PART III

Leveraging Sectoral Advantages to Expand Exports
Although less than 4 percent of land in Mali, a landlocked country in West Africa, is arable, agriculture accounts for 45 percent of the country’s economy and employs 80 percent of its workforce. Industry represents 17 percent of the country’s gross domestic product (GDP), with food processing, construction, and phosphate and gold mining as the principal industrial activities. Mali’s main agricultural export is cotton, followed by livestock. The fact that Mali is landlocked, however, has always made it dependent on the transport infrastructure and other logistical arrangements of its neighbors for trade and exports.

Thanks to excellent geographical and weather conditions prevailing in the southern part of the country, mangoes have always been abundant in Mali, particularly in the Bamako and Sikasso regions. The fruit was traditionally sold in the domestic market. In the 1970s Mali was the first country in West Africa to explore opportunities to export fresh mangoes. These exports were shipped exclusively by air freight to a niche market—high-end retail shops in France selling tropical fruits—and reached a volume of between 1,000 and 1,500 metric tons a year.

Starting in the early 1990s Mali undertook several transformations in its mango subsector that have allowed the country to overcome logistical dependencies and constraints, expand exports of fresh mangoes, and make major leaps toward developing a competitive horticulture export sector.

MALI’S EXPORT DIVERSIFICATION STRATEGY

A key objective of Mali’s poverty reduction strategy over the past two decades has been—and still is—to increase rural incomes and employment opportunities by promoting agricultural diversification and developing exports of high-value commodities. In the early 1990s the government of Mali recognized a need to design policies to diversify exports and foreign exchange earnings, which had been heavily dependent on only three export products: gold, cotton, and livestock. These products, however, are quite susceptible to fluctuations. For example, cotton exports dropped dramatically in 2008 to less than half of their previous level; also, because of several years of financial crisis, the contribution of the sector to fiscal revenues has been negative throughout the whole decade.

Striving for diversification

In the face of these fluctuations, the government of Mali began, in the 1990s, to focus on high-value and nontraditional agricultural products as a means to generate income and achieve greater diversification of exports, based on the
country’s comparative advantages. Besides offering smallholder farmers the opportunity to diversify the source of their livelihoods, high-value and nontraditional agricultural products also offer countries the opportunity to diversify away from low-value bulk commodities.

Several horticulture crops were considered as possible targets for these diversification efforts, including cashews, tomatoes, shallots, and mangoes. Mangoes were a prime candidate both because of the excellent agroclimatic conditions for growing them in the southern regions of Bougouni and Sikasso and because of the fast-growing demand for mangoes in European markets (figure 10.1). Furthermore, because mangoes were already being produced by smallholder farmers throughout the country, the subsector had the potential to contribute to rural livelihood improvements. However, despite the high quality of Mali’s fresh fruit and vegetables, the high cost of air freight was severely limiting marketing and exportation. In fact, significant volumes of Mali’s mangoes were purchased and processed for export by operators based in Côte d’Ivoire, thus leaving little potential for value addition in Mali.

Early efforts toward agricultural diversification

In 1992 Mali’s Ministry of Agriculture prepared a national rural development strategy, the Schéma Directeur du Développement Rural (SDDR), emphasizing commercial agriculture, export promotion, and value addition, and the government began directing resources toward those ends using financing from international donors such as the World Bank and the U.S. Agency for International Development (USAID).

The global market for fresh mangoes

Demand for mangoes in the European Union (EU) has grown significantly in recent years, increasing by approximately 55 percent between 2001 and 2008, from 136,000 tons to more than 230,000 tons respectively (table 10.1). The leading exporter countries, in order, are Mexico, Brazil, Peru, India, Pakistan, and the Philippines; together, they represent around 75 percent of the market. Although African mango exports grew by 69 percent during the same period, export volumes remain far lower than those of the leading producers. In 2007, for example, Mexico was exporting a total of 236,000 metric tons of mangoes, while the entire African continent recorded 46,300 metrics tons of exports only (FAOSTAT).

Within Africa, leading producers, in order, are South Africa, Côte d’Ivoire, Sudan, Kenya, the Arab Republic of Egypt, and Mali. Historically, Côte d’Ivoire has exported
Significantly higher volumes of mangoes than its closest competitors on the continent, apart from South Africa. In the early 2000s, before political disturbances in the country, Côte d’Ivoire exported around 11,000 metric tons; the next closest African rival was Burkina Faso with 3,500 metric tons exported. That same year Mali reported 900 metric tons of exports (FAOSTAT).

**THE CHALLENGES**

**Identifying market opportunities**

The large amount of mango exports from Côte d’Ivoire can be partly explained by the fact that the country was working with buying agents from Mali in the 1980s and 1990s. Mango exporters in Côte d’Ivoire operated pack houses in the northern part of the country, sourcing mangoes from growers across the border in Mali. The arrangement led to a surge of mango exports, sold under an Ivorian label.

Malian mango producers did not anticipate the increasing demand for mangoes in the European market, which was moving from a luxury, niche market to a volume market. Mangoes, like some other tropical fruits, such as bananas and pineapples some decades earlier, became a fruit that was in high demand all year round by European customers.

In an attempt to increase its mango exports, Mali sought alternatives to air freight that would increase its competitiveness and market share. Mali’s landlocked status posed a serious challenge to that effort, however, and logistics and transport issues prevented an initial substantive scaling up of exports.

**Overcoming transport and logistics constraints**

High transportation costs made Malian mangoes uncompetitive in the global market. Whereas competitors in Latin America could take advantage of more economic sea freight, Mali’s producers were limited to the more expensive air freight option, which reduced their exports and relative position as a mango exporter in West Africa (table 10.2).

