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VALUE CHAIN ANALYSIS AND BUSINESS MODEL DEVELOPMENT FOR THE. MANICA AGRO-FOOD CENTRE (CAAM) -(CIG 9904219413)

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0. EXECUTIVE SUMMARY

The Italian Agency for Development Cooperation (AICS), based in Maputo, aligned with Italy's strategy to support Mozambique through bilateral initiatives in agriculture, food security, and rural development, commissioned this VALUE CHAIN ANALYSIS AND BUSINESS MODEL DEVELOPMENT FOR THE MANICA AGRO-FOOD CENTER (CAAM) with the objective of gathering all the necessary information for a sound assessment of the opportunity to build the CAAM in Manica Province—an enduring ambition of Mozambique's Ministry of Agriculture and Rural Development (MADER) to establish a model agro-food center that supports the recovery of the productive sector and small and medium enterprises in the central part of the country.

The study is developed according to the diagram presented below

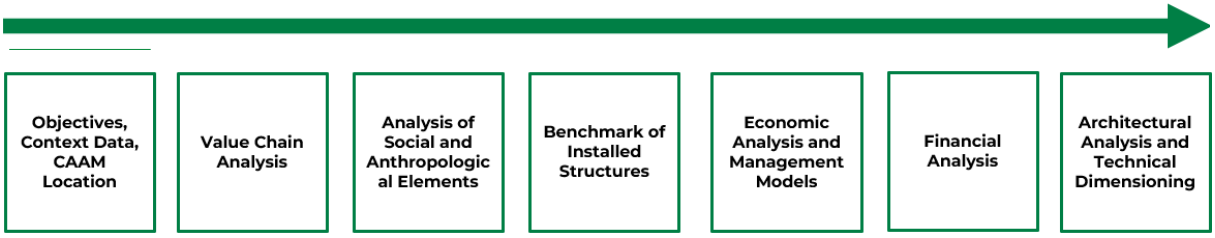


Figure 1: Project Action Plan

- In the introductory chapter, data are presented justifying the choice of Manica Province—particularly the city of Chimoio—as the CAAM location:
- The province is situated along the Beira Development Corridor, one of Mozambique's key trade routes connecting landlocked countries such as Malawi, Zambia, and Zimbabwe to the sea through the Port of Beira. This route relies on a road and rail network also linking neighboring provinces, Sofala and Tete, positioning Manica as a vital hub for transport and consolidation of goods.
- The Chicamba Ring (Anel de Chicamba), a project involving the implementation of public infrastructure to boost production, develops the potential of the districts of Vanduzi, Manica, Sussundenga, and the city of Chimoio.
- Between 2017 and 2055, the population of these three provinces is expected to triple from 6 to 18 million residents, increasing the demand for food (660,000 tons of fruits and vegetables in 2055 – Source: INE Population Projections 2050 and Consultants' Estimates).
- The irrigated area in Manica Province is concentrated in 25 irrigation schemes owned by farmers' associations and supervised by INIR, mainly located in the districts of Vanduzi, Manica, Sussundenga, Barué, Mossurize, and Gondola, covering more than 1,700 hectares.
- The city of Chimoio has nearly 6,000 agri-food vendors operating in precarious markets with poor accessibility, inadequate hygiene and sanitation, high product wastage, and intense informal trade activity.
- Several potential locations for building the CAAM's central structure were identified, with **Hombua Market** being proposed—an area already reserved by the provincial government, and with proximity to production zones,

logistical accessibility, reach to consumer markets, availability of transport alternatives, and potential to ease congestion in overcrowded wholesale markets.

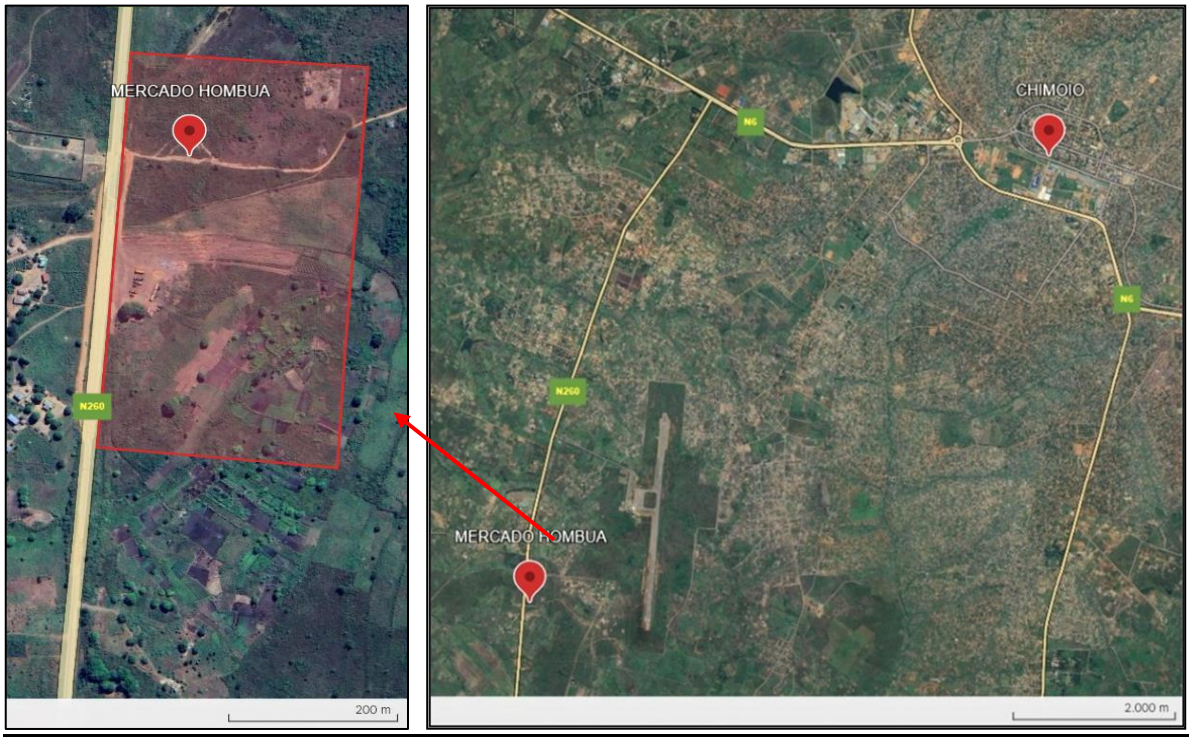


Figure 2: Location of Hombua Market in relation to Chimoio

Moving forward with the analysis of the value chains (VCs), starting from a broader list of VCs outlined in the PEDSA-PNISA II 2022–2030, and cross-referencing the selected VCs with the VCs identified by stakeholders during the field missions, the final VCs to support include in CAAM were selected.

The key VCs identified were: horticultural crops, potato, onion, garlic, tropical fruits (banana, pineapple, avocado, lychee, citrus), legumes (especially beans), coffee, cashew, honey, dairy products, poultry and eggs, and red meat.

These value chains are already being successfully developed by several regional companies and cooperatives, which have been identified and should be involved in business partnerships and youth training initiatives (whether university graduates or not).

Priorty VC	Most relevant companies per VC
Vegetables	AGROMANICA (Chimoio/Sussudenga); SEMOC (Chimoio/Macate); RDI/Montesco (Báruè); Kota Farmer
Tropical Fruits	GAN EL (Sussudenga); Frutas do Revue; Westfalia (Chimoio, Sussudenga, Báruè): recebe produção da Cooperativa do Revue, da Mac&Moz e da Vanduzi
Cashew	PNG/Fundação Carr; Condor Annacardium

Poultry	AAA- Abílio Antunes Agronegócios (Chimoio, Gondola); Investagro (Nhamatanda); EDP (Tete); Nguku (Dondo)
Macadamia	Mac&Moz (Sussudenga); MM-Associação Moçambicana de Macadamia
Legumes	MAFER (Moatize); Investagro; Moazagri (Barué); ECA (Barué); TCO-Agro (Beira); Luteari (Gondola)
Honey	Mozambique Honey Company (Chimoio, Catandica); PNG/Fundação Carr (Gorongosa, Cherimgoma, Mwanza, Nhamatanda); TCP (Caia, Cheringoma)
Dairy Products	DANMOZ (Chimoio, Gondola); COPOLEITE (Dondo, Nhamatanda, Beira); Agromac (Manica/Sussudenga)
Soya	AAA- Abílio Antunes Agronegócios; EDP; Merek (Beira)
Red Meat	MozBeef (Chimoio, Sussudenga); Canal Food (Nacional); Frutos do Planalto (regional); Mozagri (Báruè); Beira Boi; Matadouros Municipais (Dondo; Buzi; Chimoio; Tete)
Coffee	COOPCAM, Café Vumba, Café Manica, Café Chimanimani; Café Gorongosa (PNG) em Sofala

Figure 3: priority VCs and relevant players

It was also found that, beyond specific investments in these value chains, there is a structural and cross-cutting need for support across the entire productive sector—the so-called Anchor Projects (*Projetos Âncora*, abbreviated as AP).

For these investment-oriented APs, the CAAM can and should play a central role, resulting in a significant increase in the supply of food products and helping fulfill the food security objective that this structure is meant to support, making it strategic for the sector.

The following APs have been identified, each encompassing specific activities:

- **PA1**: CPSA – Agricultural Services Provision Center, NTT – Technology Transfer Hub, INAGROS – Agribusiness Incubator in rural areas.
- **PA2**: Wholesale market.
- **PA3**: Sorting, packaging, and preservation center for fresh products (vegetables, fruits, fish, seafood, others).
- **PA4**: Processing and transformation units.
- **PA5**: Laboratories.
- **PA6**: Facilities to be leased or sold to investors.

Using a power–influence matrix, the main stakeholders were identified and classified. It is recommended to include strategic actors with High Influence and High Power in the future Coordination Committee, engaging them early on in active project support.

The Mozambique Development Domains analysis identified **four Agri-Clusters** surrounding the CAAM: **Barué** and **Vanduzi**, where the planned investments have the potential to rapidly and sustainably increase production, quality, diversity, complementarity, and sustainability. **Macate**, with a unique specificity: large volumes of **organic banana production** by many small producers, along with citrus, lychees, and other fruits. These are essential to keep the CAAM

operating for a larger part of the year, supporting diversification and offering potential for **fresh exports** and **local processing**. **Sussundenga**, which has recently seen exponential agribusiness growth, with significant investments in **macadamia, avocado, coffee**, and **irrigated farming areas**.

During the field missions, managers from several irrigator associations were interviewed, and their feedback significantly enriched the development of this study.

Since one of the desired outcomes of the CAAM's implementation is the restructuring of current market circuits, shortening the time and steps between production and final destination, it was concluded that intervention is needed at all stages and with all actors in the distribution chain, as outlined below:

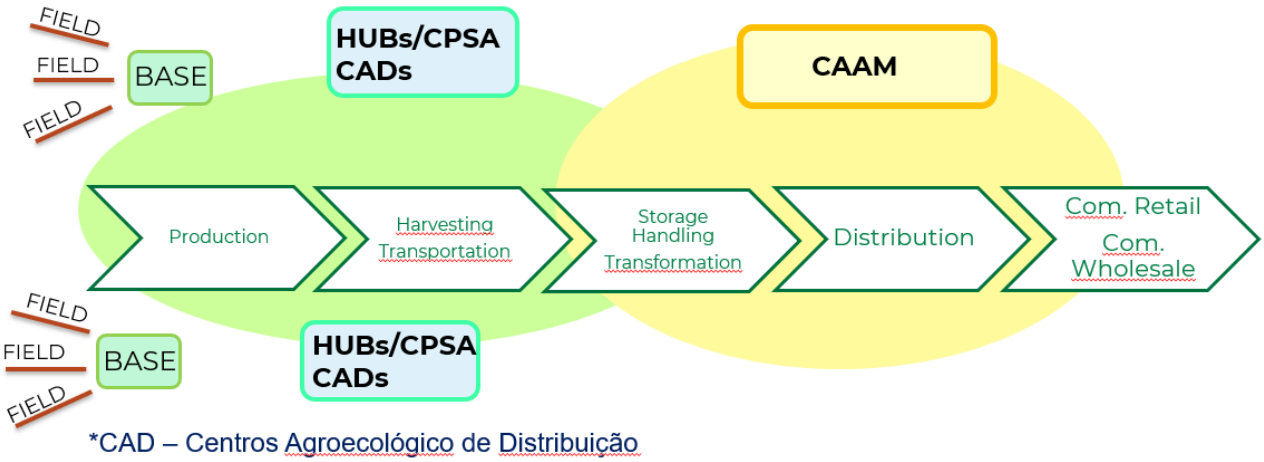


Figure 5: Food supply chain from production to trade

It is therefore proposed to approach the project following a rural Agri-hub conceptual model, associating the central CAAM structure with four Agricultural Service Provision Centers (CPSA) / HUBs, each located in one of the anchor districts more geared towards supporting the priority VCs identified, as illustrated in the following figure:

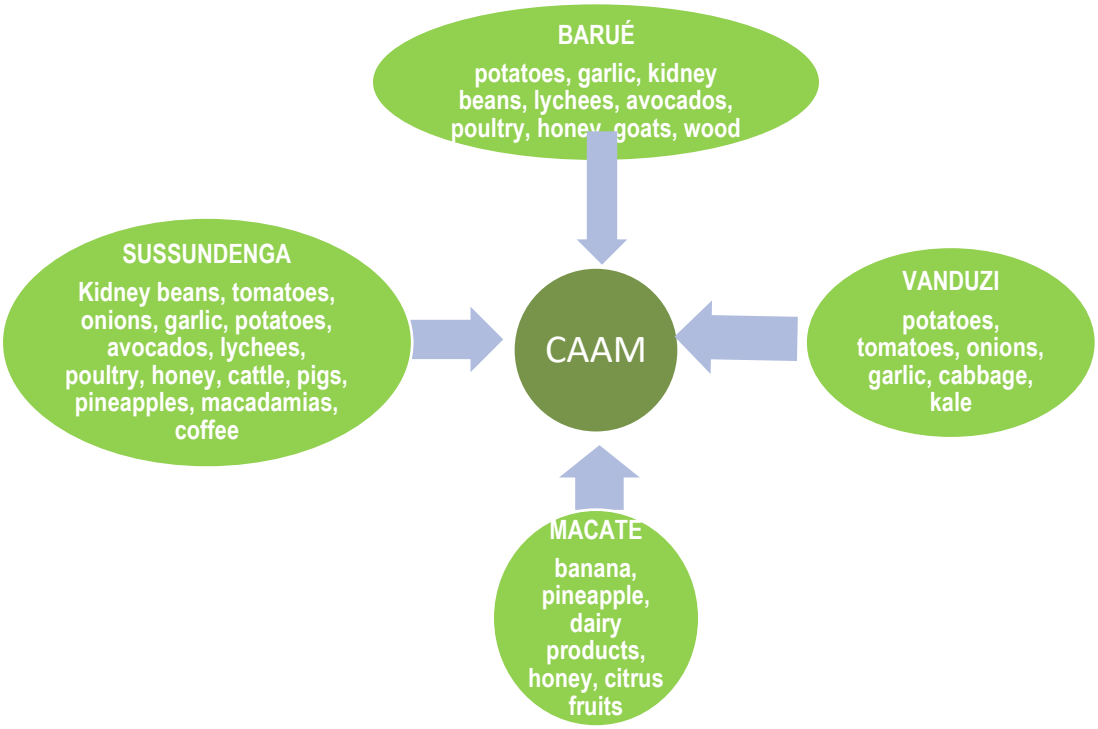


Figure 4: CAAM and the CPSAs/HUB of each of the districts identified as priorities. Source: Consultants

The activity of the CAAM (and consequently, its revenues) should not depend solely on value chains whose production is predominantly carried out by small-scale farmers. Instead, it should incorporate additional activities and services that, on the one hand, enhance the profitability of the CAAM and, on the other hand, add value that fosters the development and strengthening of the identified value chains—for example, transformation, processing and preservation; high-tech services and specialized infrastructure; strategic partnerships; and institutional coordination.

Indeed, the social analysis of the agricultural communities that will be impacted by the CAAM revealed that the lack of market access and absence of specialized services are their main limitations. For this reason, the design of CAAM as an integrated commercial platform will be strategic in facilitating the marketing of agricultural crops. It will also enable access to production inputs, knowledge, and financing—currently unavailable—thereby improving the social and economic conditions of the producers, their families, and ultimately, their communities.

The economic analysis identified three operational models for the implementation of CAAM, positioned more closely toward either the supply side or the demand side. It was concluded that the Agropark or Agropole model would offer the best guarantees for achieving the objectives of this study.

Model A – Optimizing logistics for local retail trade
• Represents the traditional wholesale market located near a city • Aggregates products from surrounsing agricultural areas and redistributes them to local retailers • The key players in this model are wholesalers.
Model B – Optimizing logistics for major retailers and HORECA
• Expands on Model A by integrating advanced logistics functions and services to supply a larger urban area. • The main customers are large retail chains (supermarkets) and the HORECA sector (hotels, restaurants, and catering services), which require broader product aggregation and higher service levels. • The key players are wholesalers and logistics companies.
Model C – Optimizing supply from rural areas
• Primarily focuses on supporting agricultural production by providing essential services to farmers. • Includes the supply of agricultural inputs, aggregation of harvested products, and transportation to a wholesale platform. • This model strengthens the link between farmers and the market, enhancing efficiency in the supply chain.

Table 1: CAAM Model Structure and Positioning

A combined model of supply- and demand-oriented functions is therefore proposed: agri-hub functions to provide services to the production areas, and a wholesale market to serve the urban area. This model integrates a Central Agro-Food Center (CAAM) located near the consumer zone (the city of Chimoio) and strategically positioned along the Beira Corridor, along with four CPSAs/HUBs situated in production zones to ensure continuous and quality supply to the market throughout the year.

In this way, the CAAM will create added value, not only by improving product distribution to the city or urban areas, but more importantly, by promoting sustainable agricultural development. This will help to rebalance local production with imports to meet the needs of a growing population.

In the project scenario, it is assumed that local production will grow by 1.5% annually, with a 15% reduction in losses, allowing local production to meet 52% of demand.

From a management perspective, a strong public-private partnership (PPP) is recommended: the private sector will be responsible for ensuring competitiveness and efficient management of operational and marketing activities.

The public sector will provide the conditions for long-term competitiveness by supporting innovation, building trust in the international market, promoting local social development through skilled human resources, appropriate legislation, and social support.

As for architectural considerations, after evaluating performance indicators, Model C received the highest score and is therefore considered the best option for building the agro-food center (CAAM). However, the total construction and operating costs (excluding HR, cleaning, security, marketing, etc.) are relatively high, which is why a revised version—Model C_rev C_0 (Phase 1 version)—is proposed. This version follows a modular and phased construction approach, beginning with a central agri-hub facility and four HUBs.

In Model C_0 (Phase 1):

The estimated construction cost for the central CAAM hub is €11,000,000 for a total area of 115,000 m²;

Each of the four HUBs is estimated at €825,000 for an area of 7,000 m²;

The total construction cost for the CAAM and four HUBs is €14,300,000.

Figure 6: Sketch 3 C_0 (Phase 1 version), CAAM rendering

Figure 5: Sketxh 3 C_0 (Phase 1 version), HUB rendering

In this scenario, in 2055 (scenario C_0 Phase 1), the amount of goods passing through the CAAM will be 70,000 tonnes/year, 55% of which will come from production in neighbouring districts (40,000 tonnes/year), 40% from other inputs (27,000 tonnes/year), 5% from farmers located near the CAAM (3,000 tonnes/year).

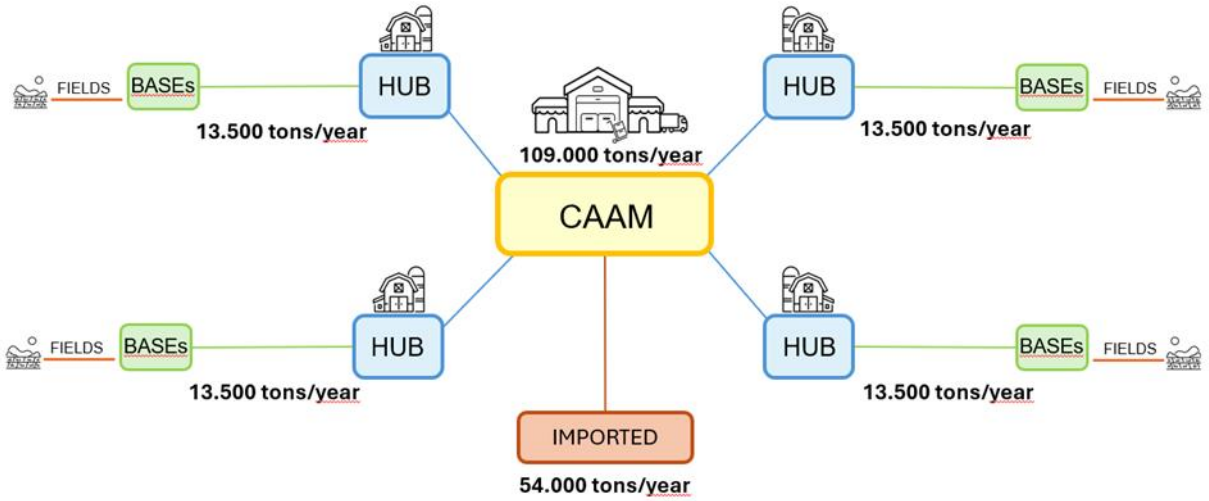


Figure 6: Sketch 3 rev C_0 (Phase 1 version), HUB rendering (versão Fase 1), operating diagram

- The total investment plan amounts to €35 million, and operating costs are estimated at €4 million in total;
- The loan agreement includes the following financial conditions: total loan duration of 32 years; grace period of 22 years; and a repayment period of 10 years with a 0% interest rate;
- A 0% Financial Discount Rate (WACC) is assumed.

The strategy adopted aims to make CAAM attractive to wholesalers and to structure the various markets in such a way that they find opportunities for growth and favorable conditions for development within this new infrastructure.

The model also considers additional revenues from services that can be provided within the infrastructure, such as: rental of spaces for shops, banks, social services, processing units, cafeterias, logistics services, cold storage areas, etc. These values are based on an assessment of CAAM's potential to deliver services to commercial and industrial operators, using international benchmarks and the needs identified through stakeholder consultations during field visits.

The processing units are expected to increase product value by 15% (through loss recovery), due to the added value from better machinery, packaging, and higher-quality products.

The Agri-HUB's revenue will come primarily from the commercial margin on the sale of agricultural inputs, machinery, and equipment used for logistics and post-harvest services. Other services included in this estimate are technical assistance, training, and experimentation. The Agri-Hub supports all farm activities, not only fruit and vegetables. It acts as a collection point in the post-harvest phase, supplying the CAAM exclusively with fruits and vegetables—at least during the initial phase of the investment.

Each Agri-Hub is expected to sell raw materials and services worth €2.3 million (based on €300/hectare × 7,800 hectares). Assuming a commercial margin of 15%, the operating margin per hub is estimated at €450,000 per year, on average, during the first five years (entry phase).

The revenue from the hubs will consist of these commercial margins from economic and financial transactions. To meet their financial sustainability needs, the HUBs should be incorporated into the same share capital as CAAM. The HUB's

compensation, calculated on agricultural inputs, also includes marketing, logistics, and post-harvest services provided to farmers. In fact, agricultural inputs and tools are advanced at the start of production.

Key Financial Results:

- The EBITDA (Earnings Before Interest, Taxes, Depreciation, and Amortization), a measure of profitability used as an alternative to net income, has been positive since the fourth year of operation
- O Operating cash flow becomes positive from the fifth year onward.
- The Internal Rate of Return (IRR) is approximately 0.3%, with a Net Present Value (NPV) of €2.2 million (assuming WACC = 0%).

Three alternative management models for the CAAM and HUBs are proposed, differentiated by the roles assigned to the public and private sectors:

No que ao Modelo de Gestão diz respeito, a**presentam-se as** 3 alternativas do modelo de gestão do CAAM e dos HUBs, q**ue se distinguem pelas diferentes funções dos setores público e privado:**

- PUBLIC MODEL: The State, the Municipality of Chimoio, and the Province of Manica own 100% of the enterprise, with varying shares—for example: State (first scenario 50%), Municipality of Chimoio (25%), Province of Manica (25%);
- PRIVATE MODEL: The second option is a fully private model (100%), including representatives from various stakeholders in the production, trade, and logistics sectors MODELO PRIVADO.
- MIXED MODEL: Lastly, a public-private partnership (PPP) where the State retains the majority share, with the Municipality and Province holding a total of 80% (e.g. State 40%, Municipality 20%, Province 20%), and the remaining 20% owned by private companies.

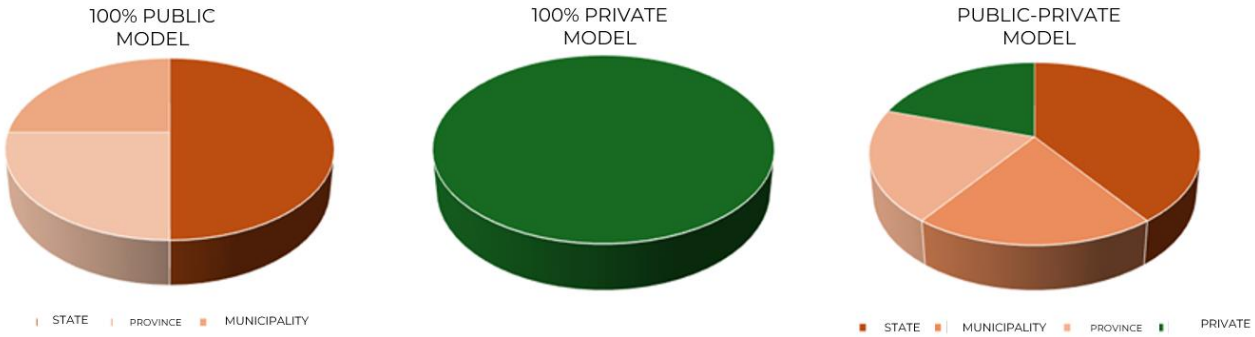


Figure 7: illustration of the 3 proposed solutions

As a future roadmap, a detailed Operational Plan is presented, outlining the actions to be carried out annually up to the opening of the CAAM. These are as follows:

OPERATIONAL IMPLEMENTATION PLAN Definition of the Roadmap to be followed to ensure that the CAAM+4 Hubs infrastructure is operational within the 6th year guaranteeing: Strategic and financial alignment with the project Progressive and prioritized construction of the Hubs and CAAM Clear governance and an efficient business model Modern infrastructure equipped to respond to market needs									
PHASES	**ATIVITIES**	**RESULTS**	**COMPONENT**	**YEAR 1** **2025**	**YEAR 2** **2026**	**YEAR 3** **2027**	**YEAR 4** **2028**	**YEAR 5** **2029**	**YEAR 6** **2030**
COORDINATION COMMITTEE - CONVENING **Sharing and coordination of the feasibility study**	**INITIAL ACTIVITIES** **Approval and operational instructions on the feasibility study**	Approval of CAAM location Approval of the economic and financial business plan model Approval of architectural sketch Approval of strategic stakeholders / territorial consultation platform Approval of governance model Approval and start of the Operational Plan Approval of equipment and machinery	--------	**Start**					
PLANNING, CONSULTATIONS AND LAUNCHING THE CALL FOR TENDERS FOR THE PROJECT (CALL FOR TENDERS 2) **Structuring project governance, defining templates, initiating procurement and launching tenders** **(mainly responsible for AICS)**	**PRELIMINARY ACTIVITIES** **Structuring and involving all stakeholders**	Define all 3 Committees and their members: Coordination Committee (CC), the Management Unit (UG) and the Technical Assistance Unit (UAT). Confirm and reserve land for the Houmba market and its expansion Identify and define the locations of the 4 Hubs and reserve the area for this purpose	Credit (RA1) Present (RA1)						
	CONSULTANCY FOR TENDER 2 **Consultancy, advice and preparation of preparatory documentation for tenders for construction, supplies and operations**	Consultancy for the preparation of Tender 2 for the design, authorizations and tender documents for construction Preparation, launch and award of Tender 2 Consultancy and assignment of Construction Management, supervision, monitoring, auditing and communication for the overall construction and installation activities Creation of an internal technical coordination structure for the design phases (specialists in technical and administrative disciplines for coordination, control and validation of Tender 2 documentation)	Credit (RA1) Present (RA1)						
	DEVELOPMENT OF TENDER 2 **Consultation, advice and preparation of preparatory documentation for construction, supply and operations tenders**	Development, design and authorization of process and infrastructure engineering Development of technical documentation Environmental impact studies Preparation of technical-administrative tender documents Development and acquisition of planimetric-altimetric, topographic, seismic, geotechnical and other data	Present (RA1)						
CONSTRUCTION AND OPERATION OF INDUSTRIAL INFRASTRUCTURE: Tender 3 and construction of the 4 Agri Hubs and the CAAM to consolidate the supply chain and start operating the infrastructure	**UTILITIES AND PUBLIC SERVICE CONNECTIONS** **Provisions for connection services for the 4 Hubs and the CAAM**	Infrastructure for electricity, water, sewage and telecommunications networks Definition of secondary accesses from the main road	Credit (RA2)						
	TENDER 3 AND CONSTRUCTION **Tender for the award of construction, supply and start-up operations**	Preparation, launch and award of Tender 3 for the construction of works and infrastructure, main equipment and installations (machinery for processing, packaging, related accessory material, etc.), secondary equipment and installations (field vehicles, vehicles for logistical transportation, handling equipment, etc.) and service installations and equipment (furniture, laboratory equipment, various consumables, etc.) Detailed Engineering Development Procurement services for equipment, accessories and installations Procurement services for subcontracting and supplies Construction, installation and assembly	Credit (RA2)						

BUILDING GOVERNANCE AND DEVELOPING STRATEGIC BUSINESS PLANS **Structuring CAAM's Governance and Strategic Plans (responsible for MAAP with assistance from AICS)**	**CAAM'S GOVERNANCE STRUCTURE** **Identify and define the Governance structure**	Consultation for CAAM governance proposal (CAAM and Hubs management model) Establish selection criteria for operators and partners Appoint the Board of Directors of CAAM and the HUBs (according to the governance solution decided)	Credit (RA2)						
	CAAM MULTI-STAKEHOLDER AND MULTI-LEVEL PLATFORM **Development of the multi-stakeholder platform**	Creating a multisectoral and multilevel platform Developing strategic partnerships Develop and implement a marketing and sales strategy: positioning, customer acquisition and promotion of CAAM Human resources strategy: defining the staff structure, staff qualifications, functions and areas with the use of service provision	Credit (RA3)						
	STRATEGIC PLANS **Developing business and marketing plansg**	Consultancy to identify the best form of business/management models for the spaces within the CAAM and Hubs (producers' and wholesalers' space - processing areas - cold rooms - logistics spaces, services and laboratories - use of multi-level processing equipment, packaging, others to be identified) Business Plan: Definition of the financial and sustainability model for CAAM and the Hubs Operational Manuals: Operational Processes for Efficient Management	Credit (RA3)						
	LAUNCH OF THE PUBLICITY AND MARKETING PHASE FRO SPACES AND MARKETING **Development and marketing of areas**	Hiring and transferring wholesalers from Market 38 to CAAM Marketing of producers' spaces Marketing of service areas, processing, cold storage, logistics and construction spaces, others	Credit (RA3)						
	TRAINING AND IMPLEMENTATION OF OPERATIONAL STANDARDS **Recruitment, Procedures and Digitization**	Recruiting and training teams (technicians, administrators, managers, etc.) Drawing up regulations and guidelines (internal regulations for employees and operators, code of good practice in food safety and quality standards) Implementing digital systems (supply chain management software, digital monitoring of efficiency and operations, etc.)	Credit (RA3)						
PREPARING FOR OPENING, START-UP AND OPERATIONS **Testing and commissioning the facilities, recruiting the teams and testing all operations.**	**OPERATIONAL TESTS AND PREPARATION FOR OPENING** **Testing operating systems, defining suppliers and commercial communication strategies**	Testing of all operational systems (logistics, cold chain management, transport and security, etc.) Hiring essential service providers (security, maintenance, cleaning, quality control, etc.) Establishing commercial partnerships to ensure continuous supply Launching the communication and marketing strategy for CAAM and the Hubs	Credit (RA2)						
	OFFICIAL LAUNCH **Opening, monitoring and planning**	Opening of CAAM and the 4 Hubs Installation of operators in the spaces Continuous monitoring of the first months of activity and operational adjustments Planning new expansions and investments as necessary	Credit (RA2)						

Two recommendations are integral parts of this framework:

For Tenders 2 and 3, the use of standardized procedures is advised:

For an international tender, national regulations should be followed—particularly the Legislative Decree No. 36 of March 31, 2023, which constitutes the new Public Contracts Code—in combination with the internal specifications of the AICS Agency, to ensure alignment with operational specificities in partner countries and the needs related to international cooperation. As for applicable standards, reference should be made to:

the European Union directives on public procurement, the PRAG rules (Practical Guide for Contract Procedures for EU External Actions), and FIDIC standards (International Federation of Consulting Engineers), depending on the project's specifications and sources of funding (PRAG is usually used in EU-funded projects, while FIDIC contracts apply to large-scale engineering and construction projects).

For both the project design phase (Tender 2) and the construction phase (Tender 3), it is recommended to adopt a cautious strategy that ensures deadlines, methods, and final quality.

For the design phase, the design stages defined in Legislative Decree 36/2023 of the Public Contracts Code should be consulted, ensuring that the technical configuration of the main facilities and equipment is aligned with market needs, based on the guidelines of the Multistakeholder Platform, as well as with the management strategies and governance model of the CAAM. Consequently, the layout of the buildings and physical infrastructure must reflect this alignment.

For the construction phase, it is recommended to work with EPC (Engineering, Procurement and Construction) firms, Design and Build contractors (turnkey contracts), or General Contractors, based on the international FIDIC model, through a single tender process covering both the 4 HUBs and the CAAM. The tender may allow separate bids for the HUBs and the CAAM. Under such a contract, construction, supply, assembly, and implementation would be delegated to a single entity, in accordance with the tender project requirements.

The type of award procedure (single lot, dual lot, or other arrangements) should be decided based on the technically and economically most advantageous offers, and on the evaluation of the organizational, technical-executive, and financial capacities of the bidders.

The procurement of key equipment and installations will be subject to safeguard clauses, linking their acquisition to a final technical and time-specific definition.

At the end of this report, the Conclusions and Recommendations necessary to consolidate the project are presented, along with all annexes attached to this document.

The CAAM (Agro-Food Center of Manica) aims to position itself as one of the most important institutions for agricultural and food promotion in Mozambique. With an innovative and inclusive vision, CAAM stands out for its integrated approach, which seeks not only to increase agricultural productivity, but also to support climate resilience and sustainable development.

Through its ability to engage local communities and adapt its initiatives to territorial needs, CAAM aspires to become a key pillar in improving the living conditions of rural families, thereby reducing hunger and malnutrition.

1. INTRODUCTION

The overall objective of this study, VALUE CHAIN ANALYSIS AND BUSINESS MODEL DEVELOPMENT FOR THE MANICA AGRO-FOOD CENTER, is to:“ Provide the Italian Agency for Development Cooperation (AICS) in Maputo and the Ministry of Agriculture and Rural Development (MADER) of Mozambique with all the necessary information to thoroughly evaluate the feasibility of constructing an agro-food and logistics center in Manica Province that is both economically and environmentally sustainable, compliant with international standards, and well integrated into the local territory.”

1.1 Study objective

According to the terms of reference, **this project must propose and define the construction of an agro-food and logistics center in Manica Province,** referred to throughout the document as CAAM, and must ensure multifunctional characteristics suited to the qualitative and commercial enhancement of local agricultural production, in line with a value chain and agribusiness approach.

The CAAM is intended to support the recovery of the productive sector and leverage the agricultural potential of central Mozambique—particularly focusing on the fruit and vegetable value chain—by designing processes to add value to local production, properly certifying its quality according to international standards, with the goal of enhancing food security and potentially boosting exports.

In addition, the CAAM must demonstrate the capacity to attract private investors, who will establish their own aggregation and sales units, processing businesses, or other agro-food activities oriented towards the market.

The implementation of this project and the future construction of CAAM should have a strong and immediate impact on fruit and vegetable supply chains through the:

1. Creation of a new wholesale market area, leading to the closure of wholesale activities in the current Municipal Market of Chimoio (Francisco Manyanga Market, or Market 38) and its relocation to the new area.
2. Commercial enhancement of local production through:
    a. Support for quality production aligned with the agricultural calendar.
    b. Improved organization of the supply chain.
    c. Upgraded territorial infrastructure.
    d. Quality control and product certification.
    e. Cold chain management in all post-harvest stages, from primary packaging at production sites to transportation and availability of refrigerated storage at the market.
3. Marketing policy coordination to enhance the competitive positioning of local products, particularly within the AfCFTA and EU Economic Partnership Agreement frameworks.

4. Significant reduction in food loss and waste along the supply chain through better control and processing.
5. Reduction of agro-food imports in central Mozambique.
6. Retention of export-related benefits within the country, allowing national entrepreneurs to better leverage regional and international trade agreements.
7. Improvement of working conditions (quality, safety, health) along the supply chain.
8. Promotion of economic, social, and environmental sustainability through the creation of new jobs, particularly for women and youth, and support for startups and private sector growth.
9. Contribution to the establishment of a regional system for price regulation and transparency in agricultural products.
10. Increased investment opportunities for private actors in the fruit and vegetable sectors.
11. Reorganization of agro-food trade in Chimoio and the central region, particularly along the Beira Corridor.

Finally, CAAM should also ensure the establishment of:

- A Multistakeholder Platform where key actors involved in the fruit and vegetable sector along the Beira Corridor can contribute to CAAM's goals, identify with them, and benefit from its success.
- An information technology platform for the exchange of data on the fruit and vegetable sectors (with a proposal to integrate it with MAAP and the SIMA system).
- A fund for entrepreneurs interested in joining the CAAM.

1.2 Methodology used

The activities carried out to meet the study's objective were grouped into seven main tasks, each with various sub-tasks tailored to the specific area of focus.

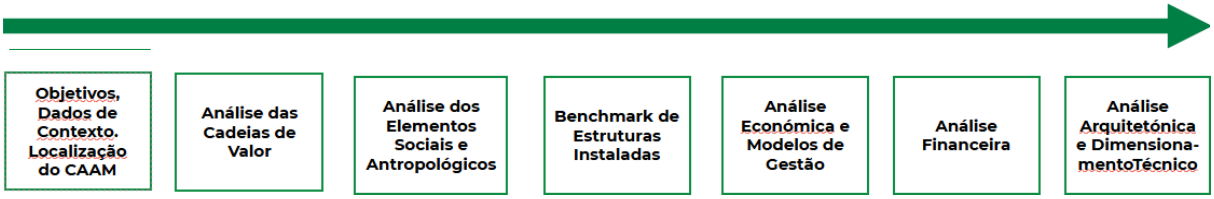
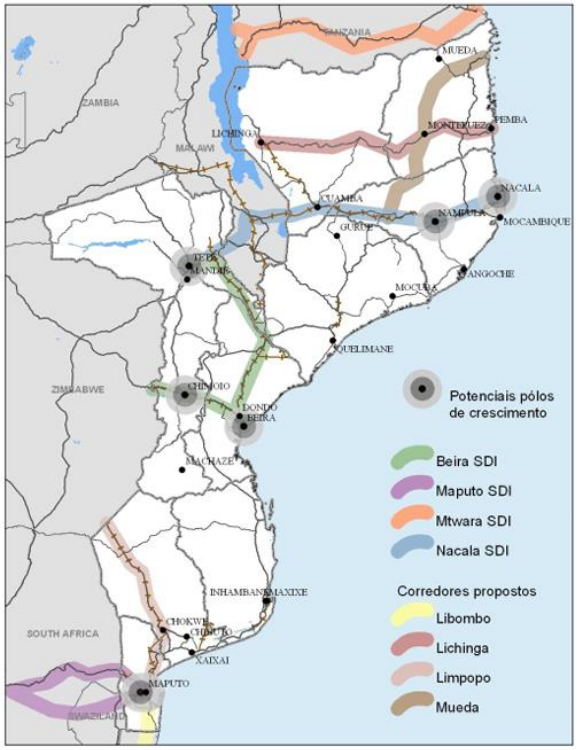


Figure 8: steps in the methodology used, from defining objectives and context to architectural analysis and technical dimensioning

1.3 Regional context

The Province of Manica, located in central Mozambique with its capital Chimoio, lies approximately 1,100 km north of Maputo and around 200 km west of the coastal city of Beira. This province covers an area of 62,272 km², with suitable climate and soil for prosperous agriculture, its main economic activity, along with small-scale mining and energy production.

The province is located along the Beira Development Corridor, one of Mozambique's main trade routes connecting landlocked countries—such as Malawi, Zambia, and Zimbabwe—to the sea via the Port of Beira. This strategic location, combined with proximity to neighboring provinces—especially Sofala and Tete—makes Manica a vital hub for transport and goods consolidation, promoting service development and contributing to economic growth.



Mozambique is characterized by diverse geography, including coastal plains, highlands, mountains, and major rivers such as the Zambezi River, which greatly impacts Manica and its neighboring provinces. This geographic diversity influences the distribution of infrastructure and productive activities, which rely on an east-west and north-south railway network and a national road system connecting the country and its neighbors.

Figure 9: Development corridors and potential growth centres (SDI - Spatial Development Initiatives). Source: Prospects for Growth Poles in Mozambique: Summary Report August 2010, The World Bank Finance & Private Sector Development Africa RegionrGeography and infrastructures

The Province of Tete is crossed by the Zambezi River, making it a strategic hub for hydroelectric energy, as it hosts the Cahora Bassa Dam. Its transport infrastructure is still developing: the province's road network is limited, and while rail connections are essential for mineral exports, they require modernization. Despite the infrastructure limitations, the provincial capital, Tete, is well connected via railway and a national highway.

