

# Unlocking the potential of the Indian banana trade



**MAERSK**  
LINE

# About this case study

## Maersk Line is a key partner to Indian export industries and an important stakeholder in the emerging banana export trade.

This case study summarises the findings from research carried out in 2011 by members of Maersk Line's Sustainability team, alongside external consultants. The group visited India to learn first-hand about the Indian banana export model, its growth potential and the contribution it can make to India's social and economic development.

As this summary will show, the study found that:

- Increasing banana exports has the potential to bring significant economic, social and environmental advantages to India
- To expand the export trade, major investment is needed, along with close collaboration between domestic and international stakeholders in the industry
- Critical upgrades in India's cold chain infrastructure will be key to unlocking future growth potential.

### <1%

The proportion of Indian bananas that are currently exported. This represents just 0.3% of all internationally traded bananas.

### 20–30%

The proportion of Indian fruits and vegetables estimated to go to waste in India due to the absence of an effective cold chain. This amount is equivalent to the total annual consumption of fruit and vegetables in Great Britain.

### 25m tons

The amount of bananas that could theoretically be freed up for consumption if the emerging export productivity gains were achieved across the entire Indian banana sector.

### 28%

India's share of world banana production, making it the world's largest banana producer:

### 3,000

The number of containers currently exported from India to markets in the Middle East.

### 190,000

The potential number of containers if India was to realize its growth potential.

## India: A world of opportunities



# The Indian banana industry



Bananas are the world's favourite fruit and the fourth most important food crop after rice, wheat and maize. India is the world's largest producer of bananas, with 28% of world production.

Yet less than 0.1% of current Indian banana production is exported, which represents less than 0.3% of the international banana trade. India's social and economic development potential is closely linked to its ability to bring in new investments, technologies and know-how to its huge agricultural sector. India's affinity to Middle Eastern markets, where there is growing demand for bananas, offers significant potential for boosting its exports. India also offers an alternative to the region's current supply from more remote sources.

Unlike the rest of the world's major banana growing areas, which are dominated by large-scale commercial farms, the Indian banana industry is based on large numbers of small, independent farmers, typically cultivating less than 3 acres.

Our study has looked closely at the emerging Indian banana export model and the wider social and economic implications of the future growth of the trade. Importantly, when considering exporting

food from a hungry nation like India – where an estimated 231 million people (24% of the population) are undernourished – the impact on domestic consumers and any possible political implications are important considerations. For an export model to thrive under these conditions, it must offer clear benefits, not just to new customers abroad, but also to the local economy and the growing local communities.

The Indian banana trade is therefore a good example of the potential opportunities, and the challenges, involved in boosting export production in emerging economies.

We hope that the lessons learnt in this study could aid discussions regarding how the export of bananas and other similar commodities can be increased in India and the role of an effective cold chain in enabling that growth.

"India in the next 5–10 years, will become the world's largest grape and banana exporter so there is big potential in the business."

**Tata Chemicals**  
Freshinfo News

# Connecting smallholder farmers to global value chains through contract farming

The dominant farming model for export-quality bananas in India is contract farming.

Due to the structure of landholding in India there are limits to how much land a company or individual can own. The contract farming model allows agribusiness firms to gain access to bananas produced across a larger area than legal constraints on ownership would otherwise permit. The model centers on a strong local exporter who provides support throughout the growing phase and assumes full responsibility for quality control, distribution and marketing in line with the needs of the global markets. In turn, large numbers of smallholder farmers agree to sell their produce to the exporter at