Historically, Mali relied on Côte d’Ivoire as a link to port facilities. Cotton lint and other products, for example, were exported through the port of Abidjan. In addition to relying on its neighbor’s ports, Mali also relied on its neighbor’s infrastructure to move its export products to the ports. Until the 1990s the only rail line in Mali with international links was run inefficiently, leading to significant high prices and delays. This protracted transport process was especially detrimental to those Malian agricultural products that have high spoilage and shrinkage rates. A research report (CARANA Corporation 2004) also points out that producers’ logistical costs were negatively affected by the cost of the consolidation of goods and poor business practices.

**Other challenges**

Although infrastructure was the most serious constraint to Malian exports of fresh produce, inadequate access to finance and land; a poor business climate; inadequate

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**Table 10.1 Mango Imports to the European Union, by Country, 2004–09 (metric tons)**

<table>
<thead>
<tr>
<th>Country</th>
<th>2004</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009a</th>
<th>Annual</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brazil</td>
<td>69,319</td>
<td>82,293</td>
<td>84,858</td>
<td>82,993</td>
<td>96,870</td>
<td>69,590</td>
<td>9</td>
<td>40</td>
</tr>
<tr>
<td>Peru</td>
<td>19,817</td>
<td>26,394</td>
<td>41,027</td>
<td>36,854</td>
<td>50,756</td>
<td>25,062</td>
<td>27</td>
<td>156</td>
</tr>
<tr>
<td>Pakistan</td>
<td>10,938</td>
<td>12,306</td>
<td>10,120</td>
<td>12,224</td>
<td>12,941</td>
<td>12,913</td>
<td>4</td>
<td>18</td>
</tr>
<tr>
<td>Israel</td>
<td>8,059</td>
<td>12,548</td>
<td>11,181</td>
<td>14,808</td>
<td>12,261</td>
<td>12,606</td>
<td>11</td>
<td>52</td>
</tr>
<tr>
<td>Côte d’Ivoire</td>
<td>11,426</td>
<td>9,856</td>
<td>14,428</td>
<td>14,706</td>
<td>11,249</td>
<td>11,659</td>
<td>0</td>
<td>–2</td>
</tr>
<tr>
<td>United States</td>
<td>7,612</td>
<td>6,894</td>
<td>5,971</td>
<td>7,404</td>
<td>7,516</td>
<td>5,536</td>
<td>0</td>
<td>–1</td>
</tr>
<tr>
<td>Senegal</td>
<td>2,810</td>
<td>3,011</td>
<td>6,194</td>
<td>4,702</td>
<td>6,034</td>
<td>6,219</td>
<td>21</td>
<td>115</td>
</tr>
<tr>
<td>Costa Rica</td>
<td>3,983</td>
<td>6,271</td>
<td>7,545</td>
<td>4,664</td>
<td>5,360</td>
<td>5,685</td>
<td>8</td>
<td>35</td>
</tr>
<tr>
<td>Mali</td>
<td>2,096</td>
<td>2,560</td>
<td>3,477</td>
<td>4,317</td>
<td>4,902</td>
<td>3,480</td>
<td>24</td>
<td>134</td>
</tr>
<tr>
<td>Dominican Rep.</td>
<td>1,228</td>
<td>1,591</td>
<td>1,618</td>
<td>2,767</td>
<td>4,307</td>
<td>4,179</td>
<td>37</td>
<td>251</td>
</tr>
<tr>
<td>India</td>
<td>915</td>
<td>1,720</td>
<td>2,472</td>
<td>2,425</td>
<td>2,577</td>
<td>2,470</td>
<td>30</td>
<td>182</td>
</tr>
<tr>
<td>Burkina Faso</td>
<td>928</td>
<td>1,164</td>
<td>2,152</td>
<td>3,191</td>
<td>2,406</td>
<td>1,957</td>
<td>27</td>
<td>159</td>
</tr>
<tr>
<td>Other</td>
<td>23,516</td>
<td>20,035</td>
<td>19,786</td>
<td>19,003</td>
<td>13,209</td>
<td>12,893</td>
<td>–13</td>
<td>–44</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>162,646</td>
<td>186,643</td>
<td>210,829</td>
<td>211,057</td>
<td>230,388</td>
<td>174,248</td>
<td>9</td>
<td>42</td>
</tr>
</tbody>
</table>

Source: Eurostat.

a. January to November.
management, harvesting, and handling techniques; and little investment in mass production further weakened producer export capacity.

Lack of Market Information and Organization. Malian producers and exporters did not have a good grasp of the requirements of the intensely competitive European market. In addition, poor organization and coordination between producers, government inspection officials, and exporters led to inefficiencies affecting the industry’s ability to meet international orders on time.

Lack of Proper Harvesting Practices and Postharvest Handling Techniques. Buying agents typically visited orchards once a season and harvested all of the fruit at once, regardless of its ripeness. In addition, many growers did not manage their orchards, did not prune undergrowth, and did not clean the ground under the trees, creating a good habitat for fruit flies.

Little Investment at the Production Level. Investment in mango production—including the establishment of commercial orchards—is important because it provides producers and exporters a degree of organization and efficiency. Traditionally, Malian farmers saw mango production as mainly a subsistence activity, a business opportunity. Even though orchards were smaller than five hectares, as much as 50 percent of total mango production was wasted each year (Club du Sahel/OECD 1998), and little investment was made in increasing production. Additionally, because Malian mangoes were exported through Ivorian pack houses, Malian producers received little return from their crop and thus had even fewer incentives to invest in commercializing crop production.

An Uninviting Investment Climate. Foreign investors, unfamiliar with Mali’s policies and procedures for conducting business, perceived investment in the country as high risk. In addition, limited foreign direct investment in the country and poor enforcement of fair business practices further reduced competitiveness.

