

Sustainable Cold Chain Systems for Food Loss and Waste Reduction

Rosa S. Rolle, Ph.D

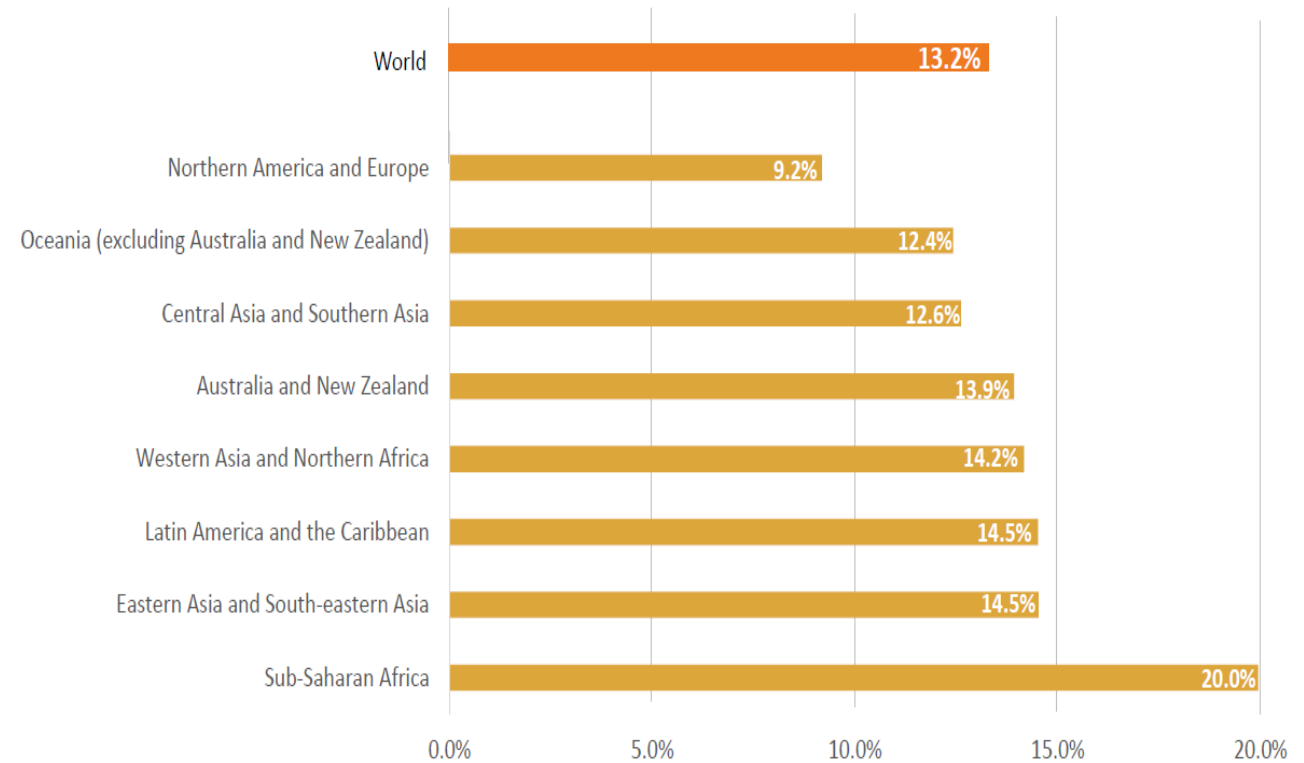
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Global Facts and Figures

