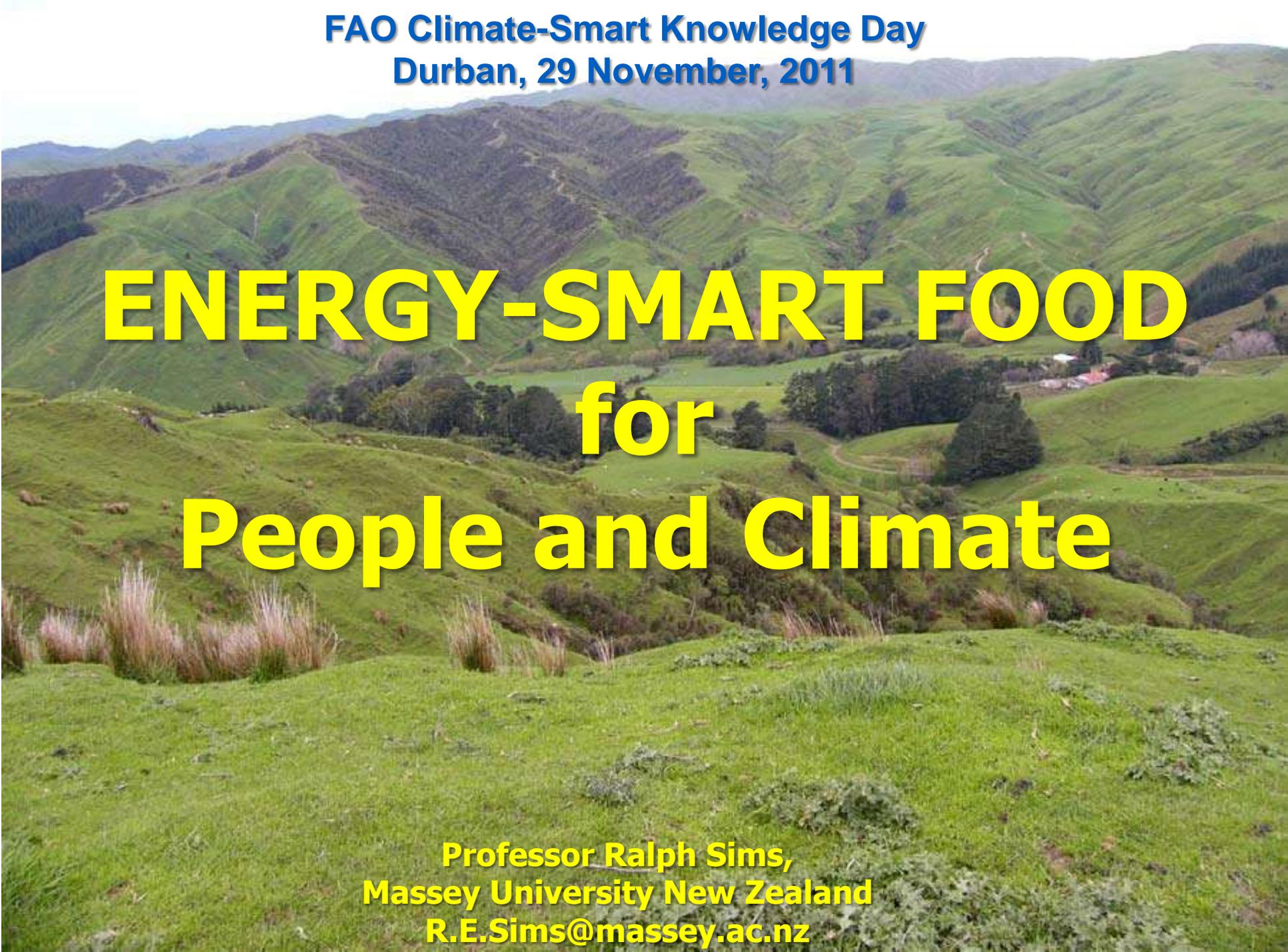


**FAO Climate-Smart Knowledge Day  
Durban, 29 November, 2011**



**ENERGY-SMART FOOD  
for  
People and Climate**

**Professor Ralph Sims,  
Massey University New Zealand  
[R.E.Sims@massey.ac.nz](mailto:R.E.Sims@massey.ac.nz)**

# Issue paper at

<http://www.fao.org/docrep/014/i2454e/i2454e00.pdf>



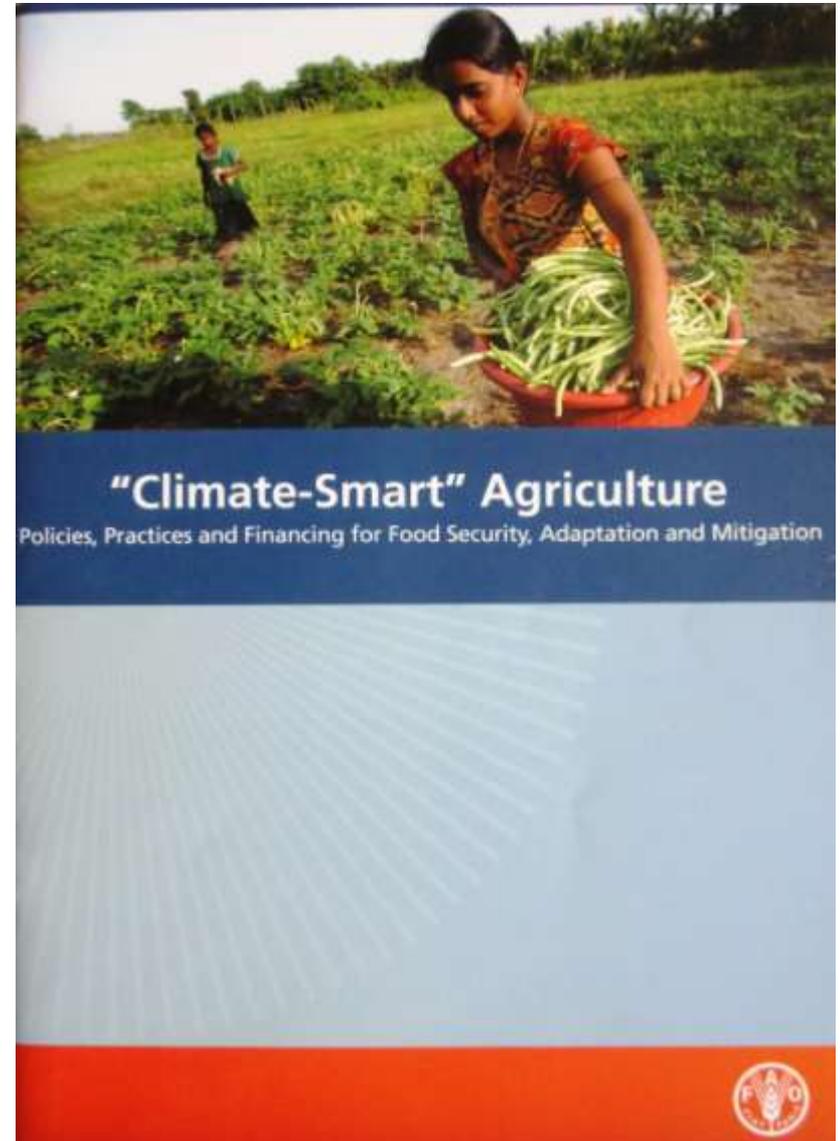
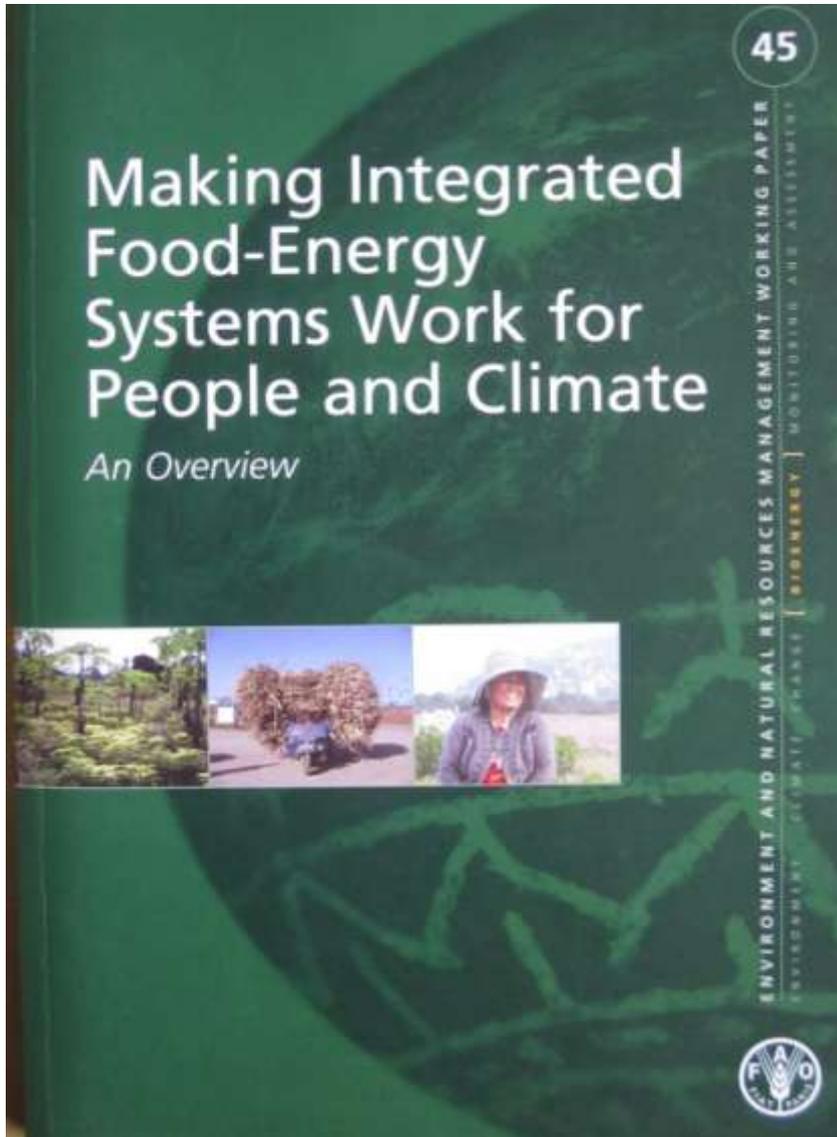
**"ENERGY-SMART" FOOD  
FOR PEOPLE AND CLIMATE**  
ISSUE PAPER