Poor Land Titling and a Nonexistent Land Market. Bureaucratic inefficiencies and land tenure rules kept Malian producers from owning large tracts of land, thereby creating another barrier to large-scale horticulture. Until the Agriculture Orientation Law of 2006, there were no provisions for the establishment of commercial-scale irrigated plots, nor could producers purchase irrigated land that could be used as collateral against which to secure loans.

Inadequate Working Capital and Lack of Supply Chain Financing. With limited working capital, Malian production and subsequent exports were constrained because exporters were required to finance the cost of shipping. This problem was of particular urgency to exporters, who did not always receive payments from previous shipments before they needed to send additional shipments.

In short, not only did Mali need to make changes that would enable it to improve its main constraint—infrastructure—it also needed to undertake a series of transformations improving technical capacity and business regulatory practices in the mango sector (box 10.1).

INTERVENTIONS
Supporting agricultural diversification

The transformation of Mali’s mango export sector began in the mid-1990s with PAVCOPA, the pilot project funded by

| Table 10.2 Mango Exports to the European Union, 1970–95 (metric tons) |
|-----------------|-----------------|-----------------|
| Mali            | Burkina Faso    | Côte d’Ivoire   |
| 1970            | 35              | —               |
| 1980            | 1,172           | 2,116           |
| 1990            | 1,300           | 2,700           |
| 1995            | 850             | 714             |

Source: FAOSTAT.
Note: — = not available.

Box 10.1 The Mango Export Value Chain before Reforms

Before reforms in the sector, the value chain included producers, intermediaries, and exporters.

- Producers sold produce to buying agents, called “pisteurs,” independent traders who select, harvest, wash, sort, package, and transport the fruit from orchard to pack house.
- Agents worked exclusively for a particular exporter.
- Quality control was undertaken by exporters, who selected fruit that were of export quality and returned the second-grade fruit to the pisteur for sale on the domestic market.

Source: Authors.
Rethinking and redesigning the mango export value chain

The first step that triggered the agricultural export reform process in Mali occurred when a small but critical mass of stakeholders were brought together to thoroughly analyze and assess opportunities for diversification into high-value crops. Initial implementation of PAVCOPA was not unsuccessful; however, the preparation of its midterm review in January 2000 provided an opportunity to restructure the project and create a new business plan.

Another critical point was reached when APROFA and its technical team of advisors began analyzing what had made Côte d’Ivoire successful in developing sea-freighted mango exports. Although Mali had been exporting mangoes for years, the industry was not broadly based but rather limited to a narrow market targeting an exclusive club of exporters on the periphery of Bamako.

Observing and understanding the success of Côte d’Ivoire entailed a thorough analysis of the global market demand and its trends, and an assessment of the supply chain in Côte d’Ivoire. This evaluation suggested that three critical steps were necessary to change the mango industry in Mali. The industry had to penetrate and compete in the growing market for fresh mangoes (that is, the sea-freighted trade to major European ports and hubs such as Rotterdam, Antwerp, Algeziras, and London); establish the drivers of change and a value chain within the system to improve competitiveness; and identify and implement solutions to overcome poor access to international ports while developing alternate and effective transport routes.

A key innovation: Introduction of multimodal transport in the export value chain

The design and implementation of a multimodal transportation system in 1995 was a key innovation for the Malian mango industry that eased transportation logistics constraints and costs. Through this new system, mangoes are loaded into temperature-controlled containers and driven into Ferkessedougou, Côte d’Ivoire. There, the containers are transported by rail to Abidjan and shipped to Europe. The containers are maintained at 5 degrees Celsius. Transit times per shipment between the mango-producing regions of Sikasso and northern Europe have declined from 25–30 days to approximately 12–15 days (Danielou, Labaste, and Voisard 2003). As figure 10.2 illustrates, multimodal transit also allowed large volumes of mangoes to be exported from Mali at an affordable cost. The existence of this uninterrupted cold chain (refrigerated containers) greatly decreases the rate of spoiling of mangoes during transit.

Designing the innovation and testing the system

To hedge risks involved with the new system, APROFA negotiated and signed a partnership agreement with a privately owned Ivorian company, SN Tropical Expressions (SNTE), that split the costs, profit margins, and risks associated with the first shipment of 200 tons. SNTE was responsible for both the logistics and packaging involved in shipping the produce to their ultimate port of destination in Europe. A profit margin was built into the fixed price to ensure that both parties respect their mutual costs objectives. If the average selling price is greater than the fixed price, APROFA and SNTE share the difference. This partnership resolved the problem of lack of finance for exporters because SNTE had the necessary working capital to fund the operation.

Under the same agreement, APROFA was able to obtain a guarantee from a local bank enabling SNTE to lease an existing pack house in Sikasso with the necessary equipment for precooling fruit pallets. In addition, SNTE seconded two experienced managers to operate the Sikasso facility. Precooling the mangoes at the pack house stage is critical for the continuous cold chain. The establishment of continuous cold chains in the export of horticulture and other high-value crops remains one of the most serious challenges to the expansion of exports from other Sub-Saharan African countries.
Early success

The test carried out by APROFA and SNTE was a great success from many points of view, particularly in terms of quality: none of the 63,000 cartons of mangoes shipped to the Netherlands was rejected. To the contrary, there were demands for steady shipments of Malian mangoes. The
validation of the feasibility and profitability of the new value chain for mango exports represented a critical breakthrough and opened completely new horizons for the mango business in Mali.

Despite sociopolitical turmoil in Côte d’Ivoire, Mali’s cold chain transportation system remained uninterrupted. The pilot project helped Malian producers and exporters address the three major constraints of Mali’s export supply chain: finance, management, and infrastructure. Producers were able to receive a higher price for their mangoes at the farm gate—125 CFA francs versus 50 before, a 150 percent increase. Similarly, exporters increased the volume of fruits they were able to ship from Mali, which translated into increased revenues. The impact of the pilot project has been far reaching and has encouraged entrepreneurs to engage in similar ventures within and outside the mango sector.

