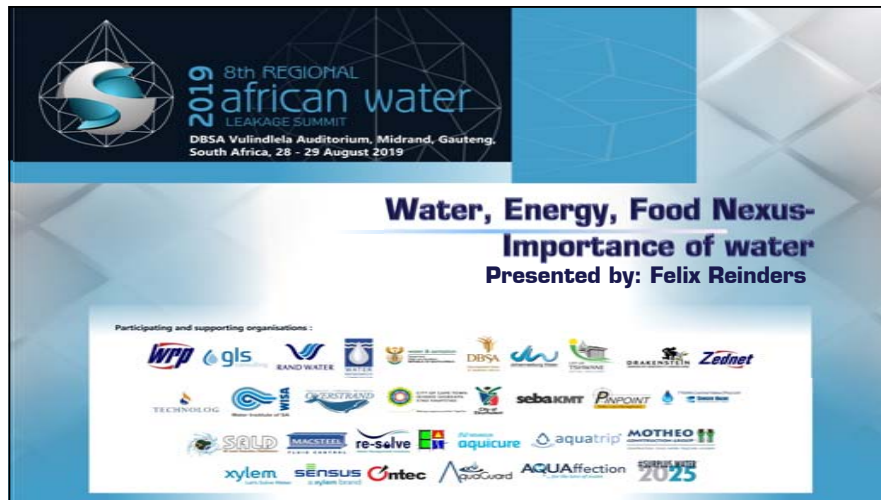




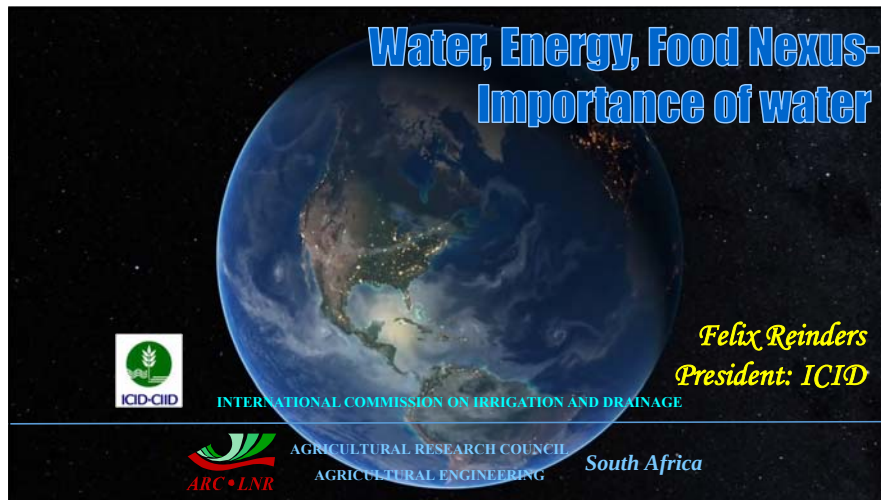
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Coming up.....

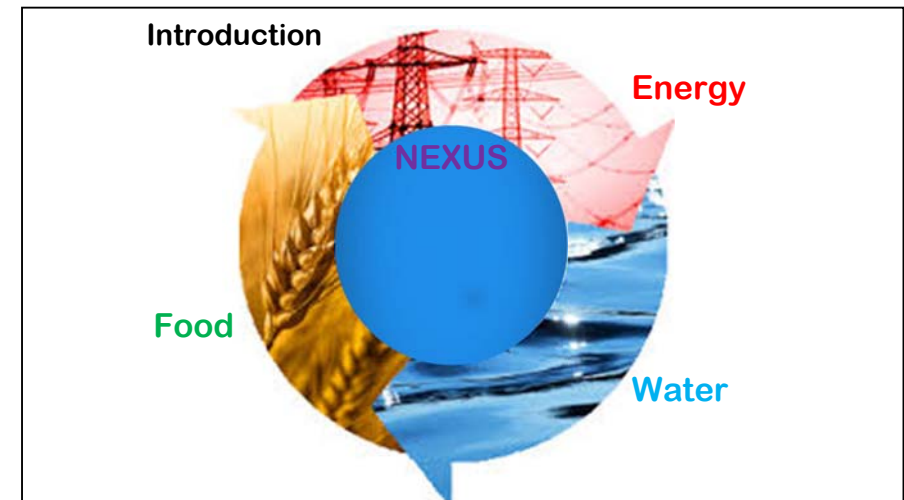
- Introduction
- Water
- Energy
- Food
- Technology
- Conclusion



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SIWI www.stockholmstatement.siw.org In Stockholm, September 1-6, 2013 **WORLD WATER WEEK**

STOCKHOLM STATEMENT

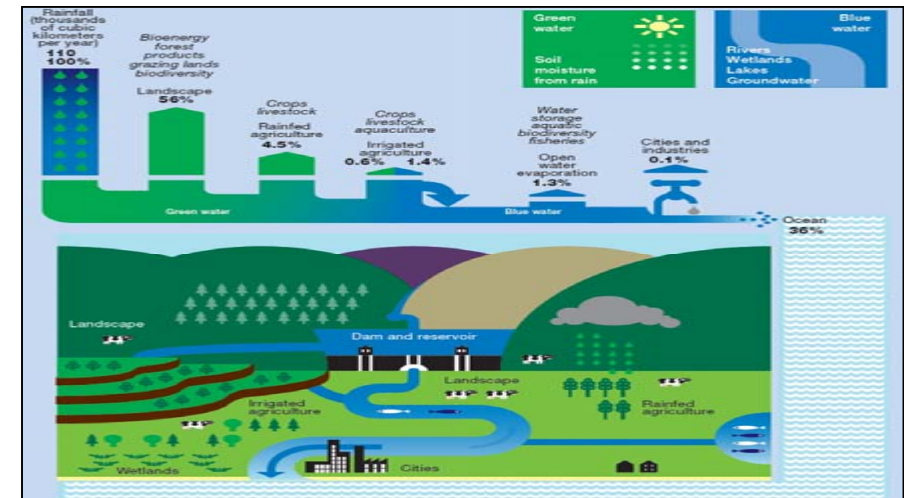
A Call for A Sustainable Development Goal on Water

As an outcome of broad consultations prior to and during the 2013 World Water Week in Stockholm, we call upon the United Nations and its Open Working Group to propose a **Sustainable Development Goal on Water**.

Water is at the core of sustainable global development and is a cross cutting resource. Within the post-2015 development agenda water should be considered and integrated into all relevant areas, such as energy and food security. Given the centrality of water for individuals, ecosystems and economic development, water is a powerful tool for cooperation across borders, sectors and communities.

A dedicated goal on water is necessary for a world where all people can live in safety and dignity.

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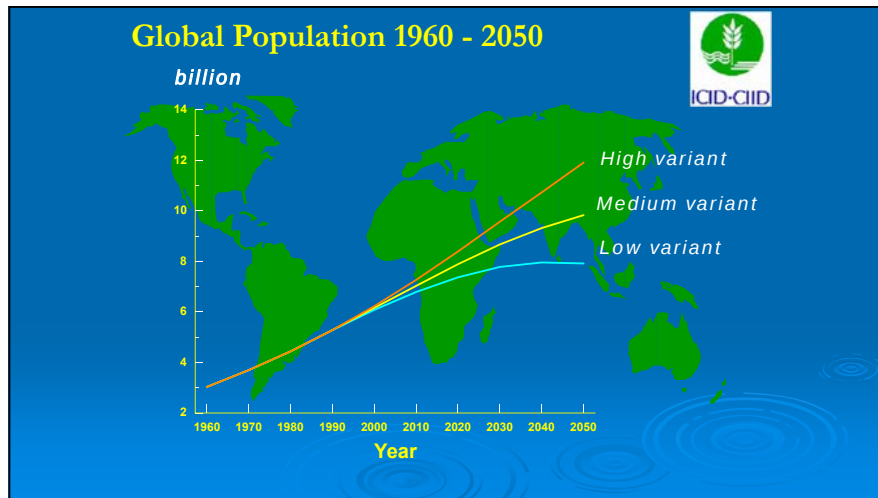
There are global opportunities for better efficiency and resources conservation in the water, food, and energy supply chains.