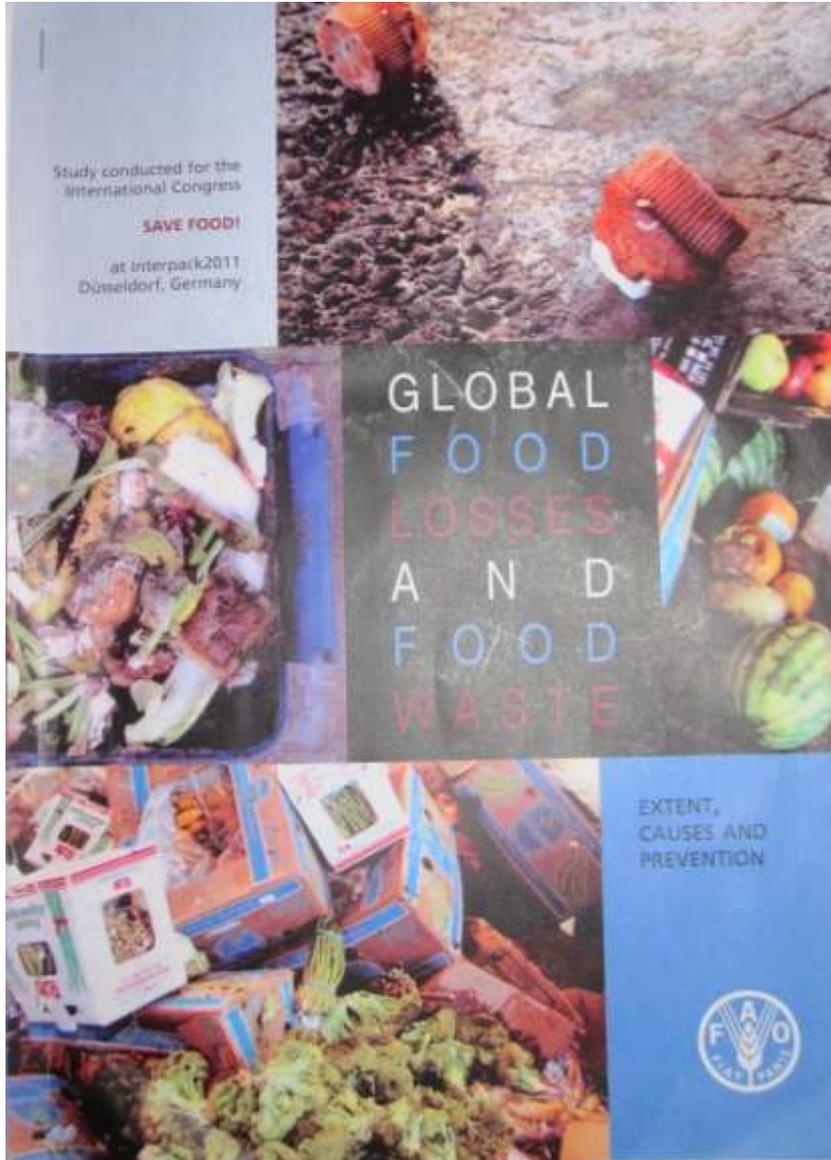
# Policy brief: "The Case for Energy Smart Food Systems" at