The Province of Manica, which borders Zimbabwe, serves as an important transit zone for goods and people, linking the Port of Beira to inland areas. The region is crossed by two national roads (running north-south and west-east) and a railway line. These infrastructures are generally more developed than in other inland areas, but still face challenges related to maintenance and expansion.

The city of Chimoio stands out as a strategic hub in Mozambique's commercial networks due to its privileged location along the Beira Corridor and proximity to the Zimbabwean border. Located about 200 km from the Port of Beira and 90 km from the Zimbabwe border, Chimoio plays a central role in the transit of agricultural products, rail and road connections, and logistics and commercial support. These characteristics make the city a key driver of economic development for both the region and the country.

As for the Province of Sofala, located along the central coast, it is one of the most economically significant due to the presence of the Port of Beira, one of the country's main maritime gateways and a transport corridor for landlocked neighboring countries such as Zimbabwe, Zambia, and Malawi. Its infrastructure includes the Beira-Machipanda railway and highways connecting the country's interior to the coast.

The Port of Beira is the central point of the corridor and one of the most important ports in Southern Africa. With modern infrastructure, the port plays a crucial role as an export hub for goods from Mozambique's inland provinces and neighboring countries.

Investment in infrastructure and strengthening Chimoio's local economy is essential to maximize opportunities for regional and international trade. Furthermore, Chimoio is considered the second-best connected city in terms of infrastructure and trade, second only to the capital, Maputo.

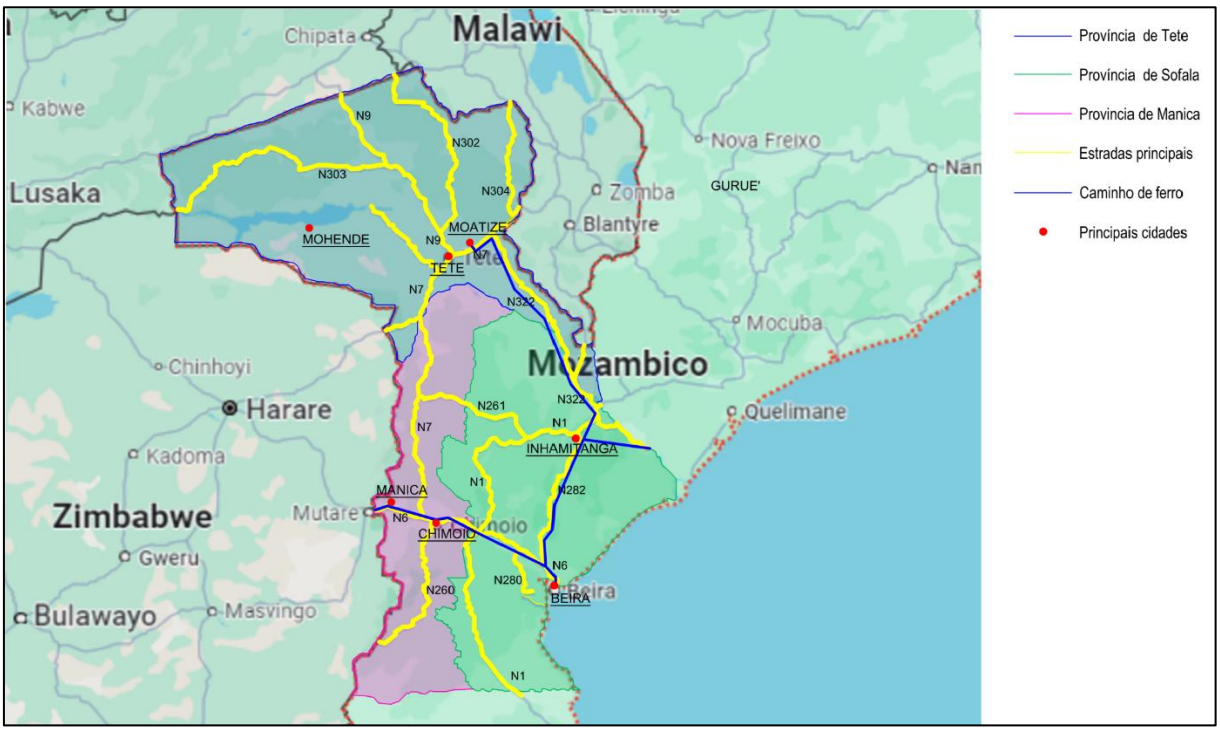


Figure 10: Tete, Sofala and Manica regions - Main road-rail infrastructure. Source: Map drawn up by Consultants

1.3.1 The Chicamba Ring

The Chicamba Ring is a public infrastructure project designed to boost production across the districts of Vanduzi, Manica, Sussundenga, and Chimoio. Supported by local authorities, this integrated planning and management model aims to increase trade transactions and strengthen local value chains, thereby improving living and working conditions in these communities..

This region is characterized by its richness and fertility, being highly active in terms of production and agroecological diversity. It contains several areas where the agricultural sector is more developed than in the rest of the country, particularly in terms of irrigated land and the presence of smallholder cooperatives.

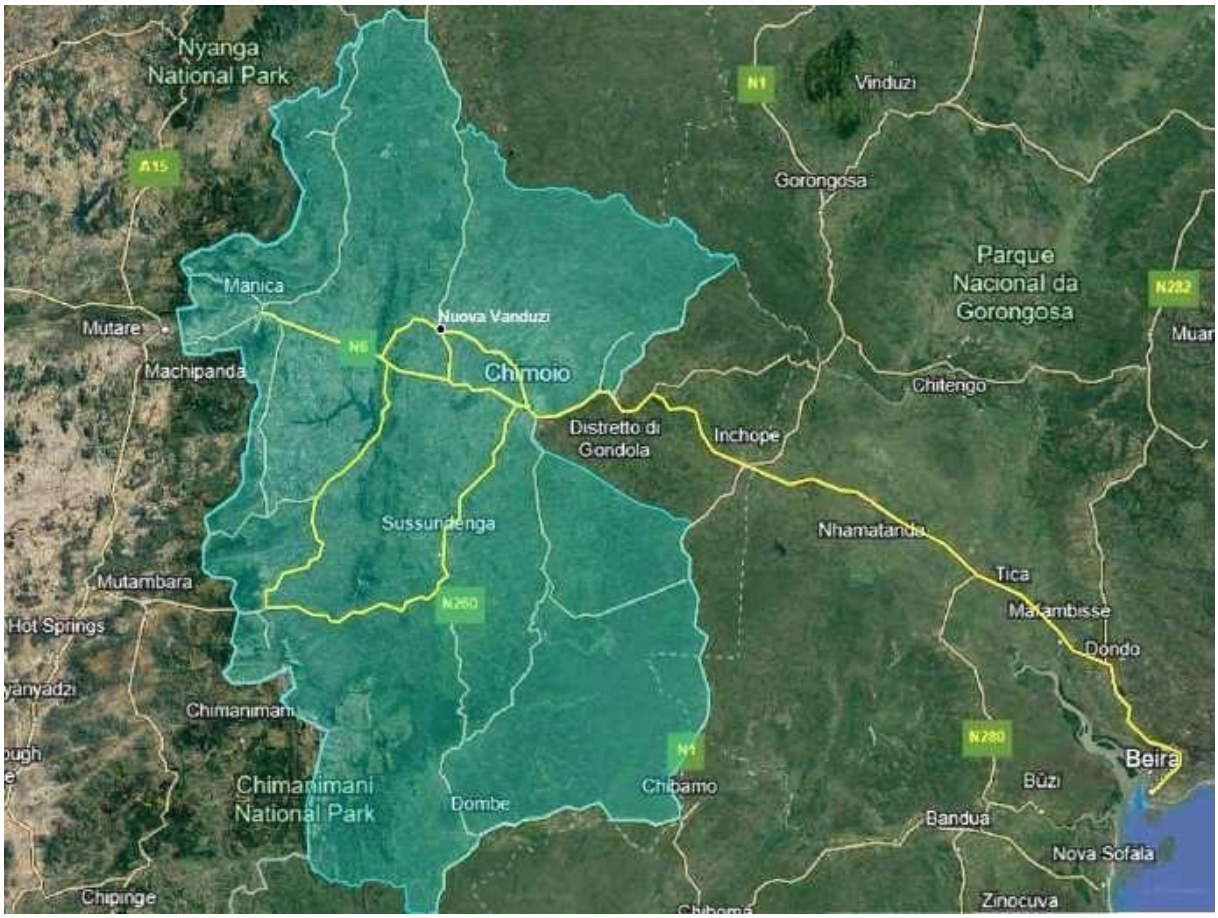


Figure 11: Chicamba Ring, Source: Map drawn up by Consultants based on data from the 'Chicamba Ring' Project of the Zambezi Valley Development Agency, 2023

In this context, the Chicamba Ring area is strategically important and highly relevant to the project, as it will serve as a supply zone for agricultural production and ensure the volume of food products needed to supply the CAAM. This will enable CAAM to become a platform for the distribution of local and regional agricultural production, providing farmers with access to markets and increasing the overall regional supply.

1.3.2 Demographic projections and food demand

Given that the future CAAM is expected to have an impact that extends beyond the Province of Manica, the demographic analysis also includes the Provinces of Sofala and Tete, which are also part of the Beira Corridor. Emphasis is placed on the projected population growth in these three provinces, with a corresponding increase in food consumption and the resulting need for greater supply to meet rising demand.

According to the 2017 Census, the population of these three provinces accounted for nearly 25% of Mozambique's total population. Based on demographic growth projections by the National Institute of Statistics (INE) for the years 2030, 2040, and 2050, and compared to 2024 levels, the relative share of these provinces will increase progressively—18% and 53% respectively—reaching 89% by 2050 (20 years after the projected opening of CAAM in 2030). By 2055, that figure rises to 119%, reflecting a population more than twice the size of today's.

These projections indicate that Manica, Tete, and Sofala will experience faster population growth than the national average, which is estimated at 80%, with Mozambique expected to reach 60 million inhabitants by 2050.

Years	Province population (INE estimates)			Total	Growth compared to 2024
	Manica	Tete	Sofala		
2017	1 942 781	2 644 650	2 255 439	6 842 870	-
2024	2 363 184	3 269 765	2 750 530	8 383 479	-
2030	2 780 703	3 899 022	3 239 372	9 919 097	18%
2040	3 558 056	5 092 953	4 139 427	12 790 436	53%
2050	4 387 024	6 338 813	5 090 348	15 816 185	89%
2055	**5 085 763**	**7 348 422**	**5 901 108**	**18 335 293**	**119%**

Table 2: Population Projections 2017 - 2050 (Sofala, Manica and Tete 2023). Source: INE, Population Projections 2017 – 2050

We can therefore expect a huge increase in demand for food and the resulting pressure on agricultural resources and their arrival in urban centres.

1.3.3 Identification of Irrigation Zones

A map is presented below showing the location of various irrigated perimeter communities. To facilitate identification, color codes have been used to indicate the respective districts.

Based on field investigations conducted in Manica, 25 main areas were identified where structured irrigation systems are in place and operational. The highest concentration of irrigated zones is found in Sussundenga (12) and Vanduzi (8). All irrigation systems are owned by farmers' associations and supervised by INIR, with significant past and ongoing investments (including World Bank and the current IRRIGA-BM project).

As previously mentioned, these areas are located within the Chicamba Ring and are proportionally distributed around the Manica–Beira corridor, between the cities of Manica and Chimoio. The irrigated areas are also distributed north and south of the N6 road, and four main clusters can be defined (corresponding to the four Agro-Poles to be established in this phase):

- A compact cluster northwest of Nova Vanduzi;
- Another more dispersed cluster west of Sussundenga;
- Additional smaller irrigation systems located:
  - in Macate (only the small scheme in Gondola);
  - in Barué (only one system).

This map does not include all individual irrigation systems operated by commercial and emerging farmers, who use

central pivots, drip irrigation, sprinklers, etc.—yet these will be crucial for ensuring sufficient production volumes in the first 5 years. This is because the associations will need to undergo a complete capacity-building process, including management and outsourced concession (a process just now being implemented by INIR, and which should be monitored by the Project Coordination Committee).

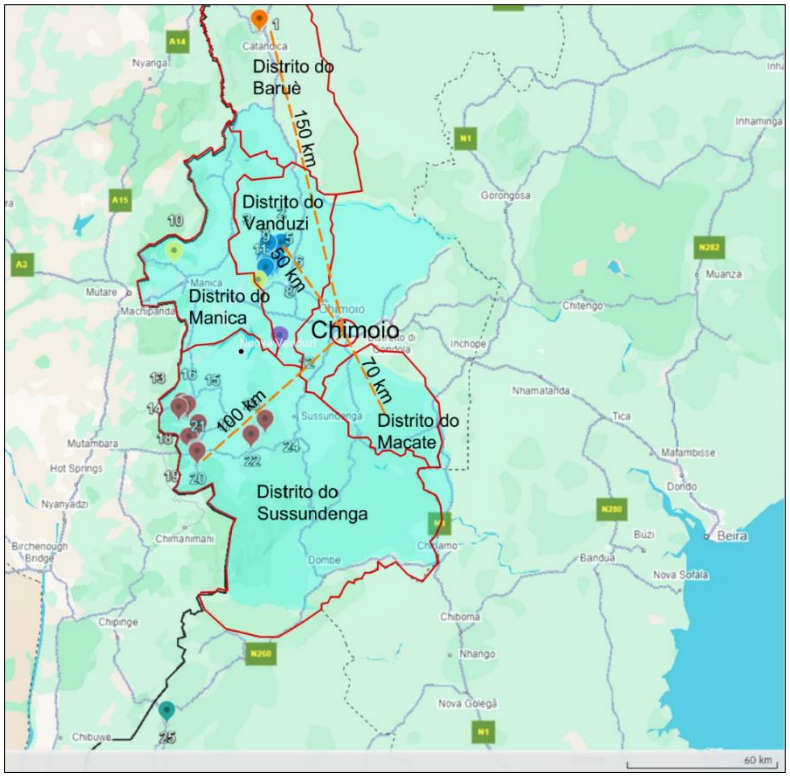


Figure 12: Zoom in on the main irrigation areas in the Manica region. Source: Map drawn up by Consultants

The distribution of the irrigation system directly affects production and is a good indicator for choosing the best location for the structures to be built for the Agro-Complex to be defined.

The table below summarises the total current areas with irrigation systems in each district. Details of the various irrigation perimeters can be found in Annex 1

No. of irrigation perimeters	District	TOTAL area (he)
1	Báruè	75,719
18	Vanduzi	317,887
2	Manica	342,032
1	Gôndola	1,117
8	Sussundenga	960,194
1	Mossurize	21,789

25	TOTAL	1.718,74

Table 3: No. of irrigated perimeters and intervention areas, by district, in the province of Manica. Source: INIR

The largest irrigation systems are in the districts of Vanduzi, Manica and Sussundenga. Also along the N6 motorway, still in the Beira corridor, the existence of these irrigated areas validates the choice of the outskirts of Chimoio (close to these districts) for the implementation of CAAM.

1.4 Econmic and commercial perspectives

The field missions carried out by the team, along with the documentary analysis, highlighted the following dynamics relevant to the development of CAAM:

On the production side:

There is a proliferation of agricultural production within irrigation projects developed by regional agencies, supported by rural extension officers who provide daily assistance to producers in terms of agronomic knowledge, optimal cultivation techniques, treatments, and harvesting.

Examples include:ADVZ (e.g., in the Belas irrigation perimeters in the District of Vanduzi, and others in Sussundenga and Barué, under programs such as PROMEZA, Manguane, and Mais Oportunidades), INIR (in all irrigation systems, through the IRRIGA project financed by the World Bank), and other regional development projects.

These areas of strong food production impact will be mapped and integrated into the value chain analysis. The consultants experienced a high level of dynamism among local producers, whose support will be essential for training farmers to manage both production and their own businesses.

On the value chain side:

With regard to food supply chains, based on visits to private companies such as Westfalia, DanMoz, MacinMoz, Montesco, Agromanica, Frutas do Revue, Shoprite, and UNIDO Chimoio, the following needs were identified and grouped into two key areas:

a. Improving agricultural production and yields;
b. Improving product aggregation at the production level to reduce logistics and market preparation costs (including sorting, washing, packaging, etc.), thereby facilitating integration into the value chain.Do lado da cadeia de Valor

Some positive examples emerged, such as in Serra Choa, where a potato farmer began collecting and aggregating produce from surrounding farms and transporting it to the Chimoio market. This led to the acquisition of a larger vehicle, optimizing transport operations. There are also well-structured business groups that serve as models in the fresh produce trade, particularly within the lychee, banana, and avocado value chains.

During visits to markets such as Katandica, Cerâmica, and Market 38, several vendors were interviewed who sourced their products from other national markets, which in turn were supplied by neighboring countries via

multiple intermediaries. This widespread practice, seen not only in this region but across the country, results in long and complex supply chains characterized by inefficiencies in product handling, which negatively affect food quality and market prices.

Transport and distribution infrastructures lack the necessary equipment to maintain proper refrigeration and freezing temperatures, resulting in significant quality losses and a high rate of rejected products.

In visits and interviews at modern retail outlets such as Shoprite-Freshmark, it was noted that these regional chains lack fresh products that meet their standards of presentation and quality. Most of their supply comes from South Africa and Zimbabwe (via the Beira Corridor), except during peak national production periods for certain crops (e.g., tomato, cabbage, lettuce, kale, and to a lesser extent, potato and onion). Store managers reported a lack of consistency and volume in local supply, despite their continued efforts to source locally and regionally.

On the other hand, the State's (in)capacity to supervise and regulate all operators is severely limited by a lack of resources and qualified personnel. As noted in official reports, such as GIZ's VAMOZ Competir 2023 and the Action Document (AD) of GV4G-EU 2023–24, this regulatory gap enables the growth of unlicensed activities, distorting fair competition and inflating prices due to the lack of oversight and control. This leads to low levels of structural investment, value creation, and sustainable employment in the fresh produce sector, among others.

Overall, strong emphasis is placed on the crucial role of physical infrastructure in supporting commercial operators and helping create more efficient distribution and logistics networks, especially in the agri-food sector. Such infrastructure is essential for the proper functioning of supply chains, particularly to ensure the safety and hygiene of marketed food products.

1.5 Overview of existing markets in the Region

In the Province of Manica, the largest market is the Francisco Manyanga Market, commonly known as Market 38, located in the city of Chimoio. This market interacts with various markets across the city and the country, both for supply purposes and for re-shipment to other provinces.

Annexes 2 and 3.1 provide detailed lists of:

- Markets identified in the provinces of Manica, Sofala, and Tete (Annex 2),
- Markets existing in Chimoio (Annex 3.1).

At the national level, Market 38 receives products from intermediaries coming from Maputo, specifically from Zimpeto Market, which itself receives goods from South Africa. These imported products often replace local produce, competing in both quality and price, and also come from neighboring countries such as Zimbabwe.

Market 38, along with the retail market of Katanga, located in the city center, plays a key role in receiving and distributing food products to Cerâmica Market in Beira,Tete Wholesale Market, Dondo Wholesale Market, as well as to numerous other markets within the city and across the Province of Manica.

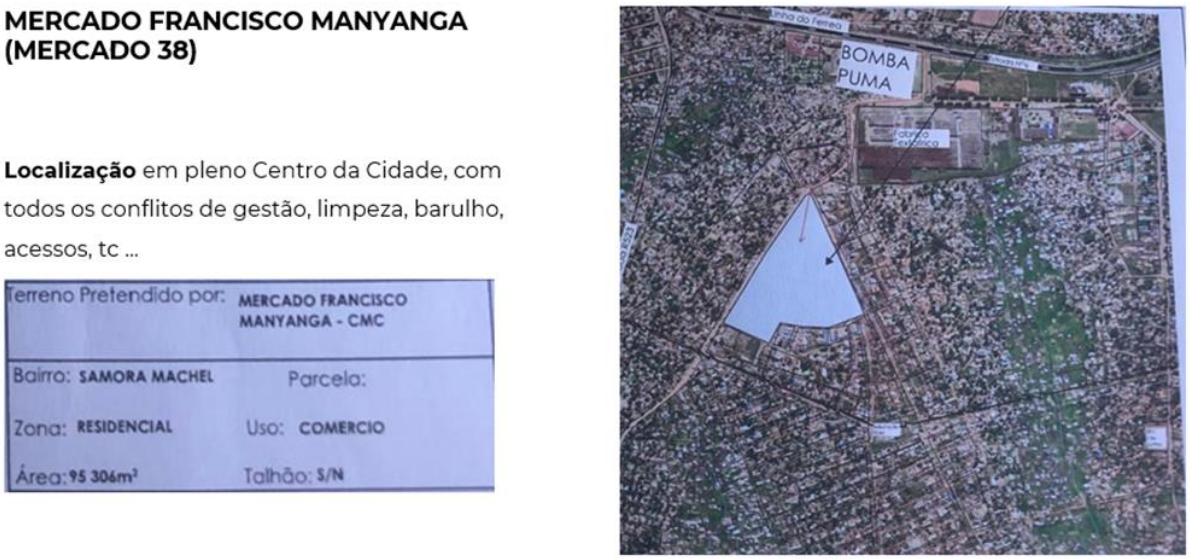


Figure 13: Location of Market 38, Chimoio (Source: Conselho Autárquico de Chimoio)

As Market 38 serves as the main hub for the concentration of regional, national, and cross-border food products, as well as for re-shipment, it represents a potential focal point for future integration with CAAM. This integration must also include coordination with other large markets, which in turn are surrounded by and dependent on various smaller “sub-markets” located on their peripheries.

In addition to Market 38 and Katanga Market, five other large markets have been identified in Chimoio, which interact with 33 smaller markets that serve the city’s population. These must be considered in the commercial strategy to be implemented in the future.

Annexes 3.1, 3.2, and 3.3 provide, respectively: A List of Markets in Chimoio, Data on Chimoio Markets, and Market Layout Plans provided by the Municipal Council.

All these markets lack proper infrastructure, preventing the correct aggregation of sectors by food category, and failing to meet hygiene and operational efficiency standards.

Despite the proactive role of the Chimoio Municipal Council, which has even initiated the construction of new sales pavilions at Market 38, the current location of the market continues to cause conflict with nearby residents, particularly regarding supply operations and market sanitation.

A characterization of these markets—in terms of area, number of operators, prices, and dedicated staff—is presented below. Sendo o mercado 38 o grande mercado de concentração da oferta de produtos alimentares regionais, nacionais, provenientes dos países limítrofes e re-expedição, este constituirá o potencial foco da futura articulação com o CAAM, incluindo a necessária articulação com os restantes mercados de maior dimensão e que possuem vários “mercadinhos” a gravitar e destes dependentes na periferia de cada um.

Name of Markets		Area	No of sellers		Prices		Employees
		(m2)	Fixed	Seasonal	Monthly rate (mzn)	Monthly rate (mzn)	No
Francisco Manyanga (mercado 38)		95 306,0	2 200,0	1 500,0	600 - 2000	15 -20	5
Mercado 25 de Junho (mercado do Katanga)		4 950,8	721,0	1 000,0	600 - 2.000	15 -20	5
Mercado Mpulango		13 487,7	573,0		600 - 2000	15 -20	6
Mercado Jagarto			362,0		600 - 2000	15 -20	1
Mercado Central - Josina Machel		2 200,0	443,0		600 - 2000	15 -20	3
Mercado Feira		26 704,0	1 103,0		600 - 2000	15 -20	5
Mercado 7 de Abril			291,0		600 - 2000	15 -20	4
Total	**7**	**142 648,5**	**5 693,0**	**2 500,0**			

Table 4: Identification and General Characterisation of Markets in the City of Chimoio (Source: Chimoio Municipal Council)

The main weaknesses to be noted in most of the markets visited by the technical team are the precarious infrastructure, difficult accessibility, poor hygiene conditions, high levels of product waste and intense informal trade activity.

From a commercial point of view, it should be emphasised that the producer does not have a physical presence in the municipal, retail and wholesale markets, which deprives him of the ability to negotiate and perceive market needs, as he does not have direct contact with the population and the trade.

1.6 CAAM localisation

Following the contextual considerations regarding the Manica–Beira corridor and the analysis conducted both on-site (regarding market locations and production areas) and on a broader scale through the review of international benchmark projects, it was concluded that the best location for CAAM is, without doubt, the outskirts of the city of Chimoio. In addition to the reasons mentioned previously, this location offers the best connectivity infrastructure, including:

- The N6 highway, which crosses the city and ensures the transport of goods. It is one of the three main transport corridors in the country and provides access to the sea;
- The railway network that runs parallel to the corridor, which will be a valuable asset considering the potential for a freight station and the transport of food products by rail, with a positive impact on transportation costs;
- The local airport, which intends to become an international platform, expanding its portfolio of air connections. The Chimoio Airport is undergoing a development project supported by the local municipality, including the construction of cold storage facilities for fresh products and the extension of the runway to

accommodate cargo planes.

In addition, Chimoio, the capital of Manica Province, has been identified as a primary beneficiary of the Action Plan approved under Resolution No. 7/2021 of September 28, referring to the National Territorial Development Plan. This plan outlines strategic goals and action lines to promote the development of provincial capital cities across the country's three major regions: north, center, and south.

Throughout the corridor, a number of agrifood and non-food businesses have transformed the local landscape, with a proliferation of warehouses, some already in use and others available for rent or sale, reflecting a growing and expansive dynamism. New units have been identified, including slaughterhouses, vegetable and fruit packing centers, industrial facilities, production aggregation warehouses, and export logistics centers. Several activity licenses have also been approved (according to data provided by AIPEX).

For the potential location of this infrastructure (CAAM), various sites previously identified by stakeholders and included in existing studies were visited—all of which are located in the outskirts of Chimoio, as shown in the map below.

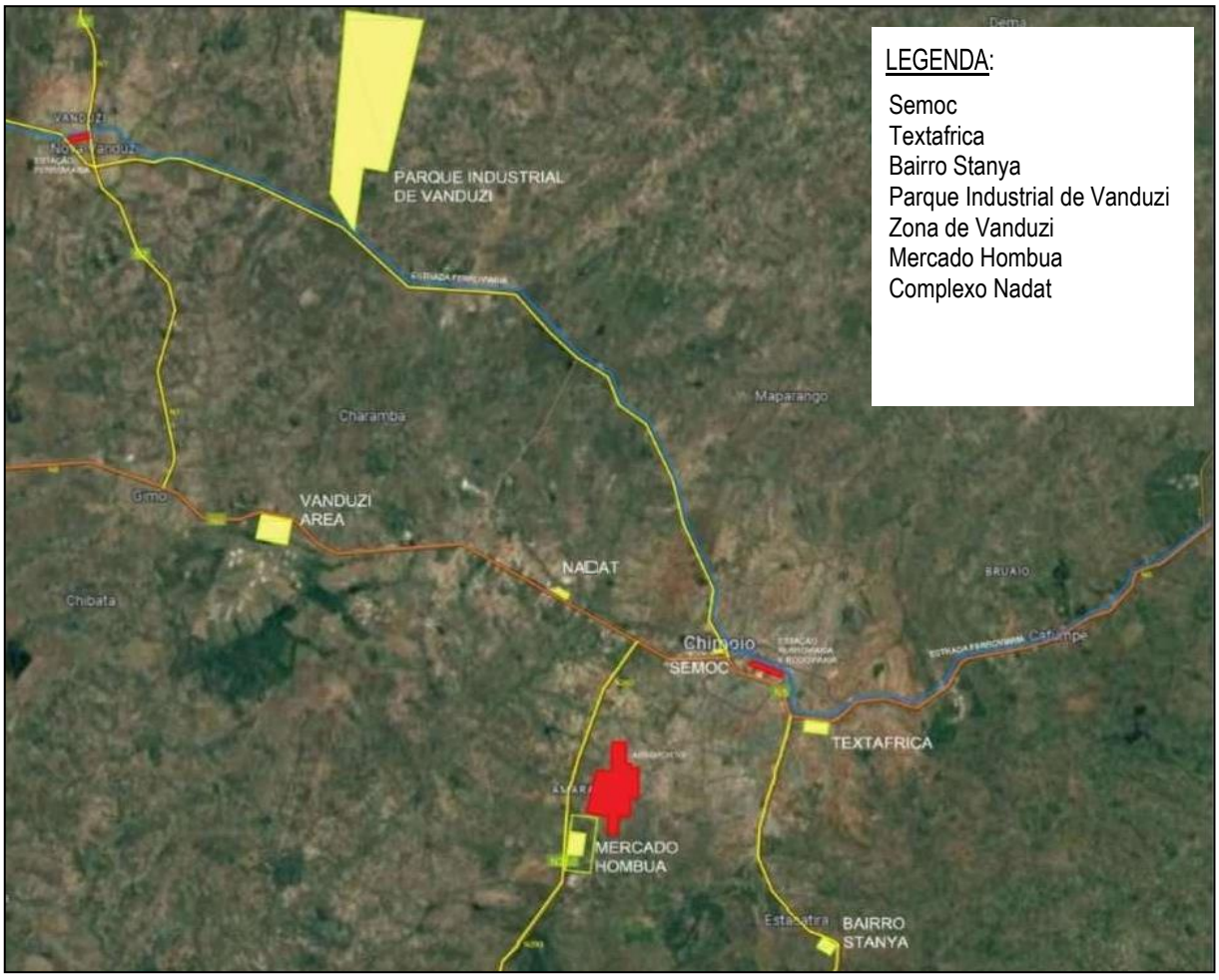


Figure 14: Overview of all locations. Source: Map drawn up by Consultants

The identified exploratory areas fall into two categories: some are already-built facilities, such as Semoc, Textafrica,

and the Nadat Complex; others are existing plots of land identified specifically for the future establishment of the Agro-Food Center in Chimoio.

It was found that the Semoc area and the Textafrica structure do not offer suitable locations nor possibilities for expansion, and were therefore excluded from the final analysis.

To provide a detailed overview of the CAAM site selection process, the following tables present the evaluation criteria by parameter, which were used to determine the most appropriate location.

Main characteristics of analsyed areas					
Characteristics	**Evaluation of potential**				
	Barrio Stanya	**Parque Industrial Vanduzi**	**20 ha Vanduzi**	**Mercado Hombua**	**Complexo Nadat**
Available surface	*4,9 he*	*100 he*	*20,0 he*	*10,0 he*	*6,0 he*
Expansion potential	*To be verified*	*Not necesssary*	*To be verified*	*Extension until 40 he*	*To be verified*
Area availability	*free*	*free*	*free*	*free*	*built*

Table 5: Main characteristics of areas visited

The parameters and evaluation criteria used in the comparative analysis of the various possible locations are presented in the following table.

Main characteristics of analsyed areas	
Parameters	*Evaluation Criteria*
1. Proximity to horticultural production zones	1 - Location far from production zones (> 100 km or 90 minutes by land transport) 5 - Very close location (≤ 25 km or 30 minutes by land transport)
2. Proximity to main road networks (N6)	1 - Difficult access to main roads (> 20 km from the N6) 5 - Direct or very close access (< 2 km from the N6)
3. Proximity to current/future urban areas with significant consumption (retail markets)	1 - Location far from major urban centers (> 100 km) 5 - Very close location (< 20 km) to urban areas with high retail demand
4. Proximity to airport and railway line	1 - No close access (> 30 km) 5 - Direct or very close access (< 5 km) to both transport modes
5. Presence of overloaded wholesale markets	1 - No overcrowded markets in the area (< 25 km) 5 - Presence of overcrowded markets with vendors (< 5 km)
6. Availability of basic infrastructure (public services)	1 - Lack of infrastructure such as electricity, water, sewage, telecommunications 5 - Full availability of basic infrastructure (electricity, water, sewage, telecom, etc.)
7. Absence of environmental constraints (hydraulic, geological, seismic, climatic)	1 - Presence of multiple restrictive factors (flooding, poor geology, seismic risk, etc.) 5 - No significant environmental constraints
8. Compatibility with local laws and regulations	1 - Strong legal restrictions that prevent project development 5 - Area compatible with local laws, regulations, and standards, facilitating project approval and execution

Table 6: Summary of potential areas

The location known as "**Mercado Hombua**" received the highest evaluation score and is therefore the recommended site for the construction of the central structure of the CAAM. This recommendation is based on its proximity to production areas, logistical accessibility, reach to consumer markets, availability of alternative transport options, and its potential to reduce congestion in overcrowded wholesale markets located in residential areas.

Pictures of the site, taken during the information-gathering phase, are also presented, along with evidence of the land reservation for the CAAM's installation, which is included in Chimoio's economic activities plan.

Site evaluation (score: from 1 to 5)					
Parâmetros	**Evaluation of localisations potentials**				
	Bairro Stanya	**Parque Industrial Vanduzi**	**20 ha Vanduzi**	**Mercado Hombua**	**Complexo Nadat**
1. Proximity to horticultural production zones	3	3	4	3	3
	>40 km	*>40 km*	*>30 km*	*>40 km*	*>40 km*
2. Proximity to main road networks (N6)	4	3	5	5	1
	10 km	*20 km*	*<1 km*	*6 km*	*<1 km*
3. Proximity to current/future urban areas with significant consumption (retail markets)	2	5	4	4	5
	8 km	*20 km*	*18 km*	*10 km*	*6 km*
4. Proximity to infrastructure					
4. Railway lines	4	5	3	4	4
	10 km	*<1 km*	*18 km*	*10 km*	*8 km*
4.2 Airport	3	2	3	5	4
	20 km	*30 km*	*20 km*	*<1 km*	*10 km*
5. Presence of overloaded wholesale markets	3	1	1	3	3
	8 km	*25 km*	*20 km*	*10 km*	*6 km*
6. Availability of basic infrastructure (public services)	3	2	3	4	5
7. Absence of environmental constraints (hydraulic, geological, seismic, climatic)	5	5	5	5	5
8. Compatibility with local laws and regulations	5	5	5	5	5
Total	**28,5**	**27,5**	**30**	**33,5**	**31**

Table 7: Comparative assessment of the five locations under analysis

Figure 15: Pictures of Mercado Hombua

Figure 16: Plan released by Chimoio City Council: site reservation for Hombua Market

2. ANALYSIS OF VALUE CHAINS IN CENTRAL MOZAMBIQUE AND TARGETS FOR THE CAAM

This chapter provides an in-depth analysis of the priority value chains (VCs) for the CAAM and the stakeholders involved, laying the groundwork for decisions related to the sizing and architectural layout of the complex, which will define the structure of the Agro-Food Center of Manica.

The PEDSA-PNISA II 2022–2030 presents an extensive list of value chains, of which 15 are inclusive and 6 are non-inclusive, as shown below.

Following two field missions, direct interactions with local operators, and a data-based evaluation using multiple criteria (environmental factors, business environment, market potential, competitiveness, existing or needed infrastructure, local added value, presence of SMEs, employment, inclusion, and nutrition), the team was able to identify **groups of value chains with different levels of priority,** based on their stage of development. These groups will require different approaches for the CAAM's structure and service model.

(The underlying calculations for value chain evaluation are included in Annex 4.1 – Value Chain Evaluation Tables.)

Figure 17: VCs identified in PEDSA-PNISA 22/30, inclusive and non-inclusive.

Seasonality of production was also considered in this assessment, as it is key to ensuring a consistent flow of products into the CAAM throughout the year. In addition to identifying priority areas for intervention, the study also highlighted investment opportunities and the functionalities CAAM must offer to capitalize on them. CAAM should also be flexible and prepared to support other value chains that may emerge as relevant due to market shifts, climate change, or new anchor investors.

It was concluded that the functional design of the CAAM should foresee two types of dedicated investments:

1. investments across all priority VCs and other future ones (6 Anchor Projects - AP):
PA1 – CPSAs (*), NTTs (**) e INAGROs (***) em Pólos Periféricos (4) PA2 – WHOLESALE MARKET PA3 - CENTRE FOR THE SELECTION, PACKING AND CONSERVATION OF FRESH PRODUCTS (Vegetables, fruit, fish and seafood) PA4 - PROCESSING PA5 - LABORATORIES PA6 - SPACES TO RENT OR SELL TO INVESTORS
2. Specific investment in specific CVs, starting with the priority ones, with the promotion and attraction of investment projects to rent or sell space in the CAAM / Central site and in the CPSAs
• Vegetables • Tropical Fuirts, Citrus • Cashew • Poultry (Eggs, Chickens) • Dairy Products • Macadamia (*) • Coffee • Legumes (Kidney Beans) • Honey • Soja • Red meat
(*) CPSA – Centro de Prestação de Serviços Agrários (**) NTT – Núcleo de Transferência de Tecnologias (***) INAGROs – Incubadora de agronegócios no campo

Table 8:Investment opportunities. Source: Consultants, 2024

The groups and priorities were defined as follows:

Priority 1: Honey and Poultry (Eggs and Meat)

Priority 2: Vegetables, Tropical Fruits (Banana, Mango, Pineapple), Citrus, Beans, Soybeans, Cashew, Dairy, Cattle, Goats, Pigs

Priority 3: Coffee and Macadamia

Since these value chains are interconnected, the cross-cutting investments should begin immediately within the productive sector, starting with the CPSA or equivalent structures (Anchor Project 1 – PA1), and the Wholesale Market (PA2) for Priority 2 value chains, which will also require support for preservation (PA3) and processing (PA4).The laboratories (PA5) and investment spaces (PA6) will be relevant across all value chains.

CRONOGRAMA INDICATIVO DE IMPLEMENTAÇÃO DOS PROJECTOS ÂNCORA POR PRIORIDADE DE IMPACTO(1)				
Projecto Âncora	**CVs Beneficiadas**	**Ano1**	**Ano2**	**Ano3**
PA1 - CPSAs, NTTs e INAGROs em Pólos Periféricos(4 Unid)	Todas CVs (1)			
PA2 - MERCADO GROSSISTA	Foco nos Hortícolas, Frutas, Túberculos, Leguminosas			
PA3 - CENTRAL DE SELECÇÃO, EMBALAMENTO E CONSERVAÇÃO DE PRODUTOS FRESCOS	Foco nos Hortícolas, Frutas, Túberculos			
PA4 - TRANSFORMAÇÃO	Foco nos Hortícolas, Frutas, Túberculos			
PA5 - LABORATÓRIOS	Todas CVs (2)			
PA6 - ESPAÇOS PARA ARRENDAR OU VENDER A INVESTIDORES	Todas CVs (3)			
(1) - Os serviços de preparação de terra, venda de insumos e ferramentas/utensílios, extensão, informação de mercado, etc, beneficiam todas CVs				
(2) - As análises diversas irão facilitar certificações várias para todas as CVs (Lichies, abacate, macadâmica, mel, café,lacticinios, etc)				
(3) . De igual modo todas as CVs poderã ser beneficiadas com a atração de investimentos vários conforme identificadas algumas oportunidades				

Table 9 – Indicative timetable for implementing the anchor projects. Prepared by Consultants

***13 categories of structural problems** common to the value chains (VCs) in the Beira Corridor were identified and then evaluated (on a scale of 1 to 5) according to the following factors: i) Investment, ii) Timeline, iii) Feasibility, iv) Short- to Medium-Term Impact, v) Long-Term Impact.*

The scores obtained were grouped from highest to lowest priority based on five criteria (maximum total score: 25 points). Based on this, the investment priorities for CAAM were determined in terms of the types of interventions to be undertaken.

1º Group	**23 e 24 points – Menor nível de investimento relativo, mais viável, com grande impacto a curto prazo e também a médio-longo prazo**
2º Group	20 to 22 points - Equally high on all criteria, but one or two below
3º Group	Remaining - various combinations of very low scores in some criterion (e.g. roads require a lot of investment, have little immediate impact on producers due to the time it takes to complete them, but have a high impact in the medium to long term) and are therefore not a priority for CAAM investments.

2.1 Current opportunities for the agribusiness sector

Agriculture accounts for approximately 26% of Mozambique's GDP, but it is responsible for 80% of national employment. Smallholder farmers (SHFs) are responsible for 95% of the country's agricultural production, with the remaining 5% contributed by commercial farmers.

These figures clearly reflect that the agricultural sector is dominated by smallholder farmers, who mainly produce for subsistence and heavily rely on natural resources and ecosystem services, with little to no focus on market-oriented production.

As a result, despite its social, economic, and environmental impact, the agricultural sector remains underinvested and underserved in terms of the key factors needed for sustainable growth. It is characterized by a horizontally fragmented value chain with little diversification, lack of integrated value chains and economies of scale, weak organization and logistics efficiency, with actors geographically dispersed, outdated quality standards, lack of local certification entities, and a predominance of informal trade, even in cross-border exports.

These are the main causes behind the low economic, environmental, and social sustainability of agricultural value chains in Mozambique, which ultimately hinder a greener, more climate-resilient, and inclusive growth.

Recognizing the importance of developing a sustainable agribusiness sector, it is estimated that agricultural investments in 2024 will amount to approximately USD 245 million, including: public spending, investments by bilateral and multilateral agencies, credit lines provided to agribusiness companies by financial service providers—as illustrated in the table below[1]:

Multilateral Agencies	95 US$ Million
Bilateral Cooperation Partners	65 US$ Million
Foreign Direct Investment (FDI)	55 US$ Million
Financial Institutions	15 US$ Million
General State Budget	15 US$ Million
Total	**245** US$ Milhões

Table 9: Origin and annual volume of Agribusiness funding. Source: ODAMOZ; Website of the various co-operation partners, search google and other sources of consultants.

An analysis of the project list shows that UN agencies have concentrated all their agribusiness-related investments within the Beira Corridor. The World Bank has invested 73% of its funding in nationwide projects, while 18% was directed to the Zambezi Valley and the Nacala Corridor, largely due to their strategic importance for exports and regional integration. Only 9% of the funds were allocated to projects focused on the Northern Region.