The idea is to improve components of the food production supply chain with respect to water and energy use as well as reducing food waste.

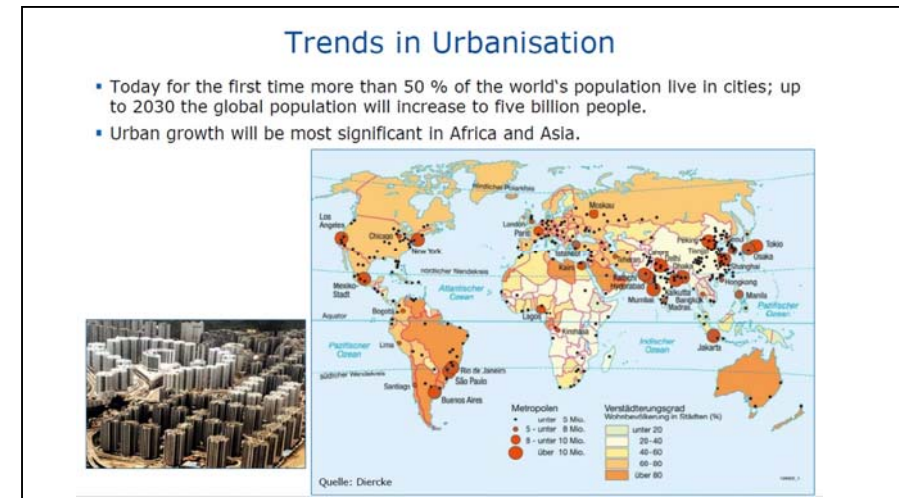
Food waste accounts for 1380 km³ of water being wasted every year globally and is equivalent to a value of US\$ 252 billion.

Translated to an easier to understand volume it equates to a person wasting on average 243 litres a day of water in the food they throw away.

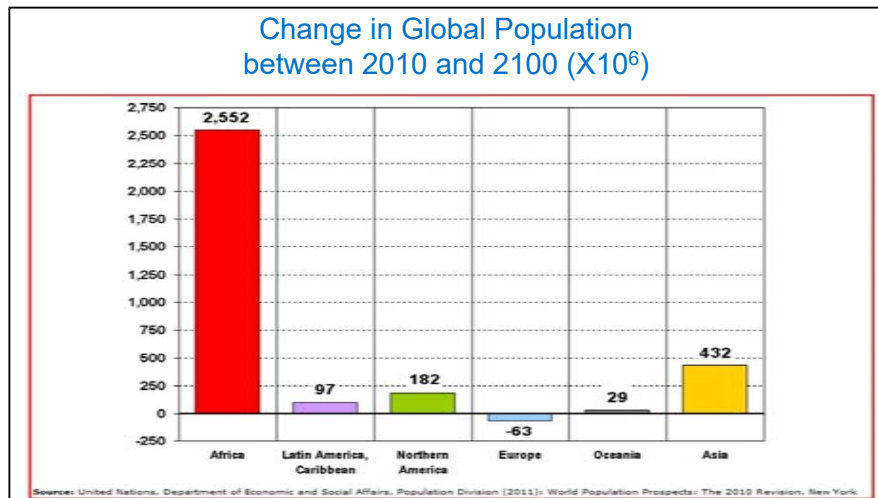
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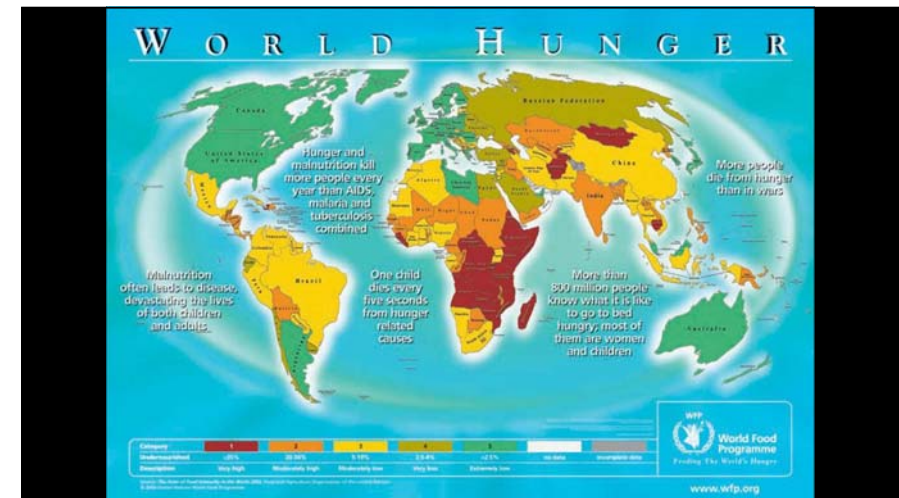
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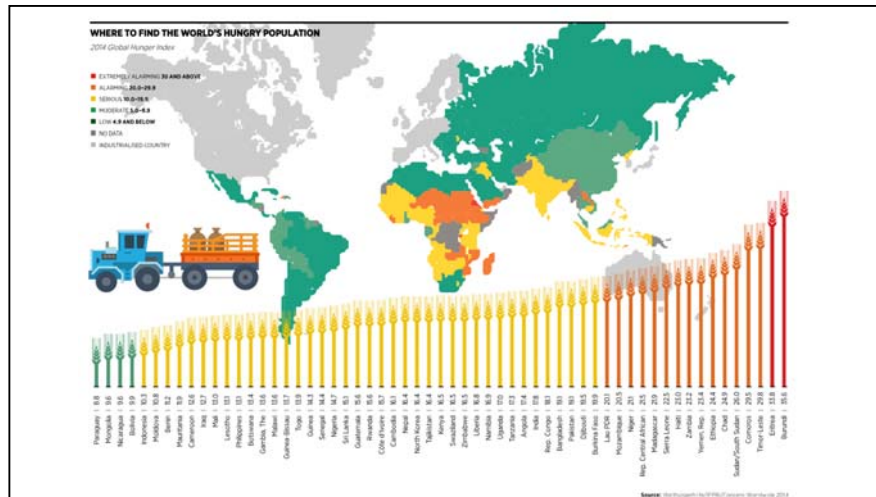
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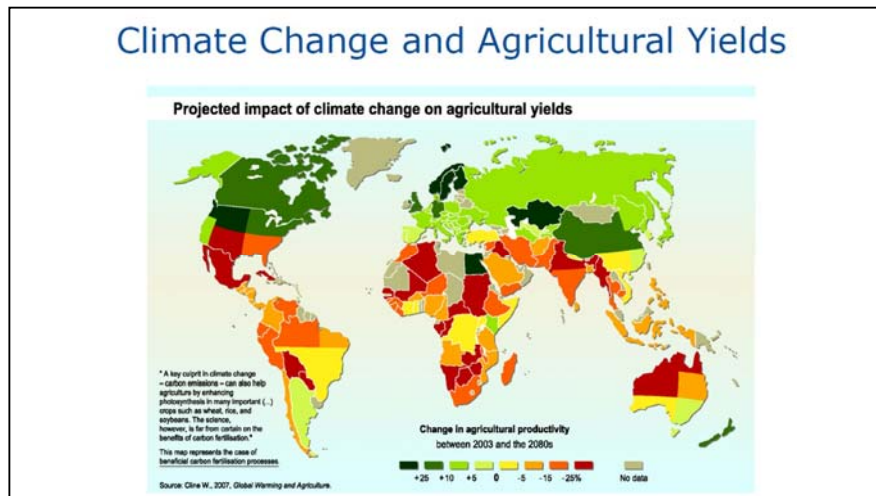