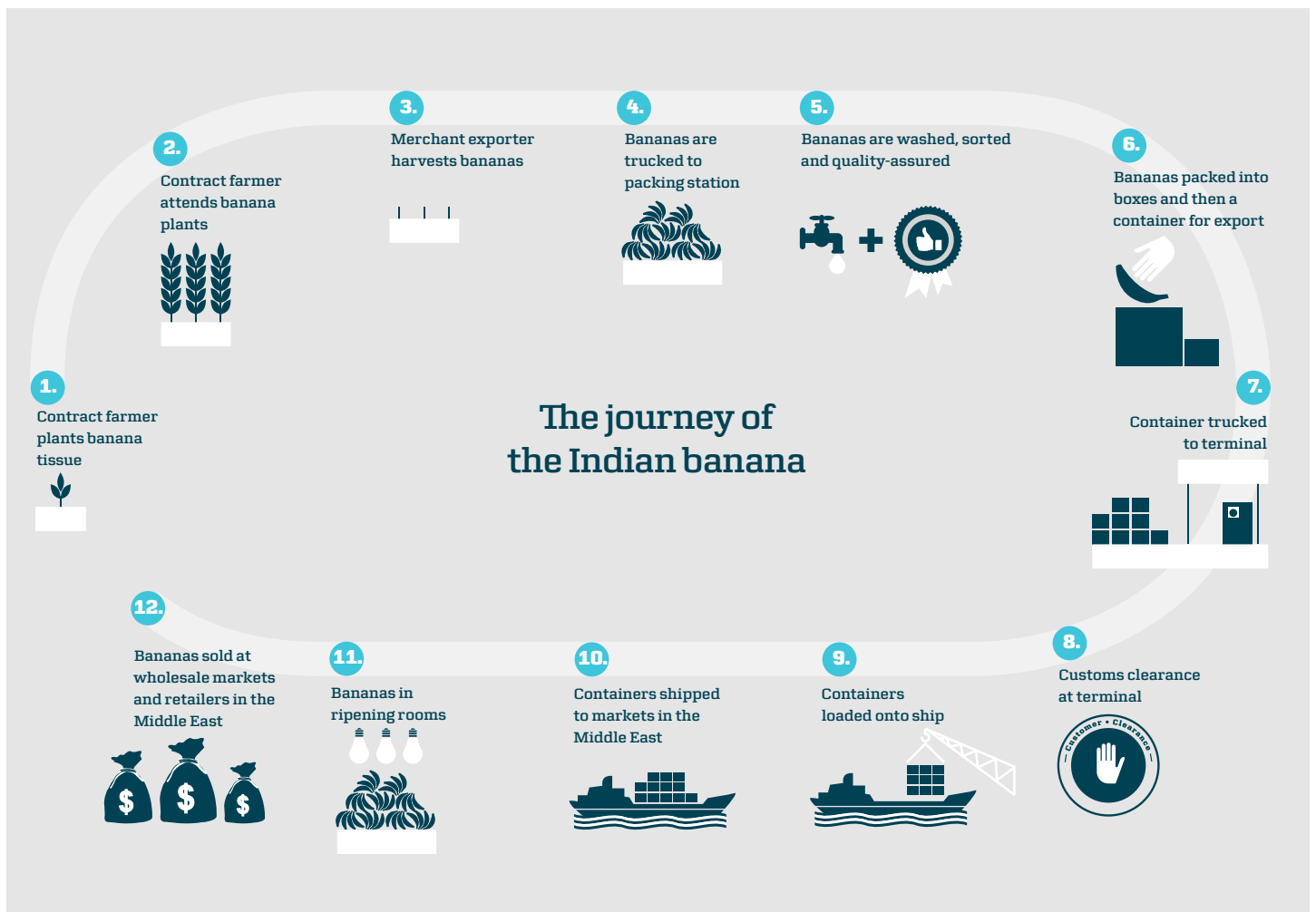
a minimum guaranteed price. The contract farming model can hold important benefits for the farmer. In addition to significant productivity improvements, which provide the farmer with more value for each invested rupee, farmers can also benefit from increased access to credit, reduced input costs, access to capital, equipment and technical support. Most importantly, the provision of a guaranteed minimum price, negotiated on an annual or long-term basis, reduces the farmer's risk. This makes export-orientated farmers less prone to the kind of big price fluctuations found in the domestic market.



