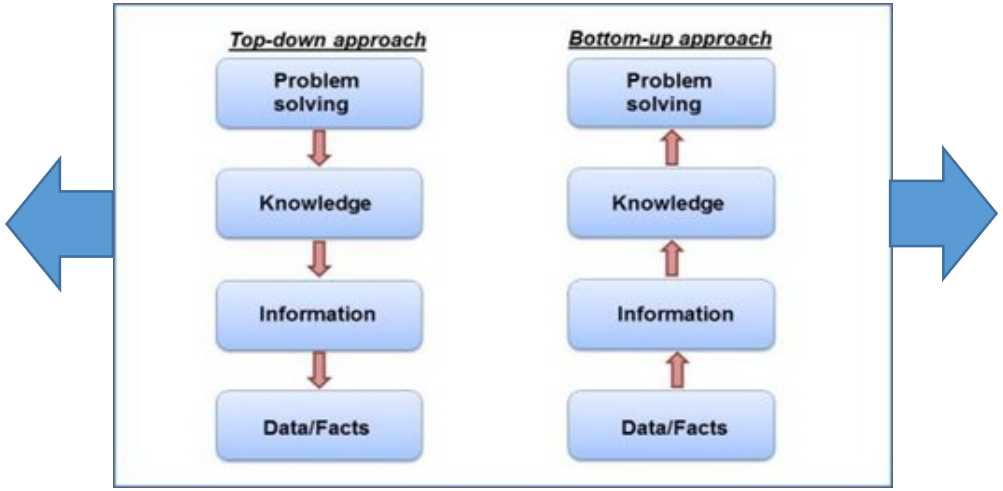
Day 2 Summary

Governance Challenges in the W-E-F Nexus

Successful application of WEFN must integrate with an urgent need for innovations in government, management and governance. When coupled with adequate governance systems the WEFN could mature democracy and enable empowerment (sustainable development?) (SSH)

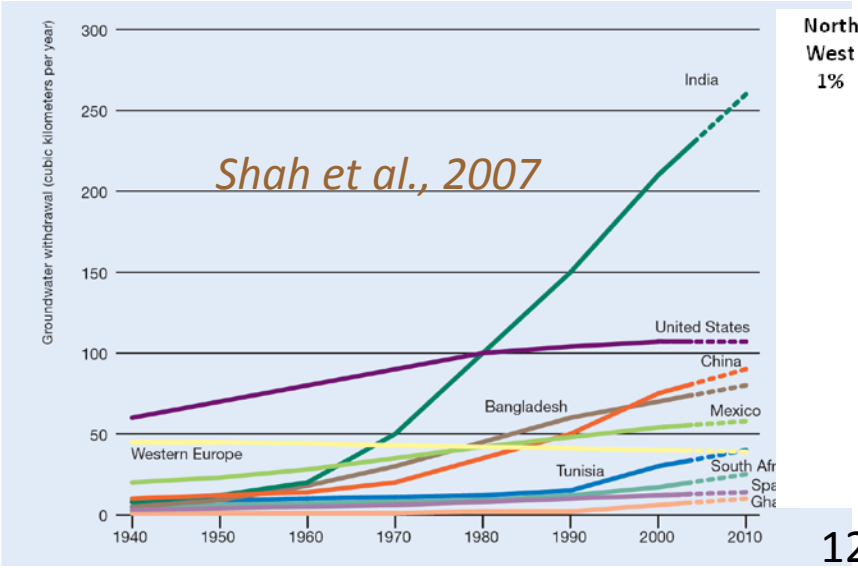
Case Study for OvaHimba: People have power. Failing to be transparent in informing people who will be affected by a development can make it much more difficult to get final approval for a project. (RM)



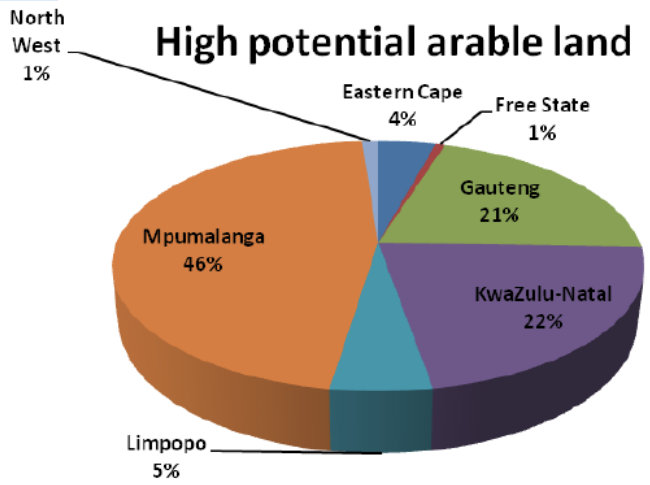
Inputs from local citizens are important for WEFN governance. The WEFN should be considered as part of the development of SDG indicators. (HF)