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By the year 2030, the following should have been achieved:

- A doubling of global water productivity
- A realisation of the human right to safe drinking water and sanitation
- Increased resilience to water-related disasters
- Increased food production

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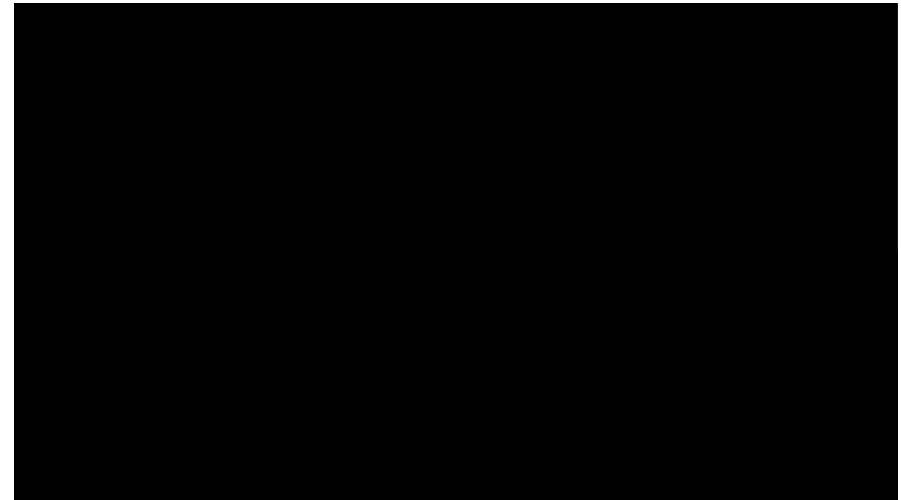
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A closer look at
Water-Energy-Food
Nexus