Similarly, 50% of the funding from impact investors (multilateral and bilateral cooperation agencies) and 64% of funding from financial institutions was directed toward countrywide initiatives.

In contrast, the European Union (EU) balanced its funding between the Beira Corridor and the Nacala Corridor. Private foreign investors financed specific investment projects, distributed across the country according to the priority value chains relevant to their objectives.

When comparing amounts, bilateral donors financed US$ 177 million for the Beira Corridor and an additional US$ 30 million for the Central Region, compared to US$ 85.5 million allocated to the Nacala Corridor.

Detailed information on international donor funding and investment projects in Mozambique can be found in Annex 5.1 – Donors and Projects and Annex 6 – Investment Environment.

Rural development projects cover multiple areas of development, including infrastructure, access to basic services (such as healthcare and education), and income generation. The latter is addressed through private sector development initiatives, such as strengthening the capacities of value chain actors,

improving access to finance for private companies, supporting the development of the business ecosystem.

[1] Some of the budget data and its content are estimates made by the consultants, who have already used some of this information for other reports (e.g. European Union).

In recent years, significant initiatives have been launched by the government and development partners in the agricultural sector to finance agribusiness actors.

The most relevant initiatives for CAAM are listed in the following table:

Project/Programme	Organisation / Implementation	Objective/Area of Expertise
IRRIGA (WB-INIR)	World Bank (WB) and INIR	**Rehabilitation of irrigated areas in the province**, using FAO-MAFAP and INIR recommendations for the implementation of PPPs/iDPPs (confirming the Minister's mandate to the NIR) could result in larger and more competitive volumes of products (gravity irrigation).
MORE OPPORTUNITIES (WB-ADVZ)	World Bank (WB) and ADVZ	**Rehabilitation of last-mile infrastructures**, including irrigation (irrigation and individual systems), rural roads and rural training centres, among others to be updated on the "Anel de Chicamba" pre-project.
MANGWANA (Dutch-ADVZ co-operation)	Dutch co-operation and ADVZ	**Investments in production**, **post-harvest, processing and market links** in chains such as soya, vegetables, beans, poultry, rice and others.
AICS and FAO projects	AICS and FAO	are designed with CAAM as an anchor, complementing their investment, such as in irrigation, producer training, market links, product certification, etc.
Green Value for Growth (EU-Netherlands-ADVZ)	European Union, Netherlands and ADVZ	**Financing for integrated investments and technical assistance anchored in leading companies in focus value chains** (soya, avocado and cashew) and other complementary ones (poultry, beans, lychees, etc. that contribute to the viability of value chains that are more resilient to climate change and greener), including strengthening and facilitating links with some key institutions (INNOQ. IPEME, others).
PCCAA (WB and ADVZ)	World Bank (WB) and ADVZ	**Accompanying the feasibility studies for the Dondo Logistics Support and Facilitation Centre (Sofala)**, due to the potential overlap of investments in the Corridor and its competition for Manica's production and the large market that the city of Beira represents for producers in Manica and Téte provinces.

Table 10: Summary of Projects / Programmes, Their Implementers and Areas of Activity. Source: Consultants

These interventions, and the value chains considered by the different development programmes and potential funders in the Beira Corridor, particularly in Manica province, could complement CAAM's action, helping its sustainable development and boosting its impact.

2.2 Actores privados mais relevantes

A list of companies is presented which gives an idea of the existing players, their regional location, the value chains in which they operate, some recent investments supported by public funds and the number of producers involved in promotion or other formal commercial relationships, which helps to try to understand the level of added value, competitiveness, proximity, market guarantees for small producers and the critical mass of existing and potential agribusiness. Annex 7 contains a list of the meetings held with the various stakeholders on the 1st and 2nd missions, respectively identified with their contact details.

These companies, cooperatives and entrepreneurs must be involved in the dynamics of supply growth and be active partners with the producers they want to empower, increasing and valorising their production. They are also agents to be located within CAAM's main structure if their growth requires adequate space for their agri-food and commercial activities.

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Priority VC	Empresas mais relevantes por Cadeia de Valor
Hortícolas (tomate, batata, reponho, cebola, couve, alho, cenoura, pepino)	AGROMANICA (Produz hortícolas em estufa e ar-livre; faz outgrowing; desidrata cebola) – Chimoio/Sussundenga; SEMOC (produção de semente de batata e batata para consumo; selecção e embalamento de batata; transformação de batata – Parceria com ADZ e Governo Holanda – WUR_CPI – Chimoio/Macate); RDI/Montesco (Produção de semente de batata e batata para consumo) - Báruè; Kota Farmer (produção comercial de Hortícolas);
Frutas Tropicais (Banana, Lichias, Ananás, Manga, Abacate, Citrinos)	GAN EL (produz banana e outros, exporta orgânica) - Sussundenga; Frutas do Revue (transformação de fruta por desidratação e polpas/concentrado: Manga, Lichias, ananás, banana, papaia, outras); Westfalia (Produz, outgrowing e selecção e embalamento de Lichias e Abacate) – Chimoio, Sussundenga, Báruè; Cooperativa do Revue (Produção de Lichias e abacate ligados com Westfália); Mac&Moz (produz abacate que entrega à Westfália, mas foco em Macadâmia); Vanduzi (Abacate que também entrega à Westfália)
Caju	PNG/Fundação Carr tem iniciada a instalação de uma fábrica de processamento de caju na Gorongosa, com ambição de comprar em Sofala e Manica; Indústrias com sede em Nampula e em Gaza (Condor Annacardium), além de *traders* compram castanha na região.
Avicultura (Ovos, frangos)	AAA- Abílio Antunes Agronegócios (Maior produtor, processador e distribuidor de frangos e ovos do país – Chimoio, Gondola; Investagro- Ração e Ovos&Frangos – Nhamatanda; EDP – Escolha do Povo (Incubação de ovos, ração, farinha de milho) – Tete; Nguku (aviários de frango, matadouro, incubadora) – Dondo;
Macadamia	Mac&Moz (Produção e secagem de macadâmia) - Sussundenga; Many Others (AMM-Associação Moçambicana de Macadamia Members list)
Leguminosas (Feijão Vulgar)	MAFER (Processamento de feijão vulgar – Moatize); Investagro-Feijões (agrega, seleciona e exporta para África do Suç); Mozagri (selecção e embalamento de feijão); Moazagri: Processa feijão, produz caprinos, compra de produtores, abate caprinos e vende) - Barué; ECA (Moageiro de milho para farinha e gritz para cerveja, com outgrowing de milho cerca de 3.000 produtores, Barué; TCO-Agro (Produz arroz e Feijão vulgar em Chemba e processa na Beira); Luteari (Rede de agrodealers que agregam feijão bóer, gergelim, milho, soja e vão começar fejão vulgar, tem silos em construção) - Gondola.
Mel	Mozambique Honey Company (AT a Produtores de Mel, agrega, processa e comercializa) – Chimoio, Catandica; PNG/Fundação Carr (AT a Produtores de Mel, agrega, processa e comercializa) – Gorongosa, Cherimgoma, Mwanza, Nhamatanda; TCP (AT a Produtores de Mel, agrega, processa e comercializa) – Caia, Cheringoma.
Lacticínios	DANMOZ (Criação de Gado Leiteiro, Fábrica de leite pasteurizado, queijo, iogurtes, rede distribuição com lojas e postos móveis em Chimoio e Beira) – Chimoio, Gondola; COPOLEITE (cooperativa de criadores de gado leiteiro; processamento de leite pasteurizado e yougurtes) – Dondo, Nhamatanda, Beira; Agromac (ração e criação de gado leiteiro) – Manica/Sussundenga.
Soja	AAA- Abílio Antunes Agronegócios (idem avicultura) EDP- Escolha do Povo (idem avicultura); Manica; Merek (fábrica de ração avícola) – Beira.

Priority VC	Empresas mais relevantes por Cadeia de Valor
Carnes Vermelhas	MozBeef (criação de bovinos, feed lot, matadouro) – Chimoio, Sussundenga; Canal Food (outgrowing de caprinos e bovinos; matadouro e distribuição nacional); Frutos do Planalto (Criação de suínos, matadouro e distribuição regional); Mozagri (criação de caprinos, feed lot, matadouro e distribuição) - Baruè; Beira Boi (criação de bovinos e feed lot, produção de luzerna e exportação); Muitos criadores comerciais em Manica, Sofala, Tete; Matadouros Municipais (Dondo; Buzi; Chimoio; Tete)
Café	COOPCAM, Café Vumba, Café Manica, Café Chimanimani Café Gorongosa (PNG) em Sofala.
Aquacultura	Companhia de Zembe/Agromanica (tanques de produção de tilápia) – Chimoio; Kruger (criação de alevinos e produção de alguma ração) – Beira; outros na cidade da Beira (Tilápia, Camarão, Caranguejo); Chicoa Fish (criação, processamento e venda nacional e exportação) – Songo/Cahora Bassa; Muitos pescadores artesanais de tilápia, capente, nas barragens de Chicamba e Cahora Bassa.
Madeira	Portucel (Concessão florestal de eucalipto, exporta toros) - Sussundenga; IFLOMA (Concessão de pinhal, exporta toros); Lefasflor (Concessão sustentável de floresta Mioma; processa briquetes; exporta toros e tábuas) – Cheringoma; Moflor (concessão madeireira, serração) – Sofala, Manica; TCP (Concessão florestal sustentável, serração, produção e fomento de mel) – Cheringoma, Caia;

Table 11: Summary of Companies by Value Chain in the Beira Corridor. Source: Consultores, 2024

2.3 Assessment of value chain development by segment

To identify gaps and potential areas for intervention within the pre-selected value chains, a matrix was developed based on a standard activity segment structure used by the World Bank, which was then adapted by the consultant to reflect the Mozambican context.

A qualitative assessment was carried out, using four levels considered representative of the development stage of each value chain activity segment[2].

A	There are enough well-organised private or public players (with sufficient assets, good management, apparent sustainability) to guarantee a functioning VC, even if there is still room for improvement
B	There are reasonable private and/or public players who can be optimised, but they could be more and better and with more investment
C	There are some private and/or public players, but with some gaps and needs, which need to be improved with investment
D	Non-existent, or almost non-existent. Requires investment from scratch

Table 12 Evaluation Criteria of the current development of value chains. Source: Consultants, 2024

According to the analysis carried out, the conclusions were as follows:

- **Quartile 4 (75%–100%)**: The most developed value chains, based on the number of activity segments rated Good (A) or Fair (B)—regardless of transaction volume—are: **Poultry (eggs and chickens)**, led by national leader **Abílio Antunes Agronegócios (AAA)**; **common beans**, **honey**, and **coffee**.

  These VCs generate the most national added value, create jobs, are potentially more competitive and economically sustainable, and can be scaled quickly in terms of number of producers and volume. They also replace significant imports or are already exporting (as with honey and coffee), and are ready to use and pay for CAAM services immediately.
- **Quartile 3 (50%–74%)**: The value chains of **soy, cashew, cattle, dairy, goats, timber, Boer beans, vegetables, reno potato, pigs, and banana** are at a **reasonable stage of development**, with some actors already present or organized, but still in need of more actors and coordination to reach scale, increase added value, employment, competitiveness, and sustainability.

  These chains require more private investment and public support, and are where CAAM can play a crucial role, by providing technical assistance, access to markets, and infrastructure support.
- **Vegetables and reno potato** are **important cash crops** with **short production cycles**, allowing for multiple harvests per year and at different altitudes. They typically yield **higher unit values** and create **more**

[2] Developed and used by the consultant since 2008 in multiple value chain studies conducted in Mozambique for the Government of Mozambique (GoM – MADER, ADPZ, MEF) and cooperation partners (World Bank, GIZ, AICS, ADA, FAO, KFW, TBI-AGRA, etc.).

employment, particularly for women. However, they face serious gaps in access to hybrid seeds for the cold and rainy seasons, a lack of medium and large-scale producers, no agro-industry, and no last-mile agronomic services or aggregation structures. Fresh processing infrastructure (especially for potato and onion) is non-operational, and management capacity is limited (only the public company SEMOC and a few small companies in Beira and Tete supplying supermarkets and the HORECA sector).

Key challenges include lack of hybrid seeds, few mid- to large-scale producers, and insufficient processing infrastructure.

- **Quartiles 2 and 1 (1%–49%)**: **Lychee, avocado, and macadamia** are high-volume, export-oriented value chains with fewer actors and lower potential for scaling, contributing less to national added value and job creation. However, they are potential users and strong payers for CAAM services, such as laboratory testing, certification, recycling, and by-product valorization (e.g. rejected fruit not fit for export).

For mango and pineapple, despite the increasing number of fruit processing units (for drying, juice, pulp, jams, and liqueurs) in Chimoio, Manica, and also in Inhambane and Maputo, which are driving demand across Manica and other producing provinces, both chains are still in a very early stage of development.

They require significant investments in infrastructure, capacity building, and logistics support, with long-term potential for mango, and short- to medium-term impact for pineapple.

Using the same evaluation matrix, the analysis also identified the least developed activity segments across the prioritized value chains for CAAM, highlighting where intervention is most urgently needed:

1. Research and Development (e.g. seeds better adapted to climate change and market demand; production technologies that regenerate soil and the environment; healthier food; pre-basic seed production);
2. Seed Production (from basic to certified seeds);
3. Agricultural production by larger-scale emerging producers
4. Rural Trade and Aggregation
5. Final Processing and Transformation (including on-field or horticultural center-based primary processing, such as sorting, packaging, and preservation for vegetables);
6. Recycling, which is virtually non-existent, except for avocado (used by large companies for composting) and cashew, where shells are now reused for CNSL oil production.

2.4 Relevance and prioritization of value chains and strategic geographic analysis

To prioritize the pre-selected value chains (VCs) for analysis within the framework of the CAAM, in addition to assessing the level of development based on the number of actors and their organizational structure, it is necessary to consider a broader set of economic, social, and environmental variables. These allow for a proper assessment of their relevance to the sustainability and impact objectives defined for the CAAM.

In the first phase, three exclusion criteria are applied. Any value chain that fails to meet at least two of these criteria is excluded from the initial list (however, depending on the final analysis—including the CAAM business model, required investments, synergies between VCs, etc.—some excluded or deprioritized VCs may be reconsidered).

In the second phase, all VCs are scored from 1 to 5 (5 being the highest relevance) based on various indicators grouped into factor categories, aligned with the overall investment objectives for CAAM, as defined by MADER and AICS. These categories include:

A. Landscape and Ecosystem Management: Environmental sustainability of the VCs to be promoted is a key concern of this study. Therefore, several criteria were introduced in the assessment matrix to reflect this, including:

- Opportunities for landscape restoration and conservation;
- Suitability for agroecological, agroforestry, and climate-smart agriculture practices;
- Synergies with other crops (rotation, intercropping, storage);
- Soil, water, and fertility requirements;
- Adaptability to climate change and vulnerability to extreme events;
- Contribution to climate change mitigation;
- Risk of pollution and impact on biodiversity;
- Susceptibility to human-wildlife conflict;
- Opportunities for carbon credits.

B. Business environment:

- Enabling environment for agribusiness;
- Barriers to anchor investment;
- Presence of large-scale investors, national or international.

C. Competitiveness Potential

- Growth of domestic markets and potential to substitute imports;
- Expansion into export markets;
- Potential to increase productivity through green technologies;
- Market stability over the past 3–5 years;
- Potential for circular economy integration.

D. Infrastructure:

- General and specific infrastructure needs (e.g., irrigation, energy, silos, cold storage, processing plants);
- Need for efficient logistics (roads, development corridors);
- Timeframe for achieving results;
- Availability of laboratories, innovation centers, and skilled workforce.

E. Local Added Value

- Post-harvest and processing value potential at the district and national level;
- Availability of inclusive business models and local financial instruments (VCLFs).

F. SME Growth

- Potential for clustering and diversification;
- Level of value chain organization (e.g., associations, cooperatives, exporters);
- Level of private investment and access to finance.

G. Employment Generation

- Capacity to create direct and indirect jobs.

H. Inclusion and Nutrition

- Potential for contract farming;
- Inclusion of gender, youth, and people with disabilities;

Given the need to narrow down the number of prioritized value chains in relation to the available CAAM budget, the complexity of implementation in the specific context of Manica, past experiences in Mozambique, and international benchmarking, the analysis focused on the top quartile (above the 75th percentile) and the upper half of the 3rd quartile (above the 62.5th percentile).

As a result, the VCs that best satisfy the full set of prioritization criteria—including landscape/ecosystem management, business environment, competitiveness, infrastructure, local added value, SME growth, employment generation, and inclusion/nutrition—are the same VCs already presented earlier in this chapter, which are recalled here:

Priority 1: (>= 75%)	Honey, Eggs, Chickens
Priority 2: (>=62,5% <75%)	Beans, Soya, Banana, Vegetables, Cashew, Poultry, Dairy, Cattle, Goats, Pineapple, Mango
Added for potential and complementarity	Coffee, Macadamia Note: These are high-growth VCs, very important for integrating agroforestry and regenerative models, both with medium and large-scale private investors, which have the potential to install the necessary storage and processing infrastructures in the CAAM space and which can serve the sector as a whole, contributing as additional anchors for its monetisation.

Table 13: List of priority value chains for CAAM. Source: Consultants, 2024

2.5 Priority geographies in the beira corridor

As already introduced earlier in this chapter, certain geographic areas in Manica Province have clear relevance to the CAAM. These include zones with a high concentration of irrigated areas, such as Barué/Vanduzi and Sussundenga, proximity to transport infrastructure, and locations where planned investments are already underway, such as the Beira Corridor and the Chicamba Ring.

By cross-referencing this information, it was possible to identify the areas that could benefit the most from CAAM.

Using the Mozambique Development Domains (DDM) classification—which maps agribusiness ecosystems along the Beira Corridor—and combining this with an assessment of: general and agribusiness-specific infrastructure, business environment development, presence of organized SMEs, ecosystem sensitivity, and existing public/private/development partner projects, the analysis identified the geographic zones with highest strategic priority, considering CAAM's future activities and investment viability.

The analysis concludes that within the identified Agri-Clusters[3], the districts of:

Barué (part of agro-ecological zones R10 and R4), and **Vanduzi** (R10 and R4), in Manica Province, are those where investments will most rapidly and sustainably generate impact, in terms of production growth, quality, diversity, complementarity, and sustainability. This will ensure the viability and return expected by the Italian development financing.

Macate District (R4) presents a unique specificity within the province: large-scale production of organic bananas by a large number of smallholders, along with citrus fruits (orange, tangerine, lemon, grapefruit), lychee, and others. These crops are essential for ensuring CAAM operates throughout the year, fostering diversification and enabling both fresh export and local processing (e.g., Frutas do Revue).

Sussundenga District (R10 and R4) has recently experienced exponential growth in agribusiness, especially in macadamia, avocado, and coffee, as well as community irrigation systems supported by the World Bank.

These four Agri-Clusters will be proposed as locations for CAAM-supported Hubs/CPSAs, focusing on priority investment value chains.

2.6 Clustering and prioritisation of structuring interventions by value chain

Based on the detailed list of constraints and necessary interventions by value chain, a clustering was carried out by theme in order to better define and assess the key structural interventions that CAAM will need to implement.

Five criteria were defined and scored qualitatively on a scale from 1 to 5 (5 being most favorable for intervention), aligned with standard indicators used in international investment evaluations:

1. **Investment**: The higher the level of investment required, the lower the score.
2. **Timeline:** The longer the time required to implement and achieve results, the lower the score.
3. **Feasibility**: Although necessary, the intervention may be more or less feasible (technically and economically) depending on current conditions and prospects. The fewer the obstacles, the higher the feasibility and thus the score.
4. **Short-term Impact**: Whether the results and impact are achieved in the short term or longer. Short-term impacts (e.g., extension services) are also considered to reflect in the long term.

[3] Methodology used to draw up the 'Agribusiness Development Plan, 2012-16' - PNDA, CEPAGRI-MADER', others and recently in the "Green Value For Growth, 2025-29, EU".

5. **Medium- and Long-term Impact**: Similarly to the above, but with results more clearly achieved over time.

Key findings:

- A first group of structural interventions stood out for requiring relatively lower investment, being more feasible, and having high short- and long-term impact. These include "Agricultural Extension", "Aggregation and Agricultural Services", and "Tax Incentives", to be implemented near production areas.
- A second group includes interventions that also scored high across most criteria, though some with slight limitations, such as “Working Capital Financing” and “Trade Policies.” The latter scored lower in feasibility due to SADC agreements and strong import lobbies, though recent advances (e.g., creation of IAOM, Oilseeds Regulation, Price Stabilization Mechanism) indicate progress in 2022–2023. A previous success includes sugarcane value chain revitalization policies in 2019–2021, attracting USD 100 million in investment.
    - Also in this second group is investment in a “Vegetable Processing Plant” (tomato, onion, garlic, pepper, chili sauces), to complement fresh processing and drying/dehydration units. This would enhance the profitability of these crops by absorbing production surplus and lower-quality grades (which represent up to 60–70% in the case of tomato and 30–40% for others), while allowing producers to continue earning more in rural and urban fresh markets. It also reduces perceived risk and encourages further investment.
    - “Producer Organization” is also part of the second group but faces challenges: it takes more time and is less feasible due to low literacy levels and the cultural tendency not to collaborate for business purposes. However, it is crucial—both for formalization (legal invoicing through cooperatives) and for efficiency in access to services and markets. CAAM should lead this with strong coordination among existing development projects in the Beira Corridor, requiring no CAAM budget funding.
    - “Quality Standards” are essential for accessing catering channels for major projects (Gas & Oil, Mining) and for exports.
    - Another important area is “Product Quality Improvement,” meaning certification for national and international markets. CAAM and its support structures should offer technical and financial support for certifications (HACCP, ISO, SABS, GLOBALG.A.P., etc.) to enhance competitiveness.
- The third group includes the remaining interventions: rural roads, land leveling/drainage, informality, and R&D (e.g., improved seeds and irrigation). These are structural, high-impact, long-term investments that are less feasible in the short term due to high costs or complexity (e.g., informality).
- CAAM must act to strengthen productivity and avoid stagnation.
- Limited Exports: Companies in Manica export to regional and global markets (Europe and Asia), but

volumes remain low due to lack of competitiveness. For example, Companhia de Vanduzi exited vegetable production despite initial success. This potential must be reversed.

2.7 Strategic approaches to rural development and sustainability

Given the various aspects already mentioned, the success of the CAAM Project will depend on adopting a community-centered model focused on the development of the local MSME ecosystem, promoting sustainable and viable business models based on the local market.

The project should follow a bottom-up strategy, evolving through market relationships and partnerships with lead companies in the value chains operating within an economically viable radius of 100 km, thereby facilitating the transfer of know-how and skills.

This approach should include actors across the entire ecosystem and at all stages of the value chain, from research institutions (such as IIAM, INIR, IAM) and educational institutions supporting R&D (Universities and TVETs), to input suppliers, service providers, and NGOs that support emerging smallholders organized into green condominiums, associations, or cooperatives, assisted by public and private extensionists, community agents, agribusiness consultants, and agri-traders, also known as Agribusiness Development Agents (ADAs).

The ADAs will be catalyzed by local medium-sized companies (whether private enterprises or modern cooperatives with a business orientation) that offer technical, agronomic, aggregation, value-added, and marketing services (potential CPSAs), facilitating connections with input suppliers, processors, off-takers, and traders.

This structure will provide direct market access, both national and international, for the products from priority value chains, reducing dependency on intermediaries who often absorb much of the generated value. As a result, producers can reinvest in their businesses, improving productivity, production, and income.

This integrated approach aims to bridge local, district, and provincial gaps, promote economic diversification, improve product quality through mechanization and technical support, foster youth entrepreneurship, and encourage the processing and commercialization of higher-value local products—ultimately strengthening the resilience of the productive and economic system.

While the approach focuses on anchor value chains to ensure annual cash flow for MSMEs, it will also encompass other relevant chains in the agri-hub ecosystem, leveraging the synergies created by the project.

An integrated CAAM operating model is proposed, linking the central structure to Agricultural Service Provision Centers (CPSAs), and in turn to producers and cooperatives, ensuring continuous access to agricultural products year-round, thanks to the strategic installation of CPSAs in areas with significant volume, diversity, seasonal complementarity, and competitiveness.

This follows the rural agri-hub model, where each anchor district identified functions as a CPSA/Hub, supporting the priority value chains in its area, as illustrated in the following figure.

:

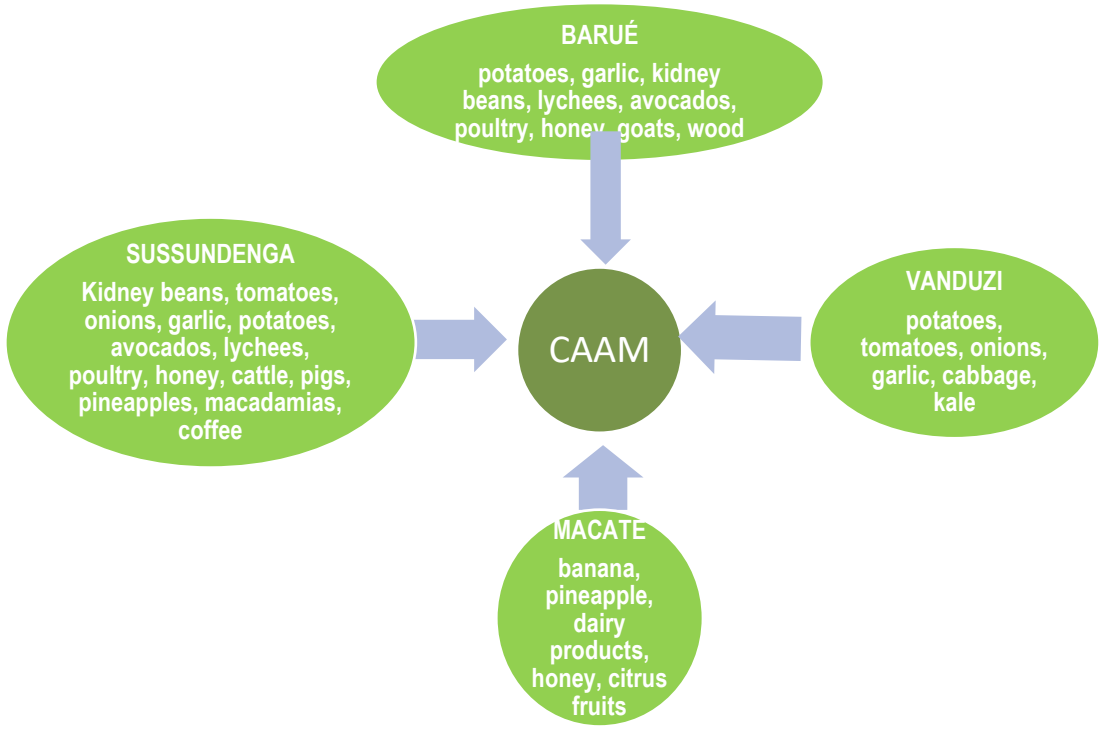


Figura 18: CAAM and the CPSAs/HUBs of each of the districts identified as priorities. Source: Consultants

In terms of implementation methods, inspired by the benchmarking of the recommendations of the study 'Feasibility Study of the CPSAs, within the framework of PROSUL', PEDSA-PNISA and the almost unanimous recommendations expressed during the 2 field missions, both the Four CPSAs and the central CAAM site should be managed under PPP or private management concession arrangements (e.g. as MADER did in 2023 for the CAIC - Chockwè Agro-Industrial Centre).

2.8 2.8 Investment opportunities in CAAM and its functionality

The functional design of the CAAM should include two types of investment, as already mentioned in the introduction to this chapter:

- Those that cut across all the priority VCs and other future ones (6 Anchor Projects - AP);
- Those channelled to specific CVs, starting with the priority ones.

Investment Opportunities and their Functionality	
I - Transversal to all priority CVs	**CAAM'S OWN INVESTMENT**
CPSAs, NTTs and INAGROs in Peripheral Hubs(4) - PA1	**LOCATION** **Barué:** Anchor CVs - Potatoes, Garlic, Kidney Beans, Lychees, Avocados, Eggs, Honey, Goats, Wood. **Vanduzi:** Anchor CVs - Potato, Tomato, Onion, Garlic, Cabbage, Kale **Sussudenga:** Anchor CVs - Kidney Beans, Tomatoes, Onions, Garlic, Potatoes, Avocados, Lychees, Eggs, Honey, Cattle, Pigs, Pineapples **Macate:** Anchor CVs - Banana, Citrus fruits (Orange, Tangerine, Lemon), Pineapple, Dairy products, Honey **PRIMARY PROCESSING**

Investment Opportunities and their Functionality	
	Objective: to improve the nutritional level of families by extending the shelf life of food, circular economy, rural employment, higher income. Factory activity: Supporting young entrepreneurial SMEs to invest in solar dryers for vegetables, dried fruit, tilapia and meat and jam units for local consumption, co-designing PNs and with *seed capital,* training in CAAM.
ANCHOR PROJECTS at CAAM (Central site near the city)	**PA2 - WHOLESALE MARKET** Availability of adequate space and infrastructure for fixed sales outlets and area for temporary outlets for organised producers (cooperatives and MSMEs). **PA3 - CENTRE FOR THE SELECTION, PACKING AND CONSERVATION OF FRESH PRODUCTS (Vegetables, fruit, fish and seafood)** Draw up a PN and look for co-investors (e.g. 50-50%) to set up a fruit and vegetable and fish farming centre in PPP, with preservation and freezing chambers, including online valorisation of 4th and 5th range products for supermarkets and HORECA (special focus on oil and gas projects, mining in Tete, Zambézia, Nampula and Cabo Delgado). **PA4 - TRANSFORMATION** Draw up a PN and look for co-investors (e.g. 50-50) to set up a factory in PPP to produce pulps, sauces (e.g. pesto, achar, curry), dehydrated sauces, pickles, tomatoes, onions, garlic, chillies, etc. pesto, achar, curry), dehydrated sauces, pickles, based on tomatoes, onions, garlic, peppers, chillies; and a factory for cooking and preserving pulses (common beans, boer beans, nehma beans and others) to complement the recent 7/8 factories for selecting and packaging fresh pulses (Note: until the end of the 1990s there was a similar factory in Chilembene, Chóckwè district, Gaza province). **PA5 - LABORATORIES** Set up a laboratory with all the necessary equipment to carry out all the food analyses already carried out externally by companies in Manica, Sofala, Tete and Zambézia and those required for the anchor projects described here (use the equipment already in the laboratory at the Instituto Agrário de Marare and the IIAM laboratory in Chimoio as a satellite partner, completing investment and training). **PA6 - SPACES TO RENT OR SELL TO INVESTORS** In the areas of logistics, services (management, technical, certification, financial, others) and specific priority CVs as described below. Depending on the budget available after the CPSAs, the previous anchor projects and the priorities adopted in the economic model that is selected, some standard warehouses could be built for rent, as it is easier to rent than to attract investment in construction and there is already plenty of supply.
II. Priority VCs	**Promotion and attraction of investment projects to rent or sell space on the CAAM Central site and in the CPSAs**
Vegetables	**AMOUNT** (via TA at CAAM, NTTs, INAGRO and CPSAs) Expanding/strengthening the number of medium and large farmers Support Organised Business Oriented COOPS to provide services to their member SHFs and SCFs Expand and strengthen the offer of CPSAs and Fixed Aggregators Support (including subsidies for the product delivered) leading companies in the use of off-take contracts with small and medium-sized producers. **DOWNSTREAM** Anchor project shown above with investment from the CAAM budget
Tropical Fruit (Banana, Pineapple	**AMOUNT** (via TA at CAAM, NTTs, INAGRO and CPSAs)

Investment Opportunities and their Functionality	
Litchie, Avocado, Mango, Citrus)	Expanding/strengthening the number of medium and large farmers Support Organised Business Oriented COOPS to provide services to their member SHFs and SCFs Expand and strengthen the offer of CPSAs and Fixed Aggregators Support (including subsidies for the product delivered) leading companies in the use of off-take contracts with small and medium-sized producers. **DOWNSTREAM** Processing banana flour to enrich maize and wheat flour, including flour from other fruits for the growing international market Avocado oil and guacamole factory; Frozen pulp for the HORECA channel and supermarkets (to increase availability throughout the year and reduce waste in shops and homes); Potential for the circular economy, such as making starch from avocado pits (along with cassava) and mango for recyclable catering packaging; Processing banana and pineapple fibres for the textile industry, linking with "Italian fashion"; use of banana trunks after harvest to produce fibres for handicrafts. Potential for circular economy using 2nd choice, seasonal peaks, rejects, waste (e.g. organic compost);
Cashew(*)	**AMOUNT** (via TA at CAAM, NTTs, INAGRO and CPSAs) Expanding/strengthening the number of medium and large farmers Support Organised Business Oriented COOPS to provide services to their member SHFs and SCFs Expand and strengthen the offer of CPSAs and Fixed Aggregators **DOWNSTREAM** Processing of raw cashew nuts (does not yet exist in the Centre Zone) Secondary processing (salt, jam, cold, etc.) Processing vinegar with cashew fruit, dried fruit, cajuina, molasses, frozen pulp CNSL oil processing Support Processing cashew flour and other nuts
Poultry farming (Eggs, Chickens)	**AMOUNT** (via TA at CAAM, NTTs, INAGRO and CPSAs) Expanding/strengthening the number of medium and large farmers Support Organised Business Oriented COOPS to provide services to their member SHFs and SCFs Expand and strengthen the offer of CPSAs and Fixed Aggregators **DOWNSTREAM** Processing eggs in flour, scrambled eggs for the HORECA channel
Dairy products	**AMOUNT** (via TA at CAAM, NTTs, INAGRO and CPSAs) Expanding/strengthening the number of medium and large farmers Support Organised Business Oriented COOPS to provide services to their member SHFs and SCFs Expand and strengthen the offer of CPSAs and Fixed Aggregators **DOWNSTREAM** It needs to be processed into UHT, which will drastically improve the market, provide import substitution (and raw exports) and allow other leading players to enter;
Macadamia (*)	**AMOUNT** (via TA at CAAM, NTTs, INAGRO and CPSAs) Expanding/strengthening the number of medium and large farmers Support Organised Business Oriented COOPS to provide services to their member SHFs and SCFs

Investment Opportunities and their Functionality	
	Expand and strengthen the offer of CPSAs and Fixed Aggregators **DOWNSTREAM** Macadamia nut cracking plant to serve all the companies in the sector, which currently export unhulled macadamia nuts. Processing roasted, fried and seasoned macadamia nuts Macadamia flour processing
Coffee	**AMOUNT** (via TA at CAAM, NTTs, INAGRO and CPSAs) Expanding/strengthening the number of medium and large farmers Support Organised Business Oriented COOPS to provide services to their member SHFs and SCFs Expand and strengthen the offer of CPSAs and Fixed Aggregators **DOWNSTREAM** Coffee capsule production plant Warehouse for the coffee producers' co-operative to use for green coffee
Pulses (Kidney Beans)	**AMOUNT** (via TA at CAAM, NTTs, INAGRO and CPSAs) Expand/increase the number of medium and large farmers Support Organised Business Oriented COOPS to provide services to their member SHFs and SCFs Expand and strengthen the offer of CPSAs and Fixed Aggregators
Honey	**AMOUNT** (via TA at CAAM, NTTs, INAGRO and CPSAs) Expand/increase the number of medium and large farmers Support Organised Business Oriented COOPS to provide services to their member SHFs and SCFs Expand and strengthen the offer of CPSAs and Fixed Aggregators
Soya	**AMOUNT** (via TA at CAAM, NTTs, INAGRO and CPSAs) Expand/increase the number of medium and large farmers adopting agroforestry and ILPF models Support Organised Business Oriented COOPS to provide services to their member SHFs and SCFs Expand and strengthen the offer of CPSAs and Fixed Aggregators **DOWNSTREAM** Processing of extruded *soya* for meals and its packaging ("*soya meat*") Extraction and refining of cooking oil for multi-oil crops (soya, sunflower, peanut, cotton) Promote the strengthening of maize flour with soya flour in existing mills Supporting new soya milk processing companies Supporting new biscuit processing companies or diversifying existing ones
Red meat	**AMOUNT** (via TA at CAAM, NTTs, INAGRO and CPSAs) Promote the production of lucerne, grass and silage for feeding cattle, goats and pigs in Crop, Livestock and Forest Integration (CLFI) schemes. Support Organised Business Oriented COOPS to provide services to their member SHFs and SCFs Expand and strengthen the offer of CPSAs and Fixed Aggregators **DOWNSTREAM** Meat processing and by-products in sausages, poloni, mortadella, charcuterie Meat meal to incorporate into poultry feed
Other CVs with complementary potential	
Aquaculture	**AMOUNT** (via TA at CAAM, NTTs, INAGRO and CPSAs)

Investment Opportunities and their Functionality	
	Promoting tilapia production at the Chicamba dam Promoting the recovery and efficient use of fish ponds for tilapia production by MSMEs **DOWNSTREAM** Processing fresh and whole or processed - frozen Quality dehydration and proper packaging Fishmeal mill for incorporating into poultry feed
Wooden posts and piles(*)	**AMOUNT** (via TA at CAAM, NTTs, INAGRO and CPSAs) Promoting the production of timber from tree species produced in agroforestry, ILPF, plantations and sustainable concessions by MSMEs **DOWNSTREAM** Pile and pole processing
Biomass utilisation(*)	Processing of briquettes based on agricultural by-products and waste (valorises them, alternative to coal consumption), at CAAM and CPSAs as a demonstration and training for young entrepreneurs
Composting(*)	Organic compost production at CAAM and CPSAs as a demonstration and training for young entrepreneurs
Vermicompost(*)	Vermicompost production at CAAM and CPSAs as a demonstration and training for young entrepreneurs

(*) These are value chains that have not been analysed for the reasons explained in the introduction chapter, but which nevertheless have potential interest that should be explored in greater depth during the CAAM implementation
Note: See Anenex 8. Priority VCs SWOT analysis

Table 14: Investment Opportunities Source: Consultores, 2024

3. SOCIAL AND ANTHROPOLOGICAL ANALYSIS

This chapter provides a social and anthropological analysis of the community that will be influenced by the CAAM project and proposes recommendations to avoid negative impacts while promoting positive economic and social outcomes in the Manica province.

The first project feasibility study[4] identified the following potential socioeconomic impacts:

- Stimulation of business growth (mostly informal), with short- and long-term positive employment effects, positively influencing the regional and national economy, and contributing to household income increases
- Security could be negatively affected, especially by a rise in criminal activity; therefore, the project must address safety concerns to prevent future unrest and conflicts, and to foster safer communities.
- Livelihoods are expected to improve, with medium-to-high impact and mid-to-long-term effects, driven by increased employment opportunities, more income to stimulate economic activity, better access to healthcare and education, and improved food supply for both the community and the country.
- Higher levels of engagement are anticipated, with a medium-to-high significance impact over time, influencing market dynamics and allowing smallholders to enhance their production systems.

Following a preliminary social assessment of Manica province, a set of hypotheses was developed and verified through field interviews, visits, and meetings with representatives from public institutions, key informants, private companies, and irrigation zones (see Annex 19 – Visit to Irrigation Zones, Second Mission).

3.1 The Role and Position of CAAM

It was verified that neither rural communities nor other stakeholders were aware of the CAAM project. Therefore, effective communication and information sharing during the preparation phase is crucial to raise awareness.

Currently, smallholders operate under a buyer-dominated system, which limits their ability to obtain fair prices. Despite this, market constraints are so strong that oligopolistic channels are often the only option.

Rural communities identify market access as their main constraint.

Rural communities view CAAM as a strategic partner and expect to establish regular, trade-based relationships. Their vision is clear: a CAAM that helps rural communities enhance agricultural production through strategic partnerships. However, the integration of new technologies introduced by CAAM with traditional farming methods must be carefully considered, due to the potential negative impacts it may have on rural communities, such as the

[4] Newtech (2021). Estudo de Viabilidade para o Projecto Integrado de Agro-processamento na Província de Manica, Moçambique.

disruption of existing cultivation practices, unequal access, and the exclusion of certain groups or categories.

Rural communities view CAAM as a strategic partner and expect to establish regular, trade-based relationships.

CAAM is expected to help increase smallholder farmers' access to markets, influencing market dynamics and enabling them to improve their production systems and access to inputs. This, in turn, will contribute to poverty reduction and, by increasing income flows to connected rural communities, help combat food insecurity. Contract farming and agricultural cooperatives in irrigated areas should be the cornerstones of the strategic partnership between rural communities and CAAM.

Rural communities need access to specialized services: the supply of production inputs, knowledge, and financing.

CAAM can facilitate the transition of the agricultural and food sectors from a disorganized, supply-driven, low-value model to a well-structured, high-tech, demand-driven, and safe industry, offering significant employment and business opportunities.

Given the strong interest of rural communities in CAAM, its impact could be substantial—reaching thousands of rural families and serving as an active driver of family farming and the transformation of subsistence agriculture into commercial agriculture, while simultaneously improving the social context and livelihoods of rural communities.

This transformation is a crucial element in CAAM's positioning, as most farmers currently practice subsistence agriculture, which would hinder their participation in CAAM due to the low quality and volume of their produce. Therefore, careful guidance is essential to avoid the emergence or reinforcement of social imbalances in rural communities, including the rise of dominant positions—as already observed in the commercial system.

CAAM must be an integrated commercial platform that provides rural communities with solutions and commercial services. More than just a distribution center, it should deliver integrated services that address the needs of rural communities, improving their social and economic conditions.

Social dialogue, collective bargaining, and social certification schemes are additional areas that CAAM should consider to improve the social conditions of rural communities—particularly in terms of enhancing human rights, fair wages, fair pricing, and other related aspects[5].

