

POLICY BRIEF

Developing the Cold Chain for Agriculture in the Near East and North Africa (NENA)



INTRODUCTION

This policy brief draws, among others, on the papers presented and discussed at an Expert Consultation Meeting held in July 2011 in Cairo, Egypt, as well as training workshops and guidance materials. It represents the combined knowledge and views of subject matter experts from the Near East and North Africa (NENA) region. While the extent of losses and waste in the food system is becoming better understood, the region's countries have heightened their commitment to tackling the problem. This policy brief supports cold chain development as an integral element of improving the efficiency of the food system and reducing food losses and waste.

The context

The lack of sufficient and efficient cold chain infrastructure is a major contributor to food losses and waste in NENA, estimated to be 55% of fruits and vegetables, 22% of meats, 30% of fish and seafood, and 20% of dairy (FAO, 2011). This amounts to up to 215 kg/year per capita, which not only exacerbates the food insecurity in NENA and the high reliance on imports, but is a waste of scarce natural resources (water and land, most acutely) and a source of economic losses and environmental problems. A reliable and efficient cold chain can not only contribute to reducing losses and waste in the quantity and quality of food, but can also improve the efficiency of food supply chains and compliance with food safety and quality standards, thus also reducing health problems and costs associated with the consumption of unsafe food. Reducing food losses and waste will also reduce food shortages and thus exposure to food price volatility for countries dependent on food imports. Cold chain development is, therefore, a necessary step in improving food and nutrition security in NENA.

STATE OF THE COLD CHAIN IN NENA

The extent of cold chain capacity and utilization is greater for exported food products as compared to food destined for domestic markets. The gap is illustrated by the prevalence of smallholder farmers in NENA, who largely market their production through traditional food chains; food products handled through these channels are usually exposed to a broken cold chain or none at all. While data on cold chain storage capacity in NENA countries is incomplete, Table 1 demonstrates how even the countries with more advanced systems lag behind international indicators.

The constraints

Establishing an uninterrupted series of cold storage and distribution facilities and activities, especially for perishable foods, within maintained temperature conditions not only requires the infrastructure and technology, but the coordination between multiple stakeholders, capable technical personnel, adequate

Key messages:

1. Cold chain development is an essential integral element of growth in the food sector and needs to be better integrated into agriculture and food policies, strategies and action plans.
2. Strategies for cold chain development should be adapted to specific commodity groups, and geographic and socioeconomic conditions.
3. Good management of the integrated steps, including maintenance, is needed, recognizing that collaboration among multiple stakeholders involved in the unbroken cold chain of a particular commodity is vital.
4. Governments can provide key services, such as public infrastructure and legislation, which can facilitate cold chain development. Education, awareness and capacity building are also critical service which governments can provide.

information, and sound operational management. Characteristics of the agriculture sector in NENA have prevented this, namely i) the predominance of small-scale producers and traders and their limited financial means or know-how to adopt technologies, especially due to the limited or non-existence of cooperatives; ii) lack of capacity in the management and maintenance of cold chain infrastructure, especially among small and medium enterprises (SMEs); iii) lack of infrastructure and misuse or non-use of existing infrastructure; iv) minimal or lack of application of food quality and safety standards and regulations, and lack of enforcement particularly in domestic markets; and v) lack of education and awareness among producers and value chain actors, especially consumers, on the adverse effects of high ambient temperature on the quality and safety of food, and use of traditional techniques that often exacerbate the problem.

Table 1: At a glance Cold chain storage capacity estimates for selected NENA countries compared with Germany and USA

Country	Capacity m ³	m ³ per capita*	Year of estimate
Tunisia	1 310 011	0.122	2011
Algeria	2 500 000	0.066	2011
Morocco	1 700 000	0.053	2011
Saudi Arabia	2 200 000	0.088	2006
Germany	21 800 000	0.262	2010
USA	107 476 000	0.344	2010

Data from IARW (2010), FAO (2012) and population data from FAOSTAT.