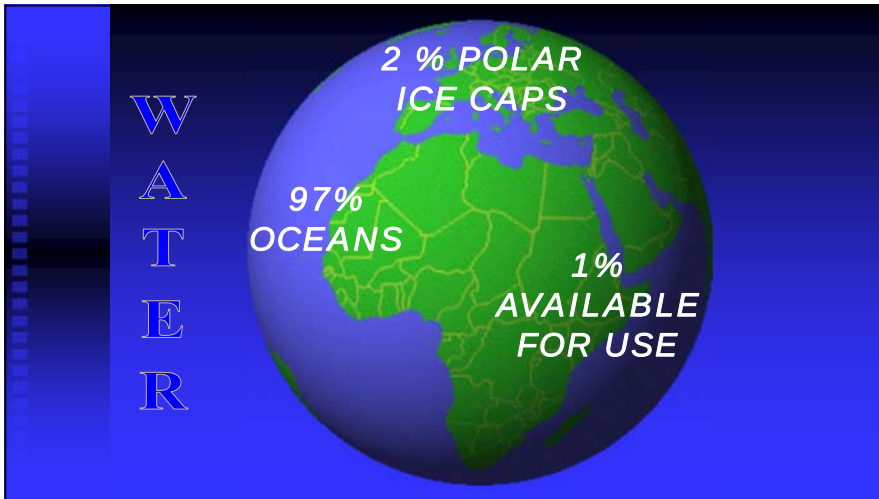
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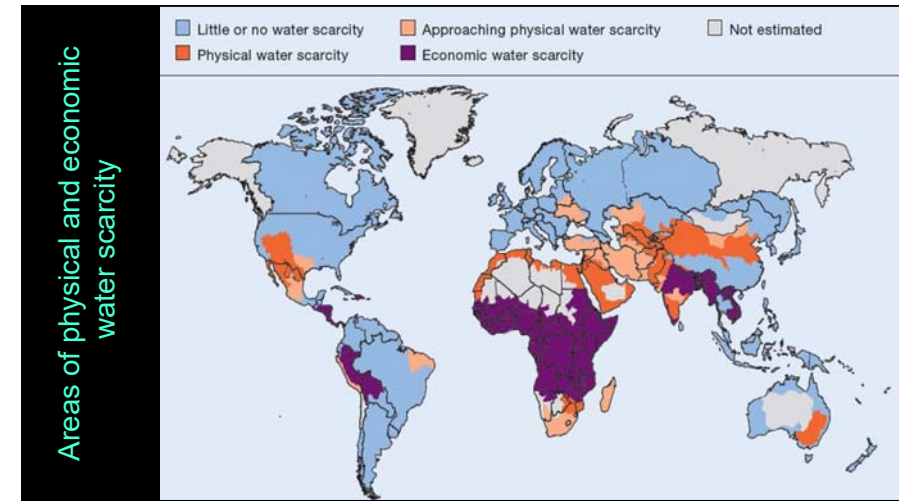
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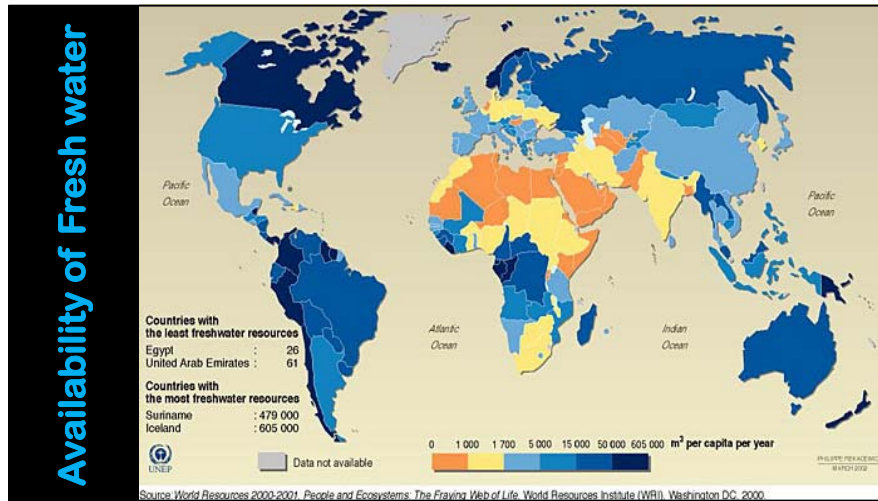
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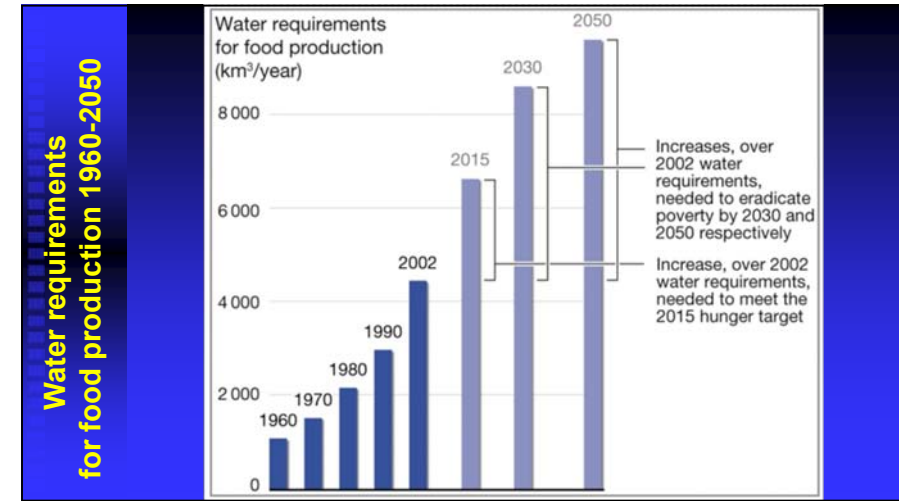
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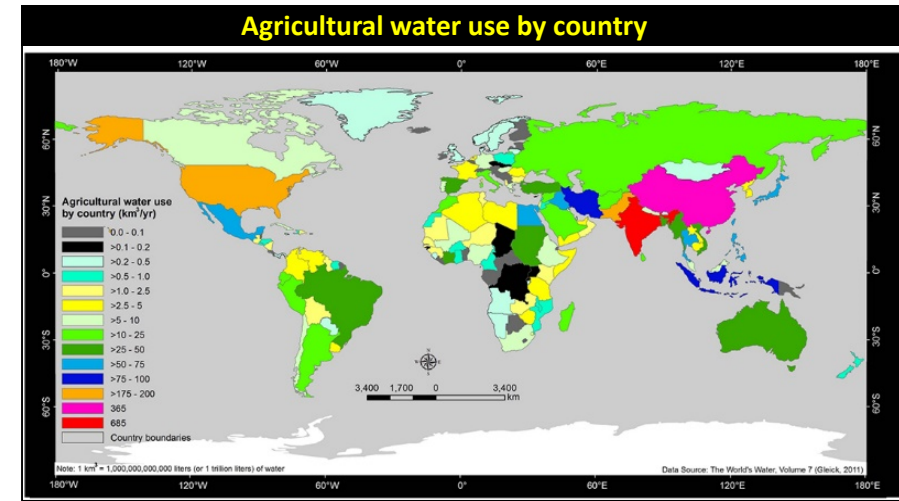
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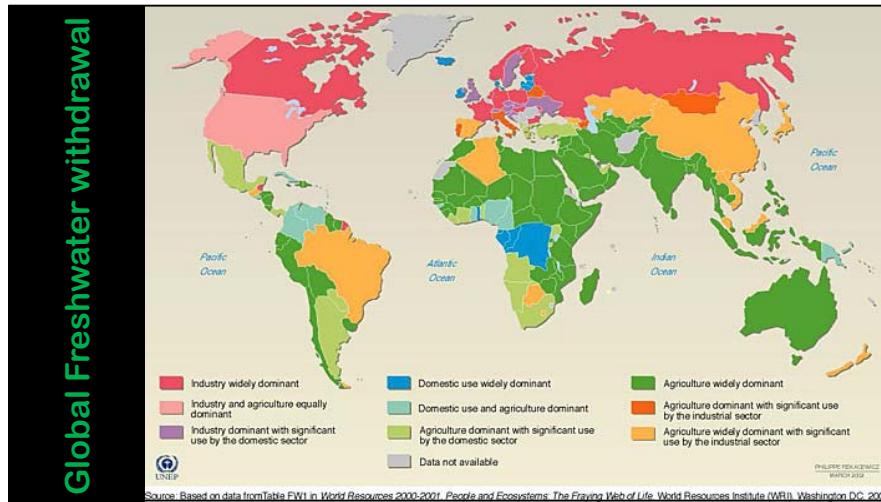
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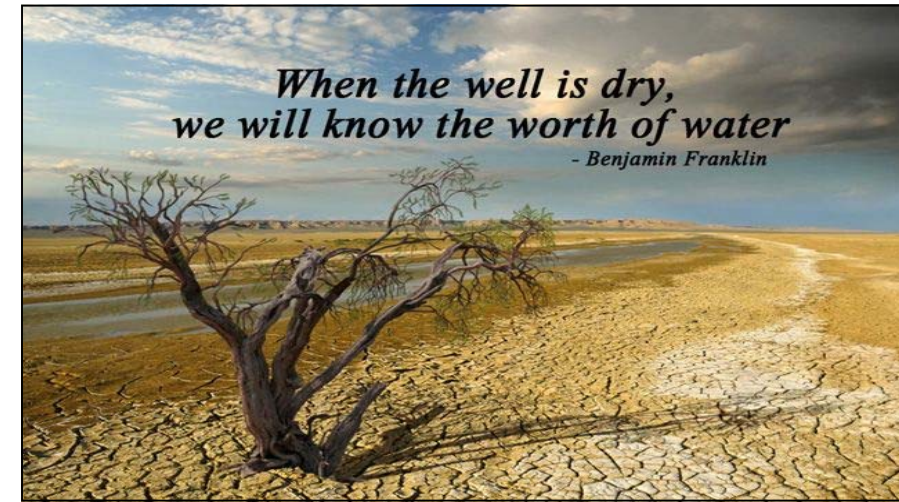
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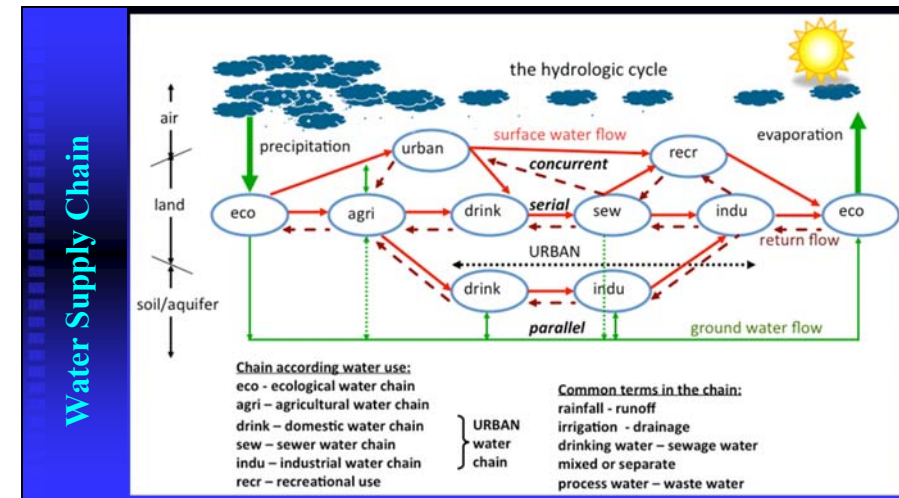
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The importance of water:

- **Water is the key to food security**
– without water, crops simply cannot grow.
- **Water is not just for primary production**
– it plays a vital role at all stages along the agricultural value chain
- **Water for agriculture connects us all together**
– In times of scarcity we all have a responsibility to use water wisely, efficiently and productively.

We need to be more 'water smart'.

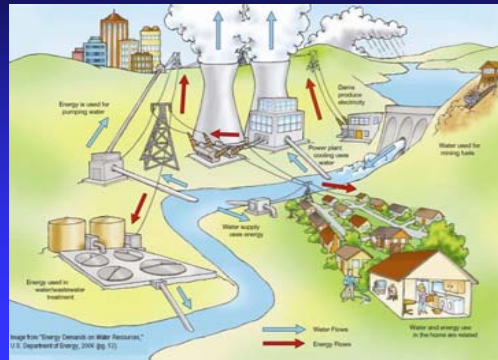
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Efficiency of water management		
Method	Efficiency	Remarks
Flood irrigation	60 ÷ 90%	New water management control technologies
Sprinkler irrigation	70 ÷ 90%	From high pressure to low pressure application
Trickle irrigation	80 ÷ 85%	Reliability, durability and water management
Sub-surface irrigation	90 ÷ 95%	Shallow soil management
Controlled drainage	50 ÷ 85%	maintain and manage high water table as appropriate
State of the art water management	85 ÷ 100%	Soil moisture management and delivery system management

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Water needs energy

Energy is vital to providing water → needed to power systems that collect, transport and distribute water.



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"Energy production consumes significant amounts of water; providing water, in turn, consumes energy."