<http://www.fao.org/docrep/014/i2456e/i2456e00.pdf>

# The FAO has already been concerned about the food / energy / climate nexus.



# Global food losses and food waste



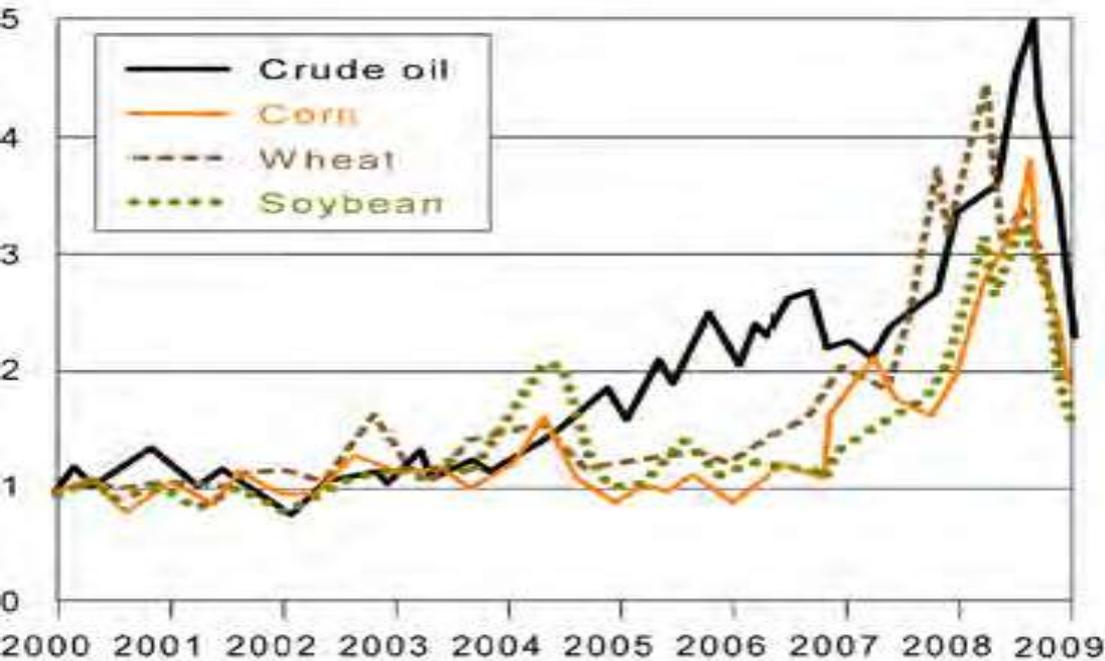
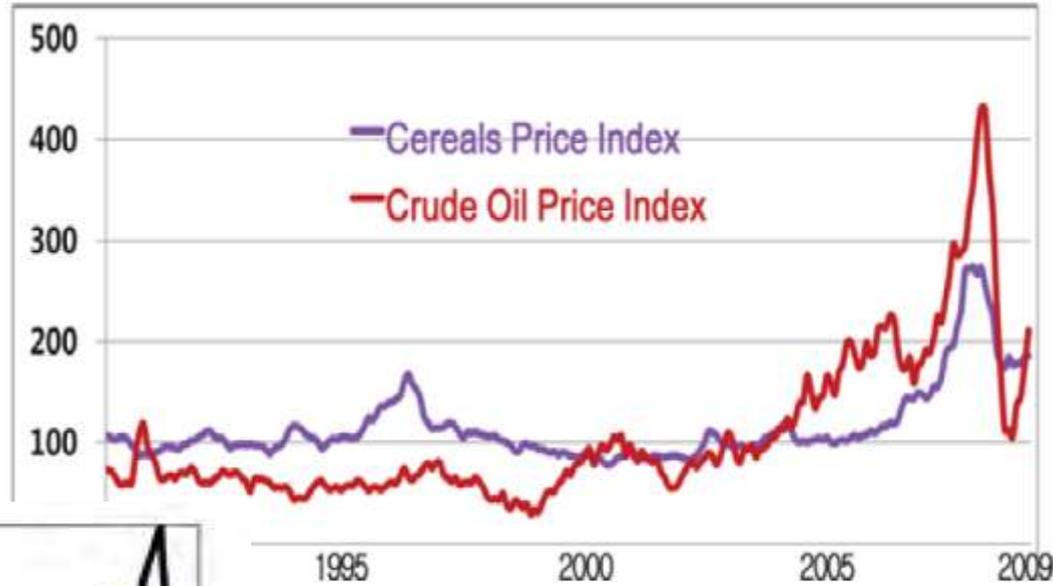
**We fail to consume around one third of all food produced.**

**This wastes scarce land, water and energy resources.**

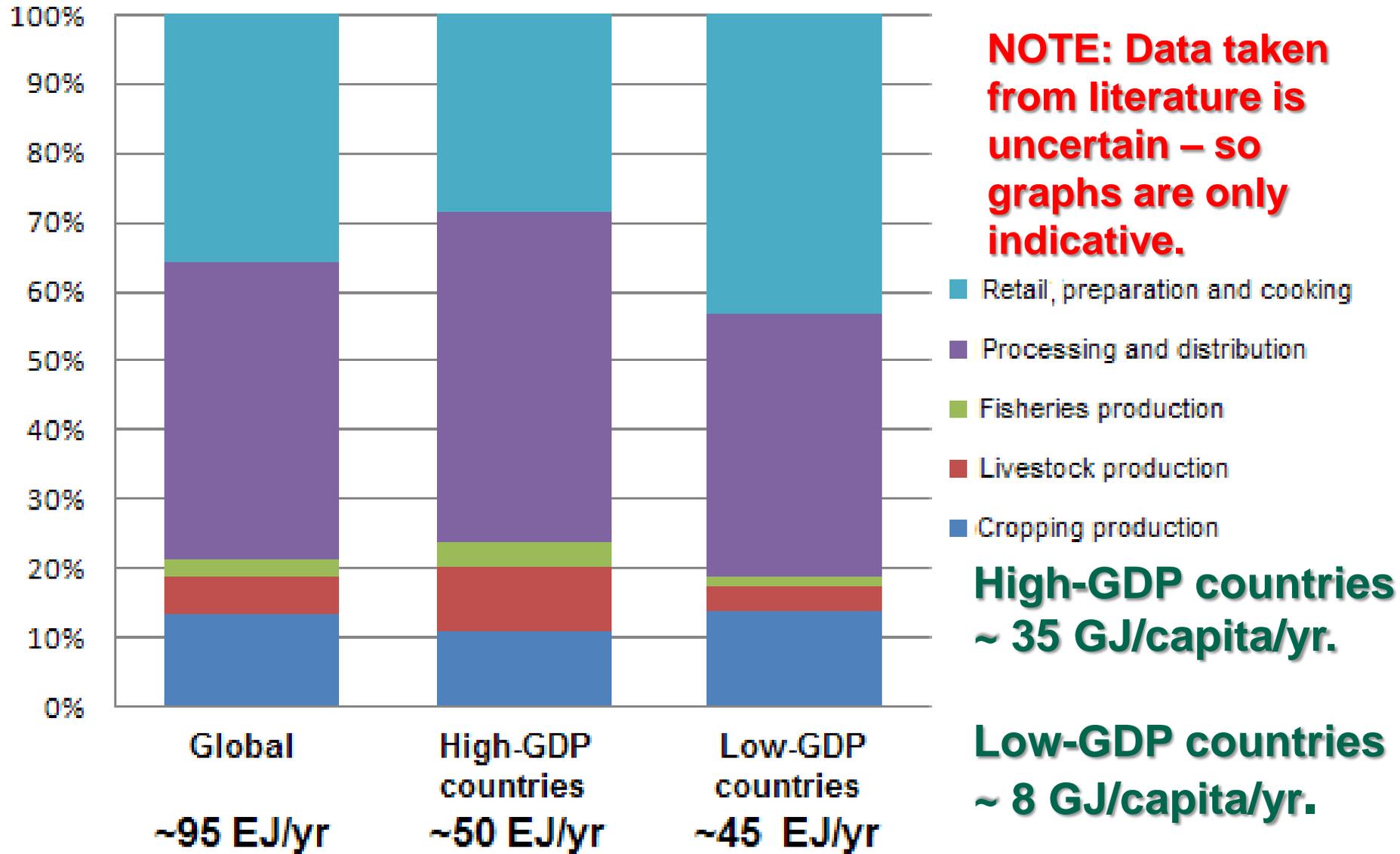
# **So what is this energy problem?**

- **The global agri-food supply chain (from “paddock-to-plate”) is heavily dependent on fossil fuel inputs – both direct and indirect.**
- **Current concerns are mounting over oil/gas/coal reserves and related greenhouse gas emissions.**
- **Modernizing food systems in developing countries simply by increasing fossil fuel inputs may no longer be feasible as it was in the past for the Green Revolution for OECD countries when there were abundant supplies of cheap energy.**
- **Alternatives to cheap fossil fuel inputs are not being considered as options to improve food supply systems and security in all countries.**