Regional cooperation is essential for strategic planning in TB in light of climate change (NMM)

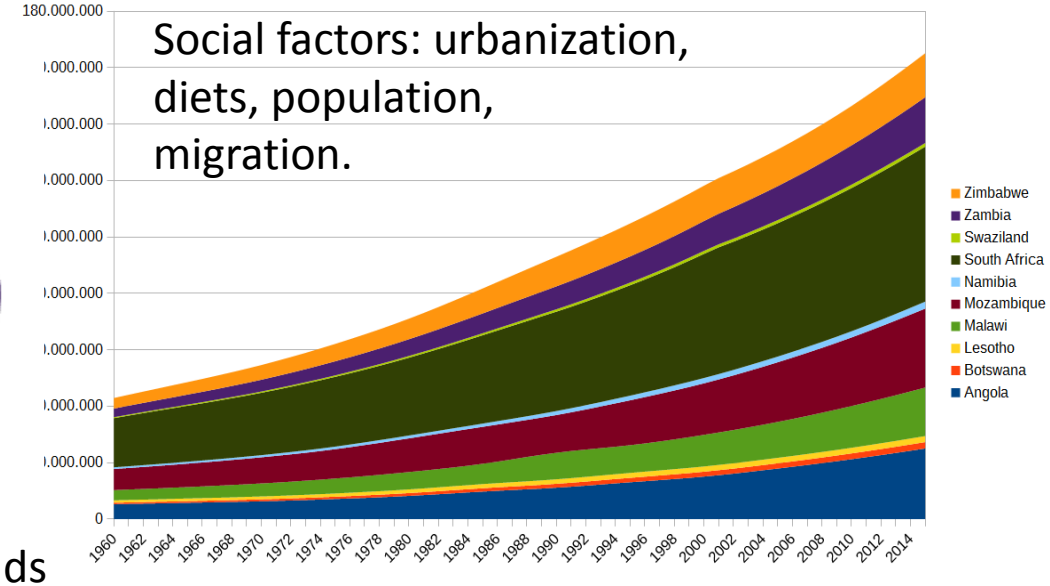
Environmental factors and trends (1)



Groundwater development in many areas is not sustainable (KV)

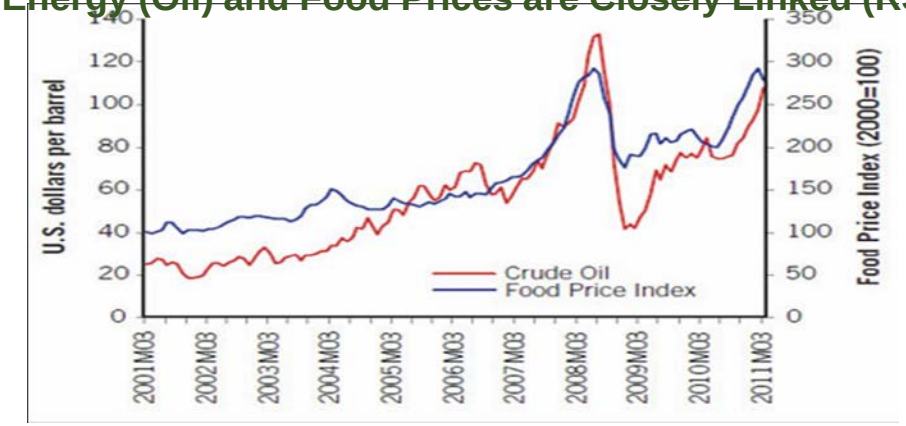


12% of high potential arable lands in Mpumalanga Basin will be lost to mining while another 13.6% of the land is being prospected (GS)