*In a world where water scarcity is a major and growing challenge, **meeting future energy needs depends on water availability** –and meeting water needs depends on wise energy policy decisions."*

(World Policy Institute and EBG Capital, March 2011)



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Energy needs water

- Energy production depends on water → some 580 billion cubic metres of freshwater are withdrawn for energy production every year (IEA, 2012)
- Water is used for primary energy production as well as power generation especially for cooling at thermal power plants
- Extraction, transport and processing of fuels and irrigation to grow biomass feed-stock are also water intensive

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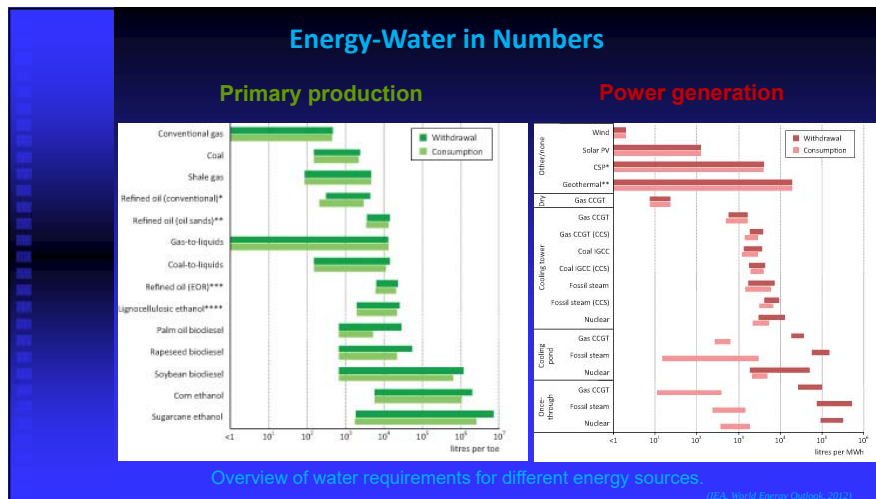
Power Generation						
Type	BioMass	Coal	Nuclear	Natural Gas	Solar	Wind
						
Water Impact	Moderate	High	High	High	Low	Low
Fuels		Description				
Oil and gas		Drilling, well completion and hydraulic fracturing; injection into the reservoir in secondary and enhanced oil recovery; oil sands mining and in-situ recovery; upgrading and refining into products.				
Coal		Cutting and dust suppression in mining and hauling; washing to improve coal quality; re-vegetation of surface mines; long-distance transport via coal slurry.				
Biofuels		Irrigation for feedstock crop growth; wet milling, washing and cooling in the fuel conversion process.				

Key uses of water for primary production (IEA, 2012)

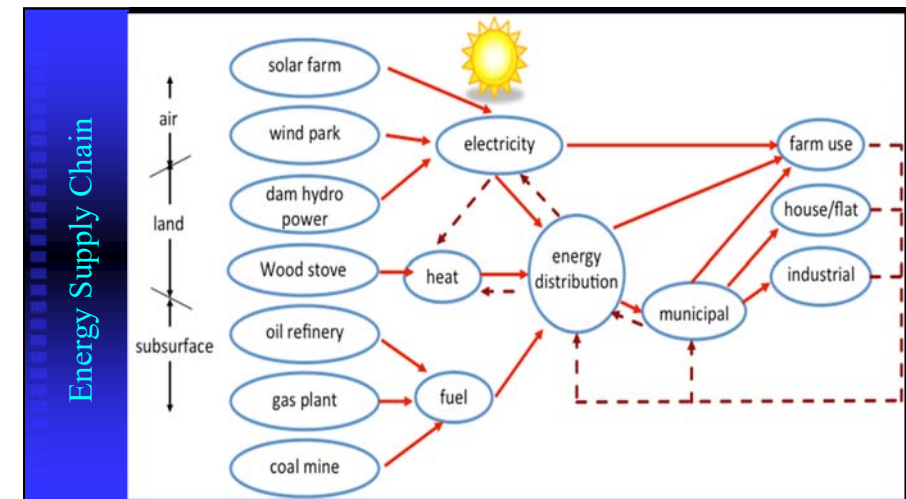
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Examples of energy savings

- LEPA: Low energy precision application systems
- Utilising of low pressure drip irrigation technologies
- Improved Irrigation scheduling

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Challenges

Demand for food

1 billion people are threatened by hunger
2 billion people can not afford healthy diet

Additional drivers

+population increase
+additional demand for food
due to increased income

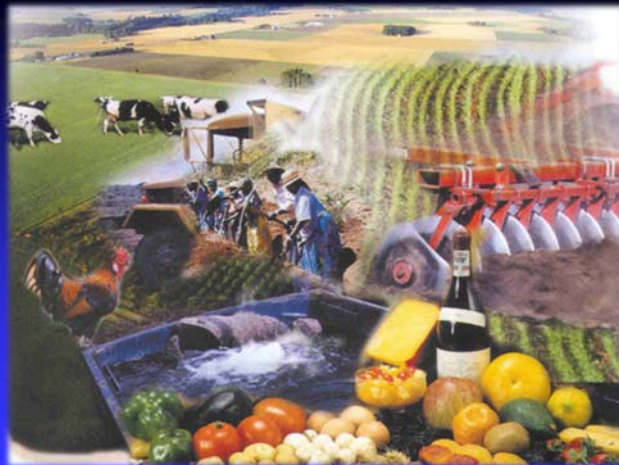
Food production need to increase

→ +42% until 2030
+ 70% until 2050

Do we have sufficient biomass for food production?

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What is food security?

There are many different definitions of food security. The definition frequently used as defined at the World Food Summit of 1996:

Food security is existing when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life.



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What is food security?

Food security includes the following aspects:

- Availability
- Access
- Affordability
- Quality
- Nutrition
- Safety



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Cultivated Land Worldwide

■ 1 533 Mha – Total world Agriculture Area

■ 300 Mha – Currently under Irrigation

20% of total agricultural land area
supplies about 40% of the world's food

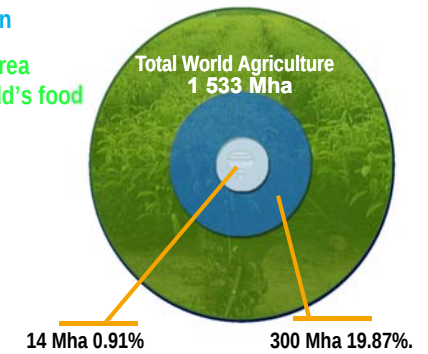
■ 14 Mha - Drip irrigated

Crop productivity values:

