

Climate Change  
&  
Food Security

**One World South Asia**

**Annual Regional Meeting 2008**

**Climate Justice for Realisation of the MDGS: Southern  
Perspectives and Voices**

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# Presentation overview

Food Security & Food System

Concepts and contexts

Climate Change

Manifestation

Impacts

Adaptation & Mitigation strategies

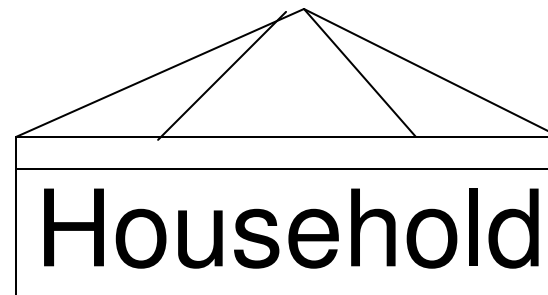
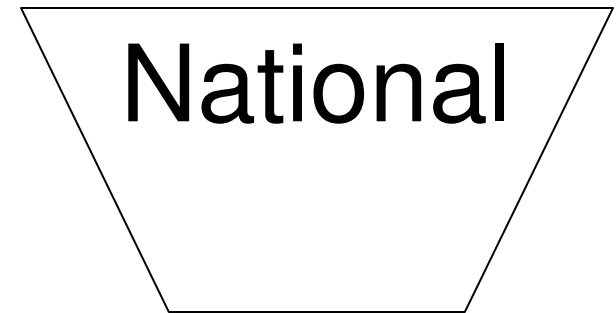
FAO on climate change

Challenges ahead

# Food Security & Food System

- **Food security** exists when all people, at all times, have access to sufficient, safe and nutritious food to meet their dietary needs & food preferences for an active and healthy life.
- **Food system** is a set of dynamic interactions between and within bio-geophysical and human environments that influence both activities and outcomes all along the food chain (production, storage, processing, distribution, exchange, preparation and consumption)
- South Asia has more than half of global food insecure

# Food Security Dimensions



## Availability

(produced, procured, arranged, imported)

## Access

(distributed and made available)

## Affordability

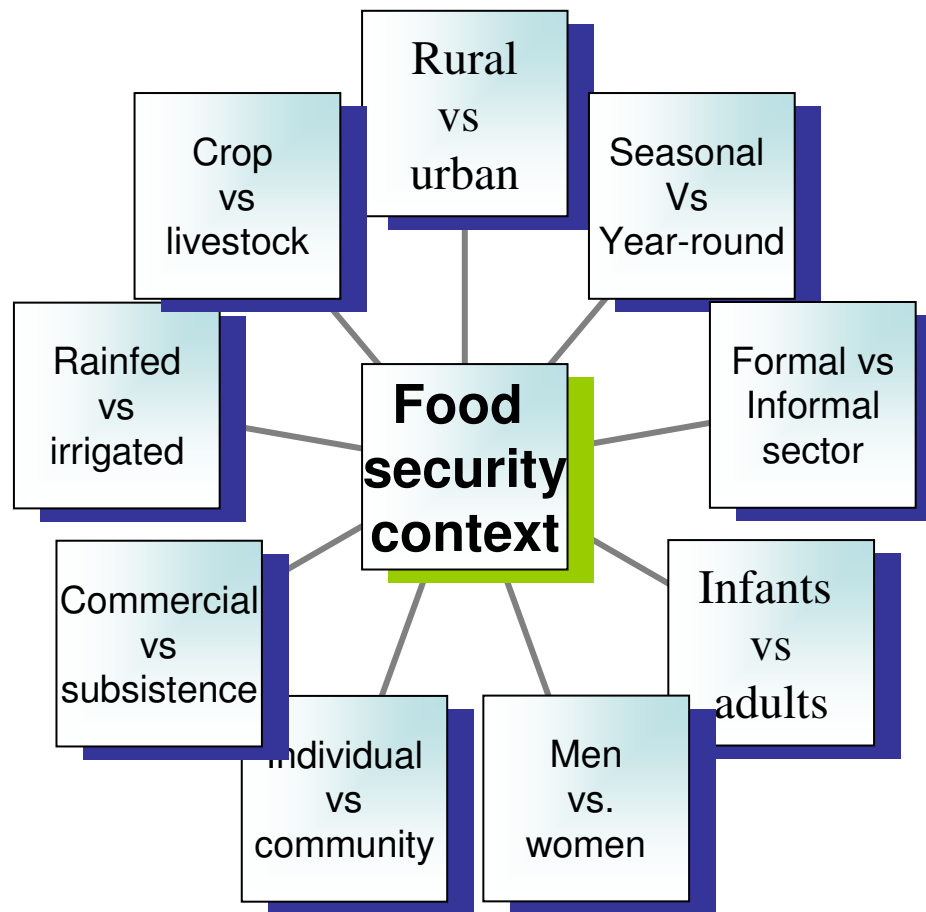
(people have means to get or purchase)

## Absorption

(healthy/receptive enough to assimilate)

## System Stability

(sustainability of production to supply)



# Climate Change- fundamentals

- Swedish scientist Arhenius predicted 100 year's ago the warming of the globe due to burning of fuels
- Natural process takes place on various time scales – astronomical, geographical and decadal - in both global and regional terms.
- That sets a whole process of change in earth's climate
- Caused by both natural and human activities – burning of fossil fuels 28.5%, deforestation 18%, transport 14%, industrial activity 14%, and even agriculture 14%
- Leads to high concentration of CO<sub>2</sub> and other GHGs that entail a series of physical, biological, ecological and economic changes - some are irreversible.

