

REDUCING POST HARVEST FOOD LOSSES – THE CRITICAL ROLE OF LOGISTICS

JOHN MANNERS-BELL, CEO, TRANSPORT INTELLIGENCE LTD

In October 2011, the United Nations estimated that the world's population had reached seven billion. This landmark event was accompanied by many warnings regarding the impact of over-population. Wars, hunger, water shortages and disease have been forecast by many commentators, should the number of people in the world continue to grow at its present rate. It is forecast that the world's population will rise to 9.1 billion by 2050 and that food production will have to rise by 70% if it is to keep pace with peoples' needs.

It should be noted that fears of population growth are not new and its impact is generally over-played. Developments in farming and technology have so far allowed food production to keep pace with the growth in the number of hungry mouths.

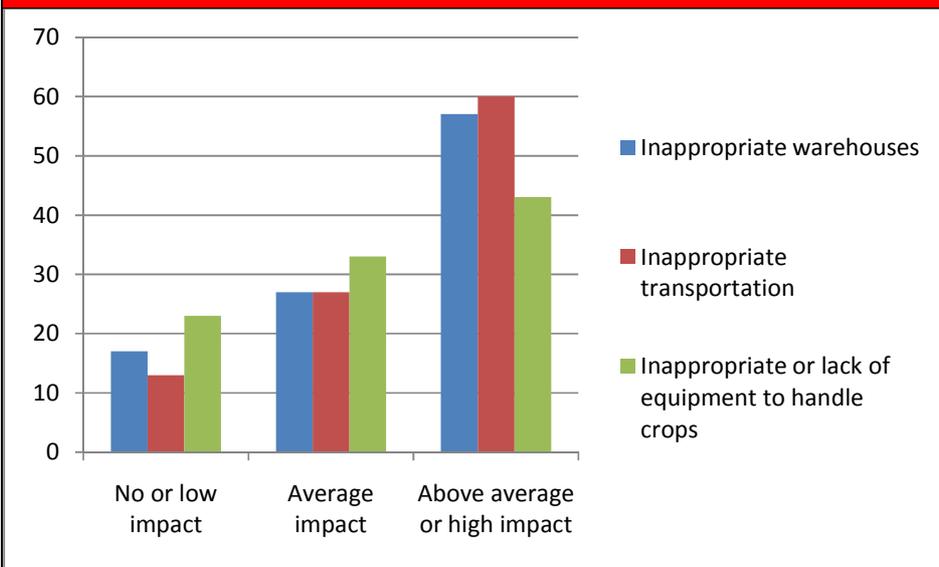
However, if the world is to keep feeding its ever-burgeoning population, more will have to be done. Population growth is occurring in developing regions with the most fragile economies, societies and inefficient infrastructure. This means that an increasingly large proportion of the world's population will be located in high-risk areas, where a poor harvest or conflict can result in disaster.

Consequently, an improvement in food production, although important, is unlikely to be sufficient on its own. There must be improvements in all sections of the food supply chain and this includes fundamentally how products are moved to market – that is, the role of logistics and transportation. A cursory look at the processes involved show the enormous inefficiencies which presently exist in the movement and storage of food stuffs. This, as we shall see, results in a large proportion of product perishing en route to market.

A recent survey¹ (Despoudi et al) very clearly shows that inappropriate warehouses and transportation have a high impact on the level of food losses.

¹ Food security and food losses: A producer to processor perspective; Stella Despoudi, Grammatoula Papaioannou, Samir Dani; School of Business and Economics, Loughborough University, UK, 2012

Figure 1: To what extent do you think the following process related factors influence the level of food losses of your products?



Source: School of Business and Economics, Loughborough University

At the same time as being a major problem for developing countries and their populations, it also offers a major opportunity. After all, if the logistics can be successfully addressed, a vast amount of additional food can be brought to market with no increase in production output.

THE EXTENT OF THE PROBLEM

Although empirical evidence is scarce, it is estimated that in the developing world between a third and a half of food is lost post-harvest, between farmer and consumer. This occurs through poor handling or biodeterioration by micro-organisms, insects, rodents or birds². Livestock products, fish, fruit and vegetables are most at risk due to poor standards of refrigeration. Most fresh produce is transported in an unpackaged form and is often sold at markets where handling dramatically reduces its shelf life.