- Rain fed 30% of Irrigation

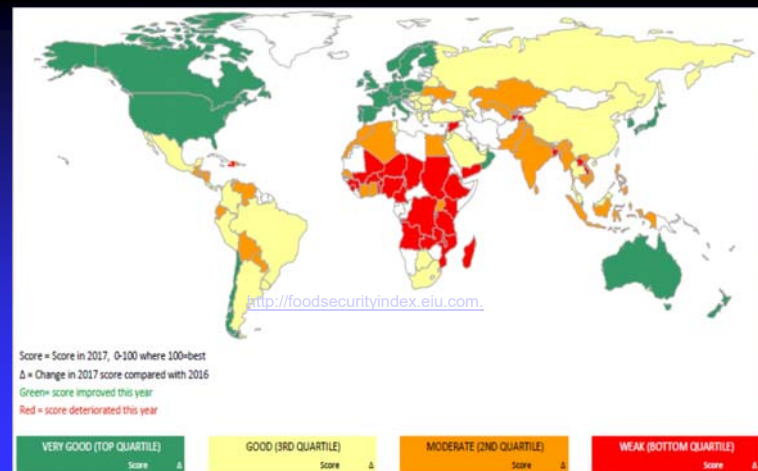


Source: ICID - CIID



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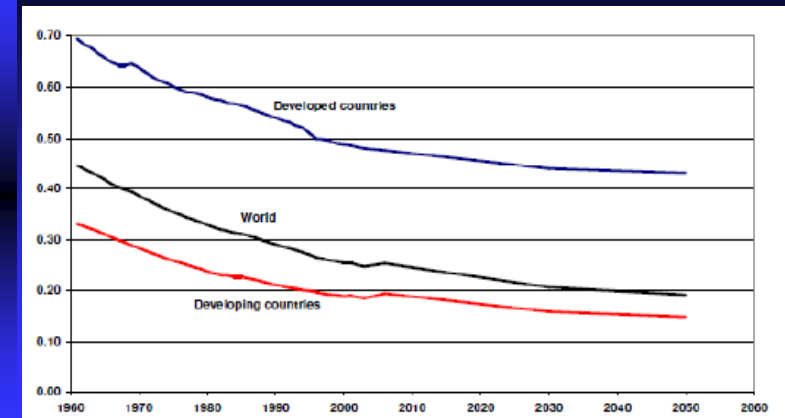
2017 Global Food Security Index



Source: Economist Intelligence Unit/DuPont

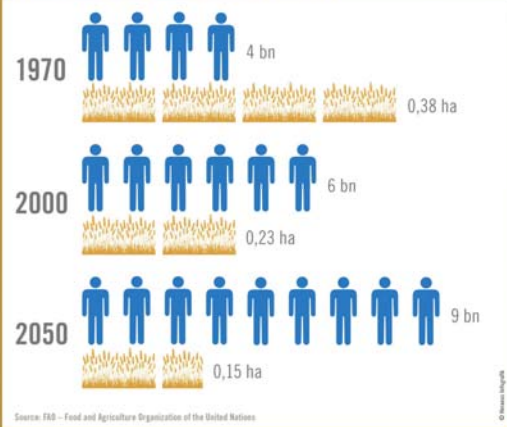
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Arable land per capita in ha



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ARABLE LAND PER CAPITA



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Per capita food production

Calculated as: $\text{total production} / \text{population}$

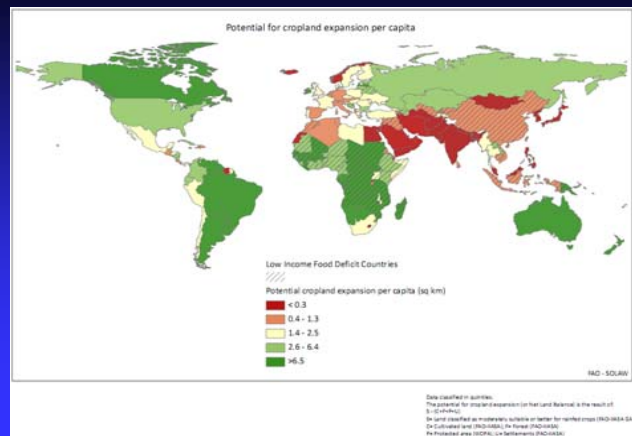
Growing, but not as rapidly as total production

Annual growth rates:

1950s: 1.4%
 1960s: 0.8%
 1970s: 0.4%
 1980s: 0.4% ... and holding steady

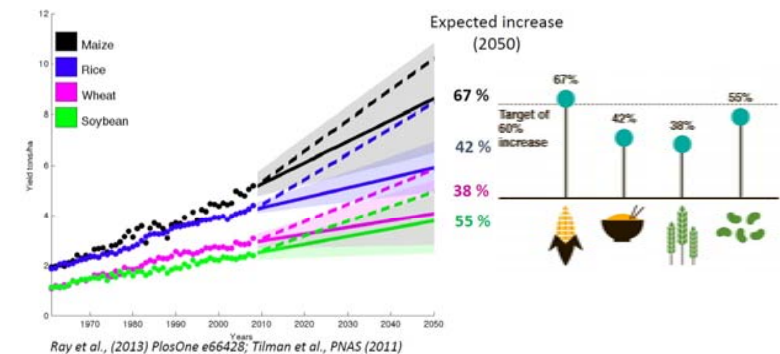
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Land available for crop expansion is limited



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What is needed to sustain food production?

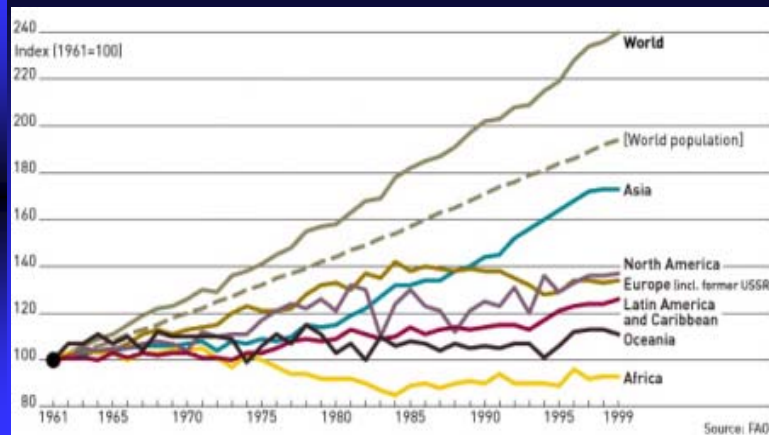


Annual increase rates need to double

Game-changing solutions are needed to produce „more with less“

52

World Agricultural production



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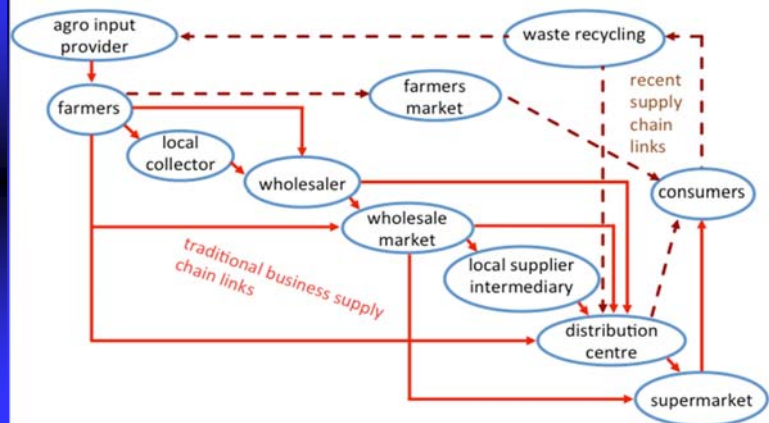
Virtual Water

Virtual Water is the amount of water that is embedded in food or other products needed for its production.

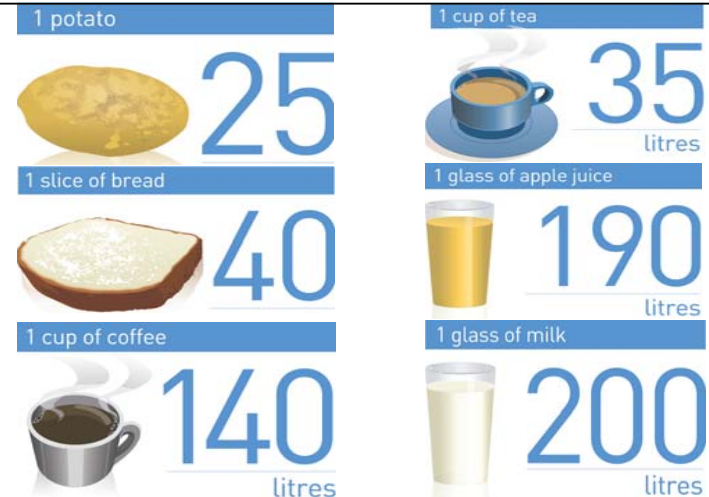
Virtual water refers to the amount of water required to produce a good from start to finish or it is the volume of freshwater used to produce the product, measured at the place where the product was actually produced.

