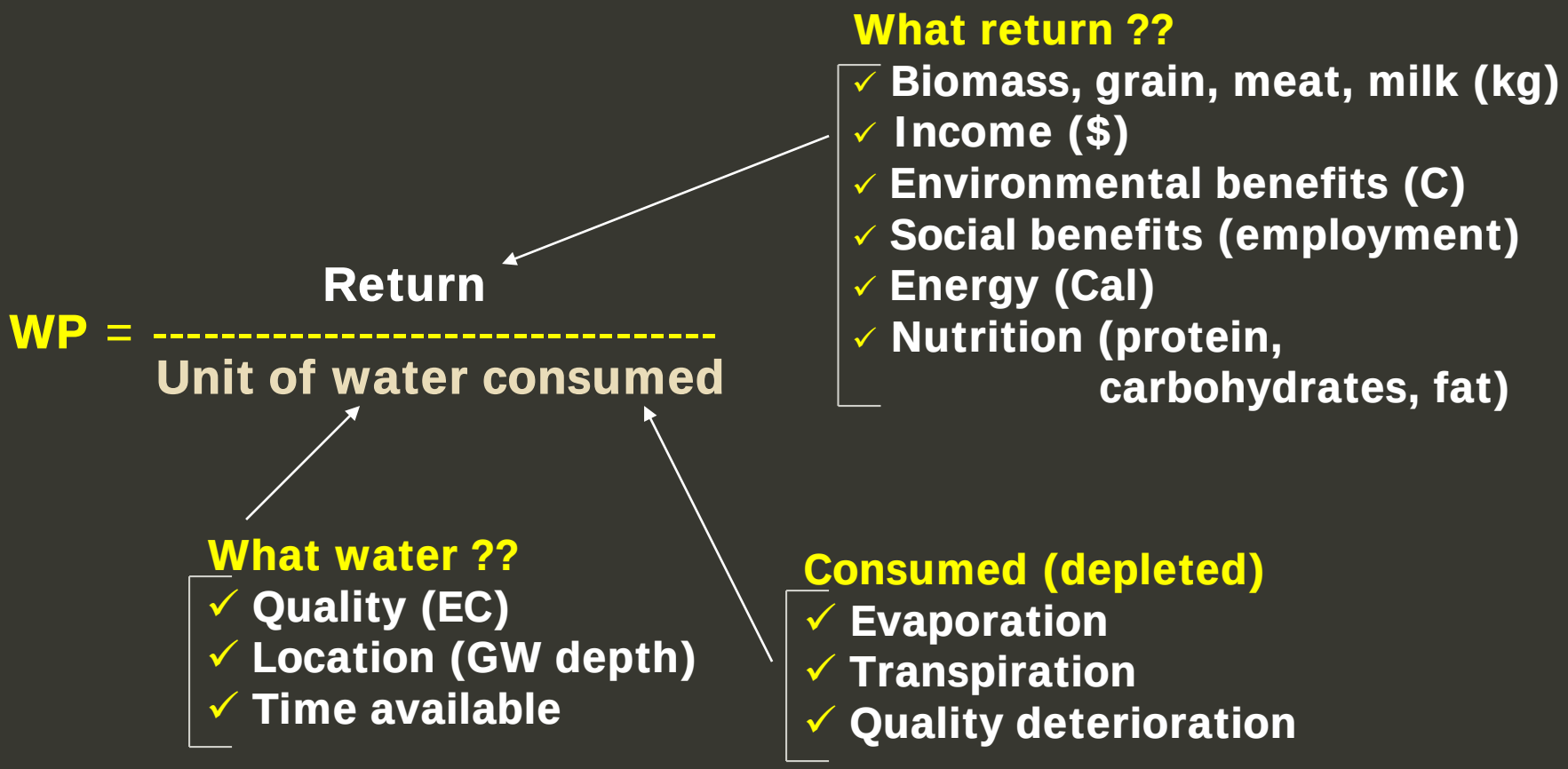
BUT

Should not expect substantial water savings for expansion or diversion to other sectors