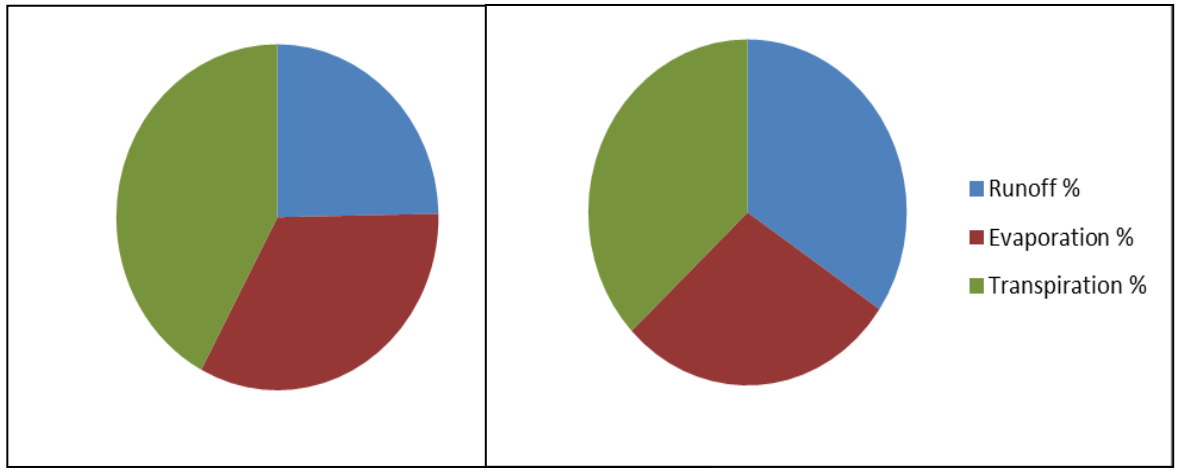
Stressors include food security, economic, social and environmental factors (MB)

Energy (Oil) and Food Prices are Closely Linked (RS)

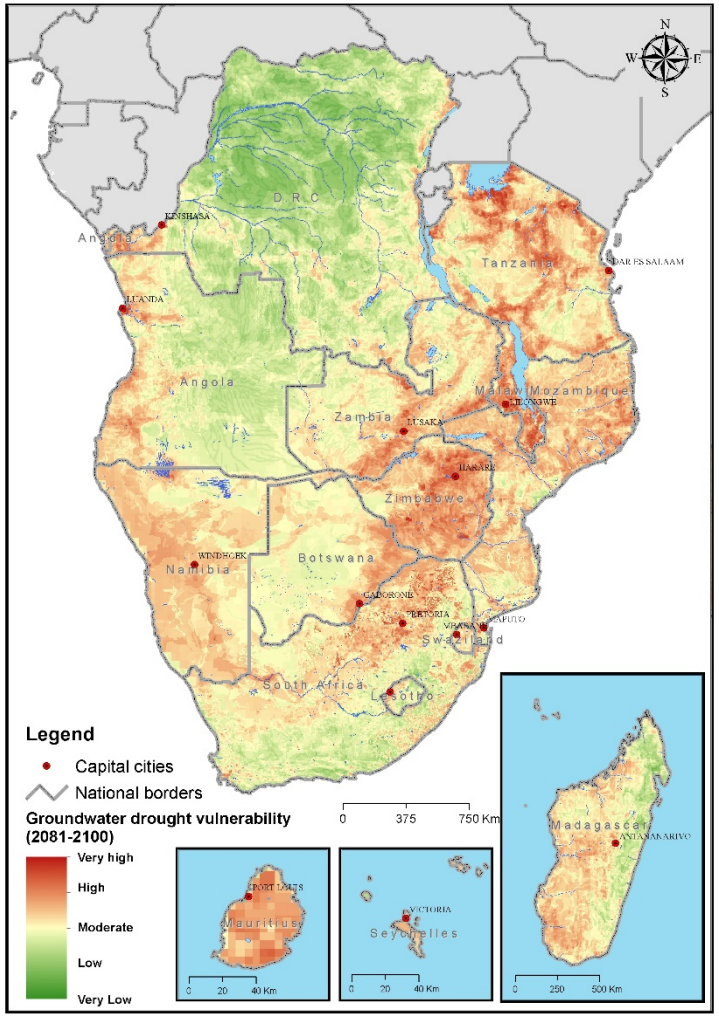


Analysis of the Berg Basin shows importance of land and the utility of the FWEL framework in analyzing basins and making choices for improvements (SM&NM)

Environmental factors and trends (2)