# Food prices have recently become strongly linked with oil/gas prices.



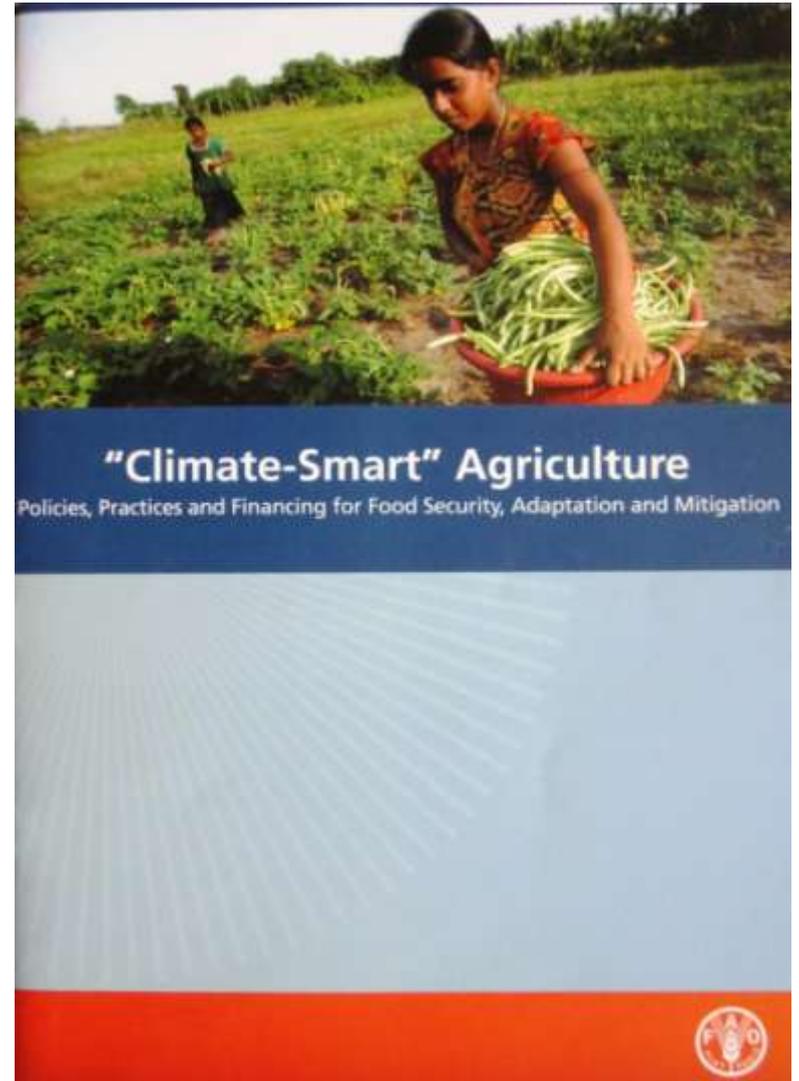
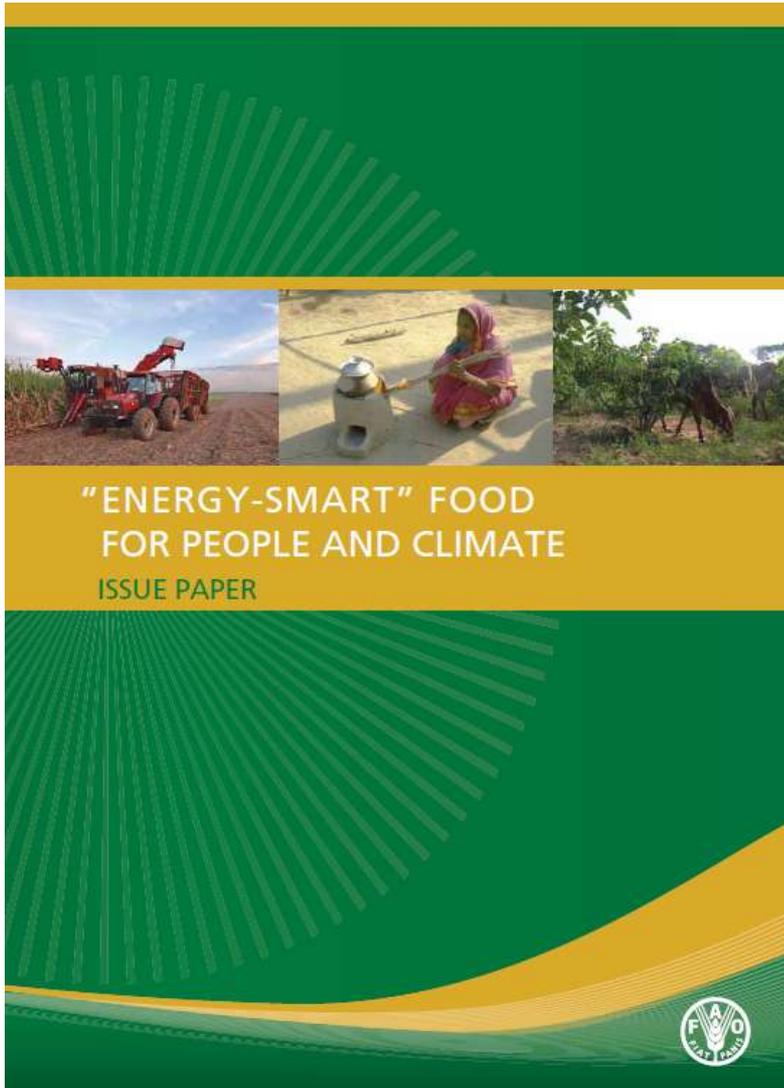
# Shares of energy in Agri-food supply chain



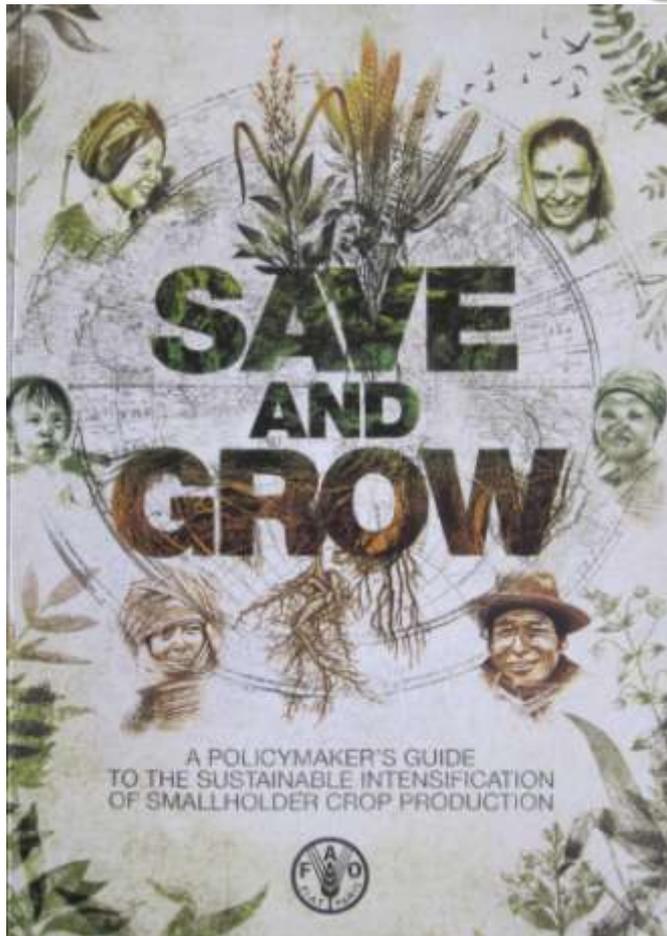
**Around 32% of the total global end-use energy demand of ~300 EJ/yr is used for providing food.**