Although the full export potential of Malian mangoes is yet to be determined, APROFA conducted a number of studies to produce estimates of such figures. In the Sikasso region, for instance, where production in 2001 was estimated at 48,000 metric tons, it is expected that the region could export 14,400 metric tons (under the assumption that only 30 percent of the mangoes would be of export quality). APROFA estimates that with total production of approximately 200,000 metric tons, Mali would be able to export 50,000 metric tons (25 percent) of its mangoes.

**Consolidating success and transforming agricultural exports in Mali**

In 2005 the government of Mali launched the Agricultural Competitiveness and Diversification Project, a six-year investment project, funded by a $46.4 million World Bank credit. The project’s goal is to increase revenues and competitiveness for a range of agricultural products with growing (yet mostly untapped) markets and strong demand, thus diversifying the economy’s foreign exchange earnings. In addition, its development objective is to improve the performance of supply chains across a range of nontraditional agricultural, livestock, fisheries, and produce in which Mali enjoys a strong competitive advantage, including mangoes, cashews, shallots, potatoes, dairy products, beans, papayas, sesame, and shea nuts.

The project includes five components: demonstration and dissemination of irrigation, postharvest, and value-adding technologies; improvement of the performance of existing and developing supply chains; facilitation of access to finance for producers and operators; investment in key collective, market-oriented infrastructure; and management, monitoring, and evaluation of project implementation.

Using a series of analytical tools and data, the project team identified value chains for export markets, providing a basis for prioritized interventions that would ultimately create value and improve livelihoods of Malian small farmers. The analysis used five modules to assess the competitiveness of a range of nontraditional agricultural value chains (box 10.2). Each module built on the previous one and progressed from a comprehensive list of sectors to those with true marketability, competitive advantage, and comparative advantage. This process also took into account the demand in existing end markets and identified new potential end markets, regional climate and growing factors, production capacity, access to finance, and infrastructure, among other determinants.

**Improving quality by investing in infrastructure and technical assistance**

Mali’s revised surface transport system vastly increased the country’s export capacity for mangoes. In fact, once the new transportation system was established and proven economically efficient and reliable, the government pursued additional

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**Box 10.2 The Strategic Profile Approach**

The approach that was followed to identify and prioritize value chain interventions in Mali entailed the following sequence of modules, each one comprising several steps:

- Module 1: Defining Mali’s Broad Portfolio of Agricultural Sectors
- Module 2: Analyzing Market Demand and Market Entry Conditions
- Module 3: Analyzing the Competitiveness of Potential Malian Offerings
- Module 4: Defining Priority Sectors
- Module 5: Competitiveness Planning: Putting the Analysis into Action

Through this process, a series of operational tools was developed for each of the selected value chains—the Strategic Development Plan, the Competitiveness Plan, and the Priority Action Plan. PCDA is now in the process of implementing these action plans with the respective value chain stakeholders.

*Source: Authors.*
interventions to increase the quality and quantity of mangoes exported. A number of successive agricultural diversification projects were thus started during the 2000s: USAID’s Centre Agro-Entreprise (CAE), Trade-Mali, the Initiatives Intégrées pour la Croissance Economique du Mali (IICEM) program, and the World Bank’s Programme Compétitivité et Diversification Agricoles (PCDA). Interventions covered by these programs included infrastructure cold-chain and conditioning improvements, phytosanitary improvement programs (especially the control of fruit fly infestation), certification programs, traceability programs, training in orchard management practices, and postharvest handling training programs. Figure 10.3 summarizes the continuum of projects and initiatives that supported the development of the mango industry in Mali between 1993 and 2009.

To strengthen human and physical capacity and to improve the competitiveness of mango exports, a pack house and logistics facility known as the PLAZA (Périmètre Logistique Aménagé en Zone Aéroportuaire), with capacity to handle 2,000 tons of fresh produce a year, was built in 2007 (box 10.3). The PLAZA has been integral in helping mango exporters (mainly sea-freight exporters) prepare their products for export with precooling and storage rooms, meet international standards for quality and safety, and train staff. The PLAZA is the only modern pack house away from the growing region and the border with Côte d’Ivoire. However, the PLAZA currently operates only during the mango season. PCDA is looking at other perishable export products, such as papaya and other fresh produce, that could make use of the pack house.

Figure 10.3 The Stages of Development of the Mango Export Industry in Mali

Box 10.3 The PLAZA

The World Bank project, PCDA, with funding from the Dutch Embassy, built a modern pack house in Bamako, near the airport, to help exporters improve their capacities in handling and shipping mangoes. The PLAZA has proven to be an effective pack house despite its location, away from the growing region and the border with Côte d’Ivoire. However, the PLAZA currently operates only during the mango season. PCDA is looking at other perishable export products, such as papaya and other fresh produce, that could make use of the pack house.

Source: J. E. Austin Associates.
Note: DHV, API and CNPI are all project acronyms.

Source: Authors.
for horticulture in Mali. A precooled and shipping facility in Sikasso is also being considered.

With assistance from the donor community, the government has provided technical assistance and training in phytosanitary issues. Continuous tightening of the EU food safety regulations, coupled with stricter demands in terms of traceability, are making it necessary to devise and deliver substantial interventions in agricultural export countries. Figure 10.4 illustrates the general stages of horticulture export quality requirements.