The paradigm change

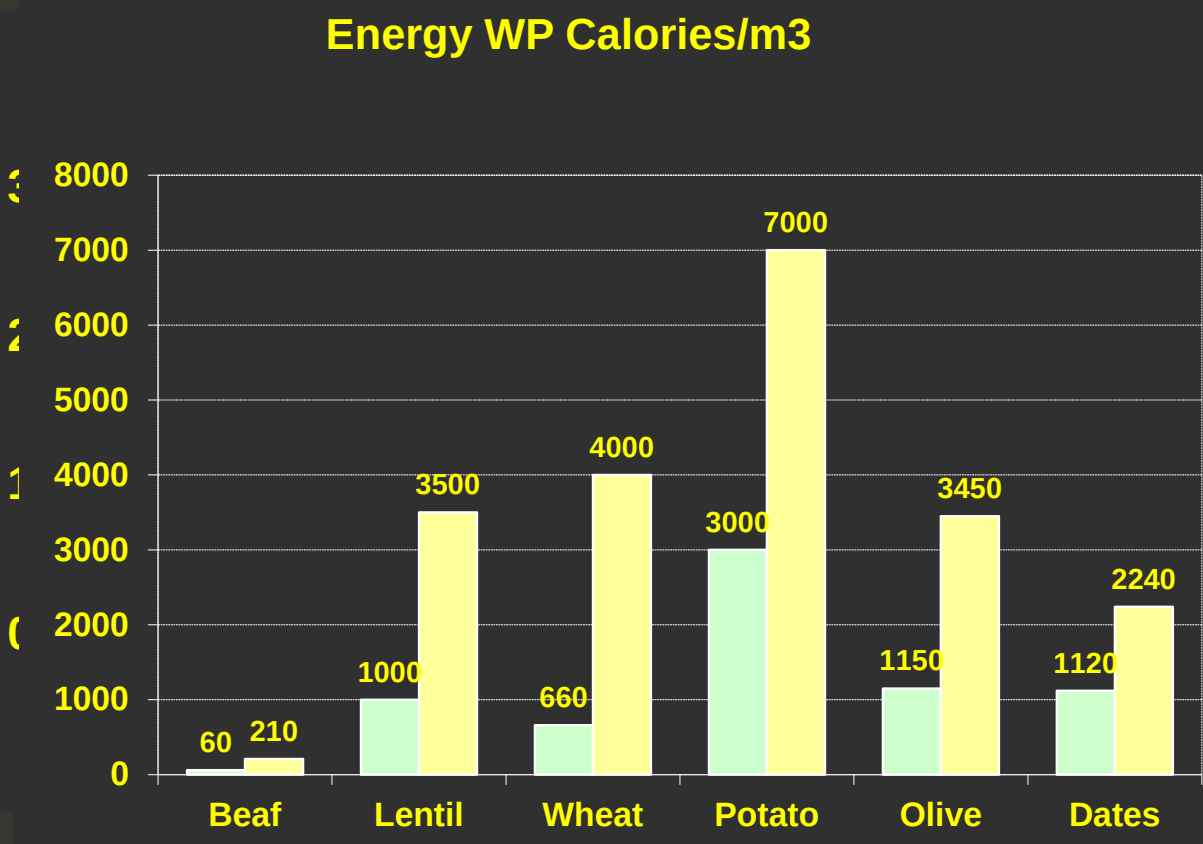
from
water “efficiency”
to
water “productivity”

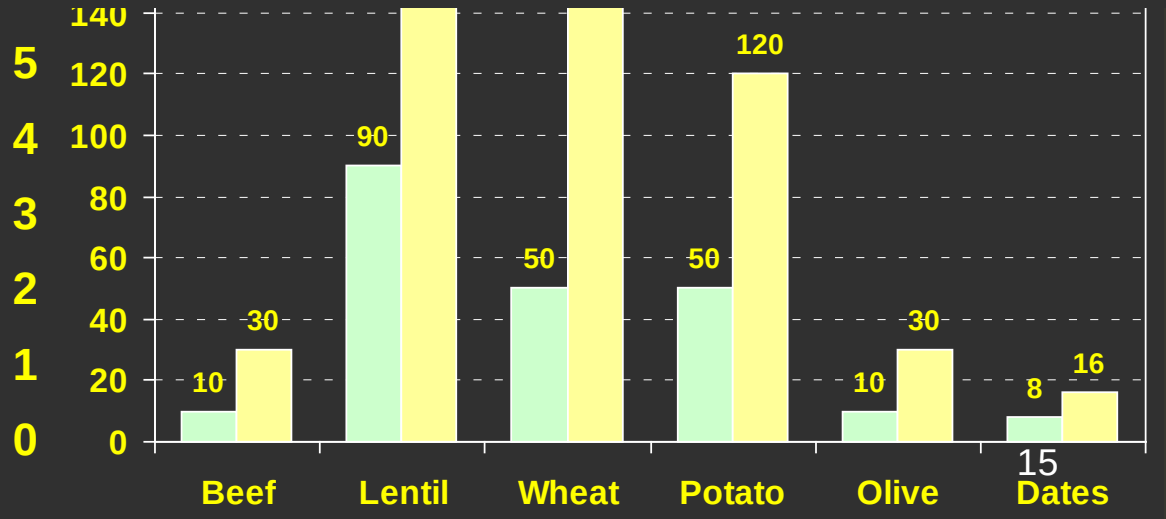
Water productivity: the concept



Water productivity types and values ranges

- *Each Calorie needs a liter of water to produce*
- *A person average daily consumption of 3000 calories needs 3 m3/day of water for food production*
- *Annually this is about 1000 m3 per capita, the standard water scarcity threshold*