Under the export model, banana bunches are color-coded and covered with bags to control ripening and protect against diseases.



Pack-houses ensure the consistency in supply, quality and volumes required by global buyers.



# Key productivity gains from the export model

In the study, three key benefits from accelerating the growth of the export model became apparent.

- **Improved yields.** The average domestic productivity for Indian bananas is 15 tons per acre. This compares to 25 tons per acre under the export model, meaning that farmers serving the export market currently get a better return from the money they have invested. According to Indian exporters interviewed, there is potential to increase yields even further through adapting modern growing techniques, such as those used in the Philippines.
- **Improved quality.** Under the export model, smallholder farmers have been able to increase their share of export-quality bananas, which generally generate a higher market price. With improved harvesting techniques, an additional 10% of the farmers' crops could be converted into export-quality bananas according to some exporters.

- **Less waste.** Currently, 20–30% of India's banana production is estimated to go to waste, lost in India's domestic infrastructure. By establishing an unbroken cold chain from pack-house to origin, the export model has managed to reduce post-harvest waste levels during transportation to 1–2%, representing a significant productivity gain.

The study has suggested that if yield and waste levels in the domestic banana industry and cold chain infrastructure could be raised to the level of the emerging export model, up to 25 million tons of bananas could be made available for domestic and global consumption.

## The advantages of temperature controlled distribution

Transporting fresh produce like bananas over long distances is an essential element of global food distribution. Most food waste in the supply chain comes directly or indirectly from poor temperature control. To minimize these losses and extend the shelf life of fresh produce, an uninterrupted series of storage and distribution activities, a cold chain, is a critical component. Recent innovations in container technology, such

as Maersk Line's StarCare™, mean that bananas can now potentially travel up to 50 days with minimal losses and their freshness retained. Technologies such as these are creating new opportunities for banana growers all over the world to reach more distant markets without eroding the quality of their products. For India, StarCare™ could thereby also offer an opportunity to advance into markets beyond the Middle East in the future.

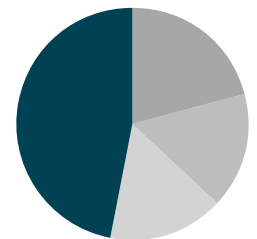
## Up to 25 m

tons more bananas could make it to consumers if the export productivity gains were applied to the domestic sector.

## 1–2%

is the share of bananas lost during transit in the export model.

## Banana waste during domestic transit



- 47% Farm gate to local mandi
- 21% Wastage within district
- 16% Wastage within State
- 16% Wastage outside the State

Source: enRoute, Transport Corporation of India Ltd.

# A scenario for growth in the Indian banana exports

Based on interviews with exporters and local authorities, the study quantified the growth potential of the Indian banana export trade and the economic impact that growth could bring.

In 2010, the value of Indian banana exports was estimated to be US\$79 million, with around US\$28 million of this value accrued to India and the rest going to foreign actors in the export value chain. The study found that the potential for further growth is strong.

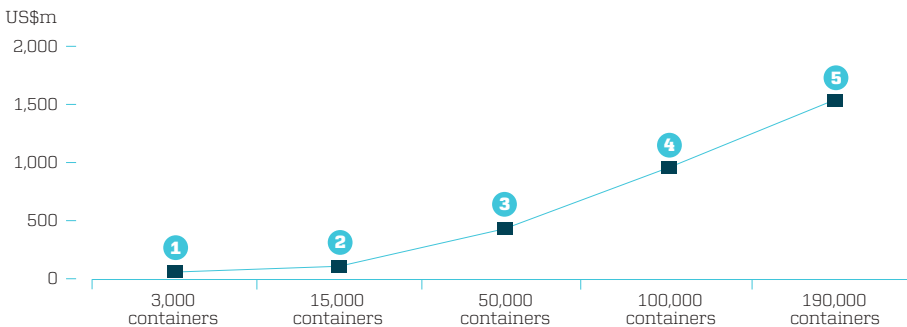
The graph below outlines a possible growth scenario for the export sector, with key milestones along the way. It shows the additional economic value that would be gained by India as the number of container loads of bananas exported is increased.

