Ministry of Foreign Affairs

Strategic Gateways An Integrated Study of Trade Routes and Agricultural Value Chains along the Caála Logistical Platform (CLP) and the Lobito Corridor, Angola

Commissioned by the Netherlands Enterprise Agency

>> *Sustainable. Agricultural. Innovative. International.*

Kingdom of the Netherlands

Commissioned by the Embassy of the Kingdom of the Netherlands in Angola (EKN) and the Netherlands Enterprise Agency (RVO)

(Incorporating Value Chain Analysis of Various Crop Types)

Final Version

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EXECUTIVE SUMMARY

1. Key Findings

Across all the interviews, meetings and site visits we had with stakeholders and role players, from both public and private sector, the following key insights and findings have been observed:

- Angola had a very thriving agricultural sector prior to 1975, being quite self-sufficient for the most part to meet the needs of domestic demand, and it also exported several crops such as coffee, maize, bananas and cassava. This was thanks to nherent blessings such as plentiful rainfall, many rivers and waterways and rich soil. However, the natural endowments were also complimented by an organised farming community that properly exploited (in a positive way) the natural endowments.
- Unfortunately, Angola's agricultural sector has been in steady decline since the start of the civil war in 1975.
- Several policies and programmes have been attempted, both during the war, and in the 23 years since the end of the war but met with only limited success.
- Much of Angola's pre-1975 agricultural organisation, policy support, financial instruments and farming expertise has either been lost or severely reduced.
    - Government support is available to farmers, but is quite limited for the task of properly reviving the sector to diversify the economy as intended;
    - Regulatory capability needs to be strengthened and compliance by farmers and other actors in the value chain needs to be monitored and controlled, especially for the purposes of gearing up for exporting to the EU and other markets;
    - The question of land tenure for farmers has to be resolved if the farmers are going to be enabled to improve production and yields;
    - Inputs such as seeds and fertiliser are quite expensive to the average farmer. They generally farm with what is available, which often leads to harvesting crops that are not of the highest quality;
    - Private sector financial instruments are also limited, and expensive;
    - Many older and experienced farmers have exited the industry. The good thing is that many new and younger farmers have entered the market, but they lack critical skills and know-how;

- Education, training and mentoring of many farmers is therefore critical;
- Cooperatives do exist, but lack of progress in organising the many small-holder and family-owned farms into more sustainable ventures would suggest there is room for improvement on this front.

- It's been almost 50 years of decline, and there are not shortcuts to restore Angola's agricultural sector to its former glory.
- Turnaround of Angola's agricultural of course, but it will be via a multi decade plan, sector can be achieved with all stakeholders and role players in the public and private sectors, NGO's and Community Based organisation such as Cooperatives and business councils, financing institutions and education and research institutions to all be aligned around common objectives and pull in the same direction in order to make progress and reach ultimate goals.

"Turnaround of Angola's agricultural will be via a multi decade plan"

- Focussing on regional developments such upgrading agricultural production and improving agri-logistics via the Caála Logistics Platform (hereafter referred to as the 'CLP') in the province of Huambo is an ideal way to establish a laboratory to start addressing these multitude of challenges and learning lessons that can be transferred to other provinces and initiatives across the country.
- Agriculture is central to Angola's economy and rural livelihoods, with vast untapped arable land and favourable conditions for both staple and export crops. The sector is increasingly prioritised in national development strategies, offering strong potential for growth, diversification, and job creation.
- What we found that was really exciting is that, despite these many challenges, all stakeholders have an extremely positive energy and drive towards improving the conditions on the ground and moving towards improved quality, improved output, improved profitability, reducing post-harvest losses and gearing up to begin exporting crops such as avocados and citrus again.

"all stakeholders have an extremely positive energy and drive towards improving the conditions"

- This is a very positive movement that can be built upon through undertaking a cluster approach to development such as utilising the Dutch Diamond (Dutch-Angolan Diamond) approach, or some similar methodology such as the Porter Five-Forces Model.
- It is not so much about developing a new national development plan for agriculture in Angola, as the plan is a fairly sound one, but it is more about putting in place a process where role players and stakeholders can be aligned, marshalled and galvanised behind the national development plan and actions for implementation can be coordinated and synchronised.

- However, creating the space for a review of the National Development Plan for Agriculture in Angola, and agreeing on necessary amendments or shifts of emphasis or prioritisation of objectives could nonetheless be a very useful exercise at this juncture.
- In any event, irrespective of what happens at the national level, it will probably be prudent for the province of Huambo and local stakeholders across the various local municipalities to formulate a more precise plan for developing the sector in the province and organising the public sector, private sector, NGO's/CBO's and research institutions into a coherent coalition for the advancement of Huambo's agricultural ambitions (a renaissance of sorts).
- Large scale farmers provide the foundation for the business case for the CLP on the one hand, but on the other hand, the 'status' of small and family-owned farms must be improved as well.
- The CLP will not only handle agricultural products, but also minerals and other general cargo products. The CLP will be a hub for Export cargo consolidation as well as serve as a cold storage hub for agricultural produce destined for the local markets.
- Essential information about individual farms and local roads is not fully known or understood at this stage. The Transport Route Mapping Study was supposed to produce this information as comprehensively as possible. However, this granular information and data is not available at this stage from role players and actors on the ground. A separate study focusing just on this aspect, perhaps with the assistance of the University of Huambo and other role players will need to be conducted over several months in order to establish the first set of accurate and verifiable data on local farms and local roads.
- The GIS and geo-spatial base information is not as comprehensive as first assumed and further work must also be done in this area to develop a comprehensive and validated set of GIS maps. This goes hand-in-hand with the previous point.
- A successful trial shipment of a container of avocados to Europe later this year is a big goal of the CLP and the avocado farmers.
- Construction and financing of a rail spur from the CLP to the main line is a key development project of ARCCLA and the CLP.
    - An appropriate technical/engineering solution as to how the CLP will connect with the Lobito Railway Line will be quite critical in supporting both short term and long-term efficiencies of moving product from the CLP to the Port of Lobito for export.
- Local road transport and logistics costs are quite high.
- Funding and financing options are quite expensive for private sector to take up.
- The role of Wesfalia in working with local partners to improve the production quality and increase the output from local avocado farmers is extremely positive.

- The World Bank is working with a large number of stakeholders in Angola on the Diversifica Mais (Diverisfy More) project.
- ARRCLA, the PPP Unit, BFA, IDI and road authorities are critical partners to the WB on the CLP development.
- $130mn is available at this stage to fund last mile infrastructure and human capital development (training and capacity development) initiatives.
- Funding will be targeted for:
- Upgrading of 5-10km rural roads from small farms to connect to secondary and main roads
- Cold storage facilities
- Water infrastructure
- Mapping
- Funding can be made available for public-sector led projects as well as to private sector entities
- The funding of $130mn presently available can be increased if sufficient qualifying projects are identified that warrants additional funding beyond the 130mn USD.

II. Recommendations: Strategic, Tactical & Operational

Our recommendations are based on desktop research, interactions with various stakeholders and role players across the spectrum and also builds on previous studies over the past few years in this regard. Country comparisons and global benchmarking also inform the recommendations that we propose. Unfortunately, several of our recommendations are made in the light of limited or absence of certain data and information at the local level. Nonetheless, we have applied learnings and insights obtained by other means and brought them to bear on the recommendations we propose here. It could well be that some of these recommendations, especially at the Operational level, and possibly also the Tactical level, could be reviewed and amended as and when new information from the local environment in Huambo comes to light.

Generally speaking, Operational, Tactical and Strategic level recommendations will tend to coincide with the short, medium and long term. However, this is not always the case as it could well be that a 'Strategic' or 'Tactical' recommendation may need to be addressed in the short term.

For purposes of these recommendations, we would classify issues having to be addressed at enterprise level (farm, transport/logistics operator, wholesaler/retailer, etc., as 'Operational'. Issues that need to be addressed within a vertical of the industry value chain, i.e. among a cluster of farms or farms collectively, involve cooperatives, business chambers, finance institutions, research institutions, etc. as 'Tactical'.
'Strategic' issues and recommendations will involve multiple stakeholders across the value chain, will generally involve government or an industry association in the lead role and normally will be a multi-year initiative, but not always.

a. **Develop a programme or series of programmes and initiatives** to significantly improve the organization and management of the agricultural sector in general (industry association level) and also for production areas at farm level especially for organizing and improving the functioning of smallholder and family run farms.

b. **Possibly investigate country-to-country technical cooperation agreements** to obtain assistance from other countries such as Portugal, Brazil, The Netherlands and South Africa (amongst others) to co-develop and implement such programmes.

c. **Enhance financial assistance schemes** to farmers as these are not adequate at the moment to support rapid improvement in farm production output. Potential support to farmers for liability insurance in the case of natural disasters or disease that destroys crops should ideally form part of the package of financial assistance. State-sponsored banks work well in this regard in many countries around the world.

d. **Formulate an aggressive plan** for upgrading and construction of roads and bridges, particularly in the study area of the province of Huambo – AND agree the most appropriate funding mechanism to execute rehabilitation, upgrading and construction of roads and bridges.

    i. Perhaps consider inviting qualified and experienced engineering and construction firms from the SADC Region, the continent and even globally to accelerate road and bridge construction as the rate of current rehabilitation and construction is fairly slow due to a number of reasons, including financing of road projects and capacity challenges within the construction and contractor industry in Angola.

e. **Extend the National Development Plan** for agricultural development into a multi-decade plan, divided into 5-year plans with specific goals and timelines. Development economists involved with developing national agricultural development strategies in Kenya, Ethiopia, South Africa and Peru can be commissioned for such further work.

f. **Address and resolve** the question of land ownership and land tenure.

g. **Engage** the World Bank to create/update funds or extension of funding limits to include longer roads into and out of farms.

h. **Introduce** the use of Business case approaches to prioritise road development projects identified within the CLP region as a filtering criterion.

i. **Formalise** Co-op structures to ensure gap between schemes from national/governmental level to farm level are minimised through an increase in accountability and access points with increased and improved farmer representation.

   i. Develop formalised Co-op approval criteria and pre-requisites through existing structures, benchmarked organisations and joint development of critical success factors (CSF's) needed for enhanced engagement and visibility.

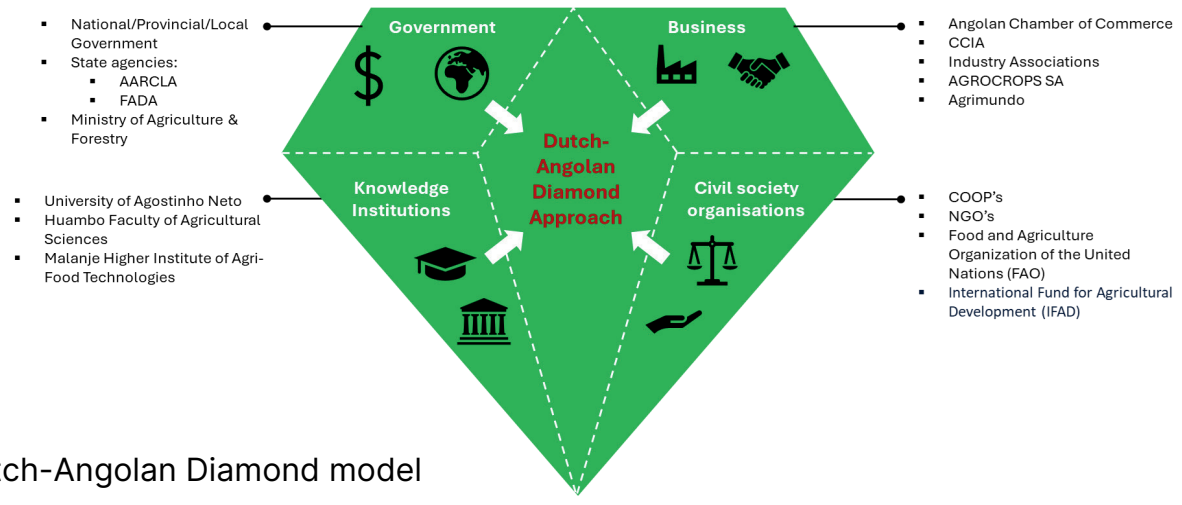
   ii. Leverage Co-op structures and entities to access FADA funding for herbicides, irrigation systems etc. through networks and greater channels.

j. **Explore and assess** non-conventional funding options such as private institution schemes (Stanbic Bank Agribusiness etc.) for viability and potential impact.

k. **Provision of** future support to National Government with National Plans and Strategy creation .

II. Tactical Recommendations

a. **Introduce a 'Dutch-Angolan Diamond' process** based on the 'Dutch Diamond' model in Huambo to align (or re-align) stakeholders and role players behind a coherent plan of action and obtain commitments from parties on roles and responsibilities for executing various components of the plan.



Dutch-Angolan Diamond model

I. Engage stakeholders through Co-op entities to ensure all levels are appropriately engaged and communication channels are maintained.

II. The Dutch-Angolan diamond relies on the principle of collaboration and integration between four key sectors working together in achieving common developmental goals. The key sectors include:

- Governmental entities: Provide regulatory support through policy creation for sustainable development, legislative standards for fair and competitive trade, funding and support mechanisms to ensure meaningful research, development and sector growth and coordination and facilitation between various key stakeholders.
- Business/Private sector: Provide a means of innovative and investable practices ensuring sustainable growth. Organisations also implement sustainable practices in the operations and processes which drives market influence, consumer behaviour and investor confidence.
- Knowledge Institutions: Universities, research centres and think-tanks provide qualitative and quantitative data, trends and insights to drive new processes, technologies and production systems in the strive for sustainable and scalable improvements to the agricultural sector. These institutions also provide key training and education to critical areas/stakeholders to better equip and upskill larger audiences and service providers (smallholder farmers, truck drivers, etc.)
- Civil society organisations: NGO's, community groups and other civil society organisations centre their focus on engagement within the communities they service, encourage accountability and transparency in due process, systems and organisations and facilitate training and development schemes.

III. The model intrinsically ensures cross-collaboration of various experts, influential parties and support structures at all levels to address and ensure complex challenges are dealt with in the most fair, economically beneficial and sustainable manner.

a. **Construction of** cold-storage facilities at key locations across the province to serve production hubs and consolidate farming output. Except perhaps for the very large commercial farmers that could afford to build and maintain its own facilities, smallholder and family-owned farms will not have the financial resources to construct and maintain their own cold-storage facilities. It will thus be prudent to construct such facilities to serve a cluster of farms (a production hub area) rather than individual facilities.
b. **Develop an optimal solution** for the rail link from the CLP to the Lobito Railway line to the nearest railway station or optimal loading point along the line. This solution needs to be designed for long-term efficiency and not just look at the shortest route or easiest option to connect the CLP to the railway line. This work is currently being undertaken, and possible design options are being discussed.

c. Introduce Technical Centre's of Excellence (CoE's) to promote and offer agronomy and other technical training to farmers to improve farming methods and quality of farming. Again, these facilities can be set up with the assistance of partner countries like the Netherlands, South Africa, Portugal, etc.

d. Introduce audit and compliance requirements for each centre to ensure uniformity and standard levels of education and service

    ii. CoE's can be run, governed and developed through Co-op entities to ensure appropriate knowledge transfer and a 'boots-on-the-ground' approach to development.

e. **The Pinduka Project**, a privately run project, has been quite a revelation in terms of how smallholder farms can be organized to improve quality and output. This is a model that can, and should, be replicated across the province, with the support of the government and state agencies.

    i. Improve co-op systems based on the Pinduka model (Strengthening of co-ops through methodologies outlines in the Pinduka Project)

f. **Investment** in reefer container rail wagons (flatbed containers) and close cooperation with shipping lines on export reefer containers should be informed by a clear demand forecast picture from the Huambo farming community (public and private sectors).

g. **Highlight initial priority areas** from visits/analyses for business case development.

h. **Co-op knowledge and information sharing** allows greater exposure to market price awareness and seasonal fluctuations across larger audiences

    i. Communications platform through Co-op structure improves sharing of pricing trends, volumes and loss trends, agricultural knowledge, funding schemes, etc.

i. **Asses value addition of services** to certain crops (gluten-free maize, pulp, etc.) linked to global demands.

j. **Expand Rail Access**: Strengthen the reliability and frequency of freight services, particularly for reefer containers. Promote block train services for agri-exports from CLP to Lobito Port. Rail capacity should match future reefer demand:

a. **Construct** golf-course style concrete cart paths to connect smallholder and family farms to main roads. These are all dirt roads at the moment and are often steep, winding and uneven surfaces. Current methods of women literally carrying crop output at harvest time in buckets on their heads from the farm to the roadside where the truck will be waiting to be loaded is quite time-consuming and can be dangerous in wet and rainy weather. This can be a perfect space for Diversica Mais last-mile investment, amongst other local road investment. Road shoulders on many local roads have also deteriorated. Improving road shoulders adjacent to farms where either road trucks can stop to be loaded or to be able to turn off the road and into the farm will be another great area of investment for Diversica Mais funds.
    i. Roads will be selected through the following criteria:
        - Road access to farms: radius and/or distance
        - Project participation
        - Crop/commodity types
        - Production/demand volumes
        - Losses and mitigation measures
    ii. Proposed Solution to include expansion opportunities

b. Over and above bridges identified in Chapter 7, **further evaluate bridges and critical transport infrastructure** that require rehabilitation linked to road improvements or within the vicinity of common aggregation/market points.

c. Beyond pre-cooling facilities specified in the Route Simulation Maps (presented below), **identify other key areas** to construct low-cost storage facilities
    i. Assess feasibility of location and storage type
    ii. Assess impact on crop yields and value
    iii. Assess ease of implementation and maintenance

d. The main informal market in Caála has been assessed as having potential to be transformed into a more formal market with a cold room for storage and also banking and business facilities. Further work needs to be done to assess the feasibility of developing other existing informal markets into distribution centres (with the possibility of also developing cold-storage facilities within the market):

i. Identify key markets for pilot

- Location and access status
- Infrastructure status-quo and requirements
- Power supply requirements (solar-powered cold-storage vs conventional)
- Assess global innovations (fan-powered solutions)

ii. Identify key aggregation point that may service 10-15 farmers (Use selection criteria based on location, ease of access for largest group of farmers and ease of output). Two aggregation locations have already been identified for Pinduka Projek farmers in the Route Simulation Maps below.

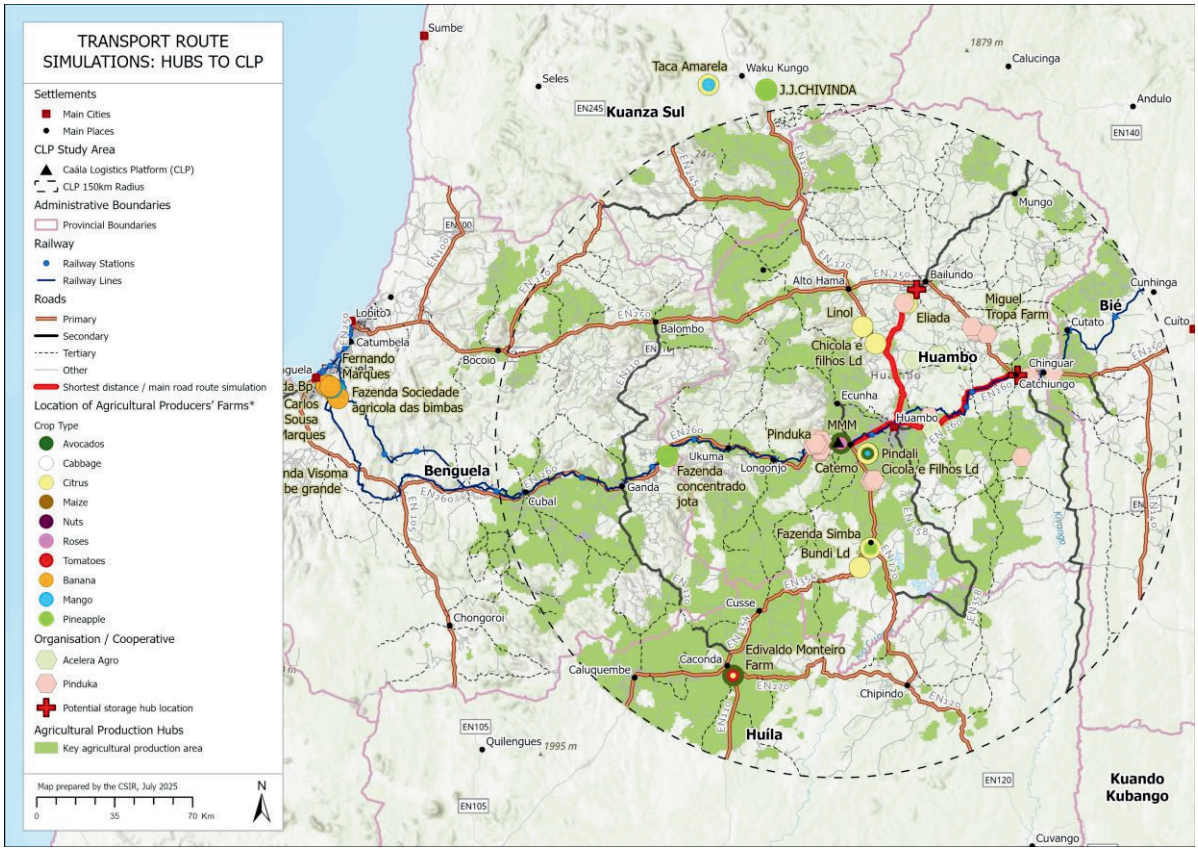
e. **Other local roads** will be specified once a more detailed study of local road conditions has been undertaken.

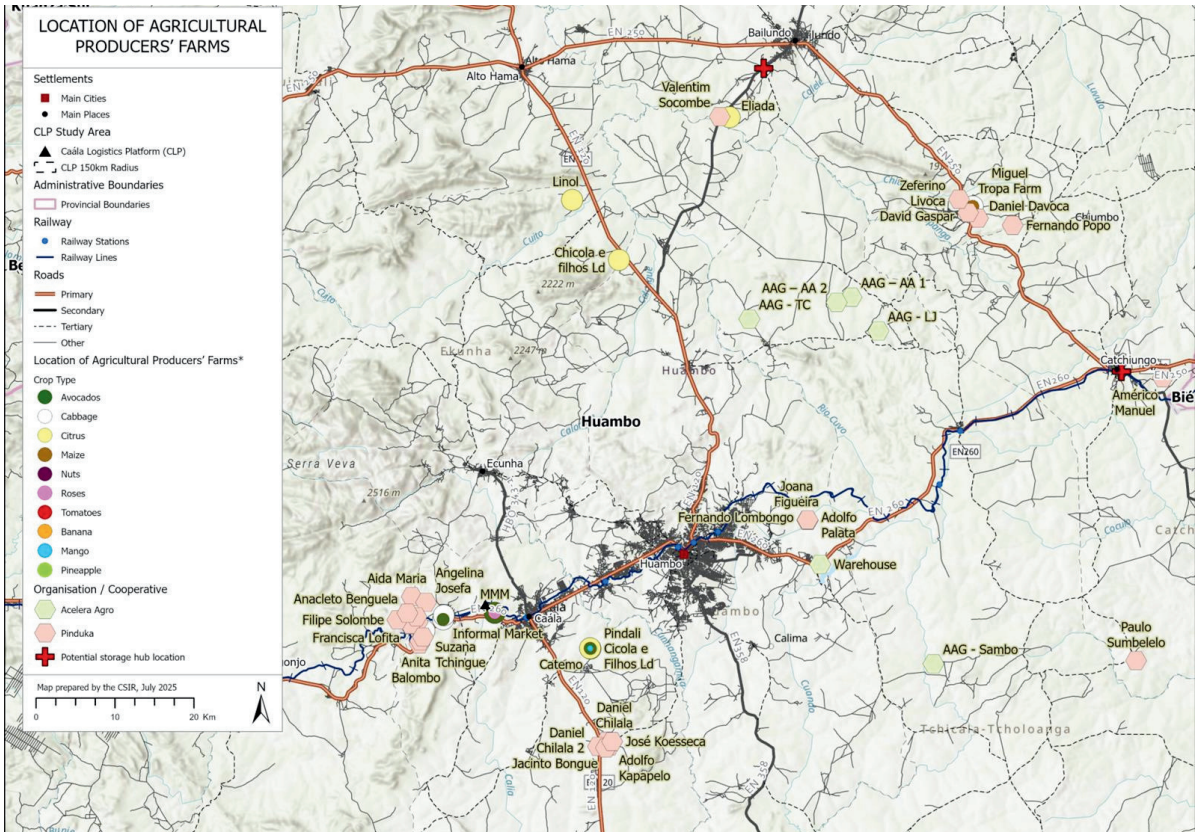
f. **Reefer plug points** at the Port of Lobito and Port of Luanda are sufficient for the immediate future. This may need to be increased as and when production output increases in a consistent manner.

g. **Short-term engagement and strengthening of Co-op functions and structures** through:

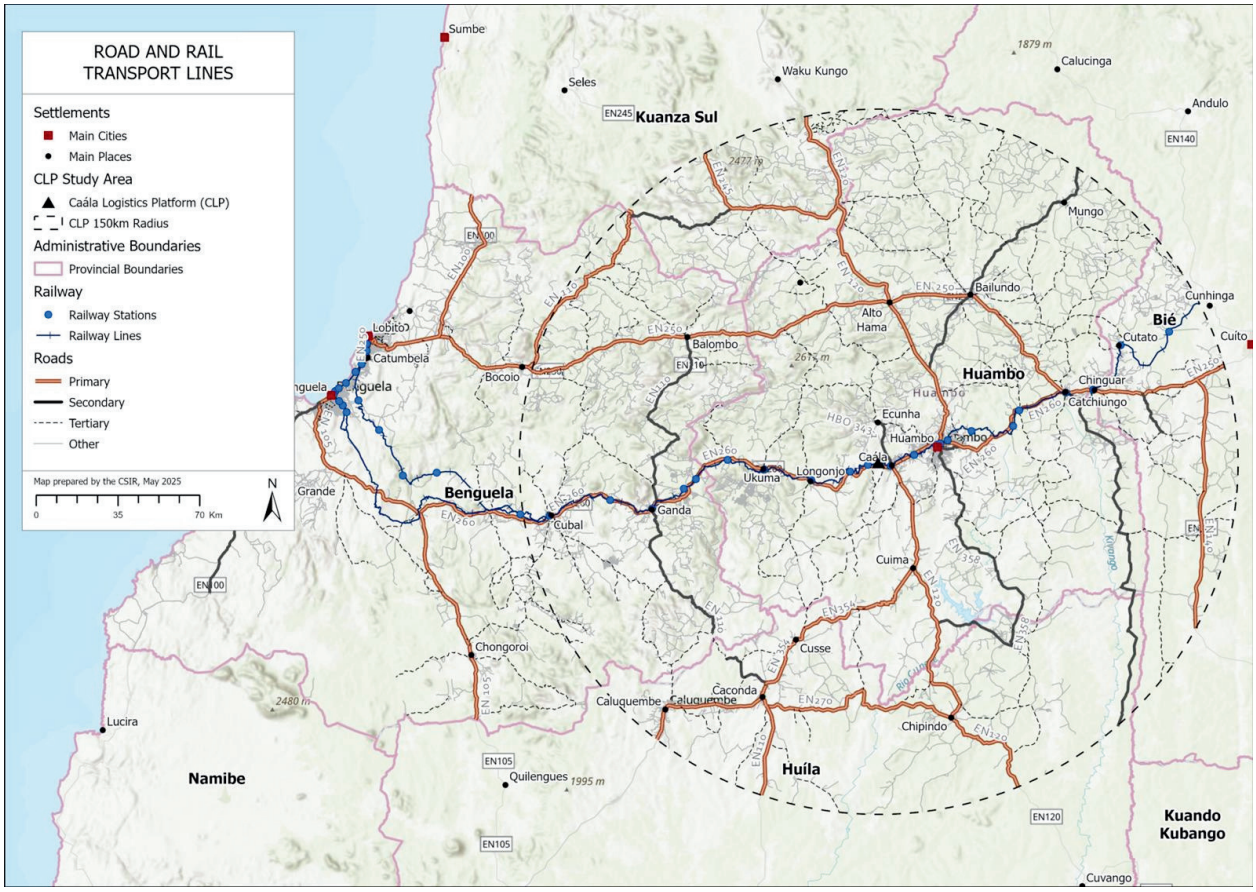
i. Developing short-medium term engagement and action plans for each farmer/representative/stakeholder using the Dutch-Angolan Diamond framework

ii. Provide SME assistance and exposure to increase awareness and knowledge regarding implementation and governance frameworks within the agricultural space across multiple stakeholder and dependency levels





The above images reference the Potential Storage Hub locations in relation to major hubs and agricultural producers' farms.



The above image references the Road and Rail network within the CLP where expanded rail access and road infrastructure development is proposed as a Tactical Recommendation.

III. Portuguese Summary (Resumo em Português)

Full final report translated into Portuguese will follow as a separate submission as per Terms of Reference requirements.

We do however, submit an executive summary of this report in Portuguese as found below:

Em todas as entrevistas, reuniões e visitas que realizámos com as partes interessadas e os intervenientes, tanto do setor público como do privado, foram observadas as seguintes perspetivas e constatações principais:

- Angola tinha um setor agrícola muito próspero antes de 1975, sendo bastante autossuficiente para satisfazer a maior parte da procura interna e exportando também várias culturas, como café, milho, banana e mandioca. Isto deveu-se a bênçãos inerentes, tais como chuvas abundantes, muitos rios e cursos de água e solo rico. No entanto, as riquezas naturais foram também complementadas por uma comunidade agrícola organizada que explorou adequadamente (de forma positiva) as riquezas naturais.

- Infelizmente, o setor agrícola de Angola tem estado em declínio acentuado desde o início da guerra civil em 1975.
- Foram tentadas várias políticas e programas, tanto durante a guerra como nos 23 anos que se seguiram ao seu fim, mas com sucesso limitado.
- Grande parte da organização agrícola, do apoio político, dos instrumentos financeiros e dos conhecimentos agrícolas de Angola anteriores a 1975 foram perdidos ou severamente reduzidos.
    - O apoio governamental está disponível para os agricultores, mas é bastante limitado para a tarefa de revitalizar adequadamente o setor e diversificar a economia, conforme pretendido.
    - É necessário reforçar a capacidade de regulamentação, monitorizar e controlar o cumprimento por parte dos agricultores e outros intervenientes na cadeia de valor, especialmente com vista a preparar a exportação para a UE e outros mercados;
    - A questão da posse da terra pelos agricultores tem de ser resolvida para que estes possam melhorar a produção e o rendimento agrícola;
    - Os insumos, como sementes e fertilizantes, são bastante caros para o agricultor médio. Em geral, eles cultivam com o que têm disponível, o que muitas vezes leva a colheitas que não são da mais alta qualidade;
    - Os instrumentos financeiros do setor privado também são limitados e caros; Muitos agricultores mais velhos e experientes abandonaram o setor.
    - O lado positivo é que muitos agricultores novos e mais jovens entraram no mercado, porém, carecem de competências e conhecimentos essenciais;
    - A educação, a formação e a mentoria de muitos agricultores são, portanto, fundamentais;
    - Existem cooperativas, porém, a falta de progresso na organização das muitas pequenas explorações agrícolas e familiares em empreendimentos mais sustentáveis, sugere que há margem para melhorias nesta frente;

- Foram quase 50 anos de declínio e não há atalhos para restaurar o setor agrícola de Angola ao seu antigo esplendor.
- A recuperação do setor agrícola angolano é, sem dúvida, possível. Contudo, será através de um plano plurianual, com todos os intervenientes e atores dos setores público e privado, ONGs e organizações comunitárias, como cooperativas e conselhos empresariais, instituições financeiras e instituições de ensino e investigação, alinhados em torno de objetivos comuns e a trabalhar em conjunto para progredir e alcançar os objetivos finais.
- Focar no desenvolvimento regional, como a modernização da produção agrícola e a melhoria da logística agrícola por meio da PLC na província do Huambo, é uma maneira ideal de estabelecer um laboratório para começar a abordar os diversos desafios e aprender lições que podem ser implementadas em outras províncias e iniciativas em todo o país.
- O que achámos realmente empolgante é que, apesar destes muitos desafios, todas as partes interessadas têm uma energia extremamente positiva e estão empenhadas em melhorar as condições no terreno e avançar no sentido de uma melhor qualidade, maior produção, maior rentabilidade, redução das perdas pós-colheita e preparação para recomeçar a exportação de culturas como o abacate e os citrinos.
- Este é um movimento muito positivo que pode ser desenvolvido através da adoção de uma abordagem de desenvolvimento em cluster, como a abordagem do Diamante Holandês, ou alguma metodologia semelhante, como o Modelo das Cinco Forças de Porter (Diamante Holandês-Angolano).
- Não se trata tanto de desenvolver um novo plano nacional de desenvolvimento para a agricultura em Angola, uma vez que o plano é bastante sólido, mas sim de implementar um processo em que os intervenientes e as partes interessadas possam alinhar-se, organizar-se e mobilizar-se em torno do plano nacional de desenvolvimento e em que as ações de implementação possam ser coordenadas e sincronizadas.
- No entanto, criar espaço para uma revisão do Plano Nacional de Desenvolvimento da Agricultura em Angola e chegar a acordo sobre as alterações necessárias ou mudanças de ênfase ou priorização dos objetivos pode, ainda assim, ser um exercício muito útil nesta conjuntura.

- De qualquer forma, independentemente do que acontecer a nível nacional, será provavelmente prudente que a província do Huambo e as partes interessadas locais nos vários municípios elaborem um plano mais preciso para o desenvolvimento do setor na província e organizem o setor público, o setor privado, as ONGs/OBCs e as instituições de investigação numa coligação coerente para a promoção das ambições agrícolas do Huambo (uma espécie de renascimento).
- Os grandes agricultores constituem a base do caso de negócio da PLC, por um lado, mas, por outro lado, o «estatuto» das pequenas explorações agrícolas e familiares também tem de ser melhorado.
- O PLC não servirá apenas para manusear produtos agrícolas, bem como minerais e outros produtos de carga geral. O PLC será um centro de consolidação de carga para exportação, bem como um centro de armazenamento frigorífico para produtos agrícolas destinados aos mercados locais.
- Nesta fase, as informações essenciais sobre as explorações agrícolas individuais e as estradas locais não são totalmente conhecidas ou compreendidas. O Estudo de Mapeamento das Rotas de Transporte deveria produzir essas informações de forma mais abrangente possível. No entanto, essas informações e dados aparentemente não estão disponíveis nesta fase junto aos responsáveis e intervenientes no terreno. Será necessário realizar um estudo separado, focado apenas neste aspeto, talvez com a assistência da Universidade do Huambo e outros atores, ao longo de vários meses, a fim de estabelecer o primeiro conjunto de dados precisos e verificáveis sobre as explorações agrícolas locais e as estradas locais.
- As informações básicas do SIG e geoespaciais não são tão abrangentes como se pensava inicialmente, sendo necessário continuar a trabalhar nesta área para desenvolver um conjunto abrangente e validado de mapas SIG. Isto está diretamente relacionado com o ponto anterior.
- O envio bem-sucedido de um contentor de abacates para a Europa ainda este ano é um grande objetivo do PLC e dos produtores de abacate.
- A construção e o financiamento de um ramal ferroviário do PLC até a linha principal são um projeto de desenvolvimento fundamental da ARCCLA e do PLC.

- Uma solução técnica/de engenharia, adequada, para a ligação do PLC à Linha Ferroviária do Lobito será fundamental para apoiar a eficiência a curto e longo prazo do transporte de produtos do PLC para o Porto do Lobito para exportação.

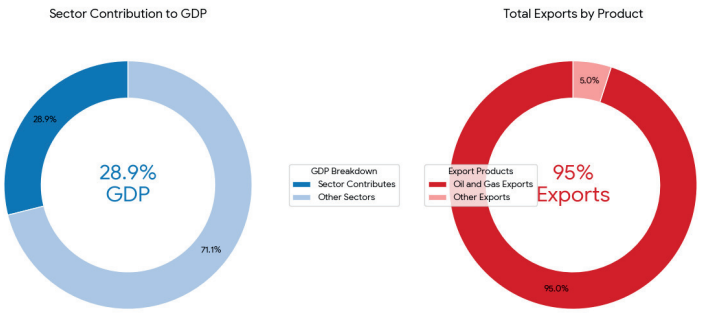
- Os custos de transporte rodoviário local e logística são bastante elevados.
- As opções de financiamento são bastante caras para o setor privado.
- O papel da Wesfalia no trabalho com parceiros locais para melhorar a qualidade da produção e aumentar a produção dos produtores locais de abacate é extremamente positivo.
- O Banco Mundial está a trabalhar com um grande número de partes interessadas em Angola no projeto "Diversifica Mais".
    - A ARRCLA, a divisão de PPPs, o BFA, o IDI e as autoridades rodoviárias são parceiros essenciais do Banco Mundial no desenvolvimento do PLC.
    - Nesta fase, estão disponíveis 130 milhões de dólares para financiar iniciativas de infraestruturas da milha final e desenvolvimento de capital humano (formação e desenvolvimento de capacidades)
    - O financiamento será direcionado para:
- melhoria de 5 a 10 km de estradas rurais de pequenas explorações agrícolas para ligação às estradas secundárias e principais.
- Instalações de armazenamento frigorífico.
- Infraestrutura hídrica.
- Mapeamento.
- O financiamento pode ser disponibilizado para projetos liderados pelo setor público, bem como para entidades do setor privado.
- O financiamento de US$ 130 milhões atualmente disponível pode ser aumentado se forem identificados projetos qualificados suficientes que justifiquem financiamento adicional além dos US$ 130 milhões.