Phytosanitary requirements are still a challenge for Malian produce and several other West African countries. In the past, many shipments of mangoes were rejected once they reached Europe because of fruit fly infestations or other phytosanitary concerns. These problems arise partly from a lack of proper harvest and postharvest handling techniques. Since the fruit fly problem is a regional one, several regional initiatives have been established to eliminate the flies. Over the past three years, the West African Fruit Fly Initiative (WAFFI), jointly financed by the World Bank, the European Union, and the World Trade Organization (WTO), has been piloting fruit fly surveillance and mitigation protocols in West African orchards, including those in Mali. The knowledge and experience gained thus far has led to the design of a West African Regional Action Plan to control fruit flies. Once the substantial funding required to implement this program (€25 million) is gathered, the large-scale interventions planned by the program should translate into much-reduced prevalence of fruit flies in Malian orchards, thus improving the quality of the marketed fruit.

**Figure 10.4 Continuum of Commercial and Regulatory Horticulture Export Requirements**

<table>
<thead>
<tr>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
<th>Level 5</th>
<th>Level 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ visual characteristics</td>
<td>+ quality grades and varietals preferences</td>
<td>+ basic requirements on pesticide use</td>
<td>+ internal quality characteristics of products</td>
<td>+ specifications for selected, basic standards, basic GAP, good hygiene and approaches to safe pesticide use/storage and associated record-keeping systems</td>
<td>+ specifications for more advanced and often quite specific process standards with associated greater detail in record-keeping</td>
</tr>
<tr>
<td>+ visual inspections</td>
<td>+ visual inspections</td>
<td>+ 2nd and 3rd party inspections/ testing</td>
<td>+ 2nd and 3rd party conformity assessment</td>
<td>+ 2nd and 3rd party conformity assessment</td>
<td></td>
</tr>
</tbody>
</table>

**Stringency of official and buyer’s requirements**
Level of sophistication of the conformity assessment systems

<table>
<thead>
<tr>
<th>Informal sector domestic</th>
<th>Horticulture exports to high-end Int’l outlets</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Domestic high end horticulture</td>
<td>Low risk products</td>
</tr>
<tr>
<td>- Ethnic produce exports</td>
<td>High risk products/sophisticate postharvest operations</td>
</tr>
<tr>
<td>- Exports to wholesale markets</td>
<td>(fresh and dried products)</td>
</tr>
</tbody>
</table>

Source: Jaffee 2009.
Phytosanitary issues are closely linked to the certification process. Recognizing that many of its mangoes are sold in supermarket chains in Europe, Mali has pursued several certifications, including GLOBAL G.A.P. certifications. Streamlining the export process at the airport has contributed to the success of Mali’s certification programs.

Improving orchard management and postharvest handling interventions

Orchard management and postharvest handling interventions have been very important in Mali as well. To have high-quality fruit to export, quality improvement must begin at the orchard level. Training in such improvements has been provided by several institutions in recent years, including the government, international partners, and even exporters themselves. Training has been comprehensive, with topics ranging from harvesting best practices, transport handling aimed at reducing damage to the product, and grafting techniques to improve the varieties and productivity of trees. Over time, training has increased the capacity of mango producers, allowing for continued success in the subsector.

Supply chain financing

Through the PCDA project, local banks and other financial institutions have regained trust and interest in Malian horticulture. In 2008 CFAF 150 million were lent to operators in the subsector, a record level compared with the past 10 years. This loan was disbursed in the form of credit for the import of shipping material (CFAF 56 million) and seasonal credit (CFAF 94 million) for three exporters. Between 2007 and 2008, PCDA provided a guarantee to a commercial bank to fund the import of transport boxes from Côte d’Ivoire; the bank held them in bond through a third party, releasing them on credit terms when the exporters needed to prepare an export shipment. In 2009 the same banks agreed to pre-finance the import of boxes directly to the exporters. PCDA has established its credibility in this area and continues to play an important facilitative role between farmers, exporters, and professional operators on the one hand, and the banks and financial institutions on the other hand.

Business training

Capacity building has been critical for the transition from subsistence mango farming to commercial farming. Producers received training in crop husbandry and best harvest practices, developing tools and linking value chain actors to financing. International partners have also provided assistance in small business development techniques.

As part of PCDA, for example, the Dutch firm Bakker Barendrecht teamed with five exporters operating at the PLAZA to teach the exporters how to reach European markets with their products. Bakker invests in knowledge in mango production and pays a minimum on the fruit if the exporters abide by a code of practice detailed in the contract. Varieties, ripeness, size, and other details are agreed upon with exporters for the entire season, with the possibility of payment of premiums if the mangoes sell well.

RESULTS AND IMPACTS

Mali’s development agenda places a high priority on agricultural growth and diversification. The achievements realized through the PAVCOPA and PCDA projects have made a direct and tangible contribution to this agenda. A whole range of stakeholders participating in the value chain—small farmers, traders, agroprocessors, exporters, service providers (technicians, financiers, and accounting specialists), and input and equipment providers—have been involved since project launch and are benefiting from the expansion and improvements brought about by these projects.

Quantitative results

Results achieved after 15 years of reform in Mali’s mango subsector are summarized in table 10.3. In many cases, the improvements are significant. The volume of mangoes exported, for example, reached 11,995 tons in 2008, an all-time record with a growth rate of 24 percent a year. (figure 10.5). Mango exports generated revenue of CFAF 9.7 billion ($25 million) in the same year, a significant proportion of the earnings generated by Mali’s traditional exports, such as cotton lint. A range of stakeholders—farmers, harvesters, processors, and exporters—are benefiting from expansion in mango trade and improvements along the value chain. This means increased market share, value creation, and improved prices at all stages of mango production. The price producers receive for their mangoes at the farm gate increased by 150 percent between 1993 and 2008. That price increase has allowed for additional capacity for other on-farm activities as farmers became aware of the margins to be gained from horticulture production.
Table 10.3 Key Quantitative Improvements in Mali’s Mango Subsector, 1993–2008