The growth trajectory is based on progressive improvements in productivity and reductions in waste on the smallholder farms dedicated to export-quality banana production.

It also presumes a gradual increase in the acreage dedicated to export banana production in India. This could be achieved through banana farmers in identified export production 'clusters' switching to the export model, or through the conversion of farmland in those areas to export banana cultivation from alternative crops. The use of virgin land could offer further increases.



Value US\$ created to India from export growth



Source: Maersk Line

- 1 Baseline:** 3,000 containers per year represents the 2010 baseline. Today, only 0.15% of the total Indian banana acreage is dedicated to exports and the Indian export is equivalent to just 0.3% of the global trade.
- 2 15,000 containers per year:** This is the short- medium-term export ambition of Indian stakeholders and would bring Indian exports up to around 2% of the current global trade; about the same as Honduras or Côte d'Ivoire. This level of exports would make use of 0.5% of total banana acreage in India.
- 3 50,000 containers per year:** This is the medium-term export ambition of the Indian trade and is equivalent to around 5% of the current global trade, a level achieved by Guatemala and Panama. It would require 1.5% of the total Indian banana acreage.

- 4 100,000 containers per year:** This level represents the long-term ambition of the Indian export sector. At this point, India would provide around 10% of the world's banana exports, about the same as the Philippines, whilst still only making use of 3% of its total banana acreage for exports.
- 5 190,000 containers per year:** This is the estimated volume of exports that would be achieved if the production capacity of the banana clusters currently identified was fully realized. Using up 5% of Indian banana acreage, this level of exports would represent 17% of the current global total, about the same as Colombia or Costa Rica.

Given the volume increases and level of productivity improvements needed, increasing exports to 190,000 containers per year is an ambitious milestone to aim for. However, the level of ambition in the industry is high and the study estimated that, with a 4% annual increase in yields and a 27% annual increase in acreage dedicated to export-quality bananas, this could be achievable as soon as 2025.

Reaching this level would make bananas a key export industry for India. The economic impact of this would be significant. The export industry would generate US\$4,646 million each year, of which US\$1,612 million would accrue to India and the rest to foreign stakeholders. This would add more fuel to the continuing growth and development of the Indian national economy.

There would also be significant localized social and economic impacts in the banana-growing clusters. These are discussed in the next section.

# The social and economic impact perspective

The socio-economic impacts of expanding the Indian banana export model could be significant. The current export of approximately 3,000 containers is estimated to employ 2,250 people, directly or indirectly, including 1,000 farmers.

Should India manage to realize its full potential and increase its volumes to 190,000 containers, this could increase to 96,000 jobs in total. They, in turn, would support 405,000 dependants. 34,600 smallholder farmers would be among those to benefit.

Increased productivity as a result of improved produce quality and know-how from exports would generate around 60% more income for farmers and 106% for workers. This would allow for improved access to basic utilities, education and healthcare for them and their families. However, the study also found that there are limits to how much a smallholder farmer with only around 2.5 acres can earn and thus the extent to which he and his family would be able to escape poverty.

Once the benefits of increased yields flatten out, further rises in income levels are still possible if individual farmers are able to increase their acreage. As well as increasing production capacity, the study found that five and even 10-acre farms are much less vulnerable to natural hazards

and crop failures compared with smaller farms. However, increasing average farm size would require significant land reform.

The vulnerability of smallholders and workers, detailed in the box to the right, raises an important question about the economic value distribution of the global banana trade. In this respect, the Indian export model looks very similar to the global model, with approximately 10% of the economic value going back to farmers and less than 2% of this to the farm workers. In contrast, foreign economic stakeholders capture 65% of the economic value of an internationally-traded banana.