# What is the solution?

## “Energy-Smart is Climate-Smart”



**Making the agri-food supply chain Energy-Smart and Climate-Smart is part of a larger paradigm shift to “*do more with less*” being promoted by FAO and partners as “Save-and-Grow”**



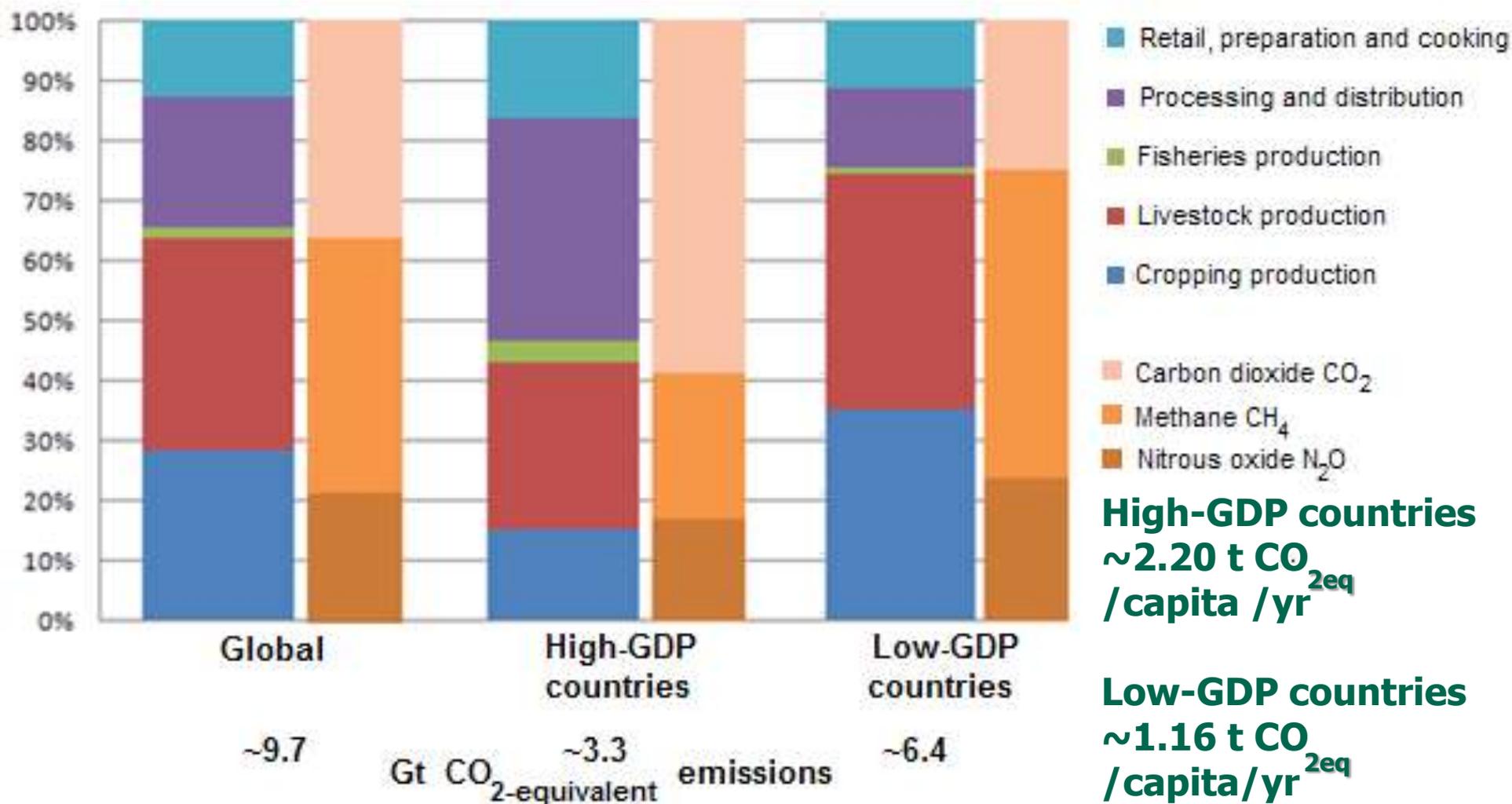
**“Making agriculture more productive and resilient will demand better management of our natural resources – land, soil, water and energy.”**

# **Energy-Smart food:**

- Improves access to modern energy services for energy-poor subsistence farmers and fishers to provide increased food supply and security.**
- Ensures energy inputs, from whatever sources, are used more efficiently than at present along the entire agri-food supply chain.**
- Reduces the energy intensity (MJ / kg of food product) of both direct and indirect energy inputs.**
- Captures the renewable energy sources available and uses them to displace fossil fuels.**
- Simultaneously enhances food security, sustainable development, climate change mitigation, and resilience by reducing GHGs.**

# Shares of greenhouse gas emissions

Around 22% of total global GHG emissions (~45 Gt CO<sub>2</sub>-equiv /yr) arise from the agri-food chain.