<table>
<thead>
<tr>
<th>Year</th>
<th>1,050 metric tons exported</th>
<th>11,995 tons exported</th>
<th>1,042%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1993</td>
<td>Marginal sea-freighted mango exports; exports not recorded as originating in Mali</td>
<td>Sea-freighted exports total 4,600 tons</td>
<td>460%</td>
</tr>
<tr>
<td>2008</td>
<td>$460,000 of revenue generated by mango exports</td>
<td>Value of mango exports reached $3.4 million in 2007</td>
<td>639%</td>
</tr>
<tr>
<td></td>
<td>25-day transit time from Sikasso to northern Europe</td>
<td>12-day transit time from Sikasso to northern Europe</td>
<td>–13 days</td>
</tr>
<tr>
<td></td>
<td>Farm gate price of CFAF 50</td>
<td>Farm gate price of CFAF 125</td>
<td>150%</td>
</tr>
<tr>
<td></td>
<td>237 tons of European imports</td>
<td>European imports increased to 4,560 tons</td>
<td>1,824%</td>
</tr>
</tbody>
</table>

*Source: Author research; revenue contribution figures from FAOSTAT.*

The average quality of fruit exported from Mali has improved. The number of sea container rejections due to fruit flies, for example, dropped from 14 containers in 2007 to 5 containers in 2008. Backward linkages at the production level also have improved tremendously, as have relationships between exporters and farmers. Mali has also been able to set a foothold on the Fair Trade niche market (box 10.4). Exporters provide support services to farmers such as helping to manage their plantations, working to reduce fruit flies, and implementing certification or traceability programs on the plantation. In return, exporters purchase farmers’ final product—often without a contract. The trust established by these interactions allows exporters to obtain a higher-quality product, because farmers are more willing to respect phytosanitary controls when provided assistance. In fact, trust among all actors in the mango value chain has increased over time.

**Figure 10.5 Mali Mango Exports, 1993–2008**

![Graph showing mango export quantity and value from 1993 to 2008](image)

*Source: FAOSTAT and J. E. Austin.*

**Box 10.4 Fair Trade Market Opportunities**

Recent data from the Fairtrade Labelling Organizations show that about 8,000 tons of fair-trade-certified fruit were sold in Europe in 2005, including pineapples, mangoes, avocados, and citrus and deciduous fruits (excluding bananas). By volume, the United Kingdom accounted for more sales than any other country, with 4,700 tons of fruit. On a per capita basis, however, spending was highest in Switzerland. Sales of fair-trade products have grown strongly since 2005. As a brand, fair trade is making its way into the mainstream and is being taken up by supermarkets. The sector already has the same performance requirements as conventional products: year-round supply and quality and price guarantees are to be expected.

*Source: Authors.*
In addition to improvements within Mali, regional cooperation also has improved. For example, mango exporters in Mali have organized to obtain multicountry support from donors to fight against fruit flies, and the multimodal transport initiative involved coordination among several stakeholders across borders. These efforts have led to an improved value chain not only in Mali but in Côte d’Ivoire, Senegal, and other countries.

**Qualitative changes**

The initial, and now sustained, take-off in the growth of mango exports has led to a complete transformation of the subsector, not only in quantitative terms but also qualitatively. The expansion of the subsector has brought about a progressive and likely irreversible change in business practices in the sense of increased professionalism and attention to product quality, better compliance with trade standards, and increasing interest in private investment.

For one, major players in the mango business are now present in Mali and have an interest in expanding their operations and making long-term investments in the country. AHOLD, a major Dutch supermarket retail chain, has operated in Mali since the PLAZA and has been providing technical assistance to Malian exporters and PCDA. In addition, substantial work has been undertaken on the upstream/production level of the production chain. Mango production is now considered a legitimate agricultural activity, not just fruit collection. (PCDA, for example, has invested in a study that aims to map tree crop plantations using satellite imaging.) Financial institutions have also shown renewed interest as demonstrated by the increasing volume of credit to the subsector, the low default rates, and the emergence of innovative financing instruments, such as input prefinancing. Finally, Mali’s Mango Task Force has been active for some years to improve coordination in the subsector, develop an agenda for collective action between professionals, and provide a platform to address issues of common interest with the public sector.

**THE WAY FORWARD**

While the mango industry in Mali has grown in recent years, it will continue to develop in the years ahead. Mali has given priority to a number of areas, including market positioning, improving quality and quantity, attracting capital, adding value to mango exports, improving transportation infrastructure, and potentially establishing more links at the regional level.

**Improving market positioning and diversifying market outlets**

While Mali has succeeded in increasing sea-freighted exports since the 1990s, there is still room for better market positioning and diversification of market outlets. First, Mali, whose mangoes represent only 2 percent of the total mango imports to the European Union, is still a marginal player in the global market for mangoes (figure 10.6). Second, the European Union and other importing markets are dynamic, meaning that there is constant need for adjustment and improvement to meet market demand. Mali is currently supplying the EU market based on the seasonality of its production, which is concentrated between mid-May and early July, after Burkina Faso but before Senegal (figure 10.7).

Going forward, it will be important for Mali to extend its harvest season and develop markets other than Europe. To address this, PCDA is testing the irrigation of mango orchards, which may offer opportunities to induce flowering and fructification at a different period of the year. Local exporters also have begun seeking market opportunities in the Middle East and North Africa, among other places. Mali has begun to export mangoes to Morocco. There are also substantial opportunities in other Sub-Saharan country markets.

**Continuing to invest in quality and product differentiation**

In recent years Mali has focused on obtaining certifications that will allow mangoes to enter the European market, such
as GLOBAL G.A.P. the certification required by supermarkets in the European Union. Collaboration along the value chain led exporters to assist producers to achieve certification through training, with the support of PCDA. Some producers have even obtained certification of their mangoes as organic. The market for organic fruit and vegetables is a growing one, particularly in countries of northern Europe and Switzerland.