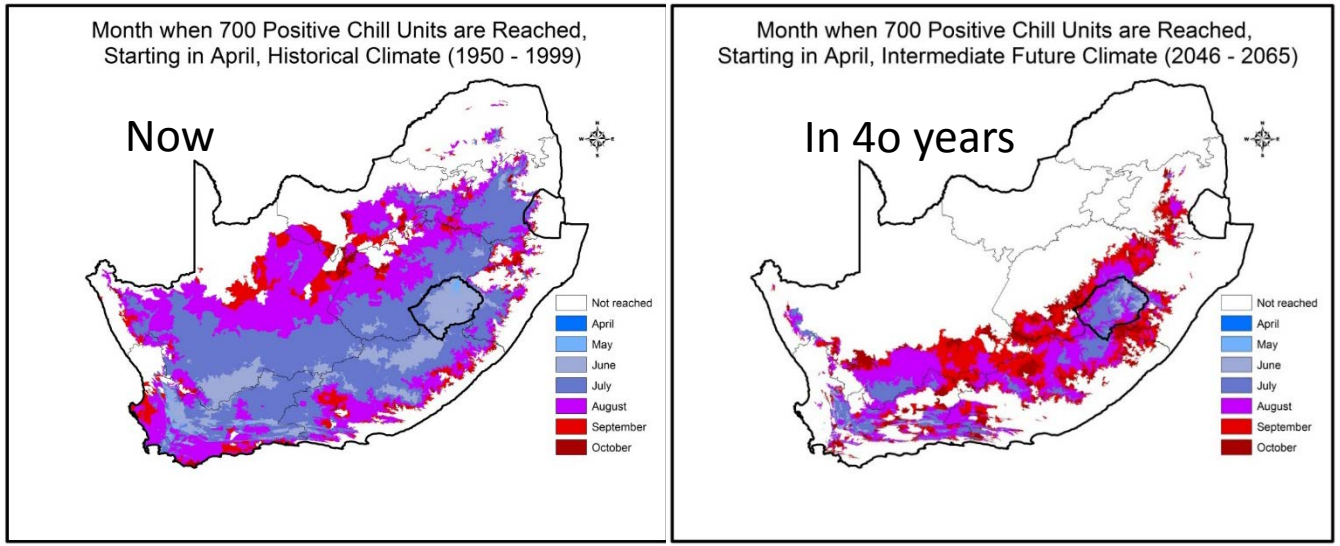
Future climate (IPCC SRES A1B, 2081-2100)