3.2 Key Findings of the Social Analysis of the CAAM Project

A complex production system and agri-food trade network

Agri-food trade in Manica Province operates within a complex ecosystem involving thousands of people who, at different levels and scales, derive income and livelihoods from it—often fragile due to limited investment capacity and lack of working capital.

CAAM can have a strong impact on this system by helping to counter dominant positions in value chains, combatting illegal trade, insecurity, and criminal activities in and around the CAAM area, and reshaping the social structure linked to the commercial network.

Although ambitious and designed to address key issues, the PACE/PEAS system proposed by the Ministry under the SUSTENTA program raises several concerns regarding its implementation—such as the hybrid nature of PACE, expected communication challenges within the system, and the difficulties in organizing and monitoring financial support, which can take different forms.

CAAM opportunity to improve equality and inclusion

The social organization of rural communities can significantly influence economic relations with CAAM and the dissemination of knowledge among community members.

In some cases, these organizations can facilitate engagement between their members and external environments, thereby promoting a positive relationship with CAAM. In others, however, they may act as barriers to equal participation, especially when internal conflicts or competing interests prevent members from engaging.

Opportunities for CAAM to enhance equality and inclusion

Rural communities still face unmet needs in terms of market access, extension services, seeds, and financing. These represent clear opportunities for CAAM to improve the local rural economy through targeted interventions.

By simultaneously building value chains and providing appropriate training programs, CAAM can play a key role in ensuring the inclusion of women, youth, and other vulnerable groups in the local agri-economy. It can also foster

[5]From a broader perspective, these initiatives can enable CAAM to focus more closely on export markets and high-quality domestic channels.

generational renewal in agriculture, creating positive social impacts and promoting equal access to inputs, finance, and markets.

The important role of rural community social organization

The social organization of rural communities can significantly influence economic relations with CAAM and the dissemination of knowledge among community members.

In some cases, these organizations can facilitate engagement between their members and external environments, thereby promoting a positive relationship with CAAM. In others, however, they may act as barriers to equal participation, especially when internal conflicts or competing interests prevent members from engaging.

Social Relations Influenced by Gender Inequalities

There is a widespread ideology in rural communities that places men in leadership roles, influencing all types of social relations between men and women, including business, labor, and family relationships. This leads to clear gender inequalities, particularly within households, where women often occupy a subordinate position—both within the family and in rural community settings.

Previous training efforts aimed at raising awareness among rural communities (and men in particular) regarding more balanced relationships and shared household responsibilities have produced fragmented results—some improvement in certain families, but little to none in others (which appear to be the majority). In contrast, the MICAIA Foundation reports positive outcomes from its awareness-raising activities, which involved both husbands and wives to promote a shift in mindset.

The analysis of polygamous families reveals a varied picture, suggesting that polygamy may have a positive impact on agricultural production and the economic outcomes of such households.

Potential for Rural Women to Establish Relations with CAAM

As a significant component of agricultural labor in rural and irrigated communities, women can play a vital role in commercial relationships with CAAM. If adequately empowered and equipped, they can engage in profitable farming. However, the current gender balance places them in a vulnerable position, which hinders their full realization as independent social and economic actors.

Potential for Agricultural Cooperatives to Play a Key Role in CAAM

Existing farmer organizations and associations, along with stronger cooperatives, can help consolidate agricultural supply and potentially facilitate the rapid start-up of commercial operations at CAAM. Cooperative solutions can also play a crucial role in ensuring product quality and certification compliance at CAAM.

3.3 Recommendations

CAAM represents a critical opportunity to promote economic development and social inclusion in the region. To maximize its impact, CAAM must adopt a comprehensive approach to inclusion, ensuring that its governance, infrastructure, service delivery, and financial mechanisms are inclusive and equitable.

By prioritizing women, youth, and people with disabilities, CAAM can help minimize systemic barriers that have already been identified, empower vulnerable groups, and create an enabling environment for their active participation in economic activities.

3.3.1 Community engagement

Community Engagement: building relationships with rural communities

To encourage regular and consistent participation of rural communities in its activities, CAAM should consider creating a dialogue platform with rural communities. This platform would serve to discuss and address aspects of collaboration and participation**.**

To operate effectively, dedicated personnel should be appointed to coordinate meetings and the platform's overall function. The platform should meet offline, both at CAAM and in rural villages, depending on needs—in the latter case through CAAM staff visits to the communities.

In general, regular public relations activities between CAAM and rural communities are recommended, such as site visits and individual contact.

Advocacy and Community Awareness

As part of the dialogue platform, CAAM should organize awareness-raising activities to educate the community on the importance of economic participation by women and youth and the capabilities and rights of people with disabilities.

Such initiatives can help shift traditional social and gender norms, change attitudes, and reduce stigma, fostering a more inclusive environment and stronger relationships between CAAM and rural communities**.**

Adopting a Broad Range of Participatory Methods for Inclusion

At the micro level, this goal should be achieved through the direct involvement of rural communities, using participatory methods that incorporate elements of collective intelligence to improve the agri-food system[6][7]**..**

The Farm Field Schools methodology could be considered to support the use of collective knowledge and relevant

[6] We refer to collective intelligence as the ability to solve complex problems in a group, where the collective capacity can exceed that of any individual and the flow of information is optimised within the group.

[7] According to international practices (for example, the Nuwebiz Foundation in Northern Uganda), in order to achieve economic empowerment, we have to look at the population, which leads us to adopt a collaborative pool model if we want to succeed.

digital tools, contributing to the sustainability of improved social practices in the Manica region.

Social certifications should also be considered to promote integration with rural communities and demonstrate CAAM's social responsibility. Relevant certifications may include SA8000 (social accountability), Fair Trade, and GLOBALG.A.P., which focuses on primary production and includes social components such as GRASP.

Themes like organic practices, integration of local knowledge, and biodiversity protection should also be considered in this domain.

Gender-Sensitive Practices Integrated into CAAM Governance

CAAM's governance structure must prioritize gender-sensitive policies to ensure equal representation and participation. A specific policy statement on inclusion should be adopted, addressing issues related to gender, youth, and disability. This statement should also be reflected in CAAM's statutes and in the criteria for beneficiary inclusion. Such a commitment against discrimination will protect the rights of these groups and promote their economic participation.

New Technologies for Better Integration: Mobile Communication Development

CAAM should promote the use of mobile communication systems to connect with users and disseminate awareness and training programs. In addition to increasing transparency and facilitating user engagement, these solutions can be an effective tool for the inclusion of women and other disadvantaged groups, by providing dedicated communication channels and targeted information.

Given the widespread use of the internet and mobile communication in Manica's rural communities, the dialogue platform should also include online communication channels, ideally leveraging existing social media platforms, which are widely used in the region. This would allow for more intensive and personalized communication between rural communities and CAAM.

Inclusion of Vulnerable People

In this context, CAAM could act as a promoter, catalyst, and physical hub for national or international initiatives aimed at supporting the social and professional inclusion of the most disadvantaged individuals.

3.3.2 Monitoring CAAM's social outcomes

To track and enhance the implementation of social activities, a monitoring system should be established, based on a set of indicators linked to CAAM's specific objectives. Additionally, a dedicated social monitoring unit should be created within the broader monitoring service, specifically responsible for overseeing the social components of CAAM's activities.

3.3.3 Inclusion and Equity

Social Work Planning

A social safeguards assessment should be carried out for all markets potentially affected by CAAM before operations begin, identifying the necessary measures to minimize possible negative effects. It must be recognized that the informal sector will play a crucial role in achieving sustained and widespread progress in improving well-being—at least for the next decade.

As such, a social work plan must be developed that goes beyond job creation to include human capital development and the identification of training needed to equip members of rural communities. CAAM's social action plan can empower communities by supporting local farmers, associations, and cooperatives with training and resources to establish and grow their activities.

Moreover, creating a skilled workforce and fostering a stable environment can attract new businesses—thereby generating even more job opportunities. Regular monitoring and evaluation are essential to ensure that the social plan lives up to its promises.

Capacity Building, Training, and Education: Knowledge and Technology Dissemination

Improving the skills and capabilities of all users must be a top priority for CAAM. The creation of a dedicated unit for training, technology transfer, and advisory services is recommended, offering a range of services that includes:

- Inclusive capacity-building programs, education, and training focused on entrepreneurship, financial literacy, and technical skills. A tailored program for women, youth, and people with disabilities can help these groups engage more actively in CAAM's economic activities.
- The creation of support networks and mentorship programs can provide CAAM users with the guidance and resources they need to succeed. For women, this could include connections with successful female entrepreneurs and leaders. Establishing and supporting organizations and networks for women, youth, and persons with disabilities can offer targeted resources, awareness efforts, and peer support.
- Providing youth with vocational training and education tailored to rural economic needs can equip them with the skills necessary for modern agriculture, agro-industry, and other rural sectors. Creating incubation centers, mentorship programs, and business development services can support young entrepreneurs in developing and expanding their ventures, including promoting innovation and adoption of agricultural technologies.
- Offering training programs adapted to the specific needs of people with disabilities, including agricultural techniques, entrepreneurship, and other relevant skills.
- Promoting the use of modern agricultural technologies and practices to boost productivity and attract youth to the sector—such as precision farming, mechanization, and sustainable practices.
- Encouraging the formation of groups and cooperatives. Establishing women's cooperatives can assist with

collective bargaining and resource sharing. Similarly, promoting youth associations can provide platforms for collective action, shared resources, and advocacy. CAAM can support them in increasing bargaining power and access to resources.

- Supporting women's land ownership and property rights, which often present obstacles to participation in business and access to finance. Ensuring equal rights to land ownership and inheritance can economically empower women and increase their participation in agriculture and other rural sectors.
- This goal should be addressed through CAAM's proposed advisory unit.
- Assisting all CAAM users and rural communities in improving issues related to occupational health and safety.

Through specific knowledge-sharing initiatives, CAAM should aim to enhance agriculture by improving the knowledge base of all local farmers, thereby increasing climate resilience.

CAAM's role in coordinating knowledge dissemination—aligned with its social plan—should also ensure that any potential discrimination based on gender or age in sharing knowledge is avoided.

Facilitating access to production inputs should be a core mission of CAAM[8], as it remains a critical need in rural communities—especially regarding seeds. This can be addressed both through direct CAAM interventions and partnerships with input suppliers.

Since this issue is often linked with financial access, CAAM should also support community savings groups and more broadly encourage initiatives that promote financing schemes for rural communities[9].

Horizontal Integration in Agriculture: the key role of cooperatives and farmer associations

Structural bottlenecks and economic constraints may prevent existing trade networks from participating in CAAM. To attract commerce, CAAM should encourage contractual agreements with farmers and promote the transformation of existing associations in rural communities into agricultural cooperatives, considering a partnership with the Mozambican Association for the Promotion of Modern Cooperatives (AMPCM) to implement tailored support from design, legal registration, and implementation to the functioning of these cooperatives.

Given the crucial importance of contracts and cooperatives in increasing operational efficiency and farmer engagement with CAAM, specific programs for strengthening this area should be considered. The proposed CAAM advisory unit should be responsible for promoting cooperative development programs and associated ventures among the communities linked to CAAM.

[8] As will be seen below, this role will be assigned to the HUBs, local support satellites within CAAM

[9] The MICAIA Foundation, which has provided savings training and promoted a savings group of around 300 women, could be a good example.

Gender Relations: Women's Inclusion and Gender Equality

CAAM must take all necessary measures to ensure equal economic participation for women, including implementing affirmative actions to encourage women to access CAAM. This could include designing tailored access mechanisms and dedicated programs related to financing, inputs, and knowledge.

CAAM should also promote awareness and training initiatives on gender equality and inclusion to change prevailing mindsets and cultural norms, challenging stereotypes. Showcasing the achievements of women farmers, for example, can help break gender stereotypes and foster a more inclusive agricultural sector.

Access to Services and Agricultural Inputs

Access to CAAM's services must be equitable, removing economic barriers through preferential fees or subsidies for women and youth, without distorting market competition. For people with disabilities, preferential access is recommended to ensure full participation.

Access to agricultural inputs—such as seeds, fertilizers, and technology—is often a major constraint. CAAM should address this through dedicated assistance lines for women, youth, and persons with disabilities, including tailored supply services designed in collaboration with communities.

Providing gender-sensitive extension services can ensure that women receive the same level of support and information as men. This service, which CAAM could develop in collaboration with the Ministry of Agriculture, should include training of female extension agents who can more effectively reach women farmers.

CAAM should be a workplace open to people with disabilities, and should encourage inclusive hiring practices by offering incentives to companies within CAAM that employ persons with disabilities and supporting disability-friendly businesses operating in partnership with CAAM.

Access to Finance

Access to finance is essential for women, youth, and people with disabilities, enabling them to participate in CAAM and strengthen their professional capacities. In many rural communities in the region, women have already formed microfinance and savings groups, which CAAM could support by connecting them to financial resources needed to start and grow their activities.

To this end, CAAM could establish a dedicated financial unit tasked with promoting partnerships with sustainable financial organizations and designing tailored credit lines for these groups, offering customized financial services, such as microloans, grants, and savings programs.

For youth, these services can support the transition from subordinate roles to entrepreneurship, empowering them to develop and grow businesses linked to CAAM. For people with disabilities, such programs can enhance access to CAAM and promote economic independence.

In addition, CAAM should prioritize digital financial literacy training to equip women, youth, and people with disabilities with the skills needed to effectively manage their finances. This approach ensures that financial inclusion is both accessible and sustainable, thereby supporting economic growth and social inclusion across the community.

Infrastructure Component

The development of gender-sensitive infrastructure is essential to ensure accessibility for all. This includes:

- Designing accessible infrastructure, ensuring access for people with disabilities. For persons with disabilities, CAAM must comply with accessibility standards, including adaptive designs that facilitate physical access and assistive technologies.
- Designing inclusive WASH facilities (Water, Sanitation, and Hygiene) for people with disabilities and women.
- Providing special additional services that may facilitate women's access, such as maternity services, childcare, and healthcare services. The economic and social sustainability of these proposals should be evaluated jointly with local authorities and international partners.
- Promoting the use of assistive technologies and adaptive equipment to enhance productivity and independence of people with disabilities in their activities with CAAM.

The Importance of a Systemic Approach: attention to integrated organizational models

Among the various examples available in the literature and international experiences, the one that, in our view, offers the best inspiration for CAAM's future growth in an inclusive and open manner—and aligns with the rural agro-hub hybrid model proposed by the value chain study—is the Integrated Agricultural Food Park (IAFP) proposed by YES Bank in India.

This model provides a platform for the spatial clustering of multiple agricultural production chains while effectively addressing the inherent shortcomings of the traditional system. An IAFP, with modern production and processing facilities, is connected to Rural Transformation Centers (RTCs) located in watershed areas, which serve as integrated supply links, connecting farmers with the demand side of the agro-food chain efficiently.

In the CAAM context, CAAM would act as the **IAFP, while irrigation groups would serve as the RTCs (the rural agro-hubs). Following the IAFP model and based on the needs expressed by rural communities, CAAM should provide at least: cold storage facilities, ripening chambers**, **warehousing space**, **r&d incubation units**, **food processing zones**, **training centers**. **The irrigation groups, like the rural processing centers in the Indian example, should provide collection centers**, **agricultural microfinance and credit**, **extension and training services**, **agri-clinics**, **social welfare facilities**. Moreover, the strong integration with rural communities through the RTCs gives the IAFP a fundamental role in improving the social conditions and livelihoods of the

connected rural communities [10].

A importância de uma abordagem sistémica: Atenção aos modelos organizacionais integrados

Entre os vários exemplos disponíveis na literatura e em experiências internacionais, aquele que, na nossa opinião, oferece a melhor inspiração para o crescimento futuro da CAAM de uma forma inclusiva e aberta e para captar as necessidades sociais do ecossistema de Manica, e que se enquadra no modelo híbrido do agro-hub rural proposto pelo estudo da cadeia de valor, é o Integrated Agricultural Food Park (IAFP), proposto pelo YES Bank na Índia.

Este modelo inclui uma plataforma para o agrupamento espacial de várias cadeias de produção agrícola, ao mesmo tempo que resolve eficazmente as deficiências inerentes ao sistema correspondente. Um IAFP, com instalações modernas de produção e transformação, está ligado a centros de transformação rural (RTC) localizados em bacias hidrográficas como ligações integrais de abastecimento, integrando os agricultores com o lado da procura da cadeia agro-alimentar de uma forma eficiente. **No caso do CAAM, este último deve atuar como o IAFP, enquanto os grupos de irrigação devem ser os RTCs (os agro-hub rurais). Seguindo o exemplo do IAFP, de acordo com as necessidades expressas pelas comunidades rurais, o CAAM deve fornecer pelo menos armazéns frigoríficos, câmaras de maturação, armazéns; incubação de investigação e desenvolvimento; zonas de processamento de alimentos, centro de formação. Os grupos de irrigação, tal como os centros de processamento rural nas aldeias do exemplo indiano, devem ter pelo menos um centro de recolha, micro-finanças de crédito agrícola, extensão e formação, agro-clínica, instalações de bem-estar social.**

Além disso, a forte integração com as comunidades rurais através dos CTRs confere ao IAFP um papel fundamental na melhoria das condições sociais e dos meios de subsistência das comunidades rurais ligadas.

Social Safeguards: involuntary resettlement in selected proposed locations

An assessment of social safeguards related to involuntary resettlement was carried out for the areas proposed for the CAAM, using a standardized methodology. The results indicate that most of the analyzed sites are fully suitable from a social safeguard perspective. These sites include Hombua Market Zone, the 20-hectare area along the N6 near Vanduzi, a Land in Sitanha, Vanduzi Industrial Park and Namat Complex (N6)

This evaluation suggests that these locations pose minimal risks of forced displacement and are considered appropriate for CAAM implementation, in line with international best practices on resettlement planning and social impact mitigation.

10 Looking more broadly at this model and the conditions of Manica's rural communities, it is likely that conventional wholesale markets may not be the right models for CAAM, as this solution could reduce CAAM's focus on the social improvements it must make at the level of rural communities.

4. BENCHMARK OF EXISTING STRUCTURES

As proposed in the installation report, and to better understand how the CAAM (Centro Agro-Alimentar de Manica) can and should function, a selection of international reference structures and projects was made—including wholesale markets, agropoles, and import/export platforms—to summarize their core functions and potential additional services relevant to the future complex.

Detailed case studies and models from international agro-industrial parks are described in Annex 9 – Benchmarking Analysis, spanning from the Middle East and North Africa (MENA) region to India, China, the Netherlands, and Northern Europe. These case studies aim to provide a broader perspective on agro-industrial park models and international experiences.

The key message is that there is no one-size-fits-all model: each structure is tailored to local needs, designed to aggregate primary production and respond to market demand, while providing logistical support and services to enhance value chains.

While Annex 9 provides extensive background and data from these international experiences, this final report highlights five selected structures that are particularly relevant for shaping the future design of the CAAM. A summary of the key features of these structures is provided below (photos and technical details are available in the annex).

5. ECONOMIC ANALYSIS AND DEVELOPMENT OF BUSINESS MODELS

5.1 Criteria and assumptions

For the economic analysis of CAAM, various factors were considered, including analyses, data and information, as well as a set of statistical extrapolations based on different assumptions. Despite some limitations, these elements provide an approximate view of the economic reality of the value chains (VCs) in Manica province and their context in the provinces of the Central Zone, including the Zambezi Valley. The economic analysis of the value chains (VCs) in Manica province and in the context of the Central Zone provinces yields the following conclusions:

- Profitability of Crops: with adequate average productivity and market prices, the most relevant VCs show strong profitability potential. It is essential to reduce post-harvest losses. CAAM should involve emerging and medium-scale producers, in addition to smallholders, due to their capacity to generate competitive volumes quickly.
- Need to Increase Productivity: crops such as tomato, russet potato, banana, orange, and common beans require higher productivity to remain competitive in the SADC free market. CAAM should implement interventions to boost productivity and support emerging and medium-to-large producers.
- Regional Production: Despite significant production volumes in Manica, Tete, and Sofala, per capita production in Manica is low, requiring increases to meet the needs of the local population. CAAM will play a crucial role in increasing productivity and reducing losses.
- Key Crops for CAAM Cash Flow: banana, pineapple, eggs, milk, tilapia, honey, cattle, goats, and pigs ensure year-round production and are essential for CAAM's cash flow and operational sizing.
- Potential Market for Horticultural Products: for 2025, the wholesale markets of Chimoio, Beira, Quelimane, and Tete are estimated to have a demand of 74,164 tons/year, according to the “Hortivale, 2015” study. A similar calculation, based on per capita consumption of 36kg/year, projects 73,436 tons/year. The economic analysis uses this latter figure as a reference point for the development of scenario analyses and the quantities expected to pass through CAAM and the HUBs.

The economic analysis is based on the aggregated quantity of the main products from the value chains: vegetables, tubers, fruits, and common beans. Although other value chains—such as coffee, macadamia nuts, honey, eggs, and chicken—have been identified as both priority and complementary for CAAM and are essential to ensure the sustainability of the project by diversifying revenue streams and mitigating risks, they are not included in the economic analysis, following a conservative approach.

Considering these assumptions, the estimated quantity and potential value of the value chains expected to pass through CAAM are as follows:

Products	Specific Value chain

	Baseline	TONS
Tomatoes, pulses (soya, ,,,)	Vegetables	36.718
Cassava, potatoes	Tubers	14.687
Banana, cashew, pineapple, mango	Fruits	14.687
Beans	Kidney Beans	7.344
Coffee and macadamia nuts, honey, eggs and chicken	Complementary VCs	0
	2025: Vegetables marketed (tonnes)	73.436
	2025: Vegetables marketed (USD)	26.583.832
	Local production (tonnes)	41.124
	Imported (tonnes)	32.312

Table 15: Agricultural products and quantification of value chains (project result)

5.2 CAAM Business Models

An agri-food center should serve as a physical link between supply and demand within a value chain. Typically, supply originates from rural areas, while demand is concentrated in urban regions.

Based on the results of the study, three possible operational models for CAAM were identified and analyzed:

Model A – Optimizing logistics for local retail trade
• Represents the traditional wholesale market located near a city • Aggregates products from surrounsing agricultural areas and redistributes them to local retailers • The key players in this model are wholesalers.
Model B – Optimizing logistics for major retailers and HORECA
• Expands on Model A by integrating advanced logistics functions and services to supply a larger urban area. • The main customers are large retail chains (supermarkets) and the HORECA sector (hotels, restaurants, and catering services), which require broader product aggregation and higher service levels. • The key players are wholesalers and logistics companies.
Model C – Optimizing supply from rural areas
• Primarily focuses on supporting agricultural production by providing essential services to farmers. • Includes the supply of agricultural inputs, aggregation of harvested products, and transportation to a wholesale platform. • This model strengthens the link between farmers and the market, enhancing efficiency in the supply chain.

Table 16: operational models of CAAM

To determine the most suitable economic model and correctly size the agri-food hub, a structured methodology was applied, based on the following steps:

- **Assessment of the business model most appropriate for the territory**: Comparative analyses and benchmarking of different models and international cases were conducted, allowing for the selection of the approach best aligned with the region's development potential.
- **Analysis of growth prospects**: Economic, demographic, and infrastructure-related factors were evaluated to ensure that the model aligns with long-term regional strategies.
- **Definition and validation of the business model**: The model was adapted to the region's development scenarios, ensuring its viability and sustainability.
- **Architectural and engineering design**: The structural and technological framework of the model was defined as a priority, ensuring accuracy in the calculation of capital expenditures (CAPEX) and operational expenditures (OPEX).
- **Detailed budgeting and risk analysis**: A comprehensive financial assessment was conducted, refining the business model and identifying potential risks that could impact its implementation and operation.

5.2.1 Model A. Wholesale market in the retail supply city (Chimoio)

The optimization of logistics for supplying the city follows the traditional wholesale market model, in which products from rural areas are aggregated and redistributed to retailers. Wholesalers play a key role in this market, acting as intermediaries between producers and urban retailers.

Field missions revealed that the establishment of a wholesale fruit and vegetable market in Manica is necessary to enable farmers and traders in the region to market their horticultural products more efficiently and at scale.

Thus, the main characteristics of this model are summarized below, highlighting the key opportunities, as well as the risks and potential mitigation strategies. The same analysis is applied to each of the models considered, to facilitate comparison.

Category	Details
Opportunities	- Market structure is simple, ensuring easy management - Functions and skills align with the existing market, ensuring smooth implementation. - Strategic location near the city allows small retailers to buy directly, addressing the lack of direct store delivery services.
Threats	-The model relies on steady supply from nearby agricultural area: risk of insufficient agricultural supply due to low production yields and limited product range. - The model is only attractive when there is a demand by local producers -Investments in cold storage and improved road access are necessary to improve this solution
Risks	- Wholesalers may be reluctant to move due to higher fixed costs and distance from consumers. - Loss of direct sales to final consumers, which currently happens at the existing market.
Mitigation Strategies	- Address shortfalls in supply through imports managed by wholesalers. - Implement a phased transition with at least three years of financial grants for wholesalers. - Provide cold storage services to improve product shelf life and reduce losses. - Chimoio faces local supply challenges, but efficiency improvements could help in- promoting assistance and services to sustainable agriculture - Chimoio is in a central position of the Beira corridor so it can differentiate its role as a redistribution center for the entire urban area from Tete to Beira
Comparative assessment with international practices: the wholesale market in Rabat (Morocco)	-The market is located south of the Al-Taqadum industrial zone and was established on a total area of 25 hectares, including 15 hectares covered, with an investment estimated at around 600 million dirhams. (about 58 million of Euro) almost 70%more than the funds available for CAAM - The Rabat Development Company, affiliated with the Community of Rabat, was responsible for carrying out this project, which was delayed for several months due to the controversy over the choice of its location. -The new market stands out for its modern design, adhering to the standards of next-generation markets. It prevents intermediaries from entering to lower sales prices and utilizes digital systems to efficiently manage its operations and services. - This market replaces the old Akkari market, whose revenues went to the collective fund of the Rabat community as compensation - the market is positioned at the center of a production area
Implication for CAAM	This model requires large investments in logistics services and is optimal for a large city. It must be able to count on a nearby supply basin. These conditions make the model rather critical for Chimoio as it is for many similar realities in Africa and Italy as well

Table 17: Model A – Main characteristics

5.2.2 Model B. Warehouse as a platform for large modern retailers (Chimoio + Beira + Tete)

Model B is based on the functional activities and infrastructure of Model A. The main differences lie in the larger urban area covered by Model B and the type of end client, which includes modern distribution and the HORECA sector (Hotels, Restaurants, and Catering).

It may also incorporate several complementary areas:

- A wholesale section dedicated to perishable products.
- A cold logistics zone for product distribution and sorting.
- Farmers' markets, such as the one in Chimoio.

A service area for handling, quality control, and logistics, ensuring efficient supply to large-scale distribution.

Category	Details
Opportunities	The entire urban area (Chimoio + Tete + Beira) is undergoing significant demographic changes, increasing food demand in both quantity and segmentation. - Higher middle-class consumers demand better food quality, supporting the growth of modern supermarkets. - Chimoio and surrounding areas are well-suited for this model due to retail system trends[11] - The expansion of industrial and tourist areas is attracting international demand, particularly in the HORECA sector -65% of vegetables in retail are imported due to producer constraints, indicating a market opportunity for local suppliers.
Threats	- This model can support the development of HORECA and modern retail along the Beira corridor with enhanced services. - The reliance on imported products could increase, limiting local socio-economic benefits. - The functional gap between agricultural production areas and urban markets may widen without adequate local supply.
Risks	- Low production yields and an incomplete product range may not meet demand. - High quality and stringent controls required HORECA Quality Requirements - Wholesaler Relocation Resistance: higher fixed costs and increased distance from consumers may deter wholesalers
Mitigation Strategies	- Complement supply with imported fresh and frozen foods - Implement dedicated quality control services within the market infrastructure - Introduce a phased transition with at least three years of financial support for wholesalers, cold storage, and packaging services. - Retailer Attraction Strategy:encourage large retailers and cash-and-carry operators first to create momentum for wholesaler relocation.
Comparative assessment with international practices: the wholesale market in Rimini (Italy)	- The Centro Agro Alimentare Riminese S.p.A. (CAAR) is a modern service platform for the HORECA, bringing together all the fresh food chains (fruit and vegetables, fish, etc.) and the redistribution and logistics services for the HORECA. -The complex is made up of three main buildings rented to commercial operators for the sale of fruit and vegetables, fish products and miscellaneous goods (cash & carry), a management building with over 3,000 m2 of offices and a series of service buildings for the main pavilions, which house some of the activities necessary for the market systems. -The market operates through multiple wholesalers, each with dedicated stands, cold storage facilities, and office spaces, all working alongside a major wholesale and HORECA logistics provider to ensure seamless distribution.

[11] Estudo de Actualização – cadeias de valor em agronegócios. 2021. MINISTÉRIO DA AGRICULTURA E DESENVOLVIMENTO RURAL

	-local farmers have established a separate farmers' market closer to the city center, far away from CAAR have established a dedicated farmers' market, designed to serve the final consumer with a more targeted and efficient allocation of fresh products.
Implication for CAAM	Given the geographical position of Chimoio, in the center of the Beira corridor, this model could work aiming to provide logistic services to the modern distribution and HORECA of the wider urban area. Given the productive limits of the agricultural territory, the CAAM should work by aggregating mainly imported product and aggregated product from other agricultural territories

Table 18: Model B – Main characteristics

5.2.3 Model C. Agri-hub / agri-park for Nutrition-Smart Agriculture (NSmartAg)

The agri-park is a comprehensive system designed to support the development of the agricultural sector and improve the quality of production. It begins with the provision of essential services to farmers, followed by the development of infrastructure for product aggregation, primary processing, and packaging. An integrated logistics system facilitates both the collection of products from farmers and distribution to wholesale markets near urban centers.

The model under consideration is further enhanced by the additional services described in Model B, combining services for both producers and retailers. This community-centered approach aims to promote a sustainable ecosystem for local small businesses by fostering viable business models tailored to the local market.

The agri-hub is production-oriented, and to better fulfill this role, the model could be structured with "satellite structures"—that is, service hubs located in rural areas where production zones are needed.

Centers:

Located near production centers, the HUBs provide a range of services to support agriculture. These include the rental of machinery and vehicles, workshops, storage facilities for seeds, fertilizers, and other inputs, as well as research and training facilities. Each HUB also includes a local sales point for agricultural products.

Agricultural products are first collected at the peripheral HUBs, where they are stored, sorted, prepared, and, if necessary, processed. From these warehouses, both fresh and processed products can be sold locally or transported to the Agri-Food Center / Wholesale Market located in the urban area.

The need to combine both functions in rural areas—even those distant from urban zones—and to provide services for modern distribution led to the development of an integrated Model C, as presented in the following table. The agri-hub is production-oriented, and to better fulfill this role, the model could be structured with "satellite structures"—that is, service hubs located in rural areas where production zones are required.

Centers:

Located near production centers, the HUBs provide a range of services to support agriculture. These include the rental of machinery and vehicles, workshops, storage facilities for seeds, fertilizers, and other production inputs, as well as research and training facilities. Each HUB also features a local sales point for agricultural products.

Agricultural products are initially collected at the peripheral HUBs, where they are stored, sorted, prepared, and, if necessary, processed. From the warehouses, both fresh and processed products can either be sold locally or transported to the Agri-Food Center / Wholesale Market located in the urban area.

The need to combine both functions in rural areas—even those far from urban centers—with services for modern distribution led to the formulation of the hypothesis of an integrated Model C, as presented in the following table.

Category	Details
Opportunities	- Integrates local production and fosters partnerships between key actors - Enhances the development of an inclusive network adapted to local conditions - Involves all ecosystem stakeholders, including research institutions, universities, input suppliers, NGOs, small producers, and cooperatives - Can be supported by public and private extension workers, village agents, business consultants, and agro-dealers - Promotes value-added services, mechanization, technical assistance, youth-led entrepreneurship, and local product processing
Threats	- The model requires substantial financial resources for infrastructure and operational setup. -It requires clear governance and highly skilled management for processing and service operations -Demands expertise in both agricultural base services and final distribution management
Risks	- Product Availability Risk: Low agricultural yields and limited product variety may not meet urban demand -HORECA Market Stringency: High quality and strict control requirements. -Reluctance of Wholesalers to Relocate:Higher fixed costs and increased distance from consumers may deter wholesalers
Mitigation Strategies	-Establish agricultural hubs with essential infrastructure and services in production areas, acting as satellites of the central CAAM -Achieve cost reductions through economies of scale and broader agricultural production, extending beyond fruits and vegetables -Assistance in production areas to ensure traceability -Introduce a three-year phasing-in period with financial support for wholesalers, alongside cold storage and packaging services. Initially, attract large retailers and cash-and-carry operators to the central CAAM to encourage wholesaler migration
Lessons learnt form benchmarking: Lukula	-This agro-food platform (agropole/agro-hub), constructed in 2019 and fully completed and tested in October 2020, was designed to process and preserve typical products of the equatorial belt, ensuring high-quality output despite the region's extreme humidity, which makes perishability a major challenge. -The platform is specialized in product transformation (for example Cassava-based products, including cassava flour, starch, ready-to-eat cassava bread (chikwangue), and protein- and mineral-enriched cassava flour) - Srategically located at the heart of an agricultural zone, it provides comprehensive support services to small farmers within a 15-20 km radius, enabling them to process and deliver high-value finished products to Kinshasa, located 500 km away -The center was initially funded by the World Bank and, while already operating as a key hub, it is currently undergoing expansion, with additional private hubs under development, supported by private sector investments.
Implication for CAAM	Given the geographical position of Chimoio, in the center of the Beira corridor, this model could work aiming to provide logistic services to the modern distribution and HORECA of the wider urban area. Given the production limits of the agricultural territory, the HABs, satellites of CAAM, should work by providing complete services to small farmers focusing not on a few products but on the entire rotation of production. A primary transformation of non-F&V products such as fortified flours should be considered Therefore, on the CAAM side the objective is to improve the added value with logistics and transformation services. On the agricultural side, the objective is to improve the sustainability of agricultural production

Table 19: Modelo C – Main characteristics

5.3 Economic Analysis

The economic simulation of the CAAM model is based on an assessment of demand over time, primarily influenced by demographic trends and evolving consumer preferences. The base year for projections is 2025, which is assumed to remain constant until the opening of CAAM in 2030.

The model simulation considers two time horizons:

- a 10-year perspective (2035), and
- a 30-year perspective (2055) from the baseline.

This period was chosen as an alternative to the 20-year period initially proposed in the Terms of Reference (ToR) and the initial report, as it aligns more closely with the financial and amortization plan for the infrastructure.

The main assumptions adopted for the economic simulation are as follows:

- Consumption patterns of key vegetables remain unchanged
- The urban population grows at an annual rate of 3%;
- The volumes of domestically produced goods reaching urban markets have not changed from 2015 to the present and are expected to remain similar through 2055, as despite the increase in the number of producers, the technologies used remain largely the same, soil quality has deteriorated due to poor practices, and climate change has affected production conditions and tends to worsen them
- Imports are calculated as the difference between consumption and local supply
- Constant prices and a stable 2024 exchange rate are assumed for the entire period
- The estimate of future needs is based on the calculation of current per capita consumption of fruits and vegetables; this value is then multiplied by the expected population during the period, which provides a projection of anticipated demand.
- The models are evaluated according to potential development scenarios, considering changes in rural areas (supply side) and urban areas (demand side). The key scenarios are defined as follows:
- **Year 0: Baseline Scenario (BC)** – Represents a constant five-year period, from the projection year (2025) to the opening of CAAM (2030).
- **Year 10 of the projection (2035)**: Includes both the Business-as-usual Scenario (BAU) and the Project Scenario (PS).
- **Year 30 of the projection (2055)**: Continues the assessment under the Business-as-usual Scenario (BAU) and the Project Scenario (PS).

5.3.1 Organization of the Total Production of Value Chains in Manica Province

Business-as-usual Scenario

Horticultural production in Manica Province amounts to approximately 700,000 tons, covering 60% of local demand for vegetables and 37% of demand for fruits. To compensate for the supply gap, wholesalers increasingly rely on imported products. Additionally, long and inefficient supply chains contribute to significant product losses, occurring both at the cultivation stage—where waste is generated directly in the fields—and in large market centers such as Chimoio and Beira. In Chimoio, key markets such as the Francisco Manyanga Market (commonly known as Market 38) and the Katanga Market receive products from the Zimpeto Market in Maputo, which in turn sources products

from South Africa. These imported products compete directly with local production in terms of both quality and price. Market 38 and Katanga Market serve as major redistribution hubs, receiving and distributing food from Zimpeto Market to various regional markets, including the Cerâmica Market in Beira, the Tete Wholesale Market, the Dondo Wholesale Market, and several other markets in the city and province of Manica.

If the current business scenario continues, in 30 years local supply will cover only 32% of the demand for horticultural products. This decline is driven by an annual population growth rate of 2.5–3% and an agricultural sector unable to meet market demands.

Project Scenario

With the implementation of the CAAM project, local supply chains will be more efficiently integrated into urban markets through improved logistics, post-harvest facilities, and a more sustainable agricultural model—both economically and environmentally. This transformation will be supported by modern services and technical assistance.

As a result, local production is expected to grow by 1.5% per year, with a further 15% reduction in post-harvest losses, contributing to the overall recovery of supply. This improvement will result from several factors, such as increased soil fertility and the adoption of agroecological farming practices, as well as the expansion of cultivation into previously abandoned lands.

With these interventions, local production is expected to cover approximately 52% of local demand within a 30-year timeframe.

Demand simulation	Tons	%
Assumptions:		
The urban population grows at an annual rate of 3%;		
Constant prices		
no improvement in agricultural production		
no improvement in losses and waste		
Baseline		
2020: Commercialized Horticultural products (Tons)	550.000	
local production	324.500	59%
imported	225.500	41%
2025: Commercialized Horticultural products (Tons)	690.000	
local production	345.000	50%
imported	345.000	50%
Projection		
2035: Commercialized Horticultural products (Tons)	797.500	
local production	345.000	43%
imported	452.500	57%
2050-2055: Commercialized Horticultural products (Tons)	1.074.700	
local production	345.000	32%
imported	729.700	68%

Table 20: Economic model applied in Manica Province

5.3.2 CAAM Supply in Chimoio and the Urban Area

CAAM represents approximately one-tenth of the total product traded in the province. At the baseline, local production accounts for around 59% of the total product supplied. The project will enable the recovery of 50% of losses, equivalent to 15% of total production (2035 scenario). CAAM will also facilitate an increase in agricultural production in response to demographic trends.

Thus, the key points of CAAM are:

- Urban population growing at an annual rate of 3%;
- Annual growth rate of 3% at constant prices;
- Average unit value of 362 USD per ton;
- Increase in local production by 1.5% per year throughout the period (2025–2055);

Recovery of production due to reduced losses: 15% concentrated in the first 10 years (2025–2035).

The potential volumes of products from the value chains that could pass through CAAM are approximately 73,000 tons (2025 baseline), as estimated in the value chain report and included in the table below, which serves as the basis for developing a simulation for 2035 and 2055.At the baseline, local production can meet about 56% of urban demand, while approximately 44% of supply is based on imported products, due to the limitations described in the introduction of this report. In the current scenario, 61% of demand is met by imported products, which are of higher quality. With CAAM, designed under Model C, combining agro-hubs and services for the urban area, local production will meet up to 63% of the increased demand, thanks to improved cultivation conditions and reduced losses. In terms of value, the project scenario will generate an added value of approximately USD 14 million (at constant prices).

Products	Specific Value chain	
	Baseline	TONS
Tomatoes, pulses (soya, ,,,)	Vegetables	36.718
Cassava, potatoes	Tubers	14.687
Banana, cashew, pineapple, mango	Fruits	14.687
Beans	Kidney Beans	7.344
Coffee and macadamia nuts, honey, eggs and chicken	Complementary VCs	0
	2025: Vegetables marketed (tonnes)	73.436
	2025: Vegetables marketed (USD)	26.583.832
	Local production (tonnes)	41.124
	Imported (tonnes)	32.312

Table 21: product-value-chain relationship

- The size of the functional model of CAAM took into account the development of the three fundamental functions to be activated within the market; the different combinations of these functions impact the

architecture and infrastructure, according to the following phases:

- Wholesale market activities lead to an "urban and locally market-oriented" model: several spaces for wholesalers, a covered area for local producers, minimal storage capacity, and limited refrigerated storage. The considered proportion was: wholesaling 70%, logistics 30%, food processing 0% (690,000 total tons).
- Growth in logistics activities—such as storage, cold chain preservation, transit points, export and import operations—and the inclusion of food processing activities lead to an "urban, logistics, and export-oriented" model. The considered proportion was: wholesaling 50%, logistics 40%, food processing 10% (800,000 total tons).
- The consolidation of food processing and food service activities leads to an "agri-food hub" model. This activity will also need to expand significantly under the 2035 scenario. The considered proportion was: wholesaling 30%, logistics 50%, food processing 20% (1,075,000 total tons).