**Ensure compliance with standards and phytosanitary requirements**

The constant evolution of EU food safety regulations toward more stringent phytosanitary requirements, coupled with demands for traceability, make it necessary to devise and deliver specific interventions in the produce-exporting countries to meet market requirements. Recently PCDA financed an intervention by the Comité de liaison EU-ACP pour les fruits et légumes (COLEACP) specific to the mango value chain aimed at building capacities in health and phytosanitary risks control. A series of workshops, which brought together mango stakeholders of Mali and Burkina Faso, were held to train participants on risk assessment and mitigation. This training led to the creation of a guidebook for the mango value chain that is now followed in both countries.

**Continuing to focus on improvements in quantity and quality**

Although estimates vary greatly, some experts estimate that Mali could export between 20,000 and 50,000 metric tons of mangoes a year with improved management of existing mango plantations. Effective management includes introduction of new varieties, improved grafting and replanting of new trees for increased yields and quality, additional investments in pack houses and cold storage, renewed efforts in the control of fruit flies, and procurement of technical advisory services. However, in 2009, against an initial export program of 104 containers, the PLAZA could finally ship only 42 containers because of the lack of mangoes of exportable quality.

**Attracting capital**

Developing commercial value chains is a private sector business. It requires capital and know-how. If an economic sector does not manage to attract investors and capital, both national and foreign, sustaining growth will be difficult. In general, governments should encourage commercial farming by facilitating access to land concessions. In Mali’s mango subsector, the government should make financing more readily accessible and provide incentives to banks to lend to stakeholders. These actions would stimulate private sector investment into value-addition activities such as drying, canning, and juice production. Burkina Faso has had some success in producing dried mangoes, and Mali has the potential to achieve similar success.

**Diversify to better utilize the PLAZA terminal**

To maximize the use of the PLAZA and ensure sustainability, commercial operations must be able to cover PLAZA

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**Figure 10.7  Seasonality of Mango Imports to the European Union, by Country of Origin, 2008 (metric tons)**

![Graph showing seasonality of mango imports to the EU by country of origin.]

*Source: Eurostat.*
operating costs by the end of 2012, when the public funding stops. Several exporters are looking at opportunities to export green beans and other vegetables that could be packed at the terminal. To ensure profitability and competitive pricing for its members, there are plans for a strong professional organization to eventually take over management of the PLAZA.

**Further invest in marketing infrastructure**

A mechanical grading line is being installed to improve turnover at the PLAZA, enhancing the ability to quickly meet demand quantity and quality in the European market. The equipment was ordered by PCDA, and the calibrating machine should be installed for the 2010 season. Assuming an adequate fruit harvest, the PLAZA should now be able to handle over 100 containers in the 12- to 14-week mango season.

**Adding value to consolidate the achievements**

Strengthening and diversifying the value chain, in addition to valorizing the large mango surplus that is not exportable, is critical for the future growth of the mango subsector. While fresh mango exports were an entry point for Mali to reach the EU market (and indeed, demand for fresh mangoes is expected to continue in the foreseeable future), fresh mangoes may not be extremely profitable in the long run, and Malian professionals need to seek different ways to add value in the mango subsector. PCDA has been working on several clear opportunities: processing, increasing the range of products offered, expanding other value chains (papaya), and establishing new value chains.

A recent study (Royal Tropical Institute 2010) shows the potential for exports of dried mango from Mali to European markets, provided the product meets the expected quality standards. For dried mangoes, Mali has an advantage over Burkina Faso in the sense that it is relatively unencumbered by an obsolete technology and enjoys a large surplus of mango varieties that are not exportable as fresh. Recently, PCDA agreed to take up one of the study’s recommendations and finance a pilot project to produce dried mangoes based on technology established in South Africa, which currently meets the quality standards in EU markets.

**Further improving transport and fostering cluster development**

The inefficiencies the Bamako-Dakar railway and at the Dakar port are resulting in higher costs, longer wait times, and higher risks as Malian exporters operate through Côte d’Ivoire. Improvements in alternative transport routes would certainly benefit the mango subsector. Mali could also improve the road-to-rail corridor in order to reduce transport times and increase quality.

To develop a vibrant and competitive export horticulture sector, Mali also needs to encourage the development of related industries and services, such as certification, packaging material, and inputs. These related industries are key to improving the competitiveness of the value chain(s) by reducing the cost of inputs, technology, and services, and also by providing an important source of revenue and employment in Mali.

**Joining forces at the regional level**

Finally, when examining trade figures, it is evident that the competition for West African mango sectors does not come from neighboring countries, but from Central and South America. The concentration of mango exporters within the West African region, however, suggests advantages from coordinating the production and export of mangoes to Europe at a subregional level. Mali could reap significant advantages from coordinating mango production and export with Côte d’Ivoire, Burkina Faso, and Senegal. Such coordination could result in an increase in the scale of export and greater efficiencies in shipping and standardized quality control, better handling of traceability, and branding. All these factors would contribute to increased volumes of exported mangoes and, ultimately, to increased revenues for producers. One possibility would be to create a West Africa brand for mangoes.

**LESSONS AND REPLICABILITY**

The driving forces behind Mali’s experience in developing its mango sector, as well as the lessons learned during the development process, are useful to point out for other countries in the course of such a transition.

**Drivers of success**

Innovation Is Critical in Triggering and Driving Change. In the case of mango exports from Mali, the key initial innovation was in transport and logistics. Together, these changes created greater opportunity to access the large EU market. The innovations also created the dynamics of change and initiated a learning process. There is no universal formula for achieving innovation, however; innovation
derives from a combination of factors that depend on the specific country and sector context. In the case of the mango subsector of Mali, two key resources, expertise and entrepreneurship, were brought together to improve the export capacity of the industry. Additionally, creativity in funding mechanisms is another important lesson learned in the case of Mali.