1. INTRODUCTION

1.1 Background and Objectives

Background:

Angola's economy has traditionally thrived off its rich oil reserves.



The Government of Angola (GOA) has recognised the inherent risks to its long-term growth and development due to such over-reliance on its oil exports and has thus recently embarked on a strategy to diversify its economy.

The African Development Bank Group's (AFDB) Country Strategy Paper (CSP) for Angola for 2024-2029 highlights agriculture and agribusiness as a key driver for economic growth, serving as a foundation for the country's industrialisation. We will seek to extend this approach a bit further in this study be examining how the Huambo agri-sector, for fruit and avocadoes in particular, can be reconfigured for the 'Industrialisation of Freshness', as this seems to be the key to competing in the export markets.

The Embassy of the Kingdom of the Netherlands (EKN) in Angola recognises the importance of Angola's Economic Diversification Strategy and sees this as an opportunity for collaboration to boost the Angolan agricultural sector and transport and logistics capabilities.

A critical component of the envisaged improved logistics efficiency to enable and support the Agri-sector growth and development plan, is to develop a logistics hub i.e. the Caála Logistical Platform (CLP) in the Huambo region to receive and aggregate a variety of fruit and vegetable products from farms within a 150km radius from the CLP and then transport the aggregated tonnages via unit block trains from the CLP to the Lobito Port for export to the Netherlands and other regional and international markets.

The project in Angola is therefore a strategic initiative aimed at transforming the agricultural sector by addressing critical logistical challenges, reducing post-harvest losses, and enhancing the sector's overall competitiveness and robustness.

This project focuses on optimising the transportation of agricultural goods ensuring better connectivity between production hubs and the port of Lobito, and promoting, market accessibility for farmers and businesses.

"This project focuses on optimising the transportation of agricultural goods"

Objectives:

The objective of this project is to conduct a comprehensive study that will support the development of transportation routes and identify quick-wins and constraints within the system to and from the Caála Logistical Platform (CLP) to ensure that the growth and development strategy for the Angolan Agricultural sector is successfully implemented. An overall phased approach has been developed to provide a structured overview of the project, and the following three major project objectives have been identified:

1. **Decrease post-harvest losses:** By improving the efficiency and reliability of transport routes and cold chain systems, there will be a reduction to the significant losses incurred during the transportation of agricultural produce.

2. **Boost sector competitiveness:** Through better logistics, transportation costs will decrease, delivery times will shorten and product quality will improve, enabling local producers to access regional and international markets more effectively. The viability of road/route optimisation coupled with key quick and strategic investment to roads and infrastructure will also be analysed and discussed within this report.

3. **Support Economic Development:** Improvements in logistics will enhance the value chain for agriculture, generate jobs, support rural economies, and drive export growth.

1.2 Scope of the Study

To achieve this overarching objective, the project will involve the following key steps:

- Official interviews and stakeholder engagements

With support from project governance members, interviews and meetings will be arranged and facilitated with regional stakeholders.

- Site visit and formal interviews

Complete site visits and interviews within the region and determine overall trade flows on local and export opportunities.

- Data acquisition and analysis

Complete secondary research and collate and analyse available trade data relevant to both upward and downward linkages within the value chain including distribution and infrastructure assessment. Through desk research and findings from initial interviews thus far, the project team has discovered that detailed information at both the level of local farms and local roads is very sketchy at best or not available at all. GIS and geo-spatial data at the very local level is also seemingly not available and will probably have to be developed during this Study. Available GIS and geo-spatial data is too high-level for the needs of some of the stakeholders already interviewed.

- Trade Flow Overview and Recommendations

Develop trade flow report highlighting key factors, supported by volumes, capacity and infrastructure assessment outcomes which would inform recommendations and proposed investment initiatives.

1.3 Methodology and Approach

As part of our research and analysis, our team included both primary and secondary types of data collection. As indicated below, the overall approach to acquire information is a combination of report and desktop research and actual interviews with numerous stakeholders.

Figure 1: Data Collection Approach Overview

Though desktop research can provide macro and analytical reference data, the value of site visits, interviews and direct stakeholder engagement does provide additional insights into production, transport, market and social factors. In addition, the practical experience on the ground also highlights additional vital information and potential constraints within the value chain.

2. OVERVIEW OF AGRICULTURAL PRODUCTION

2.1 Overview of Fresh Fruit and Vegetable Production in the CLP 150km radius

Angola overall was a thriving agricultural country, with fertile soils, a favourable climate, and about 57.4 million ha of agricultural land, including more than 5.0 million ha of arable land. Before independence from Portugal in 1975, Angola had a flourishing tradition of familybased farming and was self-sufficient in all major food crops - except wheat. The country even exported many crops such as

coffee, maize, sisal, bananas, tobacco and cassava. However, the onset of the Angolan Civil War upon attaining independence in 1975, started the rapid decline of the Angolan agricultural sector, as well as general decline of the economy overall. Angola thus became a net importer of agricultural produce since 1977 as 29 almost all farming devolved into subsistence farming. The 27 years of civil war had a truly devastating on Angola's agricultural sector and its ability to feed the nation. Attempts at managing farms and agricultural output via the Emprêsa Nacional de Comercialização e Distribuição de Produtos Agrícolas – Encodipa (National Company for the Marketing and Distribution of Agricultural Products) after departure of Portugues farmers and traders proved unsuccessful. By 1985, the government started allocating small parcels of land to local rural farmers and offered some basic incentives to these farmers to farm the land (https://en.wikipedia.org/wiki/Agriculture_in_Angola, n.d.).

Title to the land, however, has still not officially been transferred to local farmers. This causes problems both on sustainable farming as well as capital raising for small holder and family farms. Since the end of the war in 2002, although there have been some successes in the revival of the agricultural sector in Angola, much of the status quo has effectively remained, leading to very little progress in the organisation of farms and productive output from farms over the last 23 years.

Angola has thus experienced a cumulative almost five decades of decline of its agricultural sector. Turning the sector around will not be easy and will require a multi-decade plan that all critical stakeholders and role players should build consensus on and rally behind.

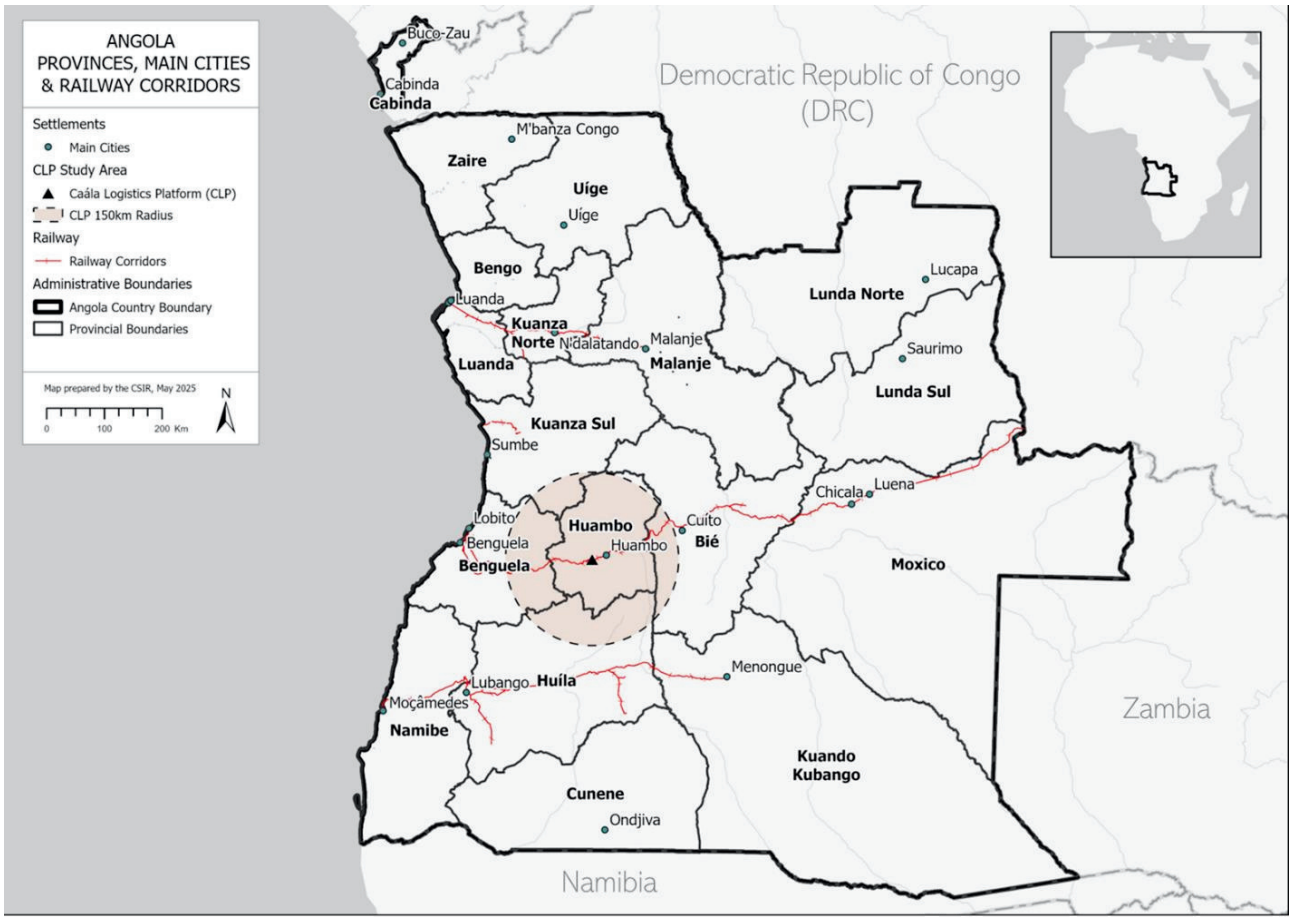


Figure 2: Angola provinces, main cities & rail corridors.

This map highlights Angola's provinces and the country's key railway corridors, with particular emphasis on the location of the CLP in Huambo Province along the Lobito Corridor railway.

Huambo, renowned for its fertile soils and strong agricultural base, is a vital hub for domestic food production.

The map also illustrates the Lobito Corridor railway, a strategic transport route linking the Port of Lobito on Angola's Atlantic coast with the mineral-rich regions of the Democratic Republic of Congo (DRC) and Zambia. The CLP's central position within Huambo Province, and its placement along this critical rail network underscores its logistical significance. The 150 km area around the CLP, the study area for this project, is mapped.

The agricultural situation in Huambo has largely followed the national pattern. However, the province of Huambo has shown early promise and has seemed to have surged ahead of other provinces in terms of agricultural development over the past 10-20 years. This province is thus an ideal area to focus on and put resources into towards the improvement and upgrading the organisation of farms with the aim of improving quality of crops farms as well as increasing agricultural output, yields and profitability to farmers. Advancement in these areas will then 1.) Reduce reliance of imports and contribute to the reduction of food insecurity through more local production and 2.) Begin to position Angolan farmers for exporting crops once more like it did almost 50 years ago.

The 150km zone around the Caála Logistical Platform CLP makes up a substantial portion of the agricultural and arable lands of the Province of Huambo, as shown in the map below [insert map]. It is a very fertile province as it is home to the most rivers and waterways in the country. The province also receives substantial rainfall throughout the year. There is so much rainfall annually in Huambo that many crops do not require external irrigation other than rainwater. Crops can be grown practically throughout the province, such that driving through the province during the field visit to farms, one will notice ordinary citizens growing basic crops quite literally on a small patch of land right next to their modest homes. These crops are mainly for household subsistence, but excess will also be sold to the local community and passersby as a source of income.

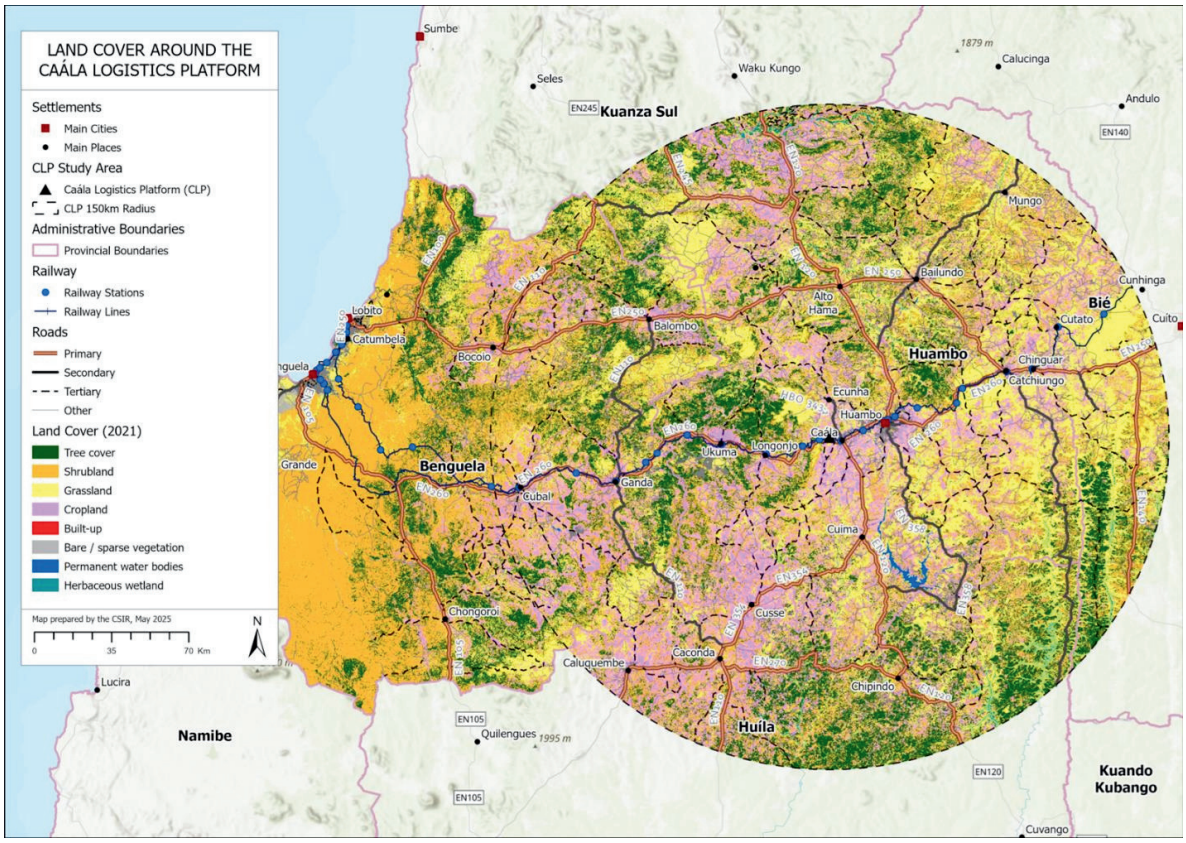


Figure 3: Land Cover around the CLP

This map displays the land cover surrounding the CLP, derived from the European Space Agency (ESA) WorldCover 10m v200 (2021) dataset. The 2021 WorldCover data, released on October 28, 2022, achieved a global accuracy of 76.7%. The global dataset includes 11 land cover classes, though for the 150 km buffer area around the CLP, only 8 of these classes are represented.

Cropland is represented in pink and is defined as: “Land covered with annual cropland that is sowed/planted and harvestable at least once within the 12 months after the sowing/planting date. The annual cropland produces an herbaceous cover and is sometimes combined with some tree or woody vegetation. Note that perennial woody crops will be classified as the appropriate tree cover or shrub land cover type. Greenhouses are considered as built-up.”

The 150 km area around the CLP is estimated to have around 1,7 million hectares of cropland.

Data Citation: Zanaga, D., Van De Kerchove, R., Daems, D., De Keersmaecker, W., Brockmann, C., Kirches, G., Wevers, J., Cartus, O., Santoro, M., Fritz, S., Lesiv, M., Herold, M., Tsendbazar, N.E., Xu, P., Ramoino, F., Arino, O., 2022. ESA WorldCover 10 m 2021 v200.

However, there are many regions and municipalities across the province where farming is more focused, and where farmers’ (smallholder, family and large commercial farmers) main intent is to produce crops for the market as their primary source of income. Most of the small and family farmers rotate their crops regularly based on seasonality, yield, profit potential and availability of inputs such as seeds and fertilizer. Interaction with several of these smallholder and family farmers has revealed that they have also learnt new methods to improve soil quality by growing different crops on the same patch of land in their crop rotation cycles. Given they these farmers typically farm on pieces of land between 1 hectare to 3 hectares, they do not have much space to allow soil rehabilitation by leaving a portion untouched for an entire season.

Commercial farmers don’t suffer the same fate and can therefore implement more advanced crop rotation methods to manage soil quality. We have also found that with a crop such as citrus and especially avocado, large commercial farmers have the financial capability to endure a 3 to 5 year period from first planting to first harvest, but small-holder and family farmers clearly do not have this financial capability. They are therefore limited to cash crops and other crops where at least two-three harvests per season (at a minimum) are possible.

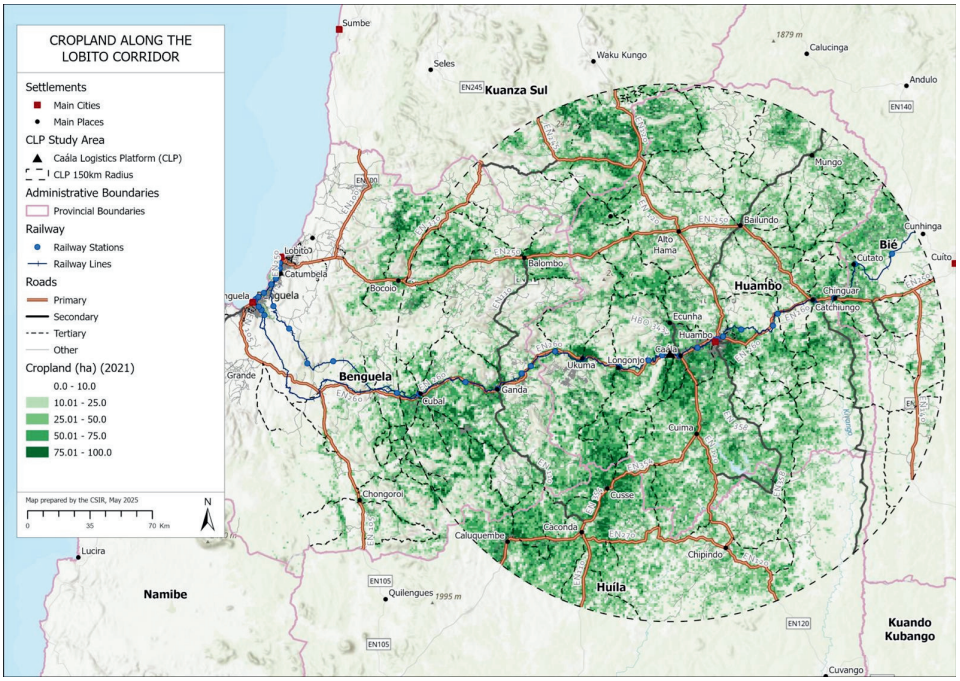


Figure 4: Cropland around CLP

This map shows the cropland area in hectares, based on the ESA 2021 WorldCover data. This data was used as an input to downscale agricultural production estimates at a more granular level.

Due to the weather conditions prevalent in the province of Huambo, the following crops are grown throughout the province:

citrus (oranges, lemon and lime); potato, tomato, avocado, nuts, maize, cabbage, pineapple, wheat, corn and casava. Roses are also grown on several farms and fish farming is popular in the Caála area.

All of the produce harvested across the province is consumed in the Angolan domestic markets, but the annual production is still insufficient to satisfy domestic demand. Therefore, Angola imports a lot of these crops as well. There are virtually zero exports of fruit and vegetables at this stage due to issues of quality, certification and of course lack of scale to supply international markets. However, the export of avocadoes and nuts offer very exciting prospects for commercial farmers in the province. Three farms are on the verge of exporting avocadoes in the next 2 seasons and at least one farmer will be exporting macadamia nuts by next season. If all goes well, the farmers will undertake a test run to export a few containers of avocado to the Netherlands before the end of the 2025 season.

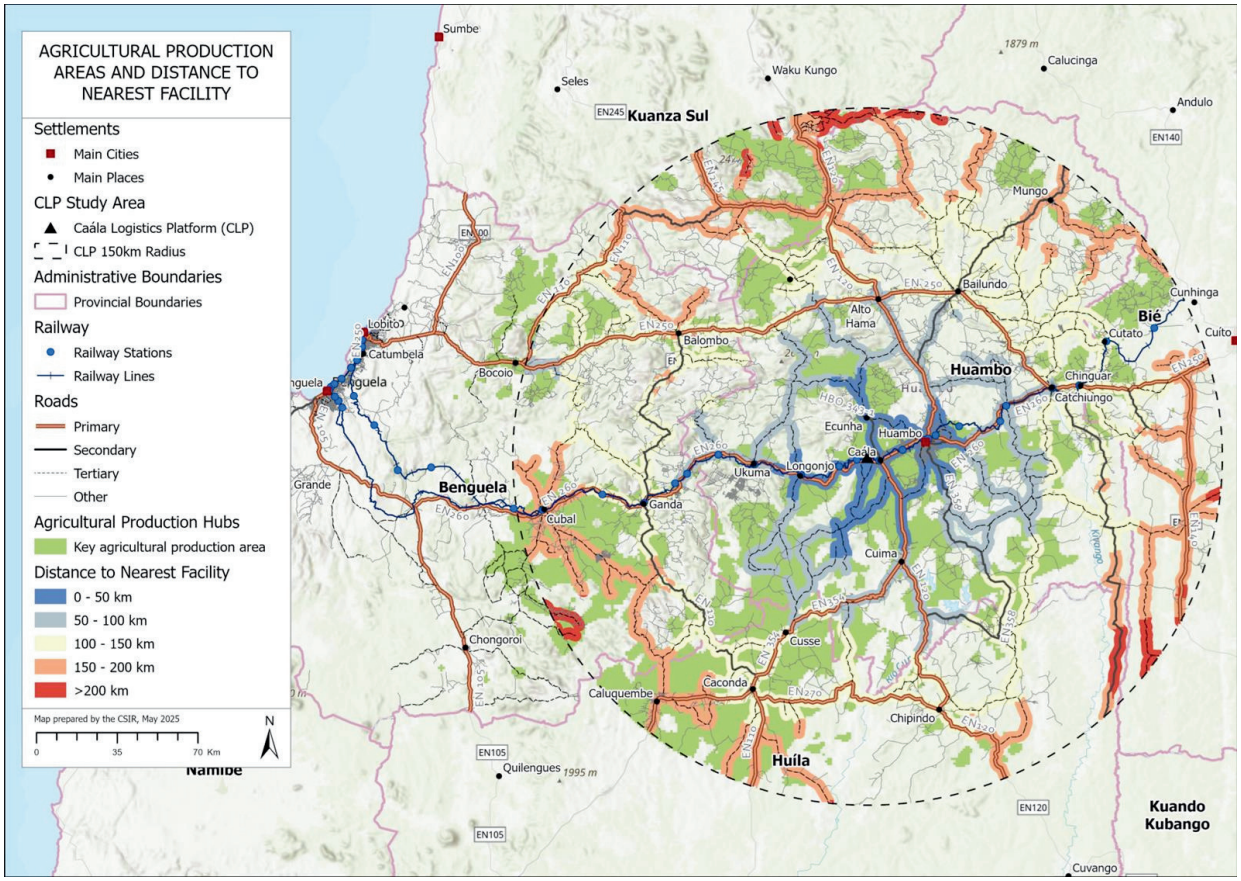


Figure 5: Key agricultural production areas

This map highlights the key agricultural production areas within a 150 km radius of the CLP, as well as throughout Benguela province.

The identified agricultural hotspots were determined through an analysis combining remote sensing-derived cropland land cover data and downscaled crop yield estimates. These estimates were informed by the 2023/24 IDA Data on Horticultural Production in Huambo Province.

Additionally, the map overlays the road network hierarchy, highlighting major roads and routes that connect these agricultural production areas to logistical storage hubs, namely the CLP and Lobito Port.

Within the overall production areas, the Purple Bridge Team (April 2025) and Resilience (June-August 2019) visited several farms in the production areas. The location and crop types of these farms are depicted below.

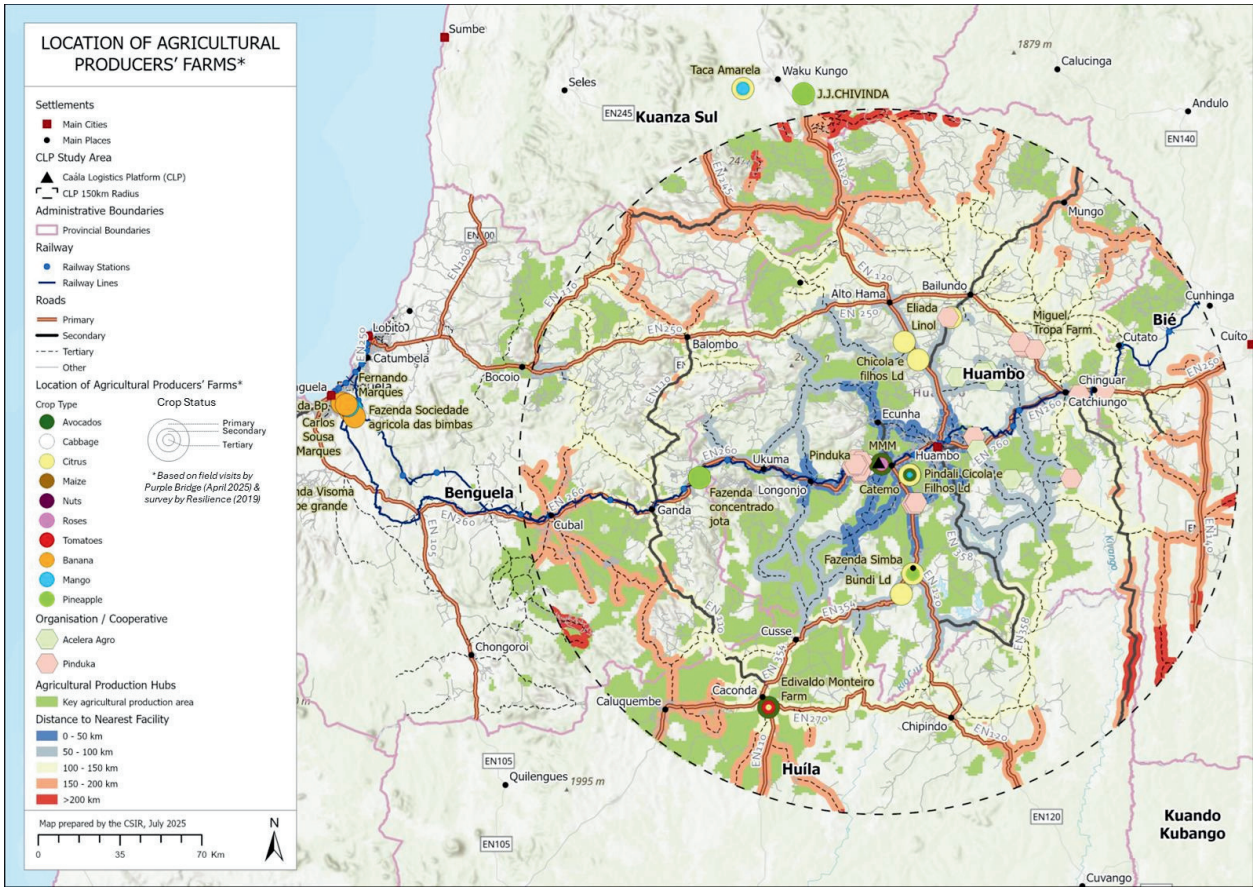


Figure 6: Location of agricultural producers' farms: Field visits by Purple Bridge (April 2025) and field surveys by Resilience (June – August 2019):

This map shows the locations of agricultural producers' farms visited during field visits in April 2025, alongside fruit farms surveyed by Resilience between June and August 2019.In April 2025, Purple Bridge conducted visits to five farms and one market, while Resilience surveyed 19 fruit farms in 2019. Each farm is labelled with its name and main crop types.

The map also visualises the road network and includes travel distance bands for main roads (primary, secondary, and tertiary roads) to either the CLP or the Port of Lobito, depending on which is closer by road.

Travel distances are colour-coded: areas within 0–100 km are shaded in blue, indicating relatively easy access to storage or export facilities. In contrast, areas located 150–200 km or more from the CLP or Lobito Port are shaded from orange to red, reflecting greater transport distances and reduced accessibility.

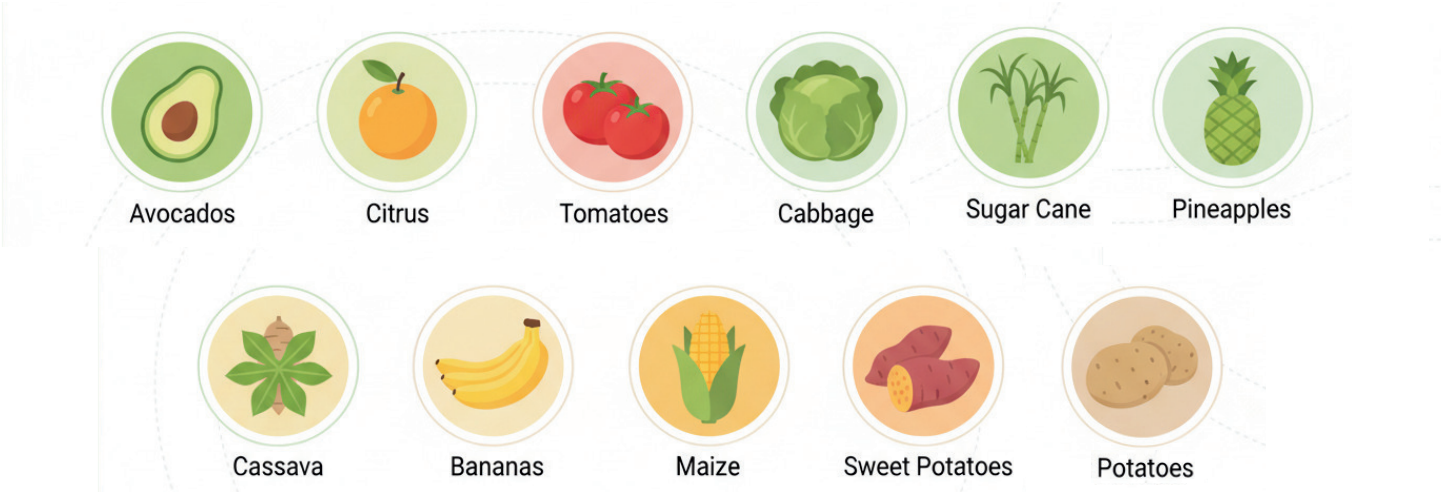
2.3 Crop Types

When considering the cultivation of crops, understanding the multitude of factors that can influence production is crucial. Additionally, the choice of crops and suitable agricultural practices further impact the outcome. Some of the key contributing factors include:

- **Climate**: The temperature, precipitation, and sunlight in a particular region can greatly influence which crops can be grown successfully. For example, certain crops thrive in warm, tropical climates, while others require cooler temperatures to flourish
- **Soil Quality:** The composition of the soil, including its texture, fertility, and pH levels, directly impacts the health and yield of crops. Proper soil management techniques, such as soil testing and amending, are essential for maintaining optimal growing conditions for crops
- **Water Availability:** Adequate irrigation systems and efficient water management practices are essential for ensuring that crops receive the necessary moisture for healthy growth. In regions with limited water resources, implementing sustainable water conservation methods is vital for maintaining consistent crop production
- **Pest Control:** Managing and preventing pest infestations is essential for protecting crops from damage and ensuring a successful harvest. Integrated pest management strategies involving both natural and chemical control methods are often employed to mitigate the impact of pests on crop yields

Considering the aspects mentioned above the key crop types for the region was identified by production volumes impacted by these factors.

The crop types included in the report consist of:



Huambo's crop calendar follows Angola's Southern Hemisphere climate (rainy Oct–May, cool Jun–Sep). The rainy season (Oct–May) is generally prime for vegetables and staples; tomatoes are a major exception, being grown in the dry months (June–September) to avoid summer rains. In practice, most vegetables (e.g. cabbage, potato) can be cultivated in both rainy and dry seasons (often with irrigation), though high summer rains tend to increase pests and reduce yields. Avocados, bananas and pineapples are essentially perennial in Huambo's temperate highlands, providing extended or year-round fruiting, while citrus (oranges/lemons) typically has a seasonal window (roughly late winter/spring).

Figure 7 below visualizes these harvest/supply windows by month for the listed crops, based on the above agroclimatic patterns.

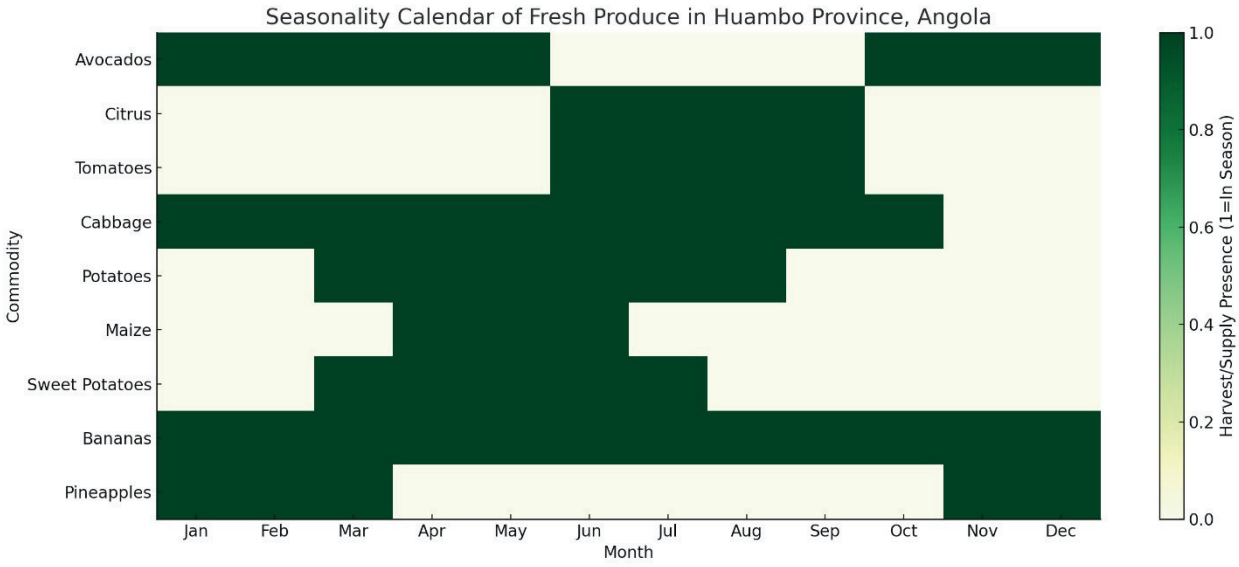


Figure 7: Angola Crop Seasonality Overview (Huambo Province)

A more detailed view of the production volumes, supported by the large value chain of each respective crop type is included and discussed in Section 3 of the report.

2.5 Identification of Storage Hubs

Efficient and strategically located storage infrastructure is critical for preserving product quality, extending shelf life, and enhancing the commercial potential of tropical fruits and vegetables. Drawing on field visits, interviews with producers and logistics operators, as well as available data, this section provides an overview of existing and prospective storage hubs in the vicinity of the Caála Logistical Platform (CLP) and along the Lobito Corridor.

At present, inadequate post-harvest infrastructure poses a significant challenge to maintaining the quality and longevity of agricultural and other perishable products. Crops are typically harvested, stored, and transported using non-refrigerated vehicles and facilities, resulting in substantial losses. The widespread absence of both general and cold storage solutions throughout the supply chain, from farms to end markets, severely limits the shelf life of produce, seafood, poultry, livestock, and dairy.

Current storage and preservation capacity remains critically underdeveloped. Addressing these structural gaps will require the deployment of advanced technologies and solutions to improve the efficiency, resilience, and sustainability of the supply chain and logistics systems.

"Current storage and preservation capacity remains critically underdeveloped."