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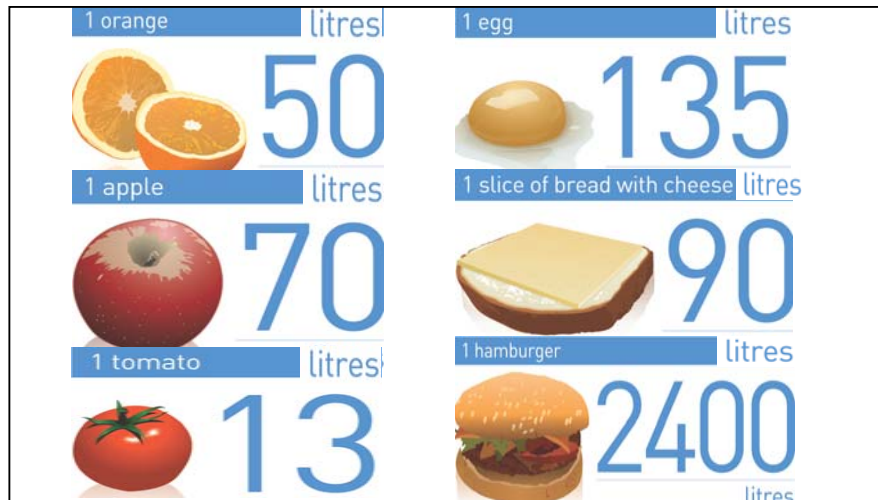
The food and agri-product-supply chain



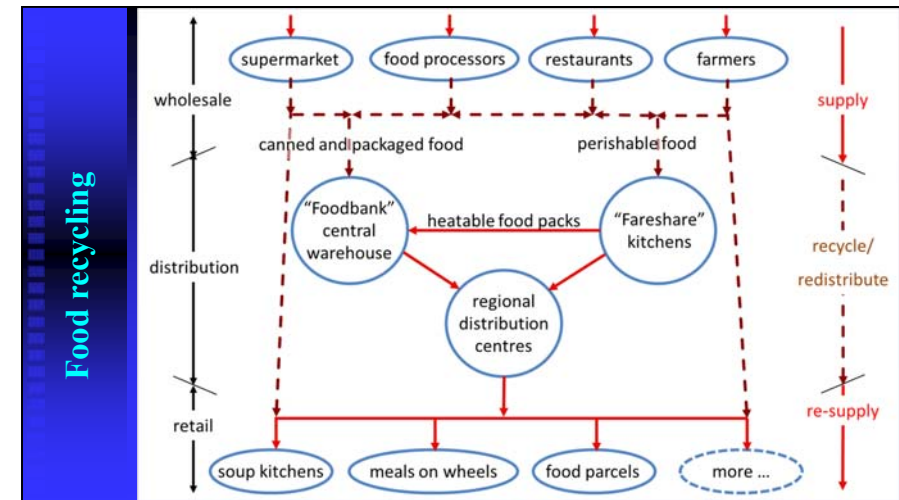
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Examples of food saving

- Food wastage: 243 litres of water a day in the food they throw away =150% of daily home water use (UK Statistic)
- USA wastes 40% (think of virtual water & virtual energy).
- Other countries...?

