covestro

PURE FACTS

Tackling food loss through improved cold chains

Contents

A problem of global dimensions

With the global population predicted to grow to well over 9 billion by 2050 and available farmland shrinking due to the rapid pace of urbanization and the effects of climate change, food security is an increasingly critical issue. How will the 158 hungry mouths born every minute be fed? This focus on food security has also pinpointed a related problem – the food losses in developing countries caused by inadequate or non-existent cold chains.

If nothing is done to reduce food loss and waste, food production will have to increase by as much as 70% in developing countries alone to feed those hungry mouths in 2050. Boosting food production to this extent will require an estimated investment of US$83 billion a year[1].

There is no evidence that this is happening. One sensible alternative is to tackle perishable food losses by improving the cold chain, i.e. the uninterrupted temperature-controlled transportation and storage of perishable goods between growers and consumers. In September 2015 the United Nations summit popularly known as Rio+20 adopted a set of 17 Sustainable Development Goals (SDGs) to build on the Millennium Development Goals.

Of the 17 SDGs, five are of particular relevance to the cold chain:

Goal 1: End poverty in all its forms everywhere
Goal 2: End hunger, achieve food security and improved nutrition, and promote sustainable agriculture
Goal 3: Ensure healthy lives and promote wellbeing for all
Goal 10: Reduce inequality within and among countries
Goal 13: Take urgent action to combat climate change and its impacts

A significant reduction in perishable food losses would significantly reduce poverty and hunger, improve nutrition, ensure healthier lives, reduce inequality, and combat climate change. Only around 10% of perishable foods are refrigerated worldwide[2], even though refrigeration is the best technology for prolonging the shelf life of perishable foods and ensuring food safety. This brochure shows how raw materials for polyurethane made by us can make a key contribution to improving the cold chain and help achieve these SDGs. Thus, our vision – "We exist to make the world a brighter place" – perfectly fits the UN's development agenda beyond 2015.

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[1] Rockefeller Foundation: Waste and Spoilage in the Food Chain, in Decision Intelligence Document (Rockefeller Foundation, 2013)

[2] Coulomb, D: Refrigeration and cold chain serving the global food industry and creating a better future: two key IIR challenges for improved health and environment, in Trends in Food Science & Technology 19, 413-417 (2008)

Polyurethane – the cold chain problem-solver

We manufacture the raw materials for polyurethane insulating foam, which is one of the practical preconditions for unbroken cold chains that would significantly increase food supply in developing countries.

Ultra-efficient insulation

The problem of food lost during transportation, storage and processing could be largely solved with existing cold chain products and technologies. Polyurethane (PU) insulating foam is a key component in a functioning cold chain – in applications ranging from cold storage building insulation and refrigerated transport units to cold storage in stores and homes. The advantages PU offers include an excellent insulation-to-thickness ratio, a positive lifetime energy balance and CFC-free production. As one of the world-leading manufacturers of polymers and high-performance plastics, we not only produce the raw materials for energy-efficient insulation throughout the cold chain but we are also researching to further improve PU's insulating qualities.

The part we are playing

We welcome the on-going expansion of the cold chain infrastructure as an effective means of tackling one of the major global issues. To this end, we are collaborating with interested parties to intensify cold chain know-how, gain new ideas, and evaluate new approaches. Moreover, we are proactively involved in the expansion process, for example by collaborating with NGOs and other partners to provide Indian farmers with low-cost solar-powered cold storage units. One example is the fork-to-farm integrated cold chain system set up up in Pune in partnership with Mr. Karrot, a fruit and vegetable retailer.

Benefits of improved cold chains in developing countries

- Increased food availability
- Significant reduction in undernourishment through a greater supply of vitamin-rich fruits and vegetables
- Effective contribution to environmental and climate protection

An economic and environmental disaster

Food loss is not just a problem of enormous significance for the health, wealth and wellbeing of people. It also has far-reaching economic and environmental impacts.