2.6 Type and suitability of storage (ambient, cold, controlled-atmosphere)

a. **Ambient Storage**

This is the most prevalent type of storage used today, particularly by small-scale farmers. Ambient stores are often simple sheds or warehouses with limited environmental controls. While ideal for short-term storage of certain hardy crops (e.g., potatoes, onions, maize), these facilities are insufficient for perishable food such as mangoes, papayas, and leafy greens.

b. **Cold Storage (Refrigerated)**

Cold storage infrastructure does not exist near the production areas. These facilities are critical for preserving the freshness of temperature-sensitive fruits like bananas, avocados, citrus, and berries.

c. **Controlled Atmosphere (CA) Storage**

Angola's inland doesn't have controlled-atmosphere storage, which manages not only temperature but also oxygen, carbon dioxide, and humidity levels. This high-end storage method is commonly used for export-grade vegetables.

2.7 Capacity and location

This info is still outstanding for ambient storage locations, as no cold storage (refrigerated) and controlled atmosphere storage are available.

2.8 Distance from production zones

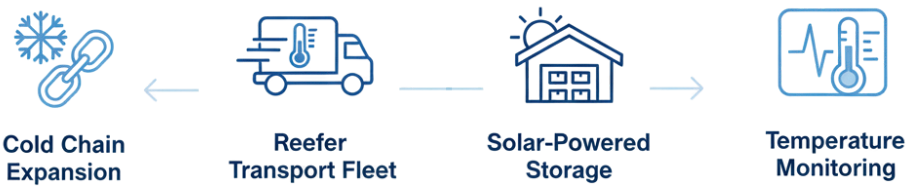
Focusing on a 150-kilometer radius from the Caála Logistical Platform (CLP) is a strategic decision that weighs logistical feasibility against the importance of combining agricultural outputs for regional and international markets via the Lobito Corridor. A 150-kilometer radius from the CLP encompasses much of Huambo Province, which is agriculturally rich, has reasonably pleasant climatic conditions, and is becoming increasingly diverse in terms of commercial farms, cooperatives, and smallholder farmers.

2.9 Post-Harvest Loss Risks and Potential Interventions

The further a production area is from the CLP, the greater the risk of spoilage, especially for perishable fruits without access to cooling infrastructure. This effect is exacerbated by:

- Poor road quality in some rural routes
- Limited first-mile cold chain services
- Lack of cooperative aggregation points

2.10 Infrastructure needs



2.11 Good agricultural and storage practices

Timely Harvesting

Training on optimal harvest maturity to prevent premature spoilage.

Sorting and Grading

Promoting practices to remove damaged or overripe produce before storage or transport.

Use of Crates Crates

Replacing sacks and loose piling with ventilated plastic crates to reduce bruising.

Pre-cooling Facilities

Cooling produce immediately after harvest to remove field heat is crucial, especially for mangoes, citrus, and avocados.

Storage Hygiene

Maintaining clean, pest-free, and well-ventilated storage environments to prevent contamination and rot.

2.12 Recommendations

Short-Term (0–12 months)

- Develop a business case for a funding partnership between World Bank (Diversica Mais Programme), FADA and Acelera Agro to develop a cold room solution at the main market in Calenga. This can include provision of banking services (ATMs) and also other business services to the local consumers, sellers, traders and farmers utilising the market every day. Activity on Fridays is especially high with 2500-3000 people visiting the market.
    - Acelera Agro is an incubator and accelerator of Agri-food startups with a main pillar in farming business, experimentational farming and sustainable farming. Acelera Agro owns more than 2000 Ha in different provinces including Huambo, Namibe, Malanje and Bie but the main operations are happening now in Huambo with some activities in Namibe. Malanje and Bie are still to be developed.
- Develop a business case for a funding partnership between World Bank (Diversica Mais Programme), FADA and Pinduka Projek for the development of cold-room facilities (pre-cooling stations) at two suitable sites for the Pinduka Projek farmers. This will enable the farmers to fetch higher prices from the buyers and could also enable the farmers to do more value-addition activities at the farms, such as washing, cleaning and packaging) that will further increase revenue per ton sold to wholesalers.
- Improvement of local roads, especially roads connecting farms to the main roads.
- Many farms could benefit from golf-course style concrete roads to make the process of loading trucks with harvested produce much simpler and also much faster.
    - This solution can be piloted with 5-10 farmers in the Pinduka Projek and in the Acelera Agro incubation project to undertake a proof of concept before rolling it out to more smallholder and family farmers supported by these initiatives.
    - The golf-course style solution can be rolled out through other Cooperatives once the concept has been proven to work in practice.
    - This would be an ideal investment from Diverifica Mais as it falls squarely into its stated objectives for funding last-mile road infrastructure.

- Roads longer than 5-10kms specified by Diversica Mais also requires upgrading. However, the Study has found that several longer roads are quire critical at this stage to upgrade immediately rather than later. An innovative funding solution needs to be found to enable these investments. Funding partners could be the World Bank, FADA, BFA, the large commercial farmers and any other sources of EU and World Banking that can be applied for. Not improving these roads urgently will have an extremely negative impact on efficient logistics solutions and the reduction of postharvest losses as the produce spends way too much time in the sun whilst being transported on the roads, the biggest challenge of which are the roads leading to/from farms to the main roads.
    - The Study has found that the road connecting the MUNGU avocado farm to the main road is about 25kms long but is in very poor condition and will have devastating negative impacts on the transport of avocadoes once the farm gets into full production. A multi-party funding solution needs to be;
    - This also applies to the road that links Alto do Tômbola Agricultural Farm in Caconda to the main roads;
    - It further applies to the 27km road linking the Acelera Agro farm in Samba to the main road that is also in very poor condition and significantly impacts transit times and potential damage to food crops due to the very bumpy road surface.

- Upgrading of several critical bridges (steel design and construction) to bring bridges up to truck weight carrying capacity.
    - The first focus can be on bridges that impact the three large avocado farmers visited during the study, the Pinduka farms and the Acelera farm in Sambo (there is currently a wooden bridge crossing the Cunene River on the road that leads to and from the farm.

- Conduct feasibility study and full asset inventory for cold storage hubs. Map all formal and informal storage sites (cold, ambient, unused warehouses) with GPS and capacity data.

- Pilot mobile cold storage units at two high-yield sites.

- Organize post-harvest training sessions for cooperatives and aggregators.

- Establish partnerships with private logistics providers to lease reefer containers and trucks.

Medium-Term (1–3 years)

- Invest in integrated cold chain infrastructure along the CLP and Lobito Corridor, including pre-cooling stations.
- Develop a cold chain coordination platform to align transporters, exporters, and cold storage operators.
- Introduce financial incentives (e.g. leasing support, tax breaks) to encourage cold chain investment by SMEs.

Long-Term (3+ years)

- Develop at least one regional Controlled Atmosphere (CA) facility at the CLP
- Expand rail-based refrigerated transport with reefer wagons and temperature-controlled logistics yard.
- Strengthen regulatory and quality assurance frameworks for cold chain operations and export certification.

Cold Chain Logistics Needs

- 0–50 km radius: Expand and upgrade existing storage facilities in Huambo and Caála, and integrate them with CLP's rail and truck dispatch systems.
- 50–100 km radius: Prioritize mobile cold storage solutions, such as refrigerated trucks or solar-powered containers.
- 100–150 km radius: Explore opportunities for shared cold storage.

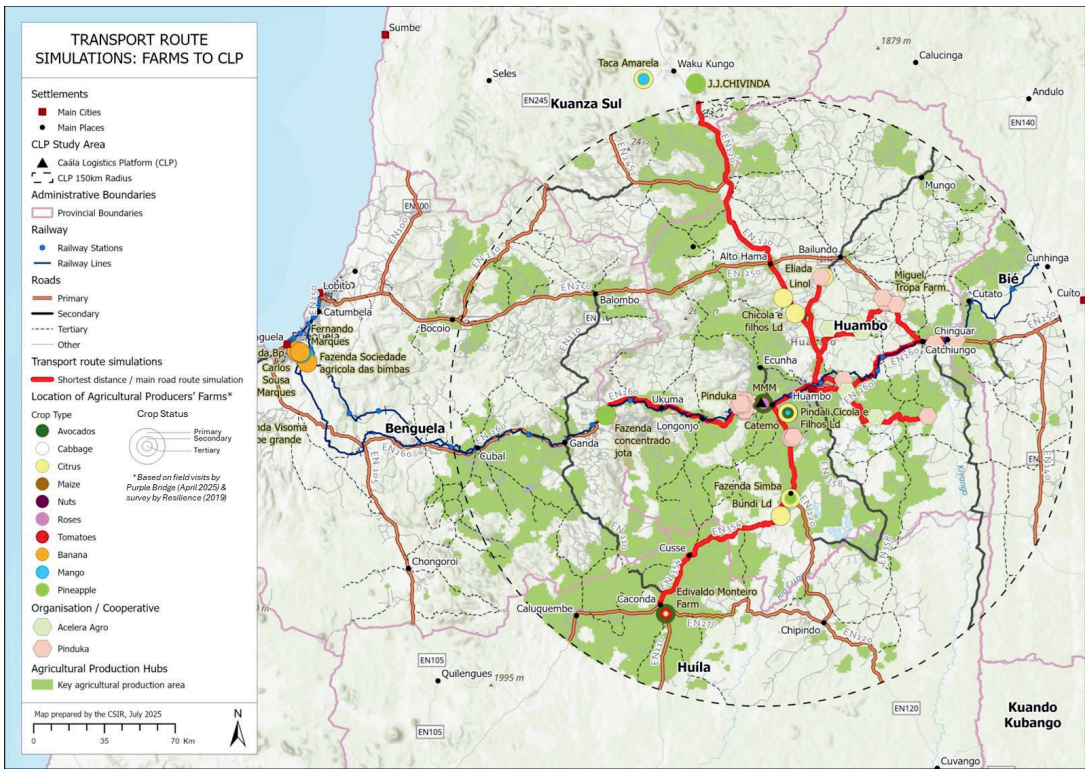


Figure 8: Route Simulation from selected Farms to CLP. (Primary/national roads used considered in this study. Other simulations may yield shorter routes based on secondary/tertiary roads however overarching assumption used was that primary roads are of a higher quality)

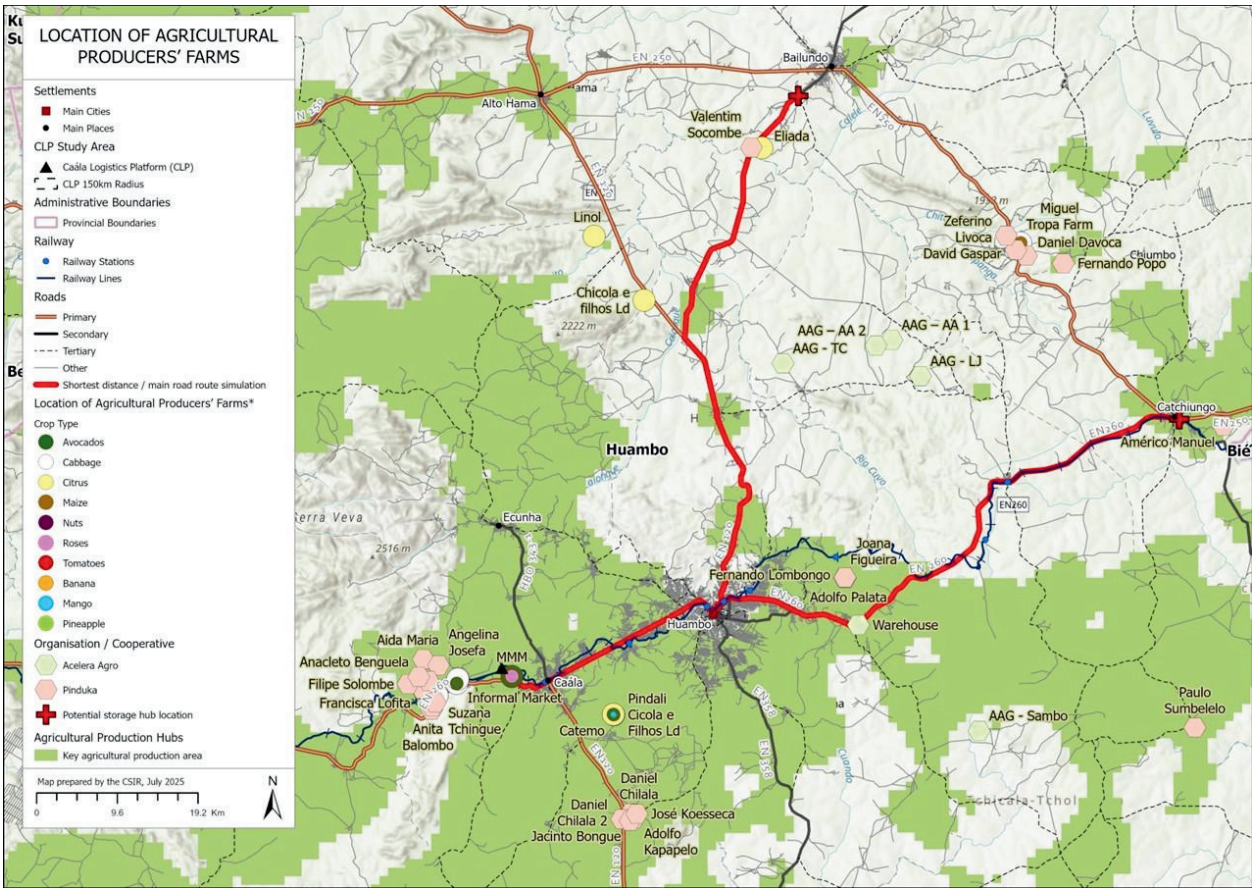


Figure 9: Route simulation from Pinduka Project Farms to the CLP with proposed locations for cold-storage facilities.

3. MARKET AND VALUE CHAIN ANALYSIS

3.1 Value Chain Overview

3.1.1 Complete regional value chain overview

The study is focused on the Caála platform, located within the Huambo region in Angola. This region is located in the central west region of the country, east of Lobito.

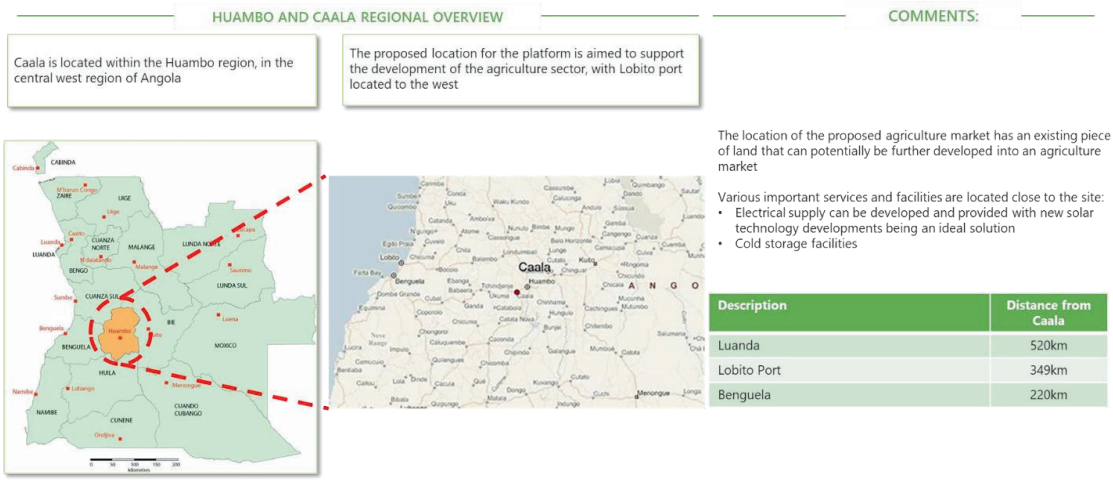
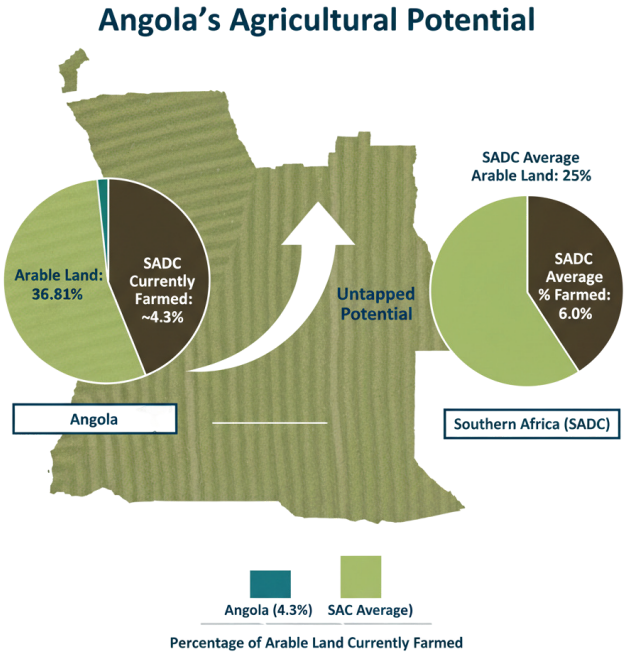


Figure 10: Huambo regional summary

This indicates the potential opportunity to significantly expand and develop the agriculture sector within the country. The Huambo region consists of some of the most arable land and currently provides majority of the maize produced in Angola.

One contributing factor is that the region is linked to six of the biggest rivers within Angola providing the ability to not only utilize the potential to develop and grow the agriculture sector within the region but also supports development by having access to water.



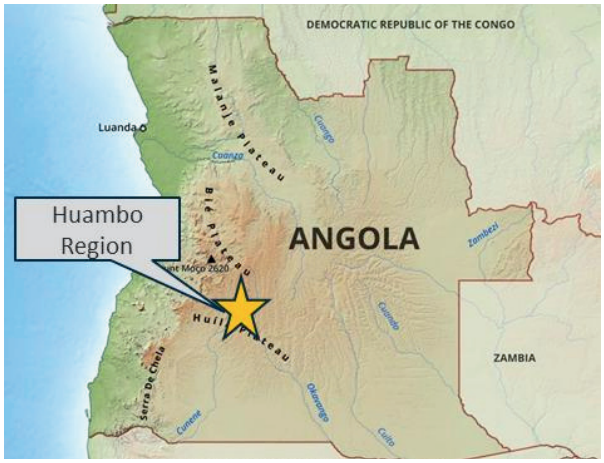


Figure 11: Major rivers surrounding Huambo region

The current agriculture situation was evaluated to understand the overall value chain of produce within the region. This is an important assessment that provides an overview of the overall sector, indicating the current production volumes. This is supported by additional data that indicates product losses and the volumes that reach markets within this region.

Based on previous studies conducted within the SADC region related to agriculture production volumes and losses, the overall volumes losses are dependent on the type of crops.

The primary causes for post-harvest losses are identified as follows:

The figure below represents a view on the production volume losses (as a percentage) per crop type

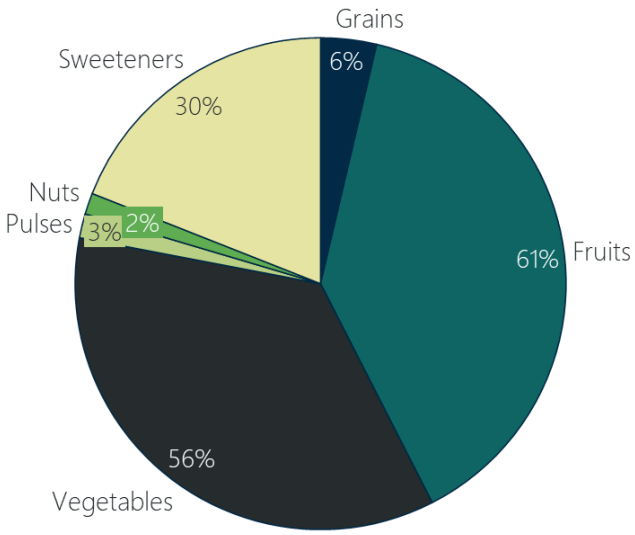
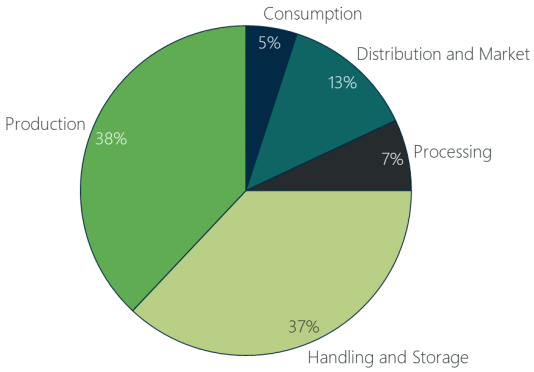


Figure 12: Post-Harvest Losses by Crop Type

The primary reason for the high variance in losses between the various crop types are based on the physical nature of each product to enable physical handling, combined with the variability on shelf life for each respective product.

The causes for all these losses are due to a combination of factors, mostly related to the level of investment within the sector and available infrastructure. As shown below, the reasons for these losses can attributed to a few contributing factors.

Figure 13: Main Factors Contributing to Post-Harvest Losses



In section 3 of the report a more detailed view is provided to highlight the specific value chain breakdown of each of the main crop types, including the volume losses across the complete value chain.

From an overall performance and market volumes perspective, our team developed an overview to indicate the tonnages produced, amount lost as well as the volumes that are consumed vs reaching the market.

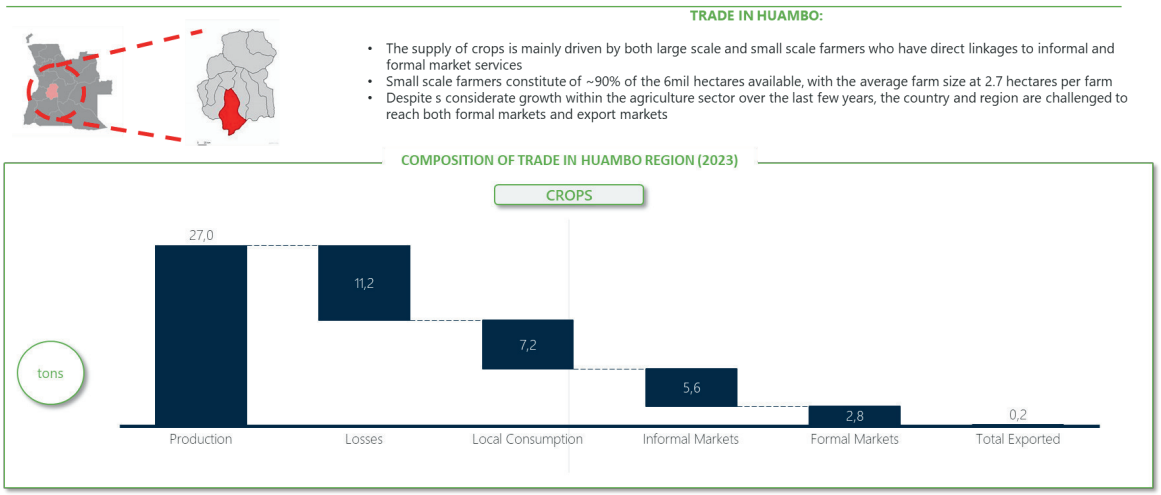


Figure 14: Huambo agriculture value chain overview

As indicated above, it is evident that major volume losses occur at production level. A large % of the production volumes are provided by small scale farmers, where a number of challenges within the sector contribute to high volume losses at the farms.

In Angola, ~90% of all farming is owned and managed by small scale family farms. This contributes to 5.4 million hectares of the available 6.05 million available farmlands in the country. In addition, the average farm size in Angola is only 2.71 hectares, which is a contributing factor to the current challenges the agriculture sector is facing.

"In Angola, ~90% of all farming is owned and managed by small scale family farms."

The existing road infrastructure within the overall region requires improvement to support the sector growth and increased volumes reaching the markets.

A more detailed view on the flow of volumes indicates the tonnages that are processed at each node within the overall value chain will be conducted to understand each respective commodity type and the constraints impacted them.

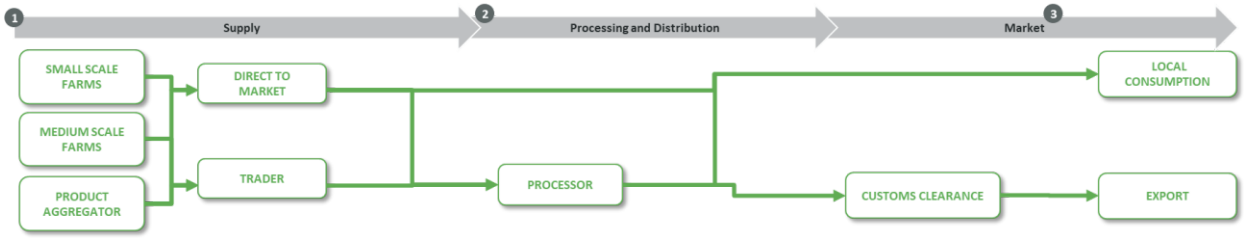


Figure 15: Overall value chain template

A standard value chain overview template us used to evaluate each respective product type to understand the current commercial value as well as the existing limitations within the sector the prohibits growth.

Using this overview, some key elements were identified that impacts the output of farms on a countrywide level.

As mentioned above, Animals the average farm size in Angola is 2.71 hectares, where 66% of the work is done manually.assist on 28% of the farms but only 6% of these farms are supported by mechanical equipment. (Bumba, 2023) This approach supports the analysis to identify where the largest losses occur, based on the flow of tonnages as well as the final volumes being sold in formal and export markets.

“the average farm size in Angola is 2.71 hectares, where 66% of the work is done manually.”

Description	Annual Volume	%
Production	27mil tons	-
Production Losses	11.2 mil tons(Estimate)	41%
Local Consumption	7,2 mil tons (Estimate)	27%
Informal Markets	5,6mil tons	30% of market volumes
Formal Markets	2,8 mil tons	10% of market volumes
Export Market	18,824 tons (2023)	0,1%

Table 1: Complete value chain overview

As indicated in the table above, the overall indication of production volumes and losses highlighted a few general aspects:

53 The small-scale farmers have restricted access to equipment, products and market information regarding their products and result in:

- Limited transport and storage of products to traders, processors or markets
- Restricted cold chain services, supported by no access to herbicides or pesticides
- These factors are some of the larger contributors to losses during the production and initial distribution phases.

3.1.2 Detailed breakdown of value chains

Our study includes the breakdown of a few key crop types within the Huambo province. This analysis provides the foundation to assess the status of each respective value chain, highlighting losses as well indicating the volumes that reach the various nodes. From our analysis a few important aspects are important:

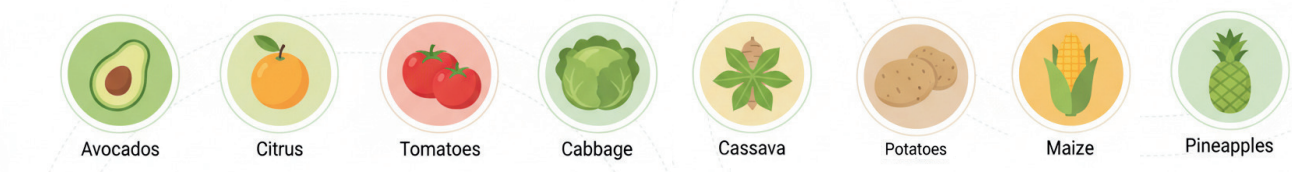
Production Volumes: This provides the total tonnages produced within the Huambo province for each respective crop type. These volumes can be positively impacted by increased access to irrigation, pesticides, herbicides and general farm training support to improve the overall tonnages produced.

After Production Losses: An indication of the tonnages (and % of total production) that is lost immediately after farm production. Recent studies in Angola and within the SADC region indicate that the production losses are high compared to other global farmers. Improved road access to farms, storage facilities and cold storage services will support a reduction in losses.

Local Consumption: The small-scale production environment in Angola, combined with restricted road and storage access, provides a scenario where a large quantity of farm produce is consumed locally without any formal trade transactions. The general process behind the local consumption is on a trade basis, where market related pricing or farmer revenue is not impacted. Improved road access and storage facilities can support to increase the volumes that reach more formal market platforms
Informal Markets: In conjunction with local consumption, the restricted road access and storage facilities provides the small-scale farmers with limited access to formal markets. This results in smaller scale, local markets where products are sold and traded with market related pricing not being a key driver to the revenue generated by the farmers.

The overall larger scale objective within the regional agriculture sector is to develop the infrastructure and services to support the increase in production volumes, reduce losses and improve the overall volumes that reach formal markets. These short-term improvements will act as primary enablers to develop the sector within the Huambo province.

Considering the classification of nodes across the value chain as indicated above, we have developed a detailed view of the value chains for the key crop types identified:



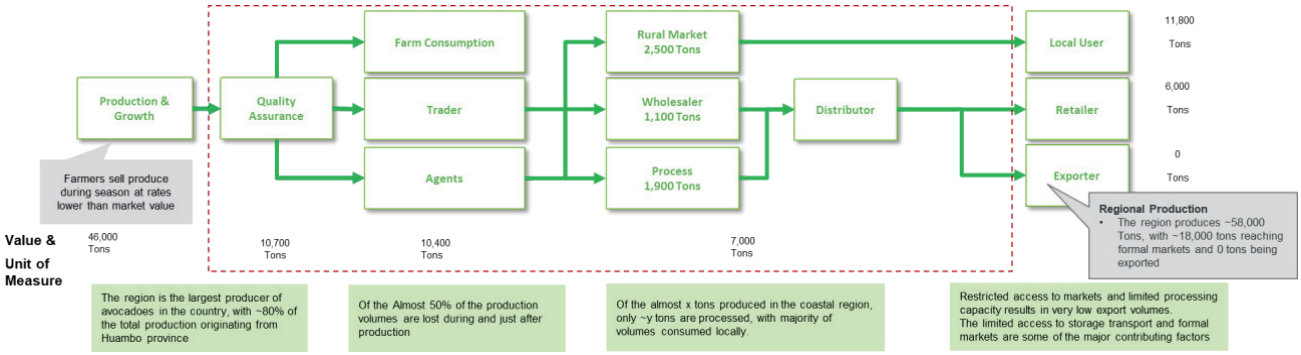


Figure 16: Avocado Value Chain

Huambo province is the largest producing region of avocadoes within the country. This provides the opportunity of potential growth in both yield (tons/hectare) as well as reducing the tonnages lost before reaching the markets.

As indicated above, less than 25% of the produced volumes reach the formal markets, and no volumes were exported. With the larger share of production volumes being locally consumed or sold via the existing informal markets, the short-term improvements can support the farmers to sell more volumes via the formal markets.

This provides a clear indication that the opportunity to improve the production and distribution of avocadoes is available, provided that the transport and distribution network can support this growth strategy.

Description	Annual Volume	%
Production	46,116 tons [1]	-
Production Losses	17,700 tons (Including distribution losses)	38.4%
Local Consumption	10,400 tons	22,6%
Informal Markets	11,800 tons	25,6%
Formal Markets	6,000 tons	13%
Export Market	0	0%

Table 2: Avocado value chain summary

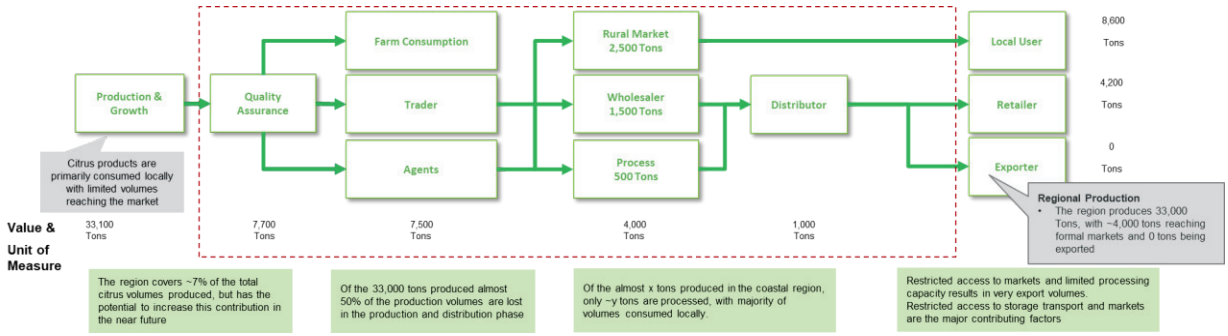


Figure 17: Citrus Value Chain

Even though less than 10% of the total country production volumes or citrus are produced from Huambo, the option to develop this specific crop type exists due to the elevation and climate that supports this. The production volumes are still relatively low with less than 30% of the produced volumes reaching formal markets and no tonnages being exported. As with avocadoes, majority of the volumes are consumed locally or sold via informal markets. To improve the output of citrus within the region will require the distribution and storage services to accommodate the development plan.

Description	Annual Volume	%
	33,000 tons [1]	-
Production Losses	11,700 tons (IncludesProduction and Distribution Losses)	35.5%
Local Consumption	7,500 tons	22,7%
Informal Markets	8,600 tons	26%
Formal Markets	4,200 tons	12,7%
Export Market	0 tons	0%

Table 3: Citrus value chain summary

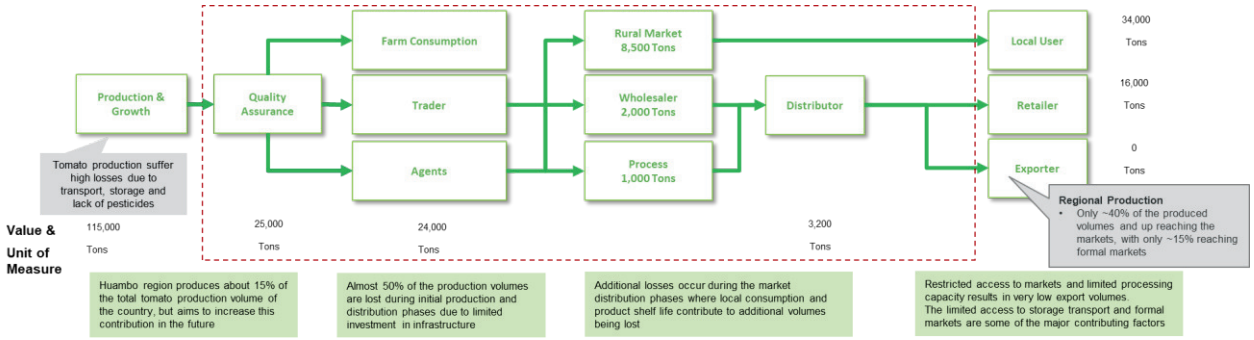


Figure 18: Tomatoes Value Chain

The development of the tomato value chain is a strategic goal within the Huambo region and forms part of the overall agriculture development plan in Angola. The estimated volumes Huambo contributes is ~15% with large scale losses occurring due to transport and storage restrictions within the value chain. Limited shelf life, combined with handling sensitivity result in less than 40% of the product reaching formal markets and nothing being exported. Local consumption combined with sale via the informal markets are the main drivers of distribution from the farmers.

	Annual Volume	%
	115,000 tons	-
Production Losses	40,000 tons (Production and Distribution losses included)	35%
Local Consumption	24,000 tons	21%
Informal Markets	34,000 tons	30%
Formal Markets	16,000 tons	14%
Export Market	0 tons	0%

Table 4: Tomatoes value chain summary

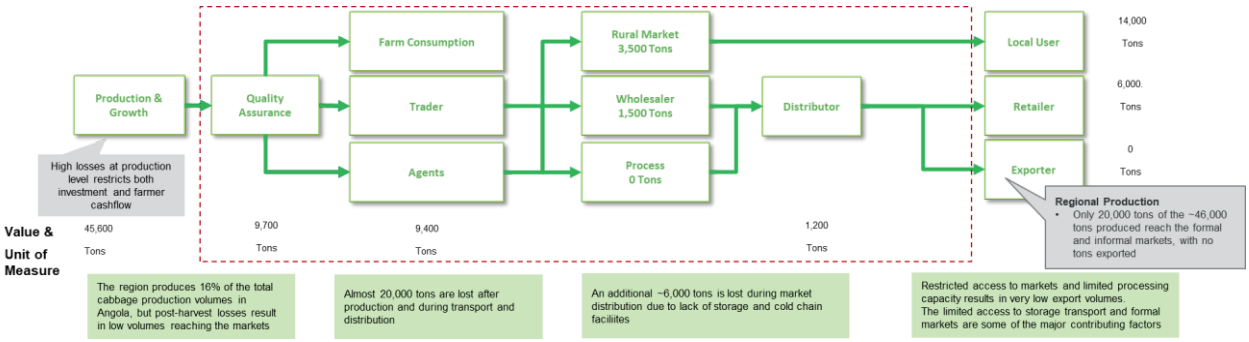


Figure 19: Cabbage Value Chain

Similar to the other vegetable crops in the Huambo region, large post-harvest losses are experienced with the need to improve and invest in cold storage solutions and improve road access to the farms.