The opportunities

The region's growing and increasingly urbanized populations are, especially through higher incomes, demanding more diversified diets. Consumption of perishable foods is growing at a rate that exceeds growth in consumption of cereals (see table 2). Purchasing habits are evolving as well, through supermarkets and hypermarkets that demand higher quality products. There is an opportunity to develop traditional food supply chains, and to connect the region's predominantly small-scale food producers to value chains which supply new and evolving urban markets.

POLICY IMPLICATIONS

A commitment to supporting cold chain development to reduce food losses and waste, maintain food quality and safety and improve food security.

Develop a strategy for cold chain development that aligns with national food security strategies and action plans. In this way, supporting cold chain development is part of strengthening livelihoods of small-scale producers, creating off-farm employment, and enhancing food security.

The strategy needs to reflect the multi-stakeholder, multi-sectorial nature of the cold chain. The cold chain is only as reliable as its weakest link, and a failure at any link will affect the cold chain for all stakeholders. The private sector being an essential actor, it is also necessary to involve agriculture, logistics, research, technology, and other sectors. Coordinating the activities of multiple actors is essential and has been an obstacle to cold chain development.

Strategic thinking and action-planning can benefit from bilateral or regional **dialogue among the region's countries, in order to share experiences and good practices.** Regional organizations and UN agencies, especially FAO, play a role in this regard.

Sufficient volume and quality of food is a necessary condition for the private sector to see profitability in cold chain development and act on it. **Policies to support organizing food producers into groups or associations should be encouraged,** to facilitate investment, dissemination of technologies and information, improve handling at the production level and farm gate, and to consolidate the volume of raw material needed to supply the chain and justify large-scale infrastructure and process investments.

The public sector can observe and enforce quality and safety standards and regulations, which lag especially in domestic food supply chains. Enforcing these regulations necessarily involves applying cold chain technology. Many examples exist of

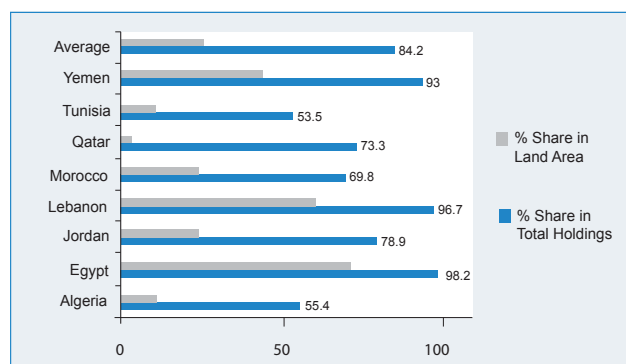
Table 2: Food supply of selected products in NENA*

	2009 Food supply (1 000 tons)	Growth rate 2000-2009
Cereals	80 990	20.1%
Vegetables	63 886	30.9%
Fruits	36 634	38.2%
Meat	11 850	38.6%
Milk - Excluding Butter	42 022	36.3%
Fish, Seafood	3 627	39.2%

Data from FAOSTAT, Food Balance sheets

* NENA consists of the North Africa and West Asia sub regions, as defined by FAOSTAT

Figure 1: Relative Importance of Land Holdings of less than 5 Hectares



Data from FAO Agriculture Census Data, compiled in "Outcome of the Regional Dialogue on Family Farming", Tunis, November 2013, unpublished

companies in NENA who have successfully adopted cold chain technology; however the investments have largely been made to meet the food import requirements of foreign markets (the EU in particular). Developing and enforcing quality and safety standards is part of reducing the large gap between domestic and export-oriented supply chains, and these should include harvesting practices, transport infrastructure and conditions, sorting, grading, packing, packaging and storage infrastructure. Supporting food supply chain actors to adopt the standards requires a transition period for awareness raising, education, and capacity building.

Interventions should be adapted to the specific products and geographic and socio-economic conditions. Feasibility studies are essential before any investment or intervention, and must take into account the conditions of the product supply chain, and its opportunities and weaknesses for development.



Lack of cold chain results in losses and waste and health hazards



Outdoor display without protection increases deterioration and losses

RECOMMENDATIONS

The essential links in an effective cold chain include pre-cooling, refrigerated storage, refrigerated transport, and refrigerated distribution and retail. A further step is refrigerated storage by consumers.

