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Climate Change

PRESENTATION

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Food Water and Energy Nexus: A New Approach

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Food Water and Energy Nexus
A New Approach

International Conference on Food, Water Energy Nexus in the Arena of Climate Change, 14th October 2016, AAU, Anand, Gujarat

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A FAO Representative, India

Building a Climate Resilient Agriculture is essential to achieve the Sustainable Development Goals

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Current Challenges (Nexus)

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- 0.87 billion people are undernourished
- 1.3 billion people lack access to electricity
- 0.9 billion people lack access to safe drinking water and 2.6 billion to adequate sanitation
- **Food-Water-Energy Nexus:** 60% more food by 2050
  - mostly from yield increase – hence a lot more energy, 40% more water and 40% more energy in 2030
  - Stressed Natural Resources
  - Climate Change
- Need to "Do More with less" / "Save and Grow"
- And Be Innovative

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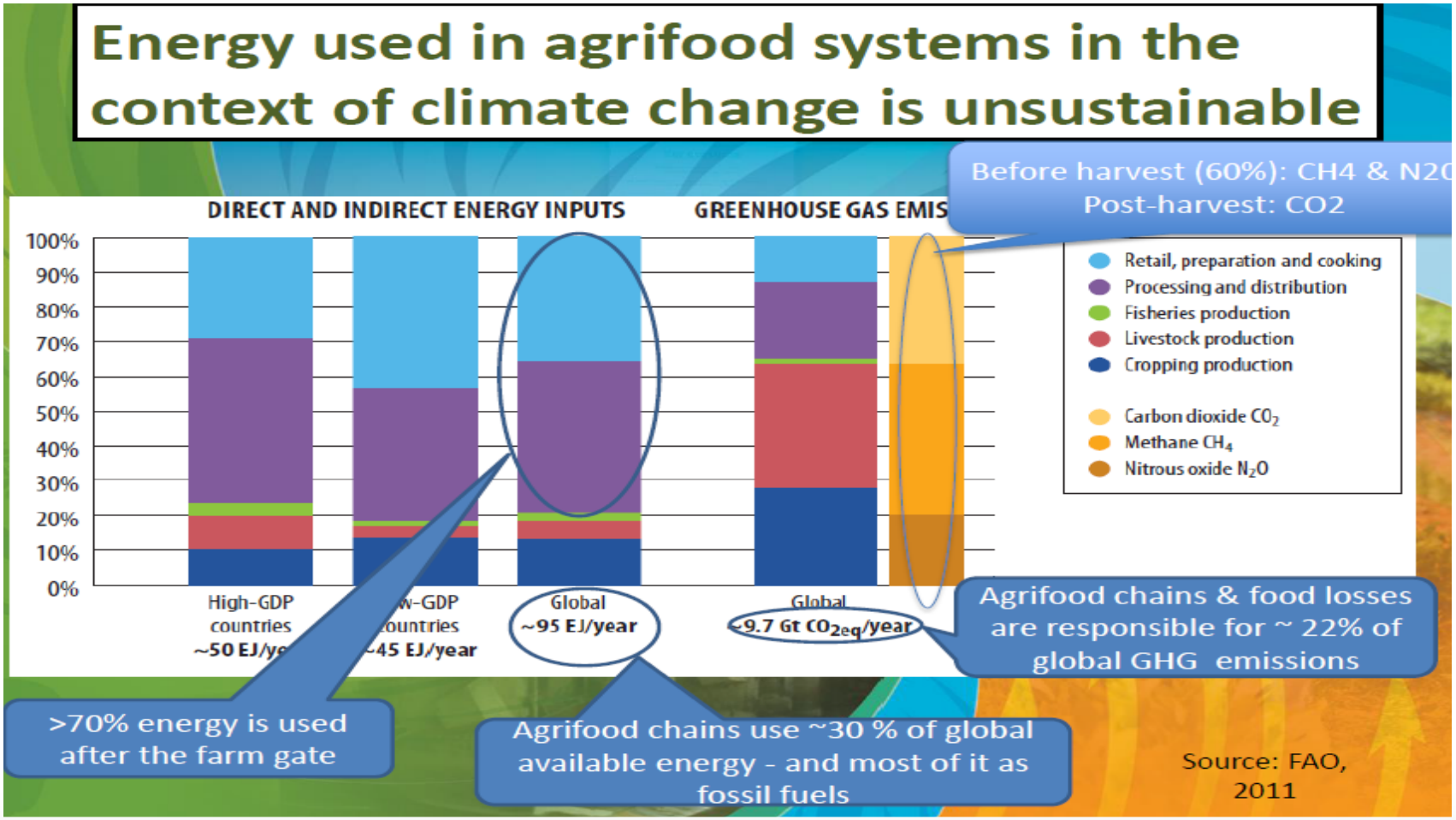
Energy used in agrifood systems in the context of climate change is unsustainable