		BAU-Business as Usual		Project Scenario	
Specific value-chains					
		Tons	%	Tons	%
Baseline	**TONS**				
Vegetables	36718				
Tubers	14687				
Fruits	14687				
Common beans	7344				
Complementary value-chains	0				
2025: Commercialized Horticultural products (Tons)	73.436			73.436	
2025: Commercialized Horticultural products (USD)	26.583.832				
local production (Tons)	41124	*41124*	*56%*	*41000*	*56%*
imported (Tons)	32312	*32312*	*44%*	*32312*	*44%*
Projection					
Vegetables	37082				
Tubers	27812				
Fruits	18541				
Common beans	9271				
2035: Commercialized Horticultural products (Tons)	92.705			92.705	
2035: Commercialized Horticultural products (USD)	33.559.210				
local production (Tons)		41000	44%	57.759	62%
imported (Tons)		51705	56%	34.946	38%
Vegetables	55474				
Tubers	21390				
Fruits	21390				
Common beans	10695				
2050-2055: Commercialized Horticultural products (Tons)	108.949			107471	
2050-2055: Commercialized Horticultural products (USD)	39.439.538				
local production (Tons)		41000	38%	68368	63%
imported (Tons)		67.949	62%	39104	36%

Table 22: Projections of project impact and business-as-usual continuity assumptions

5.3.3 Potential Impact on Transport

Currently, the transport of products is based on 2-ton vans (24,000), concentrated between August and December for 66% of the production: 70% is transported using small vans. Under the Project Scenario (PS), the system will shift to 60% trucks and 10% semi-trailers. In summary:

- VANS with an average capacity of 2 tons;
- TRUCKS with an average capacity of 10 tons;
- SEMI-TRAILERS with an average capacity of 15 tons.

This transport is managed directly by farmers or local intermediaries who collect products from the farms. Currently, about 100 vehicles per day travel from rural areas to existing markets. With CAAM organizing production through the agro-hub, product aggregation will be facilitated, streamlining transport.

The scenario analysis highlights a reduction in the use of vans and an increase in the use of trucks and semi-trailers transporting products from rural areas—where the agro-hub is located—to CAAM in the urban area:

- 2025–2030 (baseline scenario): 70% vans, 27% trucks, 3% semi-trailers;
- 2035: 50% vans, 45% trucks, 5% semi-trailers;
- 2055: 35% vans, 60% trucks, 10% semi-trailers.

As a result, the unit cost of transport will decrease, and the transport range can be extended. The estimated number of daily accesses to CAAM, in relation to the average capacity of the transport means, varies with the production cycles:

- The August to December period (150 days) covers 66% of production;
- The January to July period (210 days) covers 34% of production.

Consequently, the number of transport vehicles entering CAAM (inbound flows) remains essentially constant (approximately 200), despite the increase in the volume of production entering the market.

Regarding logistic units (transport packaging), the estimates define three different types of solutions: boxes, bulk, and sacks. The projected evolution between 2025 and 2055 is as follows:

YEAR	BOX (%)	BULK (%)	BAGS (%)
2025	50	30	20
2035	60	15	25
2055	70	5	25

Table 23: Packaging impact perspective

To estimate volumes and the weight-to-volume ratio, the following hypothesis was formulated: 60% of the production has an average ratio of 150 kg per cubic meter; 40% of the production has an average ratio of 250 kg per cubic meter. As a result, CAAM will need to manage approximately 69,000 cubic meters of goods at the baseline and 107,000 cubic meters at full scale.

5.4 Identification of the Model

The conclusion, therefore, is that CAAM can create added value not only by improving the distribution of products to the city or urban area, but above all by promoting sustainable agricultural development and thereby rebalancing local production with imported products to meet the needs of population growth. For this purpose, the final model (Model C) that has been identified is, in fact, a combination of supply and demand functions: agri-hub functions to provide services for the production area, and the wholesale market for the urban area.

It is based on the optimization of logistics within the highlighted value chains from the value chain analysis:

- Optimization of logistics to supply local city retail.
- Optimization of logistics to supply large retailers (supermarkets) and the HORECA sector in a broader urban area.
- Optimization of supply from the rural area.

Function	AgriHubs	CAAM
Primary collection and selection	✅ (directly from farmers)	✅ (for products intended for advanced processing)
Refrigerated storage	✅ (short-term for the local market)	✅ (large-scale to consolidate shipments)
Sale of organic agricultural inputs (seeds, compost, bio-fertilizers)	✅	❌
Transport to local markets and direct sales	✅	✅ (for organized retail)
Processing and advanced transformation	✅ Small-scale processing (juices, purees, flours, drying, dried fruit)	✅ (juices, purees, flours, drying, dried fruit)
Packaging for export and quality certifications	✅	✅
Logistics management and connection to ports/national and international markets	❌	✅
Retail and direct sales to supermarkets, restaurants, and wholesalers	❌	✅
Support for agricultural cooperatives and technical assistance	✅	✅
Farmer training in agroecological practices and business management	✅ (local practices)	✅ (international standards and certifications)
Digital platform for production and logistics monitoring	❌	✅

Table 24: Functional diagram of CAAM and Agro Hub

The final model (Model C) is an organizational model characterized by the concentration of the main and more complex activities in one (or more) specialized centers, supported by a network of smaller centers where some preliminary or basic services are provided. **Thanks to the network system, production is concentrated upstream and first directed to the peripheral HUBs, and subsequently to CAAM.**

A central CAAM:

- Central pivot of the organization
- Collection and development of activities related to:
  - Wholesalers;
  - Logistics along the Manica–Beira corridor;
  - Food processing;
  - Services.

CAAM

Four supply HUBs, resulting from the geographic, productive, and economic analysis:

HUB

- Transit points, i.e., they receive products from the field and send them to CAAM;
- Serve as service centers for farmers and temporary storage of goods;
- Carry out specific (basic) food processing activities.

Several small transit points called **BASEs**

BASE

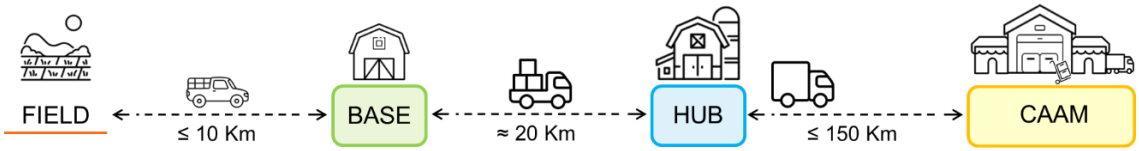
- located in the field (possibly within the facilities of farmers' associations);
- receive products directly from the fields;
- Send directly to the HUBs.

From the FIELD to the BASE: Each farmer continues as usual; if additional operational budget is available, a van is provided for each BASE to facilitate transportation between the FIELD and the BASE, and vice versa.

From the BASE to the HUB: Roads must be improved, and similarly, the use of transport vans should be encouraged, as mentioned above (additional funding required, currently not available).

Roads will be improved through funding from the AICS project.

From the HUB to CAAM: Roads need to be improved (through AICS), and transporters should be encouraged to make round trips using trucks.



CAAM and the HUBs will coordinate a diverse range of high-quality services that meet the needs of small and medium-sized enterprises (SMEs) at affordable prices. The services can be categorized into two groups:

- **Operational Services** → Essential for daily business activities (information and communication, accounting, tax management, and regulatory compliance);

- **Strategic Services** → Aimed at business growth, competitiveness, and market access (training programs, consulting and advisory services, marketing support, market information and intelligence, technology development and transfer, facilitation of business linkages).

5.5 Assessment of Product Flow and Business Model

The results of our production analysis provide estimated product flows to the HUBs, broken down into three quality categories (first, second, and third), and projected for the years 2030 and 2055.

These are the operational assumptions of the management model:Os HUB desempenham o papel de:

1. Transit point: Change of transport mode en route to CAAM;
2. Initial selection based on quality and standardization criteria;
3. Initial packaging activity (for first and second-grade products) before release to CAAM;
4. Initial processing of the product (third-grade);
5. Services for farmers.

- **CAAM plays the role of** Mercado Grossista;
  1. Food processing;
  2. Logistics facilities for storage (including cold storage units) for products from CAAM and for goods in transit along the Beira corridor.
  3. Quality control and analytical laboratory.

These are the assumptions for product flow by quality type:

- **First-Quality Products (Q-1)** go directly from the BASE to CAAM if they travel under optimal transport and packaging conditions (our estimate: 2030 = 20% of total Q-1 vs. 2055 = 80% of total Q-1).
- **First-Quality Products (Q-1)** go to the HUB when transport and packaging conditions need to be optimized (our estimate: 2030 = 80% of total Q-1 vs. 2055 = 20% of total Q-1).
- **Second-Quality Products (Q-2)** pass through the HUB when transport and packaging need optimization (fresh product – F) or undergo initial processing (processed product – P). The share of fresh product sent to CAAM will generally be higher than that of processed product.
- **Third-Quality Products (Q-3)** go predominantly to the HUB for initial processing, before being sent to CAAM for full processing.

The estimated sales channels are as follows:

- 1ª First Quality products are focused on export and the high-price domestic market (supermarkets in major cities and established international companies);
- 2ª Second-Quality products are primarily targeted at the domestic market.

Forecast	2035	2055
Export.	20%	40%
Internal	60%	30%
Processed	20	30%

- 3ª Third-Quality products are aimed at the domestic market with processing for local consumption and potential for export markets.

The estimated breakdown between sales channels in the 2035 and 2055 projection is shown in the table on the right-hand side.

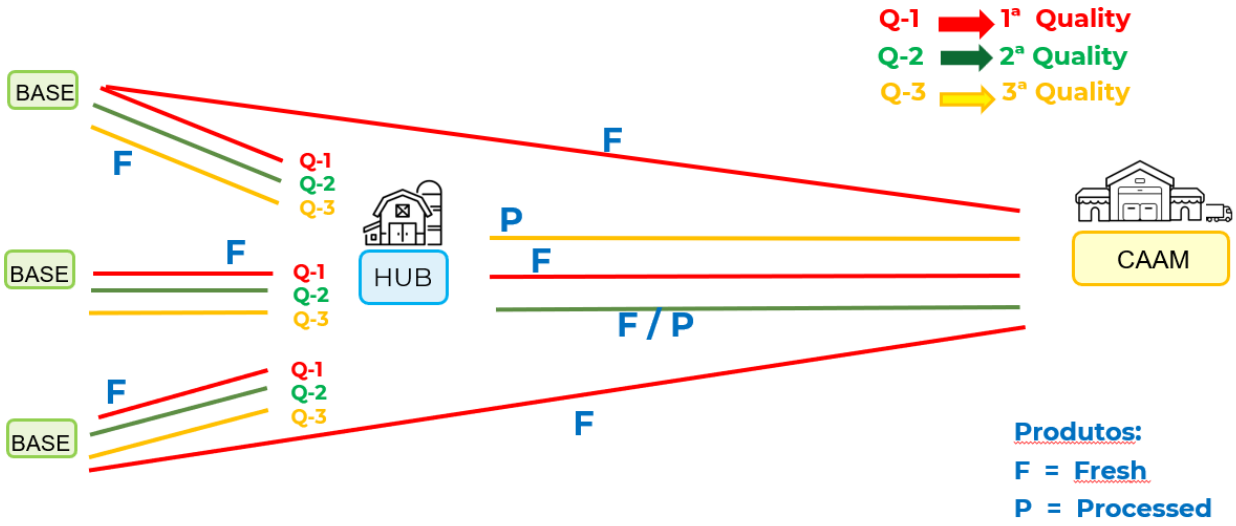


Figure 19: The different paths to quality

It is with confidence that it is stated that:

- The BASE+HUB+CAAM model drives farmers toward production control and commercial integration;
- State support for rural development aims to strengthen supply chain integration;
- Agricultural organizations will grow over time and will be able to aggregate products and reach the market more efficiently.

5.5.1 Flows within the HUBs

Essas são nossas estimativas de entrada nos HUBs e saída dos BASES:

- a variedade de produtos para os 4 hubs é determinada pela análise da cadeia de valor;
- em cada um dos 4 HUBs, 10.000 t/ano em 2030 e 13.500 t/ano em 2055;
- em 2030, a 1ª qualidade vale 25% do total, a 2ª qualidade vale 50% do total e a 3ª qualidade vale 25%. Supõe-se que essa porcentagem seja a mesma para cada um dos 4 hubs;
- em 2055, os percentuais são alterados da seguinte forma (cada hub): 1ª qualidade 40%, 2ª qualidade 45%, 3ª qualidade 15%;
- o processamento inicial é feito nos HUBs, enquanto o processamento completo será feito no CAAM. Supõe-se que, em 2030, 80% da 3ª qualidade será processada no HUB, enquanto a 2ª qualidade será processada no HUB por 10%. Em 2030, 2.500 toneladas são então processadas (80% de 2.500 toneladas de 3ª qualidade + 10%

de 5.000 toneladas de 2ª qualidade);

- em 2055, 95% da 3ª qualidade será processada no HUB e 10% da 2ª qualidade. Assim, 2.531 toneladas serão processadas (a 3ª qualidade caiu nesse meio tempo);
- esse primeiro processamento no HUB é feito com uma máquina que processa 1 tonelada/hora por 8 horas/dia, ou seja, 8 toneladas/dia. Portanto, a máquina processará 313 dias/ano em 2030, enquanto processará 316 dias/ano em 2055. Abaixo estão os valores estimados para os 4 hubs.

These are our estimates for inbound flows to the HUBs and outbound flows from the BASEs:

- The variety of products for the 4 HUBs is determined by the value chain analysis;
- In each of the 4 HUBs, 10,000 tons/year in 2030 and 13,500 tons/year in 2055;
- In 2030, first-quality accounts for 25% of the total, second-quality for 50%, and third-quality for 25%. It is assumed that this percentage is the same for each of the 4 HUBs;
- In 2055, the percentages change as follows (per HUB): first-quality 40%, second-quality 45%, third-quality 15%;
- Initial processing is carried out at the HUBs, while full processing will be done at CAAM. It is assumed that in 2030, 80% of third-quality will be processed at the HUB, and 10% of second-quality. Thus, 2,500 tons will be processed (80% of 2,500 tons of Q3 + 10% of 5,000 tons of Q2);
- In 2055, 95% of third-quality and 10% of second-quality will be processed at the HUB. Thus, 2,531 tons will be processed (as third-quality has decreased over time);
- This initial processing at the HUB is performed with a machine that processes 1 ton/hour for 8 hours/day, i.e., 8 tons/day. Therefore, the machine will operate 313 days/year in 2030 and 316 days/year in 2055.

Below are the estimated values for the 4 HUBs.

HUB do MACATE

Macate

Products	Value Chains	2030 Total (ton)	2030 III quality (25 %) processing	2030 II quality (50%) to CAAM	2030 I quality (25%) to CAAM	2055 Total (ton)	2055 III quality (15 %) processing	2055 II quality (45%) to CAAM	2055 I quality (40%) to CAAM
Tomato; cabbage; red cabbage	vegetables	3500	875	1750	875	4725	709	2126	1890
Potato	tuber	2000	500	1000	500	2700	405	1215	1080
Banana; citrus; lychee	fruits	4000	1000	2000	1000	5400	810	2430	2160
	legumes	500	125	250	125	675	101	304	270
	total	10000	2500	5000	2500	13500	2025	6075	5400

80% 10%

processing		
Ton processed / hour	Ton processed / day (8 hr) / line	Total working days
1	8	313

95% 10%

processing		
Ton processed / hour	Ton processed / day (8 hr) / line	Total working days
1	8	316

Table 25: estimated values of the Macate HUB

HUB do SUSSUDENGA

SUSSUDENGA

Products	Value Chains	2030 Total (ton)	2030 III quality (25 %) processing	2030 II quality (50%) to CAAM	2030 I quality (25%) to CAAM	2055 Total (ton)	2055 III quality (15 %) processing	2055 II quality (45%) to CAAM	2055 I quality (40%) to CAAM
Tomato	vegetables	5000	1250	2500	1250	6750	1013	3038	2700
Potato	tuber	2500	625	1250	625	3375	506	1519	1350
Banana; lychee	fruits	2000	500	1000	500	2700	405	1215	1080
	legumes	500	125	250	125	675	101	304	270
	total	10000	2500	5000	2500	13500	2025	6075	5400

80% 10%

processing		
Ton processed / hour	Ton processed / day (8 hr) / line	Total working days
1	8	313

95% 10%

processing		
Ton processed / hour	Ton processed / day (8 hr) / line	Total working days
1	8	316

Table 26: estimated values of the Sussudenga HUB

HUB do BARUE

BARUE

Products	Value Chains	2030 Total (ton)	2030 III quality (25 %) processing	2030 II quality (50%) to CAAM	2030 I quality (25%) to CAAM	2055 Total (ton)	2055 III quality (15 %) processing	2055 II quality (45%) to CAAM	2055 I quality (40%) to CAAM
Cabbage	vegetables	4000	1000	2000	1000	5400	810	2430	2160
Potato	tuber	3000	750	1500	750	4050	608	1823	1620
Banana; lychee; citrus	fruits	2500	625	1250	625	3375	506	1519	1350
	legumes	500	125	250	125	675	101	304	270
	total	10000	2500	5000	2500	13500	2025	6075	5400

80% 10%

processing		
Ton processed / hour	Ton processed / day (8 hr) / line	Total working days
1	8	313

95% 10%

processing		
Ton processed / hour	Ton processed / day (8 hr) / line	Total working days
1	8	316

Table 27: estimated values of the Barue HUB

HUB do VANDUZI

VANDUZI

Products	Value Chains	2030 Total (ton)	2030 III quality (25 %) processing	2030 II quality (50%) to CAAM	2030 I quality (25%) to CAAM	2055 Total (ton)	2055 III quality (15 %) processing	2055 II quality (45%) to CAAM	2055 I quality (40%) to CAAM
	vegetables		0	0	0	0	0	0	0
Potato	tuber	4000	1000	2000	1000	5400	810	2430	2160
Banana; avocado; citrus	fruits	5500	1375	2750	1375	7425	1114	3341	2970
	legumes	500	125	250	125	675	101	304	270
	total	10000	2500	5000	2500	13500	2025	6075	5400

80% 10%

processing		
Ton processed / hour	Ton processed / day (8 hr) / line	Total working days
1	8	313

95% 10%

processing		
Ton processed / hour	Ton processed / day (8 hr) / line	Total working days
1	8	316

Table 28: estimated values of the Vanduzi HUB

We have already explained in the report the reasoning behind our estimate of 10,000 tons entering each HUB. This is a clearly acceptable figure, considering the results of the value chain analysis conducted for the four territories studied. In fact, in the reference territories of the four HUBs, the production volumes are significantly higher—up to ten times greater than our estimated intake per HUB. This gives us confidence in the availability of sufficient volumes for processing at the HUBs.

Districts	Value chains with the highest production in the district.
Vanduzi	Reno Potato - 21.249; Tomato -21.880; Cabbage - 13.691;
Sussudenga	Reno Potato - 19.139; Garlic - 11.857; Tomato - 5.822; Lychees - 5.878; Banana - 11.695
Barue	Reno Potato - (n.a,) More than 20.000 ton garlic, tomato - 20.659, cabbage -15.866 + red cabbage - 21.557; Banana - 13.214; Lychee - 6.813; Citrous - (n.a.) More than 10.000 ton
Macate	Reno Potato - 18.825; Banana - 89.000, Avocado - 11.496: Citrous - (n.a) Value chains with the highest production in the district.

Table 29: Value chains with the highest production in the districts

This is an assumption regarding the processing line required for the initial processing activities at each HUB:

Processing Lines	Products	Investment (€ 000)
Sorting - Cleaning - Washing	potatoes, onion, ..	40.000
1 line pulps and juices and sterilization + bottling (manual)	tomato, mango, Avocados, citrus, , citrus, bananas, mango, onion, cabbage	200.000

Table 30: assumption of the processing line required for the first processing activities in each HUB

The processing line at the HUB is manual and has one-tenth the capacity of the CAAM. The operating costs of the line require 10–11 operators, steam, drinking water, tower water, and electric power. A flexible processing line was chosen, capable of adapting to different products.

This approach allows for easier amortization and eliminates the need to change technology based on the supply. When switching the type of incoming product, there is no need for different processing lines, but rather:

- Skills to adapt processing temperatures and extraction pressure based on the agricultural product;
- Manual preparation techniques for the agricultural product to optimize it for processing (e.g., peeling, cutting, etc.);
- Work planning in one (8 hours) or two (16 hours) shifts—processing is adjusted based on incoming flow and seasonality;

In this way, switching from one product to another only requires cleaning the lines, not changing the technology.

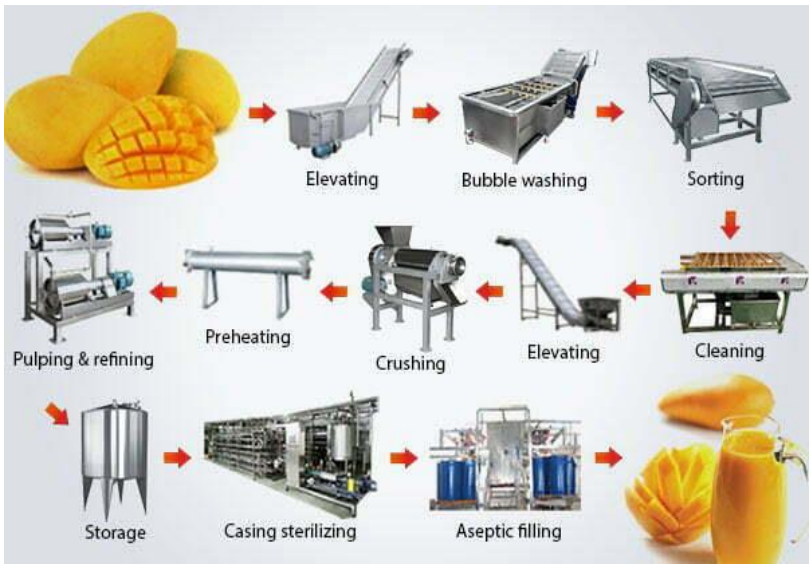


Figure 20: Mango puree/juice production flowchart

Our estimates do not take seasonality into account, as overly precise calculations would make them less concrete. However, the crop calendar for major crops by agro-ecological zones in Manica Province has been developed for FAO.

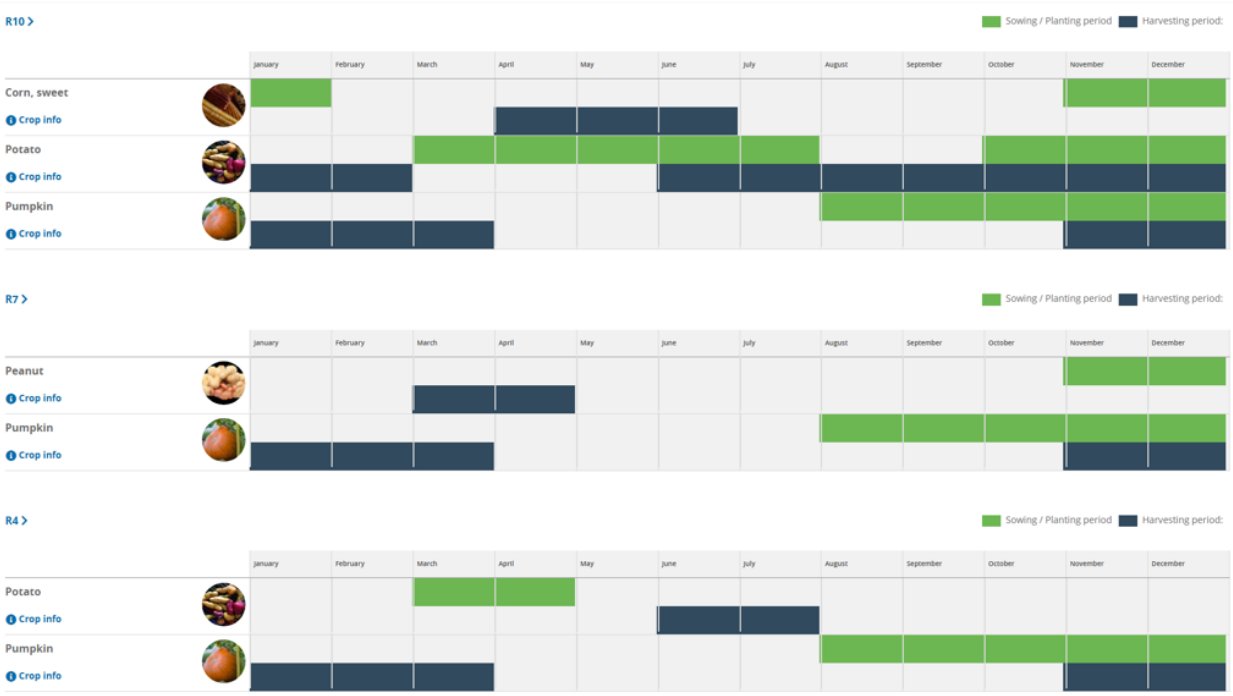


Figure 21: Calendar of the main crops by agro-ecological zones in the province of Manica (source: FAO, 2025)

5.5.2 CAAM fluxes

These are our estimates for inflows to CAAM and outflows from the HUBs:

- The value chain analysis identified an inflow of 73,436 tons in the year 2030, increasing to 108,949 tons in the year 2055;
- In 2030, first-quality accounts for 40% of the total, second-quality for 30%, and third-quality entering CAAM directly from the nearby rural zone accounts for 15%. Added to this is third-quality already semi-processed by the HUBs, representing 15% of total intake;
- In 2055, the proportions shift as follows: first-quality 50%, second-quality 30%, third-quality 10%, and semi-processed third-quality 10%;
- Regarding processing at CAAM, it is assumed that in 2030, 95% of third-quality, 10% of second-quality, and 75% of semi-processed product from the HUBs will be processed (to account for system losses). Based on these calculations, 20,929 tons will be processed in 2030;
- In 2055, 90% of third-quality, 30% of second-quality, and 75% of the semi-processed product from the HUBs will be processed. Thus, 26,148 tons will be processed—an absolute increase of 25% over the period;
- This processing at CAAM is done using machines that process 10 tons/hour for 4 hours/day, or 40 tons/day. Therefore, the equipment will operate 523 days/year in 2030, and 654 days/year in 2055. As a result, three processing machines are necessarily required.

CAAM - Chimoio

2030

	Total (ton)	(15%) semi processed from hubs	III quality (15%)	II quality (30%)	I quality (40%)
vegetables	36718	5508	5508	11015	14687
tuber	14687	2203	2203	4406	5875
fruits	14687	2203	2203	4406	5875
legumes	7344	1102	1102	2203	2938
total	73436	11015	11015	22031	29374

75% 95% 10%

processing		
Ton processed / hour	Ton processed / day (4 hr) / line (*)	Total working days (**)
10	40	523

2055

	Total (ton)	(10%) semi processed from hubs	III quality (10%)	II quality (30%)	I quality (50%)
vegetables	55474	5547	5547	16642	27737
tuber	21390	2139	2139	6417	10695
fruits	21390	2139	2139	6417	10695
legumes	10695	1070	1070	3209	5348
total	108949	10895	10895	27237	59922

75% 90% 30%

processing		
Ton processed / hour	Ton processed / day (4 hr) / line (*)	Total working days (**)
10	40	654

(*) At seasonal picks, workin shift can be at 2 x 6 hr per line
(**) The total working days are shared between the processing lines (n.3)

Table 31: estimated CAAM values

Here is a proposal for the processing lines required for processing activities at CAAM:

Processing Lines	Products	Investment (€ 000)
1.Pulp – Concentrate triple 36-38 Brix Cold Break	tomato, mango, Avocados, citrus,	3000
2.Juice	citrus, pineaples, mango	3000
3.Dehydratation. - flours	bananas, mango, onion, cabbage	2620

Table 32: assumption of the processing line required for CAAM processing activities

A market survey of Italian technologies was conducted to identify the most versatile processing lines for the production of purees, juices, and flours from fruits and vegetables. The selection criteria focused on finding the most comprehensive line possible (ready for use in the production of finished products), while also being flexible enough to accommodate different types of agricultural inputs.

A flexible processing line was chosen, capable of being adapted to various products. This allows for easier amortization and eliminates the need to change technology based on the type of supply. When switching to a different product, there is no need for separate lines, but the following are required:

- Skills to adjust processing temperatures and extraction pressure according to the agricultural product;
- Manual preparation techniques for the agricultural product to ensure optimal processing (peeling, cutting, etc.);
- Workforce planning in one (8 hours) or two (16 hours) shifts, with processing adapted based on input flow and seasonality;
- In this way, switching from one product to another only requires cleaning the lines, not a technological change.

Figure 22: Flowchart of tomato puree/juice production (in the industry in the Emilia Romagna region)

The industrial tomato processing plant (also suitable for: avocado, tomato, citrus fruits, and custard apple) can be dedicated to the production of juices, purées, pulps, and concentrates. The plant has been designed specifically for the production of paste.

The preparation lines have a capacity of up to 10 tons/hour, intended for packaging the product in tinplate boxes and laminated plastic and aluminum bags. The processing line can be managed ad hoc, taking into account client requests to achieve high viscosity values in the final product.

The separation of tomato seeds from the fruit is planned as the first stage of processing, in order to avoid high temperatures that could compromise the germination capacity of the seeds (for the seed market).

The line includes the following sections:

- Reception
- Crushing, slow grinding, refining
- Evaporation
- Sterilization and filling of 220-liter aseptic drums

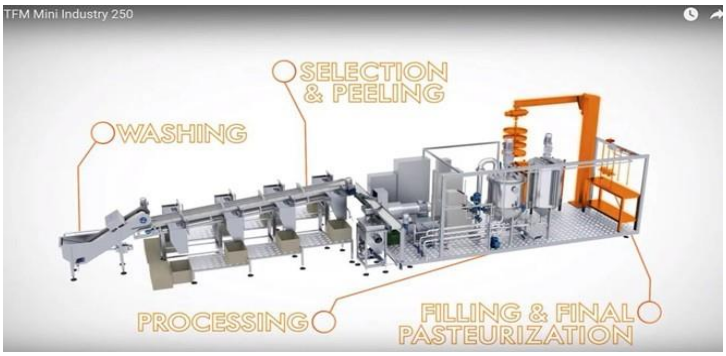


Figure 23: processing lines

Figure 24: processing lines

It is important to emphasize that the detailed configuration of all technologies and processing lines will be defined in the subsequent phases of the project.

6. FINANCIAL INVESTIMENT ANALYSIS

The model has a central agri-food market (CAAM) located on the outskirts of the city of Chimoio, within the urban area, linked to peripheral Agro-Hubs (located in the 4 districts according to production areas) where direct services are provided to farmers/producers.

The HUBs and CAAM work together to strengthen the food supply chain. The HUBs provide: services to agriculture and the food supply chain (warehouses, cold rooms for storage and laboratories for research and quality control); a processing center and a local point of sale for fresh produce; supporting local communities with working capital, training activities and social spaces and including women in the processes.

6.1 Investment Plan

The economic investment structure is the following:

Economic structure of the project	m²	€
CAAM Building	*115.000*	*11.000.000*
4 Agri-Hubs construction	*28.000*	*3.300.000*
A) TOAL CONSTRUCTION VOSTS		**14.300.000**
CAAM Machinery and Equipment	*/*	*10.610.000*
4 AgriHubs Machinery and Equipments	*/*	*4.390.000*
B) total machinery and equipment costs		**15.000.000**
A+B) CAPEX		**29.300.000**

Table 33: Economic investment structure

In addition, CAAM's initial activities will be financed partly with loans and partly with subsidies:

Values for the start of CAAM activities	
CAAM's direct services	*4.100.000*
Governance costs	*700.000*
Technical assistance, supervision	*900.000*
1) Amounts receivable for the start of CAAM's activities	**5.700.000**
2) Non-reimbursable amounts for the start-up of CAAM	**3.300.000**
1+2) CAAM start-up fees	**9.000.000**

Table 34: Expenses for CAAM's initial activities

And operating costs amount to a total of 4 million euros:

Total operating costs	**€/year**
CAAM Opex	2.769.000
HUB Opex (x4)	1.228.000
TOTAL	**€ 3.997.000**

Table 35: Total operating costs (prices including 16% VAT)

A specific organization of machinery and equipment in CAAM and HUBs is as follows:

Machinery and Equipment				
Area function	**CAAM**		**Agri-HUB**	
	Area destination	**description**	**Area destination**	**description**
Collection	Service areas	Scales (input - output)	Login	2 tractors with trailers to haul the products from the farms to the warehouses
	Facilities	Forklifts (n.4)	Exit	2 small trucks for transportation from base to hub
	Loading bays	4 trucks for the HUBs	Storage	Scale (in - out)
			Installations	Pallet trucks (n.3)
Storage	Cold storage	Sorting - Cleaning - Washing (potatoes, onions, etc.)	Processing	Forklift trucks (n.2)
			Processing	Sorting - Cleaning - Washing: potatoes, onions ,,,)
Processing	Processing	Pulp, juice, sterilization and bottling lines: avocados, citrus fruits, tomatoes, various fruits, pine nuts	Processing	1 pulp and juice line and sterilization + bottling (manual): Pineapple - citrus, mango, tomato
	facilities	Dehydration: bananas, mangoes, onions	Packaging area	Crates (20 x 1000 farmers)
	Cold storage	Forklift trucks (n.2)		
Services	Office	6 computers+monitors (working stations)	Office	4 computers + monitors (working stations)
Sales	Loading and unloading bays	Forklift trucks (n.4)		
	Wholesale spaces	Scales for wholesalers (n.50)		
Logistics	Packing area	Recyclable plastic bins (1000 for 50 wholesalers) and pallets	Logistics	Mechanical and irrigation spare parts, garage repair workshop
	Loading bays	Pallet trucks (n.10)	Facilities	Scales; quality control and sampling
Facilities	Biogas system	Biogas containers	Rental	Motorized cultivators x 1000 farmers (rental)

Table 36: CAAM-Hub investment in machinery and equipment

6.1.1 Financial structure

The loan agreement includes the following financial conditions (source: AICS):

- Total duration of the loan: 32 years;
- Grace period: 22 years (meaning there are no payments due for the first 22 years);
- Repayment period: 10 years;
- Interest rate: 0%.

Main assumptions of the financial analysis:

- The exchange rate: 1 MZN = 0.015 EUR (source: Banca d'Italia, average rate for 2024);
- Total investment of 35 million euros in loans from Italy;
- Depreciation rates (Italian administrative criteria; IAS - International Accounting Standards):

1. Buildings and Civil Works: 2.0% (50 years);
2. Machinery and Equipment: 10% (10 years).

Project duration: 32 years (in line with the loan duration)

Cost of capital (Ke): the rate of return expected on the market for comparable infrastructure investments with a similar level of risk, calculated at 11.59%. In terms of the CAPM (Capital Assessment Pricing Model), this figure takes into account:

- Risk-free rate: 2.76% (average market value of the 30-year German bond in February 2025);
- Beta (unlevered): 0.54 (Damodaran[12]- Category of food wholesalers - January 2025);
- Market Risk Premium: 16.35% (Damodaran[13] - January 2025 - including Mozambique's country risk premium);

Weighted average cost of capital (WACC): 0%, calculated by weighting debt (35 million) at 0% and equity (0 million) at 11.59%;

- Tax rate of 32%.

The strategy adopted aims to make CAAM attractive to wholesalers and invite them to move into the new infrastructure. This amount is then divided into the square meters of CAAM's parking spaces dedicated to wholesalers. In fact, the revenue comes from the sale of commercial space; the preliminary calculation of product quantities is fundamental to the incidence of commercial costs. In the first 5 years, this corresponds to 86 euros/m2 and then 129 euros/m2.

[12] https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/Betas.html
[13] https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html

Key financial assumptions	
Loan (22 yrs grace period + 10 yrs repeyment)	**€ 35.000.000**
Interest rate of the loan agreement	0%
Equity	**0**
Cost of Equity	11,59%
WACC	**0,00%**

Table 37:financial structure of the project

- Quantity of product marketed (source: value chain report, economic report): 73,000 tons in 2025; 109,000 tons in 2055;
- Value of product marketed (source: value chain report; economic analysis report): 20 million euros in 2025; 39 million euros in 2055 (at constant prices);
- Current commercial costs (source: economic analysis report): 2.3 MZN / Kg = €/Kg 0.034 (34€ /ton);
- Working capital is calculated based on the following assumptions:

Consumables cover for a period of 30 days:

1. Cash on hand covers a minimum period of 30 days, including cash for wages and salaries, electricity, fuel and general and administrative expenses;

2. AgriHubs' collection times are estimated at 180 days, i.e. at the end of the harvest, for supported harvest advances;

- Operating cash flow is positive from the fifth year onwards.

6.1.2 Revenues from wholesalers

Main assumptions: a fee is considered for wholesalers for the use of space, with an average of €71/m² in the first five years; this fee makes it advantageous to move to CAAM, as they could reduce the costs of marketing their products (€10/ton compared to the current €34/ton).

Chain Activities: Retail purchases from Chimoio Wholesalers	**Costs (MZN/kg)**	**% on the final cost to the consumer (*)**
Producer costs	4.1	13.6
Wholesale margin	2	
Wholesale Price	20	66
Commercial Costs	**2.3**	**7.6**
Retail Price	30	100

Table 38: Analysis of the profitability of the cabbage and mango supply chains in Manica, Mozambique. Source: Newtech Consultant-GAIN (USAID, 2020)

(*)To calculate a final price benchmark, a market survey was carried out at Mercato 38 and Katanga for two consecutive weeks. The surveys revealed that the customers are both HORECA, retailers and end consumers.

6.1.3 Revenues from farmers

It is proposed to charge a fee to producers who sell products directly in CAAM of:

- 10 €/m² per year for the first year
- 20 €/m² per year from the second year onwards
- 30 €/m² per year from the fourth year onwards
- 40 €/m² per year in the fifth year
- 50 €/m² per year from the sixth year onwards

A low rate is also intended to reinforce the strategy of quickly aggregating the supply and demand of products (farmers and wholesalers) and therefore make CAAM interesting for additional service providers. On the other hand, there is a risk that if the CAAM is not attractive or cheap enough for wholesalers, they may look for informal but cheaper markets and the new structure will remain unused.

6.1.4 Revenue from services

The model takes into account the additional revenues from other services that can be provided within the infrastructure, such as: rental space for stores, banks, social services, processing, cafeteria, logistics, cold storage, etc. The figures are the results of the assessment of CAAM's potential to aggregate the added services to commercial operators through comparison with international benchmarks and the needs collected in the comparison with stakeholders during field visits: €0.8 million for the first 5 years of activity, then progressively increasing to stabilize at €2.5 million from the 6th year onwards.

As a result, the unit cost per m2 (area calculated by the architectural project) for services starts at 180 euros for a total surface area with facilities to rent (logistics+processing+services+utilities+refrigerated storage): estimated at 4,500 m².

CAAM: Revenue €/m²	Year 1-5 Euro	Year 6-10 Euro	Year >11 Euro
Zone 1: wholesalers (n.50)	75	100	138
Zone 2: producers (n.200)	24	50	50
Zone 3: logistics+processing+services+utilities+refrigerated storage	180	330	403

Table 39: CAAM revenues based on the allocation of specific areas

6.1.5 Revenues from Agri-Hubs

- The HUB's revenues are generated by a commercial margin applied to sales of agricultural raw materials and logistics and post-harvest services. Technical assistance, training, capacity building and experimentation are included in the same calculation;
- To calculate the size of the market, we consider a catchment area to be the rural area within a radius of 10 km around each Agri-Hub (the distance is considered manageable with a tractor from the field to the Hub), corresponding to a rural area of around 31,000 hectares. On the principle of prudence, we consider that only 25% of the catchment area is actually cultivated agricultural land, which equates to approximately 7,800 hectares for each Agri-Hub;
- The cost of agricultural raw materials (assessment based on FAO data on fertilizers, pest control, machinery, irrigation technology, etc.) is estimated at 300 euros/hectare for all crops grown, which corresponds to 30% of farmers' income;
- The Agri-Hub, which serves all the agricultural activity of the farms within the catchment area, will sell raw materials and services for a value of €2.3 million per Hub (€300/hectare x 7,800 hectares);
- Assuming a commercial margin of 15%, the Hub's operating margin is €450,000 per year on average in the first phase (5 years of phase-in time);
- To start the production cycle, farmers need to have agricultural inputs and machinery, but with the associated financial services to advance the costs. Without the possibility of working capital, with difficult access to credit and without collateral capital, the costs of these means must be advanced by the HUB. At the end of the production cycle, the HUB collects the product from the farmers, carries out preliminary processing and then transports and sells the product to the CAAM operators. Therefore, a “product transfer” relationship is established between the farmers and the HUBs: payment to the farmers will be based on the sales price to the CAAM managers minus the costs of the inputs, the costs of services and financial advances. Consequently, the HUBs' net income will be represented by the commercial margins of these economic and financial transactions. For these financial coverage needs, the HUBs must be incorporated into the same share capital as CAAM;
- This compensation for the HUB, calculated on the factors of production, also includes marketing, logistics and post-harvest services that the HUB provides to the farmer. In fact, the inputs and tools for production are anticipated at the beginning of the production cycle. The HUB then provides the logistics to bundle the product from the field, the initial management and the post-harvest services. It then bundles the product for shipment to CAAM;
- Over the course of the plan, the reach of the Agri-Hub is expected to increase, which will lead to an increase in revenue compared to the initial assessment of 20%, in the third, fourth and fifth year of the plan respectively.

The activity of the HUB improves the productivity of companies and explains the increase in goods entering the CAAM (Italian model of agricultural consortia).

Total project revenue: CAAM + Agri-HUBs	Year 1-5 Euro	Year 6-10 Euro	Year >11 Euro
Revenue from wholesaler space	649.926	868.474	1.199.260
Revenue from farmers	26.400	55.000	55.000
Revenue from services	810.000	1.485.000	1.815.000
Total revenue CAAM	**1.486.326**	**2.408.474**	**3.069.260**
Revenue from agrihubs	1.799.597	2.441.664	2.441.664
Total project revenue: CAAM + Agri-HUBs	**3.285.922**	**4.850.138**	**5.510.924**

Table 40: Revenue Details

More information, including the sensitivity analysis, is available in Annexes 16 (Financial model) and 17 (Financial model report).