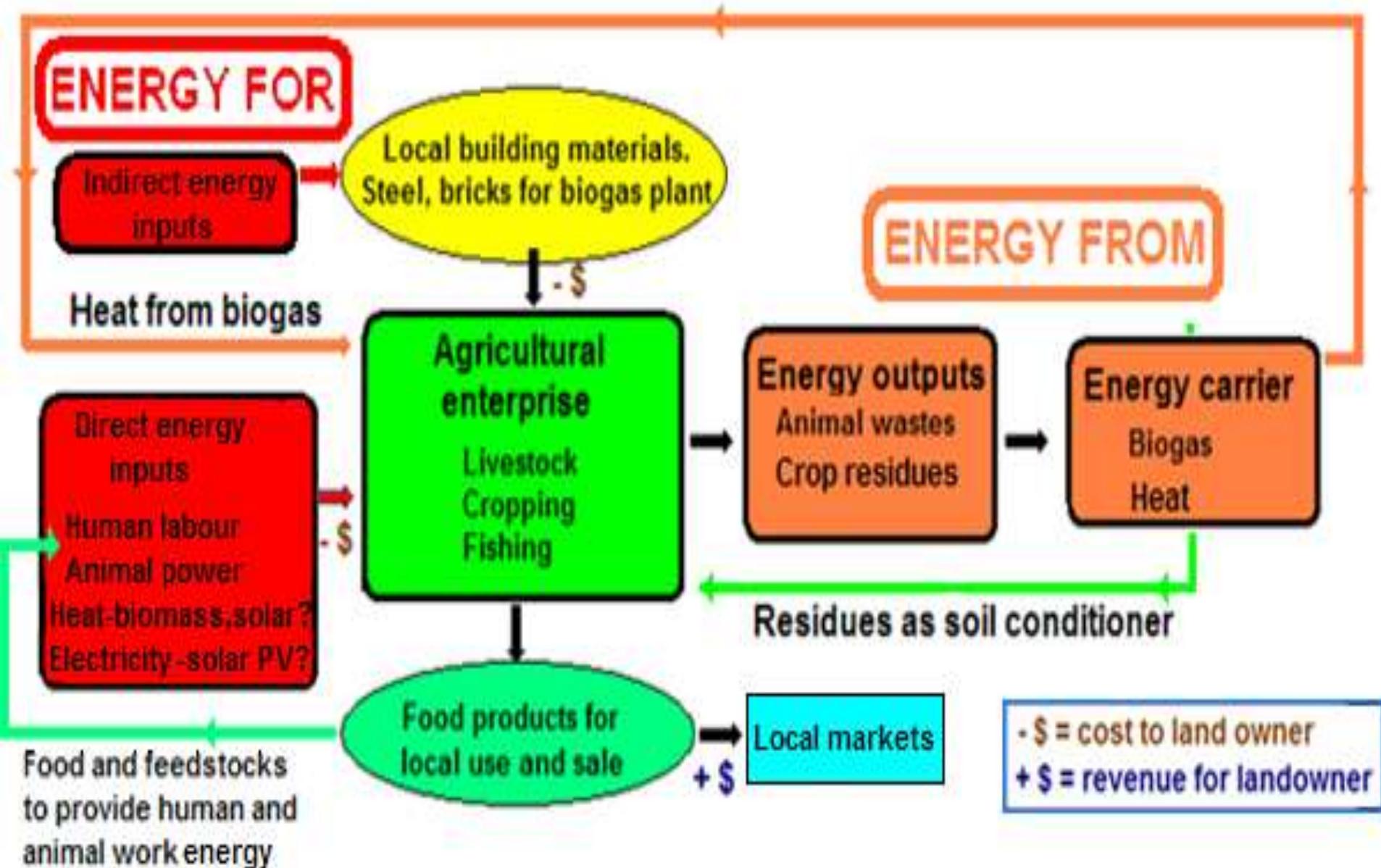
# Why is the problem complex?

- All agri-food systems depend upon energy inputs regardless of scale.
- Scales of an agri-food system range from
  - subsistence farmers growing food or fishing for their own consumption,
  - family units supplying local markets,
  - small businesses employing a few staff,
  - large corporate companies supplying huge supermarket chains across the world.
- They each have different energy use priorities, but both low- and high-energy systems can also use renewable energy.

# ***A low input agri-food / energy system***



# A *low input* agri-food /energy system



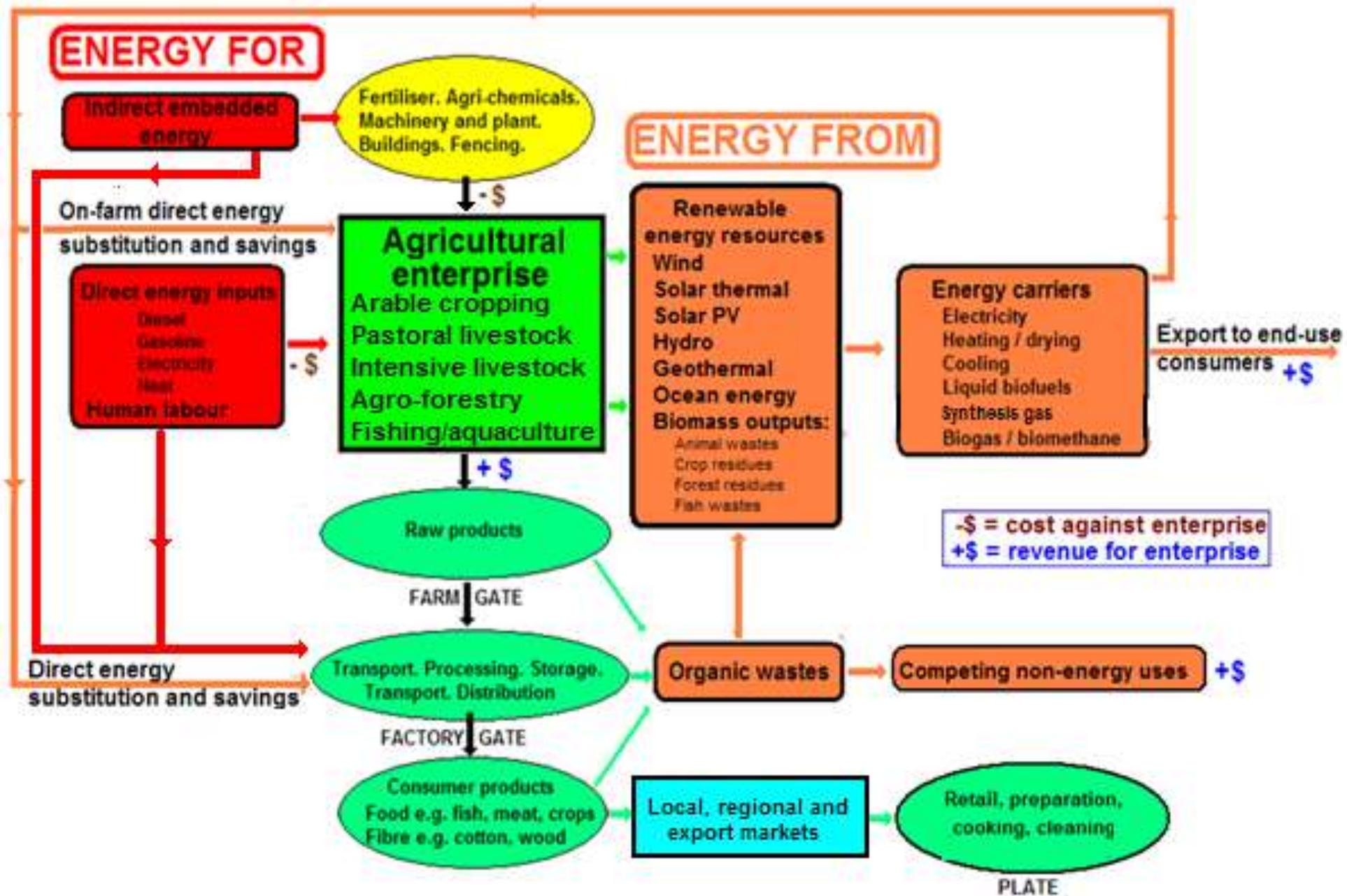
# *A low input agri-food / energy system*



# *A high input agri-food energy system*



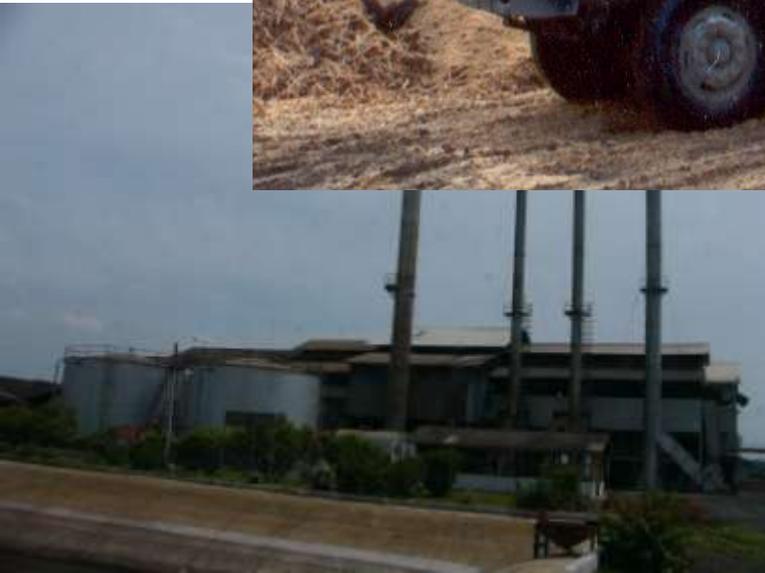
# A *high input* agri-food/energy system