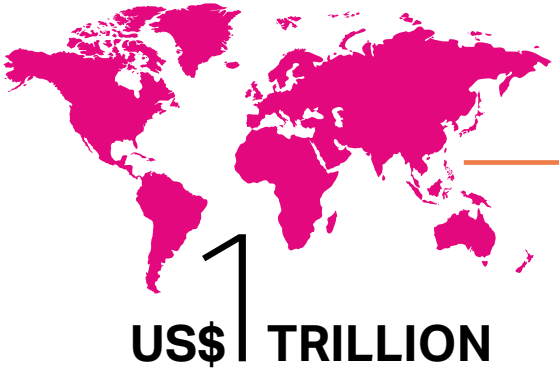
OF THE
4 BILLION
TONNES OF FOOD
PRODUCED WORLDWIDE

1.3 BILLION
TONNES OF FOOD ARE LOST ALONG THE FOOD CHAIN

Human consequences

805 MILLION
people worldwide suffer from chronic malnutrition and

2 BILLION
people fr have ome form of vitamin or nutrient deficiency.



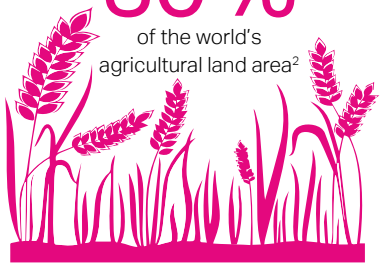
US$ 1 TRILLION

Economic impacts
The global economic loss associated with food loss is estimated at US$1 trillion.

Environmental footprint

Global footprint of water wasted[1] to produce food not eaten:
250 km³

Farmland required to grow food not eaten: around 1.4 billion ha or
30%
of the world's agricultural land area[2]



CO_2 EMISSIONS

CO_2 emissions generated in the production, packaging, transportation and decomposition of food not eaten:
3.3 BILLION TONNES
India is the world's third largest emitter of greenhouse gases after China and the US[3].

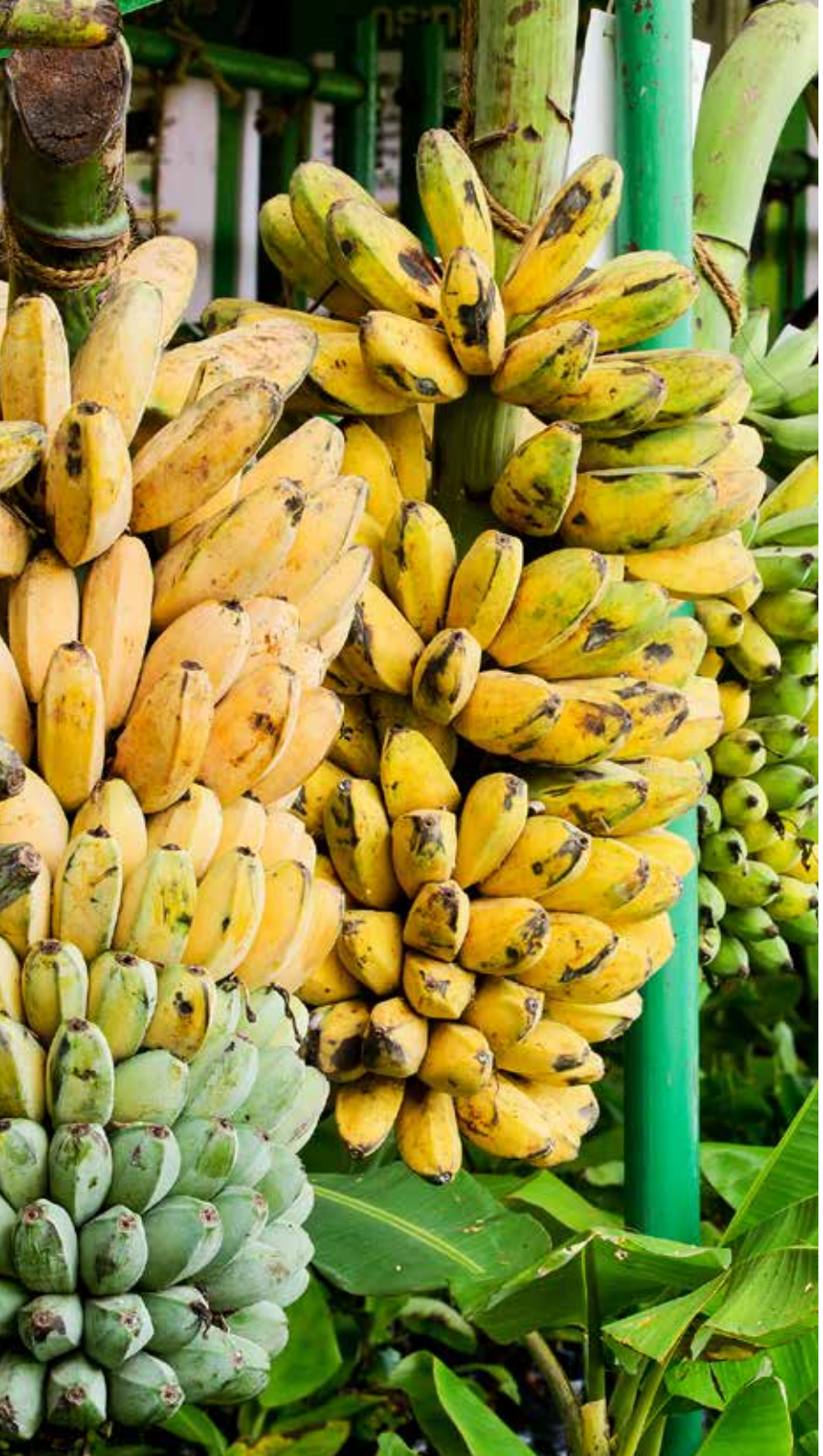
[1] Lundqvist, J., de Fraiture, C. & Molden, D.: Saving water: from field to fork: curbing losses and wastage in the food chain (2008)