6.2 Final considerations

Production is considered to be more efficient for direct farmers operating inside the hub, as they should be provided with technical assistance to help them increase their yield per hectare of land. It allows them to reduce their environmental impact by adding transport, as well as their input costs, compared to other farmers outside the hub and the BAU scenario.

- In terms of value added to the territory, the PS scenario exceeds the BAU scenario by around 6 million euros/year. The positive impacts will be on both the quality and quantity of production (at constant prices) in the value chains. The infrastructure, services, equipment and technologies within the CAAM are expected to increase the quantities and improve the average quality of perishable products. The CAAM-Hubs will offer stalls for farmers, basic services for sustainable agriculture and post-harvest (washing, sorting, grading and packaging of products, modular refrigerated rooms for pre-processing, packaging, harvesting of perishable products), improved logistics and equipment for loading and unloading trucks. This combination of improved facilities will lead to cleaner, better or well-preserved products, properly sorted, processed and packaged, which increases added value.
- In terms of income, farmers benefit the most: direct farmers enjoy higher incomes and added value. In the PS scenario, revenues should increase by 50% for formal players inside the hub compared to informal players outside the hub. As for informal wholesalers, they get fewer quantities to sell due to the fact that wholesalers inside the hub will get higher F&V flow, as well as preserving better handling and fewer losses, which may result in informal wholesalers gradually exiting venture capital.
- Processing units should also increase the value of products by 15% (loss recovery) due to the added value

generated by better machinery, packaging and higher quality products. On the contrary, wholesalers in the PS scenario are strongly benefiting from lower food losses, which can give them scope to sell at the same prices as indirect wholesalers with a competitive advantage in better quality products while preserving a higher profit margin, making products accessible to consumers, creating a win-win situation for both wholesalers and consumers.

In a nutshell:

- EBITDA (earnings before interest, taxes, depreciation and amortization) is an alternative profitability measure to net profit. It is used to assess a company's profitability and financial performance) has been positive since the fourth year of activity;
- Operating cash flow is positive from the fifth year after the start of operations;
- The internal return on investment (IRR) is around 0.3% for the project with a NPV of 2.2 million euros (WACC=0%).

Main financial results	**Year 1-5** (average) Euro	**Year 6-10** (average) Euro	**Year >11** (average) Euro
Revenue (no operating subsidies)	3.285.922	4.850.138	5.510.924
OPEX – Operacional Costs	-3.837.696	-3.997.600	-3.997.600
EBITDA	**-551.774**	**852.538**	**1.513.324**
EBITDA MARGIN	*-15%*	*17%*	*27%*
Operating cash flow	-648.850	804.285	1.461.703

Table 41: main financial results

7. ARCHITECTURAL SKETCHES AND TECHNICAL DIMENSIONING OF THE CAAM

This chapter describes and analyzes the best solution for the multidisciplinary project to build the Agri-Food Distribution Centre (CAAM) and associated facilities, taking into account the necessary equipment, location and circular economy principles.

The CAAM will operate at full capacity, receiving harvested products (from regional farmers, as well as other fresh and dried products from local wholesalers). It will facilitate sorting, processing, sale and distribution on the domestic and foreign markets.

7.1 CAAM Model

The model of the agri-food center (CAAM) has, as its first general principle, a physical link between demand and supply in a value chain (supply is located in the countryside and demand in the city or urban area). The best model is the result of developing architectural sketches of simulations of the business model best suited to the territory and the development scenarios during year 0, year 10 from the time of the projection (2035) and year 30 from the time of the projection (2055), as described in the Economic Report.

The 3 business model schemes identified and studied were:

Model A (local city): Wholesale market located in the city focused essentially on retail supply. It will be a pure wholesale market, focused on demand (agricultural products are transported to be sold to operators in the city and, to some extent, destined for export), without services to develop agriculture and improve the know-how of operators in rural areas. In addition to the market, it includes logistics support service activities, such as renting vehicles to collect agricultural products, and quality control laboratories, which, over time, will help improve the standardization of goods.

Model B (urban area): An urban distribution platform geared towards large retailers, including buying centers that supply large retailers, the HORECA channel and large supermarket companies, and aimed at companies with export capacity. It will include spaces for handling, minor processing of goods, preparation and reorganization of palletized goods to meet orders. There will be spaces dedicated to processing products, in order to minimize food waste by processing second quality products or surplus goods not sold during peak harvest periods.

Model C (incorporates the rural area): Agro-polo/agro-park which, unlike the previous models, reinforces the agricultural offer and support for producers with the aim of improving production, in terms of quality and quantity, minimizing waste in the production of unsold products, in post-harvest activities and guaranteeing services and knowledge to rural communities, incorporating the component of the flow of production to supply the growing population of the city of Chimoio and existing trade with other provinces, the rest of the country and exports.

This third model was the one he considered best suited to the regional reality, proposing:

- a central agri-food market, the CAAM, located on the outskirts of the city of Chimoio, in the urban area,

linked to ...

- …peripheral agri-hubs: at least 4, located in the districts according to the most intensified production areas and prepared for continuous production.

The study and analysis developed reflect the business models identified in the economic study, with a view to phased and progressive construction, with model areas for future expansion, depending on the evolution of demand for commercial space.

The following justifies the choice of project model for CAAM, guided by the main values of the performance indicators:

Comparison table (score ***)			
Values	**Parametrs**	**Evaluation Criteria**	
Economical	Investiment cost	*	Higher investments cost (considering the dimension)
		***	Lower investments cost (considering the dimension)
	Operating cost	*	Higher operating cost
		***	Lower operationg cost
	Mainentance cost	*	Higher maintenance cost
		***	Lower operationg cost
	Construction timing cost	*	Longer implementation
		***	Shorter implementation
Ecological	Energy requirements/use	*	Higher energy requirements for building's functioning/operativity (considerign utilities and technological infrastructure systems)
		***	Lower energy requirements for building's functioning/operativity (considerign utilities and technological infrastructure systems)
	Energy production from renewable sources	*	Low production due to smaller and simplier system
		***	High production due to larger/variegated renewable sources implants
	Enviromental emission	*	High emissions and/or no compensation
		***	Low emissions and/or compensation from renewable sources
	Use of environmentally sustainable materials	*	Use of not environmentally sustainable materials
		***	Use of environmentally sustainable materials
	Quantity and waste management	*	High quantity of waste and/or basic waste management
		***	Low quantity of waste and/or excellent waste management
Social	Presence of emergency and safety scructures	*	Low level of facilities
		***	Higher level of facilities
	Presence of facilities for relaxation and socialization	*	Low level of facilities
		***	Higher level of facilities
	Presence of structure to facilitate work and family	*	Low level of facilities
		***	Higher level of facilities
	Presence of general services facilities	*	Low level of facilities
		***	Higher level of facilities

Table 42: Performance review score

Model C obtained the highest score and is considered the best model for implementing CAAM, for the following reasons: high concern for ecological aspects in terms of the correct use of energy and waste, sensitivity to environmental and social aspects in terms of the presence of facilities, services and structures to facilitate relaxation

and socialization. Total construction and operating costs (excluding human resources, cleaning, security, marketing, etc.) penalize the model, but can be managed in terms of phases and modular construction, in line with the financial model.

In this C model, HUBs and CAAM work together to strengthen the food supply chain, improving the nutritional level of families by extending the shelf life of food, the circular economy, rural employment and increased incomes.

HUBS are not just simple collection points, but Agro-hubs that provide services to agriculture, work for the food supply chain, provide post-harvest, storage and processing space, while supporting local communities with training activities and social spaces for inclusion in the various activities carried out.

In this model, CAAM and HUBS will have different functions and provide different services, the former more geared towards meeting demand, even though some local produce may be marketed there; the latter more geared towards supporting production, with the aim of improving quality, reducing waste and increasing yields, improving farmers' incomes and increasing the country's food self-sufficiency.

Below is a representation of the dynamics from the field to the peripheral collection points (Bases) in rural communities and to the Hubs, which carry out all the aggregation, preparing the products for CAAM, as shown in the drawing below:

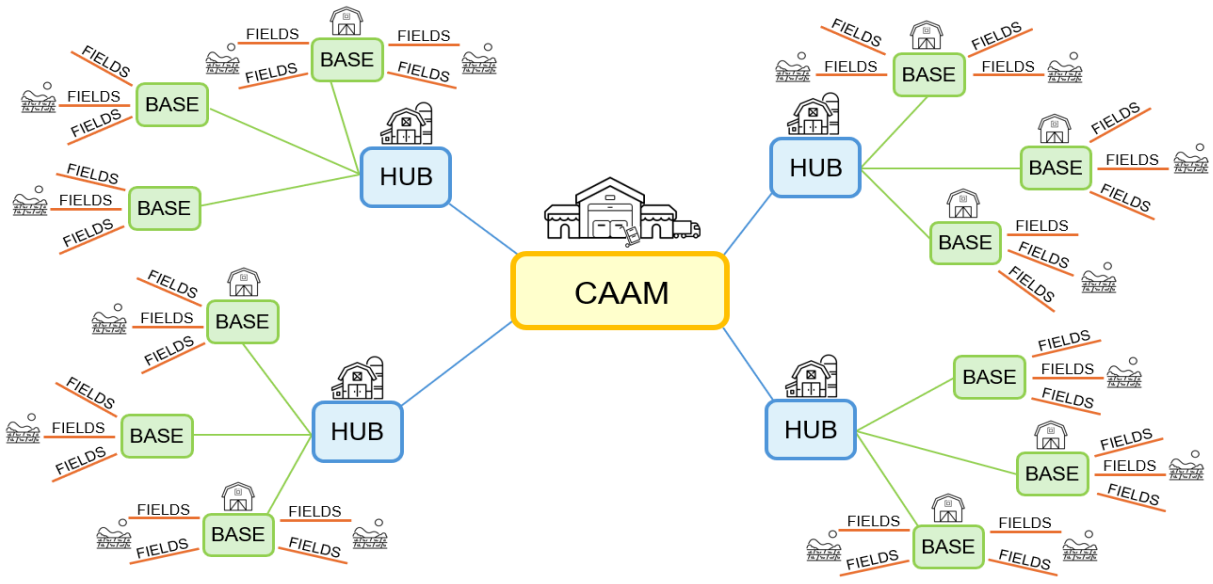


Figure 25: Sketch 3, functional dyagram

The relationship between commodity flows focuses on the direction in which the demand or sales force is carried out. The **PUSHED flow** means that the product circulates without having yet been bought by the customer, the **PULLED flow** - the product circulates towards the customer because it has been bought by them. This articulation in the proposed model can be summarized as follows:

THE FLOW OF PRODUCTS TOWARDS THE CAAM: PUSHED OR PULLED

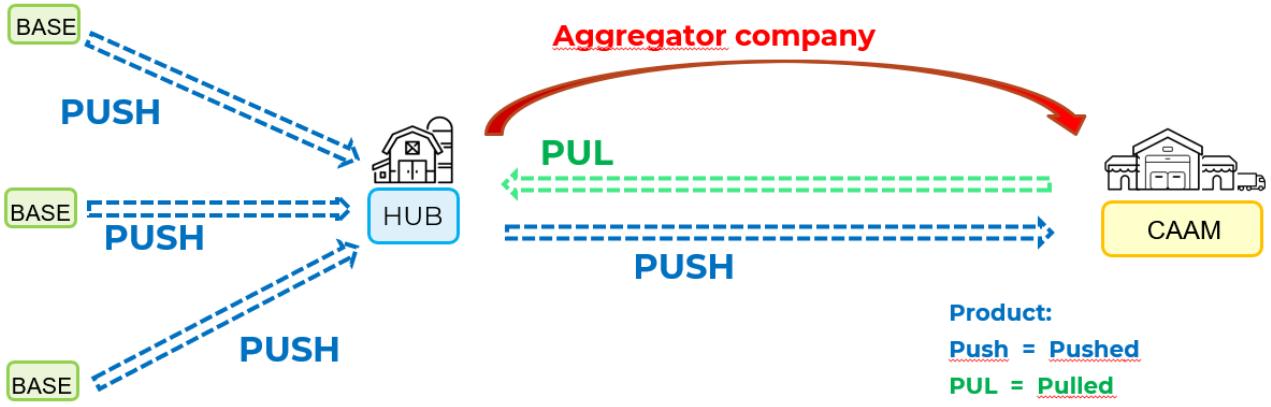


Figure 26: Flow diagram depending on whether pressure is applied by the buyer or the seller

7.2 Proposed solution: Model C - 3rd CAAM sketch + 4 HUBs

The solution designed includes two PHASES:

- Phase 1 - Start-up Scenario
- Phase 2 - Full Scenario

The scenario considered for sizing is the 2055 scenario (FULL scenario), as presented in the economic analysis chapter and developed below.

The sizing of the architecture is based on both analyses (project scenario and sensitivity scenario) which estimate the following quantities passing through the HUBs and CAAM circuit:

- The quantity of goods entering the CAAM is 109,000 tons/year;
- Of this total, 50% will come from local production - 54,500 tons/year;
- Each HUB will account for ¼ of the goods entering CAAM - 13,500 tons/year;
- The remaining 50% will come from imports (from other regions or countries) - 54,000 tons/year.

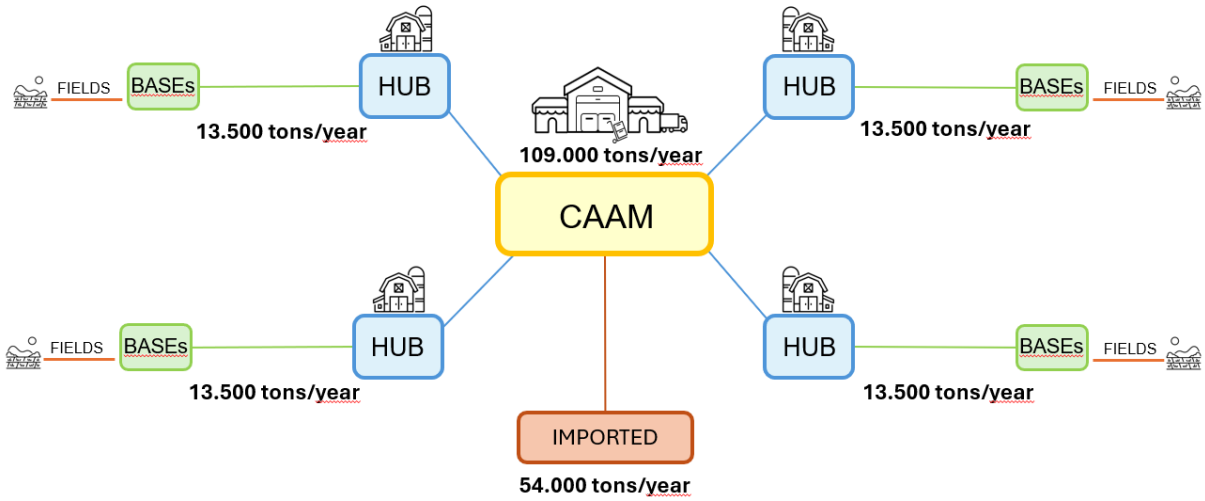


Figure 27: Model C, functional dyagram with quantities

The process mapping identifies the services that CAAM is responsible for.

The following assumptions were also taken into account when sizing CAAM:

- The high season occurs in the months between August and December:
- 66% of domestic products are concentrated in these months, i.e. 7,500 tons/month
- The imported product is constant throughout the year, totaling 4,500 tons/month
- The total of products during peak periods, including 15% of contingencies, will be **13,800 tons/month, corresponding to 460 tons/day.**

CAAM's architecture and infrastructure depend on the three fundamental functions to be activated on the market in relatively different combinations:

- Food processing activities:

→ an Agrifood pole model (model C) with a

→ wholesale trade (30%), logistics (50%), food processing (20%)

The CAAM area has been organized to accommodate upcoming and future expansions in terms of complementary services.

The block diagrams identifying the functions have been dimensioned and combined into a functional distribution plan, as shown below. These are shown in the following figures, resulting from the sizing of the various functions identified (wholesale trade 30%, logistics 50%, food processing 20%), combined in a functional distribution planimetry.

The functional blocks are spatially distributed in such a way as to allow for expansion and guarantee more efficient flows, and are as follows (remember that the areas identified for each of these zones in the figure below refer to the complete scenario):

▪ Collection ▪ Processing ▪ Storage ▪ Sale	▪ Logistics ▪ Producer area ▪ Administration	▪ Services ▪ Utilities ▪ Renewable energy ▪ Green areas	▪ Parking ▪ Coffe infrastructure ▪ Future expansion

	FUNCTIONAL BLOCKS				
1	Collecting	6.000m²	8	Services	635m²
2	Processing	2.600m²	9	Utilities	1.500m²
3	Storing	2.200m²	10	Renewable energy	5.200m²
4	Wholesalers	12.600m²	11	Green areas	20.000m²
5	Logistics	2.500m²	12	Parking slots	1.300m²
6	Producers area	1.700m²	13	Coffee infrastructure	2.000m²
7	Admininstration, Control, Facilities	1.950m²	14	Future expansion	

SITE TOTAL AREA	130.000m²
Built-up area	≈37.000m²
Free space	≈93.000m²

Figure 28: Model C, blocks scheme CAAM

In total, the intervention area will be 135,000m2, of which around 37,000m2 will be built (functional blocks 1 to 10, inclusive); the remaining area, corresponding to around 93,000m2, will initially be used for green spaces and parking, and may, depending on demand, include other activities in the expansion area, such as a cafeteria, which will already be infrastructured. This sizing proposal and the various areas taken into account have made it possible to draw up an investment estimate, based on the functions and equipment planned for each of them.

CAAM Model C data analysis							
Function of area	Destination of area	Surface [m²]	Volume [m³]	Construction		Utilities	
				Unitary cost [€/sqm]	Total cost [€]	Total energy [kWh/year]	Total water [m³/year]
Collecting	Service area	170	1.020	300,00	51.000,00	44.676	730
	Cold storage	2.000	12.000	1.200,00	2.400.000,00	1.752.000	730
	Storage	1.400	8.400	600,00	840.000,00	490.560	3.650
	Facilities	100	600	500,00	50.000,00	35.040	1.460
	Cargo bays	500	3.000	350,00	175.000,00	175.200	365
	Input and output area	1.300	7.800	300,00	390.000,00	683.280	730
	2nd quality	700	4.200	400,00	280.000,00	490.560	3.650
	Office	50	300	600,00	30.000,00	35.040	1.095
Storing	Cold storage	1.100	6.600	1.200,00	1.320.000,00	963.600	10.950
	Storage	1.100	6.600	600,00	660.000,00	578.160	3.650
Processing	Processing	1.200	7.200	1000	1.200.000,00	1.051.200	20.075
	Facilities	140	840	600	84.000,00	49.056	1.460
	Storage	180	1.080	600,00	108.000,00	63.072	3.650
	Cold storage	180	1.080	1.200,00	216.000,00	157.680	10.950
	Internal way	600	3.600	120	72.000,00	157.680	730
	Packaging area	300	1.800	600	180.000,00	157.680	7.300
Sevices	Canteen	300	1.800	240,00	72.000,00	157.680	3.650
	Training	350	2.100	450,00	157.500,00	245.280	1.460
	Fuel station	35	210	450,00	15.750,00	18.396	730
	Workshop and mainentancies	400	2.400	400,00	160.000,00	280.320	1.825
	Rental	200	1.200	400,00	80.000,00	122.640	1.095
	Changing room	150	900	400,00	60.000,00	78.840	730
	Health and care	300	1.200	450,00	135.000,00	140.160	1.460
	Quality control	300	1.200	600,00	180.000,00	140.160	1.095
	Guard house	200	800	400,00	80.000,00	70.080	1.095
	Office	430	1.720	550,00	236.500,00	200.896	1.095
Selling	Cargo bays	1.850	7.400	350,00	647.500,00	432.160	365
	Big wholesalers	3770	15.080	500,00	1.885.000,00	1.761.344	7.300
	Producers	1700	6.800	500,00	850.000,00	794.240	7.300
	Internal way	1.450	5.800	120,00	174.000,00	254.040	730
	Wholesalers Tiles	4050	16.200	500,00	2.025.000,00	1.892.160	3.650
Logistics	Cold storage	530	2.120	1.200,00	636.000,00	309.520	10.950
	Storage	530	2.120	600,00	318.000,00	123.808	5.475
	Packaging area	1.000	4.000	600,00	600.000,00	467.200	5.475
	Cargo bays	350	1.400	350,00	122.500,00	61.320	730
Coffee	Coffee	2.000	8.000	550,00	1.100.000,00	700.800	5.475
Tecnological system	Utilities system	500	2.000	1.050,00	525.000,00	292.000	7.300
	Biogas system	500	2.000	1.050,00	525.000,00	292.000	1.460
Waste teatrment	Compost	250	1.000	500,00	125.000,00	146.000	7.300
	Waste	250	1.000	1.300,00	325.000,00	146.000	7.300
Renewable system	Solar system	4.860	0	300,00	1.458.000,00	-4.000.000	730
	Wind system	340	0	1.600,00	544.000,00	-1.620.000	730
Parking	Parking	2.300	0	60,00	138.000,00	67.160	730
Roads and manovering	Roads and manovering	50.000	0	20,00	1.000.000,00	730.000	730
Green area	Green area	20.000	0	8,00	160.000,00	175.200	1.825
Future infrastructure	Future infrastructure	25.000	0	0,00	0,00	0	0
TOTALS		134.915	154.570	-	22.390.750	11.363.888	160.965

SURFACE		135.000 m²
CONSTRUCTION COST		22.400.000,00 €
OPERATING COSTS	Energy cost per year (electricity, water, air compressed, cooling, lighting, steam, etc.)	2.900.000,00 €
	Mainentance cost per year	290.000,00 €

Table 43: Model C, CAAM analysis

Figure 29: Model C, CAAM Masterplan

Figure 30: Model C, CAAM Rendering

The estimated costs of building and running CAAM (excluding human resources, cleaning, security, marketing, etc.) are summarized as follows:

- Total area of intervention: 135,000 m2;
- Built-up area: 37,000m2;
- Total construction cost: 22,400,000 euros;
- Total annual operating cost (energy and maintenance): €3,190,000/year.

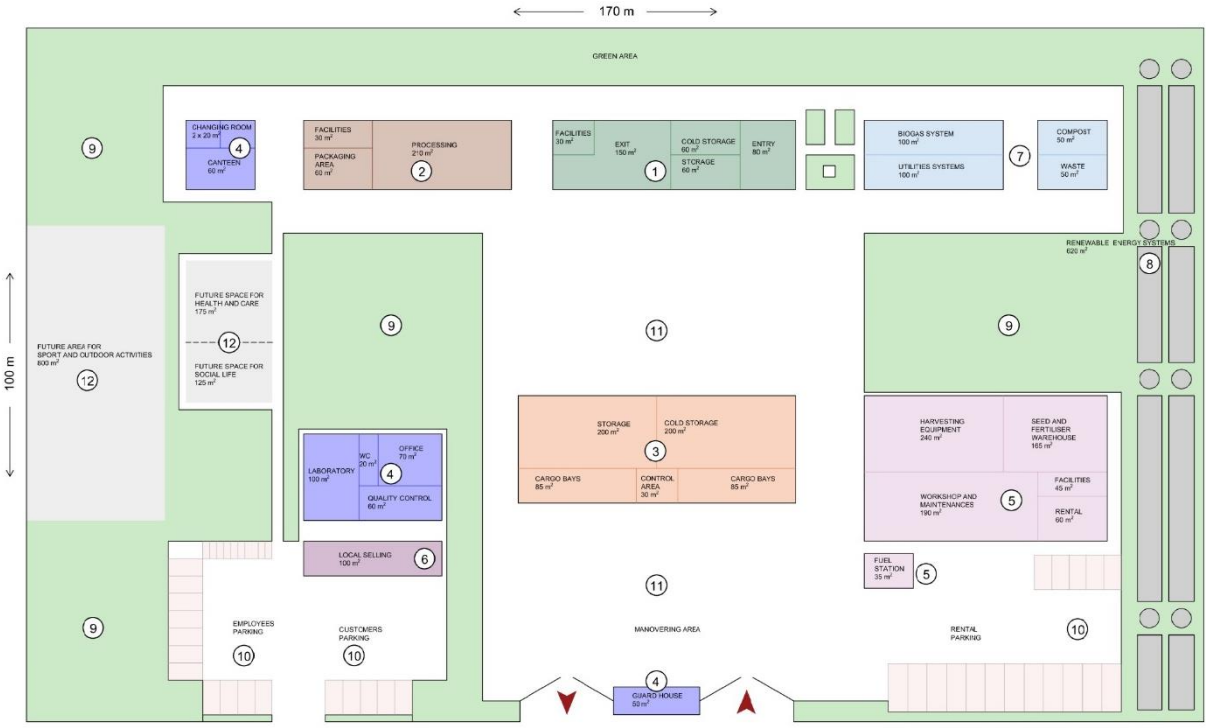
Having presented the sizing and estimated costs of the CAAM food center, it is now important to understand the

construction costs of the HUBs that will work synergistically with it.

For each HUB too, care has been taken to prepare the space to accommodate upcoming and future expansions in terms of complementary services.

The block layout identifying the functions was dimensioned and combined into a functional distribution plan, as shown below:

▪ Collection ▪ Processing ▪ Storage	▪ Administration ▪ Services fro farmers ▪ Local sales	▪ Services ▪ Renewable energy ▪ Green areas	▪ Parking ▪ Roads and traffic ▪ Future expansion



	FUNCTIONAL BLOCKS				
1	Collecting	350m²	7	Utilities	300m²
2	Processing	300m²	8	Renewable energy	600m²
3	Storing	600m²	9	Green areas	5.600 m²
4	Admininstration, Control, Facilities	400m²	10	Parking slots	525 m²
5	Farmers' services	750m²	11	Future expansion	
6	Local selling	100m²	12		

SITE TOTAL AREA	17.000 m²
Built-up area	≈2.800m²
Paved area	≈5.800 m²

Figure 31: Model C, HUB blocks scheme

In total, the intervention area of each HUB will be 17,000^{m2}, of which around 3,000^{m2} will be built (functional blocks 1 to 8, inclusive); the remaining area, corresponding to around 14,000^{m2}, will initially be used for green spaces, roads, circulation and parking, and may include other activities in the expansion area, depending on demand.

This sizing proposal and the various areas taken into account made it possible to draw up an investment estimate for each HUB, based on the functions and equipment planned for each one.

HUB - Construction and operational cost							
Function of area	Destination of area	Total surface [m²]	Surface [m²]	Volume [m³]	Construction	Utilities	
					Total cost [€]	Total energy [kWh/year]	Total water [m³/year]
Collecting	Entry	130	25	150	7.500,00	8.760	730
	Exit		30	180	9.000,00	10.512	730
	Cold storage		30	180	27.000,00	26.280	7.300
	Storage		30	180	18.000,00	10.512	3.650
	Facilities		15	90	7.500,00	5.256	730
Storage	Cold storage	210	70	420	70.000,00	61.320	7.300
	Storage		70	420	42.000,00	24.528	3.650
	Cargo bays		50	300	17.500,00	13.140	365
	Office control		20	120	7.000,00	7.008	365
Processing	Processing	85	40	240	40.000,00	35.040	20.075
	Facilities		15	90	9.000,00	5.256	1.460
	Packaging area		30	180	18.000,00	18.396	5.475
Logistic and agricoltural services	Harvesting equipment	455	100	600	50.000,00	35.040	3.650
	Seed and fertiliser warehouse		100	600	50.000,00	35.040	3.650
	Workshop and mainentancies		110	660	44.000,00	38.544	1.825
	Facilities		50	300	22.500,00	17.520	730
	Vehicles rental		60	360	24.000,00	21.024	730
	Fuel station		35	210	26.250,00	18.396	730
Facilities	Office	150	50	200	25.000,00	23.360	1.095
	Changing room		40	160	16.000,00	14.016	730
	Canteen		60	240	24.000,00	21.024	3.650
Guard house	Guard house	20	20	80	8.000,00	9.344	1.095
Tecnological system	Utilities system	50	50	200	50.000,00	29.200	3.650
Waste treatment	Compost	50	25	100	12.500,00	11.680	3.650
	Waste		25	100	32.500,00	14.600	7.300
Renevable system	Solar system	140	130	0	39.000,00	-100.000	730
	Wind System		10	0	12.000,00	-20.000	730
Parking	Parking for 17 car slots 5 trucks slots 8 moped slots	330	330	0	19.800,00	9.636	730
Roads and Circulations area	Roads and Circulations area	3.380	3.380	0	81.120,00	49.348	730
Green	Green	1.300	1.300	0	10.400,00	11.388	1.825
Expansion Areas	Expansion Areas	700	700	0	5.600,00	6.132	1.825
TOTALS		**7.000**	**7.000**	**6.360**	**825.170**	**471.300**	**90.885**

	SURFACE	**7.000 m²**
	CONSTRUCTION COST	**825.000,00 €**
OPERATING COSTS	**Utilities and operationally energy cost per year (electricity, water, air compressed, cooling, lighting, steam, etc.)**	**155.000,00 €**
	Construction, technological and utilities mainentance cost per year	**15.500,00 €**

Table 44: Model C, HUB analysis

Figure 32 Model C, HUB Masterplan

Figure 33: Model C, HUB rendering

The estimated construction and operating costs for each HUB individually (excluding human resources, cleaning, security, marketing, etc.) are summarized as follows:

- Total intervention area: 17,000 m2;
- Built-up area: 3,000 m2.

The costs are as follows:

- Total construction cost: €2,380,000;
- Total annual operating cost (energy and maintenance): 308,000 €/year.

In short, the total construction cost of the proposed model C, consisting of the CAAM and four (4) HUBs, considering the full operating scenario, to be achieved in 2055, will be:

- Total construction cost: €31,920,000, resulting from the sum of the construction cost of the CAAM (€22,400,000) and the construction of 4 HUBs (4x€2,380,000);
- Total annual operating cost for energy and maintenance: €4,422,000/year.

7.3 CAAM, model C_0 (Phase 1)

In order to move forward with this project, 35 million euros are available, of which 14.3 million euros are for construction over 3 years.

Therefore, in order to respect the available budget, the principle of modularity and the assumption of construction phasing already advocated were used, and the initial model of architectural sketch C, called C_0, which is now presented, was defined.

Both the CAAM and the HUBs have some functional blocks (buildings) that must be built, as they are essential for the proper functioning of the entire infrastructure.

However, other functions can be added, implemented or integrated over time, to create a network of agri-food hubs that not only improves the agri-food supply chain, but also improves the quality of life of local communities in all aspects.

Following the same reasoning already described for the complete C model, the assumptions, layouts and cost estimates for the PHASE 1 C model are now presented, first for the CAAM and then for the HUBs.

The sizing assumptions considered for the CAAM construction model in this 2055 scenario (PHASE 1 scenario) are as follows:

- The quantity of goods entering the CAAM is 70,000 tons/year;
- It is considered that 55% of this merchandise is produced in the neighboring districts, corresponding to 40,000 tons/year;
- Each HUB will account for ¼ of the goods entering CAAM - so 10,000 tons/year from each of the HUBs;

- It is considered that 40% of the goods arriving at CAAM originate in other regions (national or not), accounting for 27,000 tons/year;
- The remaining 5% originates from farms close to the CAAM, or 3,000 tons/year.

The CAAM area is organized to accommodate upcoming and future expansions in terms of complementary services. The block diagrams identifying the functions have been dimensioned and combined in a functional distribution planimetry, as shown below:

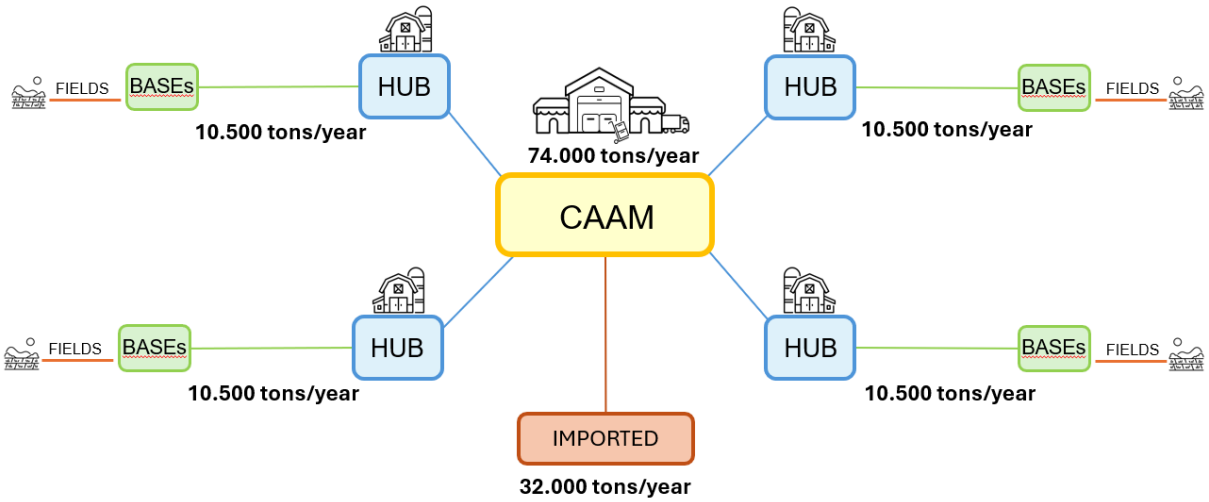
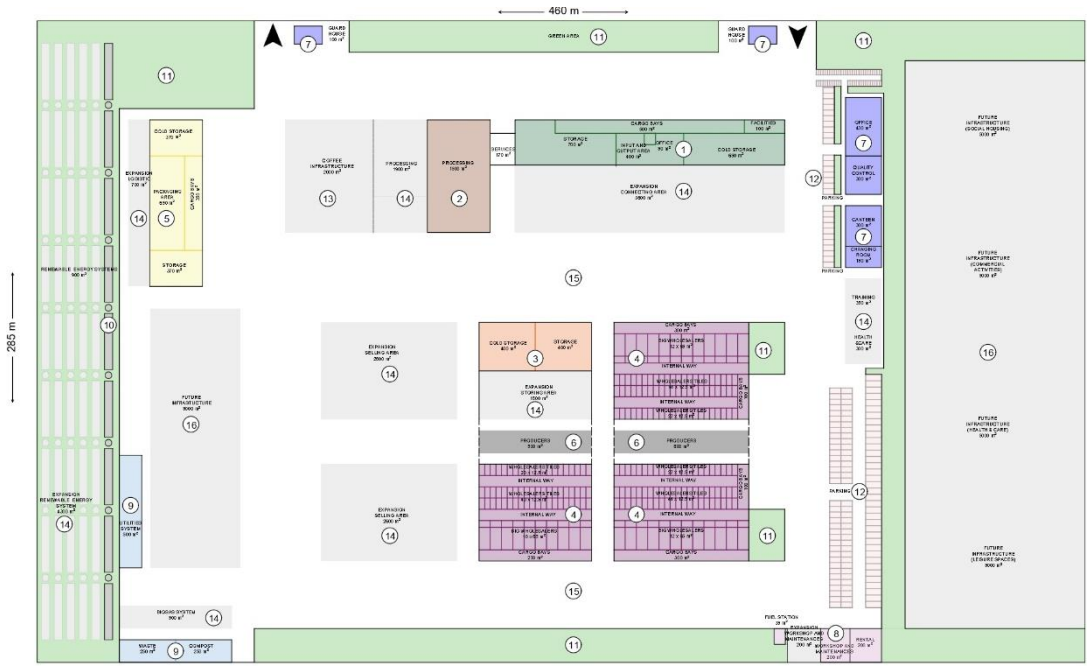


Figure 34: Model C_0 (Phase 1), fonctional dyagram with quantities



FUNCTIONAL BLOCKS							
		1st Phase	Expansion			1st Phase	Expansion
1	Collecting	2.550m²	3.400m²	9	Utilities	1.000m²	500m²
2	Processing	1.500m²	1.100m²	10	Renewable energy sources	900m²	4.300m²
3	Storage	1.100m²	1.100m²	11	Green areas	20.000m²	/
4	Selling pavillions	7.400m²	5.400m²	12	Parking	2.300m²	/
5	Logistics	1.800m²	700m²	13	Infrastructure for complementary VC	/	2.000m²
6	Producers Area	1.100m²	600m²	14	Future expansion		
7	Admininstration, Research, Facilities	1.350m²	600m²	15	Roads and monouvering areas	50.000m²	
8	Services	400m²	200m²	16	Future infrastructures		25.000m²

Figure 35: Model C_0 (Phase 1), CAAM blocks scheme

The functional blocks considered are as follows:

▪ Collection ▪ Processing ▪ Storage ▪ Sales	▪ Logistics ▪ Producer area ▪ Administration ▪ Services	▪ Utilities ▪ Renewable energy ▪ Green areas ▪ Parking	▪ Infrastructure for other VCs ▪ Future expansion ▪ Roads and circulation ▪ Future expansion

CAAM model C_0 data analysis						
Function of area	Destination of area	Surface [m²]	Volume [m³]	Construction	Utilities	
				Total cost [€]	Total energy [kWh/year]	Total water [m³/year]
Collecting	Service area	170	1.020	51.000,00	44.676	730
	Cold storage	650	3.900	780.000,00	569.400	730
	Storage	700	4.200	420.000,00	245.280	3.650
	Facilities	100	600	50.000,00	35.040	1.460
	Cargo bays	500	3.000	175.000,00	175.200	365
	Input and output area	400	2.400	120.000,00	210.240	730
	2nd quality	0	0	0,00	0	3.650
	Office	50	300	30.000,00	35.040	1.095
Storage	Cold storage	550	3.300	660.000,00	481.800	10.950
	Storage	550	3.300	330.000,00	289.080	3.650
Processing	Processing	700	4.200	700.000,00	613.200	20.075
	Facilities	110	660	66.000,00	38.544	1.460
	Storage	170	1.020	102.000,00	59.568	3.650
	Cold storage	170	1.020	204.000,00	148.920	10.950
	Internal way	100	600	12.000,00	26.280	730
	Packaging area	250	1.500	150.000,00	131.400	7.300
Sevices	Canteen	300	1.800	72.000,00	157.680	3.650
	Training	0	0	0,00	0	1.460
	Fuel station	35	210	15.750,00	18.396	730
	Workshop and maintenances	200	1.200	80.000,00	140.160	1.825
	Vehicles rental	200	1.200	80.000,00	122.640	1.095
	Changing room	150	900	60.000,00	78.840	730
	Health and care	0	0	0,00	0	1.460
	Quality control	300	1.200	180.000,00	140.160	1.095
	Guard house	200	800	80.000,00	70.080	1.095
	Office	430	1.720	236.500,00	200.896	1.095
Selling	Cargo bays	1.050	4.200	367.500,00	245.280	365
	Big wholesalers	2250	9.000	900.000,00	1.051.200	7.300
	Producers	1100	4.400	550.000,00	513.920	7.300
	Internal way	1.450	5.800	174.000,00	254.040	730
	Wholesalers tiles	2400	9.600	960.000,00	1.121.280	3.650
Logistics	Cold storage	370	1.480	370.000,00	216.080	10.950
	Storage	370	1.480	222.000,00	86.432	5.475
	Packaging area	650	2.600	390.000,00	303.680	5.475
	Cargo bays	350	1.400	122.500,00	61.320	730
Complementary VC	Complementary VC	0	0	0,00	0	0
Tecnological system	Utilities system	500	2.000	525.000,00	292.000	7.300
	Biogas system	0	0	0,00	0	1.460
Waste teatrment	Compost	250	1.000	125.000,00	146.000	7.300
	Waste	250	1.000	250.000,00	146.000	7.300
Renewable system	Solar system	810	0	243.000,00	-675.000	730
	Wind system	90	0	117.000,00	-270.000	730
Parking	Parking for 117 car slots 37 trucks slots 55 moped slots	2.300	0	138.000,00	67.160	730
Roads and Circulations area	Roads and Circulations area	50.000	0	750.000,00	730.000	730
Green area	Green area	20.000	0	160.000,00	175.200	1.825
Future infrastructure	Future infrastructure	25.000	0	0,00	0	0
TOTALS		**116.175**	**84.010**	**11.018.250**	**8.497.112**	**155.490**

SURFACE		**115.000 m²**
CONSTRUCTION COST		**11.000.000,00 €**
OPERATING COSTS	**Energy cost per year (electricity, water, air compressed, cooling, lighting, steam, etc.)**	**2.050.000,00 €**
	Mainentance cost per year	**206.000,00 €**

Table 45 Model 3 C_0, CAAM analysis

The CAAM intervention area will be made up of the following areas:

- Total intervention area: **116,000m2;**
- Total area built in Phase 1, blocks 1 to 10 inclusive: **19,100 m2;**
- Total area built in the expansion phase, blocks 1 to 10 inclusive: **17,900m2.**

The estimated construction costs and energy and maintenance costs for CAAM (therefore excluding all human resources costs, cleaning, security, marketing, etc.) are as follows:

- Total construction cost: **€11,000,000;**
- Total annual energy and maintenance costs: **€2,256,000/year.**

Below are two images with general diagrams of the CAAM with the areas of the 1st phase and the Expansion, with the respective circulation flows of goods and people:

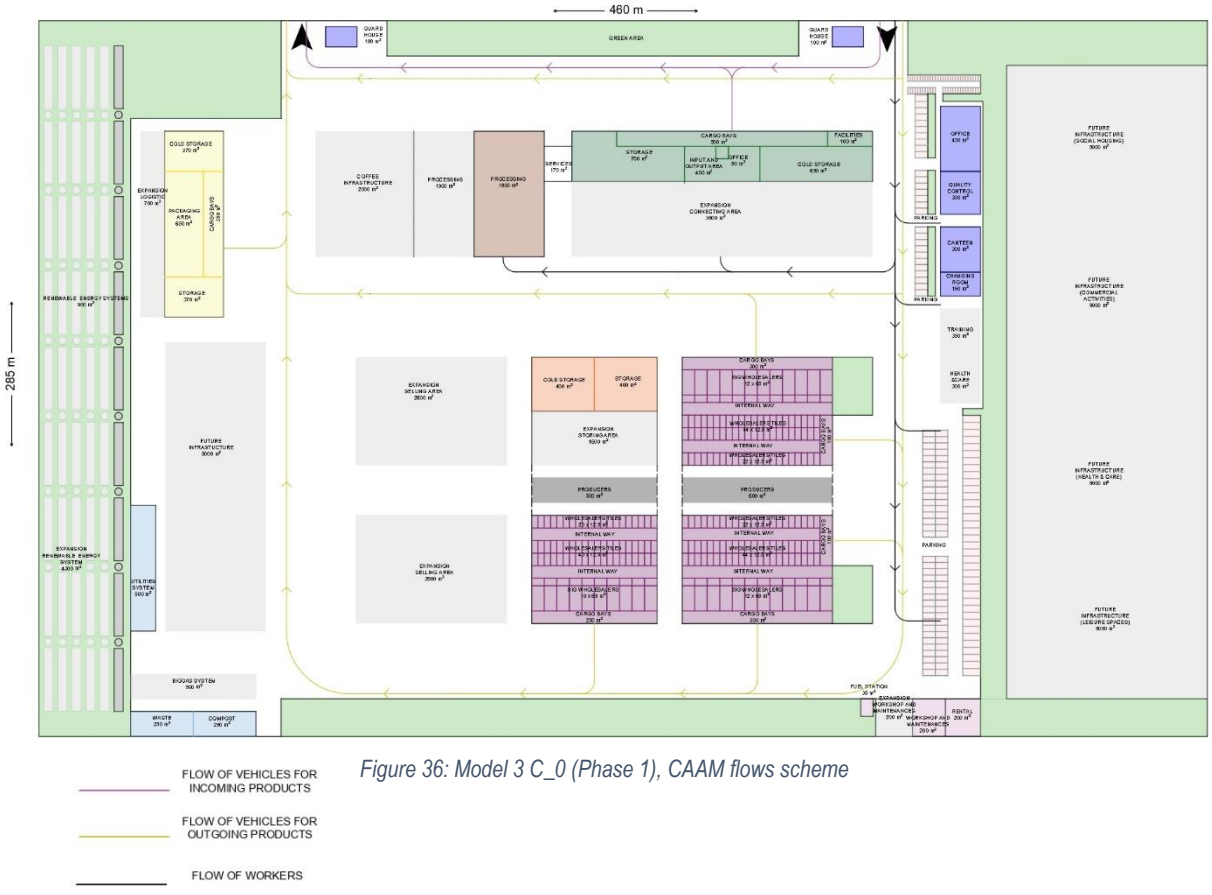


Figure 36: Model 3 C_0 (Phase 1), CAAM flows scheme

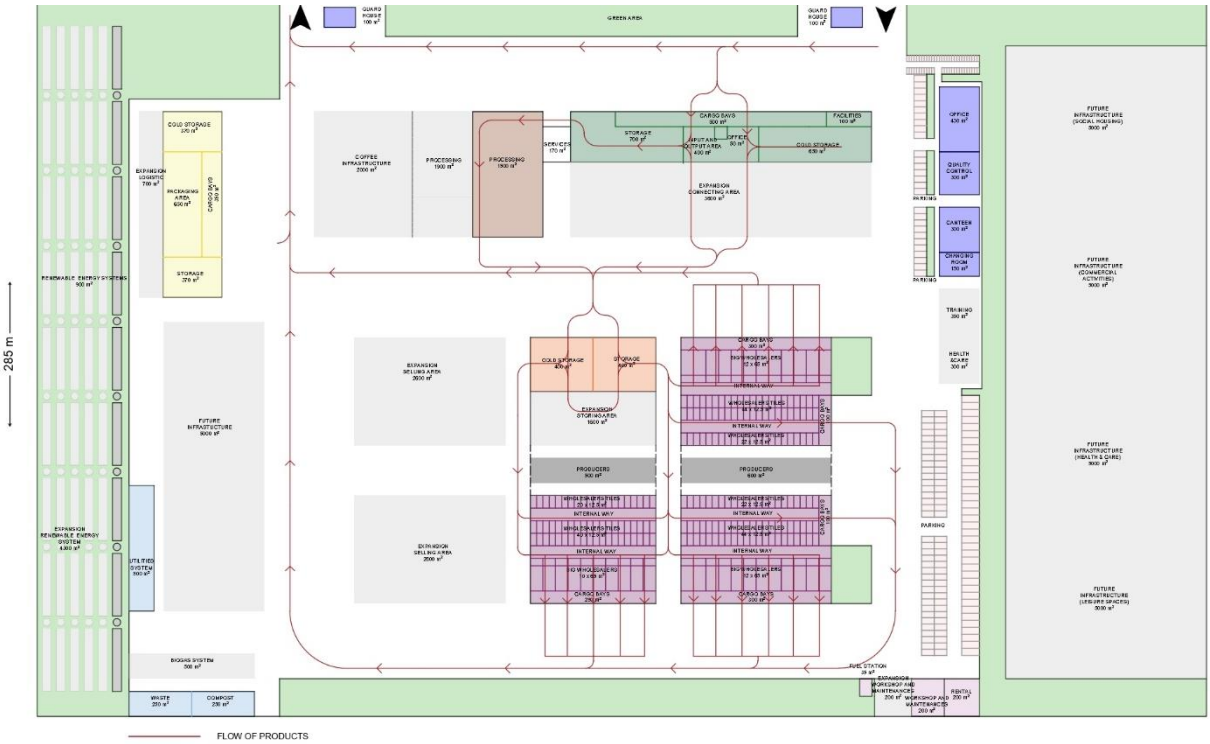


Figure 37: Model 3 C_0 (Phase 1), CAAM Products' flow scheme

The following two figures show volumetric views of various buildings and spaces so that you can better understand what is being proposed.