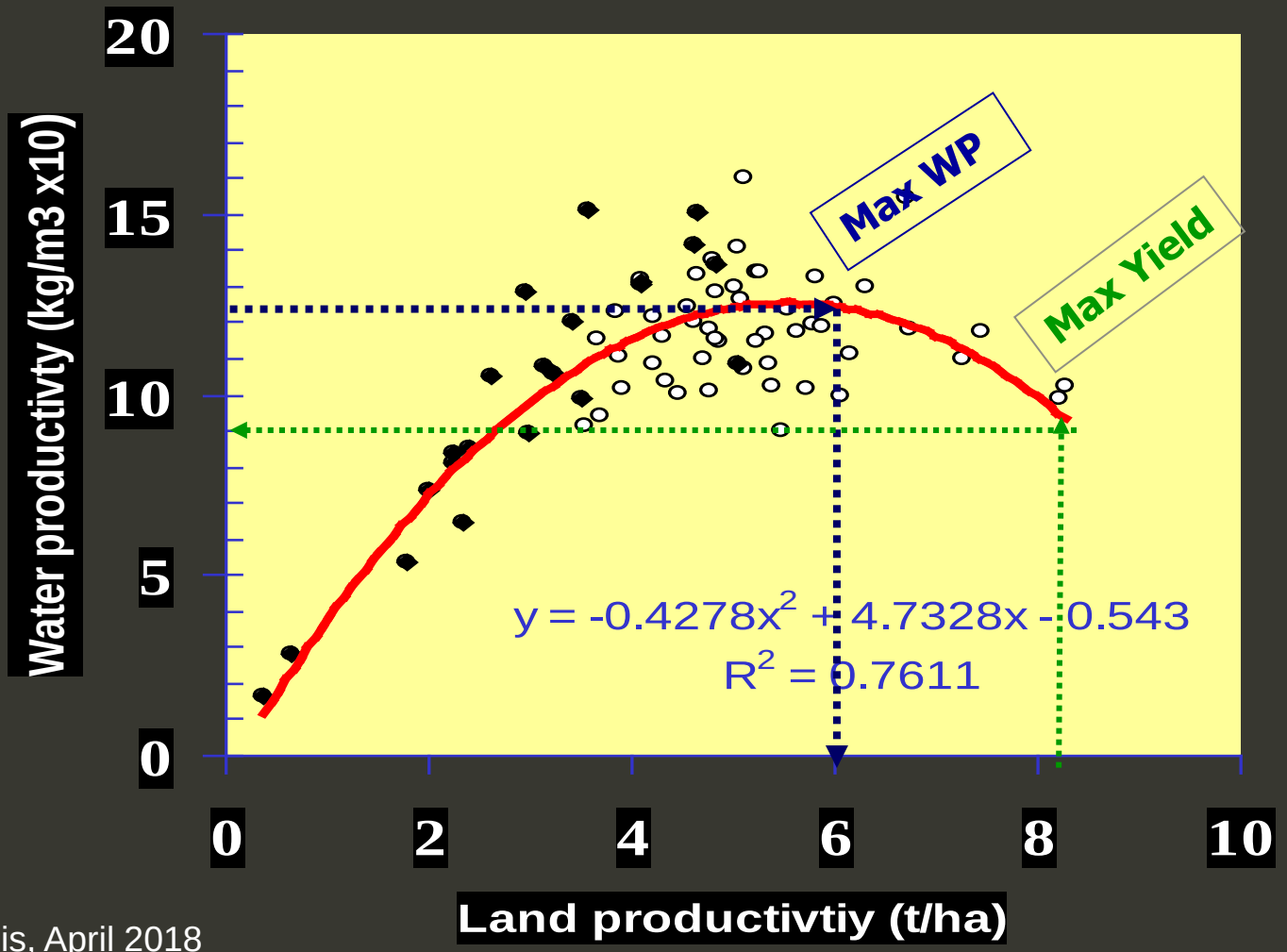




Scales and drivers to increase WP

- At the basin level:
  - ✓ competition among uses (Env., Ag., Dom.)
  - ✓ conflicts between countries
  - ✓ Equity issues
- At the national level:
  - ✓ food security
  - ✓ hard currency
  - ✓ sociopolitics
- At the farm level:
  - ✓ maximizing economic return
  - ✓ Nutrition in subsistence farming
- At the field level:
  - ✓ maximizing biological output

Tradeoffs between Land & water productivities



Strategic changes to cope with scarce agricultural water

- Cropping patterns: change to be more water productive
- NRM focus: from land to water
- Indicators: from efficiency to productivity
- Scale: from local to regional
- Policies: from reactive to proactive to foster a change

It is a prime time for change !!!!