[2] University of Nottingham: The impact of reducing food loss in the global cold chain (Final report 2015)

[3] O.J., Tostivint, C., Turbé, A., O'Connor, C. & Lavelle, P.: Food Wastage Footprint, Summary Report (FAO 2013)

India – an inefficient food manager

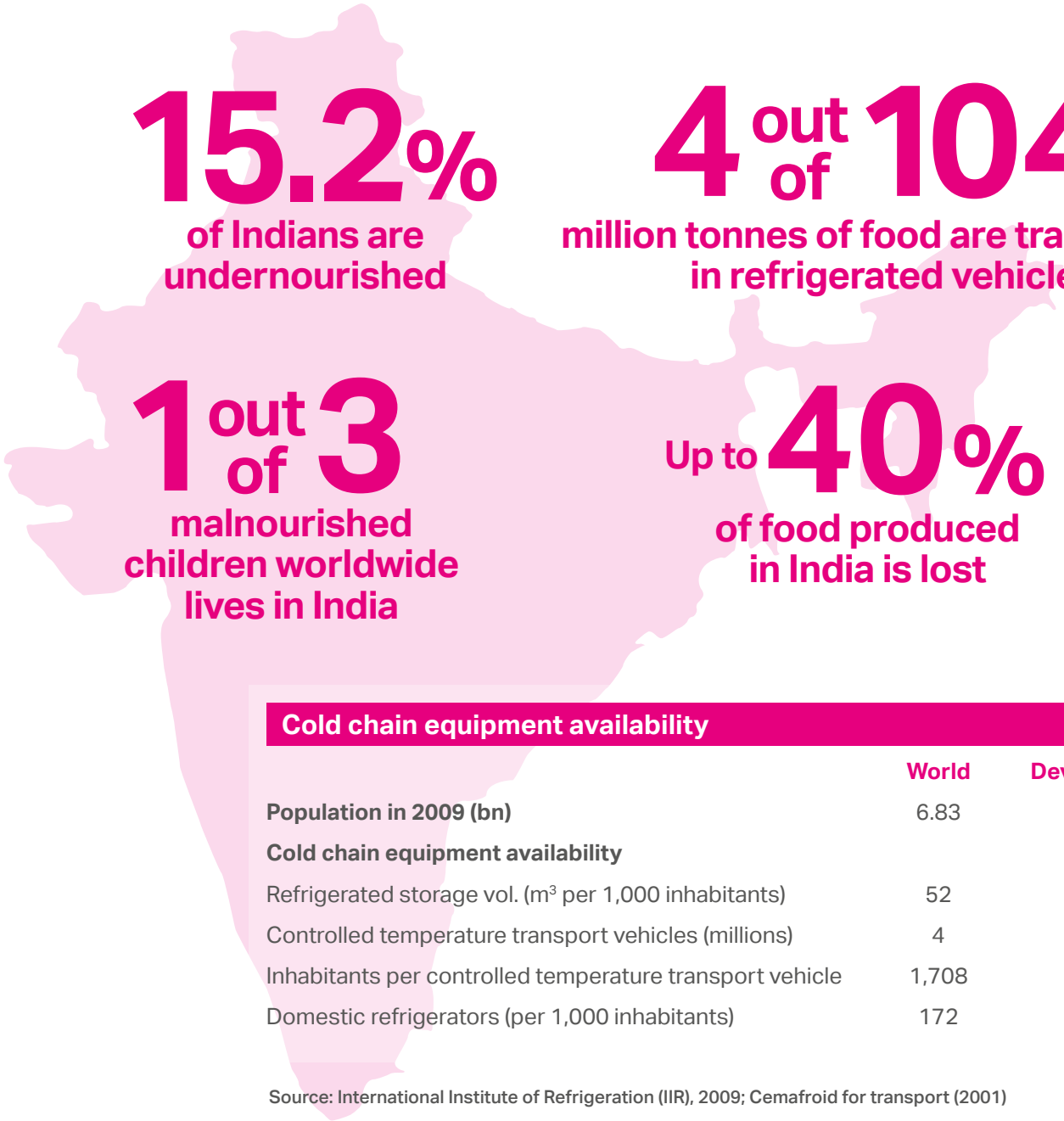
According to the UN, India will overtake China as the world's most populous nation in 2028. India is one of the world's leading food producers – and food losers. Since it is also one of the world's hottest countries, improvements to the cold chain would bring vast benefits to its inhabitants and the country's economy.