Figure 38: Model 3 C_0 (Phase 1), CAAM Masterplan

Figure 39: Model 3 C_0 (Phase 1), CAAM rendering

Having presented the sizing and estimated costs of the CAAM food center, it is now important to understand the construction costs of the HUBs that will work synergistically with it in this C_0 Phase 1 model.

For each **HUB**, care has been taken to prepare the space to accommodate upcoming and future expansions in terms of complementary services. The scheme of blocks identifying the functions was dimensioned and combined in a functional distribution plan, as shown below:

FUNCTIONAL BLOCKS			
		1st phase [m²]	**Expansion [m²]** (14)
1	Collecting	130	60
2	Processing	85	70
3	Storage	210	100
4	Admininstration, research, facilities	170	200
5	Services	455	100
6	Tecnological systems and waste treatment	100	100
7	Renewable sources	140	70
	Built up area	≈ 1.300	700
8	Green areas	1.500	/
9	Parking	350	/
10	Streets and manouvering areas	3.600	/
	Free space	≈ 5.700	
	TOTAL AREA	**7.000**	

Figure 40: Model C_0, HUBs functional blocks

In total, the intervention area of each HUB in this C_0 Phase 1 model will be 7,000m^2, with the 700m2 built in the expansion phase being included in the free area of the 1st phase.

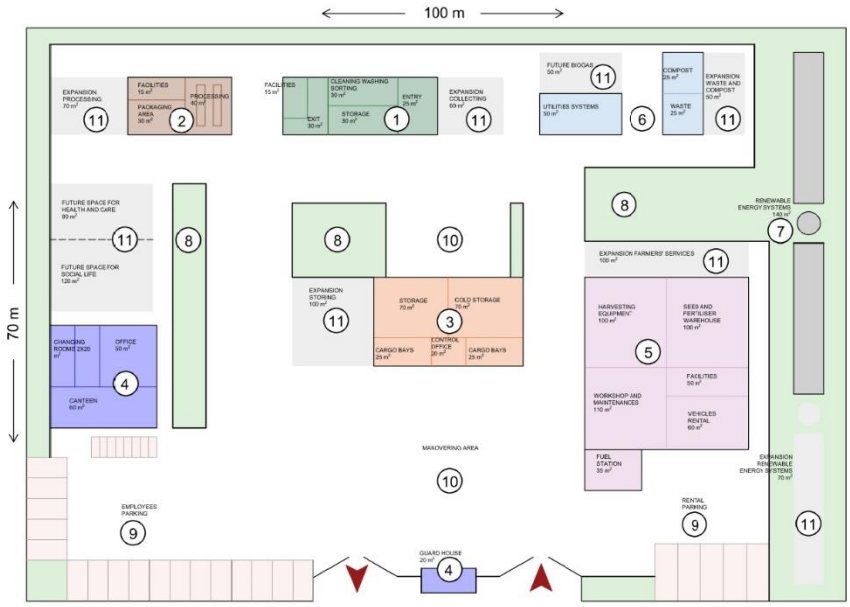


Figure 41: Model C_0, HUB blocks scheme

As mentioned above, the HUBs to be built will have to be located at points with a higher concentration of production. 4 priority HUBs have been identified, each with a vocation more focused on specific VCs, which will require the consideration of functions, services and equipment aimed at processing these products.

The following table identifies the products that will mainly arrive at each HUB and the type of treatment that has been considered.

Value Chains identified at province level		
District	**Priority VCs**	**Processing**
Baruè	Potatoes	Sorting - Cleaning - Washing
	Garlic	
	Common beans	
	Lychees	
	Avocados	
Vanduzi	Potatoes	Sorting - Cleaning - Washing Tomato 2nd quality
	Garlic	
	Tomato	
	Onions	
	Cabbage	
	Kale	
Macate	Bananas	Sorting - Cleaning - Washing Citrus fruits 2nd quality
	Garlic	
	Citrus fruits (oranges, mandarins, lemons)	
	Pineapples	
Sussudenga	Potatoes	Sorting - Cleaning - Washing Tomato 2nd quality
	Garlic	
	Tomatos	
	Onions	
	Common beans	
	Avocados	
	Lychees	
	Pineapples	

Table 46: District VC analysis

Based on the product treatment envisaged, the sizing proposal outlined above and the various functional areas considered, an investment estimate was drawn up for each HUB, based on the functions and equipment envisaged for each one.

The estimated construction and operating costs for each HUB (excluding human resources, cleaning, security, marketing, etc.) are summarized as follows:

- Intervention area: 7,000 m2;
- Construction area (1st phase + expansion): 2,000 m2;
- Total construction cost: €825,000;
- Total annual running costs for energy and maintenance: €170,500/year.

HUB - Construction and operational cost							
Function of area	Destination of area	Total surface [m^2]	Surface [m^2]	Volume [m^3]	Construction	Utilities	
					Total cost [€]	Total energy [kWh/year]	Total water [m^3/year]
Collecting	Entry	130	25	150	7.500,00	8.760	730
	Exit		30	180	9.000,00	10.512	730
	Cold storage		30	180	27.000,00	26.280	7.300
	Storage		30	180	18.000,00	10.512	3.650
	Facilities		15	90	7.500,00	5.256	730
Storage	Cold storage	210	70	420	70.000,00	61.320	7.300
	Storage		70	420	42.000,00	24.528	3.650
	Cargo bays		50	300	17.500,00	13.140	365
	Office control		20	120	7.000,00	7.008	365
Processing	Processing	85	40	240	40.000,00	35.040	20.075
	Facilities		15	90	9.000,00	5.256	1.460
	Packaging area		30	180	18.000,00	18.396	5.475
Logistic and agricoltural services	Harvesting equipment	455	100	600	50.000,00	35.040	3.650
	Seed and fertiliser warehouse		100	600	50.000,00	35.040	3.650
	Workshop and mainentancies		110	660	44.000,00	38.544	1.825
	Facilities		50	300	22.500,00	17.520	730
	Vehicles rental		60	360	24.000,00	21.024	730
	Fuel station		35	210	26.250,00	18.396	730
Facilities	Office	150	50	200	25.000,00	23.360	1.095
	Changing room		40	160	16.000,00	14.016	730
	Canteen		60	240	24.000,00	21.024	3.650
Guard house	Guard house	20	20	80	8.000,00	9.344	1.095
Tecnological system	Utilities system	50	50	200	50.000,00	29.200	3.650
Waste treatment	Compost	50	25	100	12.500,00	11.680	3.650
	Waste		25	100	32.500,00	14.600	7.300
Renevable system	Solar system	140	130	0	39.000,00	-100.000	730
	Wind System		10	0	12.000,00	-20.000	730
Parking	Parking for 17 car slots 5 trucks slots 8 moped slots	330	330	0	19.800,00	9.636	730
Roads and Circulations area	Roads and Circulations area	3.380	3.380	0	81.120,00	49.348	730
Green	Green	1.300	1.300	0	10.400,00	11.388	1.825
Expansion Areas	Expansion Areas	700	700	0	5.600,00	6.132	1.825
TOTALS		**7.000**	**7.000**	**6.360**	**825.170**	**471.300**	**90.885**

	SURFACE	**7.000 m^2**
	CONSTRUCTION COST	**825.000,00 €**
OPERATING COSTS	**Utilities and operationally energy cost per year (electricity, water, air compressed, cooling, lighting, steam, etc.)**	**155.000,00 €**
	Construction, technological and utilities mainentance cost per year	**15.500,00 €**

Table 47: Model 3 C_0 (Phase 1), HUB analysis

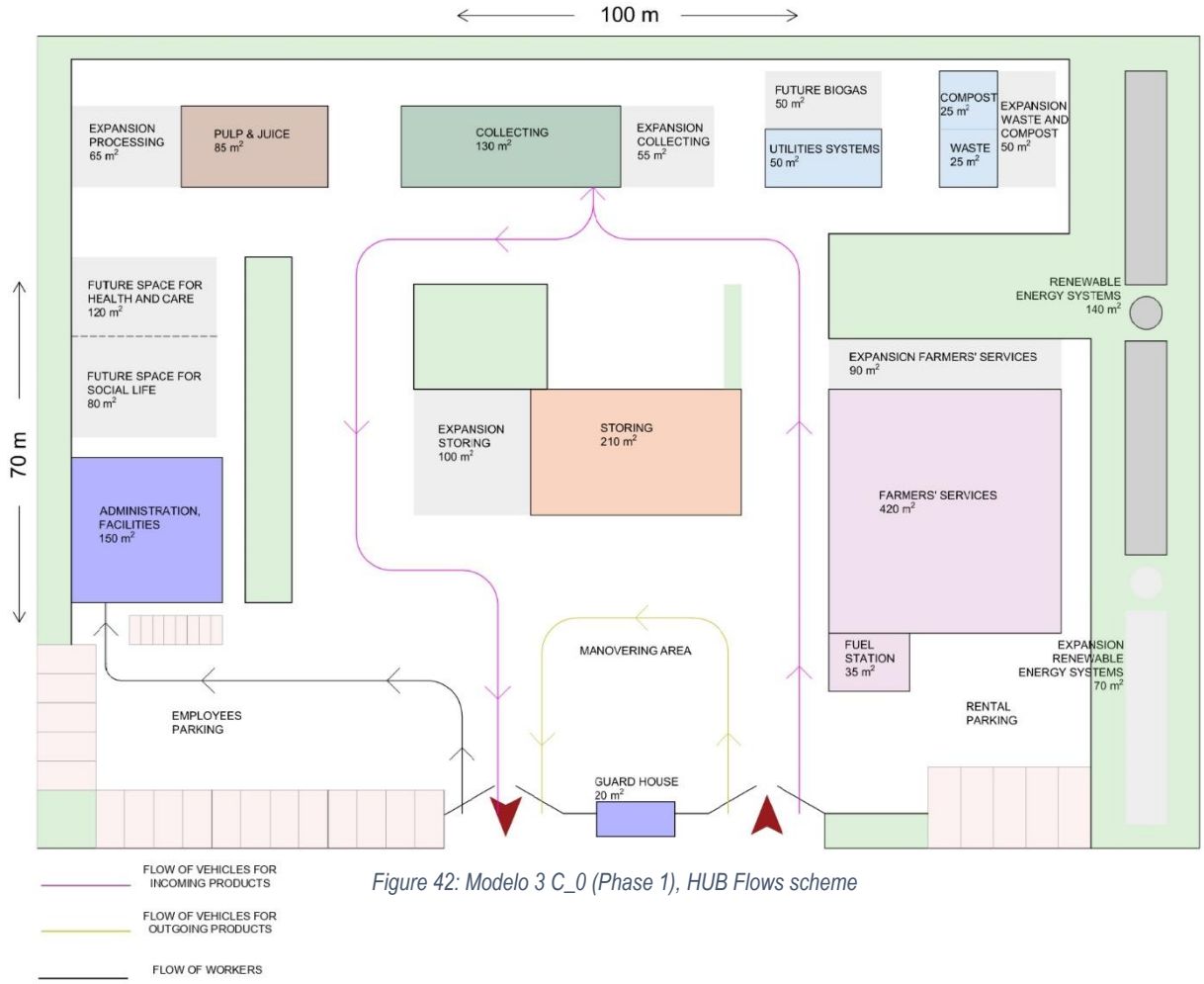


Figure 42: Modelo 3 C_0 (Phase 1), HUB Flows scheme

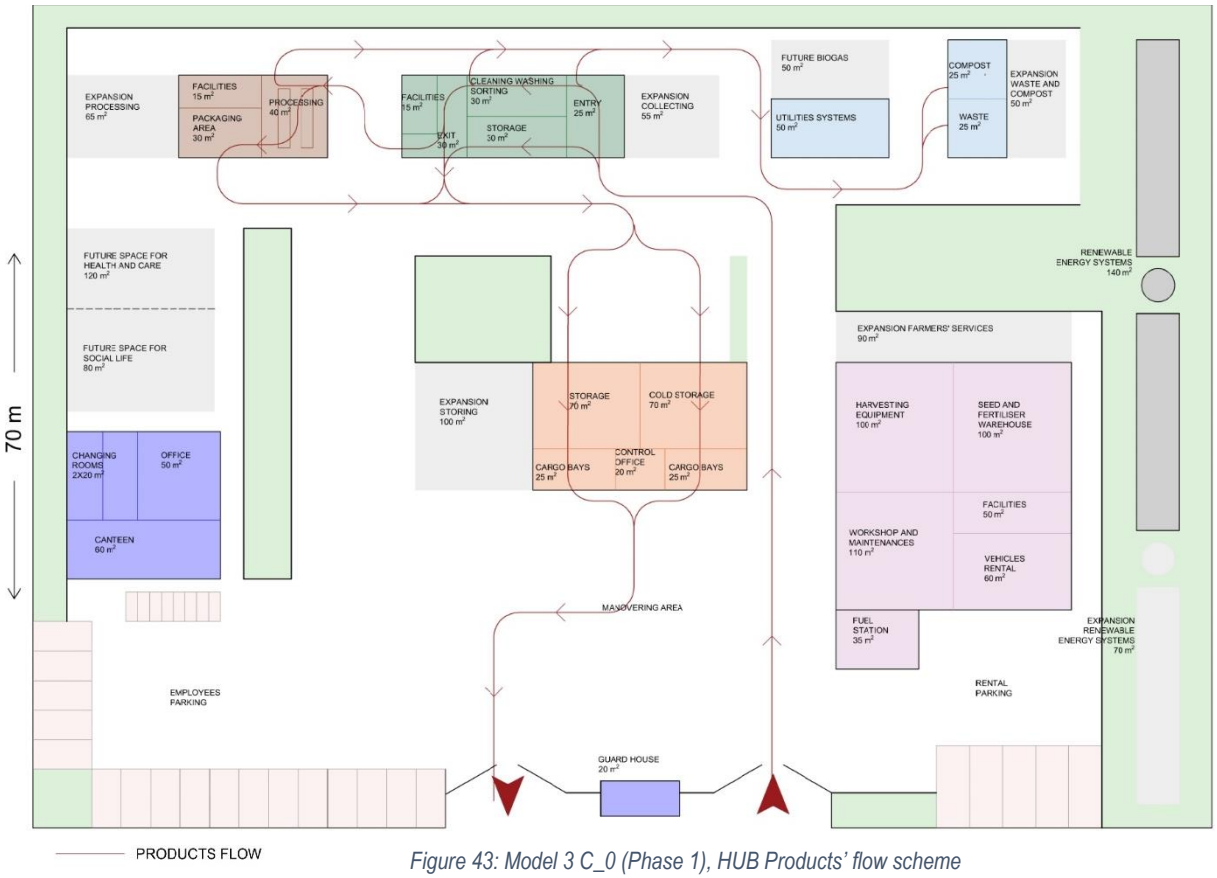


Figure 43: Model 3 C_0 (Phase 1), HUB Products' flow scheme

The following two figures show the volumetric shapes of various buildings and spaces in order to better understand what is being proposed

Figure 44: Model 3, HUB Masterplan

Figure 45: Model 3, HUB Rendering

In summary, the final solution of the C_0 Phase 1 model, designed to respect the available budget, considers the construction of four HUBs in the production areas where priority VCs are concentrated, and the CAAM in the area where demand is concentrated.

The total cost of building this model will be:

Total construction cost: **€14,300,000**

CAAM: €11,000,000

HUBs (Macate, Sussudenga, Barué, Vanduzi): 4 x 825,000 € = 3,300,000 €

Total intervention area: **144,000^{m2}**

CAAM: 116,000^{m2}

HUBs (Macate, Sussudenga, Barué, Vanduzi): 4 x €7,000 = 28,000^{m2}

Built-up area: **45,000^{m2}**

CAAM, phase 1 and expansion: (19,100 + 17,900) = 37,000^{m2}

HUBs, phase 1 and expansion (Macate, Sussudenga, Barué, Vanduzi): 4 x (1,300+ 700) = 8,000^{m2}

Total annual operating cost (energy and maintenance): **€2,938,000.00/year**

CAA: €2,256,000

HUBs (Macate, Sussudenga, Barué, Vanduzi): 4 x €170,500 = €682,000

The solutions presented represent the objective of defining a technical-functional architectural model that responds to the current and future production and consumption needs of the areas and regions involved and which, at the same time, is sustainable from an economic and financial point of view. This means that the architectural configuration of the CAAM can also change in the later stages of development of the detailed project and its construction, as long as it respects the technical, functional and distributive logic defined in this study.

8. RISK MANAGEMENT IN THE CONSTRUCTION OF CAAM AND HUBS

The construction of the Mozambique Agri-Food Center (CAAM) and its logistics hubs represents a strategic step for the development of the country's agri-food chain. However, like any major infrastructure project, its implementation is subject to a series of risks that could jeopardize the timetable, costs, economic viability and social impact of the initiative.

Given this scenario, it is essential to proactively identify, categorize and mitigate risks, ensuring that the project is implemented efficiently, sustainably and in line with international best practices. The risks have been grouped into the following main categories:

A. Political and Regulatory Risks - Changes in the regulatory framework, political instability and corruption risks;

B. Technical, infrastructural and environmental risks - Possible failures in the construction schedule, engineering problems and adverse environmental impacts;

C. Financial and Economic Risks - Overestimation of costs, lack of adequate investments and uncertainties about the profitability of the project;

D. Operational Risks - Failures in governance, inefficient logistics and low labor qualification;

E. Market Risks - Low adherence by farmers and traders, competition with informal markets and variations in product supply and demand;

F. Social and Community Risks - Resistance from the local population and the risk of social exclusion for small producers.

Risk	Category	Probability	Impact	Risk Level	Mitigation
Cunstruction delays	Tecnical/Infrastructural	High	High	Crítico	Cronograma flexível, fornecedores alternativos, fundo de contingência
Structural failures	Tecnical/Infrastructural	Medium	High	Alto	Auditorias de engenharia, certificações, controle rigoroso de materiais
Unmitigated environmental impact	Environmental	Medium	High	Alto	Estudos ambientais, compensação ecológica, tecnologias sustentáveis
Cost of overestimation	Financial	Medium	High	Alto	Revisão de orçamento, contratação de especialistas financeiros

Risk	Category	Probability	Impact	Risk Level	Mitigation
Lack of adequate investment	Financial	Medium	High	High	Strategic partnerships, tax incentives, bank guarantees
Changes in the regulatory framework	Political	Medium	High	High	Advocacy, participation in political discussions and flexible adaptation
Corruption and lack of transparency	Political	Medium	High	High	Independent audits, transparency in contracts, strict compliance
Logistical inefficiency	Operational	High	Medium	High	Integrated logistics planning, improved transportation infrastructure
Low adoption by farmers	Market	Medium	High	High	Subsidies, training, incentives for active participation
Competition with infromal markets	Market	Medium	Medium	Medium	Trade regulation, incentives for transition to the formal sector
Resistance from the local population	Social	Low	Medium	Medium	Awareness campaigns, open dialog, community inclusion

For each of these risks, mitigation strategies have been proposed which include preventive actions, improving governance, strengthening transparency, optimizing investments and incentives for engaging local communities. Below, we detail each of the risks and the strategies recommended to minimize their impacts, ensuring that CAAM fulfills its role as a driver of development for the Mozambican agri-food sector.

8.1 Risk Mitigation

A. Mitigating Political and Regulatory Risks

- Flexible business models adaptable to new regulatory requirements
- Transparent management of procedures related to the operation of CAAM: recruitment, space rental, external audits and strict compliance.
- Use of digital transparency platforms for contracts and tenders.

B Mitigation of technical and infrastructure risks

- Implementation of a flexible schedule with margins for unforeseen delays. Schedule regular confrontations

(one per month between the management unit or delegates and the company awarded the construction contract) with audits of construction materials and works.

- Contracts with multiple suppliers to avoid excessive dependence on a single supplier.
- Creation of a contingency fund to deal with extra costs.
- Hiring certified companies and strict monitoring of engineering standards.
- Using sustainable construction technologies to avoid severe environmental impacts.

C. Mitigating Financial and Economic Risks

- Strict budget planning
- Continuous review of the project budget, avoiding overestimation of costs.
- Diversification of funding sources: strategic partnerships with institutions such as the World Bank and the African Development Bank.
- Include tax incentives and subsidies to attract more private investors.

D. Operational Risk Mitigation

- Inclusion of CAAMs and HUBs in considerations regarding regional/national infrastructure plans
- Integrated transportation and distribution plan, reducing logistical bottlenecks.
- Training for managers and operators
- Ongoing training programs for workers and stakeholders.
- Partnerships with universities and research centers to promote innovation.

E. Mitigating market risks

- Active promotion of membership by farmers and traders
- Subsidies and benefits for small producers to join CAAM.
- Marketing strategies to publicize CAAM's competitive advantages.
- Regulation and formalization of markets
- Creation of incentives for informal operators to become regularized and migrate to CAAM.
- Partnerships with the government to establish policies to encourage formal trade.

F. Mitigating Social Risks

- Create a platform for dialog with the local community/ a popular participation committee
- Awareness campaigns to show benefits of the project.
- Ensuring equitable benefits
- Governance models that include small producers and traders.
- Inclusion and incentive programs for sustainable and family production.

9. PROJECT GOVERNANCE: MANAGEMENT MODEL FOR CAAM AND HUBS

In this chapter we present the best possible model for managing the **HUBs** and **CAAM.**

As far as the **ownership model for CAAM and the HUBs** is concerned, according to expert opinion and the results of the consultations carried out, the most suitable model is 100% ownership by the State of Mozambique, i.e. the MAAP, since it involves public funding.

9.1 CAAM and HUB management model alternatives

The analysis is based on the assumption that there are three possible alternatives for the CAAM and HUB management model, which are distinguished by the different roles of the public and private sectors:

- PUBLIC MODEL. the State, the Municipality of Chimoio and the province of Manica are the owners (100%), with different shareholdings, for example: the State (first hypothesis 50%), the Municipality of Chimoio (p.h. 25%), the province of Manica (p.h. 25%);
- PRIVATE MODEL. The second alternative is a totally private model (100%), including representatives of the various stakeholders in the production, trade and logistics sectors;
- MIXED MODEL. Finally, the third alternative is a mixed public-private model, in which the State holds most of the ownership, with different shares held by the Municipality and the Province (first hypothesis with distribution among public entities 80% (with the same division as in the previous example: State 40%, Municipality 20%, Province 20%) the rest belonging to private companies 20%.

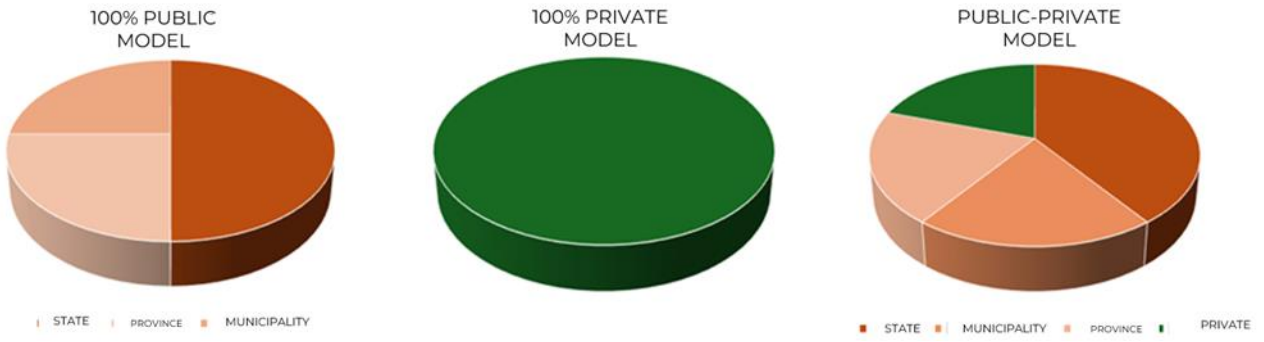


Figure 46: Three different alternatives for the CAAM and HUB management model

PUBLIC Model - Creation of a public operating company

In this model, a public company is created for the development and management of new markets, with the direct involvement of the state and other public entities (e.g. Manica Province, Chimoio Municipality). This choice is motivated by the fact that the state wants to manage the facility directly from a technical or financial point of view, and at the same time wants to retain the right to supervise this management.

The main benefits of this model include total control of costs, personnel and any subcontracting. In addition, the public authorities are represented on the Board of Directors and actively participate in public and operational

management decisions. This allows the state to maintain strategic control.

However, there are also several disadvantages: the state receives compensation based on the results achieved, and the market is seen primarily as a place for the development of public policy, but not for profits and business.

The governance options analyzed - PUBLIC Model

Fully public management guarantees total control of the targeting activities. However, when public participation is exclusive, there is a loss of effectiveness in achieving the economic objectives of profitability, compromising replicability in the phases following the support period.

Among the advantages of this model is the selection of projects, as the public administration ensures that social objectives are met, guaranteeing public services that meet the needs of the territory, even with low remuneration. In addition, project governance is ensured, since the public sector chooses and pursues objectives aimed at the public interest. Another positive point is risk management, as the public sector offers a greater guarantee of stability over a broad time horizon.

On the other hand, there are significant disadvantages to this model. Productive efficiency and innovation can be reduced, as public governance tends to be less effective by not adopting criteria for optimizing business performance. In addition, project governance can be undermined, as public administration tends to disfavour strategic choices based on maximizing profit or obtaining the best possible results in terms of economic performance. Finally, there is a financial management risk, as the public entity is remunerated according to results, which can create challenges for the financial sustainability of the model.

PRIVATE Model - Management entrusted to a private entity

In this model, the management of the services is delegated to a private operator for a long period of time (up to 30 years), allowing significant investments to be made if necessary. The state does not consider the management of this service to be a strategic priority and does not actively participate in its administration, although it retains control over the land and the value of municipal assets.

The advantages of this management, however, include greater dynamism, the transfer of burdens to the concessionaire and the guarantee of regular revenue for the state through the concession. In addition, the private operator has the freedom to make investments according to its own strategies and there is the possibility of involving external specialists.

On the other hand, the main disadvantage is the elimination of control by the state, which gives up direct management of the infrastructure and also gives up the use of CAAM for the dissemination of rural development policies.

The governance options analyzed - PRIVATE Model

Governance based on private management takes place through the support of a private partner (anchor investor) via a concession contract. This model guarantees the definition of business strategies aimed at more profitable projects, applying criteria of profitability and competitive advantage in the market.

The advantages include productive efficiency and innovation, as the private sector follows strict criteria for productive efficiency and takes advantage of accumulated know-how, translating this into optimized business performance. In addition, the governance of the projects is the responsibility of the private sector, while the public entity maintains control of the land and values the common goods, without the need for direct involvement in management. Another advantage is the reduction of risks, since the financial burden is transferred to the concessionaire, and the public sector receives regular income through the concession.

On the other hand, there are disadvantages to this model. The focus on maximizing profitability may not be aligned with the public interest, and may compromise aspects such as sustainability, environmental impact, valuing local resources and equal access to services. In addition, there is a challenge in project governance, as the private sector may not be able to value the necessary skills and synergies, especially without an adequate public research and planning structure. Finally, there is a financial management risk, as the private sector may not be efficient in attracting public funding and managing the costs of related projects.

MIXED Model - Mixed public-private management

The Italian and European system of wholesale markets is almost entirely centered on the balance between public ownership of the market area and structures and mixed public-private management of market activities, with a specific management company (managing body).

These “public” models can be divided into two distinct macro-categories:

- the mixed public-private management company that runs the market also owns the market areas and facilities. In this case, the management of the property is carried out by the management company itself because it incorporates the public owner. Therefore, any decision to reorganize the space, for example, must follow the bureaucratic procedures of the public owner.
- The mixed public-private management company that runs the market does NOT own the areas and infrastructure of the market, but only manages them. In this case, the market management company has greater operational autonomy in the management of the spaces because it is linked to the public owner through a concession contract for the management of the space.

The governance options analyzed - MIXED PUBLIC-PRIVATE Model

A Public-Private Partnership (PPP) is a government model that involves the participation of various investors, both from the private sector and from institutions. A public-private partnership (PPP) envisages strong collaboration between the public and private sectors, where each party plays an essential role in ensuring operational efficiency, innovation and sustainable development.

Private Sector Responsibility: The private sector leads operational management and competitiveness, taking a central role in conducting commercial activities, optimizing production processes and implementing marketing strategies to strengthen its market position.

Public Sector Responsibility: The public sector is responsible for creating favorable conditions for long-term competitiveness. This includes supporting innovation, strengthening confidence in the international market and promoting local social development, with a focus on training and valuing human resources.

Role of the Private Partner: The private partner, through a contract and with total or partial funding from the public sector, is in charge of making the investments needed to implement and operate the project. It must also guarantee the efficient provision of services or the supply of essential goods, the availability of which the state must ensure for citizens.

Role of the Public Partner: The public sector must guarantee the territorial development function and ensure transparency in the agri-food supply chain. This includes regulating and monitoring operations, ensuring that the activities carried out within the partnership serve collective interests and promote sustainable social and economic benefits.

9.2 Recommended governance model

There is no a priori system that is better than another, it all depends on the "strength" of the public to impose business plans and strategic lines and the "strength" of the private part of the management company to develop the best possible management for the management company.

Thus, the management company can be the owner of the areas and infrastructure of CAAM and the HUBs, or it can just be the manager, possibly paying a rent for the space. In the financial model presented, we have a management company that owns the areas and the infrastructure.

In the specific case of Mozambique, Law 15/2011 provides the operational solution within the country's legal framework. This law establishes the process for contracting, implementing and monitoring public-private partnerships, major projects and business concessions. In addition, **Decree 69/2013** regulates public-private partnerships and small business concessions. According to this legal framework, a public-private partnership refers

to projects carried out in areas of public domain - excluding mineral and oil resources - or in public service sectors. According to these agreements:

- private partner, through a contract and with full or partial funding from the public partner, is responsible for making the necessary investments.
- the private partner operates the respective commercial activity, ensuring the efficient provision of services or the availability of goods, which the state must guarantee to users.

With regard to the management model for market operations, the main recommendation is to establish a mixed public-private management company that has management and administrative autonomy, carrying out its activities according to the logic of market remuneration.

We propose the following steps:

- creation of a market management company, called, for example, “CAAM Manica”;
- definition of the shareholder structure and we suggest the percentages indicated above. Private shareholders could be chosen from national trade and logistics companies and international funds;
- appointing a shareholders' meeting, with one representative from each member;
- creation of a board of directors of the company, with a limited number of members, indicatively 5 or 7, each with the weight of their shareholding.

The board of directors appoints a chairman of the board who becomes the chairman of the company and represents the majority shareholder.

The chairman of the board presents a business plan and an industrial plan and appoints a managing director of CAAM, who is given the task of organizing the company's operational structure and presenting a business plan and an annual budget.

At the end of each year of activity, a budget is presented for approval by the Board of Directors,

the term of office of the shareholders' meeting and the board of directors, i.e. the chairman and the general manager, is three years.

9.3 CAAM's Shareholders' Meeting and Board of Directors (BoD)

Based on CAAM's stakeholder analysis and the proposed public-private partnership model, the governance structure must ensure that strategic players are actively involved in decision-making and that there is an inclusive space for dialog with other stakeholders in the development of the project.

The following is a proposal for the composition of the Shareholders' Meeting and, consequently, the Board of Directors (BoD), in accordance with normal company rules.

9.3.1 CAAM Multistakeholder Platform

The Multistakeholder Platform should be a space for dialog and collaboration, bringing together actors from different

sectors who have an influence on the project, but who don't necessarily need to be in the CoA. Its aim is to ensure an inclusive and sustainable approach, allowing diverse stakeholders to contribute to the continuous improvement of the CAAM.

Recommended actors for the Multistakeholder Platform

Main functions of the Multistakeholder Platform:

- Create a collaborative environment between different actors to ensure the sustainable development of CAAM;
- Promote good agricultural and commercial practices, ensuring that small producers have access to markets and financing;
- Identify challenges and opportunities for strengthening agri-food value chains;
- Support the implementation of inclusive policies, with a focus on the participation of women, young people and vulnerable groups.Parceiros financeiros potenciais

Para apoiar o desenvolvimento e a escalabilidade do modelo identificado, foi realizada uma breve análise exploratória para identificar potenciais parceiros financeiros e seus possíveis papéis ou estágios de intervenção.

9.3.1.1Institutional investors

- **Agribusiness Capital Fund – IFAD.** Originally sponsored by IFAD in 2019, the ABC Fund is an independent private investment fund. This impact fund proposes an innovative approach to attracting much-needed capital to rural areas and underserved segments of agribusiness value chains in developing countries. It catalyzes combined capital and provides technical assistance to investors through a dedicated facility.
- **The World Bank (for public infrastructure)** invests in infrastructure. For example, the Lukula agropolo in Congo DRC was fully financed by the WB.
- **African Development.** The bank sees agriculture in Africa as essential to driving growth on the continent;
- **Arab Bank for Economic Development in Africa (BADEA);**
- **The European Investment Bank (EIB)** supports investments in infrastructure or large private companies;
- **The Global Agriculture and Food Security Program (GAFSP)** is a multilateral partnership to finance food and nutrition security with a portfolio of USD 2.5 billion. GAFSP provides financial and technical resources - investment grants, technical assistance, concessional financing and advisory services - for demand-driven projects along the food chain, from farm to fork;
- **Common Fund for Commodities.** The Common Fund for Commodities (CFC) is an autonomous intergovernmental financial institution established under the auspices of the United Nations.

9.3.1.2 Private investors

- **Agricultural Capital Africa Ltd**. The organization supports small agricultural entrepreneurs in Africa using strategic networks and technology, as well as a strong partnership to offer financial partnership through

investments;

- **Farm Africa is an indirect investor**. It invests capital through tactical partnerships, supported by technology, to meet the financing needs of small agribusinesses in Africa;
- **Loans for African Agriculture (LAFCo)** is a company that provides financial support through loans to African agribusinesses working directly with smallholder farmers, with the aim of increasing the economic impact of African agriculture, impacting SMEs and smallholder farmers through stable incomes, increased agricultural productivity and reliable markets;
- **Root Capital** aims to connect rural farmers to the formal economy; it invests to improve the lives of rural farmers by connecting them to the formal economy;
- **Mitsui Venture Fund**. Japanese investment fund with a particular focus on African agriculture;
- **Global Environment Facility.** The Global Environment Facility (GEF) is a family of multilateral funds dedicated to combating biodiversity loss, climate change and pollution, and supporting the health of land and oceans;
- **AATIF Home - AATIF - African Agriculture and Trade Investment Fund.** AATIF is an innovative public-private partnership dedicated to unlocking Africa's agricultural potential for the benefit of the poor. The Fund aims to improve food security and create additional jobs and income for farmers, entrepreneurs and workers.

10. OPERATIVE PLAN

Below is the proposal defined as the Roadmap to be followed to ensure that the CAAM+4 Hubs infrastructure will be operational within the 6th year.