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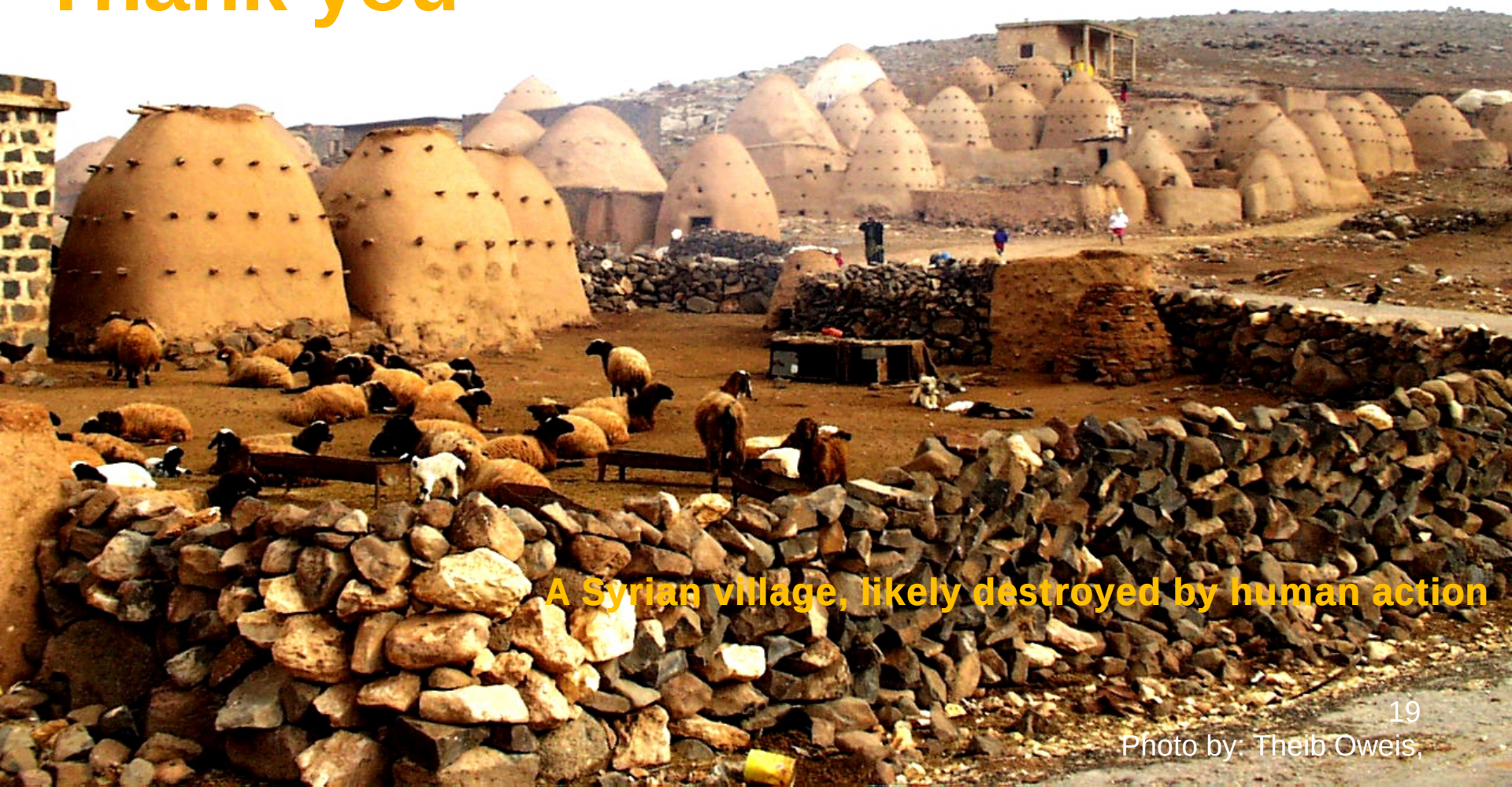
Thank you



A Syrian village, likely destroyed by human action

Photo by: Theib Oweis,