In a country like India, cold chain technology with its key component of efficient insulation can play a vital role in securing food supplies – now and in the future. Refrigeration reduces post-harvest, post-slaughter and fishery losses. An efficient cold chain helps to improve health by preserving medicines and vaccines, while proving beneficial to other temperature-sensitive products, such as chemicals, flowers and plants. For all these reasons an efficient cold chain in hot countries such as India is a key economic lever (e.g. opening up new markets), a significant social transformer (e.g. improving living conditions, raising incomes and creating jobs), and a vital public health concern (e.g. enhancing diet).

Lack of a cold chain

Yet India has cold storage units for a mere 11% of its perishable produce[1]. The lack of a cold chain is a particularly serious problem in the south of the country where there are hardly any cold storage units in a hotter and more humid climate. Of the 104 million tonnes of perishable food transported in India only 4 million tonnes (including negligible amounts of fruit and vegetables) are transported in refrigerated vehicles. The potential gains of a functioning cold chain are illustrated by the banana industry. India grows 28% of the world's bananas but accounts for only 0.3% of internationally traded bananas, which are exported in 3,000 containers. If a cold chain infrastructure were installed, the number of export containers could increase to 190,000[2] – to the benefit of many thousands of smallholder farmers.



15.2%
of Indians are undernourished

4 out of 104
million tonnes of food are transported in refrigerated vehicles

1 out of 3
malnourished children worldwide lives in India

Up to 40%
of food produced in India is lost

[1] FAOSTAT: Food and agricultural commodities production (2014)

[2] Unlocking the potential of the Indian banana trade (Maersk Line, 2011)

Cold chain equipment availability

	World	Developed countries	Developing countries
Population in 2009 (bn)	6.83	1.23	5.6
Cold chain equipment availability			
Refrigerated storage vol. (m^3 per 1,000 inhabitants)	52	200	19
Controlled temperature transport vehicles (millions)	4	2.73	1.27
Inhabitants per controlled temperature transport vehicle	1,708	450	4,421
Domestic refrigerators (per 1,000 inhabitants)	172	627	70

Source: International Institute of Refrigeration (IIR), 2009; Cemafroid for transport (2001)

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