# Energy efficiency opportunities are widespread throughout the agri-food supply chain



# Energy efficiency opportunities are widespread throughout the agri-food supply chain



# **Renewable energy:**

- can enhance access to reliable, affordable and clean modern energy services;**
- is particularly well-suited for remote rural populations; and**
- in many instances can provide the lowest cost option for energy access.**

**IPCC -**

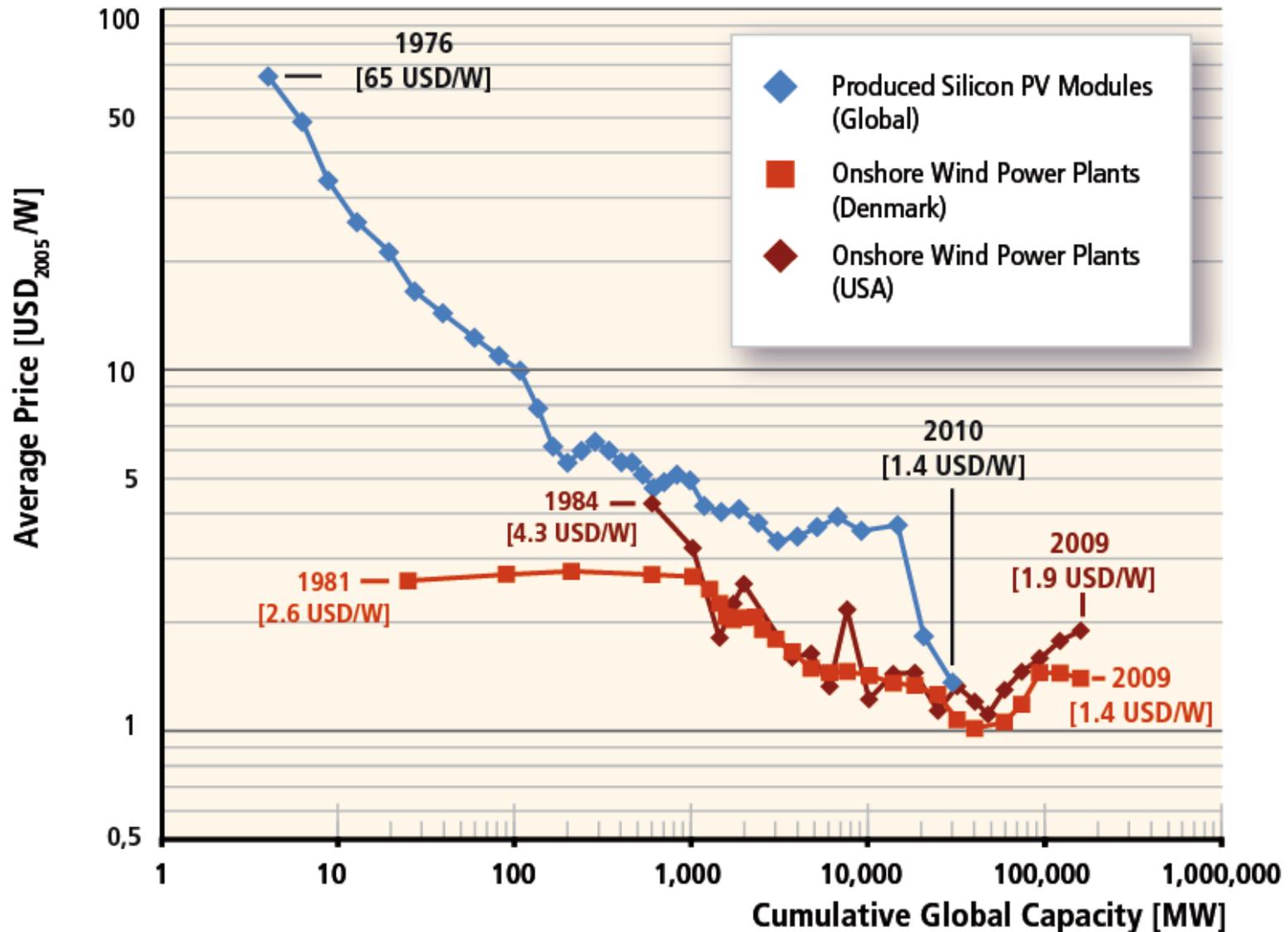
**Special Report on Renewable Energy, July, 2011.**