In recent years, Fairtrade has emerged as an example of how market instruments can seek to distribute a larger share of the economic value back to producers. While Fairtrade continues to represent only a marginal share of the global banana market, it does offer potential to test and market alternative modes of production, including those based on smallholdings, for select global markets.

## 10%

of the banana's economic value goes to the farmers and less than 2% of this goes to farm workers

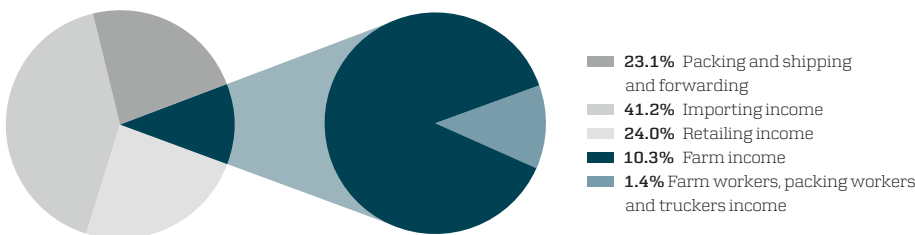
## 96,000

represents the total number of jobs of growing the exports to 190,000 containers. This would in turn create over 400,000 dependants

### The vulnerability of Indian banana farmers

- Banana farms are typically only 2–2.5 acres
- The majority of India's smallholder farmers live below the international and domestic poverty line
- There is no government insurance for banana farmers in case of crop failure. However, Indian farmers are tax exempted
- Many have debt problems. Farmers pay 36–40% interest on black/grey market loans, relative to a bank rate of c. 12%
- Rural depopulation is causing an overall shortage of rural workers, further increasing pressure on farmers
- The value of land is rising, leading some farmers to sell off their farms.

### Value distribution India 2010



Source: Maersk Line

# The environmental impact perspective

To ensure a sustainable growth trajectory for Indian banana exports, the potential economic and social benefits must be balanced against the environmental impacts of growing the trade.

While the study did not include an explicit environmental impact assessment, in the longer term, environmental issues must be considered alongside the economic and social factors. Any degradation of farmland and the natural environment will, over time, have a critical impact on the economic sustainability of the banana sector and welfare of the local population who rely on clean water, healthy soil and pollutant-free air.

Based on the findings in this study, there are indications that the expansion of export-quality bananas in India can be achieved without compromising the health of the natural environment. As a matter of fact, the improved quality and reduction of waste necessary for a profitable export model will in itself have a positive

environmental effect, allowing India to produce the same amount of bananas with fewer resources.

Furthermore, the expansion of the export model could offer an opportunity to apply modern, more environmentally sustainable farming practices on a large scale. This includes using farmer education and support to drive improved management of fertilizers and pesticides, more efficient use of irrigation and the avoidance of surface water pollution. As well as reducing any potential negative environmental effects from the export model's more intensive farming, better environmental management could also help protect the health of farm workers and neighbouring communities.



## Energy-efficiency through containerized banana transport

Environmental impacts occur across the entire Indian banana value chain, not just at the production stages. For globally traded bananas, a significant part of the environmental footprint comes from shipping and inland transportation at origin and destination. Through investments in container technologies and innovations, Maersk Line is playing a

key role in reducing the environmental footprint of internationally traded bananas. As an example, shipping bananas in a refrigerated container from Maersk Line, going from Mumbai to Dubai, will save exporters and importers approximately 12% CO<sub>2</sub> compared to the industry average.

## Reducing water use in the banana sector

In the global banana trade, reducing environmental impacts can play an essential role in increasing productivity and reducing costs – water is just one area of impact.

Water has three main uses in banana packing houses. Firstly, it is used as a natural cleaning agent to remove debris and insects. Secondly, pools hold and transport bananas prior to selection. Finally, it is used to remove latex.

In the past, over 150 liters was needed per box. Water recycling technologies have been progressively introduced since the 1990s, with modern pack-houses such as Dole's New Millennium Packing Plant in Costa Rica now using only 18 liters per box. By moving most packing activities into the banana field, Dole not only saves water, it cuts energy use and protects aquifers.