# How it manifests?

- Higher atmospheric concentration of CO<sub>2</sub>
  - Conc. of CO<sub>2</sub> has gone up from 280 ppm to 380 ppm today
- Global warming - higher global mean temp
  - Increase in min/max temp, hot/cold days, intensity of heat waves.
- Accelerating trend
  - 0.2°C every decade. Century projection 1.8°-4°C
- Gradual changes in precipitation
  - Increased frequency & duration of dry spells & erraticity of rains.
- Extreme weather events
  - Increase in annual occurrence of high winds, heavy rains, storms, flash floods, droughts, cyclone etc
- Greater weather variability
  - Greater instability in weather patterns, longer/ shorter seasons
- Rise in sea level
  - Inundation of human habitats and salt water ingressions.

# Overall impact

- Reduced agricultural productivity and food security
  - Apple, rice, wheat(loss of 4-5 Mt per °C rise- IARI study).
- Heightened water insecurity
  - 2 °C threshold can render 1.8 billion people water scarce
- Collapse of ecosystems
  - 2 °C can have untold impact on water, species diversity, marine ecology, mountain ecosystems, arid and semi-arid areas.
- Increased health risks
  - Globally an additional 220-400 million people could be at increased risk of malaria and various vector-borne diseases.
- Developing countries ( 3 out of 4 ) will be worst hit

# Impact on food security

- Agri, forestry, fisheries - sensitive to climate
  - Both global and local
- Some positive impact but mostly negative due to
  - variation in temperature, precipitation, frequency/intensity of extreme weather, greater weather variability, rise in sea levels
- Change in food system assets
  - Food production assets, storage, transport and marketing infrastructure, agri-based livelihoods, non-farm livelihoods
- Change in food system activities
  - Producing food, storing, processing, distributing, consuming
- Changes in component of food security
  - Availability, access, utilization and stability

# Impact on food security

- Shift in production patterns due to changes in
  - Land suitability, forest health/productivity, composition of marine resources, water availability, biodiversity & ecosystem functioning
- Degradation of arable land
  - increased aridity, salinity, ground water depletion, sea water inundation
- Increased vulnerability of landless/poor,
  - Loss of livelihood and food insecurity of farmers, fishers, forestry dependent people. HDR-2.6 billion world's poor may be worst hit.
- New patterns of pests and diseases
  - Humans, plants, livestock, fish exposed to new pests/ diseases/ vectors
- Higher costs to farmers and consumers
  - Cost of managing climate risks, price spiraling

# Impact on food supply in India

- **Exacerbate** existing inequalities of resource use, including access to food, water scarcity,
- **Exert** multiple impacts causing untold miseries to all - currently vulnerable - resource poor groups/regions
- **Intensify** existing market uncertainties and economic growth
- **Make** India's complex social structure more competing & conflict ridden
- **Hit** an impoverished country – 215 m undernourished
- **Affect** small and marginal farmers severely - GoI report 1,12,000 farmers suicide since 1993



# Combating climate change risk

- Adaptation – a response to actual or expected effects, that will reduce risk posed to life and livelihood
  - moderating the adverse impact
  - Promoting resilience among vulnerable people
  - local to global
- Mitigation – reducing emissions of GHGs and sequestering/ storing carbon (ST)
  - making development choices to curb emissions (LT)
  - Creating more C sink
  - Taking into account CC damages, sustainability, co-benefit, partnering, equity and attitudes to risk

# Mitigation

- Reducing emissions of carbon dioxide
  - Reduction in deforestation, control forest fires,
  - Aggressive afforestation, social forestry, silvipasture
  - prevent burning of crop residues, reduce emissions from farming / fisheries, efficient energy use of commercial agri & agro-industries
- Reducing emissions of methane and nitrous oxide
  - Improving nutrition for livestock; efficient mgmt of livestock waste; better mgmt of irrigation; efficient use of nitrogen fertilizer etc.
- Sequestering carbon
  - Enhance C sinks to reduce CO<sub>2</sub> thru afforestation, reforestation; integ. agro-forestry system; improved mgmt. of pastures and grazing practices; conservation agri for improving soil Org Matter
- Clean development mechanism
  - renewable energy from biomass; development of the clean technology wrt energy and environment, better sanitation, low cost, low resource & low energy intensive agriculture.