**[www.ipcc.ch](http://www.ipcc.ch)**

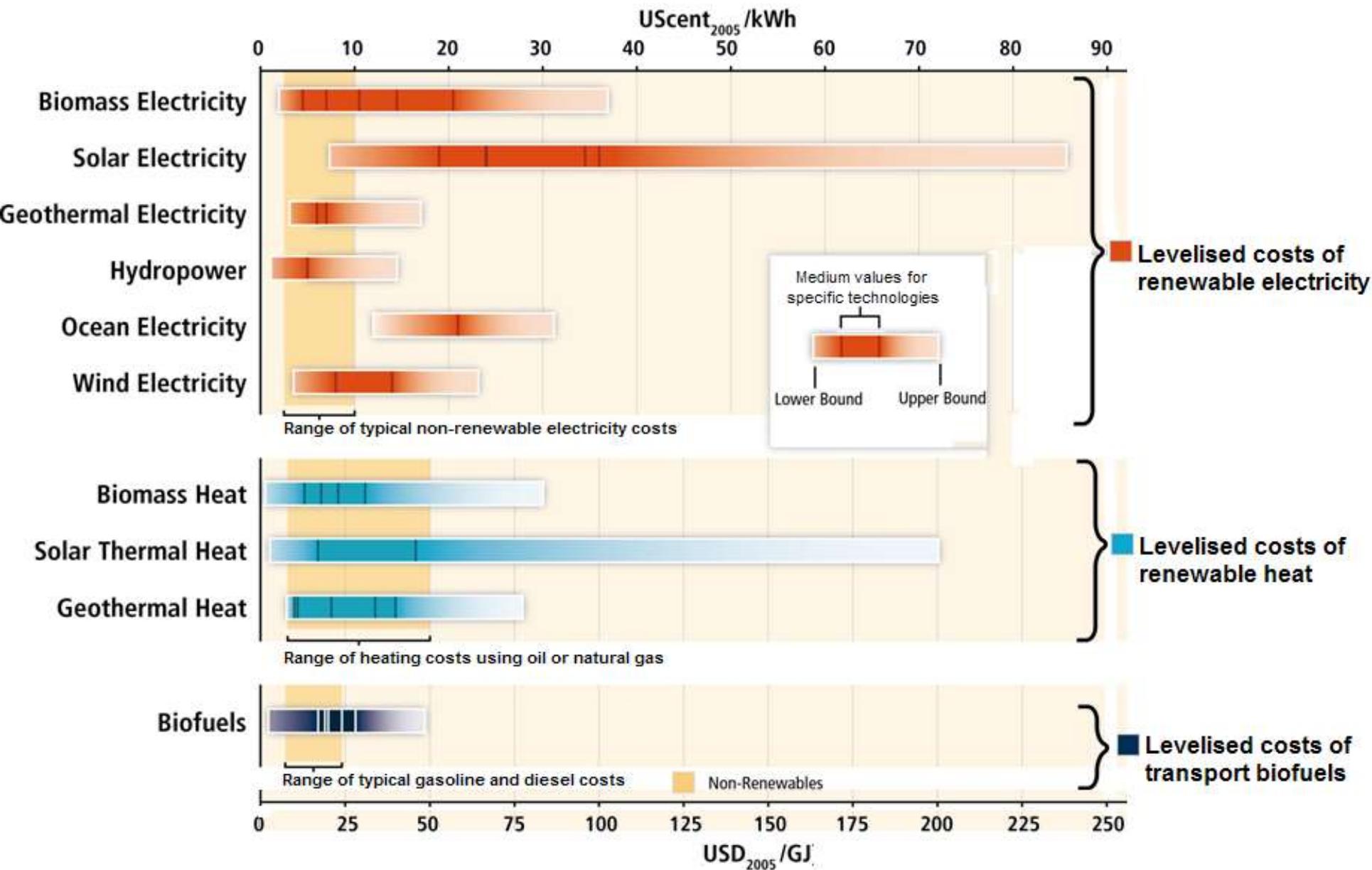




# RE costs continue to decline through increased project experience and improved performance. Further reductions can be expected.



# RE costs are often higher than current energy prices but can be competitive in various settings. <sup>24</sup>



**So where to from here?**

# **UN Secretary General UN General Assembly, 2011**

**The General Assembly of the United Nations  
declared 2012 to be the**

***International Year of Sustainable Energy  
for All.***

**Initiatives by Member States and international  
organizations are being undertaken to  
create an enabling environment at all levels  
for the promotion of access to energy and  
energy services and the use of new and  
renewable energy technologies.**

# **What policies could help drive the transition to Energy-Smart food?**

- A long-term view is needed to gain the paradigm shift to Energy-Smart food systems.**
- “How do we get started and make gradual and steady progress?”**
- Policies for supporting renewable energy uptake are diverse but well understood.**
- Policy formulation regarding energy and food should be co-ordinated amongst government ministries responsible for food, agriculture, energy, health, transport, economic development and environment.**
- FAO is aiming to assist member countries to address the food/energy /climate nexus.**

- **Given the complexity and challenges involved, the shift towards Energy-Smart food systems will be gradual.**
- **There is need to strengthen the major gaps in knowledge regarding the food/energy/climate nexus.**
- **Energy-Smart food systems can only work if legal and regulatory frameworks on land use are in place before introducing renewable energy.**
- **FAO is proposing a multi-partner programme on Energy-Smart and Climate-Smart food systems to be launched in 2012.**

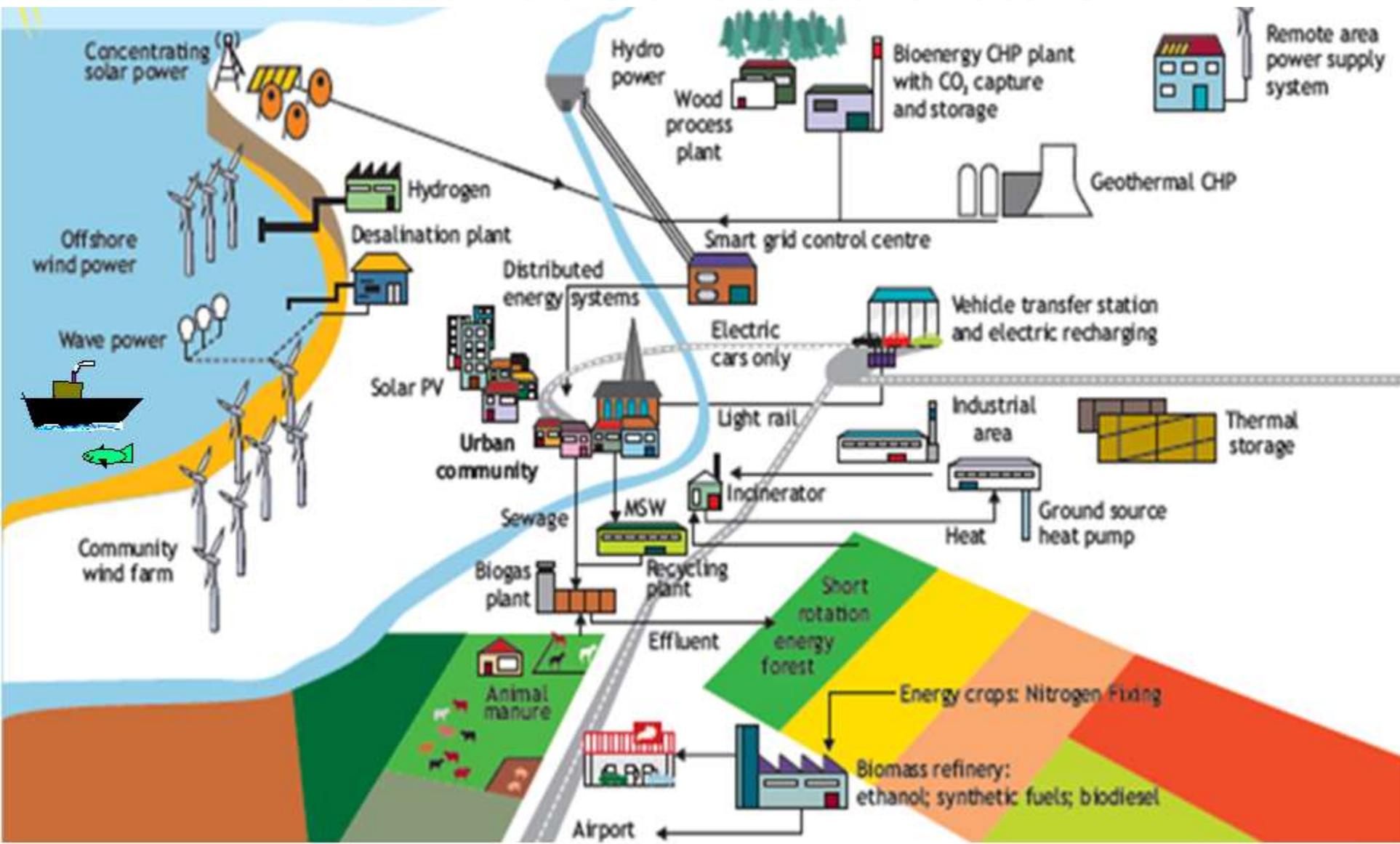
**FOR MORE INFORMATION ON THE PROGRAMME CONTACT:**

**[Olivier.Dubois@fao.org](mailto:Olivier.Dubois@fao.org)**

# In summary

- The global agri-food supply chain can be decoupled from its dependency on fossil fuels in order to meet future food demands.
- Reducing energy intensity is technically possible at all levels along the chain.
- Renewable energy technologies can help improve energy access, food security, price fluctuations and climate change impacts.
- Policy development to drive the transition to Energy-Smart food and reduce food losses needs a long-term vision.
- We are running out of time.....

# Future integration of the agri-food and energy sectors in a landscape perspective to give a sustainable and secure future.



# Shares of embedded direct and indirect energy inputs in the ONE THIRD of food produced globally that we fail to consume.

