

## Overview

The cold chain system, or low-temperature storage and transportation system, is indispensable for Southeast Asian countries as they mostly have tropical climates. There is an even more pressing need for the cold chain due to the expansion in demand for perishable products, such as processed, livestock, and aquatic products, that has arisen from the population increases and economic growth in the region.

This report aims to contribute to spreading the cold chain with modern systems by revealing the actual condition of the cold chain in selected Association of Southeast Asian Nations (ASEAN) countries, namely Thailand, Viet Nam, Indonesia, the Lao People's Democratic Republic (Lao PDR), and Myanmar. Information on the cold chain is beneficial for detecting intervention points to improve connectivity in the region and each country by supplementing initiatives regarding logistics, such as the Master Plan on ASEAN Connectivity (MPAC) 2025, from a different angle.

We focus on three aspects to describe the actual condition of the cold chain in each country based on raw data obtained from interviews with stakeholders of the chain and secondary data. (i) First is the demand for the cold chain, expressed by the volumes or values of products requiring temperature control. (ii) Next, the activities of the main players in the cold chain, such as representative firms of storage services and transportation in selected cities are summarised. (iii) We also look at government policies, such as rules about the storage and transportation of products requiring temperature control, and policies to support the development of the cold chain. The study's results are summarised as follows.

### **Demand for the cold chain**

We can observe common features in cold chain demand in the analysed countries: the growing international trade of many agri-food products requiring the cold chain, except for decreasing exports from Indonesia and imports of refrigerated and frozen food by Myanmar. Similarly, domestic consumption also drives demand for the cold chain, which is suggested from the rapidly expanding consumption of frozen products in Thailand, the production of livestock products and the number of large farmers in Viet Nam, and the production of agri-food products in Indonesia. Data on Myanmar imply there is a large potential that the modern cold chain can expand to the traditional chain or circulation under ordinary temperatures. The composition of products indicates that aquatic products take a large share in the total demand for the cold chain in most countries.

### **Activities of the main players**

Cold warehouse and transportation companies take their roles in selected parts of the distribution chain split by producer or importer, distribution centre, wholesaler, retailer, and domestic final consumer or exporter, rather than the whole logistics of the chain. There are notable differences in the warehouses and transportation equipment depending on the trade purpose. Modern cold transportation logistics using refrigerated trucks are mainly used for international trade, according to the Lao PDR and Myanmar, while traditional methods using

crushed ice and plastic cases are widely used for products targeting the domestic market in those countries.

Companies using cold storage and transportation can be classified into two types. The first is food processing companies operating their own cold warehouses or transportation, particularly in the fishery sector, which accounts for large parts of the cold storage service in Viet Nam, Indonesia, and Myanmar. The other type is companies that rent cold warehouse or transportation services from other companies. There are two types of cold warehouse rental company: third-party cold warehouse and transportation services and other companies, such as food processing companies, providing cold warehouses.

The capacity of both public and private cold storages is 940,000 tons in Thailand. The capacity of the private sector in Viet Nam is larger than 500,000 pallets. The capacities in Indonesia and Myanmar are 370,200 tons and 88,148 tons, respectively, although these indicate only the capacities of major companies. The small capacity of cold storage compared with its demand suggest a substantial part of the cold chain demand is satisfied with supply from small and medium-sized enterprises or that it is not fulfilled, and there exists the significant potential for companies to provide cold chain services.

### **Government policies**

The countries in this study do not have an integrated policy on the cold chain, although an economic and social development plan might be placed as a guide in a broad sense. Various policies affect the development of the cold chain, both directly and indirectly. A noteworthy voluntary regulation directly affecting cold storage and transportation is the service quality standard for truck operation, or the Q Mark standard, in Thailand tested in 2019, which set up a common quality standard of temperature-controlled transport. We can learn from the advanced efforts of the Thai government to standardise cold transportation and develop human resources. Other regulations affecting the cold chain include regulations on cold storage and transportation and food standards. The government can also directly support facilities and markets that can be nodes of the cold chain by conducting credit support to purchase cold chain facilities and support developing commodity markets with modern cold storages.

Several policies would indirectly affect the improvements in the cold chain, such as investment promotion for cold chain businesses, tax exemption for investment, and the permission of ownership for foreign investors. Infrastructure development, including roads and seaports crossing the Greater Mekong Subregion, led by the government would also affect the environment of cold logistics. As well, customs operations have been improved in many countries, although some challenges have also been reported.

### **Policy implications**

Governments have already implemented or considered countermeasures for cold chain issues. Despite this, the discussions in each chapter aim to provide further insights for improving the cold chain.

Hard assets, such as warehouses and trucks, in specific regions or parts of the chain are insufficient in terms of quantity and quality. For example, Viet Nam reports that both refrigerated vehicle resources and refrigerated warehouses are not enough in the areas that produce agricultural products. The modified cold vans with attached air conditioners widely used by small transportation companies have room to reinforce their equipment to ensure the quality of transported products. In addition, home delivery using cold insulation boxes attached to motorbikes are thought to be a potential investment area. Investment in agriculture and fishery, which are affected by natural conditions, is risky and costly. A clear vision from the government showing the development priorities of the cold chain and the public–private partnership mechanism would ease investors’ decisions about entry into those sectors.

This report often stresses the insufficient soft assets in the cold chain, especially human resources. This includes the shortage of truck drivers in the cold chain and the insufficient English skills and knowledge for working across borders. There is a need for training for different types of vehicles before issuing driving licences, and the expectation for universities to educate the staff and managers of companies involved in the cold chain.

The lack of quantity and quality of infrastructure, including roads, railways, waterways, ports, and electricity supply, can cause high logistics costs and damage perishable products. The challenges for roads include the availability of short-distance roads, the quality of roads, and traffic conditions. This argument contains a wide range of issues, such as investment to fulfil highway equipment, road maintenance, traffic safety, traffic control, substitutional transportation modes, and methods of road construction. Stable electricity supply in the routes of the cold chain is also needed to reduce the costs of cold storage and transportation.

Integrative management of the cold chain would decrease the risks and costs during the preservation and transportation of products. Strengthening the vertical relationship between companies or achieving further vertical integration could be measures to realise such integrative management. Another essential factor is individual technologies, such as the sensor and transmitter systems used to send data or communication networks between the actors of supply chains.

Connectivity in terms of international trade through customs is also a notable issue. In particular, the Lao PDR and Myanmar are paying attention to transit trade as a key driver to develop the cold chain, since it can expand without being restricted by the scale of domestic production. Although the high connectivity of international trade requires efficient customs operations, there would be still several issues in customs in the reported countries. The Lao PDR argues the need for decreasing customs procedures and releasing a clear statement about the time and fees of customs operations. The cold chain should accordingly improve in various aspects since progress in international connectivity suggests an intensification of international competition in cold chain industries.