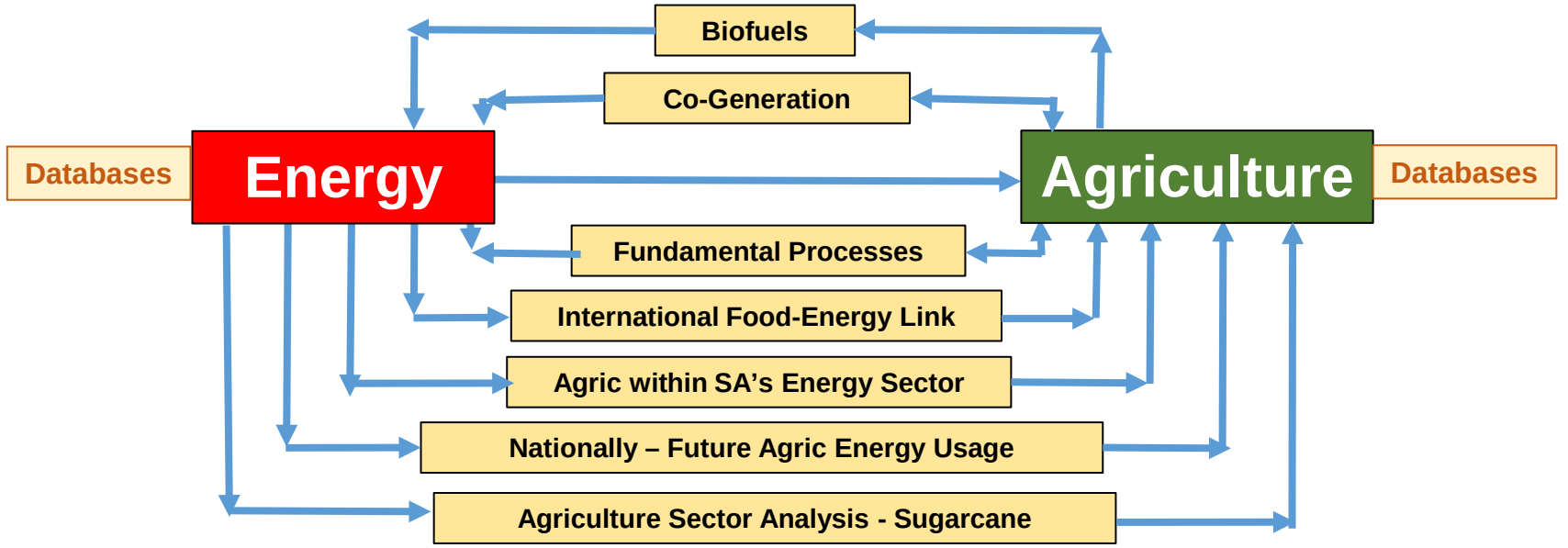
Villholth et al., 2013

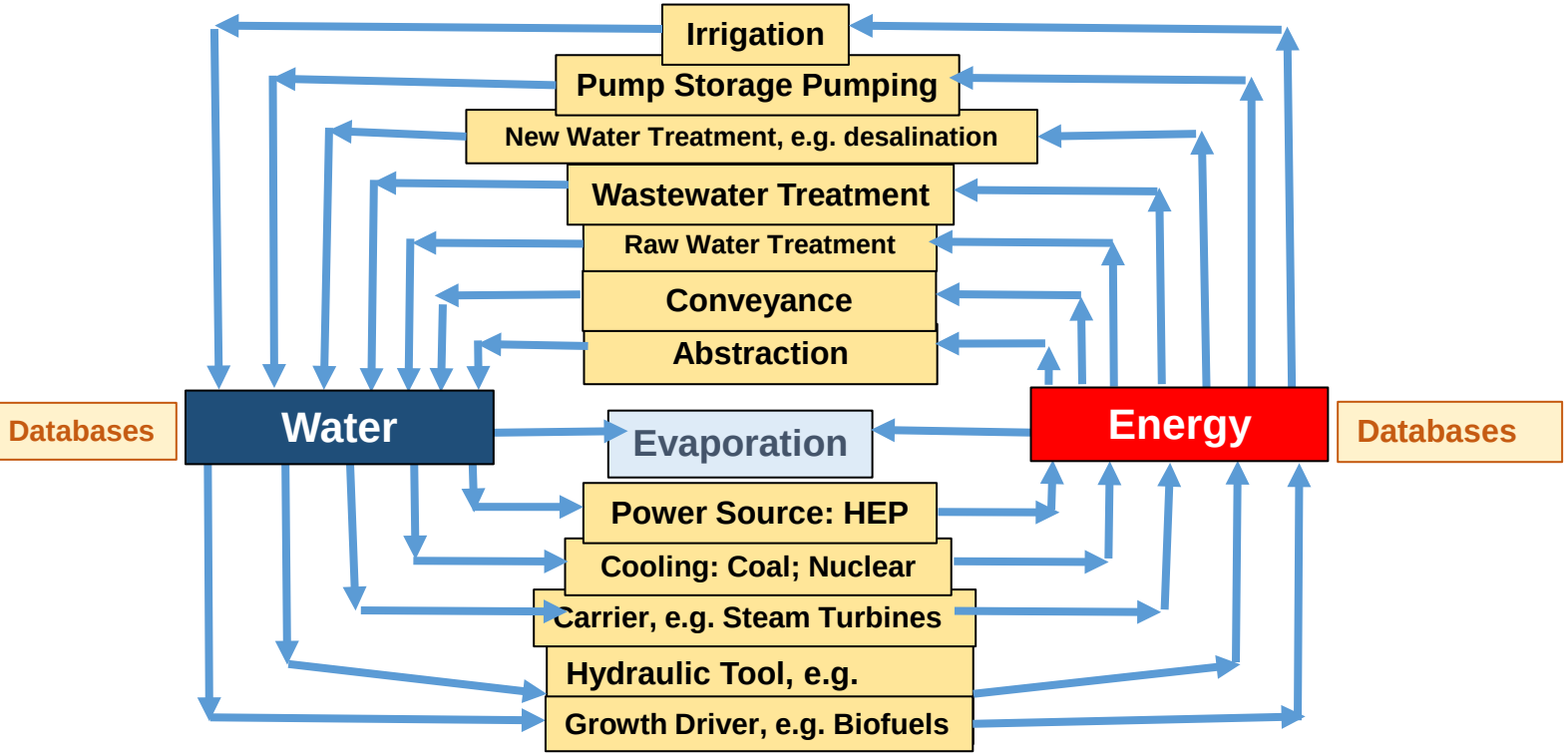
Effects of urbanization: Rural to urban: ET to R (SS)

Effects of climate change on fruit trees: now to +40y (SS)