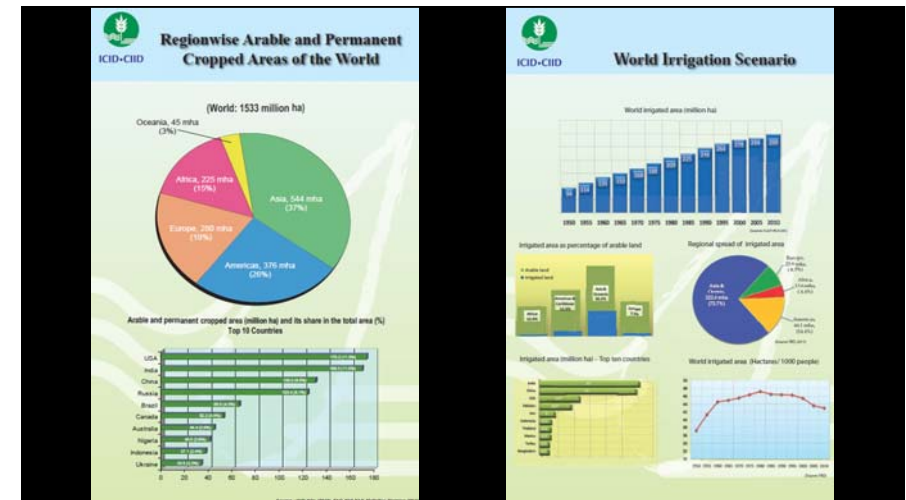
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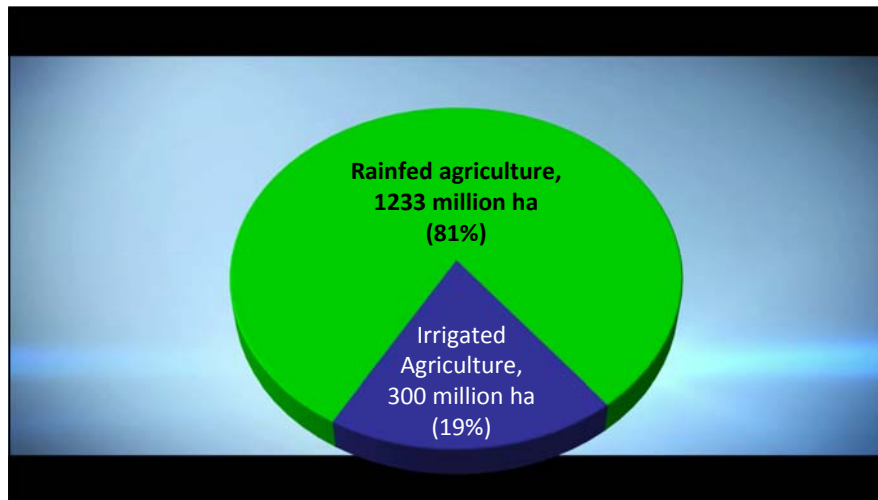
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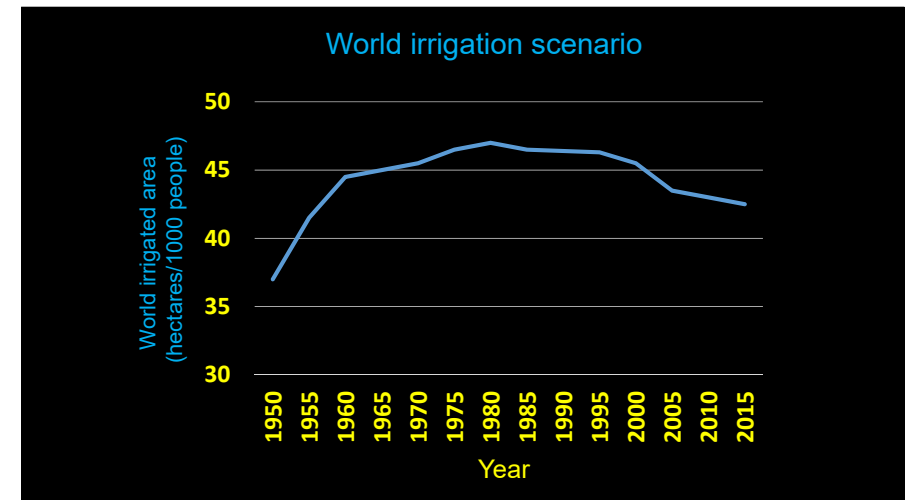
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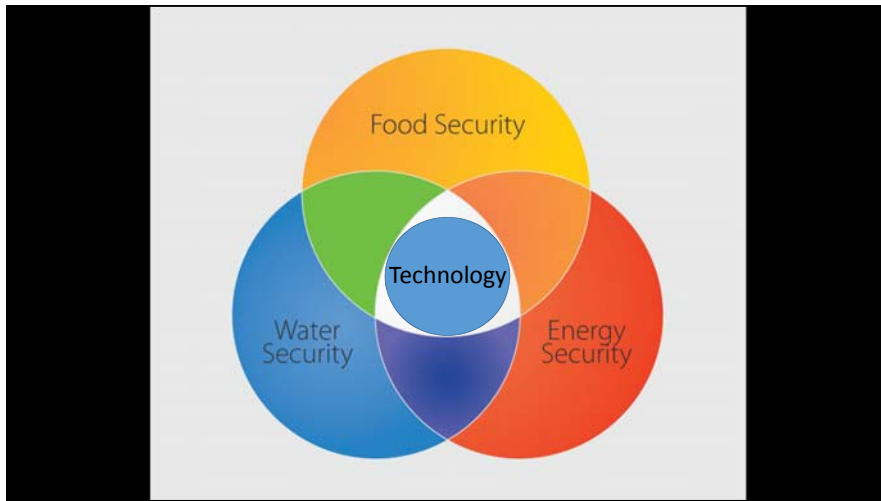
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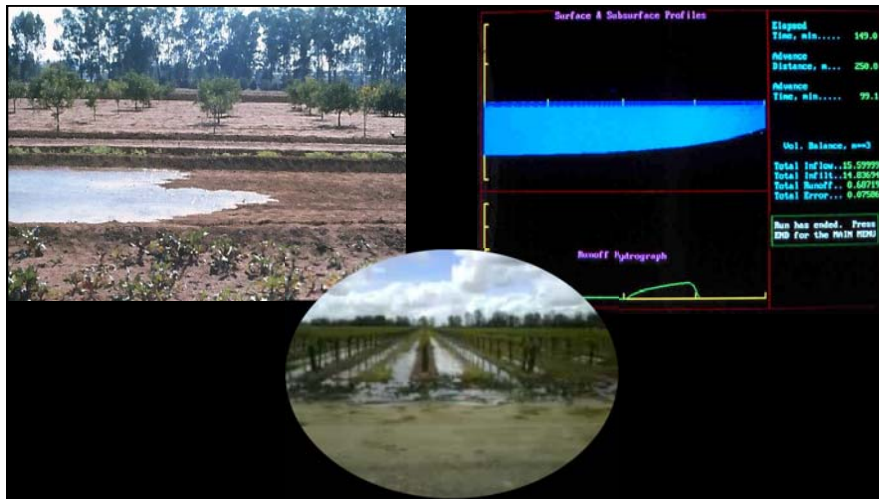
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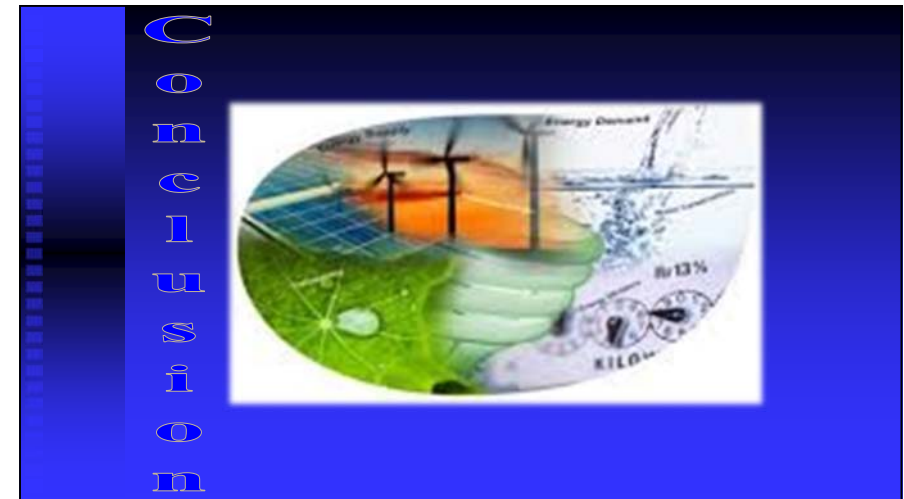
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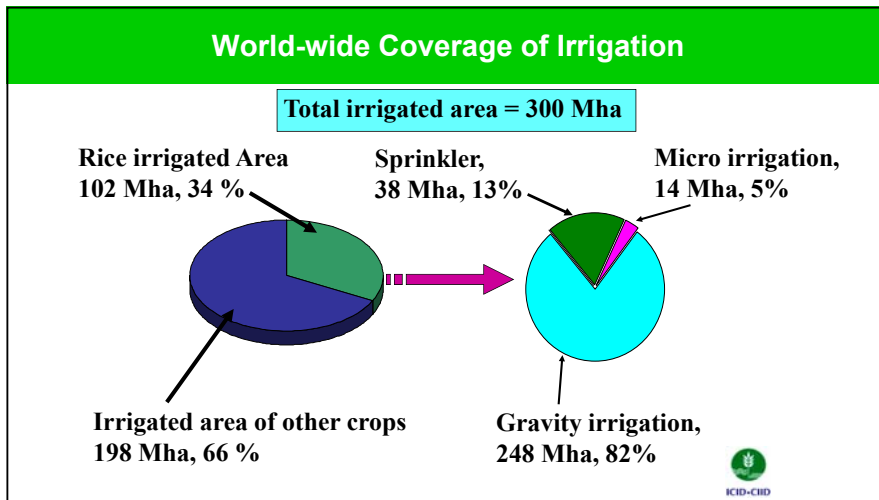
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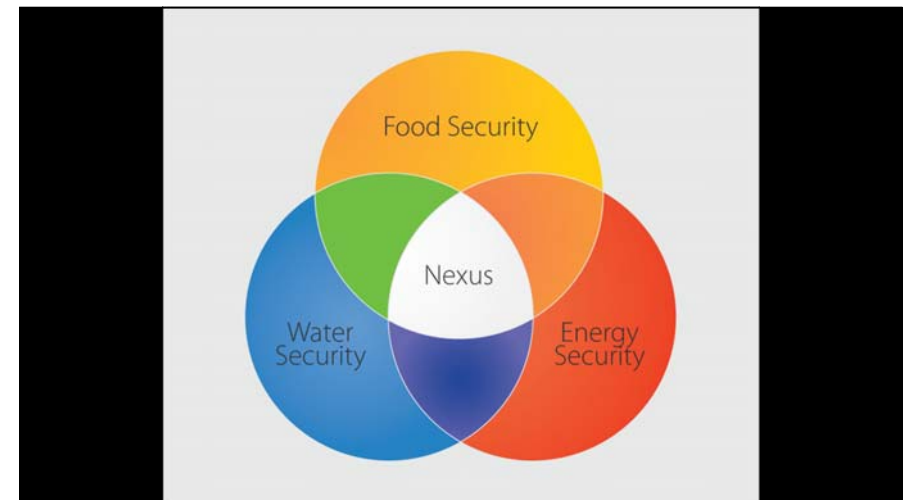
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Water-Energy-Food Nexus

- Moving towards a Green and Bio-economy for sustainability
- Water efficiency: from 60% - 95%
- Energy efficiency: from high to low use, bio energy, **limit wasteful transport of foods**
- Food efficiency: stop wastage of 30 – 40%; it saves water and energy
- Apply technology to improve food production

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Thank you



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