Description	Annual Volume	%
Production	45,600 tons	-
Production Losses	~15,000 tons (Production Losses and Distribution Losses)	33%
Local Consumption	9,400 tons	21%
Informal Markets	14,000 tons	31%
Formal Markets	6,000 tons	13%
Export Market	0 tons	0%

Table 5: Cabbage value chain summary

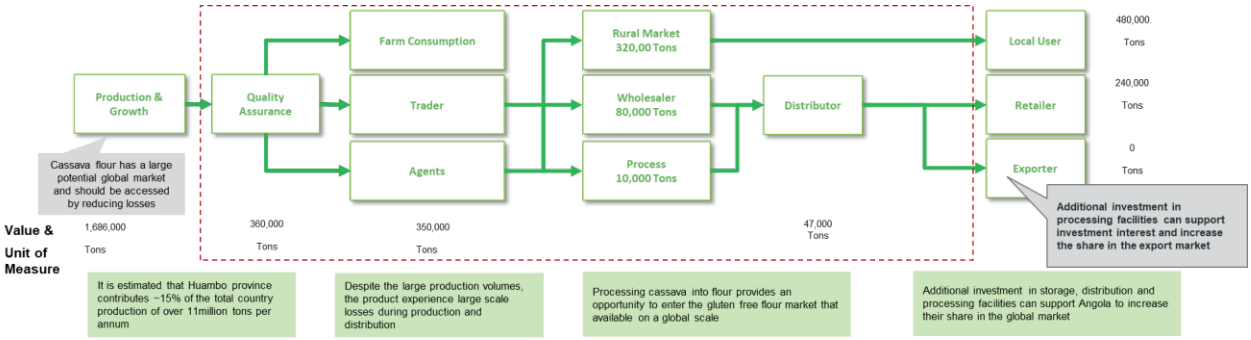


Figure 20: Cassava Value Chain

Angola produces large volumes of cassava due to the climate supporting the crop type. Despite the large production volumes, the opportunity to access global markets has not been utilised. Cassava has the benefit of providing gluten free flour, a product that has the potential to have a large scale of global interest.

In order to access these available markets, significant investment is required to provide the country with the processing capacity to access this market. In addition, it also needs to be supported by the need to improve the existing road access and storage facilities available across the value chain.

Description	Annual Volume	%
Production	1,686,063 tons (Estimate)	
Production Losses	750,000 tons	41%
Local Consumption	350,000 tons	21%
Informal Markets	480,000 tons	28%
Formal Markets	240,000 tons	14%
Export Market	0 tons	0%

Table 6: Cassava value chain summary

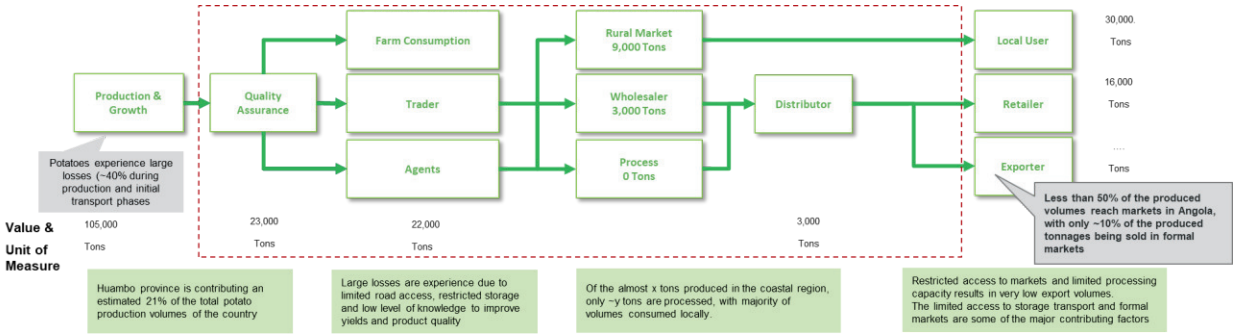


Figure 21: Potato Value Chain

Description	Annual Volume	%
Production	105,000 tons1	-
Production Losses	32,000 tons (Production and Distribution losses included)	30%
Local Consumption	22,000 tons	21%
Informal Markets	30,000 tons	29%
Formal Markets	16,000 tons	15%
Export Market	0 tons	0%

Table 7: Potato value chain summary

Potatoes are produced on a large scale within this province, with 21% of Angola's production origination from here. Despite the large production volumes, the crop experiences fairly large losses after production due to restricted access to transport and storage facilities. Similar to other crop types, Almost 50% of the potato volumes are either locally consumed or traded via the informal markets, with only 15% reaching formal trade platforms and no tonnages being exported.

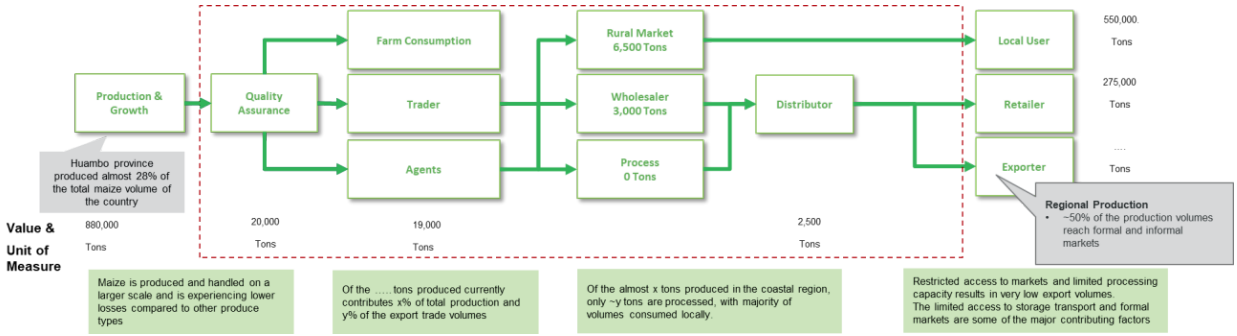


Figure 22: Maize Value Chain

Maize is produced and distributed as a primary food source within Angola. As a result, the post-harvest losses are considerably lower than the other fruits and vegetables. This is primarily due to several contributing factors:

- The crop type is less sensitive to handling and transport
- Extended shelf life compared to most fruits and vegetables
- Larger scale production volumes with bigger farms involved in producing maize due to the role in plays within the country as a food source

Despite this, maize still experience losses mostly due to the same transport and distribution constraints applicable to the other crop types.

Description	Annual Volume	%
Production	880,000 tons1	-
Production Losses	30,000 tons	3.5%
Local Consumption	19,000 tons	2.2%
Informal Markets	550,000 tons	63%
Formal Markets	275,000 tons	31%
Export Market	0 tons	0%

Table 8: Maize value chain summary

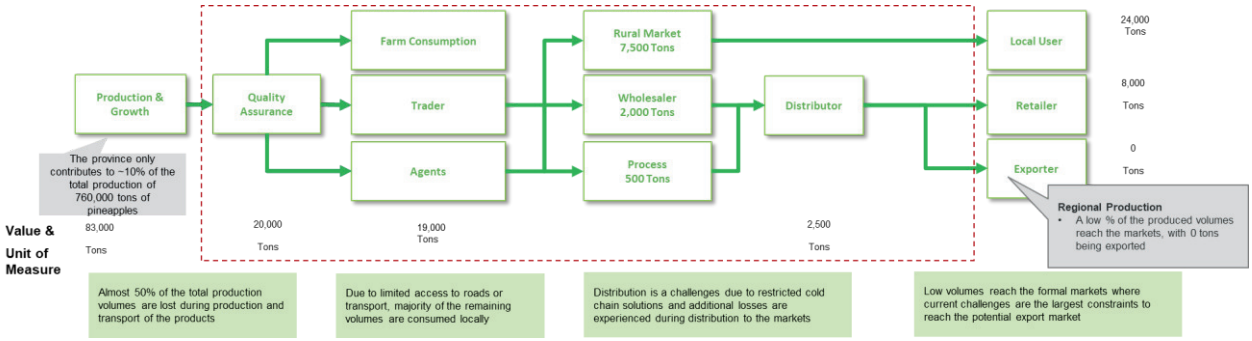


Figure 23: Pineapples Value Chain

Similar to the other fruits and vegetables, pineapples are fairly low in production volumes with high losses across the value chain. It supports the trend to highlight the importance transport, distribution, storage and cold chain services have on the volume losses, directly impacting the volumes that reach markets. This also contributes to the extremely low export volumes within the agriculture sector as a whole.

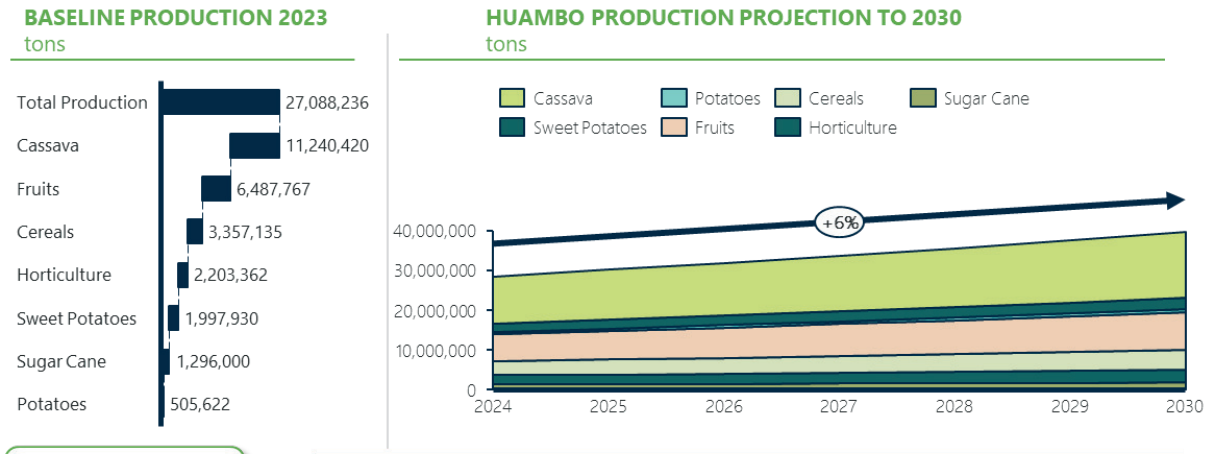
Description	Annual Volume	%
Production	83,000 tons1 (UNDP, n.d.) (ARCCLA, n.d.) (APHLIS, n.d.)	
Production Losses	31,000 tons (Includes Production and Distribution Losses)	37%
Local Consumption	19,000 tons	23%
Informal Markets	24,000 tons	29%
Formal Markets	8,000 tons	10%
Export Market	0 tons	0%

Table 9: Pineapples value chain summary

Value Addition from Storage and Cold Chain Infrastructure

3.2 Demand for Temperature-Controlled Logistics

The existing value chain assessment combined with a demand projection highlights some of the existing restrictions related to storage facilities and more specifically cold storage services.



Key commodities

The top 7 commodities ***(Maize, Cassava, Bananas, Tomatoes, Sweet Potato, sugar cane and Potatoes)*** *make up 89% of all goods produced in the region*

Highest growth commodities

The growth of the goods produced in the region is projected to grow at 5.6% until 2030, but specific focus on fresh produce types can increase this projected growth in:

Avocadoes
Citrus
Tomatoes
Cabbage
Potatoes

But the investment into roads, storage facilities and cold chain solutions via road and or rail will support the growth and development of all fresh produce types within the Huambo province

Table 10: Crop production and demand projection summary

The forecasted volumes by 2030 supports the need and value of cold storage facilities within the value chain. The volume is expected to reach 39,7 million tons at a CAGR of 5.6%.

4. INLAND TRANSPORTATION ROUTES

4.1 Mapping of Transportation Routes from Hinterland to CLP

OpenStreetMap (OSM) data indicates that the total length of roads within CLP's area of influence — considered to be a radius of approximately 150 km — is around 4,500 km. This road network is distributed among primary, secondary and tertiary roads, forming a strategic network of regional access and connectivity. The infrastructure covers not only the province of Huambo, where the platform is located, but also extends to the neighbouring provinces of Bié, Benguela, Huíla and Kwanza Sul, all of which are significant in terms of agricultural production, natural resources and the movement of goods.

"In the province of Huambo, data points to a total of 1,817 km of roads, comprising a combination of primary, secondary, tertiary and agricultural roads. Agricultural roads, although less structured, play a key role in connecting rural areas and productive cooperatives to logistics consolidation points."

In addition to the extensive road network, access to the CLP is greatly facilitated by the Lobito Corridor railway link, which connects Caála to the Atlantic coast. This railway line is one of the most important in the country, and the SADC Region, having been recently rehabilitated and modernised. It is expected to be the main transport route to the Port of Lobito (for exports). This intermodal infrastructure places CLP in a strategic position to serve not only exports via the Port of Lobito, but also the countries of southern Africa and the major commercial centres of Angola.

Direct road access to CLP is also guaranteed by the EN120 national road, classified as a primary road, which connects the city of Huambo to various locations in the surrounding provinces and to the coastal axis. In addition, there are several secondary roads that offer alternative connections, serving as support or complementary access routes, which are especially useful during periods of maintenance of the main roads or in the event of seasonal interruptions.

The complementarity between road and rail modes provides CLP with essential logistical redundancy, allowing operations to continue even in scenarios of instability or limitations in one of the modes of transport. This flexibility is fundamental for the logistics of agricultural, perishable or seasonal products, whose transport window can be critical to ensuring quality and market value.

The integration of this multimodal network creates robust and sustainable logistics opportunities, enabling the progressive growth of the volume of cargo processed by CLP and consolidating its role as a regional logistics hub of national and cross-border importance.

4.2 Transportation Routes from CLP to Lobito Port

4.2.1 Mapping of Transportation Routes from CLP to Lobito Port

From the CLP, the distribution to the Port of Lobito can be efficiently executed via two main transport modalities: rail and road. Each mode offers distinct advantages, depending on the type, volume, urgency, and final destination of the cargo.

The railway option, integrated into the recently modernized Lobito Corridor, stands out as the most strategic for transporting high-volume and heavy cargo. This corridor is part of the historic Caminho-de-Ferro de Benguela (CFB), which has undergone significant rehabilitation to improve speed, reliability, and cargo capacity. The rail line connects the interior provinces of Angola to the Atlantic coast, and it will include a critical connection point in Caála, reinforcing the CLP's role as a regional logistics hub. This line not only supports the movement of national cargo but is also positioned to facilitate international trade, especially for landlocked countries such as Zambia and the Democratic Republic of Congo, by providing a direct export route through the Port of Lobito and exports from Angola, especially with vegetables and fruits.

Despite having several intermediate stations between Caála and the coast, the railway is generally faster and more suitable for consolidated shipments. Its capacity to carry containers, bulk commodities, and heavy machinery with greater safety and reduced perunit cost makes it ideal for long-haul freight. The use of rail also reduces road congestion, carbon emissions, and wear on public infrastructure — contributing to sustainable logistics development in Angola.

Alternatively, road transport remains a vital option for flexible, decentralized cargo flows, especially for medium-sized shipments, time-sensitive deliveries, and destinations not directly served by rail. This method of transport has been largely used by the private sector using both own transportation and outsourcing. From CLP to Lobito by road, there are three principal routes available, offering redundancy and options based on road conditions or operational preferences:

Route i) via EN250, covering approximately 310 km, offers a relatively direct route with moderate traffic and links to several key localities;

Route ii) via EN120, which then connects to EN250, extending the distance slightly to around 337 km, is often used to integrate cargo from southern or eastern regions;

Route iii) via EN110, spanning approximately 352 km, represents a longer but sometimes necessary alternative, especially in cases of maintenance or seasonal road closures.

Together with the EN100, these roads form a comprehensive road freight network that connects Caála and the surrounding 150 km economic zone to the coastal gateway of Lobito. These corridors allow for the circulation of goods between rural producers, aggregation points, and export infrastructure, supporting a multimodal logistics system that enhances national and regional competitiveness.

Caála (Huambo province) to Port of Lobito (center):

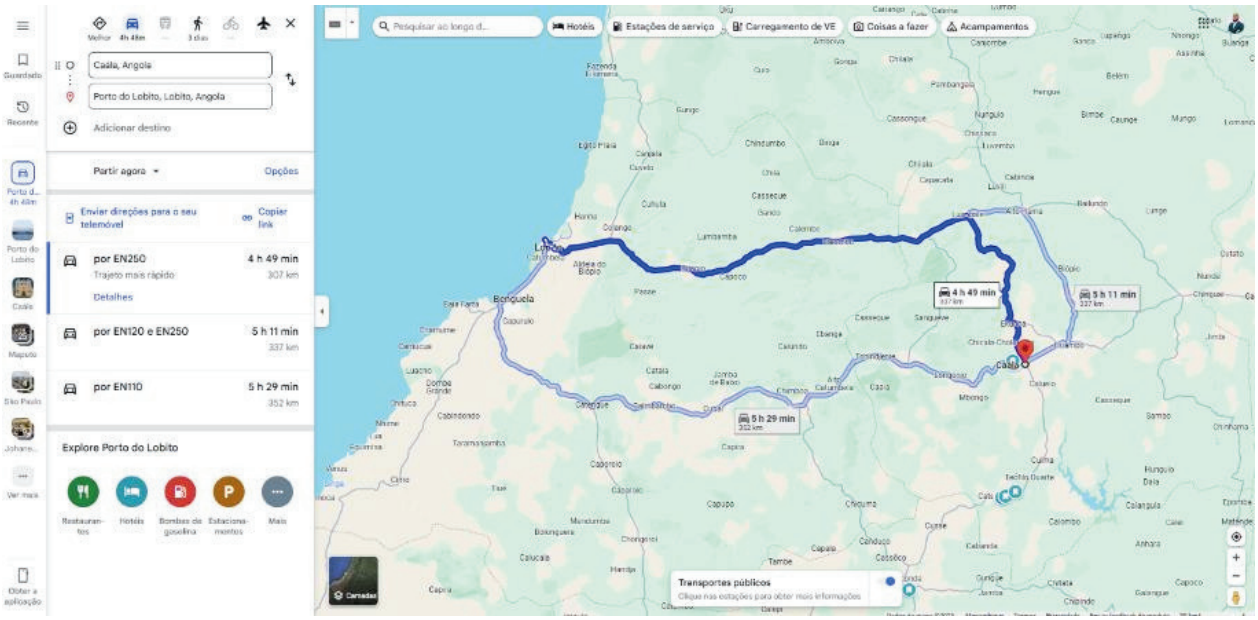


Figure 24: Caála (Huambo province) to Port of Lobito (center)

Mungo (Huambo province) to Port of Lobito (northeast):

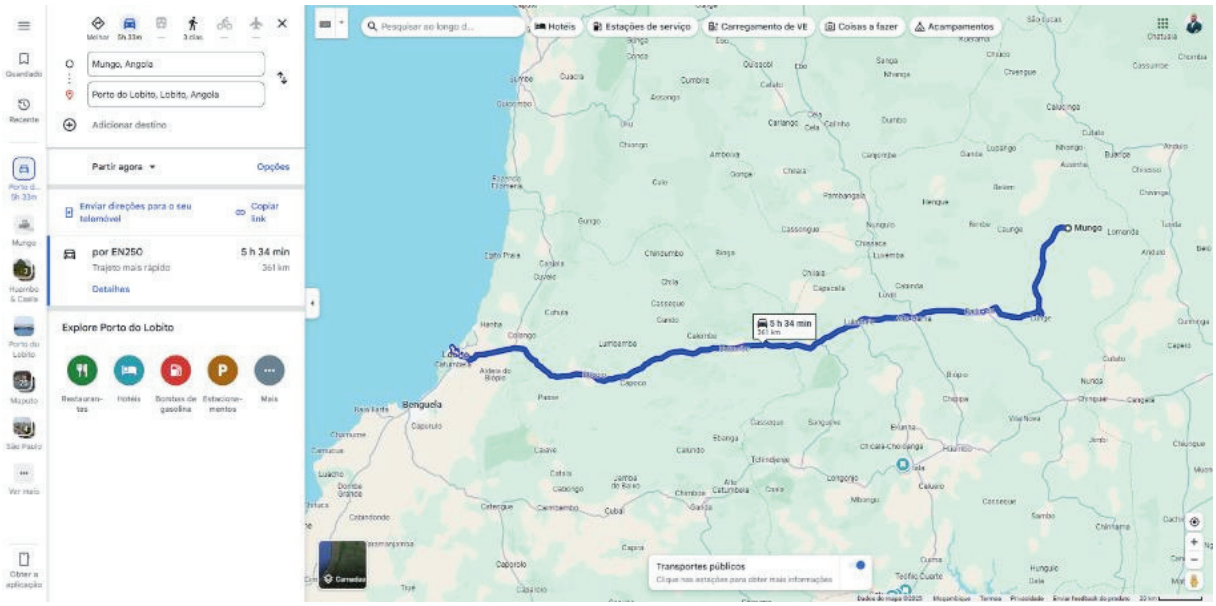


Figure 25: Mungo (Huambo province) to Port of Lobito (northeast)

Cassongue (Kwanza-Sul province) to Port of Lobito (northwest):

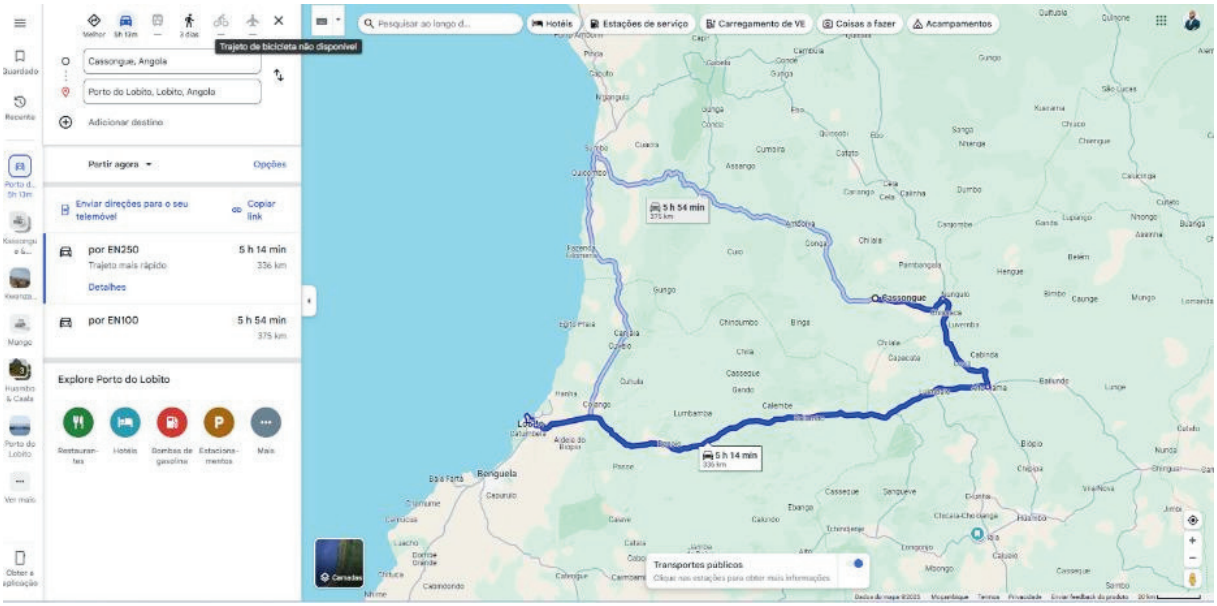


Figure 26: Cassongue (Kwanza-Sul province) to Port of Lobito (northwest)

Caconda (Huíla Province) to Port of Lobito (southwest):

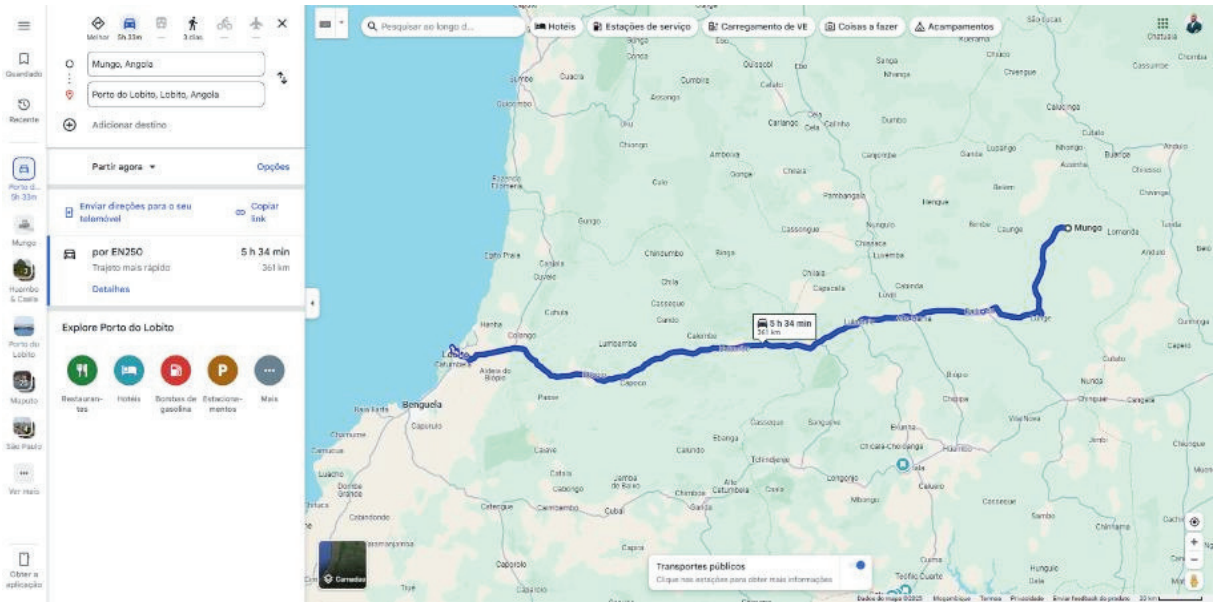


Figure 27: Caconda (Huíla Province) to Port of Lobito (southwest)

Matata (Bié Province) to Port of Lobito (southeast):

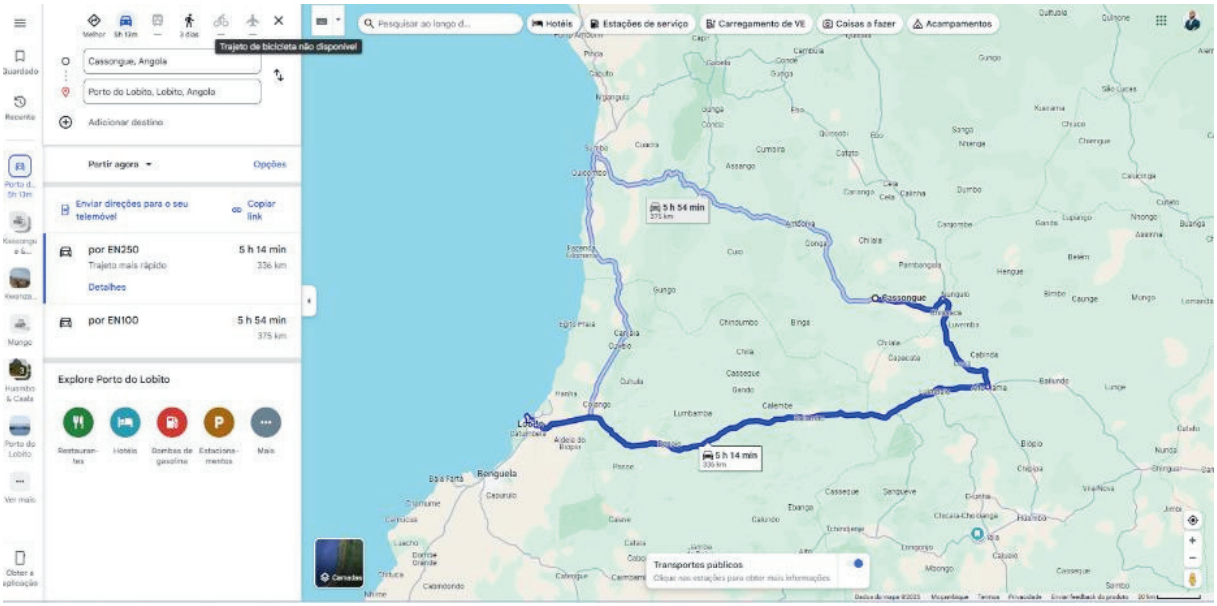


Figure 28: Matata (Bié Province) to Port of Lobito (southeast)

Route Simulation models:

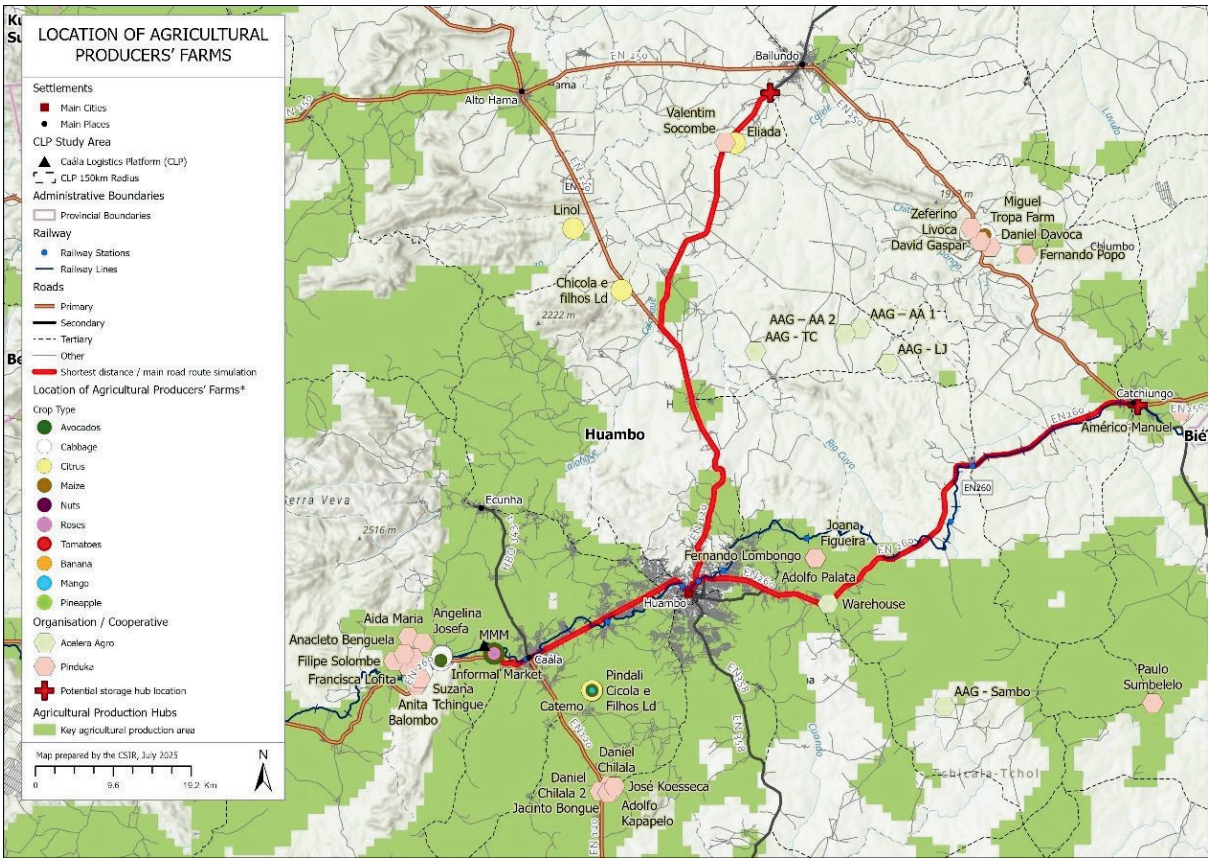


Figure 29: Route Simulation Model 1: Potential Storage Hub to selected Farms

Transport Route Simulation: Farms to CLP

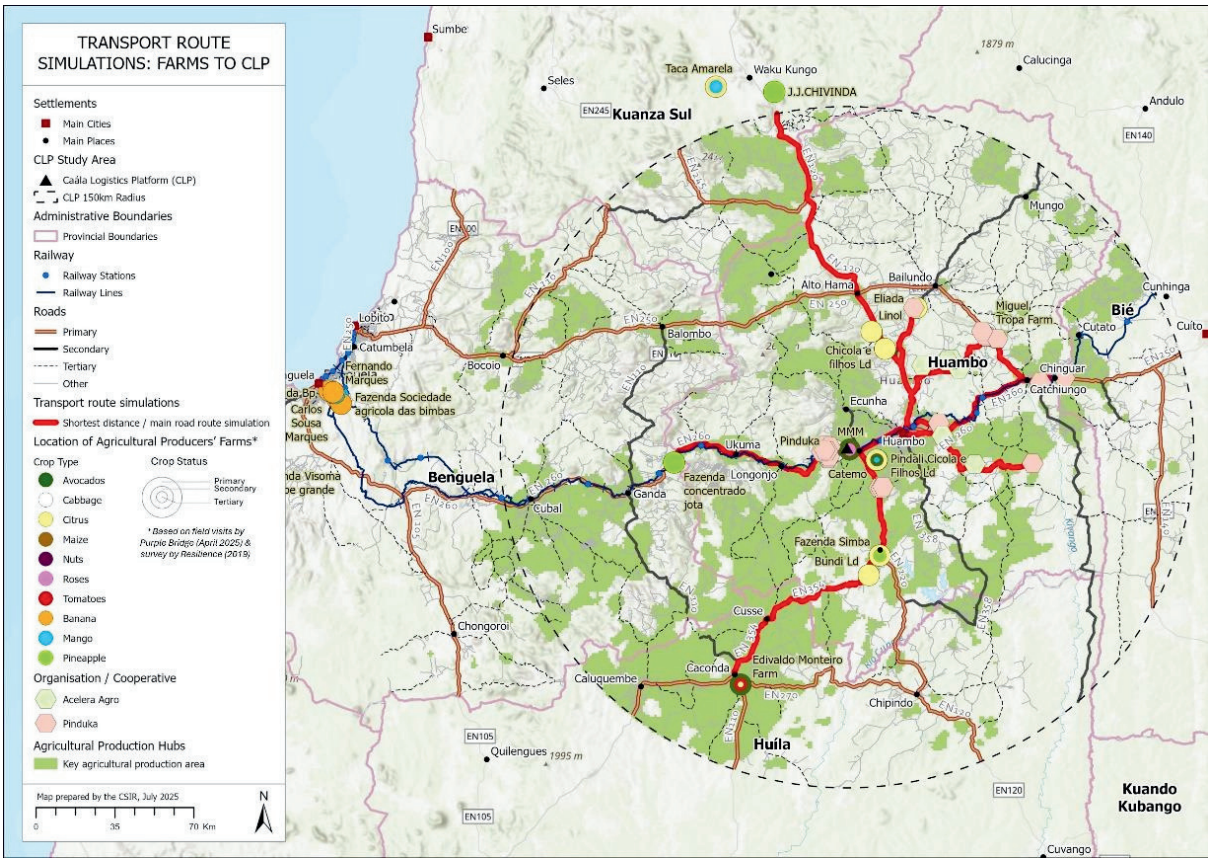


Figure 30: Route Simulation Model 2: Selected Farms to CLP

4.3 Assessment of Transport Infrastructure

4.3.1 Road conditions

The condition of the EN110, EN120, EN100 and EN250 roads is poor and in need of major repairs. The road is composed of a mixture of dirt and asphalt.

During the rainy season, the dirt road becomes very flooded, turning muddy and making it difficult for small and large vehicles to pass. At this stage, the muddy water makes it difficult for drivers to judge the depth of the potholes. On these routes, the average speed is approximately 10 km/h.

Conversely, on the asphalt road, there are several notable potholes along the road that prevent speeds of around 100 km/h from being maintained for more than 8 to 10 km.

Construction and rehabilitation projects are currently underway on both dirt and asphalt roads. A study by the Provincial Directorate of Infrastructure and Technical Services of Huambo has identified several roads in the province where more than 90% are classified as high priority (out of three categories: low, medium and high) for rehabilitation.

4.4 Height/Weight Limits

The legislative restrictions regarding road transport is an important factor to incorporate in the development and future growth of distribution within the agriculture sector. The legal specifications provided link the truck size (determined by the respective axle load) with the maximum tonnage allowed:

Description	Weight Limit
Steering Axle Load	7,700 kg
Single Axle Load	10,000 kg
Tandem Axle Load	16,000 kg
Tridem Axle Load	24,000 kg
Combination vehicle gross load	38,000 kg

Table 11: Angolan Road Vehicle Weight Restrictions

In addition, the Angolan legal requirements also apply to vehicle lengths and heights, where vehicles are restricted to a height of 4 meters with heavy passenger vehicles limited to 6.5 meters. A maximum width of 2.5 meters and the maximum lengths limited to 15 meters, 18 meters and 20 meters for rigid, articulated and combo vehicles respectively.