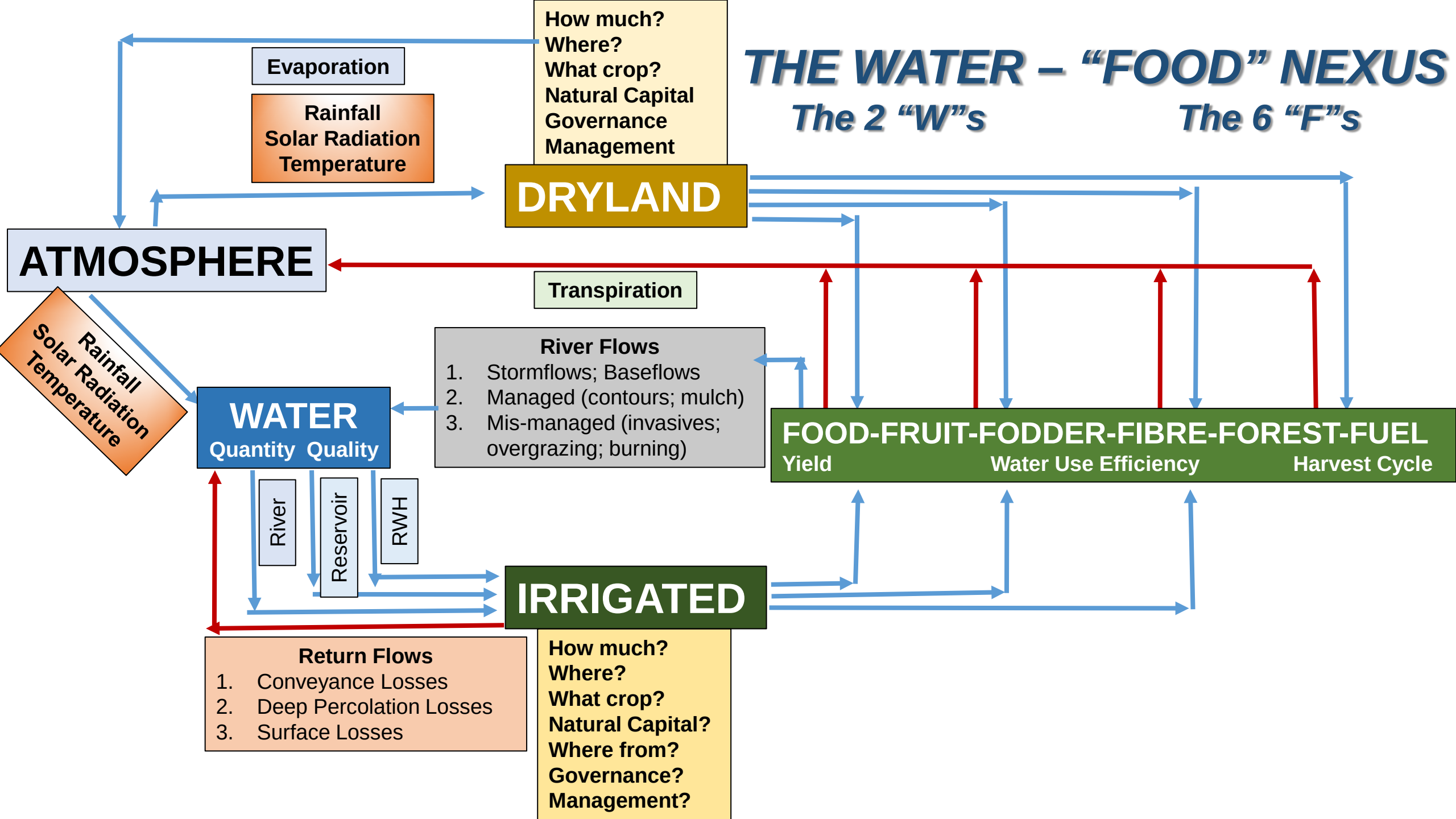


EU Commission, 2015

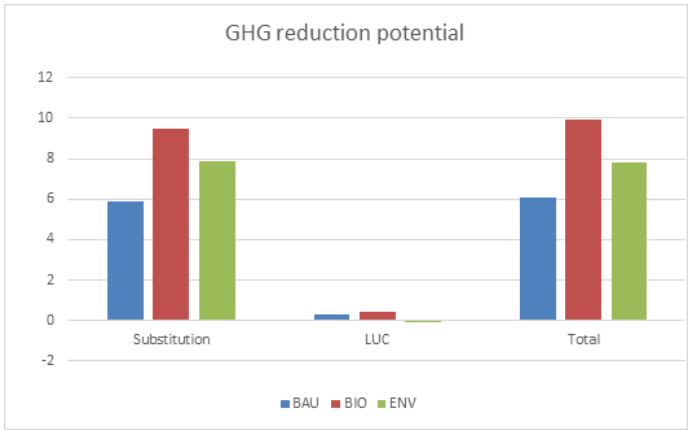




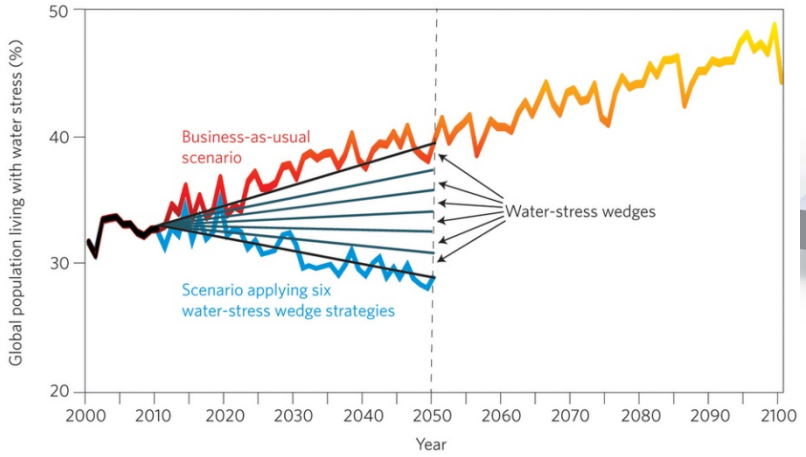
Scheme: D. Naidoo, 2015


THE WATER – "FOOD" NEXUS
The 2 "W"s
The 6 "F"s
How much?
Where?
What crop?
Natural Capital
Governance
Management
Evaporation
Rainfall
Solar Radiation
Temperature
DRYLAND
ATMOSPHERE
Transpiration
Rainfall
Solar Radiation
Temperature
River Flows
1. Stormflows; Baseflows
