

# Re-strengthening Agricultural Water Management in Africa

A review of the Comprehensive Assessment of water management in agriculture based on experiences from the Central Rift Valley, Ethiopia

Huib Hengsdijk, Plant Research International

5<sup>th</sup> WORLD WATER FORUM  
ISTANBUL 2009



BRIDGING DIVIDES FOR WATER  
16-22 MARCH 2009 • ISTANBUL, TURKEY



PLANT RESEARCH INTERNATIONAL  
WAGENINGEN UR

# Outline of presentation

- Comprehensive Assessment (CA) of water management in agriculture
- Introduction of the Central Rift Valley in Ethiopia
- Proposed solution pathways CA
- Conclusions



# CA for water management in agriculture

## The context:

- About 850 mln of malnourished people.
- Food and feed demand doubles in coming 50 years.
- Agriculture takes 70% of freshwater withdrawals.
- Without further improvement in water productivity agricultural water demand will almost double from 7130 km<sup>2</sup> today to 12 - 13,500 km<sup>2</sup> in 2050.



# CA for water management in agriculture

- Sufficient resources to feed the world, but urgent action required!

Most promising contributions to food problem:

- Increase productivity of low-yield farmers
- Largest potential in rainfed areas
- Increase productivity in irrigated areas

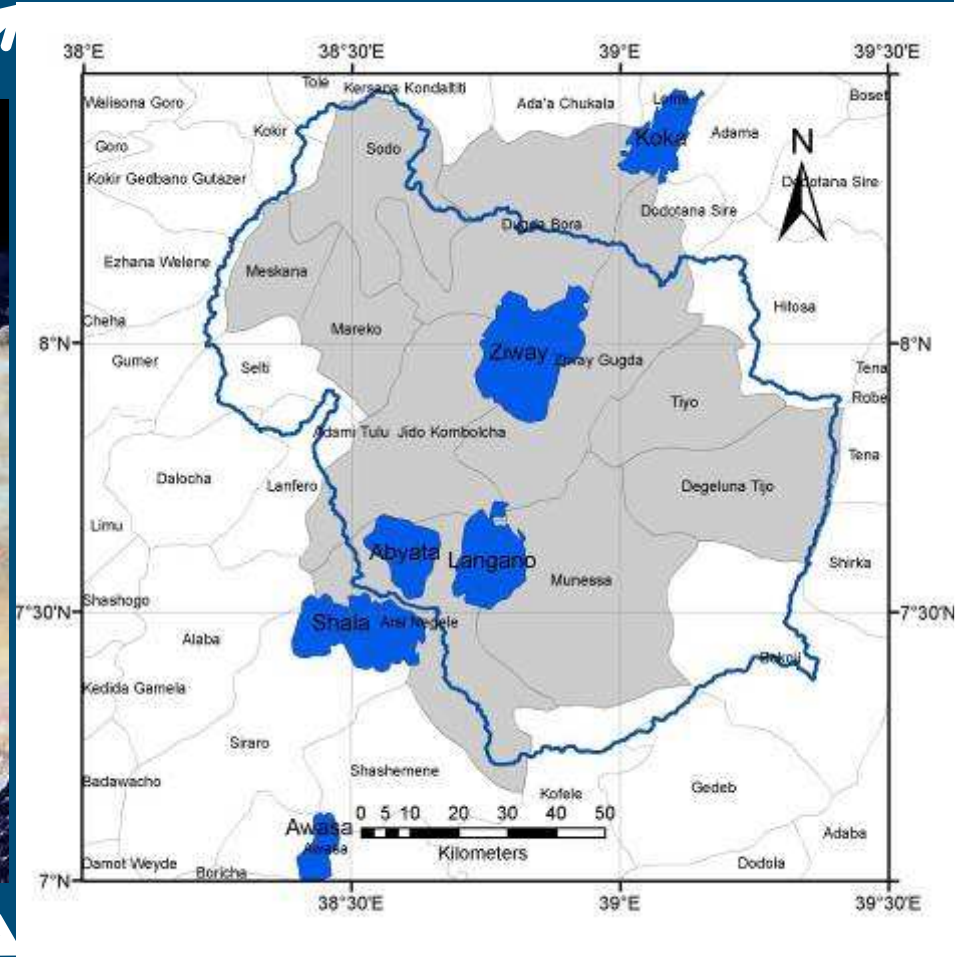
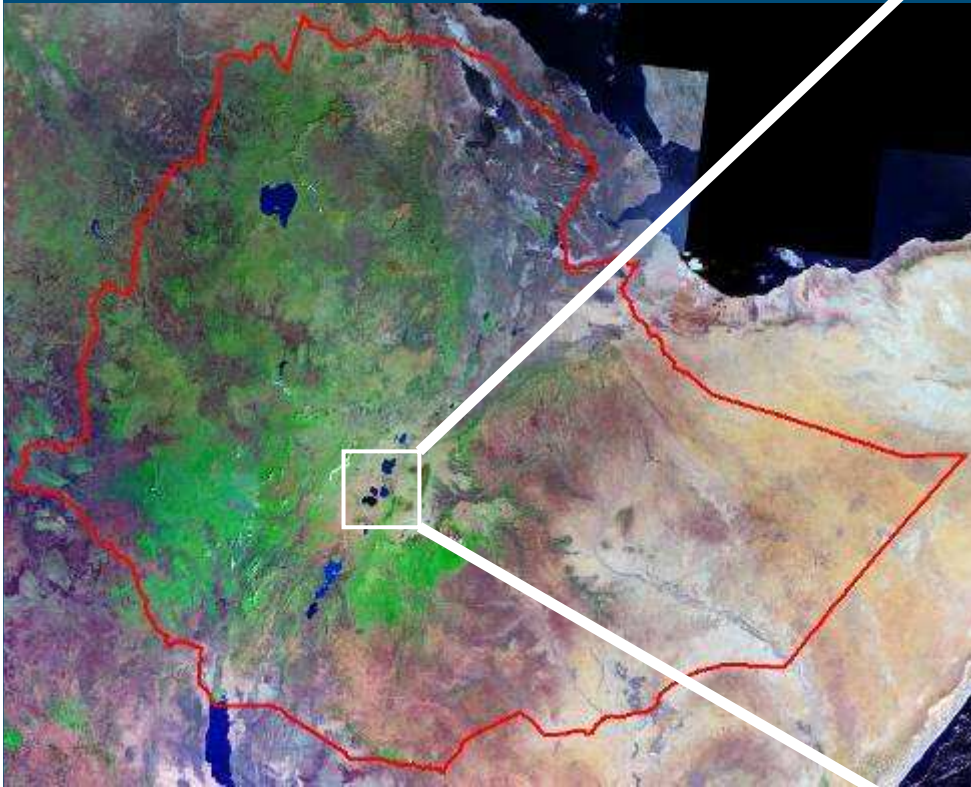