India's Climate Change Vulnerability

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- India : population- around 1.3 billion- soon to become most populous country - creating pressure on natural resources.
- Vulnerable to Climate Change
- Impact on Food security
- Impact on poor and marginal farmers, especially women.

Impacts of Climate Change

- **Global temperature increase of ~1- 4°C will heavily affected food production. Reduction in yield of wheat, rice, maize, sorghum, etc. (IPCC, 5th Report 2014)**
- **Reduction of Agriculture Yields in Medium term (2010-2039): upto 4.5- 9%**
- **Fall in GDP growth in Medium Term: up to 1.5 % per annum (Venkateswarlu et al, 2013)**
- **Reduction of Agriculture Yield in Long Term (2040 and beyond) : > 25% if no measure is taken. (ICAR, 2009)**

Climate Change Adaptation

United Nations
Framework Convention on
Climate Change

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PARIS AGREEMENT: ADAPTATION
Global goal of "enhancing adaptive capacity, **strengthening resilience** and reducing vulnerability to climate change;"
All parties, "as appropriate," to plan and implement adaptation efforts;
Encourage all parties to report on their adaptation efforts and/or needs;
Committing enhanced adaptation support for developing countries; and
A review of adaptation progress and of the adequacy and effectiveness of adaptation support, every five years.

India is a signatory of the Paris Agreement, ratified it on 2nd October.

Food Water Energy Nexus

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- WEF: a interwoven complex that has a direct influence on human life and sustainable development.
- The synergies of these key components ("supply securities") represent the complex and inter-related nature of our global resource systems.
- **Water:**
  - for agricultural production, forestry and fishery, along the entire agri-food supply chain (Agriculture accounts for 70 percent of total global freshwater withdrawals),
  - to produce or transport energy in different forms (FAO 2011a).
- **Food production** and supply chain consumes about 30 percent of total energy consumed globally (FAO 2011b).
- **Energy:**
  - is required to produce, transport and distribute food as well as to extract, pump, lift, collect, transport and treat water.
- Cities, industry and other users, too, claim increasingly more water, energy and land resources,

Food Water Energy Nexus

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- This situation is expected to be exacerbated in the near future as 60 percent more food will need to be produced in order to feed the world population in 2050.

- Global energy consumption is projected to grow by up to 50 percent by 2035 (IEA 2010).

- Total global water withdrawals for irrigation are projected to increase by 10 percent by 2050 (FAO 2011a), and face problems of environmental degradation/resources scarcity.

- In this context, the **Food-Water-Energy Nexus** has emerged as a useful concept to describe and address the complex and interrelated nature of our global resource systems, on which we depend to achieve different social, economic and environmental goals.

What is added Value of FWE Nexus Approach?

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- The Water-Energy-Food Nexus describes the complex and inter-related nature of our global resources systems
- A cross-sectoral and dynamic perspective (within a wider context of transformational processes – or drivers of change – that need to be taken into account). Ex: A cross-sectoral perspective on groundwater pumping
- An opportunity to engage with stakeholders to do just that.
- can encourage intra organisational collaboration among different technical divisions.
- The Nexus approach considers the different dimensions of water, energy and food equally and recognizes the interdependencies of different resource uses to develop sustainably.

The organizational mandate of achieving food security serves as an entry point for FAO work on the Water-Energy-Food Nexus.