# Required investments and enablers for export growth

Realizing the potential social and economic benefits of India's banana exports will require a significant upgrade in banana production and cold chain distribution.

Today, critical investments in the Indian banana export industry are absorbed by a handful of local exporters supported by a range of incentives and initiatives from the Indian Government and export authorities. Meeting the full potential of the trade would require the scale of these investments to be increased many times over.

## Cold chain

The development of effective cold chain storage and transportation services is critical to growing India's banana exports. By allowing the bananas to be kept fresh for longer, increased availability of cold chain storage would enable far more effective coordination of the supply of India's bananas with market demand, boosting the reliability of the supply and reducing wastage.

Cold chain transportation services, such as refrigerated trucks and containers, dramatically reduce waste in transit. These services need to be supported by an adequate power supply in rural areas.

To lower the cost of these services and at the same time help to optimize transport times, dedicated export corridors can be established, with an unbroken cold chain from pack-house to port.

## Pack-houses

The study estimated that around six fully dedicated pack-houses are required to handle the 3,000 container loads of bananas currently exported. However, in order to reach export volumes of 100,000 containers, around 200 pack-houses with packing capacity for two containers per day would be required.

## Farmer education

The current export model is dependent on smallholder farmers dispersed over a large agricultural area. This requires that significant investments be made in education and relevant support services to give farmers the necessary skills and knowledge to increase productivity, improve the quality of their bananas and reduce waste.

To reach the necessary level of investment to make improvements in these three areas, and to gain additional insights and expertise, India could benefit from cooperating with one of the large multinational banana companies. However, these companies have until now refrained from major direct investments in India, instead prioritising regions better suited to larger-scale commercial farming.



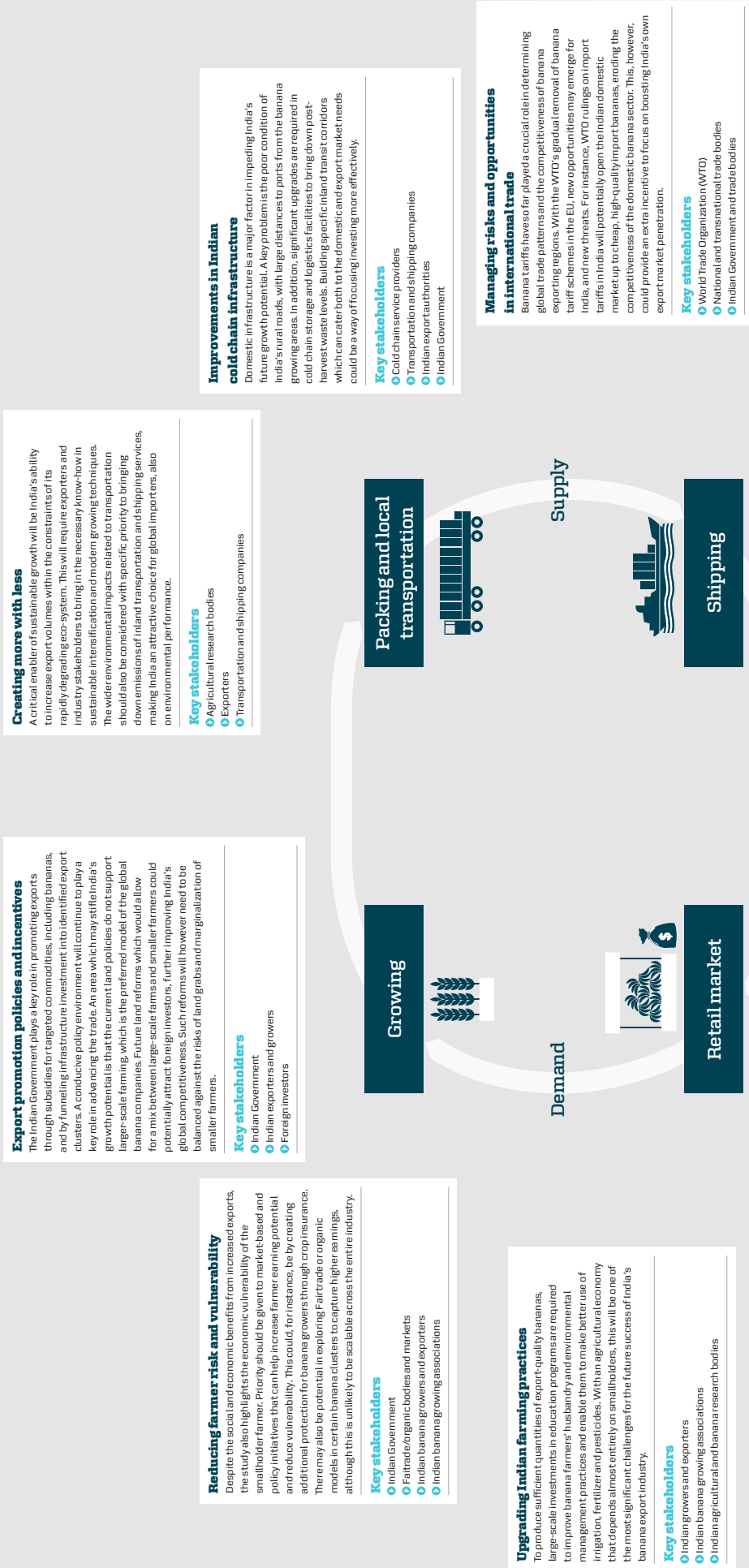
Poor transportation infrastructure wastes huge amounts of bananas