One of the core reasons behind the wastage is the extreme level of fragmentation involved in production and indeed food supply chains as a whole. The industry in developing markets is dominated by micro-

² Postharvest losses and waste in developed and less developed countries: opportunities to improve resource use. R. J. Hodges, J.C. Buzby and B. Bennett Journal of Agricultural Science, Cambridge University Press 2010

farmers who own less than one hectare. They have access to very limited resources in terms of temperature control and for that matter very little understanding of how to sympathetically handle produce. Marketing channels are disorganised and complex involving traders, middlemen and wholesalers, which leads to enormous inefficiencies. On top of this, transport systems and operations are expensive and undeveloped.

The larger commercial farmers have much more efficient supply chains, but in many cases they produce for the export markets. They supply products to a high specification for international retail chains, but are untypical of the market as a whole. Poorer farmers producing for a domestic market are unable to invest in their facilities to anything like the same degree.

However, the success of export-led farmers in markets such as Kenya can be used as an example for wider agriculture. The demands of Western retailers for consistent production levels and standards of quality have increased cooperation amongst farmers. This has increased their resources and allowed them to take more control of the supply chain, initiating the introduction of cold chain systems, for example, alongside their marketing channels.

IMPROVING LOGISTICS

Upgrading transport infrastructure, superior trucks, better packaging and enhancing the reliability of power supplies (allowing for more refrigerated storage) as well as improving training, would have immediate supply chain benefits. Much can be done to encourage private and government support for these highly-achievable aims. The points below summarise some of the problems and solutions to mitigating Post Harvest Food Losses:

- **Better transport infrastructure**

A robust road network is an essential element in getting product to market, but one which in many parts of Africa is sorely lacking. This is one of the primary reasons why cost of transport can be five times more expensive in Africa than in some parts of Asia.

One of the key ways to address this problem is to stimulate investment from the private sector. Some of the biggest investors, however, in Asia, Africa and Latin America are Chinese state-owned enterprises,

who have been encouraged to invest by the Chinese government. The reason for this is obvious – improved road infrastructure is necessary to efficiently move raw materials from inland locations to ports and Chinese companies are some of the biggest players in the exploitation of natural resources. However, the improved infrastructure will also help food supply chains and further investment from organisations such as FAO, EU, USAID, UNDP and the Asian Development Bank has been encouraged.

Governments in developing countries have also been encouraged to take a more holistic view of transport. Cost-benefit studies can show that returns on transportation projects far outweigh the investment. These benefits are not only economic, but also society-wide.

- **Improved road transport services**

Distribution of produce in Africa and many countries in Asia is characterised by transportation in open-sided trucks which are used to move goods up to 850 km. As well as the obvious problem of decay in hot conditions, poor handling, over-loading of goods without separation, rutted roads and a lack of ventilation all play a role in the degradation of produce.

Obviously, investment in better trucks would improve the condition of the product at the end of the journey. Improvement of vehicle stock will be a natural consequence of increased GDP and value creation. How to create the conditions for economic growth is beyond the remit of this whitepaper. However, there are positive steps which can be taken on an operational level which improve efficiencies.

One of the most important steps is training. At a management level, some very basic steps can be taken to ensure that transportation professionals optimise transport planning. At an operational level, the way in which goods are loaded and unloaded can also be addressed. Training seminars and the dissemination of information materials can play a role in this³.

Improving the availability and quality of specialised transport assets is also important. Although refrigerated containers are in use in many developing countries, they are certainly not universally available. For instance, they are still fairly rare in India, having only been introduced latterly.

³ Postharvest Management of Fruit and Vegetables in the Asia-Pacific Region. Asian Productivity Organization, 2006.

- **Better Packaging**

There is an acute lack of packaging technology in developing countries and this includes labelling. Packaging is important not only to protect the products in transit, but also once they have been purchased by the consumer. In many countries, such as India, most vegetables are transported loose.