1. Educate, raise awareness, and develop technical capacity:

- At the production level, support capacity development for better handling of food before, during and after harvest. Producers are first in line for the cold chain; their ability to usher perishable food into a safe, controlled pre-cooling phase will help generate the production volume needed to justify cold chain investment, and better link farmers to value chains.
- Among all value chain actors, consumers and policy-makers, raise awareness of the importance of the cold chain in maintaining food safety and quality, and in preserving its economic value.
- Enhance technical expertise in the management, operation and maintenance of specialized facilities. Support existing and new training and vocational programs, and create certifications or recognition for vocation. Engage with professional organizations and support private sector-led professional development opportunities for experts and companies wishing to train their staff

2. Stimulate investment in cold chain processes and technologies for the agro-food sector:

- *Targeted interventions to create incentives for investment* in technology and process enhancement, thus lowering the economic barriers for investors and supporting return on investment:
 - a. Facilitate access to commercial financing at affordable interest rates
 - b. Provide targeted, finite subsidies for investment in infrastructure and upgrading practices

c. Invest in public goods to stimulate private activity, for example, infrastructure in wholesale and retail markets, adequate farm to market transport, air and sea shipping transport facilities, or create storage capacity in refrigerated warehouses.

d. Address energy needs and limitations, recognizing both energy costs and access to a continuous supply of energy for refrigeration systems.

3. Strengthen the capacity of institutions and organizations for cold chain development:

- *Encourage the formation and operation of industry bodies* for supply chain actors in the agro-food industry, but also logistics companies, technicians and engineering firms specialized in cold chain infrastructure. These bodies can serve to enable access to technologies/knowledge, finance and equipment, as well as facilitate the dialogue and coordination necessary for effective cold chain development.
- *Establish food safety* and quality management standards and regulations, and strengthen the institutions responsible for their oversight and enforcement. Support the development of laboratories for quality control testing and quality measurement.

4. Support research and development:

- *Foster collaboration* between research institutions, academia and extension services. Create knowledge networks among researchers and create linkages to professional associations, industry bodies and government ministries.
- *Invest in research and development* of proper small scale and affordable technologies (i.e. evaporative cooling, small-scale mechanical precooling and refrigeration systems), post-harvest handling techniques, with particular attention to the needs of small scale producers and SMEs.

Summary

The cold chain (precooling, refrigerated transport, refrigerated commercial storage, refrigerated display during marketing, and refrigerated maintenance at home) is essential for the food sector in NENA, to reduce food losses and waste, insure the delivery of safe and nutritious food, and improve food security at national and regional levels. NENA is a food insecure region relying on food imports with limited capacity to increase production.

Developing the cold chain in NENA involves a mix of awareness and technical capacity, investment, information and technology

transfer, and better governance mechanisms. Given the gap between export-oriented food chains and domestic traditional food handling, the focus should be on technologies that are economically accessible and long-term capacity development for the vast number of small scale food producers and food chain SMEs. Although private sector actors are primary for developing and operating the cold chain in a vibrant agro-industry sector, governments can do much to facilitate private activity.



Inadequately managed cold spaces can increase losses of food and resources



Cold chain is essential to reduce qualitative and quantitative losses and health hazards



Inadequately built and inadequately managed storage room



Refrigerated transport is important to maintain foods

Bear in mind...

- Since cooling and maintaining a cold environment is more costly in hot than in temperate climates, decisions that affect energy efficiency and materials used are critical for the cold chain in NENA. This includes choice of technology, good practices, availability of proper information, and maintenance.
- Regarding transportation, if refrigerated vehicles are not available, covered vans or insulated vans could be appropriate in certain cases to help prevent warming.
- Solar technology is a possibility, especially in the absence of regular energy sources. Evaporative cooling and thermal energy storage can be cost effective options.
- Any alternatives that can reduce food losses and waste are worth investigating.
- An efficient and effective cold chain cannot improve the quality and safety of food commodities, rather preserve it.

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Maintaining the cold chain is important for food



Protection from sun and wind is needed to reduce losses

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