2. Managed (contours; mulch)
3. Mis-managed (invasives; overgrazing; burning)
WATER
Quantity Quality
FOOD-FRUIT-FODDER-FIBRE-FOREST-FUEL
Yield
Water Use Efficiency
Harvest Cycle
River
Reservoir
RWH
IRRIGATED
Return Flows
1. Conveyance Losses
2. Deep Percolation Losses
3. Surface Losses
How much?
Where?
What crop?
Natural Capital?
Where from?
Governance?
Management?

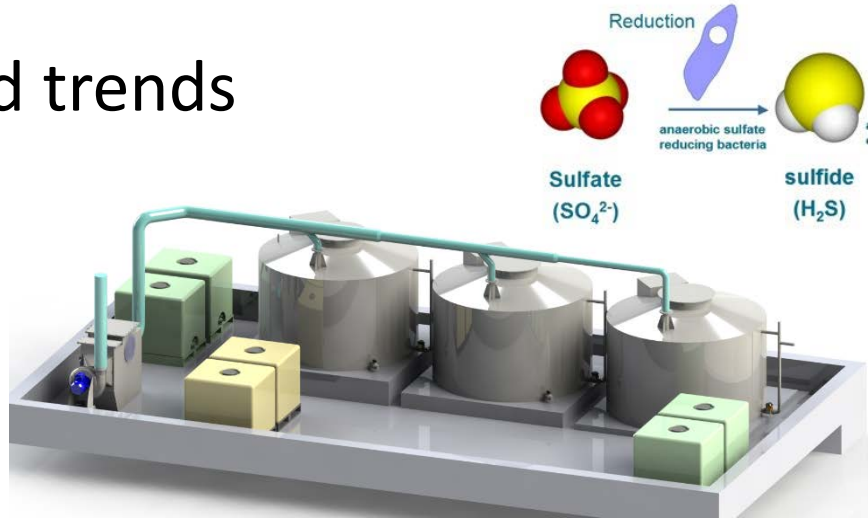
Innovations to address environmental factors and trends