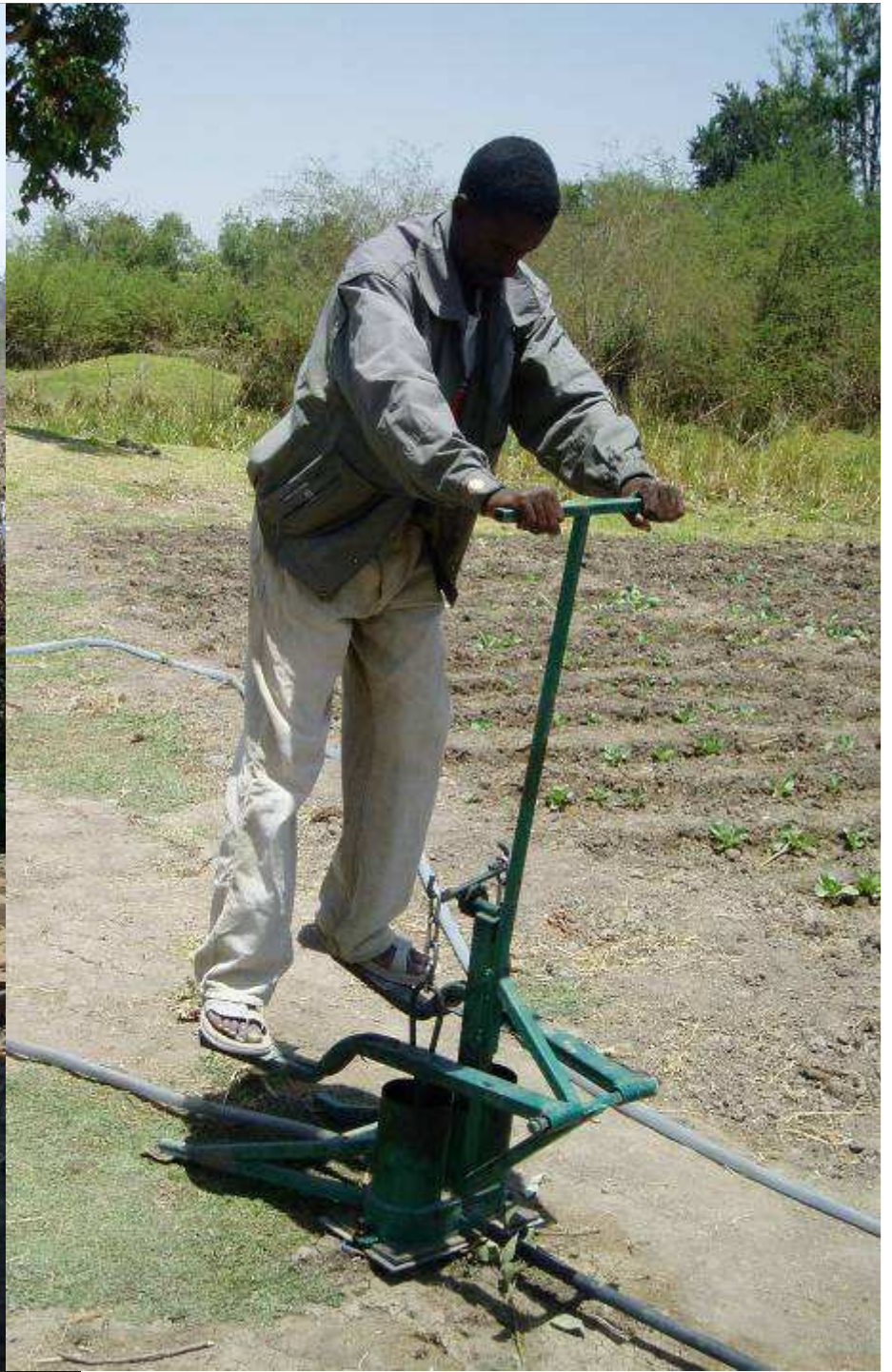
# CA solutions to meet future food demand