Vehicle heights and weights could also be restricted due to the height and type of bridges available. Even though the most recent specific data on bridges across this route was not available, the standard bridge clearance height for bridges in Angola is 4.5 to 5 meters but a suggested safe height to Lobito is 4.3 meters based on the data available on the bridges.

Even though maximum tonnage supports the economies of scale approach to minimise distribution costs, the practical aspect of using large scale trucks within the available road infrastructure is not always viable.

4.5 Rail infrastructure and integration

Caála is strategically positioned along the Lobito Corridor (LC), a key logistics axis in Angola that is parallel to the 1,289-kilometre railway. This historic railway, which has undergone extensive refurbishment in recent years, connects the Port of Lobito on the Atlantic coast to Luau, in the eastern province of Moxico, at the border with the Democratic Republic of Congo (DRC). The revitalized railway has greatly improved Angola's east-west transport capacity and now serves as a vital link for regional trade and export logistics.

Rail operations officially resumed in January 2024, under the management of Lobito Atlantic Railway (LAR), a private concessionaire responsible for operating and maintaining the corridor. Currently, LAR manages a fleet of 13 locomotives, with expansion plans underway to increase to 25 locomotives over the coming years. This increase will significantly boost transport capacity, enabling the railway to move a growing number of containerized and bulk cargo units, enhancing efficiency and throughput across the corridor.

The Lobito Corridor features several operational stations along its length, one of which is located at CLP. Construction work is ongoing at the site to develop a fully integrated logistics platform adjacent to the railway. However, current infrastructure presents technical challenges — notably, a visible elevation gap between the platform under construction and the existing rail line, which may require engineering adjustments to ensure safe and efficient cargo transfer.

The transit time between Huambo and the Port of Lobito via rail is estimated at 10 to 15 hours, depending on cargo volume, train scheduling, and track conditions.

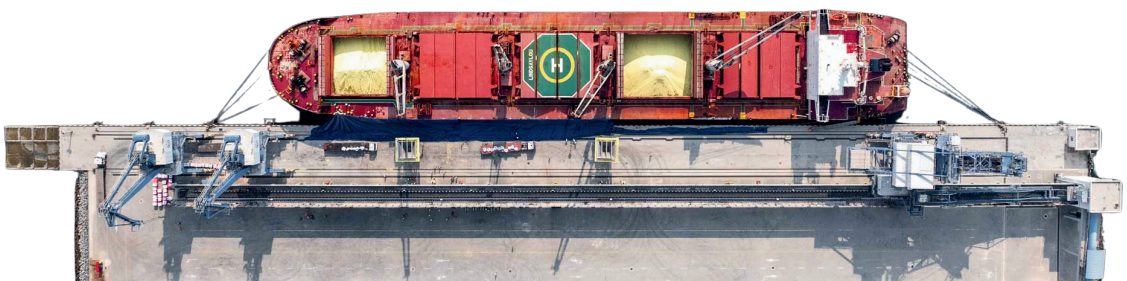
5. EXPORT LOGISTICS AND PORT READINESS

Efficient export logistics and port facilities are important components in establishing Angola's position as a competitive competitor in global fresh produce markets, particularly through the Lobito corridor. This section evaluates recent developments, current port capabilities, and provides actionable guidelines and recommendations to improve the logistics environment for perishable exports such as citrus, mangoes, avocados, and vegetables originating in the Caála Logistical Platform (CLP) area.

The Port of Lobito

maintains an average handling capacity of 16 moves per hour (MPH), enabling it to process cargo efficiently, especially during the peak season from August to November. Agricultural produce accounts for 11.3% of the total tonnage handled, reflecting its growing importance.

The terminal has 330 reefer plug points to support the shipment of perishable commodities. The turnaround time for reefer shipments varies greatly based on customs clearance, port congestion, and mode of transportation. Domestic reefer truck shipments typically take 1 to 5 days; however, sea freight shipments might take 20 to 45 days. Peak cargo movement seasons often last from August to November, reflecting increased agricultural activities during this time.



5.1 Changes in Port Operations under Africa Global Logistics (AGL)

Since assuming operational control of the Port of Lobito, Africa Global Logistics (AGL) has initiated several improvements aimed at increasing port efficiency and attractiveness for containerised and refrigerated cargo:

- Digitalisation Initiatives: Introduction of more integrated port community systems, including tracking platforms for containers, vessel scheduling, and customs clearance.
- Infrastructure Modernization: Ongoing upgrades to terminal infrastructure, paving of container yards, and plans for expanded reefer plug capacity.
- Customs Facilitation: Streamlining of customs documentation and clearance procedures in coordination with the Angola Customs Authority, including digital document submission.
- Public Private Partnerships (PPP): Engagement with international logistics operators and shipping lines to improve vessel frequency and equipment availability.

These developments support Angola's goal of turning the Port of Lobito into a regional gateway for agribusiness exports, leveraging its location and multimodal integration with rail and road infrastructure.

5.2 Operational Readiness of Export Ports

While the port currently lacks technological infrastructure for perishable commodities beyond reefer plug points, it does provide basic temperature control through a specialist workforce that monitors and maintains chilled containers. AGL works closely with shipping lines to coordinate vessel schedules and reduce delays for time-sensitive agricultural shipments.

Although no immediate cold chain modifications are planned, increased agri-exports may encourage future investments in this sector. This presents a strategic potential to increase the port's competitiveness through the development of comprehensive cold storage and pre-cooling facilities.

With direct rail link built within the terminal, Lobito is ideally situated along the Lobito Corridor, enabling direct vessel discharge to rail wagons. Rail infrastructure is fully operational and supports ongoing road improvements under the larger corridor development plan, which is partially administered by Angolan Agency for Private Investment and Promotion of Exports (AIPEX), even if precise modal share data is not available.

The cost of rail access and the state of some road networks are major obstacles to cargo transportation. Optimizing cargo flows from inland production hubs will require addressing these issues through better road-rail-port integration.

Customs clearance for agricultural exports can be completed within two days. However, securing export license authorization remains a significant bottleneck, often taking 20 to 30 days. While Angola's customs authority uses the digital Asycuda system—linked to the Single Port Window (JUP)—pre-clearance is contingent upon the completeness of required documentation.

In certain justified cases, customs allow for early cargo release pending full process completion. Despite exemptions for national goods under the export regime, exporters face several challenges, including high production costs, truck shortages, poor road conditions, elevated shipping costs, unpredictable vessel schedules, and port tariffs.

According to Decree 634/22, which regulates Angolan port rates, reefer containers at Lobito are subject to regular handling fees. Daily storage fees for the use of reefer plugs are an additional expense. Interestingly, the ALT Terminal has the lowest daily electricity connection fees in Angola, which are 72% less than those at neighbouring ports.

The port offers a 20% discount on shore handling and stevedoring costs to encourage exports; imports are not eligible for this advantage. Because of this, Lobito is becoming a more alluring choice for agricultural exporters looking for affordable logistical solutions.

Handling fees for refrigerated containers:

Assignment	20´ (usd tariff)	40´(usd tariff)
Shore handling (per unit)	224	354,4
Stevedoring (per unit)	104,88	167,81
Electrical connection	3/kwh	3/kwh

Table 12: Handling fees for refrigerated containers

Additional costs for reefer plug usage or cold storage:

Assignment	20´ (usd tariff)	40´(usd tariff)
from the 1st to the 5th day	free	free
from the 6st to the 20th day	60	120
from the 21st to the 30th day	80	160
more than de 30 days	90	180

Table 13: Reefer plug and cold storage usage fees

Large-scale infrastructural improvements are being made to improve port operations. These include of the installation of a contemporary Terminal Operating System (TOS), investments in Mobile Harbor Cranes (MHC), terminal trucks, forklifts, reach stackers, hoppers, grabs, and more. AGL is deliberately establishing Lobito as a significant agri-export hub by utilizing the Lobito Corridor and alliances with important clients like Carrinho, even though private sector investment is now restricted to non-terminal activities.

Lobito Port, which is centrally positioned in Angola, can service a large catchment area that extends from Namibe to below Sumbe and into the interior.AGL, LAR, LAI, and Carrinho are among the logistics providers and stakeholders with which the port maintains operational relationships, creating a cooperative ecosystem that is vital to the expansion of the export market.

"Lobito Port, which is centrally positioned in Angola, can service a large catchment area that extends from Namibe to below Sumbe and into the interior."

The ALT Terminal is a new concession with the facilities and capability to draw in additional shipping lines. It now runs two Ship-to-Shore (STS) cranes, increasing the efficiency of cargo handling.

Although there are currently few official plans to expand regional trade channels, efforts are still being made to establish Lobito as a hub for regional trade through the Lobito Corridor. However, the port is a viable hub for future regional integration and trade facilitation due to its advantageous position and strong logistical capabilities.

The readiness of the Port of Lobito to handle fresh produce exports hinges on several operational indicators:

5.2.1 Container capacity, berth productivity & reefer infrastructure

Component	Current Status	Observations
TEU Capacity	Approx. 250,000TEU/year	Potential for growth
Berth Productivity	20 moves per hour for containers (average)	Acceptable for mid-sized vessels.
Berth Depth	10 -13.5 meters	Accommodate Panamax-size vessels.
Rail Connectivity	Link to the CLP must be developed	Slots needed to be made available.

Table 14: Container capacity, berth productivityandreeferinfrastructure

Component	Current Status	Observations
Reefer Plugs	330	Expansion not needed in medium term
Backup Power	Generator	Intermittent blackouts remain a risk
Temperature Monitoring	Manual or Automatic	

Table15:Coldstorageandreefer electricalstatus

5.2.2 Pre-Trip Inspection and cold chain compliance

- PTI Availability:
- Cold Chain Compliance:

5.2.3 Availability of Controlled Atmosphere reefers

- Availability: Impact:

5.3 Practical Guidelines for Trial Shipments

Successful trial shipments of fresh produce from Angola require meticulous planning and coordination. Below are key components:

5.3.1 Documentation and Compliance

Requirement	Notes
Export License	Issued by The Ministry of Agriculture and Forestry and Ministry of Trade.
Phytosanitary Certificate	Mandatory for fresh produce exports.
Commercial Invoice & Packing List	Must detail temperature and packaging specifications.
Customs Declaration	Submitted via ASYCUDA system
Certificate of Origin	For trade preference under EU-Africa agreements

Table 16: Documentation and Compliance

5.3.2 Cold chain monitoring

- Use of real-time temperature and humidity loggers inside containers.
- Visual inspection and photographic documentation of container loading.
- Verification at PTI station before shipment.
- Monitoring during transit and must be connected to cloud platforms.
- 5.3.3 Coordination with shipping lines.
- Confirm reefer slot availability in advance.
- Secure CA reefer containers for sensitive produce, if available.
- Align with vessel schedules to minimize dwell time at port.
- Engage freight forwarders with experience in cold chain exports

5.4 Recommendations for Improving Export Logistics

5.4.1 Efficiency, lead times, cost reduction

To transform the CLP and Lobito Corridor into a competitive agro-logistics route, the following strategies are recommended:

Lead-Time Optimization

- Set up pre-cooling facilities at or near production areas to ensure produce enters the cold chain early.
- Implement direct rail dispatch systems from CLP to port with priority handling for perishables.
- Create a port-to-container yard booking system for reefer shipments. This is essential for streamlining cold chain logistics, especially in industries like fresh produce exports and pharmaceuticals.

Cost Reduction Measures

- **Support** shared cold storage infrastructure at key aggregation points.
- **Explore export incentives** or subsidies for trial shipments.
- **Promote** Public Private Partnerships (PPPs) for CA reefer procurement and pre-trip inspection centres.

Africa Global Logistics (AGL) has completed substantial improvement efforts at the Port of Lobito, and the facility is now fully operational, ready to handle and process an increasing volume of containerized cargo, including perishable exports. This breakthrough is more than simply a milestone for Angola's logistical infrastructure; it marks a watershed moment for the country's agricultural sector. The port's readiness removes a significant bottleneck and enables fast export activation, particularly for high-value agriculture items.

Angola's agriculture sector holds significant potential, supported by favourable climatic conditions, extensive arable land, and a strategic geographic location that offers direct access to European, Middle Eastern, and regional African markets. This potential is increasingly attracting interest from regional agri-investors and development partners, who view Angola as a prospective future food basket for the region. However, despite these comparative advantages, the sector remains largely underdeveloped. One of the primary challenges is the country's inadequate logistics infrastructure. Road conditions vary widely, while the western coastal regions have roads in fair condition that link major towns, infrastructure deteriorates markedly further inland, where many routes are in very poor condition and require substantial maintenance or reconstruction. In addition, the absence of reliable cold chain systems hampers the ability to maintain the quality of perishable goods from farm to market, limiting the sector's export competitiveness.

To maximize the potential of Angola's agriculture exports, specific investment and systemwide coordination are required. The first aim is to establish a strong cold chain infrastructure. This includes refrigerated storage and precooling facilities at inland logistics hubs like the Caála Logistical Platform (CLP), as well as the use of reefer vehicles and containers to ensure temperature control along the supply chain. Additionally, temperature monitoring systems will be required to preserve product integrity and meet international compliance standards.

It is equally important to build efficient and dependable inland transportation networks. The Lobito Corridor's rail infrastructure serves as a strategic backbone, but full advantage will be realized through integrated road-to-rail operations, dependable scheduling, and load consolidation measures. These procedures are required not simply to reduce costs, but also to ensure that product flows remain consistent and commercially viable.

The current situation also gives a great opportunity to begin testing shipments of agricultural produce from the CLP region via the Lobito Corridor. These trial runs can assess operational readiness throughout the logistics chain, test handling protocols, and show cold chain integrity. Successful execution will increase trust with international customers while also signalling to investors, logistics providers, and certifying organizations that Angola is ready to trade.

Unlike in the past, where planning was based on infrastructure that was still under construction, today's environment is determined by preparedness. The port is no longer a constraint, but an enabler. This shift in dynamics alters the nature of the opportunity: Angola no longer needs to wait for the ideal moment. The moment has arrived.

Finally, AGL's operating port facilities in Lobito provide Angola with a unique and urgent opportunity to boost its agricultural export business. To grasp it, focused inland investments in cold chain and logistics coordination must be expedited, and trial shipments must begin immediately. The convergence of market demand, port readiness, and increasing domestic manufacturing capability creates a unique and significant potential. If effectively utilized, it might usher in a new era for Angola's agriculture, one based on exports, value addition, and global competitiveness.

6. STAKEHOLDER ENGAGEMENT

6.1 Stakeholders Interviewed

We interviewed 38 key stakeholders and role players overall during the period of undertaking the study. The interviews were divided into early interviews prior to the field visit (pre field visit), meetings and interviews during the field visit and interviews and interviews and validation discussions post field visits. Most of the pre field visit interviews were conducted via the Microsoft TEAMS platform but a few were conducted via WhatsApp conference call due to network reception challenges or timing issues. (see appendix 8.2 for a full list of stakeholders interviewed)

6.2 Summary of Key Insights from Interviews and Field Visits

- There is a lot of enthusiasm and positive energy by all stakeholders and role players on the growth potential of the agricultural sector in Huambo;
- Everyone is excited about the possibilities that the CLP will bring to enhance the logistics chain in the province in general, but also for the logistics cold chain for fresh produce in particular;
- Many women and young people have taken up farming as a livelihood and are keen to grow the yield and overall output from their farms. They would also benefit greatly from learning improved and advanced farming methods if the appropriate support structures are put in place. The Pinduka Project is a shining example of what can be achieved by a group of small farmers with the right support and guidance;

> ***"learning improved and advanced farming methods if the appropriate support structures are put in place"***

- Smallholder and family farms can't afford quality seeds, fertilizer and farming equipment, so they farm with what they have at their disposable at the time of planting. This affects quality and size of crops at harvest time. As a consequence, income is often (but not always) insufficient to cover total costs of farming and make profits to invest in improving quality of production or upgrading the farm.

- Funding: the government of Angola, through various schemes, provides basic funding support to small -holder and family farmers mainly for the procurement of small farming equipment, seeds and fertilizer. Banks like BFA and Rabo Bank are looking into increasing their support and offerings to the agri-sector. The World Bank's (WB) Diversica Meis programme has made 130million USD available to fund logistics infrastructure for agricultural development in Angola. 100mn USD is earmarked for logistics infrastructure (last-mile roads, cold storage facilities and water infrastructure and 30million USD has been set aside human capital development;

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- Diversica Meis is a 5-year programme and the WB is concerned that it may not be able to disburse all the funds due to challenges with securing construction contractors to undertake projects in difficult to reach parts of the province of Huambo and throughout the country. The WB's preference would be to use local Angolan contractors to execute the works, but would consider using construction contractors from outside Anglo in the event that the Angolan contractors are hesitant to undertake work in difficult to reach areas or where the complexity of the work required may be beyond their abilities;

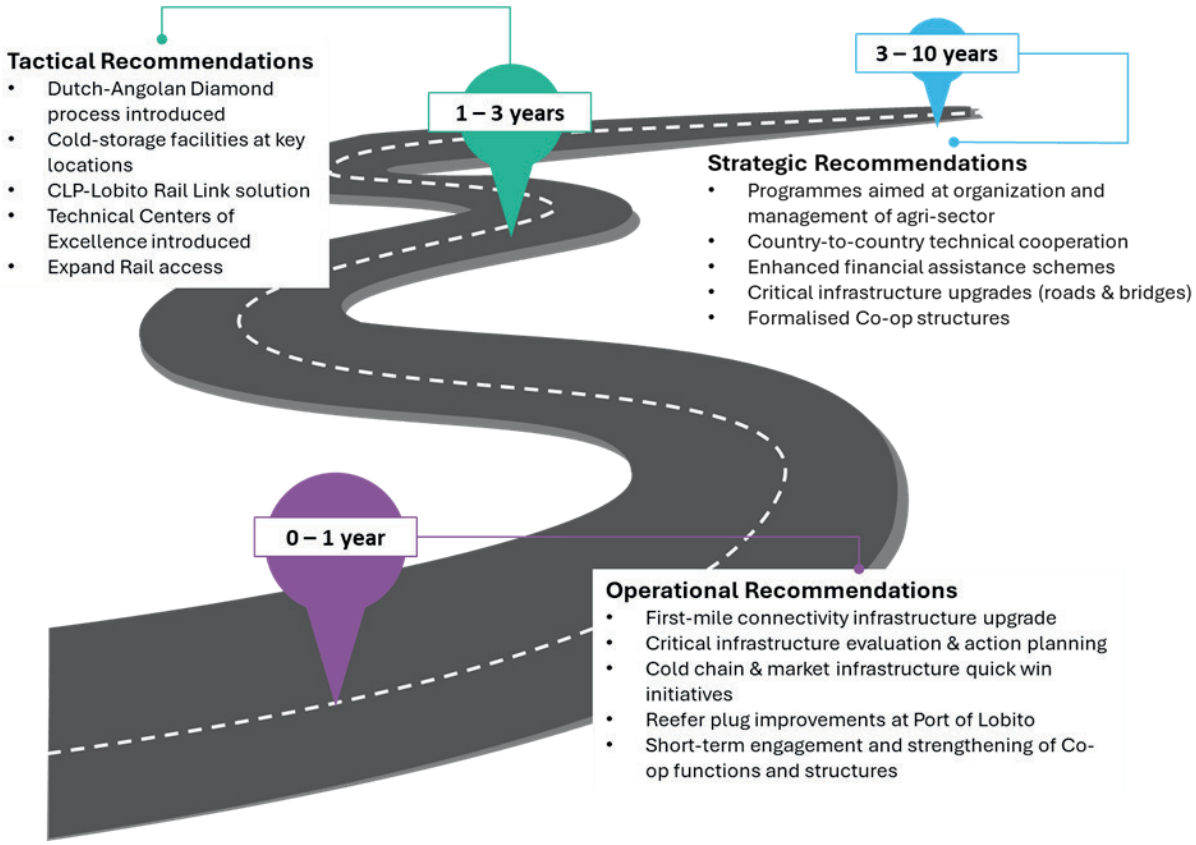
- The Angolan agricultural sector has been in decline for almost 50 years, since the beginning of the Civil War in 1975. Although there has been some improvement in the past decade or so, this has been marginal improvement. Much more needs to be done if the Angolan agricultural sector is to be restored to its former glory, at least to the point where the Angolan farmers can ensure food security for the citizens of Angola for most crops;

- Revitalization of the Angolan agricultural sector, starting with the province of Huambo, will probably take at least twenty years. However, considerable advancements can be made within the next 5-10 years – if all stakeholders and role players rally behind one clear strategy and all critical issues receive the necessary attention towards resolution;

- Critical issues and challenges uncovered and observed:
    - There is broad alignment on the National Plan for Agricultural Development across Public (national, provincial and local governments, agencies and authorities) and Private (banks, cooperatives, farmers, logistics providers, wholesalers) sectors. However, this alignment seems to only exist at a superficial level and lacks coherence across public and private stakeholders to enable consistent and sustained execution of the National Agricultural Development Plan;
    - Inasmuch as there is some funding support to the farming community, this is not nearly enough to assist with the revitalization of the sector. A LOT more funding must go into the system to support farmers or else turnaround of Angola's agricultural sector will be a pipe dream at worst. At best, revitalization may take many decades, if it realizes at all, at the current pace of activity;
    - Smallholder and family farmers do not have land tenure or title deeds to the land on which they are farming. Long-term sustainable farming, growth and improvement in farming methods is impossible to achieve if farmers do not have the right incentives and support to take the risks required to move beyond subsistence and cash-crop farming;
    - Commercial farmers can 'go it alone', but also only up to a point before farming becomes an unviable undertaking and their financial resources can be put to better use in other non-farming commercial endeavours; On the transport infrastructure side, there is the good, the okay and the ugly:
        - The Good: The Lobito Railway Corridor (railway and bulk and container port terminals) are good and have ample capacity to absorb growth of traffic in the short term. Certain planning will be required for the medium term to procure more wagons to serve the agricultural sector, but this is just part of standard planning and is not a built-in constraint on the system;
        - The Okay: Road truck capacity seems to be sufficient for now but can easily grow as farming output increases. Temporary cold storage facilities can be erected in appropriate locations to preserve the freshness of fresh produce for longer. This can be complimentary to longer-term and permanent cold storage solutions such as is planned by the CLP;
        - The Ugly: The road network across national, provincial and rural/periurban roads are in poor to very poor condition overall and can simply not support efficient, reliable and cost-effective road transport operations and logistics. First and last-mile roads connecting farms to main road networks are in a shocking condition. Due to so many rivers, streams and waterways across the province of Huambo, robust and well-engineered (not necessarily expensive) bridges are essential to enable smooth flow of road transport throughout the province and also to other provinces like Benguela to the port of Lobito. The bridges are also in a very poor condition and oftentimes non-existent at the right locations, requiring long detours to safely reconnect to roads on the other side;

7. STRATEGIC RECOMMENDATIONS

These recommendations are based on desktop research, stakeholder consultations, previous studies, and country comparisons. In cases where local data is limited, we have applied global benchmarks and analogous evidence. As new local data becomes available, especially at Tactical and Operational levels, some adjustments may be necessary. Strategic, Tactical, and Operational levels generally correspond to long-term (3-10 years), medium-term (1-3 years), and short-term (0-12 months) implementation horizons, although some exceptions exist depending on the urgency.



I. **Strategic Recommendations (Implementation: 3–10 years) Rationale:**

Angola has experienced nearly five decades of decline in agriculture. While there are promising initiatives (e.g. farm schools, some financial support via FADA), major gaps remain in farm-level capacity, farmer education, infrastructure (roads and cold-chain), and logistics. To accomplish the following objectives sustainably requires robust, long-term action:

1. Produce sufficient quantities of all basic and major crop types that can be grown in Angola to satisfy domestic demand (thus significantly reducing food imports and alleviating food insecurity).
2. Generate surplus production for export to regional and global markets by raising crop yield per hectare and improving quality.
3. Develop efficient transport and logistics infrastructure (including cold-chain) to move fresh produce cost-effectively to domestic and export markets.

These objectives cannot be met at scale in fewer than 10-20 years without sustained political will, financial commitment, and coordinated action. Many other countries' agricultural turnaround programmes require at least this period under similar starting conditions.

Strategic Actions

1. **Strengthen sector organisation and smallholder/family farm management**
   Proposed Action Steps:
   - **a.** Relevant Angolan Ministries, including ARCCLA, via internal team or consultants, will design programmes to organise and improve management among producers—especially smallholder and family farms—through cooperatives and industry associations.
   - **b.** Drive implementation via existing successful models (e.g., Projek Pinduka), adapting them to local conditions.
   - **c.** Secure funding from FADA, World Bank, commercial banks, and use Public-Private Partnerships where suitable.
   - **d.** Establish a Steering Committee for oversight of budgets and implementation.
   - **e.** Deploy a robust tracking and monitoring system to measure progress and adjust interventions as required.

2. **Strengthen sector organisation and smallholder/family farm management**
   Proposed Action Steps:
   - **a.** The relevant Ministry in the GoA will initiate outreach to countries with advanced agricultural sectors and other technical capabilities (e.g., The Netherlands, Brazil, Portugal, South Africa) to forge technical cooperation.
   - **b.** Form joint technical teams (government and private sector) to define areas of cooperation and draft agreements for ministerial approval.
   - **c.** Include oversight, funding, and monitoring in agreements and also define clear roles and escalation paths in the event of disputes at workstream level.

3. **Enhance farmer financial assistance schemes**
   Proposed Action Steps:
   - **a.** Relevant Angolan Ministry, ARCCLA, or EKN to commission a consultant to assess current funding schemes and international models, to identify models suited to Angola.
   - **b.** Simultaneously, review and strengthen existing mechanisms by public and private sector actors to increase the speed, reach, and quantum of funding available.
   - **c.** Include liability insurance for crops against natural disasters or disease as part of financial support packages, as this is a critical issue for the economic survival of farmers.

4. **Accelerate rehabilitation and construction of roads and bridges, on the back of the recently announced USD82 mn road upgrade programme in Huambo, which covers 200km of roads**
   Proposed Action Steps:
   - **a.** Relevant Ministry, ARCCLA, or EKN to commission an engineering and economic study (with university or consultant support) to map the full road and bridge network (almost 5000 km within the 150km zone from the CLP, 1,817 km of which is within the province of Huambo), identify urgent bottlenecks, and prepare business cases based on cost-benefit analysis. See the map below.
   - **b.** Particular attention should be given to roads connecting farms to main roads (first-mile farm connectivity), as this is where the weakest link in the chain is and where most time is lost. This is therefore the area where the most efficiencies can be gained in the logistics system if these roads are rehabilitated or upgraded
   - **c.** GoA, via ARCCLA, to establish a Programme Management Office (PMO) to manage implementation and sequencing.
   - **d.** The capacity of the PMO can be enhanced by contracting in consultants as and when required and/or to draw in specialised expertise.

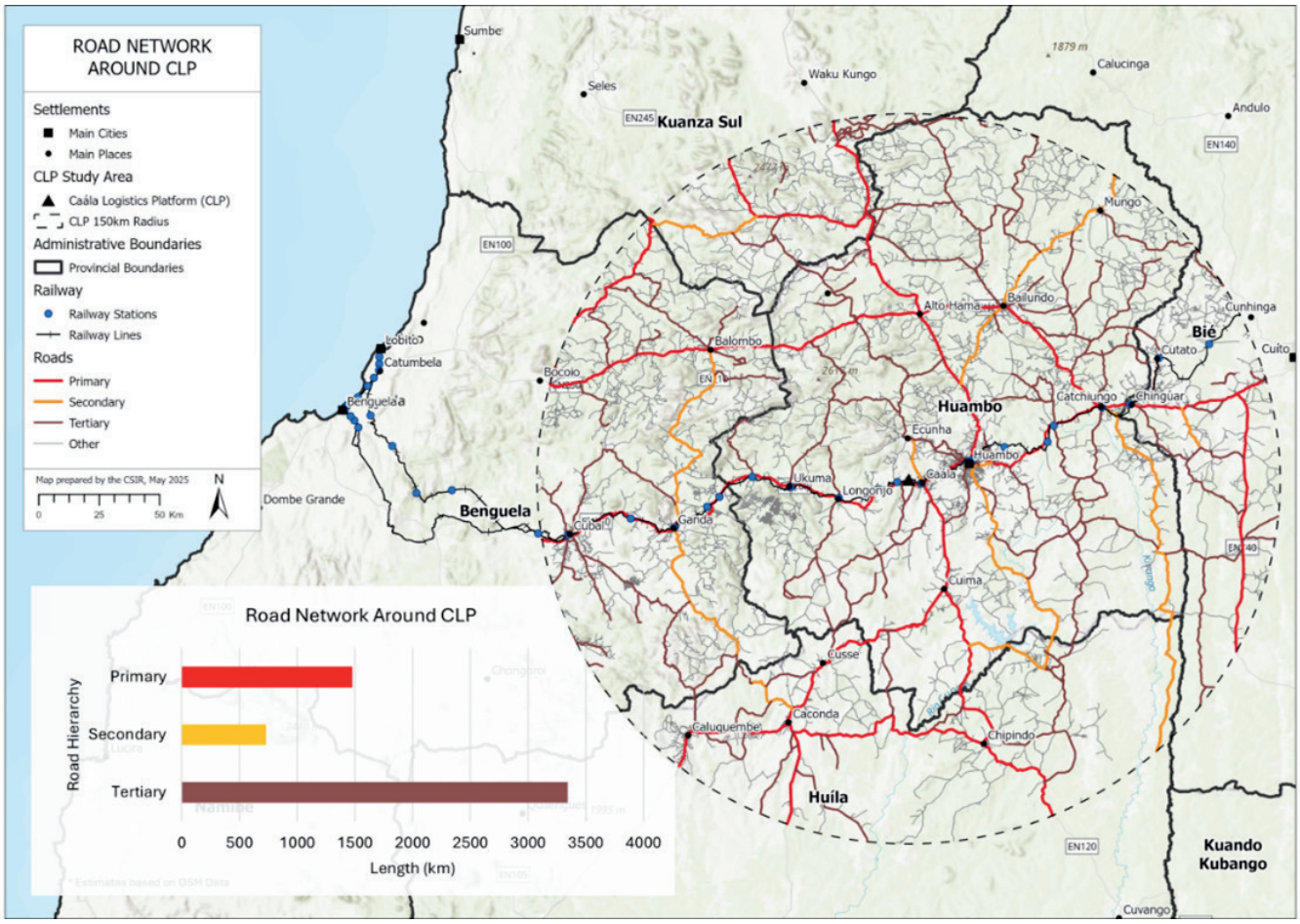


Figure 34: Route Simulation from selected Farms to CLP.

(Primary/national roads used are considered in this study. Other simulations may yield shorter routes based on secondary/tertiary roads; however, the overarching assumption used was that primary roads are of a higher quality.

5. **Develop a multi-decade Agricultural Sector Development Plan**
   Proposed Action Steps:

   a. The relevant Ministry to issue an RFP for development economists to extend the existing plans into a strategy covering several decades, broken into 5-year plans with specific, measurable goals.

6. **Reform land tenure and ownership to secure investment**
   Proposed Action Steps:

   a. The relevant ministry within the Government of Angola should lead land tenure reform, clarifying rights either through formal titles or long-term leases.

   b. Review international case studies (e.g., in Rwanda, Ethiopia, South Africa and others) to guide the model for tenure reform and its implementation.

7. **Mobilise international finance and development partners**
Proposed Action Steps:

a. Engage with the World Bank, donor agencies, and development banks to increase financing, particularly for longer road segments and logistic corridor improvements.
b. Propose inclusion of road/bridge rehabilitation projects in broader investment frameworks and trade logistics corridors (e.g., Lobito Corridor).

8. **Formalise cooperative structures and increase farmer representation**
Proposed Action Steps:

a. Develop a Best Practice Framework for the establishment and management of agricultural Cooperatives, with transparent governance, accountability, and performance metrics.
b. Establish official criteria for Cooperative registration and oversight.
c. Use Cooperatives to improve access to inputs, funding, and other resources through networked channels.

9. **Explore and adopt non-conventional / innovative financing models**
Proposed Action Steps:

a. Ministries of Finance and/or Planning, Urban Development and Housing to define a framework to increase non-conventional options (impact finance, blended finance, agribusiness venture funds).
b. Issue Expressions of Interest to private sector partners for proposals of viable models.
c. Use pilot projects (e.g., via Diversifica Mais) to test niche financing schemes.

10. **Ensure strategic goal alignment and plan continuity**
Proposed Action Steps:

a. Use the PMO (from Road/Bridge strategy) or another high-level coordinating body to support the government in maintaining alignment between national strategies and local-level realities.
b. Regularly update strategy documents, ensuring that on-the-ground challenges (e.g. logistics, infrastructure, climate) feed into strategic planning.

II. Tactical Recommendations (Implementation: 1–3 years)

Rationale:

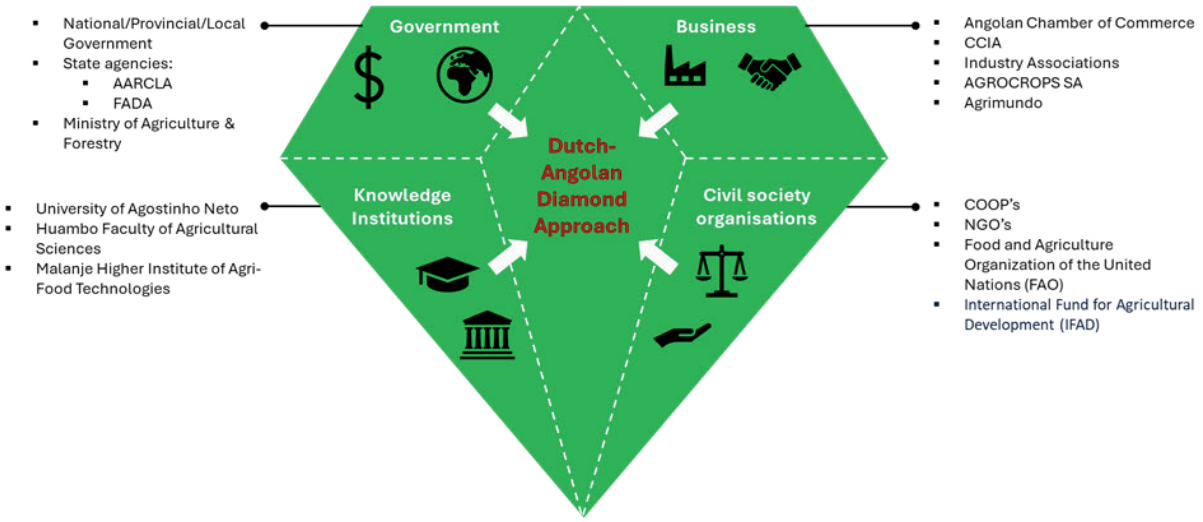
There is strong stakeholder interest and momentum in Angola, particularly in Huambo. However, progress is hampered by a lack of coordination, weak execution, and fragmented initiatives. Tactical interventions are necessary to harness existing energy, align stakeholders, and build capacity, particularly in infrastructure, markets, and technology.

1. **Launch a "Angola–Huambo Stakeholder Alignment Process" (Dutch-Angolan Diamond model)**

   Proposed Action Steps:

   a. EKN to convene stakeholders (public, private, knowledge institutions, civil society) to engage on and adopt a coherent plan of action with clear roles and responsibilities.

   b. Establish a Steering Committee and Task Teams / Workstreams to deliver various components of the plan.



Dutch-Angolan Diamond model

2. **Construct cold-storage hubs at key locations**

   Proposed Action Steps:

   a. Confirm site viability for the already-identified hubs (Catchiungo, outside Bailundo, and Caála) via business cases covering design options, technology, and economic viability.

   b. Secure funding via FADA, World Bank, or PPPs, and procure operators if needed.

   c. Use updated road, farm output, and accessibility data to identify additional hubs within ~150 km of the CLP.

3. **Design an optimal rail link from CLP to the Lobito Railway**

   Proposed Action Steps:

   a. Complete optioneering work and cost estimates for rail alignment, civil works, and connection points.

   b. Hold stakeholder workshops to share findings, secure buy-in, and agree on a funding model and execution plans.

4. **Establish Technical Centres of Excellence (CoEs) for agronomy and technical training**

Proposed Action Steps:

a. The relevant Ministry to drive a process to find partners (domestic or international) to assist in setting up CoEs.

b. Ensure CoEs are integrated into cooperatives or co-governed with smallholder representation.

c. Define audit and compliance requirements to ensure quality and consistency across all CoEs.

5. **Replicate high-performing farm organisation models (e.g. Pinduka Project)**

Proposed Action Steps:

a. Ministry of Agriculture and Fisheries or Provincial Director of Agriculture in Humabo to conduct an in-depth analysis of what drives success in the Pinduka model.

b. Apply those success factors in strengthening cooperatives across Huambo and similar areas.