The problem is most acute in the perishable fruit and vegetable sector. Considerable research has been undertaken showing that use of (very cheap) low density polyethylene film, combined with temperature controlled storage (13-14 degrees Celsius) can extend the shelf life of bananas, for example, from 5-7 days up to 45 days. Even at a very basic level, the use of corrugated fibre board (CFB) and moulded trays or partitions, instead of timber significantly, reduces bruising.

The use of CFB boxes would be a first step towards unitisation of shipments on pallets, and the introduction of fork lift trucks would be a major step in reducing product damage.

In terms of labelling, there is a lack of regulatory systems that provide supply chain partners and consumers with essential data about the product. This can be addressed by governmental initiatives and regional coordination.

- **Improved storage facilities**

Warehousing and storage facilities throughout the food supply chain in developing countries are often weak or non-existent. This includes at the farm premises themselves and at each supply chain node as far as the market or port. Temperature controlled facilities are often in short supply and sanitation is poor. In addition, there is also a lack of training and awareness related to temperature requirements and on ethylene restrictions for mixed loading. For example, ripening climacteric fruit (bananas, avocados, tomatoes for instance) should not be transported with leafy or succulent vegetables which will be harmed by ethylene emissions.

This latter point can be addressed by improved training as well as research and dissemination of best practice.

As regards the provision of staging/storing facilities, it has been suggested that individual government support for clustering of warehouses could bring significant benefits. This could be incentives or tax breaks for warehousing zones which would then lead to investment, the development of support services, a trained workforce and shared expertise.

Refrigerated warehousing is hugely problematic. The process is energy intensive and relies on a continuity of energy supply, which in developing countries can never be relied upon. However, the impact on the food chain is considerable. Shelf life of produce properly cooled can be extended from 3 days at room temperature to 90 days.

- **Better cooperation**

One area in which there could be immediate improvements for little investment is in cooperation between supply chain partners. The survey by Despoudi et al found that better coordination among supply chain partners was cited as being a key factor in the reduction of PHFL, along with better infrastructure and better skills, training and information sharing. However, whilst supply chains remain so fragmented and complex, this in practice will prove difficult to achieve.

CONCLUSION

The priority given to increasing farming productivity, whilst ignoring the inefficiency of the overall supply chain has clear parallels with the now discredited industrial production strategies of the 1970s. What manufacturer these days would be happy with half its products being unusable by the time they arrived at the customer?

By focusing on reducing waste in the supply chain, rather than purely on production efficiencies, more food will arrive where it is most needed and at a lower cost to the consumer. This will not only increase farmer income, but also alleviate poverty and hunger. As Dr. M. L. Choudhury, former Horticulture Commissioner in the Indian Ministry of Agriculture commented, "It is unfortunate that in India, policy makers and planners set targets for increased production without making any effort to reduce postharvest losses."

It is clear that whilst there is no doubt that advances in food technology and farm productivity will help mitigate the effects of the world's rising population, these gains will be negated unless more is done to improve the efficiency of supply chains.

Improving food logistics in developing countries does not just have humanitarian implications. It would decrease the need for additional areas to be cultivated which would reduce the environmental impact of agriculture. It would also reduce the level of farming intensity, meaning fewer pesticides and chemical fertilisers are required.

Production levels are already sufficient to feed the world's population for many years to come. The real challenge is getting these products from farm-to-table with the minimum of waste.

THE AUTHOR

John Manners-Bell MSc FCILT, CEO of Transport Intelligence, has over two decades experience working in and analysing the global logistics industry. He is a member of the World Economic Forum's Logistics and Supply Chain Global Agenda Council and has advised a wide range of governmental organisations and industry bodies.

For more information contact John Manners-Bell on jmannersbell@transportintelligence.com

About Transport Intelligence

With a research organisation spanning the world's key markets, Ti is the leading provider of expert analysis dedicated to the global logistics industry. Ti has developed a range of market leading web-based products, reports, profiles and services used by all of the world's leading logistics suppliers, manufacturers, consultancies and banks.

www.transportintelligence.com