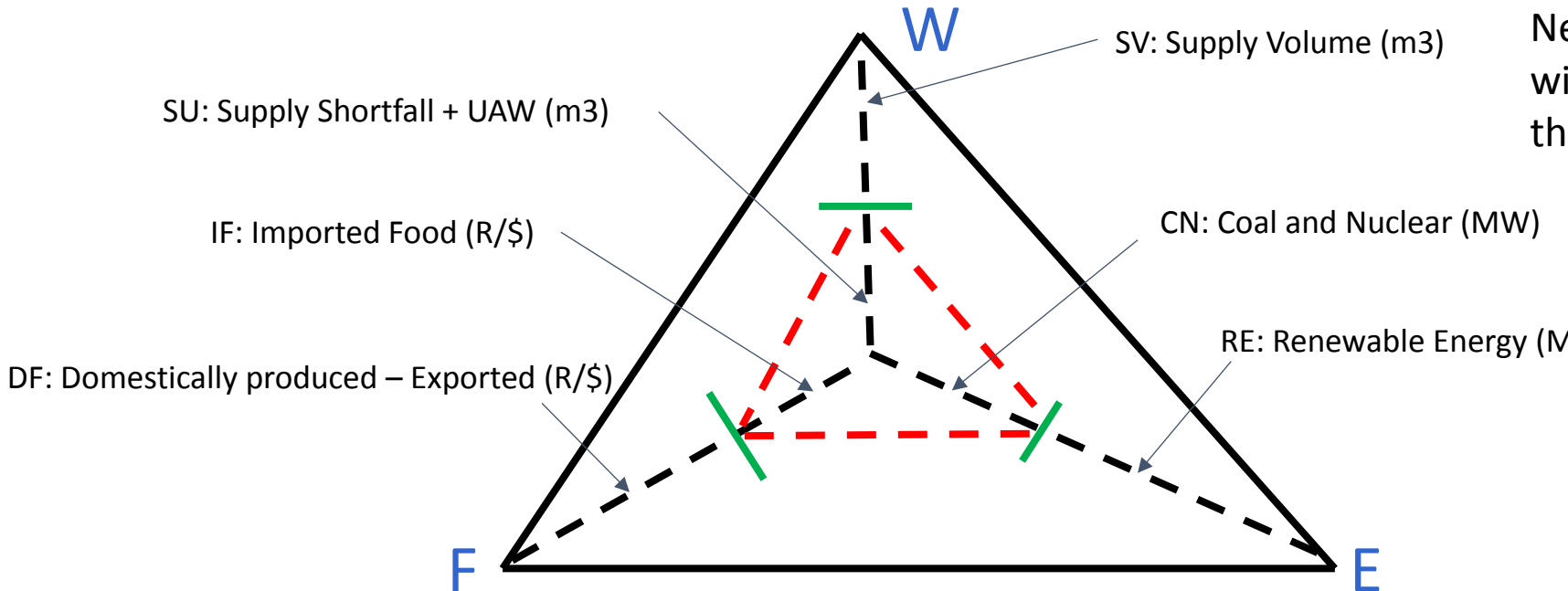
In Denmark, largest benefits for GHG emissions from biofuel comes through biomass optimized crop production (MG)



Benefits of choosing a future with water –stress wedge options (SL)



Use of biological sulphate reduction in mine waste-water treatment and recyclin (TG)



New indicators could provide us with simple ways to characterize the WEFN (GS)

W-E-F Nexus Tri-Indicator

- SDG I(W) = SV / (SV + SU)
- SDG I(E) = RE / (CN + RE)
- SDG I(F) = DF / (DF + IF)

- SDG I (WEF) = Area **Δ** – Area **Δ**

Governance Breakout Highlights:

Space (Ministries?) within governments should be created to deal with WEFN issues

Guidance should be developed for addressing trade-offs between infrastructure issues and natural systems.

Governance with authority is needed to address possible corruption issues in the WEFN

The role of non-governmental actors, including media, needs to be included in governance processes

Values related to TB water issues need to be matured in the Energy and Food sectors

A WEFN champion needs to be groomed in each government to facilitate WEFN adoption and implementation

Governance must have an adequate observation and information base to be successful

Management Breakout Highlights:

Increasingly relevant, sophisticated integrated modelling systems are available to support management decisions

Management depends on power relationships which need to be understood

Case studies are needed to understand who benefits from a WEFN perspective. WEFN could be shown to improve efficiencies, especially through the use of infrastructure development.

EO observations and forecasts are beneficial but not sufficient Management needs relevant socio-economic information and the capacity to use the data.

Many regional and national structures could be engaged in the WEFN approach.

International treaties have a role especially in securing funding support but they do not always facilitate local and provincial interactions.

Missing: mining, trade

Observations Breakout Highlights:

Access to data is a major obstacle, especially in assessing impacts that affect the WEFN (e.g. mine wastewater, climate data). Open and free satellite data help circumvent limits.

Models can help with development of options (“wedge” assessments, risk management, integrated models for tradeoffs)

Public and private sectors are likely to have different needs for data/models. We need to assess information needs and data contributions from the private sector

Turning data into information: use more validation data, communicate error estimates, develop new applications (mining waste)

Develop expertise in using socio-economic data and integrating it with physical data. Explore the use of these data to develop a WEFN indicator.

Explore opportunities to use citizen data – school observation programs, targeted data gathering (e.g., pipe leakage), open source data sources.

Observations, Science and Technology Recommendations

1. A project should be launched to evaluate the potential of citizen science to inform some integrated aspect of the WEF in a critical region during a critical period of the year.

2. Pilot projects should be undertaken to assess possible indicators for the WEF Nexus. Based on these pilot projects a suite of indicators should be produced on a regular basis.