## The state of India's rural infrastructure

Over the last 60 years, poor planning and investment has resulted in numerous inefficiencies in Indian infrastructure. In combination with unparalleled economic growth, India's inland infrastructure is increasingly under pressure. One key constraint on future growth and a significant cost driver is the state of India's rural roads and the distance from farm to ports. For instance, travelling the

300 kilometers from a banana pack-house to the closest port can take up to three days due to traffic congestion and the poor state of roadway repair. This can significantly challenge the economic and environmental sustainability of export growth. Capacity at major Indian seaports is also a potential constraint to banana export growth.

# What will it take to unlock India's future potential? Summary of key issues and stakeholders



**Export promotion policies and incentives**  
The Indian Government plays a key role in promoting exports through subsidies for targeted commodities, including bananas, and by funneling infrastructure investment into identified export clusters. A conducive policy environment will continue to play a key role in advancing the trade. An area which may stifle India's growth potential is that the current land policies do not support larger-scale farming, which is the preferred model of the global banana companies. Future land reforms which would allow for a mix between large-scale farms and smaller farmers could potentially attract foreign investors, further improving India's global competitiveness. Such reforms will however need to be balanced against the risks of land grabs and marginalization of smaller farmers.

**Key stakeholders**

- Indian Government
- Indian exporters and growers
- Foreign investors

**Creating more with less**  
A critical enabler of sustainable growth will be India's ability to increase export volumes within the constraints of its rapidly degrading eco-system. This will require exporters and industry stakeholders to bring in the necessary know-how in sustainable intensification and modern growing techniques. The wider environmental impacts related to transportation should also be considered with specific priority to bringing down emissions of inland transportation and shipping services, making India an attractive choice for global importers, also on environmental performance.

**Key stakeholders**

- Agricultural research bodies
- Exporters
- Transportation and shipping companies

**Reducing farmer risk and vulnerability**  
Despite the social and economic benefits from increased exports, the study also highlights the economic vulnerability of the smallholder farmer. Priority should be given to market-based and policy initiatives that can help increase farmer earning potential and reduce vulnerability. This could, for instance, be by creating additional protection for banana growers through crop insurance. There may also be potential in exploring Fairtrade or organic models in certain banana clusters to capture higher earnings, although this is unlikely to be scalable across the entire industry.