Time Is of the Essence. Building capacity—human, physical, or otherwise—in a new or small industry requires sustained efforts over time, especially when starting from scratch or from a very low base, as was the case in Mali.

High-Quality Technical Work Is Key. The importance of market research, value chain cost analysis, benchmarking, and assessment of industry constraints cannot be overstated. This work is critical in identifying and designing action plans, programs, and business solutions. In the case of Mali, it was perhaps the most critical factor contributing to launching the reforms.

Private Sector Leadership Is Also Important. Even though private sector involvement in the mango sector in Mali was weak at the start of the transition, it was necessary to work with the existing private operators and eventually bring in new ones, such as the Ivorian company that conducted the pilot export test. In the case of Mali, the partnership with SN Tropical Expressions was unique and provided a good model of what public-private partnerships can achieve.

Knowledge and Funding Must Be Packaged and Delivered Properly. Building capacities in emerging subsectors and industries takes not only time and perseverance but also the ability to deliver investments in “hardware” (infrastructure and other means of production) and “software” (training and knowledge transfer) in a flexible manner. In the case of Mali, capital investments such as PLAZA were imperative to the success of the mango subsector. Training alone could not bring about such a transition. Improvements to cold chain, transportation, and conditioning facilities within the horticulture sector significantly improved Mali’s capacity to export quality mangoes.

Lessons learned

A Targeted, Organized Approach Is Necessary to Sector Reform. Sector and value-chain analysis are essential tools in identifying opportunities and articulating operational strategies to create greater value in agriculture and agribusiness. It is also essential to find a key entry point that responds to market demand and helps increase scale. For Malian mangoes, this meant finding a more effective way to get the product to the market, while innovations in transport and logistics system allowed farmers and exporters to achieve the economies of scale they needed. A structured, holistic approach is required.

Sustaining Development Efforts over Time Is Necessary. Mali could not have successfully transformed its mango sector if activities had not been pursued year after year. Building an industry takes years, not months. The lesson here for governments and development partners is that if they are not prepared to dedicate time and resources to a reform over a long period of time, it is probably better not to start at all. That said, early success in the reform process, such as what Mali achieved through the positive outcome of the multimodal export pilot launched by APROFA in 2000, can serve as a foundation on which to build momentum for further reforms.

Aid Funds Can Play a Catalytic Role in Change Processes. Project aid has the capacity to provide both financial resources and know-how to share risks in order to facilitate innovation. In Mali, technical assistance programs targeting postharvest handling, supply chain finance, export, and other areas have helped improve the performance of the mango value chain and are now doing the same for other agricultural and nonagricultural sectors. Technical assistance by aid organizations can also help address market failures and can be combined in a proactive fashion with efforts and interventions by the private sector.

Collaboration and Partnerships Are Part of the Solution. Public-private partnerships (between donor agencies and government, or between the private sector and government), such as the arrangement to build and manage the PLAZA, are key in developing infrastructure that will, in turn, help a country expand a specific sector. In Mali the emergence of the Mango Task Force helped provide a space for public-private cooperation, as well as an opportunity for exporters to coordinate their respective shipments through a common buyer. In addition, the use of “Mali mango” logo on boxes created closer cooperation among shippers.

A Favorable Investment Climate and Investment Policies Remain Important. Thus far the government of
Mali’s commitment to reform in its mango sector has been carried out through diversification, donor financing, and improved technical expertise. The industry, however, is now experiencing a new generation of issues that will require significant reforms in the general business environment by promoting private sector investment, and improving access to land. Recent difficulties in implementing a Foreign Investment Advisory Service (FIAS) technical assistance program on agribusiness do not bode well in terms of the determination of the government to move to the next stage of development of agribusiness value chains.

**Scalability and transferability**

Two general lessons from Mali’s experience with mangoes can be applied to other countries. First, designing market-led strategies and investing in applied value-chain analysis is necessary if the objectives of creating higher value in agriculture, raising incomes, and lifting the rural population out of poverty are to be achieved. While general, cross-cutting agricultural support programs are necessary, they are in themselves not sufficient to make a difference. Specific information and analysis must be generated on the issues to be addressed throughout the value chain(s).

Second, it should be kept in mind that sustainable market inclusion requires multiple interventions. As demonstrated by a recently completed research program funded by the U.K. Department for International Development called “Re-governing Markets,” inclusion of small farmers in modern agricultural value chains does not happen by itself. In fact, inclusion requires interventions by multiple actors, as summarized in figure 10.8. The study indicates that three major categories of actors need to be involved: farmers and farmer groups, receptive businesses, and a facilitating public sector. Actors in all categories must be willing and able to play their role, and even then establishing sustainable market inclusion needs a public sector body to facilitate the process. This is the role that APROFA and its successive projects have played for the mango subsector in Mali and the role that such projects are still playing for a number of other emerging value chains in the country (papaya, cashew, sesame, potato, and onion).

**CONCLUSION**

Since the early 1990s Mali has achieved a spectacular increase in its exports of fresh mangoes, seizing opportunities offered by an increasing market demand in Europe and finding solutions to overcome significant physical hurdles. The initiatives taken in the mango sector in Mali clearly demonstrate that even a physical constraint as immutable as being landlocked can be overcome to some extent through innovative solutions. In Mali the entry point was the identification and economic validation of a new transport and logistics arrangement that allowed mangoes to be exported in large volumes and in good condition.

Mali currently is focusing on consolidating and expanding its initial success by strengthening stakeholder involvement and private sector partnerships to ensure growth and sustainability. The Mango Task Force has emerged as the sector’s professional organization, with potential to become a permanent trade/business association capable of handling the new issues facing the horticulture industry in Mali.

**BIBLIOGRAPHY**