6. **Invest in cold-chain transport assets (e.g. reefer wagons) based on demand forecasts**

Proposed Action Steps:

a. Relevant ministry in GoA, with the support of the National Institute of Statistics, to develop detailed demand forecasts for export and domestic reefer needs.

b. Engage relevant transport and logistics companies and funding partners to procure operating fleets as per demand forecasts.

7. **Study value-addition opportunities for key crops**

Proposed Action Steps:

a. Ministry of Agriculture and Fisheries to commission a value-addition study to identify crops with high export potential (e.g. for gluten-free maize, pulp, etc.).

8. **Expand and improve rail access and freight efficiency for refrigerated container services (forward-looking as the market grows)**

Proposed Action Steps:

a. Improve reliability, frequency, and capacity of freight (especially reefer) services.

b. Ensure supporting infrastructure is in place: locomotives, wagons, crew, slots.

c. ARCCLA and CLP management to develop a coordinated funding and procurement plan among public and private partners.

III. Operational Recommendations (Implementation: 0–12 months)
Rationale:

These are high-impact, doable actions that can quickly yield improvements in farm-level efficiency, logistics, and market readiness.

Operational Actions

1. **Improve first-mile farm connectivity**
Proposed Action Steps:

- **a.** leverage Diverisca Mais funding to construct concrete or compacted gravel "cart-paths" between farms and main roads for small-holder and family-run farms.
- **b.** Repair/improve road shoulders and access points for small-holder and family farms.
- **C.** Select pilot clusters using the following criteria: farm-road access, crop volumes, loss-mitigation potential.

2. **Strengthen cold-chain infrastructure and market aggregation**
Proposed Action Steps:

- **a.** Beyond pre-cooling facilities specified in the Route Simulation Maps (presented below), identify other key areas to construct low-cost storage facilities; assess technology options, location, and maintenance constraints.
- **b.** Formalise the existing informal market at Caála into an agro-hub with cold rooms, business facilities, banking kiosks, and SME stalls.
- **C.** EKN to commission work to identify other aggregation nodes: Identify 3–4 additional nodes, each serving 5–15 farmers, strategically positioned on feeder roads to rapidly build on to the already identified roads and bridges in this study.

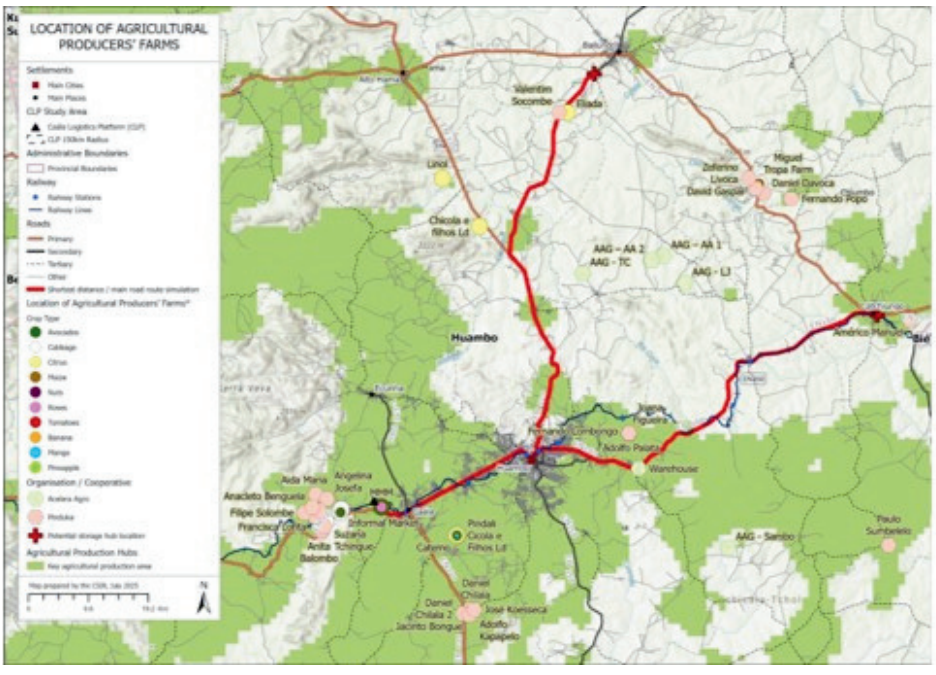


Figure 36: Location of agricultural producers' farms, showing proposed sites for storage locations

3. **Conduct route simulations, site analyses, and feasibility studies**
   Proposed Action Steps:
   - **a.** Ministry of Planning, Housing and Urban Development to map all local roads in Huambo and assess their condition via engineering surveys.
   - **b.** Perform route simulations to optimise aggregation hubs and cold storage facility placement.
   - **c.** Issue RFPs for consultants where needed and make use of the local university's Engineering Department.

4. **Monitor and manage port corridor logistics (Lobito & Luanda)**
   Proposed Action Steps:
   - **a.** Establish a Logistics Forum / Corridor Task Force including all value-chain actors (CLP, LAR, AGL, exporters, ports, transporters, etc.).
   - **b.** Monitor usage rates (e.g. reefer plug-points); define trigger points (e.g. 70% utilisation) for expanding capacity.
   - **c.** Conduct route-mapping every 6 months to identify bottlenecks from farms to markets and ports.

5. **Enhance Cooperative governance and market information**
   Proposed Action Steps:
   - **a.** Relevant Ministry to establish a digital knowledge and information sharing platform to broadcast market prices, seasonal data, and best practices for the farming community and agricultural sector.
   - **b.** Ministry of Agriculture and Fisheries, supported by ARCCLA, to develop and roll out a governance framework for Cooperatives (board structures, financial transparency, record-keeping) based on global best practice.

IV. Implementation Domains & Principles

For successful execution, all recommendations require alignment across four domains:

1. Infrastructure development (roads, bridges, cold-chain, transport assets).
2. Cold-chain strengthening (storage, aggregation, transport).
3. Legislative & institutional transformation (land tenure, cooperatives, government policies and strategies).
4. Private sector collaboration and partnership (finance, technical cooperation, market actors).

The Caála Logistical Platform (CLP) can become a regional agri-logistics hub linking Angola's central highlands to domestic and export markets via the Lobito Corridor—but only provided these domains receive focused investment, coordinated pilots, and high-level alignment by public and private actors.

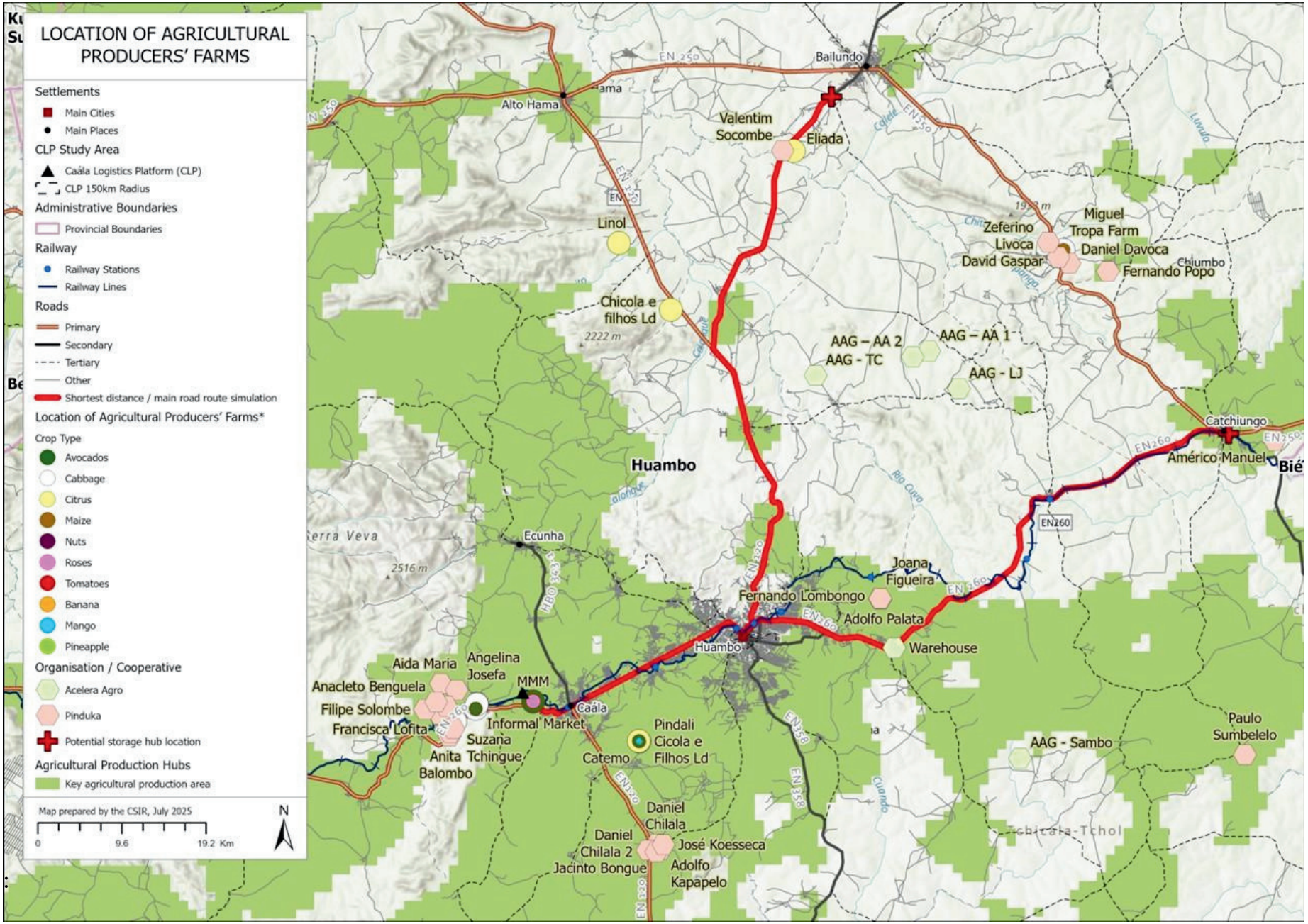


Figure 31: Simulated routes between potential storage hubs and current farms

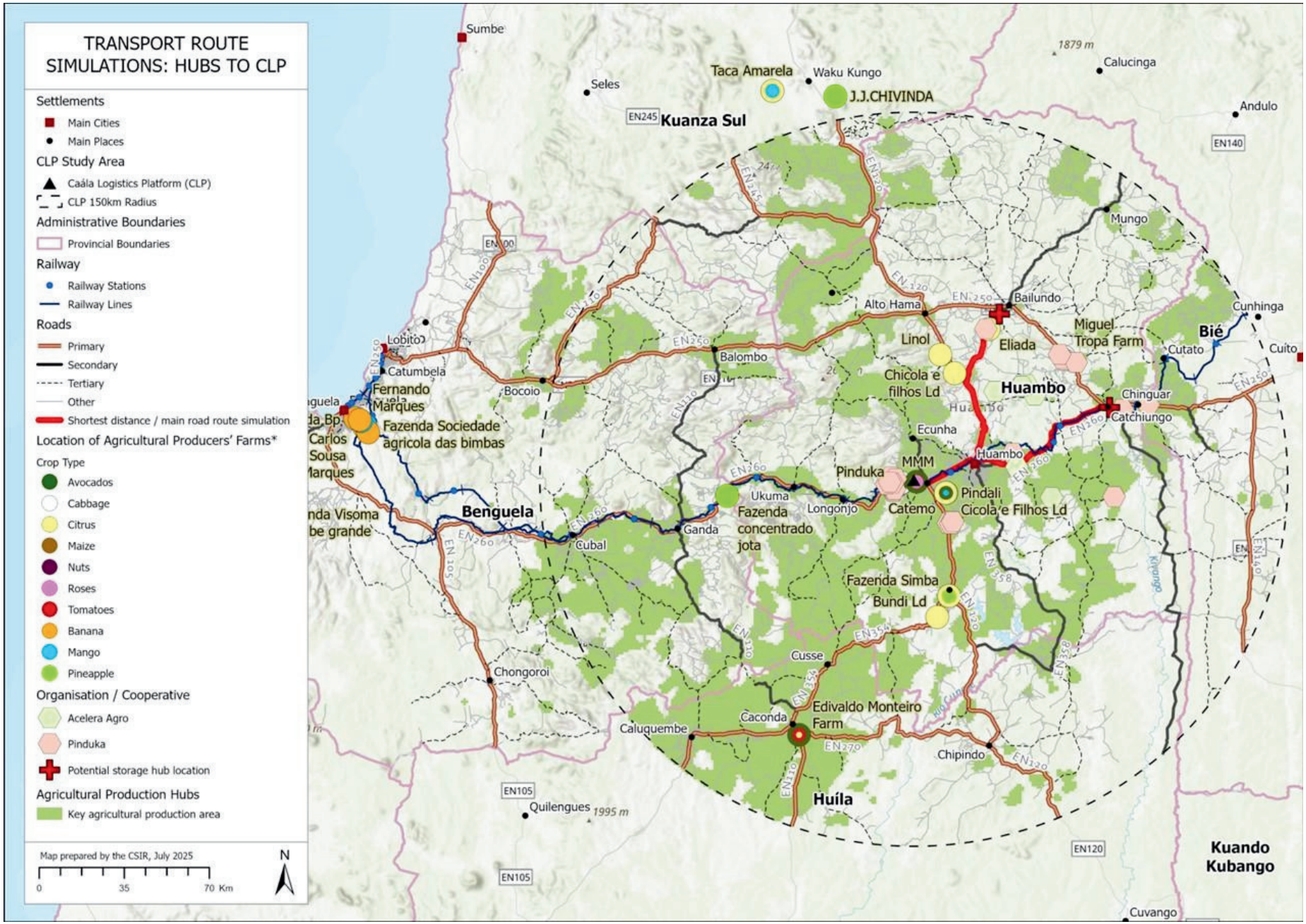


Figure 32: Simulated routes between potential storage hubs and the CLP

8. GLOBAL BENCHMARKS & COMPARATIVE OVERVIEW

Global benchmarking through case-studies are important in providing the Angolan sector with critical data, best practices and insight into development, policy, improvement levers and critical enablers that may have been utilised in other countries.

a. Peru – Citrus (and Avocado)

- Cold-chain maturity: Peru's cold storage capacity is robust, e.g. Port of Paita (~1,900 reefer plugs, 143,000 m²) (mordorintelligence.com).
- Technology integration: Realtime temperature tracking, energy efficient refrigeration, digital inventory management—near developed market standards (mordorintelligence.com).
- Market alignment: Seamless compliance with EU SPS rules and phytosanitary regimes, including traceability protocols.

Strengths of the system: Worldclass infrastructure, high reliability, strong transparency. Issues to consider: Heavy CAPEX/OPEX, but economies of scale offset costs.

"Worldclass infrastructure, high reliability, strong transparency."

b. Kenya – Avocado

- Volume: 3,000–4,000 reefer containers/year, mainly to the EU;
- Challenges: Recent Red Sea route disruptions raised transit times (up to ~40 days), ECAs (controlled atmosphere containers) max out at ~50-day protection; increased spoilage risk and rejection rates (~15–20% reported). Freight cost doubled (~USD 1,500→3,000) (freshproducemea.com).
- Infrastructure gaps: Rural pre-cooling is limited; smallholder aggregation lacks traceability; road/port inefficiencies exist (freshproducemea.com).
- Responses:
  - Rail and dry-port projects (e.g., Naivash-Mombasa).
  - Cold-chain investments near farms and packhouses.
  - Value-add pivot: oil/granules/pulp processing growing rapidly—with ~30 oil processors by 2024 to buffer market impact.

c. Rwanda – Avocado Pilot Initiatives

- Reefer container sea trials to Rotterdam, Dubai (23–24 t shipments) (idhsustainabletrade.com).
- Tech used: Active controlled-atmosphere cooling, GPS traceability, advanced packaging, NIR maturity testing, container sensors (idhsustainabletrade.com).
- Outcomes: Lower losses, added farm revenue, reduced carbon footprint (~90%) (idhsustainabletrade.com).
- Weak points: Cold-chain from farm to packhouse limited; scaling to smallholder levels remains a challenge.

d. South Africa – Citrus under EU SPS Regulations

- EU rules (0°C to –1°C for ≥16 days) to combat pests like False Codling Moth introduced in July 2022 (newyorker.com, researchgate.net).
- Economic impact: Compliance cost ~R3 billion in 2020; small-scale growers struggle without subsidies (researchgate.net).
- Response: Industry-level investment in cold treatment and centralized packhouses; support via Citrus Growers Association and DBSA.

e. India – Policy-led Cold-Chain Scaling (Citrus, Horticulture)

- NCCD (established 2012) drives national coordination, subsidies, training, and energy efficient tech adoption (researchgate.net, en.wikipedia.org).
- Still, <5 % of produce is precooled/cold chained related—losses hitting USD 8–15 billion annually (en.wikipedia.org).
- Potential: Public-private coordination, renewable powered rural packhouses shows promise to scale.

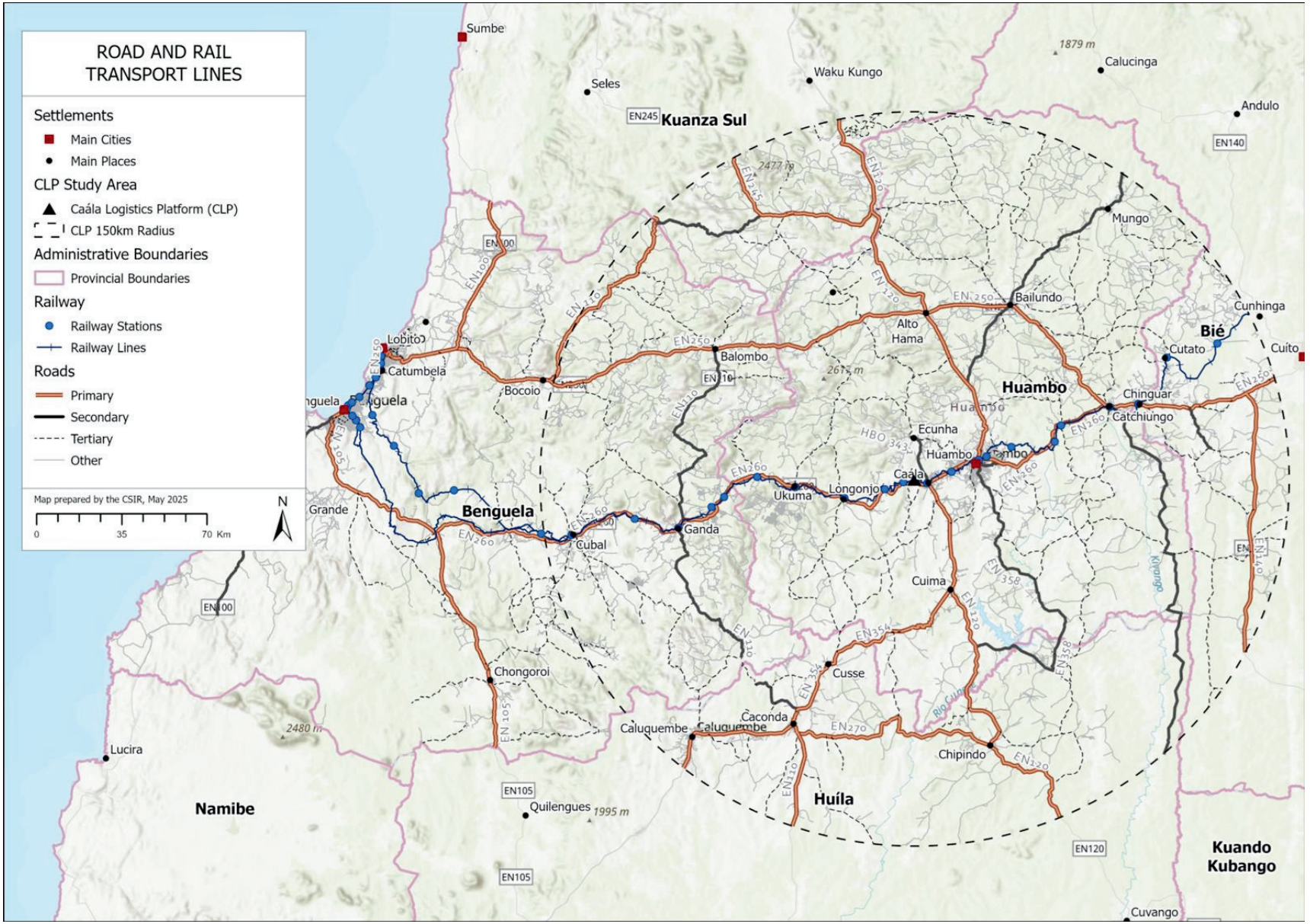
Cross-Country Comparative Analysis

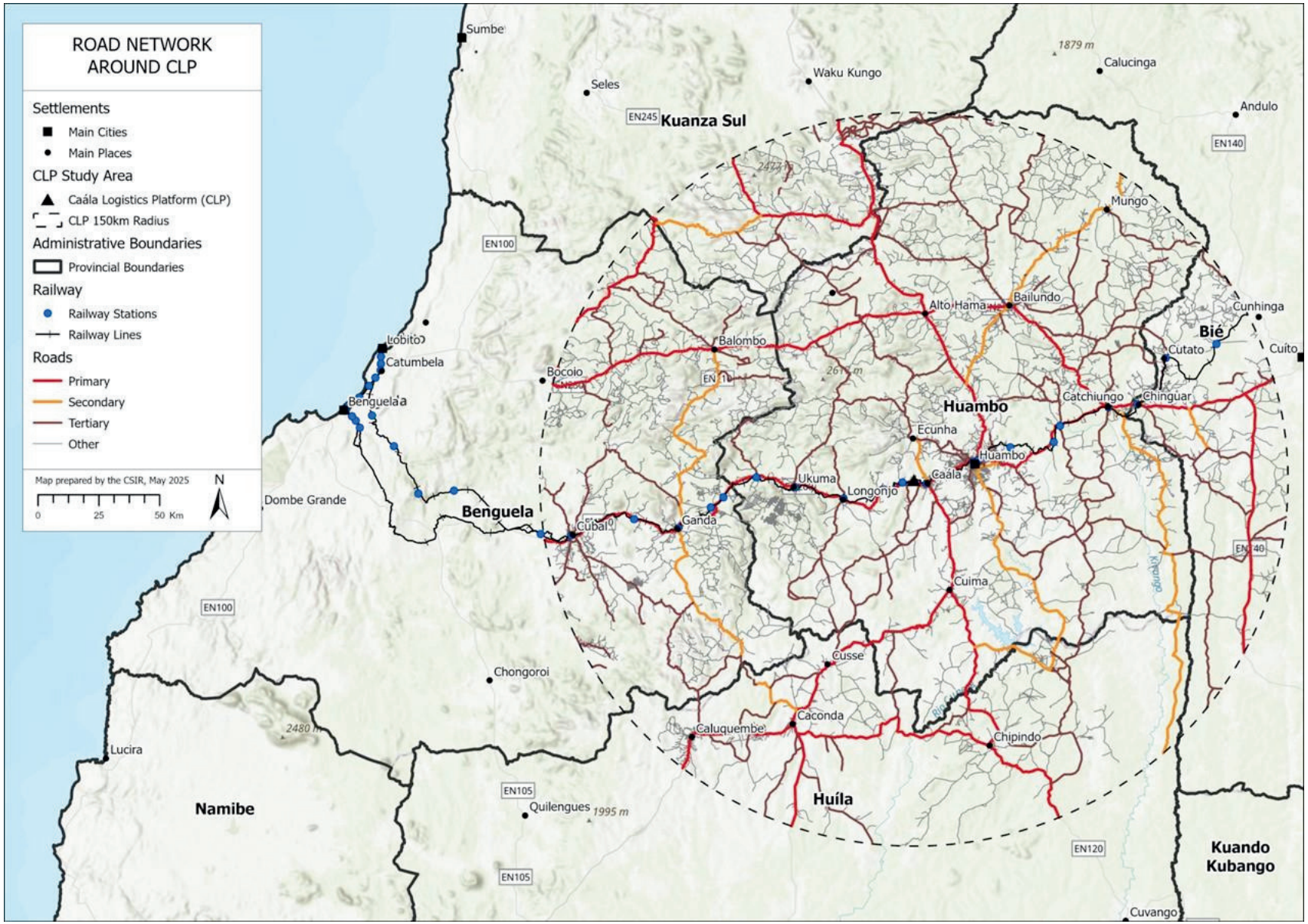
Dimension	Peru (citrus/avocado)	Kenya (avocado)	Rwanda (pilot)	South Africa (citrus)	India (emerging)
Infrastructure	High, port centric, tech-rich	Growing, gaps rural supply chain	Pilot coastal via reefer	Medium, centralized packhouses	Policy networks, urban focus
Transit Times	14–21 days via sea	30–40 days due to Red Sea rerouting	30 days CA sea	16 days cold treatment	Internal delays, lack pre-cooling
Smallholder Inclusion	Some schemes, mostly large exporters	Weak due to scale/capacity	Pilot focuses farmers	High standardization hurdles	Policy enabled PPP programs
Tech & Traceability	End-to-end IoT, CA, digital	CA, some cold tech, limited traceability	CA containers, GPS, pack tech	Cold treatment only	Training, NCCD standards
Economic Viability	Scale economies viable	High OPEX, still profitable with subsidies	Pilot ROI positive	Compliant but costly	Long-term savings expected

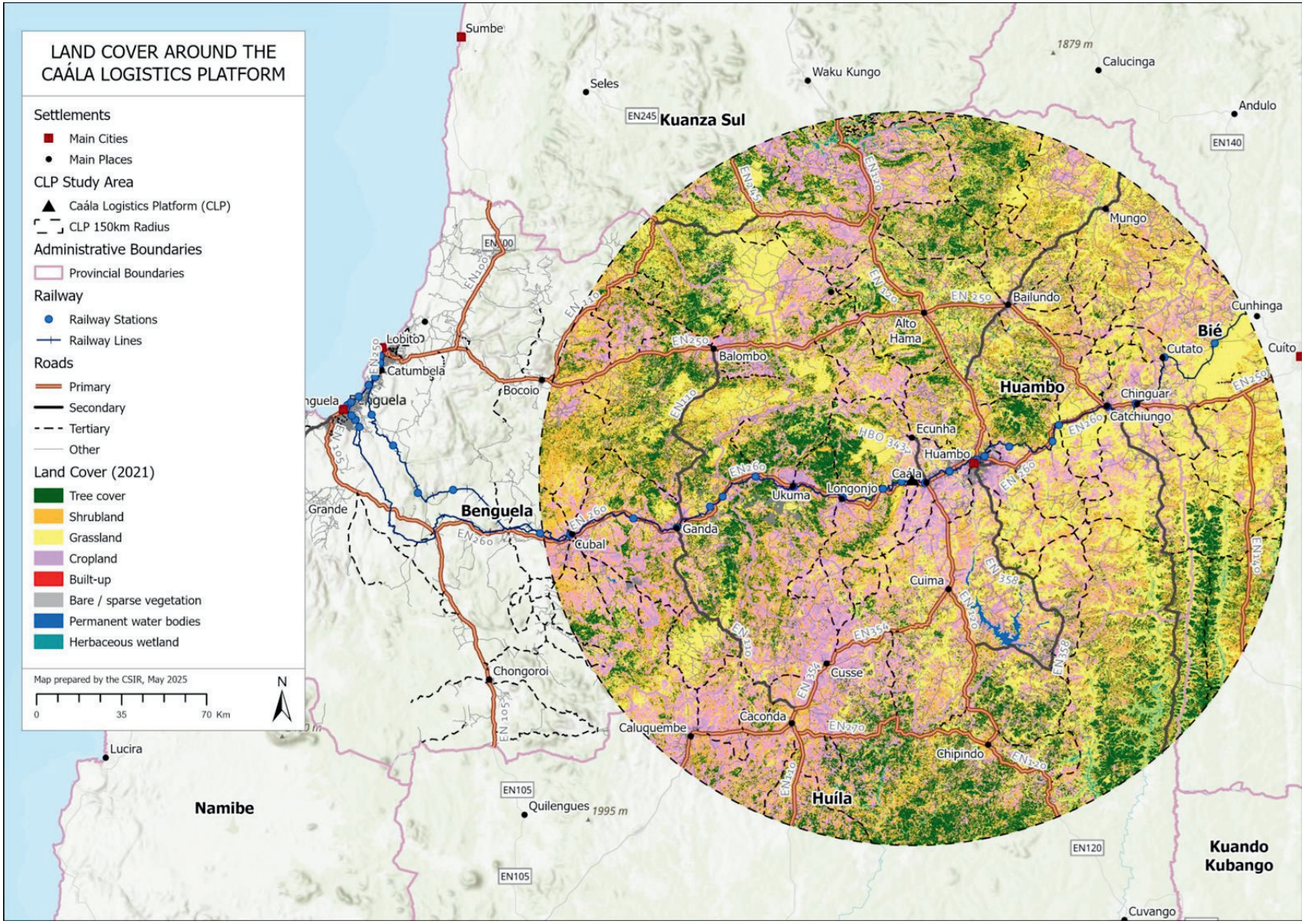
Table 17: Cross-country comparative Analysis

9. APPENDICES

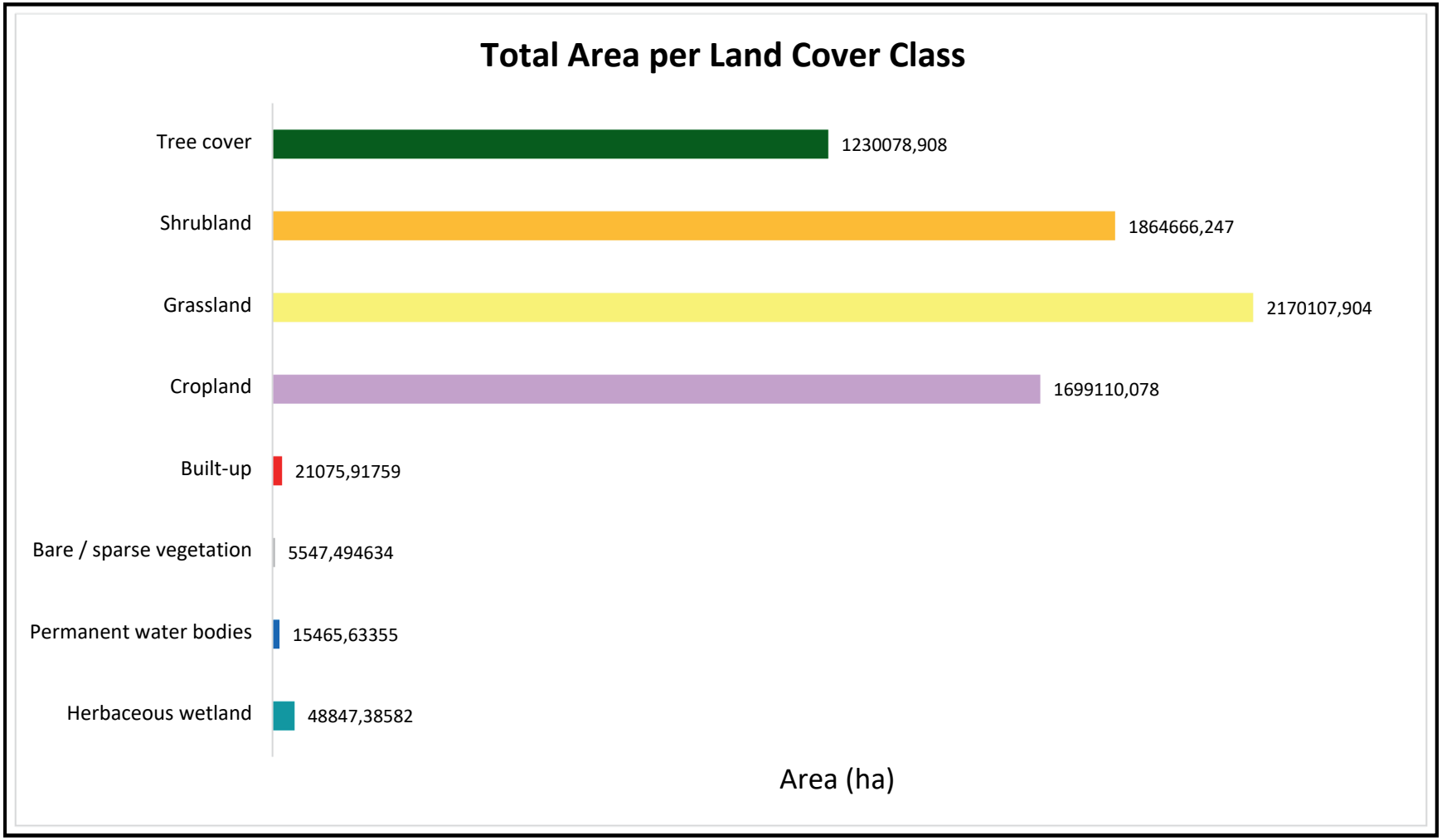
9.1 Maps of Production Hubs and Transport Routes




ROAD NETWORK
AROUND CLP
Settlements
Main Cities
Main Places
CLP Study Area
Caála Logistics Platform (CLP)
CLP 150km Radius
Administrative Boundaries
Provincial Boundaries
Railway
Railway Stations
Railway Lines
Roads
Primary
Secondary
Tertiary
Other
Map prepared by the CSIR, May 2025
0
25
50 Km
N
Sumbe
Seles
Waku Kungo
Calucinga
Andulo
Kuanza Sul
EN245
EN140
EN100
Mungo
Alto Hama
Bailundo
Cunhinga
Bié
Cutato
Cuito
Balombo
Bocoio
Lobito
Catumbela
Benguela
Huambo
Catchiungo
Chinguar
Ecunha
Ukuma
Longonjo
Caála
Dombe Grande
Benguela
Cubal
Ganda
Cuima
Chongoroi
Cusse
Caconda
Caluquembe
Chipindo
Lucira
Namibe
Quilengues
1995 m
Huíla
EN105
EN120
Kuando
Kubango
Cuvango
1879 m
2480 m



This map shows the cropland area in hectares, based on the ESA2021 WorldCover data. This data was used as an input to downscale agricultural production estimates at a more granular level.

