INFORMATION BRIEF

FISH PRESERVATION AND FOOD LOSS REDUCTION

Lessons from Quelimane

AfriFOODlinks

TARGETED AUDIENCE:

Urban planners, urban health inspectors, municipal technical officers, international donors and infrastructure funders, international development facilitation NOGs

KEY MESSAGES:

- The State of the Food System report for Quelimane identified inadequate fish preservation and post-harvest handling as important drivers of food loss.
- Based on this evidence, a pilot intervention was implemented to strengthen fish preservation through vendor training, provision of cooler boxes and improved access to ice.
- The experience demonstrates that combining infrastructure with capacity building and multi-stakeholder collaboration can significantly improve food preservation practices while contributing to more resilient urban food systems.

INTRODUCTION:

Quelimane, a coastal city in central Mozambique, has a food system shaped by urban food trade, smallholder agriculture and artisanal fisheries. While agriculture supports livelihoods in peri-urban areas, fisheries play a particularly important role in providing income, employment and a source of affordable animal protein for many households. Fresh fish is one of the city's most important food commodities and is widely traded through municipal markets. Despite its importance, the fisheries sector faces significant post-harvest challenges. Limited access to cold storage, inadequate fish preservation practices, and insufficient post-harvest handling contribute to food loss, reduced product quality, and lower incomes for market vendors. Addressing these challenges is therefore essential not only for improving livelihoods but also for strengthening food and nutrition security and building a more resilient urban food system.

To support cities in addressing challenges such as these, the AfriFOODLinks project, funded by the European Union and coordinated by ICLEI Africa, works with African and European cities to promote healthier, more sustainable and resilient urban food systems. In Quelimane, the project began with a comprehensive food system assessment that combined a desktop literature review, stakeholder consultations and two complementary case studies to identify priority food system challenges and inform targeted interventions. The findings informed the design and implementation of a pilot intervention focused on improving fish preservation and reducing food loss.

This knowledge brief summarises the evidence generated through the food system assessment, presents

the pilot intervention implemented in Quelimane, and highlights the key lessons and practical recommendations that can inform future actions to strengthen fish preservation and reduce food loss in the city's food system.

01 Statement of issue encountered

Evidence of Food System Challenges in Quelimane

The food system assessment conducted in Quelimane revealed that the city's food system is characterised by urban food trade, smallholder agriculture and artisanal fisheries, all of which play a critical role in supporting local livelihoods and food and nutrition security. Agriculture is mainly practiced in low-lying areas surrounding the city, while fisheries provide an essential source of income and animal protein for many households. Fresh fish traded through the city's markets is one of the most important food commodities within the local food system. Despite its importance, the fisheries sector is constrained by inadequate preservation infrastructure and weak post-harvest handling practices, resulting in significant food loss. Against this backdrop, the food system assessment included two case studies to examine priority challenges affecting Quelimane's food system.

The first case study investigated the causes and implications of food loss at Chabeco Market. The study revealed that vendors experience significant losses due to inadequate storage infrastructure, poor preservation conditions, limited refrigeration facilities and weak post-harvest handling practices. High temperatures, unreliable storage conditions and insufficient preservation technologies contribute to rapid deterioration of fresh produce and fish, resulting in economic losses for traders and reduced food availability for consumers. The second case study explored the city's local food producers, production systems, value chains and market linkages. While agriculture and fisheries continue to provide livelihoods for many households, the research identified weak connections between producers and local markets, limited post-harvest infrastructure and inadequate systems for organising and supporting local producers. These constraints reduce market opportunities and contribute to avoidable food losses across the food system.

Across both studies, inadequate food preservation emerged as one of the most critical bottlenecks undermining the efficiency and resilience of Quelimane's food system. Particularly within the fisheries sector, stakeholders highlighted limited access to ice, insufficient cold storage facilities and inadequate fish handling practices as major constraints. Fish vendors often had to sell their products within a few hours of arrival or risk spoilage, reducing their bargaining power and increasing economic losses. At the same time, deteriorating fish quality reduced the availability of safe and nutritious food for consumption.

Overall, the assessment demonstrated that addressing food loss in the fishery sector in Quelimane requires more than infrastructure investments alone. Sustainable improvements in food preservation require combining appropriate preservation technologies with vendor training, improved food safety practices, stronger institutional coordination, and collaboration among municipal authorities, market management, and development partners. These findings provided the evidence base for designing the pilot intervention presented in the next section.

02 Current implementation or action gap

Summary of the Pilot Intervention

Building directly on the challenges identified during the food system assessment, AfriFOODLinks supported the implementation of a pilot intervention to improve fish preservation and reduce food loss at the Quelimane Central Market. The intervention was implemented as part of the broader process of

rebuilding the Central Market following the devastating fire incident in 2023. The pilot focused on strengthening daily preservation practices among fish vendors and testing practical approaches that could complement future infrastructure developments. The intervention adopted an integrated approach, combining capacity building, preservation equipment, improved access to ice and stakeholder engagement. A two-day training programme was organised for fresh fish vendors, covering food safety, hygiene, nutrition, fish preservation techniques, waste reduction and basic business management. The training aimed to strengthen vendors' knowledge while encouraging improved handling and preservation practices throughout the trading process.

