



*Climate change: melting glaciers, diminishing water resources, trapped sunrays increase global warming*



# **THE COLD CHAIN IN DEVELOPING COUNTRIES**

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## THE COLD CHAIN IN DEVELOPING COUNTRIES

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### Introduction

Each product has its own lifetime for sanitary, nutrition and organoleptic qualities depending on:

- the nature of the product (meat, fish and seafood, milk and dairy products, fruits and vegetables ...)
- the initial microbiological condition.  
The weakest point is the main problem
- the temperature it is stored and transported. It is the same with many health products as well as plants and flowers.

There are increasing needs in developing and emerging countries due to the growth of the population, particularly the urban population, as well as the fact that the cold storage capacity per inhabitant is tenfold less in developing countries than in developed countries (with of course important variations country by country).

More in details:

Year	Unit	2000	2015	2030	2050
Global population	Billion inhabitants	6.12	7.30	8.31	9.15
Population of developed countries*	Billion inhabitants	1.19	1.25	1.28	1.28
Population of developing countries**	Billion inhabitants	4.92	6.05	7.03	7.87
% of global population	%	80.5	82.9	84.6	86.0
Undernourishment <sup>2</sup>	Billion inhabitants	0.86	0.61	0.44	

\*More-developed regions

\*\*Less-developed regions

	World population	Developed countries*	Developing countries**
Population in 2009 (billion inhabitants) <sup>1</sup>	6.83	1.23	5.60
Refrigerated storage capacity (m <sup>3</sup> /1000 inhabitants) <sup>11,12</sup>	52	200	19
Number of domestic refrigerators (/1000 inhabitants) <sup>11,13,14</sup>	172	627	70
Food losses <sup>***</sup> (all products) (%) <sup>9,15,16</sup>	25%	10%	28%
Losses of fruit & vegetables <sup>***</sup> (%) <sup>9,15-20</sup>	35%	15%	40%
Loss of perishable foods through a lack of refrigeration (%) <sup>15,16</sup>	20%	9%	23%

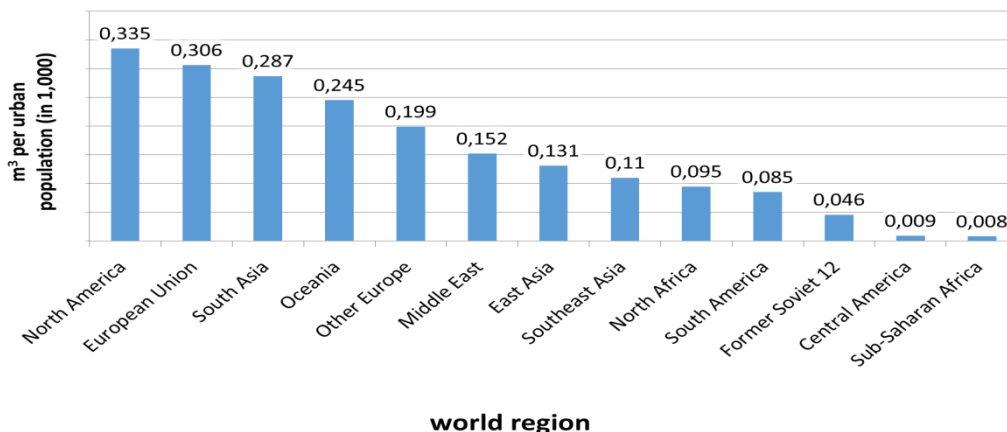
\*More-developed regions

\*\*Less-developed regions

\*\*\* The loss rate comprises post-harvest losses, i.e. during processing, storage, transport and retail sale. It does not include final losses at consumer level for several reasons:

- These final losses are particularly difficult to evaluate, although a US study has demonstrated that such losses are about 14% in the USA;
- The value of final losses depends far less than post-harvest losses on the refrigerated equipment available in industrialized countries that are well-equipped: waste accounts for a major amount of losses; Kader (University of California) considers that final losses are slightly higher in developed than in developing countries.