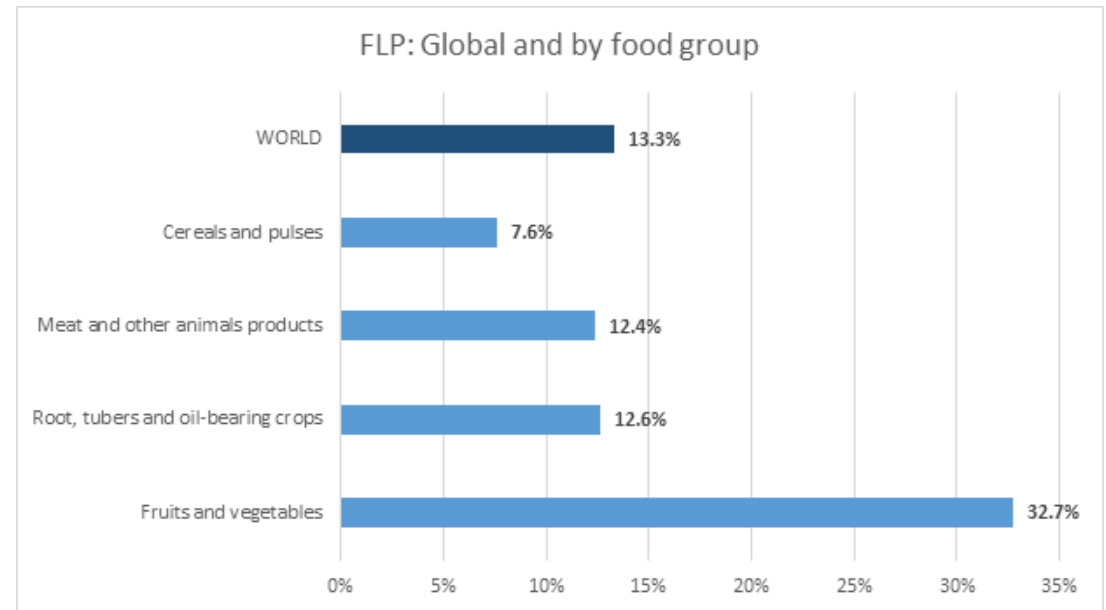
- An estimated 13 percent of food is lost in the supply chain, the equivalent of 122 Kg/capita/per year or 931 MMT of food (FAO, 2022).
- Food loss and waste account for 8 - 10 % of global greenhouse gas emissions (IPCC,2019).
- In 2022 about 9.2 per cent of the global population faced hunger, the equivalent of 735 million people – 122 million more than in 2019 (FAO et al., 2023).