FAO Approach to FWE Nexus

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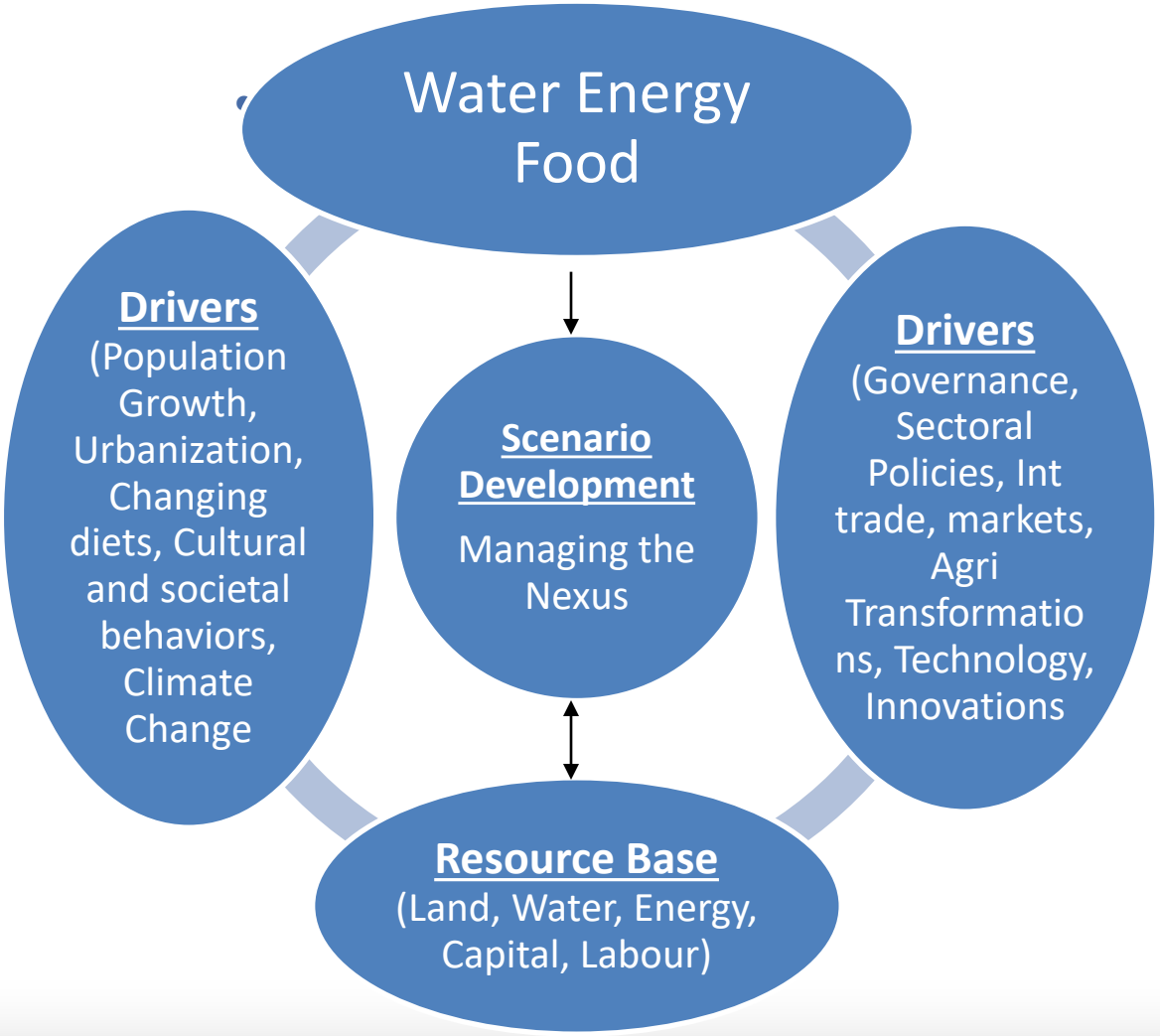

Working Areas for WEF Nexus

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Evidence

- Reliable, pertinent and timely data is needed.
- Linking to existing and planned observing systems around the world and supporting the development of new systems, tools and services is essential given issues with data availability and quality

Scenario Development

- To explore strategic questions,
- To review policies and investment decisions,
- To create 'common ground' and improved understanding of the interrelations between water, energy and food as well as the underlying drivers,

Scenarios describe a set of multiple, equally plausible future developments in an inherently uncertain world.

Response Options

- The planning and implementation of new policies, investments, regulations and incentives, capacity development and training, and technical interventions;
- Evaluating and comparing the impacts of different interventions.