OPERATIONAL IMPLEMENTATION PLAN Definition of the Roadmap to be followed to ensure that the CAAM+4 Hubs infrastructure is operational within the 6th year guaranteeing: Strategic and financial alignment with the project Progressive and prioritized construction of the Hubs and CAAM Clear governance and an efficient business model Modern infrastructure equipped to respond to market needs									
PHASES	**ATIVITIES**	**RESULTS**	**COMPONENT**	**YEAR 1** **2025**	**YEAR 2** **2026**	**YEAR 3** **2027**	**YEAR 4** **2028**	**YEAR 5** **2029**	**YEAR 6** **2030**
COORDINATION COMMITTEE - CONVENING **Sharing and coordination of the feasibility study**	**INITIAL ACTIVITIES** **Approval and operational instructions on the feasibility study**	Approval of CAAM location Approval of the economic and financial business plan model Approval of architectural sketch Approval of strategic stakeholders / territorial consultation platform Approval of governance model Approval and start of the Operational Plan Approval of equipment and machinery	--------	**Start**					
PLANNING, CONSULTATIONS AND LAUNCHING THE CALL FOR TENDERS FOR THE PROJECT (CALL FOR TENDERS 2) **Structuring project governance, defining templates, initiating procurement and launching tenders** **(mainly responsible for AICS)**	**PRELIMINARY ACTIVITIES** **Structuring and involving all stakeholders**	Define all 3 Committees and their members: Coordination Committee (CC), the Management Unit (UG) and the Technical Assistance Unit (UAT). Confirm and reserve land for the Houmba market and its expansion Identify and define the locations of the 4 Hubs and reserve the area for this purpose	Credit (RA1) Present (RA1)						
	CONSULTANCY FOR TENDER 2 **Consultancy, advice and preparation of preparatory documentation for tenders for construction, supplies and operations**	Consultancy for the preparation of Tender 2 for the design, authorizations and tender documents for construction Preparation, launch and award of Tender 2 Consultancy and assignment of Construction Management, supervision, monitoring, auditing and communication for the overall construction and installation activities Creation of an internal technical coordination structure for the design phases (specialists in technical and administrative disciplines for coordination, control and validation of Tender 2 documentation)	Credit (RA1) Present (RA1)						
	DEVELOPMENT OF TENDER 2 **Consultation, advice and preparation of preparatory documentation for construction, supply and operations tenders**	Development, design and authorization of process and infrastructure engineering Development of technical documentation Environmental impact studies Preparation of technical-administrative tender documents Development and acquisition of planimetric-altimetric, topographic, seismic, geotechnical and other data	Present (RA1)						
CONSTRUCTION AND OPERATION OF INDUSTRIAL INFRASTRUCTURE: Tender 3 and construction of the 4 Agri Hubs and the CAAM to consolidate the supply chain and start operating the infrastructure	**UTILITIES AND PUBLIC SERVICE CONNECTIONS** **Provisions for connection services for the 4 Hubs and the CAAM**	Infrastructure for electricity, water, sewage and telecommunications networks Definition of secondary accesses from the main road	Credit (RA2)						
	TENDER 3 AND CONSTRUCTION **Tender for the award of construction, supply and start-up operations**	Preparation, launch and award of Tender 3 for the construction of works and infrastructure, main equipment and installations (machinery for processing, packaging, related accessory material, etc.), secondary equipment and installations (field vehicles, vehicles for logistical transportation, handling equipment, etc.) and service installations and equipment (furniture, laboratory equipment, various consumables, etc.) Detailed Engineering Development Procurement services for equipment, accessories and installations Procurement services for subcontracting and supplies Construction, installation and assembly	Credit (RA2)						

BUILDING GOVERNANCE AND DEVELOPING STRATEGIC BUSINESS PLANS **Structuring CAAM's Governance and Strategic Plans (responsible for MAAP with assistance from AICS)**	**CAAM'S GOVERNANCE STRUCTURE** **Identify and define the Governance structure**	Consultation for CAAM governance proposal (CAAM and Hubs management model) Establish selection criteria for operators and partners Appoint the Board of Directors of CAAM and the HUBs (according to the governance solution decided)	Credit (RA2)						
	CAAM MULTI-STAKEHOLDER AND MULTI-LEVEL PLATFORM **Development of the multi-stakeholder platform**	Creating a multisectoral and multilevel platform Developing strategic partnerships Develop and implement a marketing and sales strategy: positioning, customer acquisition and promotion of CAAM Human resources strategy: defining the staff structure, staff qualifications, functions and areas with the use of service provision	Credit (RA3)						
	STRATEGIC PLANS **Developing business and marketing plansg**	Consultancy to identify the best form of business/management models for the spaces within the CAAM and Hubs (producers' and wholesalers' space - processing areas - cold rooms - logistics spaces, services and laboratories - use of multi-level processing equipment, packaging, others to be identified) Business Plan: Definition of the financial and sustainability model for CAAM and the Hubs Operational Manuals: Operational Processes for Efficient Management	Credit (RA3)						
	LAUNCH OF THE PUBLICITY AND MARKETING PHASE FRO SPACES AND MARKETING **Development and marketing of areas**	Hiring and transferring wholesalers from Market 38 to CAAM Marketing of producers' spaces Marketing of service areas, processing, cold storage, logistics and construction spaces, others	Credit (RA3)						
	TRAINING AND IMPLEMENTATION OF OPERATIONAL STANDARDS **Recruitment, Procedures and Digitization**	Recruiting and training teams (technicians, administrators, managers, etc.) Drawing up regulations and guidelines (internal regulations for employees and operators, code of good practice in food safety and quality standards) Implementing digital systems (supply chain management software, digital monitoring of efficiency and operations, etc.)	Credit (RA3)						
PREPARING FOR OPENING, START-UP AND OPERATIONS **Testing and commissioning the facilities, recruiting the teams and testing all operations.**	**OPERATIONAL TESTS AND PREPARATION FOR OPENING** **Testing operating systems, defining suppliers and commercial communication strategies**	Testing of all operational systems (logistics, cold chain management, transport and security, etc.) Hiring essential service providers (security, maintenance, cleaning, quality control, etc.) Establishing commercial partnerships to ensure continuous supply Launching the communication and marketing strategy for CAAM and the Hubs	Credit (RA2)						
	OFFICIAL LAUNCH **Opening, monitoring and planning**	Opening of CAAM and the 4 Hubs Installation of operators in the spaces Continuous monitoring of the first months of activity and operational adjustments Planning new expansions and investments as necessary	Credit (RA2)						

Recommendations:

For the procedures of tenders 2 and 3, use is made of the consolidated procedures:

For an international tender, resort to national regulations, in particular the current Legislative Decree of March 31, 2023, no. 1. 36, which constitutes the new Public Procurement Code, in combination with the internal specifications of the AICS Agency for alignment with the operational specificity in the partner countries and the needs related to international cooperation. As for the standards to be applied, consult the European Union directives on public procurement, guaranteeing transparency and fair competition, application of the PRAG (Practical Guide to Contractual Procedures for EU External Actions) or FIDIC (International Federation of Consulting Engineers) standards depending on the project specifications and funding sources (PRAG generally used for projects funded by the European Union - FIDIC contracts for large-scale engineering and construction projects).

For the design (Tender 2) and construction (Tender 3) objectives, adopt a prudent strategy to guarantee deadlines, methods and final quality.

For the design, consult the design phases provided for in Legislative Decree 36/2023 of the Public Contracts Code, bearing in mind that the main equipment and facilities must have a final technical configuration aligned both with the needs of the market in accordance with the indications of the Multistakeholders platform and with the strategies of CAAM's managers and governance, consequently aligning the relative configuration of the buildings and physical infrastructures.

For the construction, consult EPC (Engineering, Procurement and Construction) or Design and Build companies, turnkey or General Contractors based on the international FIDIC model through a single tender for the 4 Hubs and CAAM, with the possibility of a bid split between the Hubs and CAAM. With a contract of this type, construction, supplies, assembly and implementation will be delegated to a single entity, in accordance with the requirements specified in the tender project. The type of award (single or dual theme, or other formulas) will be decided on the basis of the results of the most technically and economically convenient bids and an assessment of the bidders' organizational, technical-executive and financial capacity. The acquisition of the main equipment and installations will be linked, through safeguard clauses, to their final technical and timetabling definition and refinement.

The proposed **OPERATIONAL PLAN** is complemented below by a greater detailing of actions in order to make more explicit the path needed to ensure a structured and efficient approach to the implementation of this investment. By year of investment, the following actions stand out, which should be adjusted if there are changes over time.

Phase 1 - Years 1 and 2: Stakeholder Engagement and Project Planning and Construction

In this first phase, the types of activities to be developed are related to two specific sectors – on one hand, the establishment and operationalization of the Coordination Committee and management team; and on the other, the

preliminary tasks for preparing the development of the project and construction, which will take place in the next phase (see Annex 10 – Operational Plan):

- Define a coordination committee and management units to monitor and implement the proposed actions;
- Properly identify key stakeholders essential to the success of the project, including government structures (Agriculture, for coordinating technical support services in the HUBs; Infrastructure, for implementing plans to improve road infrastructure), the Provincial Government of Manica and the District Governments of Barué, Macata, Sussundenga and Vanduzi, agricultural cooperatives and management entities of the identified irrigation perimeters, logistics service providers, financial partners;
- Receive input from the various stakeholders and fine-tune the scope and objectives of this project;
- Ensure that all stakeholders (public, private, and community) are heard and that their interests are incorporated into the project, contributing to overall engagement and participation in the future development;
- Negotiate support mechanisms for traders, particularly by designing favorable financing programs (grace periods, lower interest rates, etc.) or guarantee funds that allow them to access CAAM/HUB facilities with a reasonable financial effort;
- Secure the formal reservation (purchase or concession) of the Hombua Market land for CAAM construction with the support of the Provincial Government, also considering the expansion phase;
- Identify potential sites for construction of the proposed HUBs in Barué, Macata, Sussundenga or Vanduzi, in coordination with the respective district governments;
- Secure the formal reservation (purchase or concession) of the land for the construction of the 4 HUBs, with the support of the respective Provincial Governments, also considering future expansion phases;
- Carry out the necessary topographic and geotechnical surveys of the reserved land for the CAAM and HUBs;
- Prepare, in coordination with the design teams for the CAAM and HUBs, tenders for the design and construction of access roads to each site, considering vehicle types and traffic estimates;
- Prepare, in coordination with the design teams for the CAAM and HUBs, tenders for the design and construction of utility connections, if applicable – water and sewage, electricity, communications;
- Decide the type of tender to be launched to start the construction of CAAM and HUBs, as well as the sequence of tenders

Option 1 – Single tender: Design/Build model – a preliminary architectural study must be developed so that a tender can later be launched for detailed design and construction;

Option 2 – Two tenders: Separate tenders for design and construction – in the first tender, a design team is selected to develop the project to execution phase; based on that, a construction tender is launched. Generally, the two-tender option offers better cost control, since construction prices are based on a

detailed bill of quantities and work plan. Furthermore, without an internal team to carry out the preliminary study, an initial tender would be required to contract a design team.

Define the sequence of tenders to be launched – in principle, CAAM would be prioritized, as it will also receive operators from Chimoio's current markets; however, HUB tenders should follow closely so that products can start arriving from production areas to CAAM as soon as possible;

Prepare and publish the technical and legal documentation for launching public tenders for the design and/or construction of the CAAM and HUBs, as decided;

Secure legal approvals and environmental licenses;

Evaluate proposals and award contracts for the infrastructure and construction of the CAAM and the first two HUBs.

Once this first phase is completed, the project should move on to Phases 2 (Design/Construction) and 3 (Implementation):

Figure 47: project and implementation phases

10.1 2 - Years 3 to 6: Projects, Infrastructure and Construction of the AgriHub model - CAAM and HUBs

Phase 2 includes all the tasks of project development and construction, the latter of which will be ongoing until very close to the scheduled date for the public opening of all the structures, in year 6:

- Accompany the contractors selected in the previous phase to ensure that the construction sites are prepared, including reception and storage areas for construction materials and equipment and decent facilities for the workers;
- Start building the essential CAAM infrastructure, including sales spaces, warehouses with and without cold storage, processing units and logistics facilities;

- Ensure access and connection to basic collective infrastructures, such as electricity, water and sewage networks and data and telecommunications networks necessary for future operation and operations; if this is not possible, provide for autonomous supply, albeit provisional, and an alternative security network for a minimum operating period to be defined;
- Treat and prepare the outdoor spaces (roads, green spaces, fences), ensuring an environmentally pleasant and sustainable space;
- Developing and implementing the roads and transport networks needed to guarantee a good access network to the CAAM/HUBs, so that accessibility is no longer a constraint on the flow of local produce.

10.2 Phase 3 - Years 5 and 6: Preparing for Operation and Recruitment - CAAM and HUBs

The Phase includes tasks related to the governance and management of CAAM and HUBs, on the one hand (see 9.1. and 9.2, below), and, on the other, preparation for operation:

- Defining prices and conditions of access to each type of space;
- Prepare contracts for the use of the various types of space;
- Start the process of marketing/advertising the spaces/services available at CAAM and HUBs;
- Commercial actions in the various markets of Chimoio, to overcome the normal resistance to change and show the advantages of the new CAAM; publicity/clarification actions in the CAAM and HUBs action radii to show the advantages of the new space and how they will work;
- Develop specific actions to attract key operators into these structures, which will be essential for attracting other operators and services (see identification of stakeholders);
- Study the possibility of introducing legislation to protect the activities that take place in CAAM and the HUBs. In other words, in a perimeter with an area to be defined, all economic agents who have an interest in developing these activities or services should be directed into the complex, increasing the profitability of the investment and ensuring that all the rules and principles that led to the design of the CAAM/HUBs are complied with;
- Ensuring compliance with all health and safety requirements prior to commissioning;
- Selecting, recruiting and training the various operators, technical, operational and administrative staff; bearing in mind the principles of social inclusion and support for the most fragile communities and groups that guided the design of CAAM;
- Draw up internal regulations and common practice guides for both CAAM and the HUBs;
- Hire service providers for logistical activities, quality control, waste collection and treatment, security and maintenance companies; if some of these services are carried out in-house (because there are economic and social advantages, particularly by creating safe jobs), ensure that workers and equipment are properly trained;

- Establish partnerships with suppliers and distributors to ensure continuity in the flow of products;
- Develop a practical guide and rules of conduct for all employees and outline a reception program to integrate all new employees with CAAM/HUB procedures and principles;
- Implement internal training for all CAAM and HUB agents to ensure efficient operations and compliance with regulations;
- Implement supply chain management software and digital monitoring tools, building an information base to measure the impact of these structures on the community, their evolution and future strategic management decisions;
- Test all operational systems - logistics, cold chains, market management;
- Carrying out test operations to ensure efficient operation before the CAAM / HUBs begin full activity.

10.3 4 - year 6 and beyond: Delivery of spaces, Integration into the Distribution Circuit and Expansion

- Develop and implement a communication and marketing strategy to publicize the start of activity and attract buyers, sellers and logistics partners; maintain and adapt this communication strategy to the various stages of CAAM's evolution, particularly in the first years of operation and at specific times (new investments, new partners), demonstrating the social and economic impact of these structures;
- To officially open CAAM to commercial activity;
- Monitoring operational performance in the first few years of operation and resolving any operational and logistical inefficiencies that are identified;
- Maintain open and continuous contact with all stakeholders to improve overall performance;
- Support companies and businesses in adapting to the new infrastructures and services provided by CAAM and HUBs;
- Prepare the start of the construction process for the two proposed additional HUBs, following the steps already identified;
- Assess the need for further development and expansion in line with growth in demand;
- Implement new structures and offer, namely more processing units, new logistics areas and partnerships with retailers;
- Ensure the continuity of training programs, periodic evaluations and the necessary technological updates to maintain efficiency and sustainability;
- Review and improve internal regulations and operating procedures based on performance data and input from the various stakeholders, also taking into account new agricultural and consumer trends, trade policies and technological advances;
- Implement periodic assessments of the socio-economic benefits and impact of CAAM and HUBs.

This Action Plan guarantees that CAAM and the 4 Hubs are operational by ensuring:

- Strategic and financial alignment with the project;
- Progressive construction of the Hubs before the CAAM;
- Clear governance and an efficient operating model;
- Modern infrastructure equipped to meet market needs;
- Sustainable operating model with training, commercial partnerships and structured support services for the supply chain from producer to market.

This approach will ensure structured, efficient and sustained implementation, guaranteeing long-term economic and agricultural growth.

10.4 Mozambique-Italy Coordination Committee and Operational Unit

During the course of the project and as a result of the 2nd Mission, the team proposed that the Coordination Committee (CC) should be set up as soon as possible, with the technical support planned to be provided by the operational unit - MICAA (Mozambique - Italy / Agri-Food Center), which is currently made up of two units, Management and Technical.

10.5 Stakeholder Involvement for 2025

In order to ensure that most of the actions listed in Phase 1 are carried out, it is proposed to move ahead immediately with setting up and activating a multi-stakeholder, multi-level platform, centered on the city of Chimoio - on the one hand, because there is proximity to the direct beneficiaries (farmers, cooperatives and local companies); on the other, because interventions can be adjusted according to the real needs on the ground.

By showing transparency and ensuring that local communities feel part of the process, these actions will generate trust and, by holding periodic meetings with the same stakeholders throughout the year, it will be easier to engage them on an ongoing basis.

In all the actions to be carried out, it will be crucial to respect the following key factors in order to achieve success with Public Communication:

- Consistency of Message: Ensure that the objectives and benefits of CAAM are clear to all stakeholders;
- Regional Inclusion: Regular sessions in Chimoio to keep farmers informed and involved;
- Political and Financial Engagement: Strategic events in Maputo to ensure continued government and donor support;
- Media Outreach: Face-to-face conferences, online broadcasts and the use of social networks to reach a wider audience (at this early stage, but increasing as the date for the construction and opening of the CAAM approaches).

The proposed schedule of activities is as follows:

Month	Event and Communication	Location	Main Theme	Main Participants
February	1° Regional Session- Project Presentation and Feedback	Chimoio	Presentation of the progress of CAAM studies, challenges and opportunities, organization and location	Farmers, Local Associations, Provincial Directorate of Agriculture, Local Companies, NGOs, Regional Private Sector
March	1° Central Level Session- Tecnical Presentation of the Project and Inclusion of the Recommendations from Chimoio's Meeting	Maputo	Technical review of the project with integration of feedback received in Chimoio	CAAM Coordination Commission, Management Unit, Business Associations, Directorate of Trade and Industry
April	2° Central Level Session- Financial-economic Presentation and Governance of the Project for Decision Makers	Maputo	Economic and financial analysis, governance model for validation with political and financial decision-makers	MAAP, Coordinating Committee, World Bank, FAO, GIZ, EUROCAM, Financial Institutions, Private Entities, IGEPE
June	Tecnical Workshop and Public Consultation- Infrastructure, Logistics and Services	Chimoio	Planning of hub infrastructure, logistics needs and partners for agricultural services	MADER, AICS, Logistics Companies, Agro-industrial Processors, Private Investors
August	Regional Forum for Agri-Food Business and Cross-border trade - Opportunities in CAAM	Chimoio	Investment and collaboration opportunities in the agro-industrial sector, with a focus on hub development	Farmers, Local Companies, Associations, Investors, Banks, Provincial Directorate, Equipment Suppliers, Service Providers
October	Meeting with Regional Project Managers - Synergies and Commitments for the Expansion of Hubs and CAAM	Chimoio	Integration of regional projects for co-financing, technical support and climate sustainability in HUBs and CAAMs	MADER, FAO, AICS (Transboundary), UNIDO (PROMOVE Trade), World Bank (IRRIGA), EU (PROMOVE Agribiz), Netherlands (MANGWANA), ADB (ZEPA), Green Climate Fund

Table 48: Stakeholders Involvement - Schedule of activities for 2025

The proposed agenda for the 1st event - February | Chimoio was as follows:

- Detailed presentation of the project: Explain what has already been done, the future timetable and the expected benefits;
- Feedback sessions: Space for discussion to gather concerns, suggestions and expectations from farmers and local partners;
- Planned Infrastructure Exhibition: Display of mapped images / visual presentations to aid understanding;
- Formal: Assure participants that the feedback gathered will be integrated into the operational plan.

Annex 18 contains the supporting documents for the analysis and presentation of the Stakeholder **Influence-Interest Matrix**. Stakeholders are identified according to their Power-Influence, derived from this analytical tool used to map actors / stakeholders in a specific sector or context, categorizing them based on their power (ability to influence decisions) and influence (level of interest in issues).

The presentation of the work to the MAAP at the 2nd event - March | Maputo was as follows **aims to** ensure the strategic alignment of the CAAM Project within government priorities and strengthen its implementation in order to:
ensure the integration of the project into national agri-food sector**policies**, guaranteeing coordination between different departments and aligning actions with other ongoing initiatives;
technically validate the project, incorporating feedback from stakeholders, expert feedback on infrastructure, logistics and governance necessary to incorporate into subsequent phases;
focus on **resource mobilization and budget planning**, discussing financing needs and possible synergies with national and international funds for the various phases;
prepare institutional communication, defining a clear positioning for future interactions with other ministries, development partners and private investors, ensuring solid support for the integrated construction of activities and functions that contribute to the success of CAAM.

Annexes 12, 13 and 14 contain the two constituent documents of the public presentations respectively at the DPAP in Chimoio on 27.03.2025, the presentation at the MAAP in Maputo on 05.03.2025 Maputo and also the lists of participants in the two meetings held.

11. CONCLUSIONS AND RECOMMENDATIONS

On the basis of the data presented and its analysis, the team argued that the ideal model for CAAM would be an Agri-Hub that would include a central structure, CAAM, and its satellite HUBs. The HUBS will channel 50% of the local production they collect and prepare to CAAM, making these structures effective tools for supporting the recovery of the productive sector and enhancing the potential of the agricultural sector in central Mozambique.

The impact of the Agri-Hub in Manica province will go beyond the reorganization and ordering of trade and a greater appreciation of local agricultural production, extending to urban planning and the economic and social development of the province.

It is therefore essential that the investments planned and to be planned for the province, both by the Central and Provincial Governments and by private agents, are channelled into CAAM, provided they fit in with its philosophy, in order to take full advantage of this infrastructure as an instrument for commercial and urban planning and to make the investment effort more profitable.

The proposed location, around 20 km from the city of Chimoio, will mean that the provincial government will have to invest in public transport for the city's small traders to get to CAAM.

Likewise, the connection between CAAM and the HUBs will require coordinated investment in access road infrastructures, so that access to this redistribution center is fluid.

The investment proposal presented is phased, with four HUBs strategically positioned in the agricultural production zone and the CAAM in the demand zone. This phasing provides for a period of adaptation and integration of the various players in this new form of distribution, allowing for the construction of buildings in the various areas of the CAAM/HUB and the provision of plots for the construction of units for the installation of private or public operators as the demand for space grows, reducing the initial financial effort and integrating investor partners who share it.

The recommendations and suggestions resulting from the various consultants' analyses include the following:

11.1 Value Chains

CAAM should have a significant share of its revenues (until it reaches break-even), not dependent on VCs whose production is mostly carried out by small-scale producers, nor mostly dependent on sales made on the local market. Therefore, the following are some of the recipes and strategic recommendations:

Transformation with Innovation and Added Value with:

- using second quality, waste and surplus vegetables, tubers and fruit to produce guacamole, avocado oil, jams, canned goods and derivatives (starches, flours and soy milk);
- development of non-perishable products for local and foreign markets (Africa, Middle East, Europe, USA), including UHT milk, soybean oil and ready meals;
- circular economy and sustainability initiatives: catering articles made from cassava starch and avocado

pits, natural pineapple fiber, banana trunks for textiles, tiles made from mango waste and cashew derivatives (vinegar, cajuine, frozen pulp).

Services for Value Chains (VCs), namely:

- provision of infrastructure and specialized services (warehouses, logistics, certifications, laboratory analyses) for companies producing products such as macadamias, lychees, avocados and coffee, reducing dependence on external services, such as those carried out in South Africa (as an example).

High-tech services and specialized infrastructure:

- Mapping with drones, digitalization, ERP, agro-industrial technical assistance, laboratories and advanced logistics services, complementing areas not answered by local entrepreneurs.

Strategic partnerships, such as

- collaboration with development projects in the Beira Corridor and Manica province, such as Mangwana, Promeza, Mais Valor-UNIDO and IRRIGA;
- the expansion of innovative models such as CPSAs, ADAs and InAGRO, aimed at increasing production, productivity and the consistency of value chains, with reduced costs and greater private sector involvement.

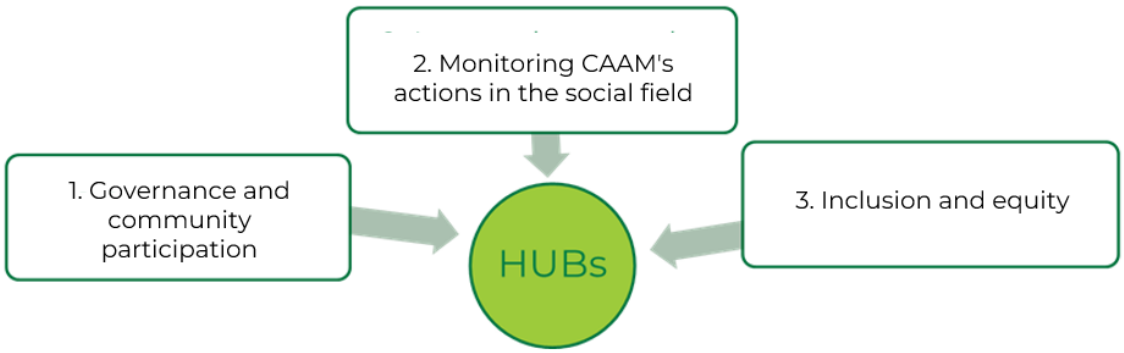
Institutional coordination, namely

- liaison with regional institutions (AdZ, IPEME, ICM, IAOM) and business associations (CPEs, AMM, AICAJU, AIAVL), as well as with SPAEs, DPAPs, DPICs and local municipalities;
- integrating anchor projects (such as the “Chicamba Ring”) and strengthening partnerships with leading companies in the mapped value chains;
- Applying this model will enable CAAM to maximize the value generated, optimize resources and promote sustainability and competitiveness in the agri-food sector in the region, at national and international level.

11.2 Social and Anthropological Elements

Many recommendations were presented at length in the chapter on this topic and will not be repeated here.

They are, however, broken down into the following 3 areas with a strong focus on rural communities and therefore on the proposed supply chain model, as shown below:



11.3 Economic and Financial Analysis

The organization of integrated supply chains with an agro-ecological approach can represent a premise for the production of organic food ingredients (tomato paste, vegetable flour, etc.) for the European ingredient markets.

The processing of second quality tropical fruit (e.g. mango) to produce organic juice can provide added value to the supply of the Italian organic market

The implementation of quality systems (Global G.A.P., organic, traceability, etc.) based on European standards is useful not only for qualifying the product and management, but also for establishing stable commercial relations with modern supply chains active in Africa, such as HORECA.

The implementation of carbon recovery cultivation practices represents a strategy to rebalance agriculture and the local environment, restore soil fertility and improve adaptability to climate change.

The production of qualified seeds for the African territory is a critical factor for agricultural production, both in terms of the quality of the seeds and their adaptability to local agricultural environments. It could be useful to develop a partnership with Italian seed companies for on-site breeding and multiplication of seeds suitable for the African environment.

In financial terms, the main figures are as follows:

- The cost of capital (Ke) (the rate of return expected on the market for comparable infrastructure investments with a similar level of risk) is calculated at 11.59%. In terms of the CAPM model (Capital Assessment Pricing Model), this figure takes into account:

1. Risk-free rate: 2,76% (average market value of the 30-year German bond in February 2025);
2. Beta (unlevered): 0,54 (Damodaran[14] – Category of food wholesalers- January 2025);
3. Market Risk Premium: 16,35% (Damodaran[15] - January 2025 - including Mozambique's country risk premium);

- The weighted average cost of capital (WACC) is 0%, calculated by weighting debt (35 million) at 0% and equity (0 million) at 11.59%;
- Tax rate is calculated at 32%.
- EBITDA (earnings before interest, taxes, depreciation and amortization) is an alternative profitability measure to net income. It is used to assess a company's profitability and financial performance) has been positive since the fourth year of activity;
- Operating cash flow is positive from the fifth year after the start of operations;

[14] https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/Betas.html
[15] https://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html

- The internal return on investment (IRR) is around 0.3% for the project with a NPV of 2.2 million euros (WACC=0%).

Main financial results	Year 1-5 (average) Euro	Year 6-10 (average) Euro	Year >11 (average) Euro
Revenue (without operating subsidies)	3.285.922	4.850.138	5.510.924
OPEX – Operational Costs	-3.837.696	-3.997.600	-3.997.600
EBITDA	-551.774	852.538	1.513.324
EBITDA MARGIN	*-15%*	*17%*	*27%*
Operating cash flow	-648.850	804.285	1.461.703

11.4 Stakeholders Envolvement:

CAAM's success will depend on an adaptive and collaborative approach, ensuring that both short-term and long-term objectives are met, even in the face of uncertainty. The influence-power matrix will continue to be an essential tool for guiding decision-making and prioritization throughout the project's development.

11.5 The Influence - Power matrix presented should be updated throughout the CAAM project (Annex 18), i.e. from the present moment until at least the start of operations. Subsequently, a Communication Plan should be analyzed and implemented, which should include all relations with Stakeholders. Stakeholder involvement for the current year 2025 was presented in Table 51. presented in this Repor s

11.6 Flow data and architectural proposal

Four CAAM support hubs have been defined.

Our estimates for entry into the HUBs are as follows:

- the range of products for the 4 hubs is determined by value chain analysis;
- in each of the 4 HUBs, 10,000 t/year in 2030 and 13,500 t/year in 2055;
- in 2030, 1st quality is worth 25% of the total, 2nd quality is worth 50% of the total and 3rd quality is worth 25%. It is assumed that this percentage is the same for each of the 4 hubs;
- in 2055, the percentages change as follows (each hub): 1st quality 40%, 2nd quality 45%, 3rd quality 15%;
- the initial processing is done at the HUBs, while the complete processing will be done at CAAM. It is assumed that in 2030, 80% of the 3rd quality will be processed at the HUB, while the 2nd quality will be

processed at the HUB for 10%. In 2030, 2,500 tons are then processed (80% of 2,500 tons of 3rd quality + 10% of 5,000 tons of 2nd quality);

- in 2055, 95% of the 3rd quality will be processed at the HUB and 10% of the 2nd quality. Thus, 2,531 tons will be processed (3rd quality has fallen in the meantime);
- this first processing at the HUB is done with a machine that processes 1 ton/hour for 8 hours/day, i.e. 8 tons/day. Therefore, the machine will process 313 days/year in 2030, while it will process 316 days/year in 2055. Below are the estimated values for the 4 hubs.

This is an assumption of the processing line required for the first processing activities in each HUB:

Processing Lines	Products	Investment (€ 000)
Sorting - Cleaning - Washing	potatoes, onion, ..	40.000
1 line pulps and juices and sterilization + bottling (manual)	tomato, mango, Avocados, citrus, , citrus, bananas, mango, onion, cabbage	200.000

Estimates of entry into the CAAM and exit from the HUBs are:

- the analysis of the value chain determined an entry of 73,436 tons in the year 2030, arriving at 108,949 in the year 2055;
- in 2030, the 1st quality is worth 40% of the total, the 2nd quality is worth 30% of the total and the 3rd quality that enters the CAAM directly from the nearby rural area is worth 15%. To this is added the 3rd quality that arrives already semi-processed by the HUBs, for a percentage of 15% of total revenue;
- in 2055, the percentages change as follows: 1st quality 50%, 2nd quality 30%, 3rd quality 10%, 3rd quality already semi-processed 10%;
- regarding processing in CAAM, it is assumed that in 2030, 95% of the 3rd quality, 10% of the 2nd quality, 75% of the semi-processed product from the HUBs (to take into account system losses) will be processed.In 2030, with these calculations, **20,929 tons are then processed**;
- In 2055, 90% of the 3rd quality will be processed at the HUB and 30% of the 2nd quality, 75% of the semi-processed product from the HUBs. Thus, **26,148 tons will be processed**, with an increase of 25% in absolute value over the period;
- this processing at CAAM is done with machines that process 10 tons/hour for 4 hours/day, i.e. 40 tons/day. Therefore, 523 days/year will be processed in 2030, while 654 days/year will be processed in 2055; three processing machines are needed.

Here is a proposal for the processing lines needed for CAAM processing activities:

Processing Lines	Products	Investment (€ 000)
1.Pulp – Concentrate triple 36-38 Brix Cold Break	tomato, mango, Avocados, citrus,	3000
2.Juice	citrus, pineaples, mango	3000
3.Dehydratation. - flours	bananas, mango, onion, cabbage	2620

The CAAM intervention area will be made up of the following areas:

- Total intervention area: **116,000 m²;**
- Total area built in Phase 1, blocks 1 to 10 inclusive: **19,100 m²;**
- Total area built in the expansion phase, blocks 1 to 10 inclusive: **17,900 m².**

The estimated construction costs and energy and maintenance costs for CAAM (therefore excluding all human resources costs, cleaning, security, marketing, etc.) are as follows:

- Total construction cost: **€11,000,000;**

Total annual energy and maintenance costs: **€2,256,000/year.**

The estimated construction and operating costs of each HUB (excluding human resources, cleaning, security, marketing, etc.) are summarized as follows:

- Intervention area: 7,000 m²;
- Construction area (1st phase + expansion): 2,000 m²;
- Total construction cost: €825,000;

Total annual running costs for energy and maintenance: **€170,500/year**

In summary, the final solution of the model, designed to respect the available budget, considers the construction of four HUBs in the production zones where the priority VCs are concentrated, and the CAAM, in the area where demand is concentrated.
The total cost of building this model will be:
Total construction cost: **€14,300,000**
CAAM: €11,000,000
HUBs (Macate, Sussudenga, Barué, Vanduzi): 4 x €825,000 = €3,300,000

Total intervention area: **144,000** m²
CAAM: 116,000 m²
HUBs (Macate, Sussudenga, Barué, Vanduzi): 4 x €7,000 = 28,000 m²

Built-up area: **45,000** m²

CAAM, phase 1 and expansion: (19,100 + 17,900) = 37,000 m^2

HUBs, phase 1 and expansion (Macate, Sussudenga, Barué, Vanduzi): 4 x (1,300+ 700) = 8,000 m^2

Total annual operating cost (energy and maintenance): **€2,938,000.00/year**

CAA: €2,256,000

HUBs (Macate, Sussudenga, Barué, Vanduzi): 4 x €170,500 = €682,000

The solutions presented represent the objective of defining a technical-functional architectural model that responds to the current and future production and consumption needs of the areas and regions involved, while at the same time being sustainable from an economic and financial point of view. This means that in the later stages of the detailed design and construction, the architectural configuration of the CAAM can also change, as long as it respects the technical, functional and distributive logic defined in this study.

As a final note, it is important to emphasize that the city of Chimoio is part of the *Green Cities* network and therefore all the **architectural alignment and technological solutions to be installed should align with the principles contained in this objective.**

11.7 Governance Model

Recommended governance models (operating company by the state or management entrusted to a private operator) in line with Mozambique's legal framework, specifically Law 15/2011: a) Creation of an operating company by the state and b) Management entrusted to a private delegate. This law establishes the process for contracting, implementing and monitoring public-private partnerships, major projects and business concessions. In addition, Decree 69/2013 regulates public-private partnerships and small business concessions. According to this legal framework, a public-private partnership refers to projects carried out in areas of public domain - excluding mineral and oil resources - or in public service sectors.

We recommend following our instructions indicated in the proposed management model (Par. 9.2)

Finally, we recommend following the proposed operating model illustrated in Chapter 10.

At the conclusion of the activities, we recommend the prompt initiation of the tender procedures for the assignment of construction works for the CAAM, in line with the guidelines provided in Chapter 10 of the Final Report.

Specifically, it is proposed to launch:

- **Tender 2 for the detailed design phase** (PFTE and executive design), **with a base bid value of €2.1 million, equivalent to approximately 7% of the total construction cost;**
- **Tender 3 for the execution of the construction works**, with a base bid value **of €29.3 million**.

12. ANNEXES

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- Annex 3.2 – Chimoio Market Data
- Annex 3.3 – Chimoio Market Layouts
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- Annex 7 – Meetings and Engagements with Stakeholders
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13. BIBLIOGRAPHY

- **Zambezi Valley Development Agency (ADZ). (2015).** HORTIVALE: Baseline study on the vegetable market in the Zambezi Valley and Beira Corridor. ADZ.
- **Zambezi Valley Development Agency (ADZ). (2016).** Agricultural Mechanization Program in the Zambezi Valley. Songo: Zambezi Valley Development Agency.
- **Bank of Mozambique. (2021).** Annual Balance of Payments Report (2021, 2022, 2023). Bank of Mozambique.
- **Bank of Opportunities of Mozambique (BOM). (2014).** Market study on volumes, prices, new products, and contract farming in the horticultural value chain in Central Mozambique. BOM.
- **CAAM, FDA – Newtech Consultants. (2021).** CAAM Study. Newtech Consultants.
- **Council of Ministers. (2021).** National Program to Industrialize Mozambique (PRONAI): Resolution No. 52/2021, of October 21. Official Gazette, Series I, (203). Ministry of Industry and Trade.
- **Food and Agriculture Organization of the United Nations (FAO). FAOSTAT**: Compare data. Retrieved from https://www.fao.org/faostat/en/#compare
- **Ministry of Agriculture and Rural Development (MADER). (2022).** National Agrarian Sector Investment Plan II 2022–2026 (PNISA). MADER.
- **Ministry of Agriculture and Rural Development. (2020).** Strategy for the Development of the Agrarian Sector (PEDSA).
- **Ministry of Agriculture. (2012).** Proposed Strategy for Agricultural Mechanization. Republic of Mozambique, Maputo: Ministry of Agriculture.
- **Ministry of Economy and Finance. (2021).** PES Balance – 2021. https://www.mef.gov.mz/Políticas/balanco-do-pes-2021.
- **Ministry of Industry and Trade. (2016).** Industrial Policy and Strategy (PEI), 2016–2025. Maputo: Ministry of Industry and Trade.
- **Food and Agriculture Organization (FAO). (2023/24).** Hand in Hand: Baseline study of value chains and investment project "Vegetable Processing Factory". FAO.
- **PROSUL – Center for Agricultural Promotion (CEPAGRI).** Feasibility study of Agricultural Service Centers. Funded by IFAD and implemented by CEPAGRI.
- **Republic of Mozambique, Ministry of Economy and Finance. (2022).** Economic Acceleration Measures Package (PAE). Minister's Office, August 9, 2022.
- **Republic of Mozambique. (2013).** National Agrarian Sector Investment Plan (PNISA) 2013–2017. Maputo, Mozambique: Ministry of Agriculture.
- **Republic of Mozambique. (2014).** National Development Strategy (ENDE) 2015–2035. Maputo, Mozambique:

Ministry of Economy and Finance.

- **TechnoServe. (2021).** Challenges and opportunities in agro-industrial development in Mozambique. TechnoServe.
- **Government of Manica Province.** Sectoral Reports (DPAP, DPIC) of the Economic and Social Plan of Manica Province. Government of Manica Province, 2021–23.
- **Government of Tete Province.** Sectoral Reports (DPAP, DPIC) of the Economic and Social Plan of Tete Province. Government of Tete Province, 2021–23.
- **Government of Sofala Province.** Sectoral Reports (DPAP, DPIC) of the Economic and Social Plan of Sofala Province. Government of Sofala Province, 2019–23.

14. ACRONYMS AND ABBREVIATIONS

ADA – Agente de Desenvolvimento do Agronegócios

AdZ – Agência de Desenvolvimento do Vale do Zambeze

AE – Ações Estratégicas

AFD – Agência Francesa de Desenvolvimento

AICS – Agência Italiana de Cooperação para o Desenvolvimento

AMM – Associação Moçambicana de Macadâmia

APIEX – Agência para a Promoção de Investimento e Exportações

AT – Assistência Técnica

BAD – Banco Africano de Desenvolvimento

BM (WB) – Banco Mundial (World Bank)

CAAM – Centro Agro-Alimentar de Manica

CEP – Centro Empresarial Provincial (CTA)

CPSA – Centro de Prestação de Serviços Agrários

CTA – Confederação de Associações Económicas

CV – Cadeia de Valor

DDM – Domínios de Desenvolvimento de Moçambique

DELPAZ – Desenvolvimento Local para a Consolidação da Paz em Moçambique

DPAP – Direção Provincial de Agricultura e Pescas

DPIC – Direção Provincial da Indústria e Comércio

FCID – Fundo Catalítico para Inovação e Demonstração

FNDS – Fundo Nacional de Desenvolvimento Sustentável

GIZ – Cooperação Alemã para o Desenvolvimento

GLOBALG.A.P. – Boas Práticas Agrícolas

GV4G – Crescimento Sustentável com Valor Verde

HACCP – Análise de Perigos e Pontos Críticos de Controlo

HORECA – Hotéis, Restaurantes, Catering

IA – Investigação Agrária

IAOM – Instituto do Algodão e Oleaginosas de Moçambique

IDE – Investimento Direto Estrangeiro

IFAD – International Fund for Agricultural Development

IFC – International Finance Corporation

IGPP – Integrated Growth Poles Project

ISO – International Organization for Standardization

MADER – Ministério da Agricultura e Desenvolvimento Rural

MCC – Millennium Challenge Corporation

MEF – Ministério da Economia e Finanças

MTC – Ministério dos Transportes e Comunicações

OGE – Orçamento Geral do Estado

OIC – Organização Internacional do Café

PA –Pequenos agricultores

PACE – Pequeno agricultor comercial emergente

PADZ – Programa de Apoio ao Desenvolvimento Rural

PCCAA – Projeto de Comércio e Conectividade na África Austral

PEDSA – Plano Estratégico para o Desenvolvimento do Setor Agroalimentarpecuário

PME – Pequenas e Médias Empresas

PNG – Parque Nacional da Gorongosa

PNISA – Plano Nacional de Investimento do Setor Agrário

SABS – South African Bureau of Standards

SCF – Small Commercial Farmer

SDAE – Serviços Distritais das Atividades Económicas

SHF – Smallholder Farmer

TDP ZIM-MOZA – Projeto de Cadeia de Valor da Agricultura e Desenvolvimento do Comércio Zimbabwe – Mozambique

UE – União Europeia

UNIDO – Organização das Nações Unidas para o Desenvolvimento Industrial

ZEEA-L – Zona Económica Especial de Agronegócio do Limpopo

ZEEPA – Projeto Zona Especial de Processamento Agro-Industrial do Corredor de Desenvolvimento Integrado Pemba-Lichinga

Italy, April 14, 2025

Consortium

STI Engineering Srl

Cibusalus Srl

Sinloc Srl