# Adaptation

- **Intensify farm production**
  - bring the yield gap while being cost effective, capital, labour, energy efficient & sustainable
- **Improve land management practices** – soil & nutrients
- **Increase water management**
  - water harvesting, watershed development, irrigation potential
- **Reduce inefficiency in water use**
  - adopt water efficient crop /varieties, production methods/techniques, water conservation,
- **Preserve and enhance plant and animal genetic resources**
  - effective use of such resources
- **Adjust food consumption patterns**
  - shift in staple food, locally produced items, reduce livestock consumption, introduce new food items, teaching good eating habits
- **Maintain dietary quality and diversity**
  - protect biodiversity, adopt dry cooking, energy efficient food preparation, raise awareness
- **Promote eco-friendly energy use**
  - coordinated multi-disciplinary approach

# Adaptation (contd.)

- Adopt ecosystem based approaches of risk management/ adaptation
  - Urban, marine, coastal, inland water & floodplain, forest, dryland, island, polar, cultivated ecosystems
- Shift to different cropping patterns
  - Alternative harvest & sowing dates as per changing precipitation patterns
  - Incorporate high value crops - market potential with post harvest / market link
- Adopt integrated farming system & Integrated agro forestry systems
  - To minimize risks, create bio-diversity and conserve water
- Shift to different fishing practices
  - From dynamic to static technologies that are less wasteful
  - Occupational training to alternative livelihoods
- Promote small scale forestry based enterprises for local income diversification
  - Integrated watershed development approach
  - Action for forest conservation, forest fires, pest management

# Coordinated action by all to

- Create awareness on climate change
  - All stakeholders be educated on causes, impact, mitigation and adaptation strategies
  - To be substantiated with data/ information
- Conduct study on amenable agri practices
  - Need for data & extensive research on impact/mitigation/adaptation
  - Building knowledge on location based sustainable practices blending with traditional wisdom and farmers' participation
- Rejuvenate wetlands/grasslands/degraded forests through community initiatives
  - Kerala Attapaady Hill Area Dev & Orissa Sust. Livelihood project
- Integrate water harvesting designs into rainfall patterns, local practices and community needs

# Governments

- Evolve clear policy options/strategies
- Reduce food security risks
  - Identify vulnerables & vulnerability, prioritize research, assess risks and formulate strategies
- Strengthen agri extension and communication
- Promote carbon sequestration
  - Evolve processes and techniques for C sink, fuel substitution;
  - Promote bio-energy;
- Develop climate variable insurance packages
  - Develop risk compensation,
  - risk insurance be linked to climate variability, farming system
- Put in place legal, institutional and monitoring mechanism
  - For sustained adoption and delivery of these measures

# FAO & Food Security

- Basic mandate is **food security**
- National food security
  - Policy support
  - **Technical capacity building** / Projects and programmes
    - Agricultural production – crop, livestock, forestry, fisheries
    - Natural resource management /livelihood promotion
    - Food marketing & processing, Food distribution, food trade
    - Nutrition & Food safety
    - Mapping food security & vulnerability
    - Information, awareness, collaboration
- **Global Assessment**, Emergency & Early Warning
- Putting knowledge at the centre
  - WAICENT, AGORA, ASK FAO, best practices, TKN,

# FAO's role

- Assist member nations to **counter the risks by impact assessment** of extreme weather conditions & identify potential adaptation options
- **Provide practical information** thru global data, analytical tools/ models, crop forecasting and impact monitoring, assessing scientific evidence and information dissemination
- Assisting in **mainstreaming climate change responses** in food and farm policies, fisheries and forestry management
- **Facilitate inclusion of appropriate strategies and action** in national food security and adaptation programs
- Provide assistance for **integrating forest-related climate change mitigation/adaptation measures** into national adaptation program

# *Global warming- the last chance for change*

## by Paul Brown

- CC happening much faster than anticipated before
- Current impacts are of action of '70s- actions of '90s still to manifest (we are already committed to 0.7°C rise).
  - 1.5°C rise 18% species die and 400 m people suffer water stress
- Several trigger off effects
  - Earth will warm up by reflecting less heat from the arctic,
  - such areas being darker absorb more heat,
  - oceans releasing more CO<sub>2</sub>, warmer soils releasing more CO<sub>2</sub>,
  - arctic permafrost Tundra gives off methane (being 23 times warming potential than CO<sub>2</sub>)
- Effects not clearly known
- Exact Impacts are still to be understood properly
- If not by 2015 – some of processes becomes irreversible

# A looming crisis

- What kind of development trajectory we follow
  - to become more equitable, sustainable- conservation responses - limit human-induced climate change, -curb luxurious consumption levels,
- Energy security
  - endorsing Biofuels plantation, growing them in wastelands
  - Converting cereal (corn or sweet sorghum) into ethanol
- What kind of national policy package we frame
  - Farm/FS policy, Energy policy, technology options, Pro-poor focus
  - CC policy to tackle - industry, agriculture, vulnerability reduction, emergency measures, rehabilitation and change over strategies
- What kind of research initiatives to be taken up
  - to understand problems in all these diverse areas and explore solutions
- How to work together to find effective and durable solutions
- What alternatives could be good enough to make a significant difference
- Political sagacity and will
  - at every levels to see that sensible policy are framed, decisions are taken and adhered to for larger common good

We have to -  
if the human race has to survive

*Thanks*