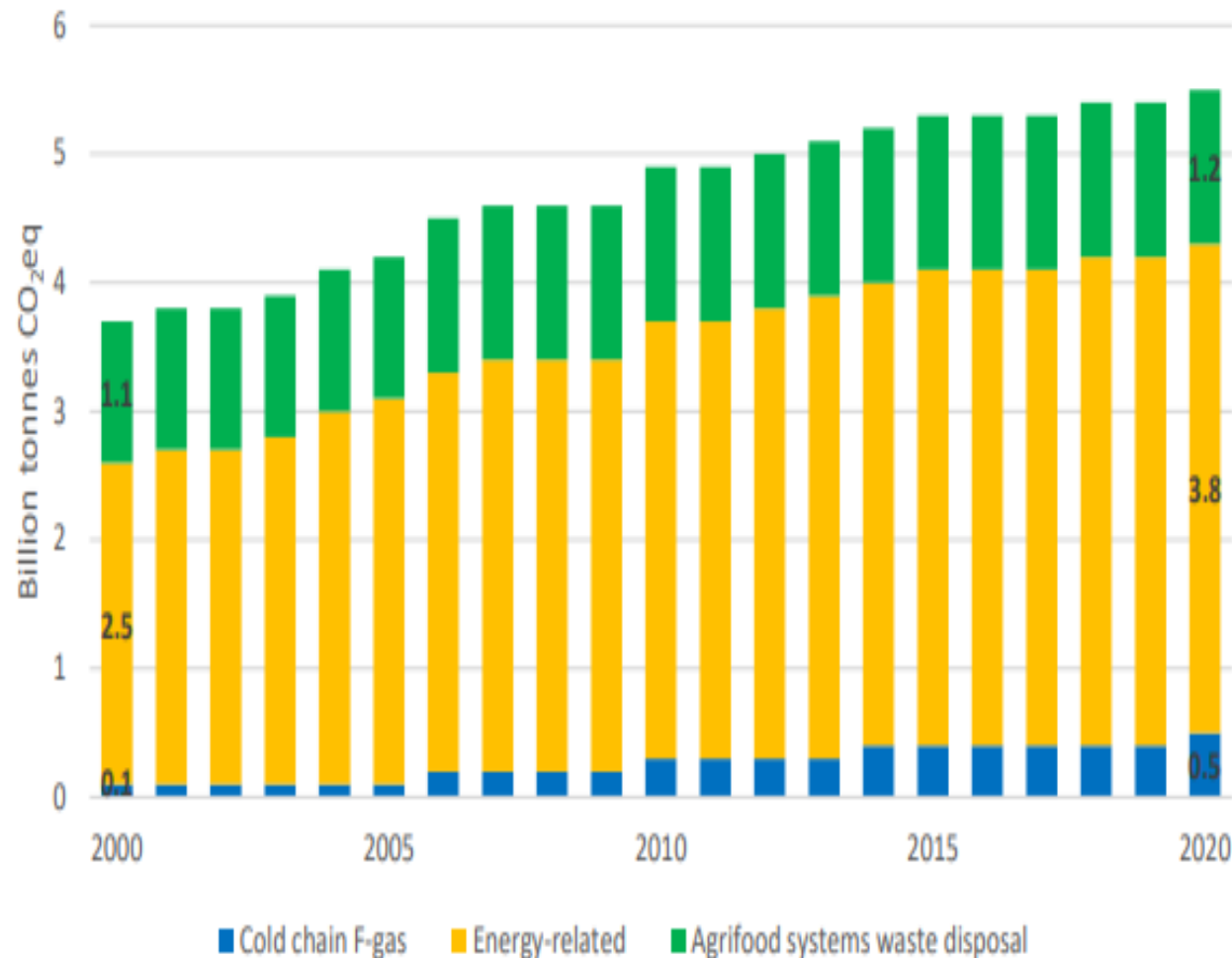
Cold Chains – opportunities and risks



- Cold chains can help to fight food insecurity, prevent and reduce food losses, and improve economies across the developing world
- Reliable cold chains are critical components of local, national, and global food systems.
- Cold chain activities account for 5 % of global food system emissions (Crippa, *et al*, 2021).
- Food cold chains have serious implications for climate change and the environment.



Pre-and post-production emmissions across agrifood systems



Trends in pre- and post-production emissions (2000-2020)

- A 38 % increase in emissions from energy related activities in agrifood systems.
- A five-fold increase in emissions fluorinated gases (associated with cold chain systems).
- An 11 % increase in agrifood system disposal.

Comparison of Pre- and Post-Production Emissions by GHGs (2000 – 2022)

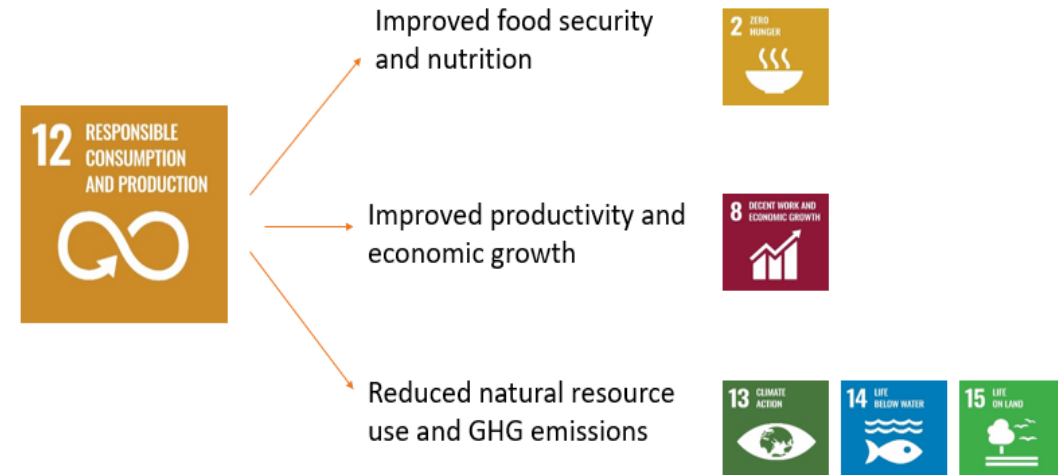


Greenhouse Gas	Pre – and post-production emissions
Carbon Dioxide	A 48 % increase in CO ₂ from 2.4 Gt CO ₂ eq to 3.6 GT CO ₂ eq
Nitrous Oxide	A 42 % increase in the CO ₂ eq emissions of nitrous oxide
Methane	A 10 % increase in the CO ₂ eq emissions of methane
F-Gases	A 517 % increase from 0.07 GT CO ₂ eq to 0.46 eq -which reflects accelerating expansion of food cold chains especially in low-income countries.

Sustainable Cold Chains and Cooling Systems



- With rising global temperatures, the demand for cooling technologies and systems to reduce food losses will continue to increase.
- Reducing food loss and waste can positively impact climate change, but only if new cooling-related infrastructure is designed to use gases with low global warming potential, is energy efficient and makes use of clean sources of energy and low carbon transportation.
- Sustainable cooling systems and cold chains can make an important difference in collective efforts to reduce food loss and waste.



Policy Recommendations



- Governments and other cold chain developers should conduct cold chain needs assessments and develop National Cooling Action Plans (NCAPs) to provide the underlying direction for holistic and sustainable cold chain infrastructure creation and to rationalize cold chain programmes across ministries.
- In line with NCAPs, governments should develop costed and sequenced five-year plans, missions, policies and dedicated agencies/departments, and provide financial assistance and capacity support for sustainable food cold chain components, with the aim of achieving seamless movement of agricultural products from farm to fork.
- Governments and other cold chain developers should collaborate with relevant institutions to quantify and value the broader socio-economic impacts of sustainable cooling and cold chains, taking into account poor, disadvantaged and marginalized food producers and their communities, as well as women and youth.
- Governments, working with industry and relevant stakeholders, should build digital twins to guide “build-to suit” projects for local implementation.

Source: UNEP and FAO: Sustainable Food Cold Chains

Thank You