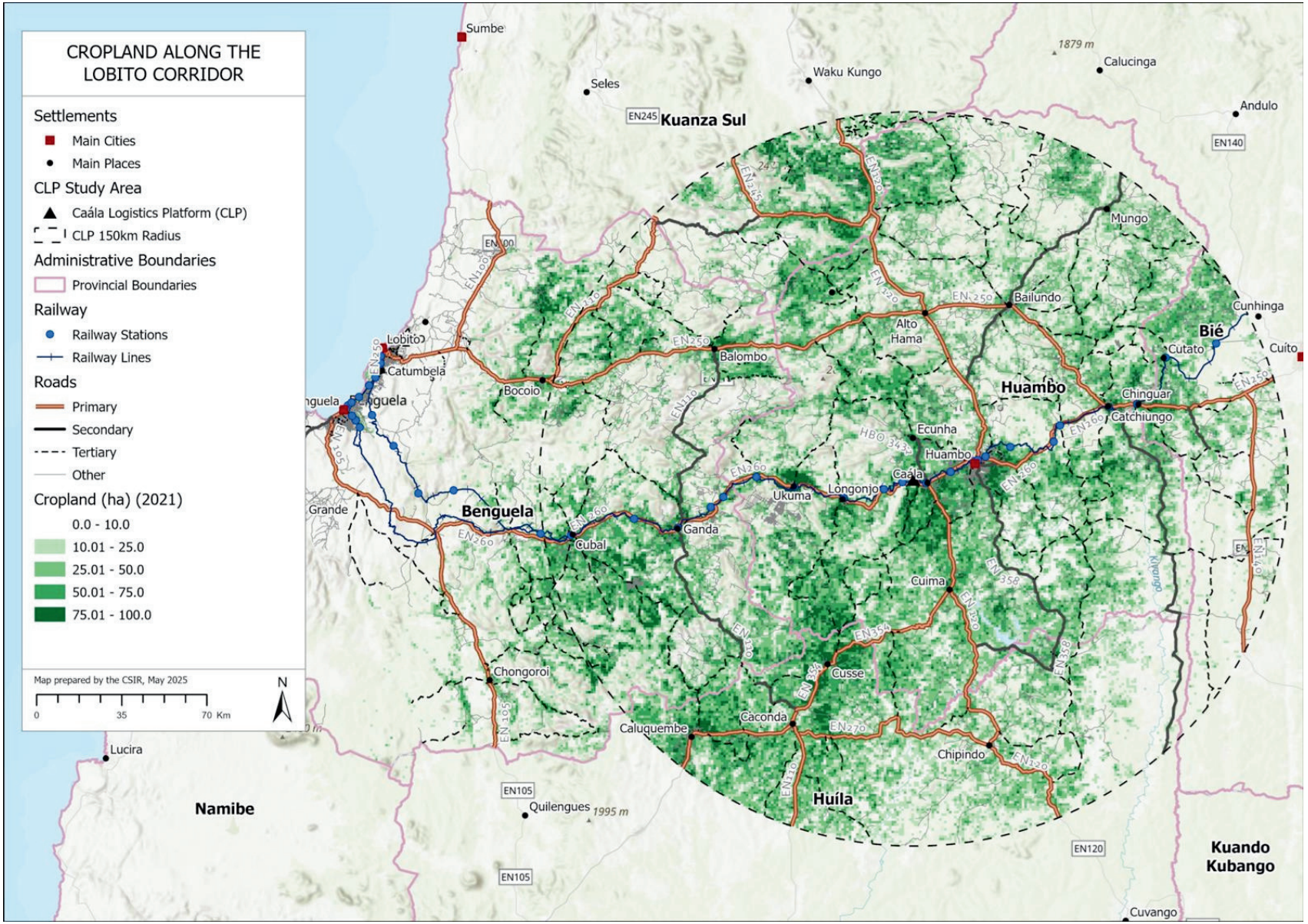


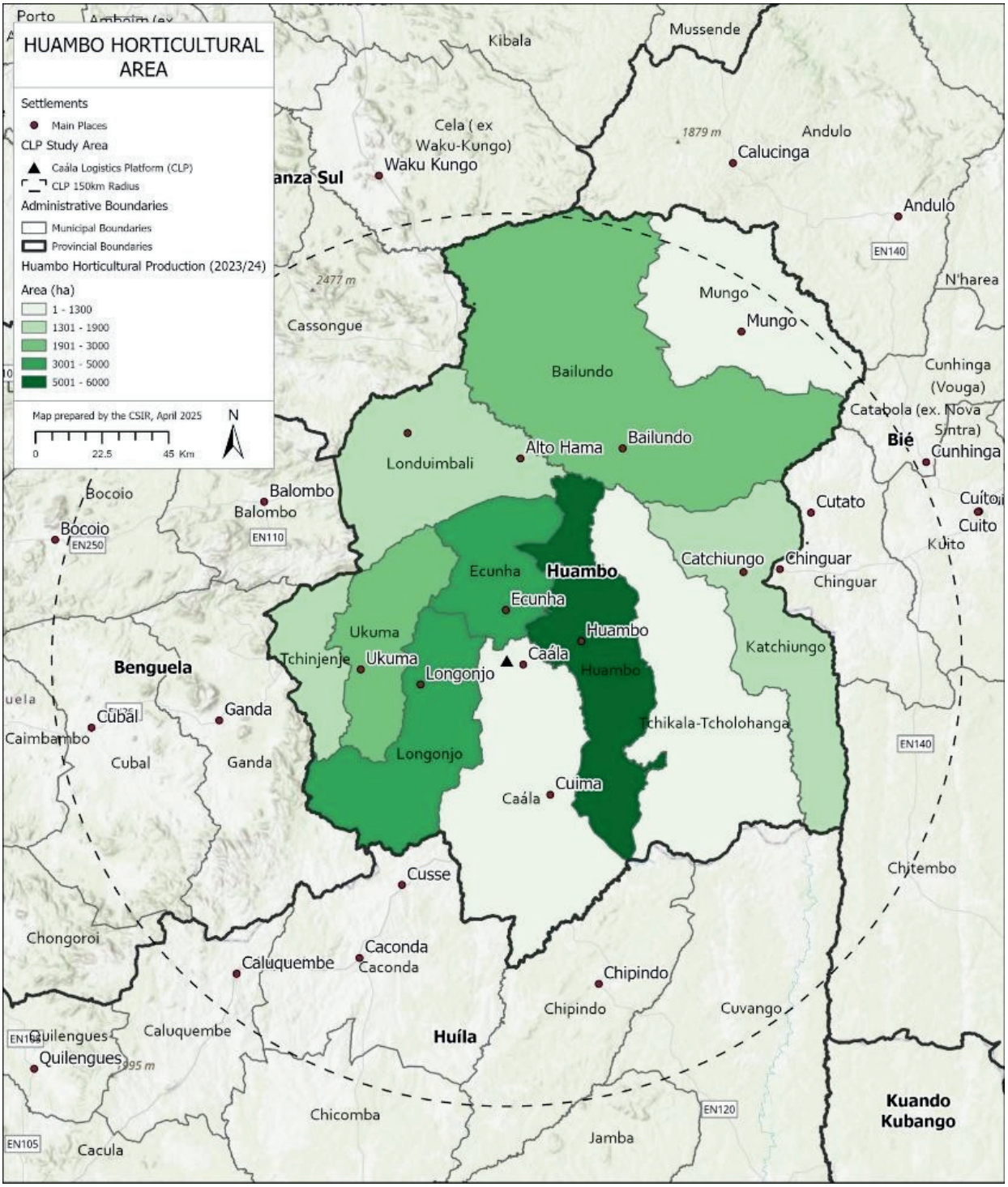
This map displays the land cover surrounding the CLP, derived from the European Space Agency (ESA) WorldCover 10m v200 (2021) dataset. The 2021 WorldCover data, released on October 28, 2022, achieved a global accuracy of 76.7%. The global dataset includes 11 landcover classes, though for the 150 km buffer area around the CLP, only 8 of these classes are represented.

Cropland is represented in pink and is defined as: “Land covered with annual cropland that is sown/planted and harvestable at least once within the 12 months after the sowing/planting date. The annual cropland produces an herbaceous cover and is sometimes combined with some tree or woody vegetation. Note that perennial woody crops will be classified as the appropriate tree cover or shrub land cover type. Greenhouses are considered as built-up.”

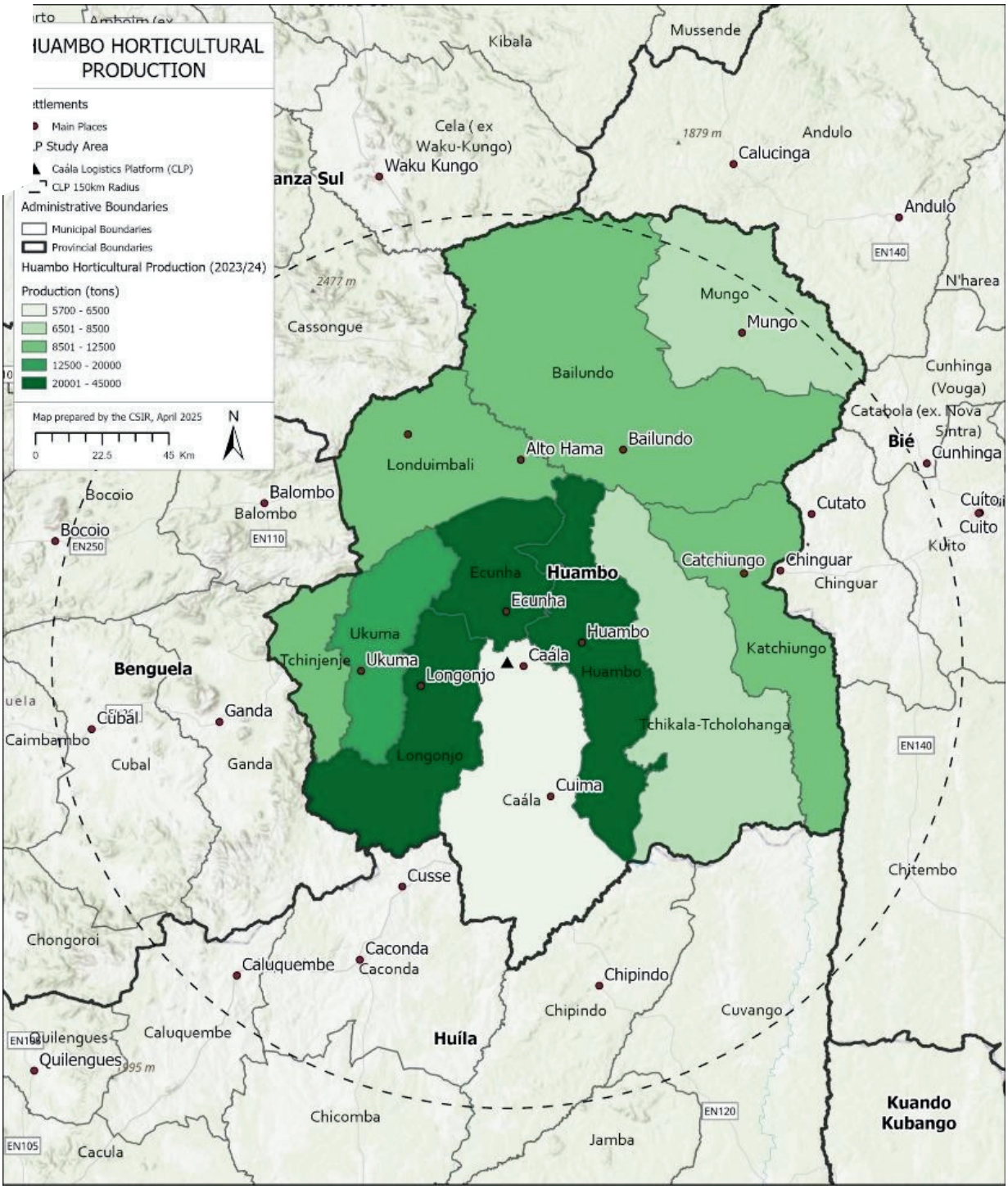
The 150 km area around the CLP is estimated to have around 1,7 million hectares of cropland.

Data Citation: Zanaga, D., Van De Kerchove, R., Daems, D., De Keersmaecker, W.,Brockmann, C., Kirches, G., Wevers, J., Cartus, O., Santoro, M., Fritz, S., Lesiv, M., Herold, M.,Tsendbazar, N.E., Xu, P., Ramoino, F., Arino, O., 2022. ESA WorldCover 10 m 2021 v200.


CROPLAND ALONG THE LOBITO CORRIDOR
Settlements
Main Cities
Main Places
CLP Study Area
Caála Logistics Platform (CLP)
CLP 150km Radius
Administrative Boundaries
Provincial Boundaries
Railway
Railway Stations
Railway Lines
Roads
Primary
Secondary
Tertiary
Other
Cropland (ha) (2021)
0.0 - 10.0
10.01 - 25.0
25.01 - 50.0
50.01 - 75.0
75.01 - 100.0
Map prepared by the CSIR, May 2025
0
35
70 Km
N
Sumbe
Seles
Waku Kungo
Calucinga
1879 m
Andulo
Kuanza Sul
EN245
EN140
Mungo
Bailundo
Cunhinga
Bié
Cuito
Cutato
Alto Hama
Lobito
Catumbela
Balombo
Bocoio
Huambo
Chinguar
Catchiungo
Ecunha
Caála
Longonjo
Ukuma
Benguela
Grande
Cubal
Ganda
Cuima
Chongoroi
Cusse
Caconda
Caluquembe
Chipindo
Lucira
Namibe
Quilengues
1995 m
Huíla
Kuando Kubango
Cuvango
EN105
EN120



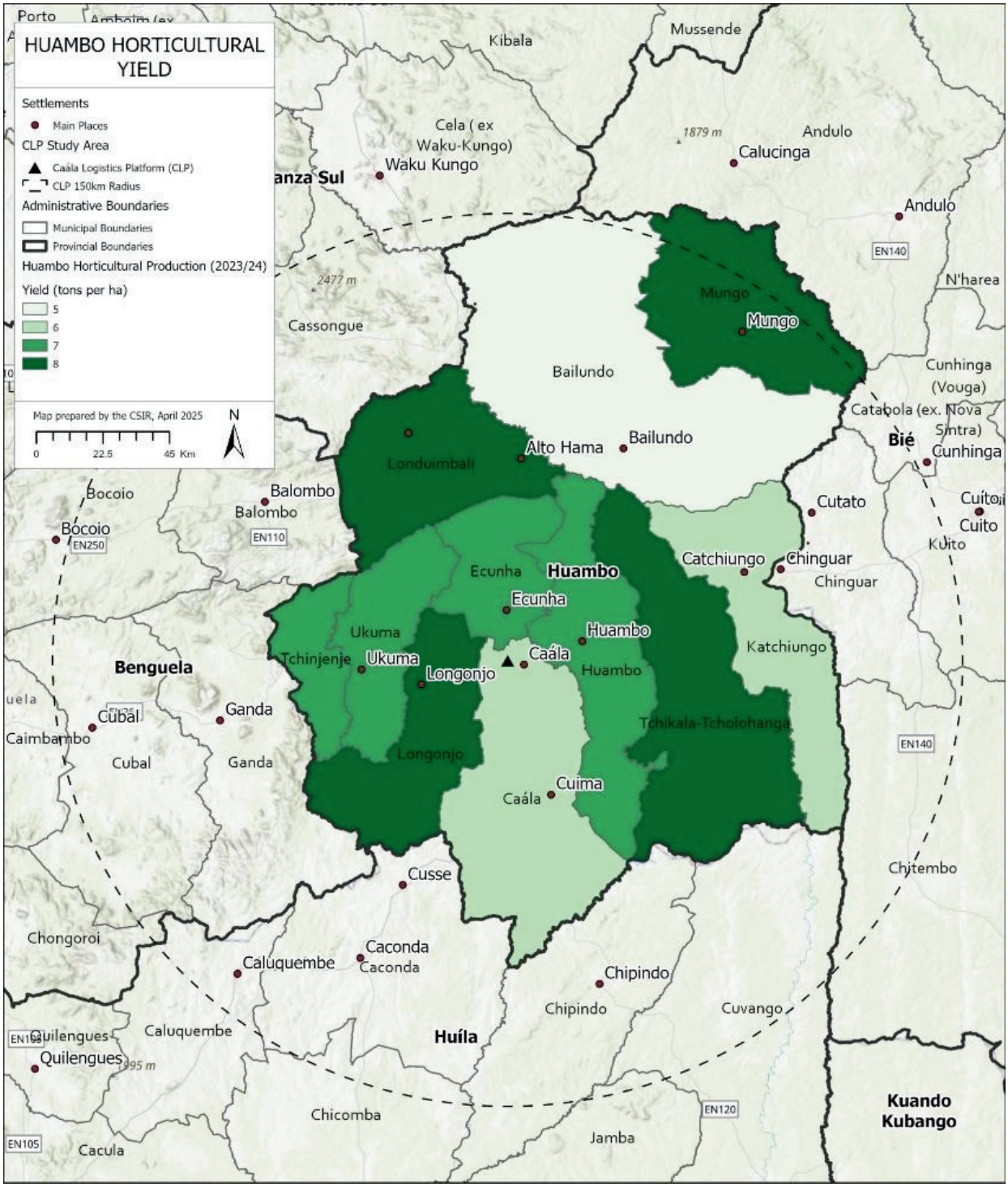
Huambo Horticultural Statistics:
These maps are based on IDA Data on Horticultural Production of Huambo Province 2023/24.
The IDA Data gave municipal level figures for Horticultural Production (tons), Yield (tons/ha) and number of producers, which are mapped.
The municipal yield estimates together with the downscaled cropland area data were used to estimate local level agricultural production. For areas outside of Huambo Province, an average yield value of 7 tons/ha was assumed.



This map highlights the key agricultural production areas within a150 km radius of the CLP, as well as throughout Benguela province.

The identified agricultural hotspots were determined through an analysis combining remote sensing-derived cropland land cover data and downscaled crop yield estimates. These estimates were informed by the 2023/24 IDA Data on Horticultural Production in Huambo Province.

Additionally, the map overlays the road network hierarchy, highlighting major roads and routes that connect these agricultural production areas to logistical storage hubs, namely the CLP and Lobito Port.

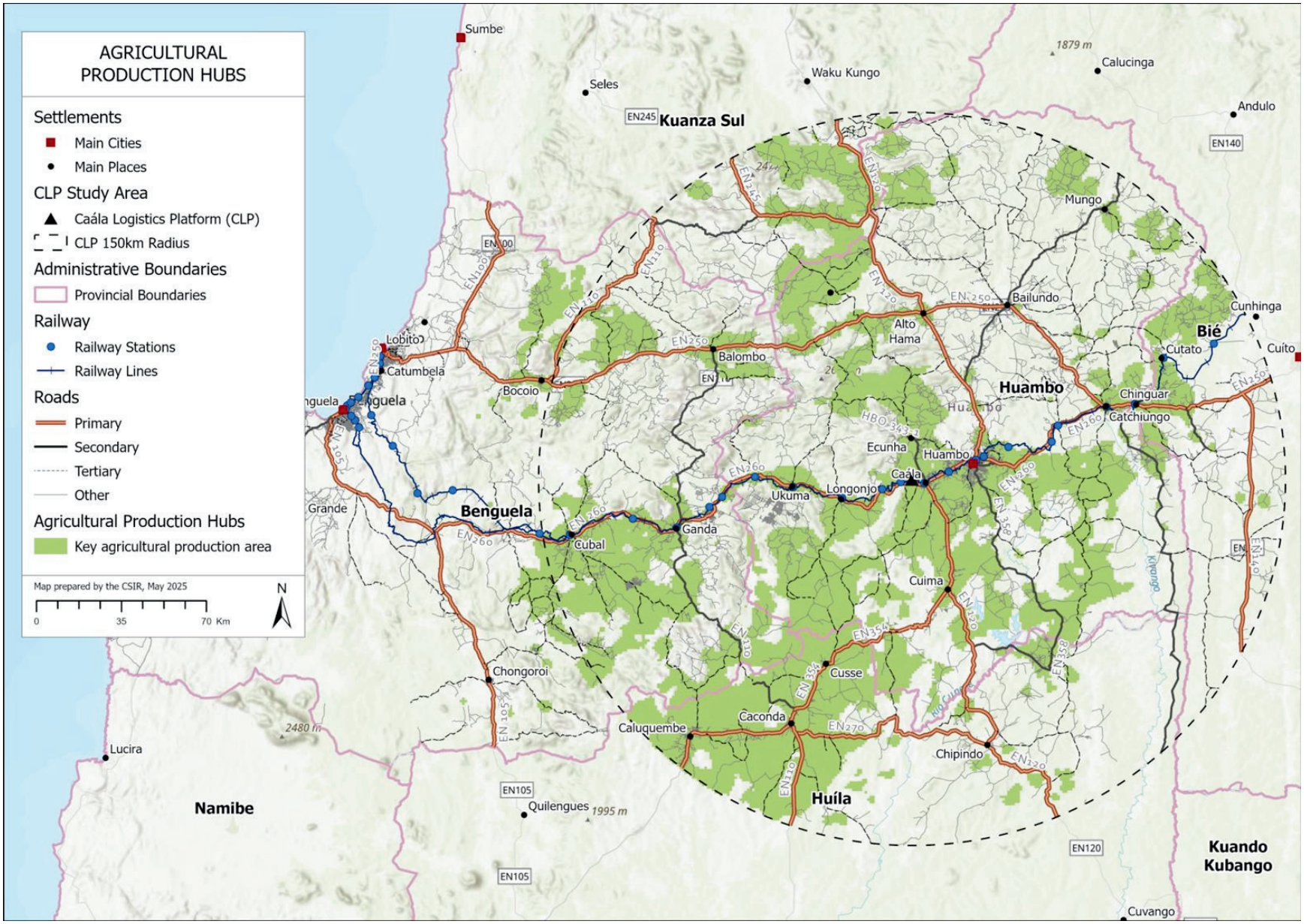


An accessibility study for service area allocation assesses how easily a population can access a particular service, taking into account factors such as distance, travel time, and cost.

In these maps, an accessibility analysis was conducted to delineate the service areas of the CLP and the Lobito Port, based on the shortest travel distance from hinterland locations to each facility.

The CLP's service area is shown in brown, while the Lobito Port's service area is shown in blue. These areas represent the locations from which each facility is the closest in terms of travel distance.

It's important to note that this analysis does not account for the additional time and cost required to transport agricultural goods from the CLP to the Lobito Port via rail.



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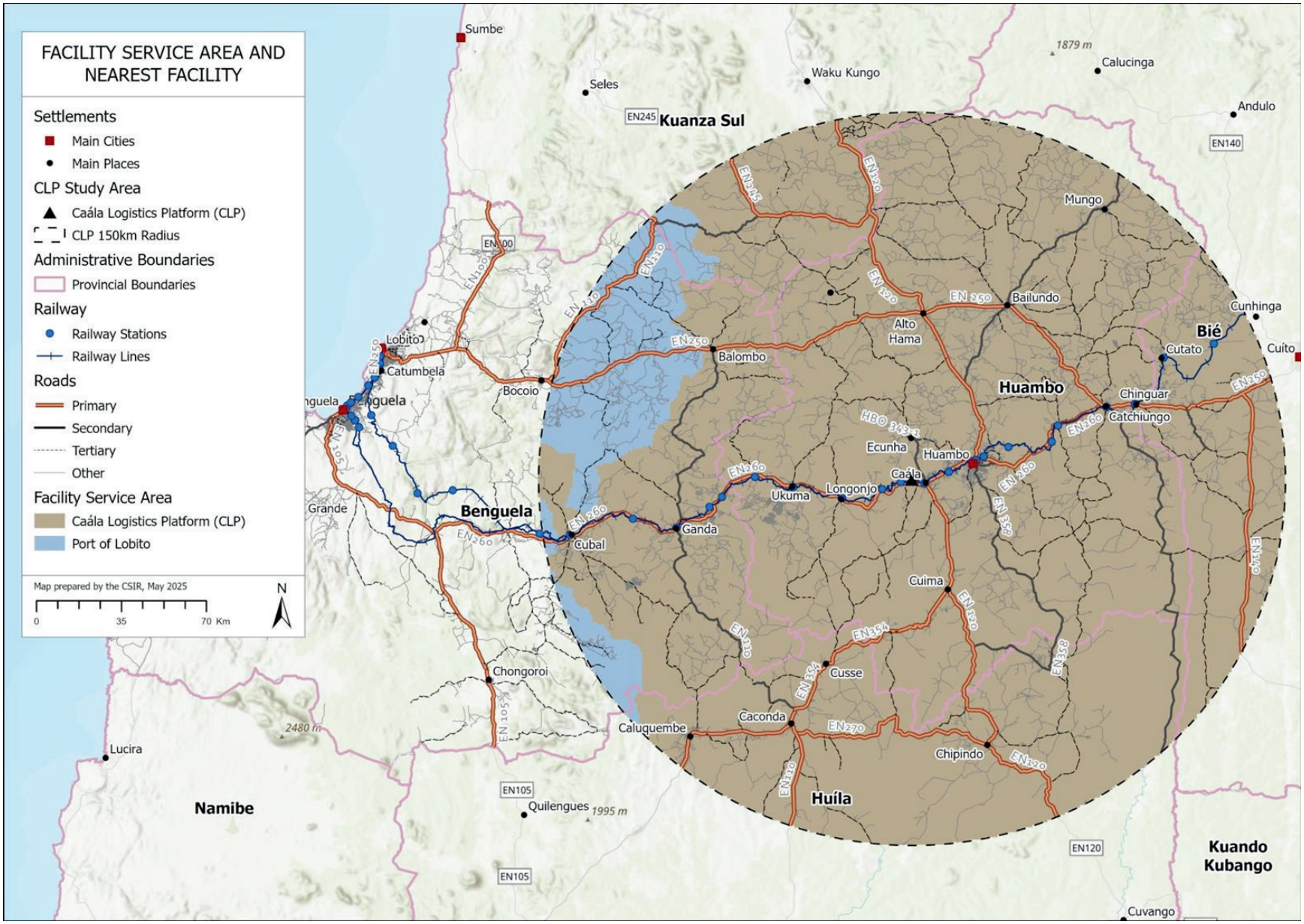
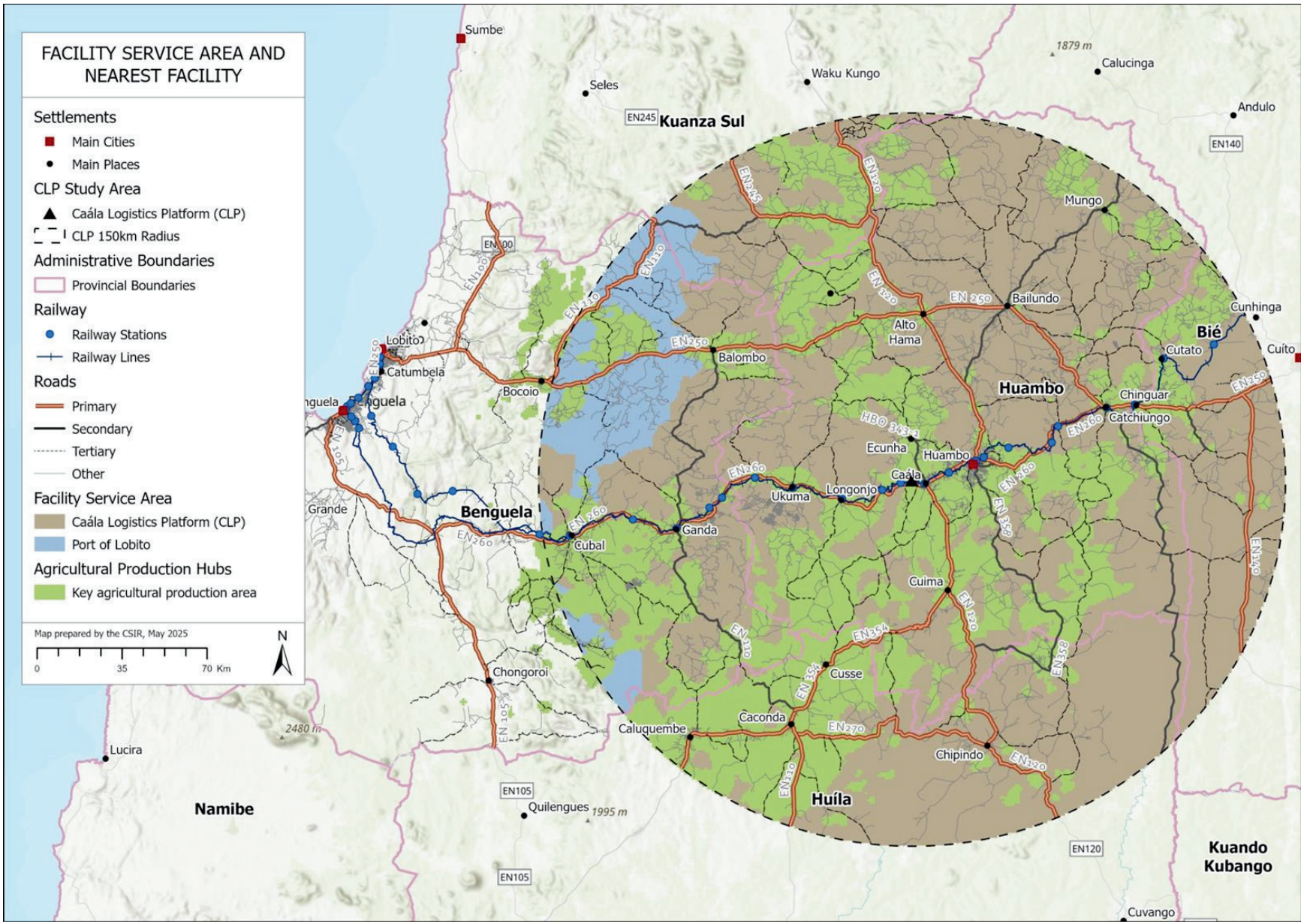


In these maps, an accessibility analysis was conducted to delineate the service areas of the CLP and the Lobito Port, based on the shortest travel distance from hinterland locations to each facility.

The CLP's service area is shown in brown, while the Lobito Port's service area is shown in blue. These areas represent the locations from which each facility is the closest in terms of travel distance. Key agricultural production areas have been overlaid on these service areas.

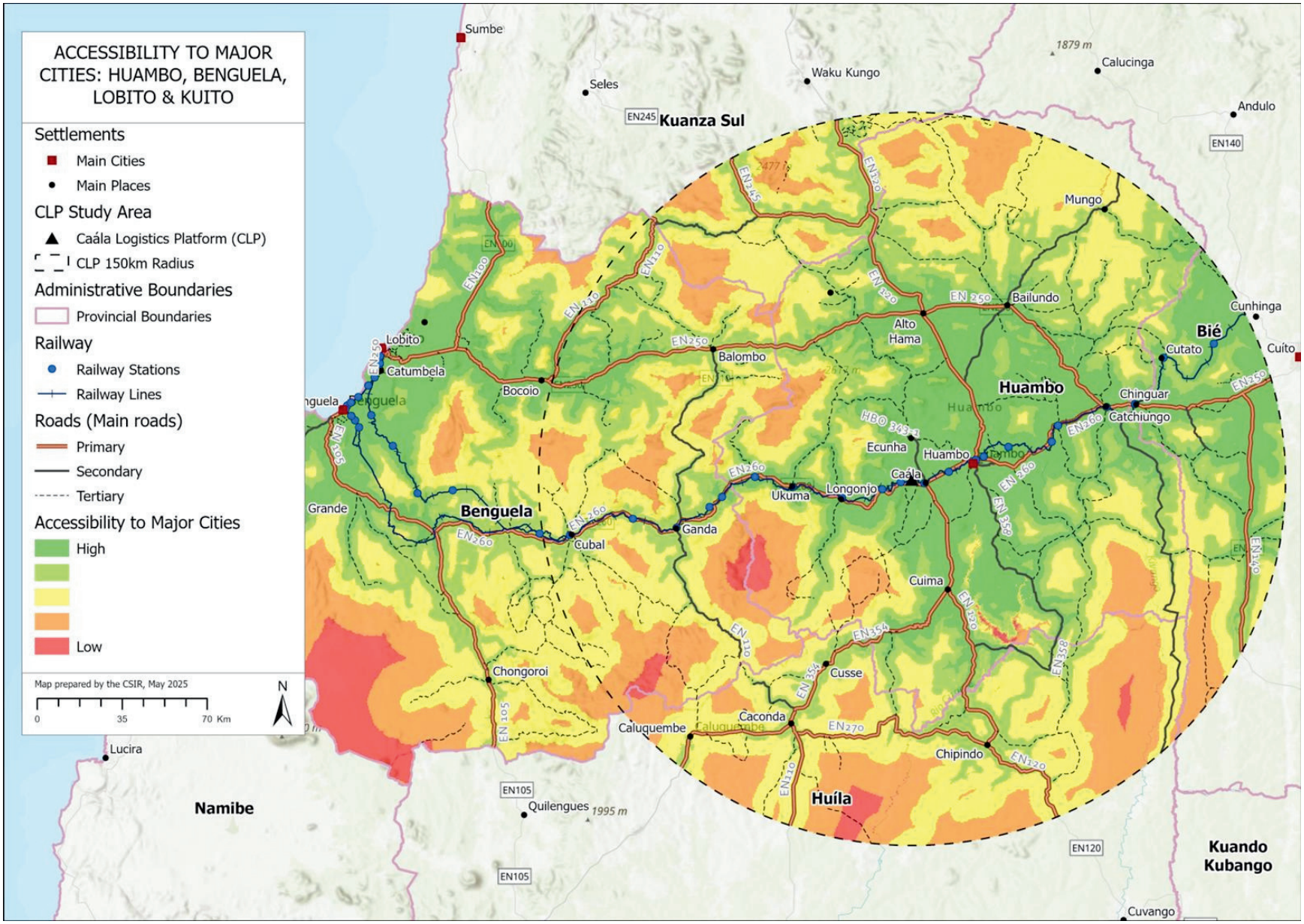
It's important to note that this analysis does not account for the additional time and cost required to transport agricultural goods from the CLP to the Lobito Port via rail.



This map illustrates the accessibility to major cities within the 150 km area around the CLP. Accessibility was modelled through a raster-based travel time/cost analysis, focusing on the 20 largest cities in the country (each with a population exceeding 110,000).

This 500m resolution raster dataset is part of FAO's Hand-in-Hand Initiative, utilising Geographical Information Systems - Multicriteria Decision Analysis (GIS-MCDA) to identify optimal locations for value chain infrastructure sites.

The dataset was generated using OpenStreetMap data for roads, railways, and rivers, along with UN Map country borders, the HydroSHEDS 15' resolution GRID for the Digital Elevation Model (DEM), and GHSL - the Global Human Settlement Layer. City population data was sourced from CityPopulation.de.