**Capacity of cold storage warehouses by world region.**



**TABLE 1 Comparison of the cold storage capacity per capita in selected sub-Saharan African countries**

	Ethiopia	United Republic of Tanzania	Namibia	South Africa
Capacity (litres/capita in urban areas)	2	2	5.1	15

Source: IARW, 2012.

Note: Data are for 2012, except for South Africa, for which 2008 data are shown.

**TABLE 2 Production of perishable foodstuffs in sub-Saharan Africa in 2010, and average annual growth in production in 2000–2010**

	Fruits	Vegetables	Roots and tubers	Meat	Milk	Fish (capture and aquaculture)	Total production and average rate
Production (thousand tonnes/year)	72 063	33 802	225 494	11 332	24 000	6 140	372 831
Annual growth 2000–2010 (%)	3.8%	3.7%	3.6%	3.8%	4.6%	11.9%	5.2%

Source: FAO, 2013.

Some figures apply for refrigerated transport:

Two main categories:

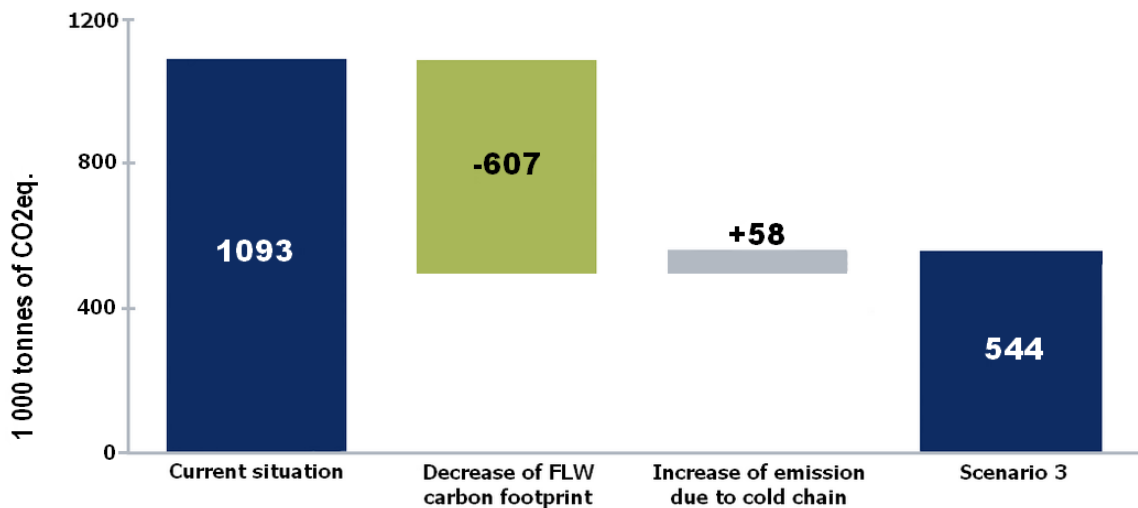
- refrigerated vehicles: 4 millions (2015)
- refrigerated containers: 1,2 Millions (2015)

Vehicles:

- 1/450 inhabitants in Europe
- 1/13 000 inhabitants in China (2011)
- 1/ 150 000 inhabitants in India (2014)

## Conclusions

There is everywhere (in developed as in developing countries) a need of controls and traceability, because health is a vital issue. However, investing in the food cold chain in developing countries can also increase the food supply by 15% at least (and the more you preserve the food, the more you produce market growth stimulating increases in production). Moreover, it can reduce the carbon footprint



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IIR actions in that field are thus numerous:

- European research projects with the aim of generating improvements in every country: FRISBEE, Cool Save, Supersmart ...
- Publications (Informatory Notes and Joint Policy Briefs)
- The Working Group on the cold chain in hot climates
- The Conferences and Workshops (New Zealand, Tunisia, Dubai, China ...)
- Partnerships with non-profit organisations (FAO, UNIDO ...)
- Works with the private sector