**Key stakeholders**

- Indian Government
- Fairtrade/organic bodies and markets
- Indian banana growers and exporters
- Indian banana growing associations

**Upgrading Indian farming practices**  
To produce sufficient quantities of export-quality bananas, large-scale investments in education programs are required to improve banana farmers' husbandry and environmental management practices and enable them to make better use of irrigation, fertilizer and pesticides. With an agricultural economy that depends almost entirely on smallholders, this will be one of the most significant challenges for the future success of India's banana export industry.

**Key stakeholders**

- Indian growers and exporters
- Indian banana growing associations
- Indian agricultural and banana research bodies

**Meeting domestic market demands**  
Stakeholders consulted for this study suggested that high levels of domestic banana consumption were a factor in creating less of an incentive for exports. With the rise of the Indian middle class, the domestic requirement for export-quality bananas may well increase, adding further constraints to export sector development. For the exports to continue to grow over the coming 10–20 years, it needs to offer exporters economic benefits that the domestic market cannot match.

**Key stakeholders**

- Domestic wholesalers and retailers
- Indian exporters
- Indian banana consumers

**Improvements in Indian cold chain infrastructure**  
Domestic infrastructure is a major factor in impeding India's future growth potential. A key problem is the poor condition of India's rural roads, with large distances to ports from the banana growing areas. In addition, significant upgrades are required in cold chain storage and logistics facilities to bring down post-harvest waste levels. Building specific inland transit corridors which can cater both to the domestic and export market needs could be a way of focusing investing more effectively.

**Key stakeholders**

- Cold chain service providers
- Transportation and shipping companies
- Indian export authorities
- Indian Government

**Managing risks and opportunities in international trade**  
Banana tariffs have so far played a crucial role in determining global trade patterns and the competitiveness of banana exporting regions. With the WTO's gradual removal of banana tariff schemes in the EU, new opportunities may emerge for India, and new threats. For instance, WTO rulings on import tariffs in India will potentially open the Indian domestic market up to cheap, high-quality import bananas, eroding the competitiveness of the domestic banana sector. This, however, could provide an extra incentive to focus on boosting India's own export market penetration.

**Key stakeholders**

- World Trade Organization (WTO)
- National and international trade bodies
- Indian Government and trade bodies

**Penetrating strategic export markets**  
Global competition in the global banana market is strong and may intensify in response to India's attempt to enter key export markets. Furthermore, new growing regions within South Asia, e.g. Sri Lanka, may also enter the market over the coming years, further challenging India's export growth. On the other hand, new markets in the Middle East are growing. The proximity of the region to India and existing trade connections make the Indian industry well-placed to capitalize on this growth, in the longer term there could also be the potential for India to supply markets in Eastern Europe, the Black Sea and potentially East Asia.

**Key stakeholders**

- Global banana importers and retailers
- Competing banana regions
- Multinational banana companies

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## The role of Maersk Line

Maersk Line's instigation of this research stems from our desire to understand better the industries in which we play a direct and indirect role as enablers of global trade. We also wanted to learn about some of the opportunities and challenges in ensuring a sustainable and inclusive growth trajectory in the global agricultural value chains of tomorrow. As a world-class provider of refrigerated transportation services, we recognize that we have relevant knowledge and skills to offer to stakeholders across the Indian banana value chain.

We offer this study as one of many potential perspectives on the Indian banana trade. We share our observations in hope that the study can make a contribution to discussions among stakeholders up and downstream in the Indian banana industry who, like ourselves, can have an impact on future developments in the trade.

We will look forward to working closely with exporters, buyers and authorities in further maximizing the future impact potential of the Indian banana export.

For further information about the research presented in the folder and to share relevant insights and views in support of a sustainable growth trajectory for the Indian banana trade, please contact Maersk Line Sustainability via Mette Olsen ([mette.olsen@maersk.com](mailto:mette.olsen@maersk.com)).

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