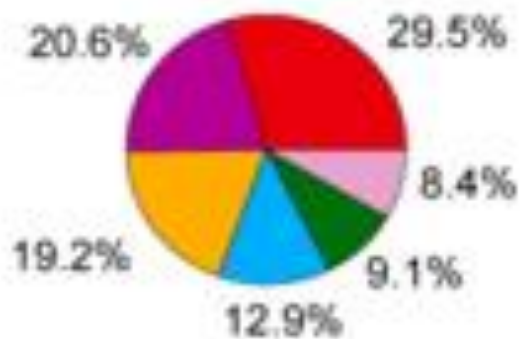
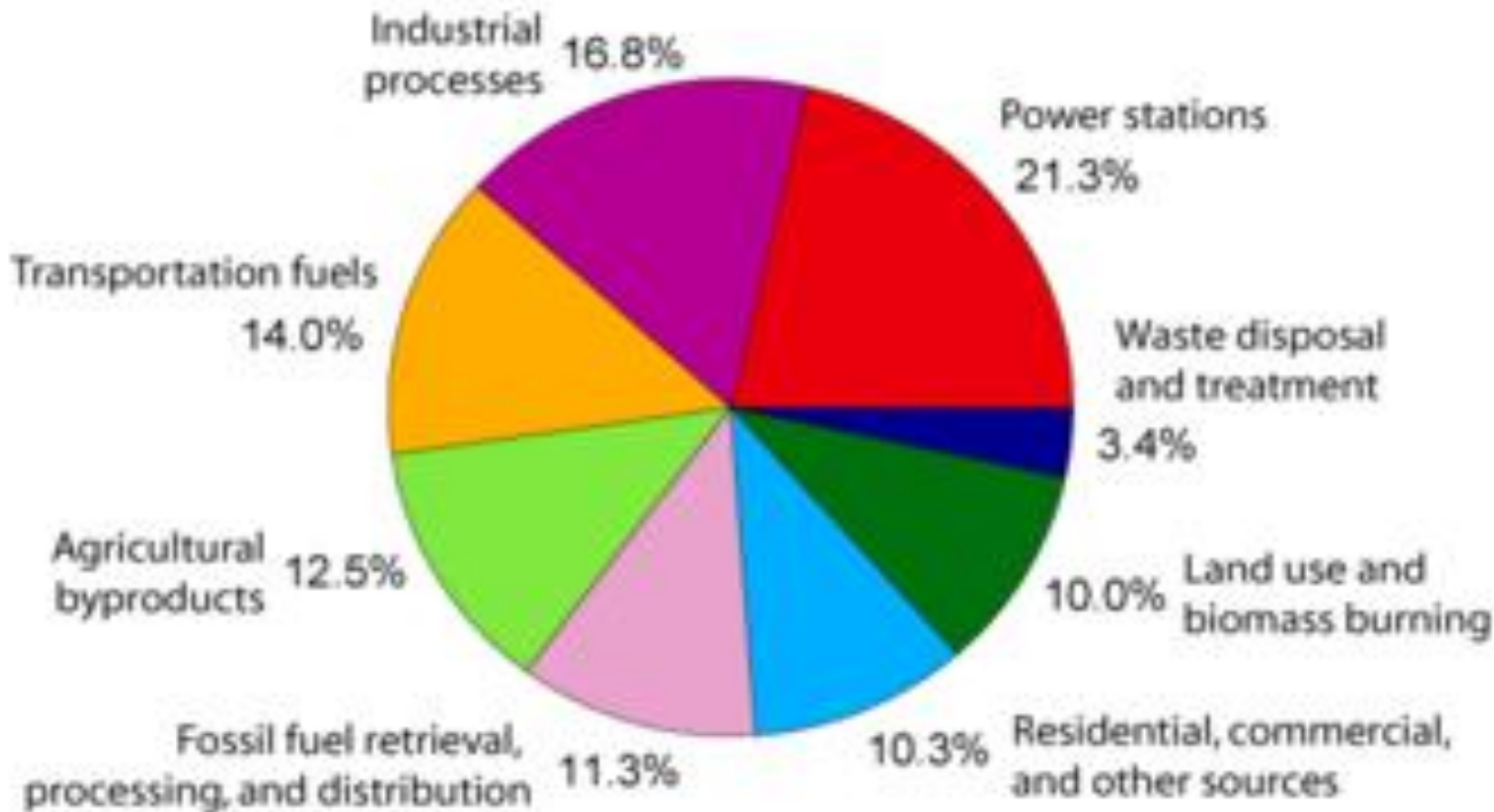