To improve fish storage during market operations, sixty insulated cooler boxes were distributed to selected vendors. These provided a practical means of maintaining lower temperatures throughout the trading day and reducing product deterioration. Recognising that cooler boxes alone cannot preserve fish without an effective cooling medium, the pilot also introduced an Ice Credit System. During the initial implementation phase, ice was provided free of charge to encourage adoption of improved preservation practices. The system later transitioned to a co-payment model, allowing the project to assess the financial sustainability of regular ice use while promoting vendor ownership. As the planned municipal ice production facility had not yet become operational, the pilot partnered with seven local ice suppliers to guarantee a reliable supply of ice throughout implementation. This adaptive approach demonstrated how existing local businesses can support food system innovations while larger infrastructure investments are still under development.

Stakeholder workshops provided a platform to review implementation progress, validate the findings, and identify opportunities for scaling up the intervention. The workshops brought together municipal departments, market management, researchers, regulatory institutions, and vendors, fostering collaboration and shared learning. Monitoring conducted during the pilot indicated encouraging results. Beneficiary vendors reported that the combined use of cooler boxes and regular access to ice extended the preservation period of fresh fish from less than one day to approximately two to three days, contributing to reduced spoilage, improved product quality and greater confidence in selling fish over a longer period. Together, these activities directly addressed several of the priority challenges identified during the initial food system assessment, illustrating how research findings can inform practical interventions.





Figure 1 & 2: Fresh fish and shrimp preserved with ice in insulated cooler boxes at Quelimane Central Market.

03 Lessons learnt and insights from AfriFOODlinks

Key Lessons Emerging from the Intervention

The pilot generated several important lessons that extend beyond fish preservation and offer valuable insights for strengthening urban food systems.

Lesson 1. Evidence-based interventions are more likely to address real food system challenges

One of the strongest outcomes of the Quelimane experience is the direct connection between research and implementation. The pilot addressed targeted challenges identified through the food system assessment, ensuring that investments responded to local needs rather than assumed priorities.

Lesson 2. Improving fish preservation requires an integrated approach

The intervention confirmed that infrastructure alone cannot solve food loss challenges. Cooler boxes became effective because they were accompanied by access to ice, practical training and improved understanding of food safety and preservation practices.

Lesson 3. Affordable and reliable access to ice is fundamental

The Ice Credit System introduced demonstrated that regular access to affordable ice can significantly improve fish preservation while reducing spoilage and maintaining product quality. Testing different financing approaches also generated useful insights into designing sustainable preservation services.

Lesson 4. Capacity building is essential for sustained impact

Training enabled vendors to maximise the benefits of preservation equipment while strengthening food safety, hygiene and business management practices. This illustrates the importance of combining hardware with knowledge transfer.

Lesson 5. Collaboration creates more sustainable food system solutions

The collaboration between municipal authorities, development partners, researchers, market management, vendors and local ice suppliers proved essential for implementation. Such partnerships can strengthen ownership while improving the sustainability and scalability of future interventions.

SUGGESTED ACTIONS

The experience from Quelimane provides valuable lessons for cities seeking to reduce food loss and strengthen the resilience of urban food systems. Building on these lessons, the following actions are recommended:

ACTION N° 1: EXPAND ACCESS TO COLD-CHAIN INFRASTRUCTURE

Future investments should continue expanding access to cold-chain infrastructure by operationalising the planned municipal ice production facility and ensuring reliable cold storage services for market vendors. These investments should be complemented with affordable financing mechanisms that enable small-scale traders to access preservation technologies and services sustainably.

ACTION N° 2: INSTITUTIONALISE CAPACITY BUILDING

Capacity building should be integrated into municipal market support programmes. Regular training on food safety, post-harvest handling, hygiene and business management will help vendors maintain improved preservation practices while increasing consumer confidence in the quality of marketed fish.

ACTION N° 3: STRENGTHEN MONITORING SYSTEMS

The Municipality should also strengthen monitoring systems to track post-harvest losses, product quality and vendor performance over time. Such information will support evidence-based planning and timely intervention, thus allowing continuous improvement.

ACTION N° 4: STRENGTHEN STAKEHOLDER COLLABORATION

Continued collaboration among municipal authorities, research institutions, development partners and market actors will enhance local ownership, promote cost-sharing, and enable the sustainable scaling of successful interventions.

ACTION N° 5: PROMOTE EVIDENCE-BASED INTERVENTIONS

Investments should be grounded in evidence generated through food system assessments and continuous learning. Linking research to implementation will enable cities to design targeted, context-specific interventions that address priority challenges and contribute to more resilient, inclusive, and sustainable urban food systems.

CONCLUSION

The Quelimane experience demonstrates how evidence can be translated into practical action to address complex challenges. Linking research to implementation enabled the city to design targeted, context-specific interventions that addressed priority challenges for fish preservation and food loss. The pilot showed that relatively simple and context-appropriate solutions, combining capacity building, cooler boxes, and improved access to ice, can extend fish preservation, reduce post-harvest losses, and improve livelihoods for market vendors. Equally important, it highlighted the value of collaboration between municipal authorities, development partners, researchers, and market actors in designing and implementing effective and sustainable food system solutions. As Quelimane continues to invest in market infrastructure and food system development, the lessons from this pilot provide a strong foundation for scaling up fish preservation initiatives and embedding food loss reduction within broader urban food system planning. More broadly, the experience illustrates how evidence-driven, collaborative, and locally tailored interventions can help cities build more resilient, inclusive, and sustainable urban food systems.

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