- Investing to increase production in rainfed agriculture
  - Enhanced soil moisture management and supplemental irrigation
  - Improving soil fertility management
  - Expanding crop areas
- Investing in irrigation
  - Increasing supply (e.g. innovations, storage facilities)
  - Increasing water productivity by integrating multiple uses
- Agricultural trade within and between countries
- Reducing gross food demand (e.g. changing diets, reducing post-harvest loss)



# Central Rift Valley in Ethiopia









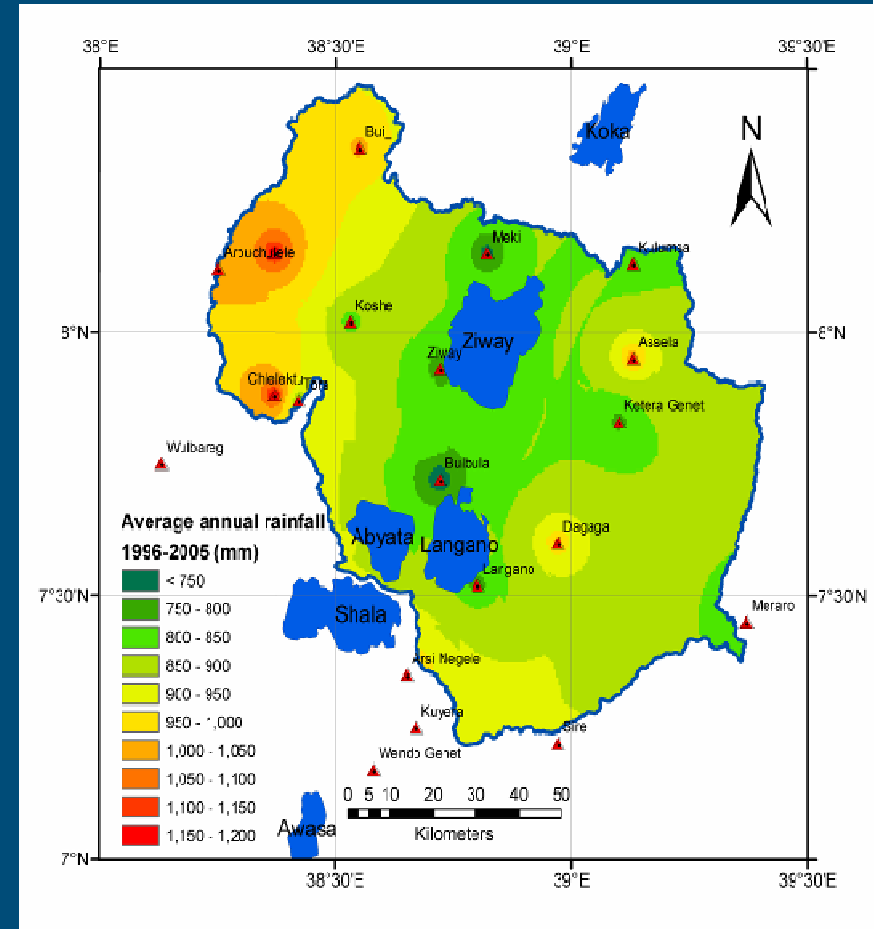


# Central Rift Valley (CRV) in Ethiopia

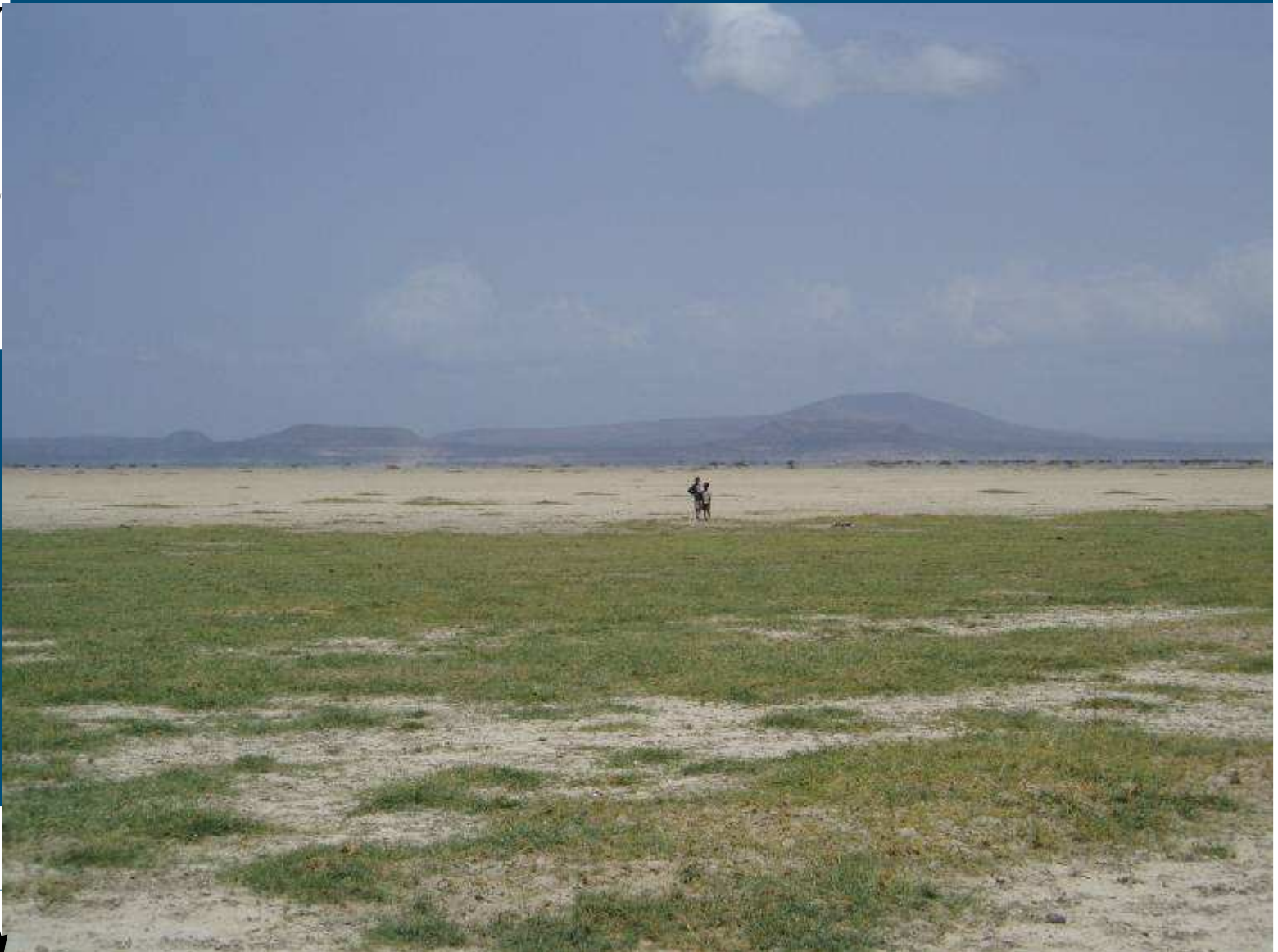
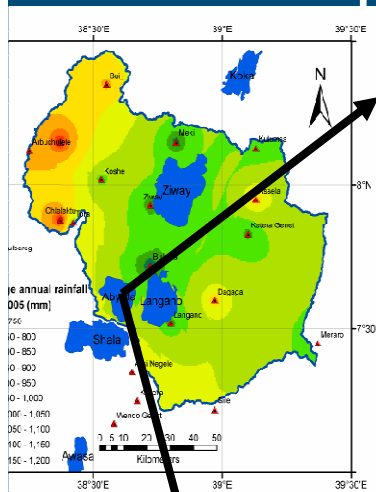
- Altitude 1500 -3000 m
- Annual rainfall 650-1250 mm
- Closed river basin