Some Issues on the Water-Energy-Food Nexus

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- Trade offs between **water use efficiency** and **energy use efficiency** (e.g. gravity versus drip irrigation)?
- •Trade offs between **water for agriculture** and **water for energy**
- •How can “free energy” influence the use of water and land in agriculture ?

FAO Experience: Groundwater Governance

Andhra Pradesh Farmer Managed Groundwater Systems (APFAMGS).

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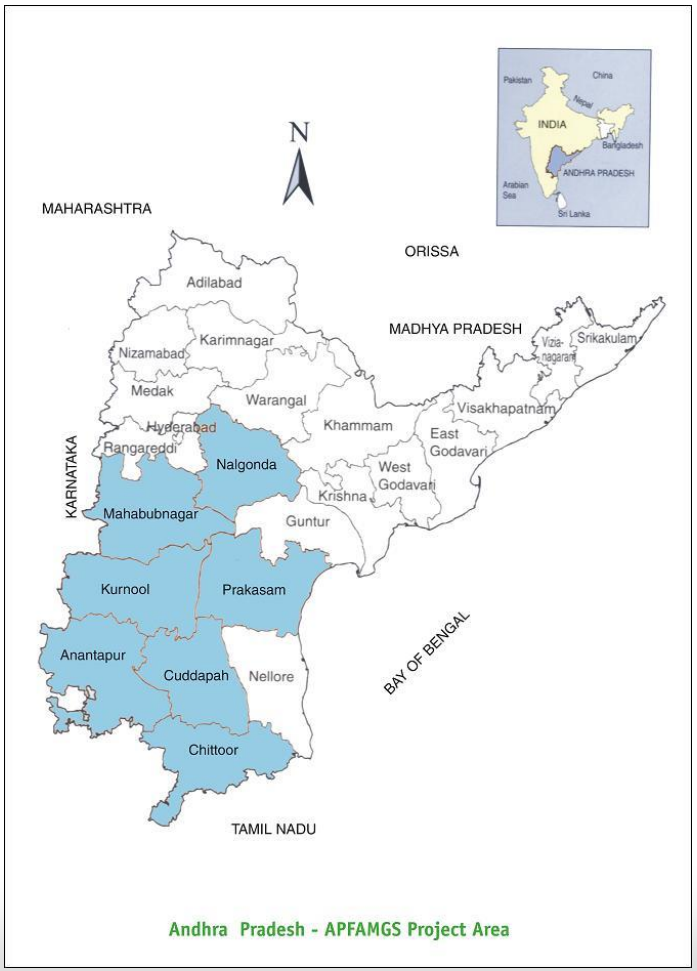
- Managing groundwater distress in 650 villages spread across 7 districts in AP & Telangana



- Established institutions to monitor groundwater and empower them with new knowledge on demand-side groundwater management
- Linked groundwater development to the availability of the resource
- Designed Famers Water Schools (FWS) to build knowledge & skills of groundwater users to administer it as a Common Property resource

Results:

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- Reduced Risks associated with groundwater distress
- Reduced groundwater pumping while improving economic returns per unit water
- Improved governance of common property resources, in particular ground water
- Limited conflicts between upstream & downstream groundwater users through new knowledge on groundwater movement & availability
- Improved preparedness
- Improved resource Governance
- Changes in the local institutional level on Water resource management

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Self Regulating Groundwater Development through Panchayat Raj Institutions

Features under this project

- PRI – closest **administrative unit** accessible to all well owners. **Two-tier Management Framework**
- **Registration of all wells** through PRI (enumeration)
- **Monitoring of groundwater development data** under the aegis of PRI (1 drinking water and 10 irrigation wells in each GP). Display data at village centre
- Groundwater **data collection technically supervised, validated by Groundwater Department for developing one of the largest database**.

FAO Work on Climate Change

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- FAO is also collaborating with MoA&FW and MoEF&CC, GoI, to work on a “Green Agriculture” project for duration of seven years, focusing on
  - Eco-restoration of 1 million hectare of degraded land;
  - Self-replication through sustainable business models and
  - Conserving keystone species in project states (Madhya Pradesh, Mizoram, Odisha, Rajasthan and Uttarakhand).

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Thank You

Contact us

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The FAO Approach to Water Energy Food Nexus

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