**THE MEKONG DELTA -
RISKS AND OPPORTUNITIES
IN THE FACE OF CLIMATE
CHANGE AND RESOURCE
DEPLETION**

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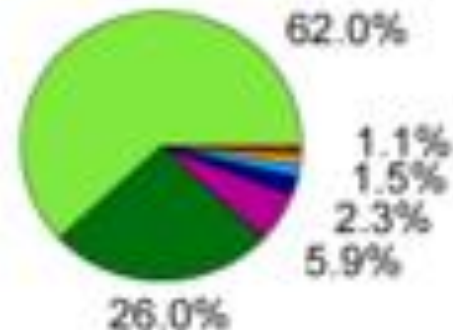
Annual Greenhouse Gas Emissions by Sector



Carbon Dioxide
(72% of total)



Methane
(18% of total)



Nitrous Oxide
(9% of total)

Source:
WIKIPEDI
A

How agriculture in the Mekong Delta contribute to global warming

- Land uses
 - Lost mangrove forests > CO₂ increases
 - Extensive rice growing > CH₄ increases
 - Livestock raising > CH₄ increases
 - Agricultural technology
 - Fertilizers application > N₂O increases
 - Use of fossil fuel (pumps; thermal power...)
 - Emission of CO₂ and other gases
- >> ***need quantitative data.***

Global Warming Potential (GWP)

$$\text{CH}_4 = 21 \text{ CO}_2$$

$$\text{N}_2\text{O} = 310 \text{ CO}_2$$

Impact on MKD agriculture

- Increase in air temperature
 - Crop yields may be affected adversely
 - More insects and diseases expected
- Changes in water level
 - More frequent floods during rainy season
 - More severe drought during dry season
 - Salinity intrusion further inland (2009: 120 km)
 - By 2100, inundated from 19-59 cm, even to 100 cm (IPCC 2007 Report)

Skeptic argument (John A. Jauregui)

“In the scientific papers, nothing has done more to “GREEN” the planet over the past few decades than elevated levels of atmospheric CO₂ together with moderate sun-driven warming of the planet. If in doubt this assertion, simply Google “*Biological Effects of Carbon Dioxide Enrichment*” and “*Solar Inertial Motion (SIM) model of global warming*”. Then review the basic documents and a sampling of the scientific bibliographic references. One has to ask the question, “Why have environmental groups and our government turned this obvious gift of nature on its head and buried us in propaganda designed to convince us of just the opposite reality?” As a consequence, I have stopped all donations to environmental organizations... I highly encourage you to do the same.”

How to be resilient to CC impacts

- Reduce rice production ?
- Reduce livestock raising ?
- NO! We may have better approaches toward mitigation of the adverse impacts of CC by:
 - Adaptation
 - Mitigation
 - International collaboration

Adaptation to CC (1)

- Reforestation of the coastal mangroves and conserving their biodiversity will
 - enhance environmental resilience,
 - reduce Vietnam's net contribution to climate change
 - provide valuable community assets, tourism resources and even saleable pollution offsets via Clean Development Mechanism schemes.

Adaptation to CC (2)

- Policy makers to provide better farm infrastructures and research facilities:
 - Develop more sustainable farming systems using appropriate crop-animal-aquaculture integration.
 - Breed crops for tolerance to heat, submergence, or salinity; resistance to new species of insects and diseases.
 - Construct empoldered areas to grow valuable fruit trees replacing rice.
 - Construct empoldered residential areas.

Mitigation measures (1)

- Farmers adjusting cultivation practices:
 - Rice farmers:
 - Stop over fertilizing; apply balanced fertilizers
 - Apply safe pesticides.
 - Apply intermittent irrigation.
 - Apply zero-tillage seeding technique.
 - Use all straw and stubbles for feeding to buffaloes or cows, then use livestock manure for biogas production and organic fertilizer to return to soil
 - Use straw for mushroom production, then return the depleted straw to soil.

Mitigation measures (2)

- Livestock producers:
 - Use rice straw as much as possible
 - Use appropriate feed plants for farm yard animals (*Stylosanthes guianensis*, *Gliricida sepium*, Cassava leaves, Sweet potato leaves, water spinach, Duckweed, *Moringa oleifera*, jackfruit leaves)

International collaboration

- The Tra Noc thermal power plants ***versus*** some carbon-friendly, nuclear, renewable, and perhaps clean coal power plant.
- Reforestation of the coastal mangroves for protection.
- Production of clean refrigeration equipment.