## Major agricultural problems:

- Food deficit area
- Overexploitation of freshwater for irrigation
- Overgrazing
- Encroachment on marginal land



# Overexploitation of freshwater for irrigation



# CA solutions *vs* practical lessons from the CRV

## Investing in irrigation

- Increasing supply (e.g. innovations, storage facilities)
- Water extraction is already associated with the depletion of fresh water resources affecting ecosystem functions.
- Improve water productivity of delivery systems (hard and soft infrastructure).
- Increasing water productivity by integrating multiple uses
- Partly already happening (e.g. livestock watering, washing), but options for more uses may be further explored



# CA solutions *vs* practical lessons from the CRV

## Investing in rainfed agriculture. Why?

- Low yields: largest potentials for improvement
- Most hungry and poor people depend on rainfed agriculture
- Majority of cropland is rainfed, providing 60% of global cereal production

### 1. CA: Enhanced soil moisture management

- **Soil moisture management practices:**
  - Bunds, ridges, etc. → Very labor intensive
  - Conservation tillage → Herbicides or labor required; unsuitable for *teff*
  - Mulching → Biomass shortage



# CA solutions *vs* practical lessons from the CRV

## Investing in rainfed agriculture

### 2. CA: Supplemental irrigation, e.g. storage of rain water

- Technically feasible (soils), economically viable and sustainable (siltation)?
- Shift towards non-cereal crops, while markets are already flooded with vegetables of poor quality?
- Upscaling: Tradeoffs with downstream users?
- By reducing risk, supplemental irrigation may provide incentives for investments in other production factors, but....
- .....only when other requirements are in place (e.g. credit and input markets)!
- Poor experiences with micro catchments elsewhere in Ethiopia.



# CA solutions *vs* practical lessons from the CRV

## Investing in rainfed agriculture

### 3. CA: Improving soil fertility

- Very important for soils that received low inputs for many years
  - Access to fertilizers?
  - Liberalization of fertilizer market (monopoly of government related organization)
  - On degraded and marginal soils, low fertilizer recoveries can be expected: fertilizer use economically viable in short term?
  - Increase fertilizer efficiency by combining organic inputs (but available?)



# CA solutions *vs* practical lessons from the CRV

## Investing in rainfed agriculture

### 4. CA: Expanding crop areas

- Limited possibilities because good land is scarce.
- Agriculture already shifted towards marginal areas and areas of interest for nature and biodiversity.
- More attention for land reform and land markets in combination with the development of a social safety net.





# Equally important for improving agriculture production

- Fair and stable output prices
- Access to credits and inputs
- Research and capacity building
- Re-allocation of resources



# Conclusions

- CA: “Investments in water management are the entry point to unlock the potential in rainfed agriculture.”
- R&D should not focus on isolated (e.g. water management) technologies.
- Rainfed farmers face many social, economic and institutional constraints.
- Solving these constraints will require leadership at different levels.
- It is the combination of the entire technology package and lifting of the social, economic and institutional constraints (‘enabling environment’) that can make the difference.
- Only then important synergies possible, and investments in water management will pay off.