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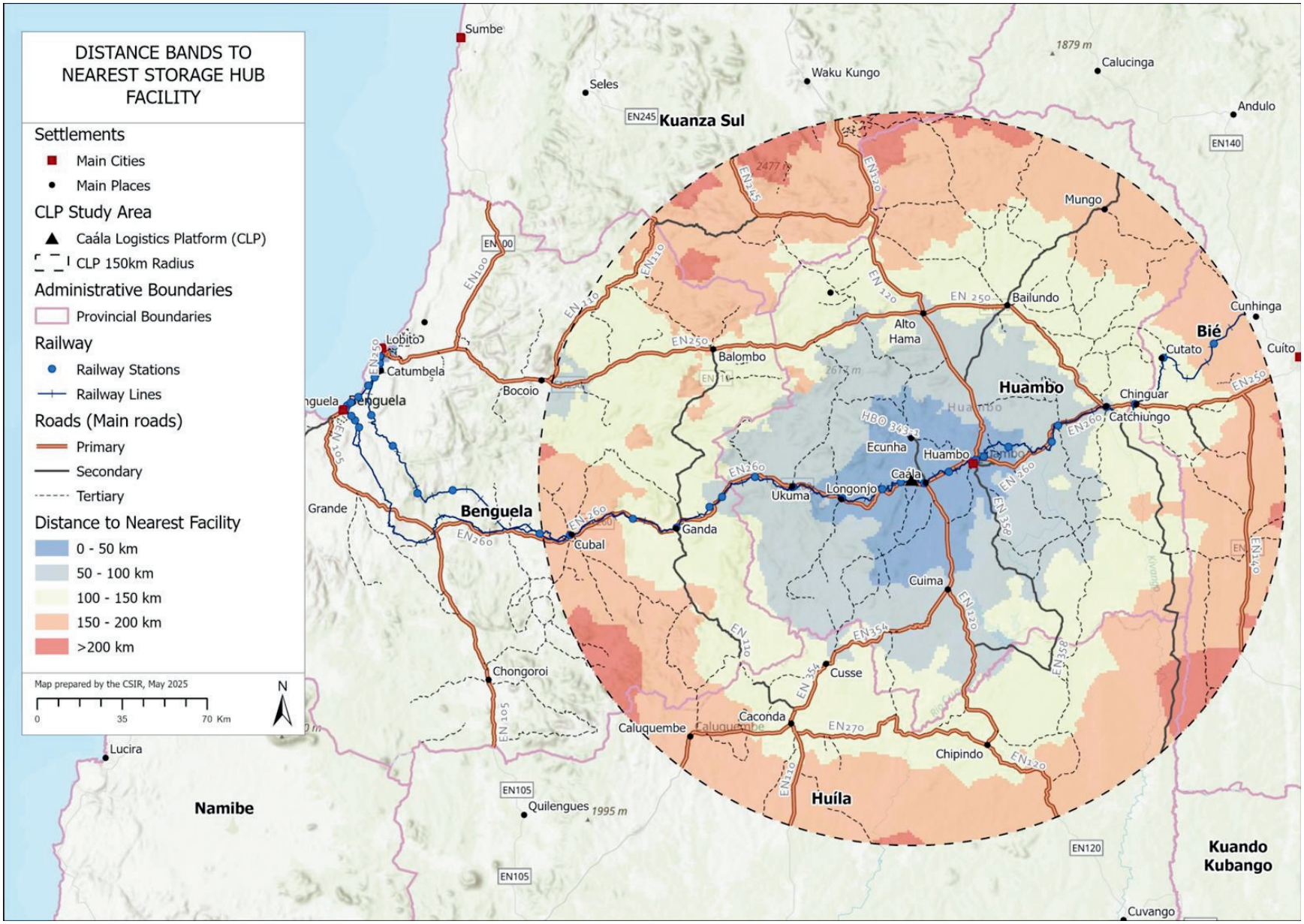

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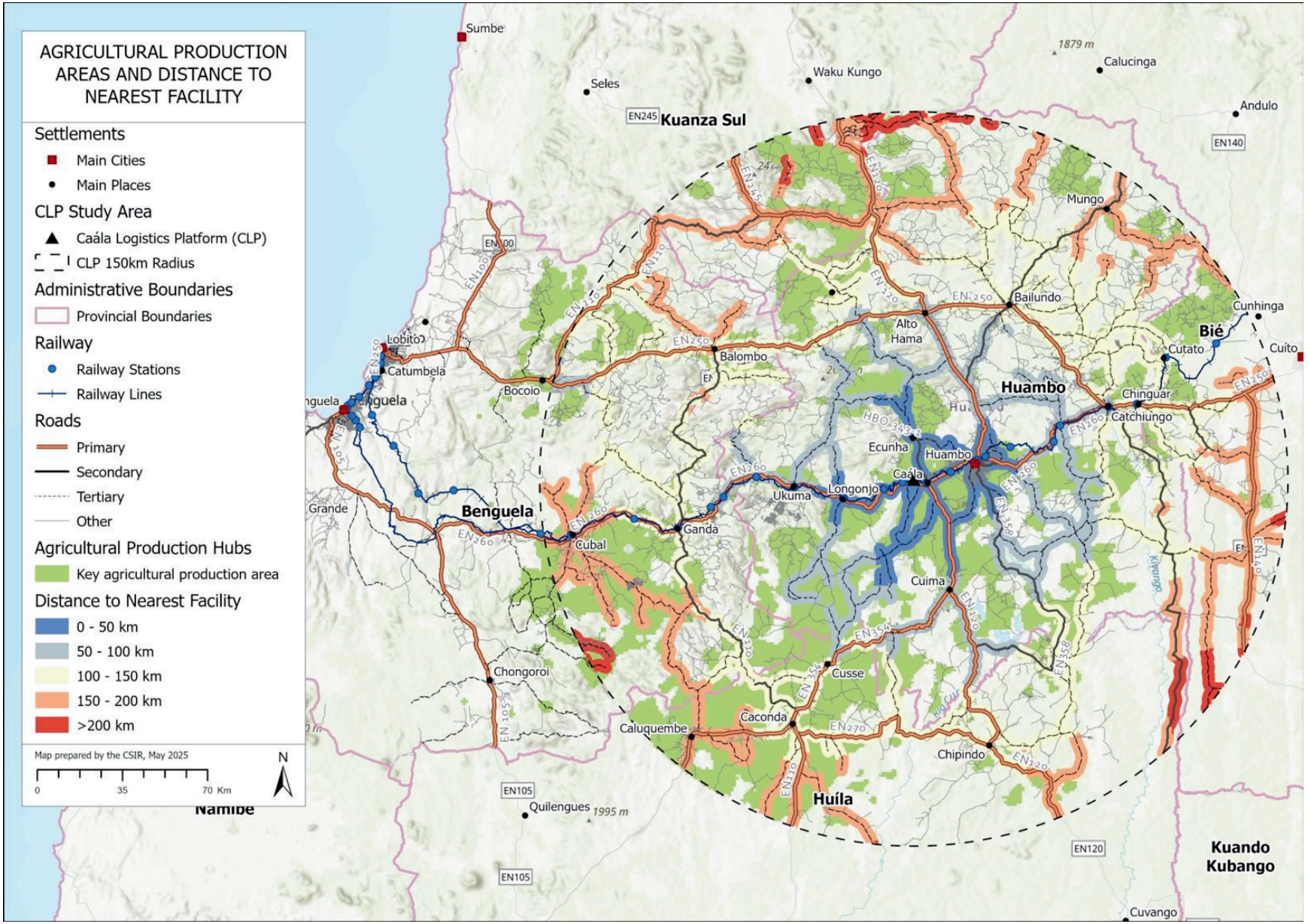
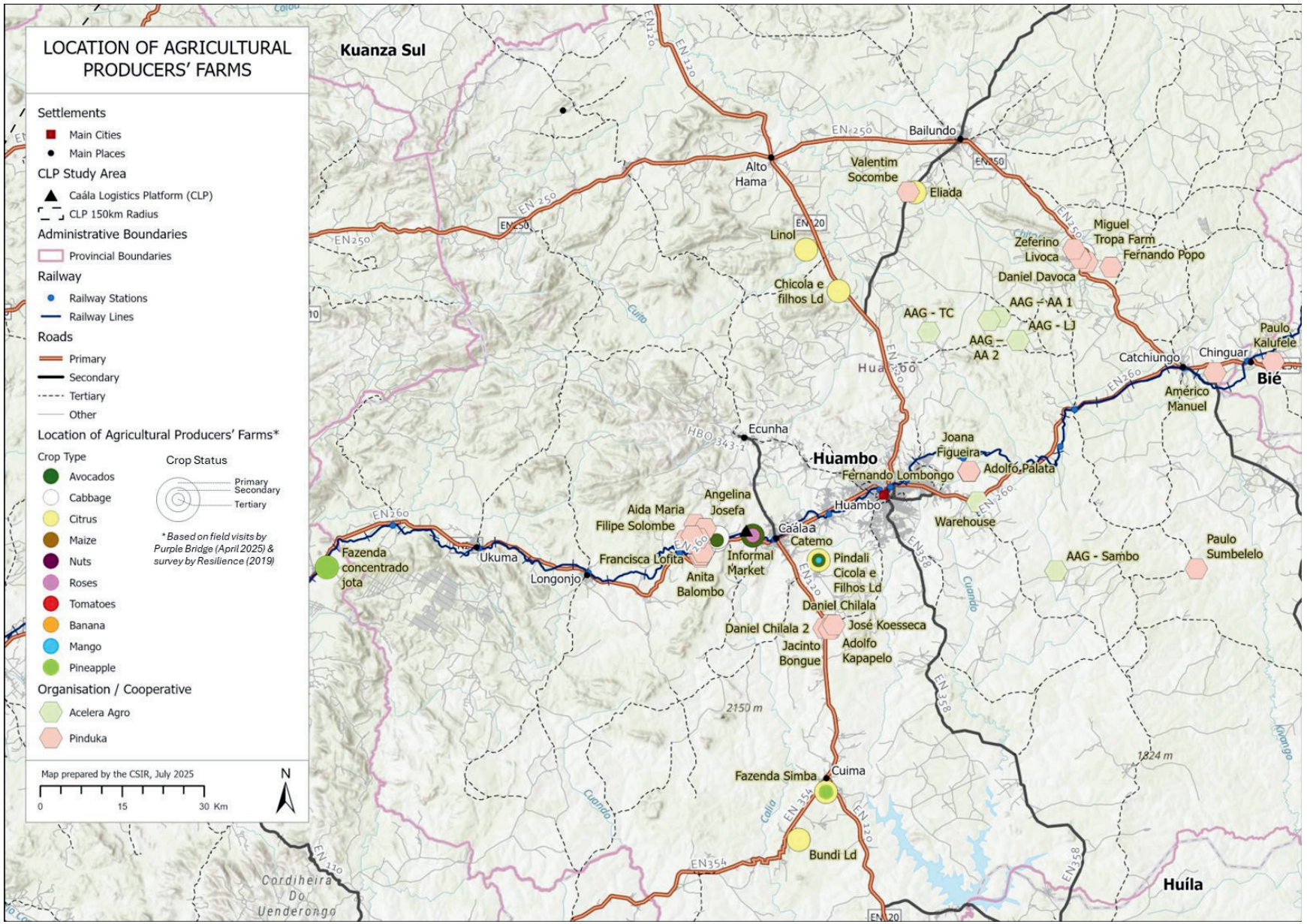
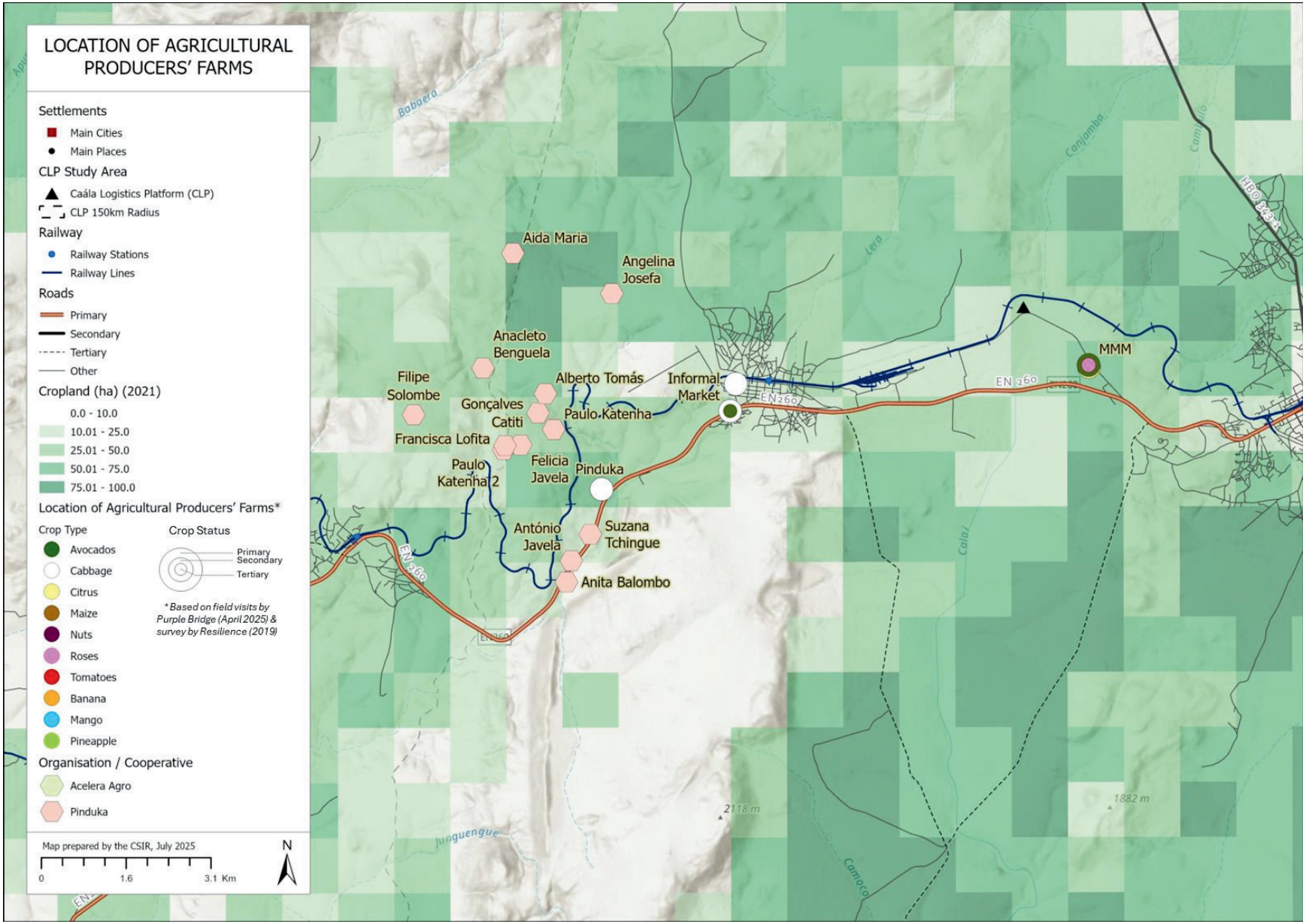
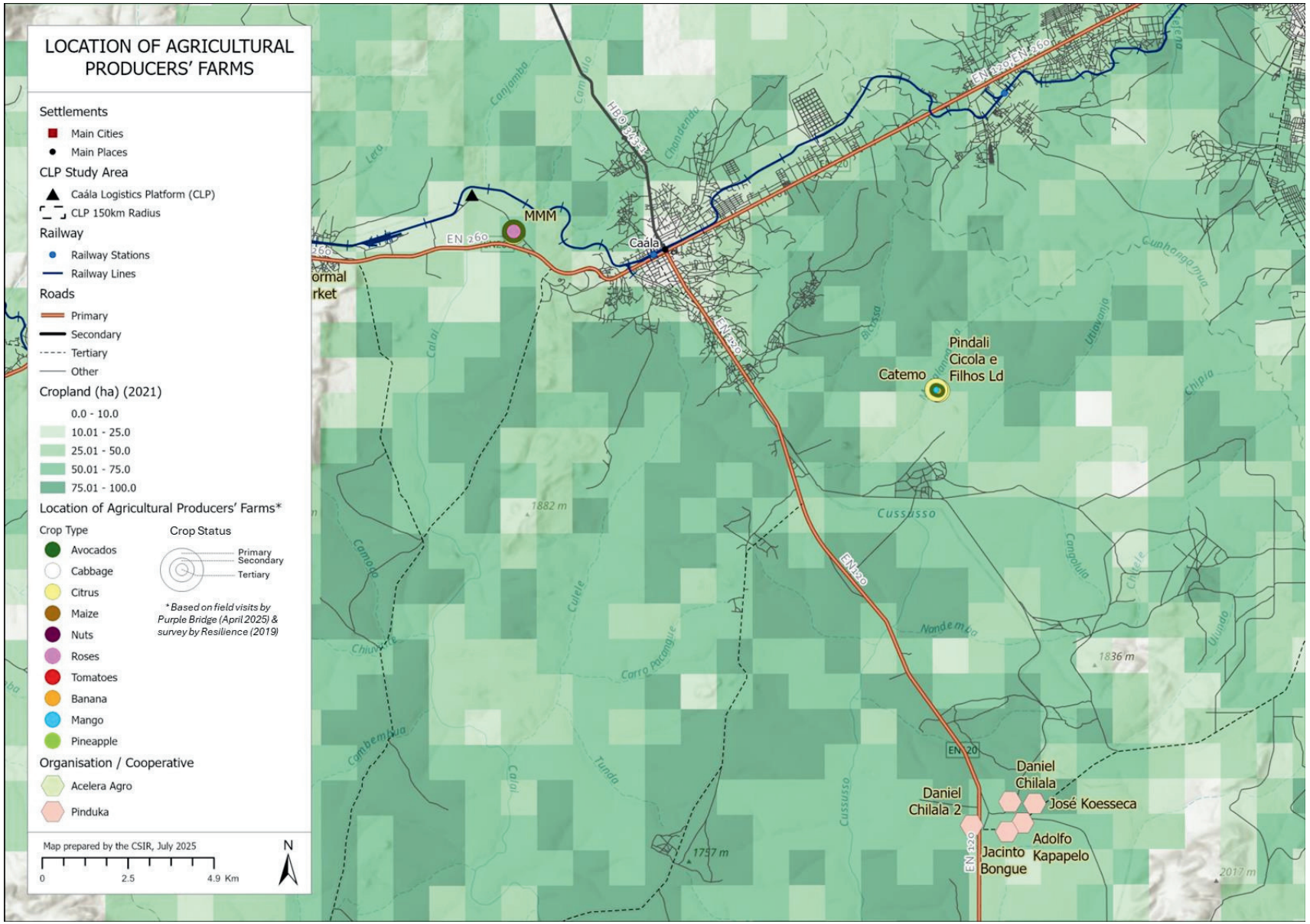

AGRICULTURAL PRODUCTION AREAS AND DISTANCE TO NEAREST FACILITY
Settlements
Main Cities
Main Places
CLP Study Area
Caála Logistics Platform (CLP)
CLP 150km Radius
Administrative Boundaries
Provincial Boundaries
Railway
Railway Stations
Railway Lines
Roads
Primary
Secondary
Tertiary
Other
Agricultural Production Hubs
Key agricultural production area
Distance to Nearest Facility
0 - 50 km
50 - 100 km
100 - 150 km
150 - 200 km
>200 km
Map prepared by the CSIR, May 2025
0
35
70 Km
N
Sumbe
Seles
Waku Kungo
Calucinga
Andulo
Kuanza Sul
Mungo
Bailundo
Cunhinga
Bié
Cuito
Cutato
Alto Hama
Balombo
Bocoio
Lobito
Catumbela
Huambo
Chinguar
Catchiungo
Ecunha
Caála
Longonjo
Ukuma
Benguela
Ganda
Cubal
Cuima
Chongoroi
Cusse
Caconda
Caluquembe
Chipindo
Huíla
Quilengues
1995 m
Kuando Kubango
Cuvango
Namibe
EN245
EN140
EN250
EN260
EN120
EN105
EN270
EN354
EN358
EN359


LOCATION OF AGRICULTURAL PRODUCERS' FARMS
Settlements
Main Cities
Main Places
CLP Study Area
Caála Logistics Platform (CLP)
CLP 150km Radius
Administrative Boundaries
Provincial Boundaries
Railway
Railway Stations
Railway Lines
Roads
Primary
Secondary
Tertiary
Other
Location of Agricultural Producers' Farms*
Crop Type
Avocados
Cabbage
Citrus
Maize
Nuts
Roses
Tomatoes
Banana
Mango
Pineapple
Crop Status
Primary
Secondary
Tertiary
* Based on field visits by Purple Bridge (April 2025) & survey by Resilience (2019)
Organisation / Cooperative
Acelera Agro
Pinduka
Map prepared by the CSIR, July 2025
0
15
30 Km
N
Kuanza Sul
Bailundo
Alto Hama
Valentim Socombe
Eliada
Linol
Chicola e filhos Ld
Miguel Tropa Farm
Zeferino Livoca
Fernando Popo
Daniel Davoca
AAG - TC
AAG - AA 1
AAG - LJ
AAG – AA 2
Paulo Kalufele
Catchiungo
Chinguar
Bié
Américo Manuel
Ecunha
Huambo
Joana Figueira
Fernando Lombongo
Adolfo Palata
Huambo
Warehouse
Angelina Josefa
Aida Maria Filipe Solombe
Caalaa Catemo
Pindali Cicola e Filhos Ld
Informal Market
Francisca Lofita
Anita Balombo
Daniel Chilala
Daniel Chilala 2
José Koesseca
Jacinto Bongue
Adolfo Kapapelo
Fazenda concentrado jota
Ukuma
Longonjo
AAG - Sambo
Paulo Sumbelelo
2150 m
1824 m
Fazenda Simba
Cuima
Bundi Ld
Cordiheira Do Uenderongo
Huíla


LOCATION OF AGRICULTURAL PRODUCERS' FARMS
Settlements
Main Cities
Main Places
CLP Study Area
Caála Logistics Platform (CLP)
CLP 150km Radius
Railway
Railway Stations
Railway Lines
Roads
Primary
Secondary
Tertiary
Other
Cropland (ha) (2021)
0.0 - 10.0
10.01 - 25.0
25.01 - 50.0
50.01 - 75.0
75.01 - 100.0
Location of Agricultural Producers' Farms*
Crop Type
Avocados
Cabbage
Citrus
Maize
Nuts
Roses
Tomatoes
Banana
Mango
Pineapple
Crop Status
Primary
Secondary
Tertiary
*Based on field visits by Purple Bridge (April 2025) & survey by Resilience (2019)
Organisation / Cooperative
Acelera Agro
Pinduka
Map prepared by the CSIR, July 2025
0
1.6
3.1 Km
N
Aida Maria
Angelina Josefa
Anacleto Benguela
Filipe Solombe
Alberto Tomás
Informal Market
Gonçalves Catiti
Paulo Katenha
Francisca Lofita
Felicia Javela
Pinduka
Paulo Katenha 2
António Javela
Suzana Tchingue
Anita Balombo
MMM
EN260
2118 m
1882 m
Babaera
Lera
Calai
Camoco
Junguengue

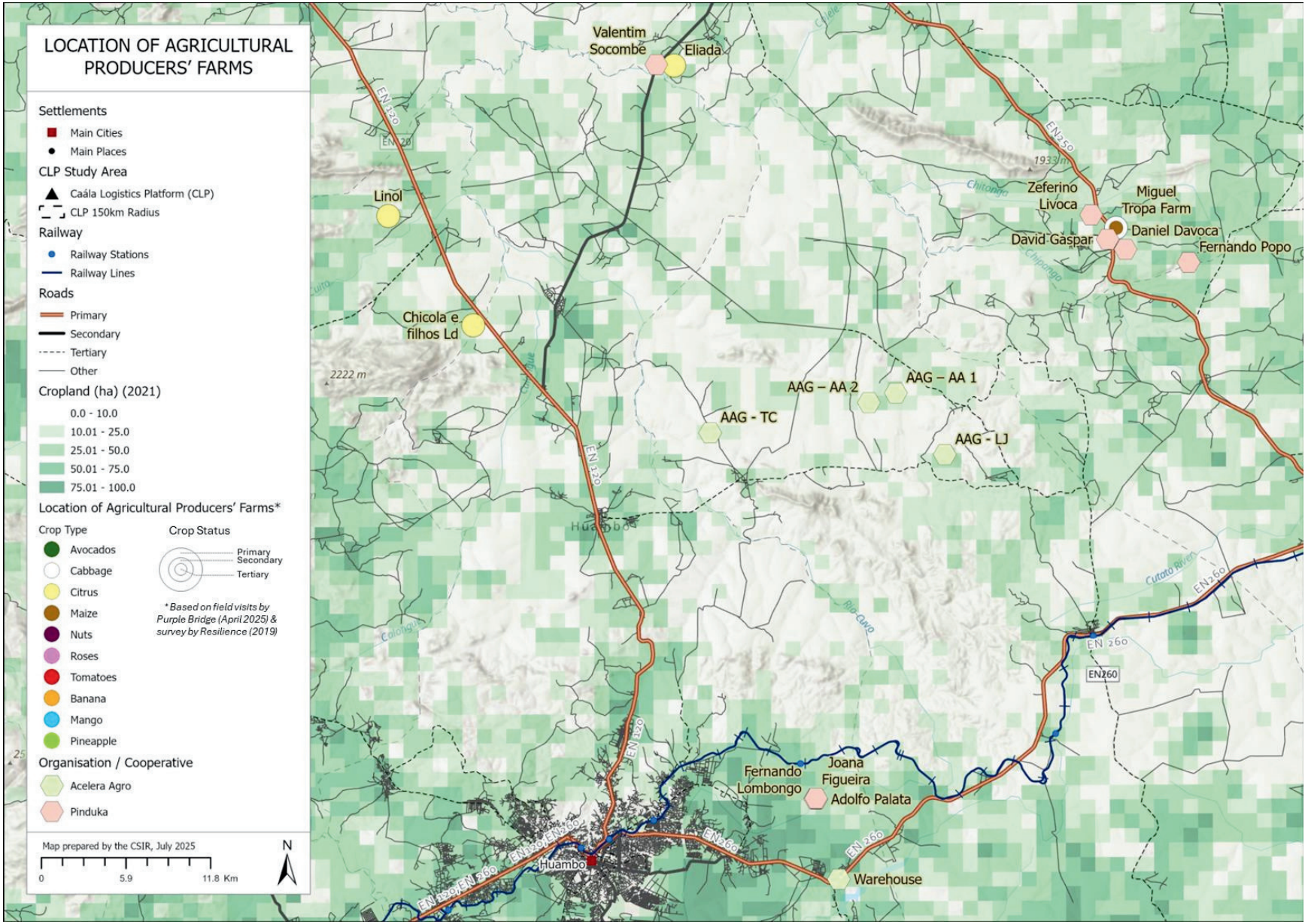


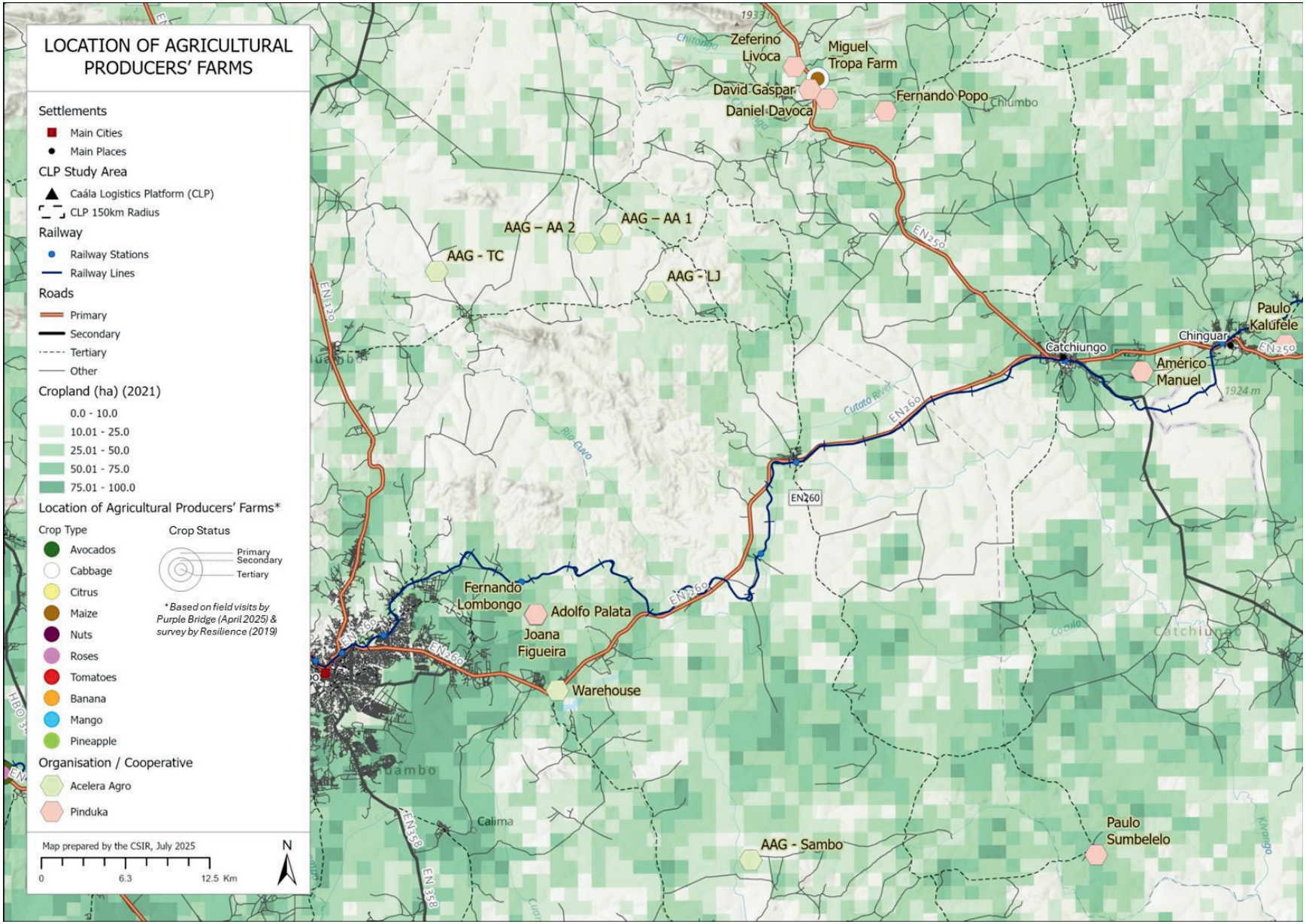
These maps displays the locations of agricultural producers' farms visited during fieldwork in April 2025, alongside fruit farms surveyed by Resilience between June and August 2019. In April 2025, Purple Bridge visited six farms and one market, while Resilience surveyed 19 fruit farms in 2019. Each farm is labelled with its name and main crop types.

The map also shows the road network and overlays travel distance bands from either the CLP or the Port of Lobito (whichever is closer by road) based on primary, secondary, and tertiary roads.

Travel distances are colour-coded to reflect accessibility:

- Areas within 0–100 km are shaded in blue, indicating easier access to storage or export facilities.
- Areas 150–200 km or more from the CLP or Lobito Port are shaded in orange to red, representing longer transport distances and reduced accessibility.


LOCATION OF AGRICULTURAL PRODUCERS' FARMS
Settlements
Main Cities
Main Places
CLP Study Area
Caála Logistics Platform (CLP)
CLP 150km Radius
Railway
Railway Stations
Railway Lines
Roads
Primary
Secondary
Tertiary
Other
Cropland (ha) (2021)
0.0 - 10.0
10.01 - 25.0
25.01 - 50.0
50.01 - 75.0
75.01 - 100.0
Location of Agricultural Producers' Farms*
Crop Type
Avocados
Cabbage
Citrus
Maize
Nuts
Roses
Tomatoes
Banana
Mango
Pineapple
Crop Status
Primary
Secondary
Tertiary
*Based on field visits by Purple Bridge (April 2025) & survey by Resilience (2019)
Organisation / Cooperative
Acelera Agro
Pinduka
Map prepared by the CSIR, July 2025
0
5.9
11.8 Km
N
Valentim Socombe
Eliada
Linol
Chicola e filhos Ld
Zeferino Livoca
Miguel Tropa Farm
David Gaspar
Daniel Davoca
Fernando Popo
AAG – AA 2
AAG – AA 1
AAG - TC
AAG - LJ
Fernando Lombongo
Joana Figueira
Adolfo Palata
Warehouse
Huambo
EN 120
EN 260
EN260
2222 m


LOCATION OF AGRICULTURAL PRODUCERS' FARMS
Settlements
Main Cities
Main Places
CLP Study Area
Caála Logistics Platform (CLP)
CLP 150km Radius
Railway
Railway Stations
Railway Lines
Roads
Primary
Secondary
Tertiary
Other
Cropland (ha) (2021)
0.0 - 10.0
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Avocados
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Tomatoes
Banana
Mango
Pineapple
Crop Status
Primary
Secondary
Tertiary
* Based on field visits by Purple Bridge (April 2025) & survey by Resilience (2019)
Organisation / Cooperative
Acelera Agro
Pinduka
Map prepared by the CSIR, July 2025
0
6.3
12.5 Km
N
Zeferino Livoca
Miguel Tropa Farm
David Gaspar
Daniel Davoca
Fernando Popo
Chilumbo
AAG – AA 2
AAG – AA 1
AAG - TC
AAG - LJ
EN250
EN120
Paulo Kalufele
Chinguar
Catchiungo
Américo Manuel
1924 m
Cutato River
EN260
Rio Cuvo
Fernando Lombongo
Adolfo Palata
Joana Figueira
Warehouse
EN360
EN358
Calima
AAG - Sambo
Paulo Sumbelelo
Kuando

Municipality	Area (ha)	Production (tons)	Yield (tons/ha)	Number of producers
Mungo	972.7	7782.0	8	1849
Bailundo	2058.9	10294.5	5	5827
Londuimbali	1323.0	10584.0	8	3617
Katchiungo	1723.9	10343.8	6	3071
Tchikala-Tcholohanga	1000.8	8006.7	8	1710
Huambo	5988.2	41917.4	7	10619
Caála	965.0	5790.2	6	3958
Ecunha	4749.5	33246.5	7	9639
Longonjo	4584.1	36673.3	8	1014
Ukuma	1970.3	13792.2	7	3971
Tchinjenje	1782.4	12476.8	7	1209
~~Calenga ???~~	~~3610.4~~	~~39714.6~~	~~11~~	~~4587~~

Table 18: Municipalities and respective production yields and producers

Farm Name	Farm Owner	Site Visit Date	Crop Type Primary	Crop Type Secondary	Crop Type Tertiay	Crop Type Other	Crop Volume Tons	Farm Size Area	Farm Ownership Type	Link to Google Location
MMM	Dulce Oliveira	09 Apr 25	Avocados	Roses					Owner	https://maps.app.goo.gl/SWCwitTc3LeUDGM88
Pinduka	Anacleto (Small Farmer)	10 Apr 25	Cabbage						Owner	https://maps.app.goo.gl/PRZEpTSGiFENrZWb6?g-st=im
Pinduka	Susana (Small Farmer)	10 Apr 25	Cabbage						Commonage	https://maps.app.goo.gl/tSHFYsfxpF3p2QgK8?g-st=im
Informal Market		10 Apr 25	Cabbage	Avocados					Commonage	https://maps.app.goo.gl/F8wbG9cmN2nWGiuF7?g-st=im
Miguel Tropa Farm	Miguel Tropa	10 Apr 25	Cabbage	Maize					Owner	https://maps.app.goo.gl/1sjSreSDMVrGqYfo9?g-st=im
Edivaldo Monteiro Farm	Edivaldo Monteiro	11 Apr 25	Avocados	Tomatoes	Citrus	Nuts			Owner	https://maps.app.goo.gl/AQG83qR5CuNAbZtJ6?g-st=im

Table 19: Farm details, crop and ownership types

9.2 Contact List of Stakeholders

List of Stakeholders:

- Flying Swans - Erik Van de Kamp
- ARCCLA – Mr. Arvelino Chimbulo and Jose Carlo Pinto
- MMM Farm – Ms. Dulce Oliviera
- Westfalia – Ms. Merle Daniels & Zac Bard
- Provincial Director of Agriculture Huambo – Mr. Joao Hotalala
- World Bank – Cristina Ferreira, Pedro Marcielino and Mrs. Vacha Cardoso. Also Dr. Manuel Vitongue
- Bank of Angola (BFA) – Mr. Jose Carlos Costa, Mr. Jose Camamba Francisco
- Institute of National Statistics – Mr. Fernando
- Ministry of Planning, Luanda – Director Masotha Mansitha
- Department of Infrastructure and Technical Services (Huambo) – Provincial Director Francisco Rogrigues Neto
- Department of Transport, Traffic and Urban Mobility (Huambo) – Provincial Director
- Department of Agriculture (Huambo) Department of Trade and Commerce – Provincial Director Tavash Edson
- Caála Municipality – Mayor of Caála
- Lobito Atlantic Railway – COO Nicola Gregoir
- Africa Global Logistics – COO Katelijne Verschaeren, Ms. Sindy Capella, Ivo Ribeiro COO ATL, Irina Casimire, Jesse Chipau
- Pinduka Project – Miguel Tropa, Maria and several Pinduka Project farmers
- Alto do Tômbola Agricultural Farm – farm manager for citrus, avocadoes and nuts and farm manager for tomatoes

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Grower Power for Value Creation in High-Value Horticulture? The Case of Citrus in South Africa - Shingie Chisoro, Simon Roberts, Published online: 3 August 2023, The European Journal of Development Research (2024) 36:1–24 Link to article - https://doi.org/10.1057/s41287-023-00591-z

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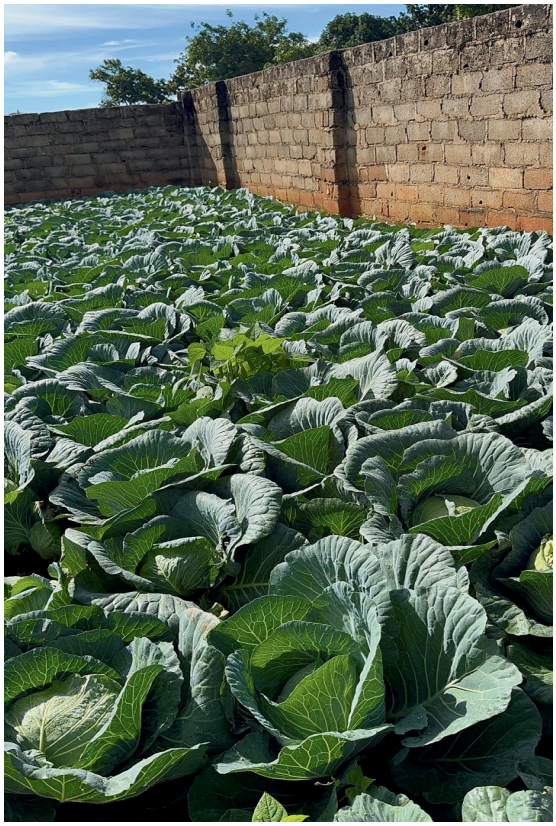
9.4 Site Visit Images

Workers packing carrots into bags at a truck loading site in Caála

One of the farmers in the Pinduka Project, farming cabbage in his yard.

Overgrowth encroaching onto road surface in the village.



Cabbage grown on family property, within the village.

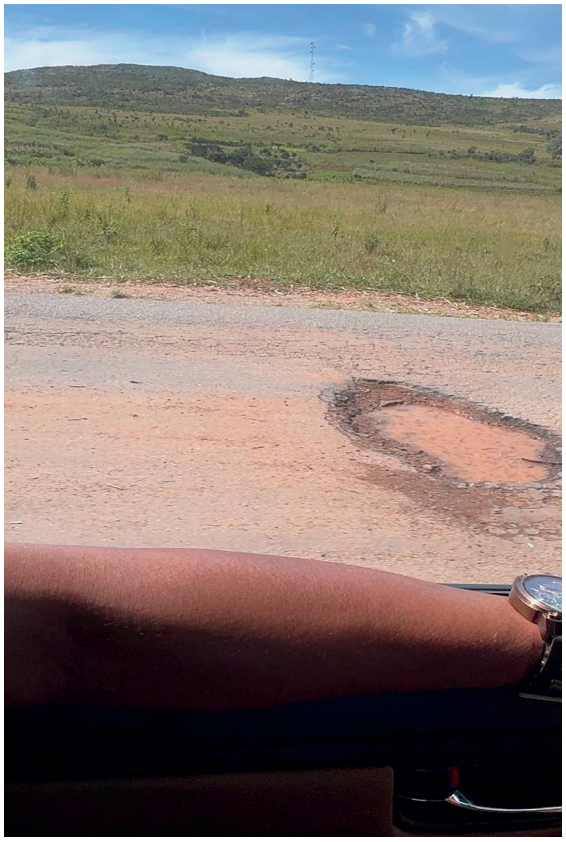
Cabbage farm (~1 ha.) of second farmer in Pinduka Project

Trucks doing deliveries in Caála area, has to stay on the main roads

Villagers packing cabbage into bags in the sorting & packing area

Road maintenance between Caála and Caconda (national road)

Cabbage section farmed in Pinduka Project farmer #1



Potholes and road deterioration are constant across routes

Large sections of National road between Caála and Caconda are gravel and not tar, as sections of tarred road is closed for maintenance and resurfacing

Aerial view of the road network in and around the farm areas around the Huambo airport region

TRANSPORTATION ROUTE MAPPING TO AND FROM THE CLP: FINAL REPORT

(Incorporating Value Chain Analysis of Various Crop Types)

PROPERLY PREPARED BY:

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