Ministry of Foreign Affairs

SCOPING STUDY
VEGETABLES SECTOR NORTHERN CÔTE D'IVOIRE

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RESILIENCE

SCOPING STUDY VEGETABLES SECTOR – NORTHERN CÔTE D'IVOIRE

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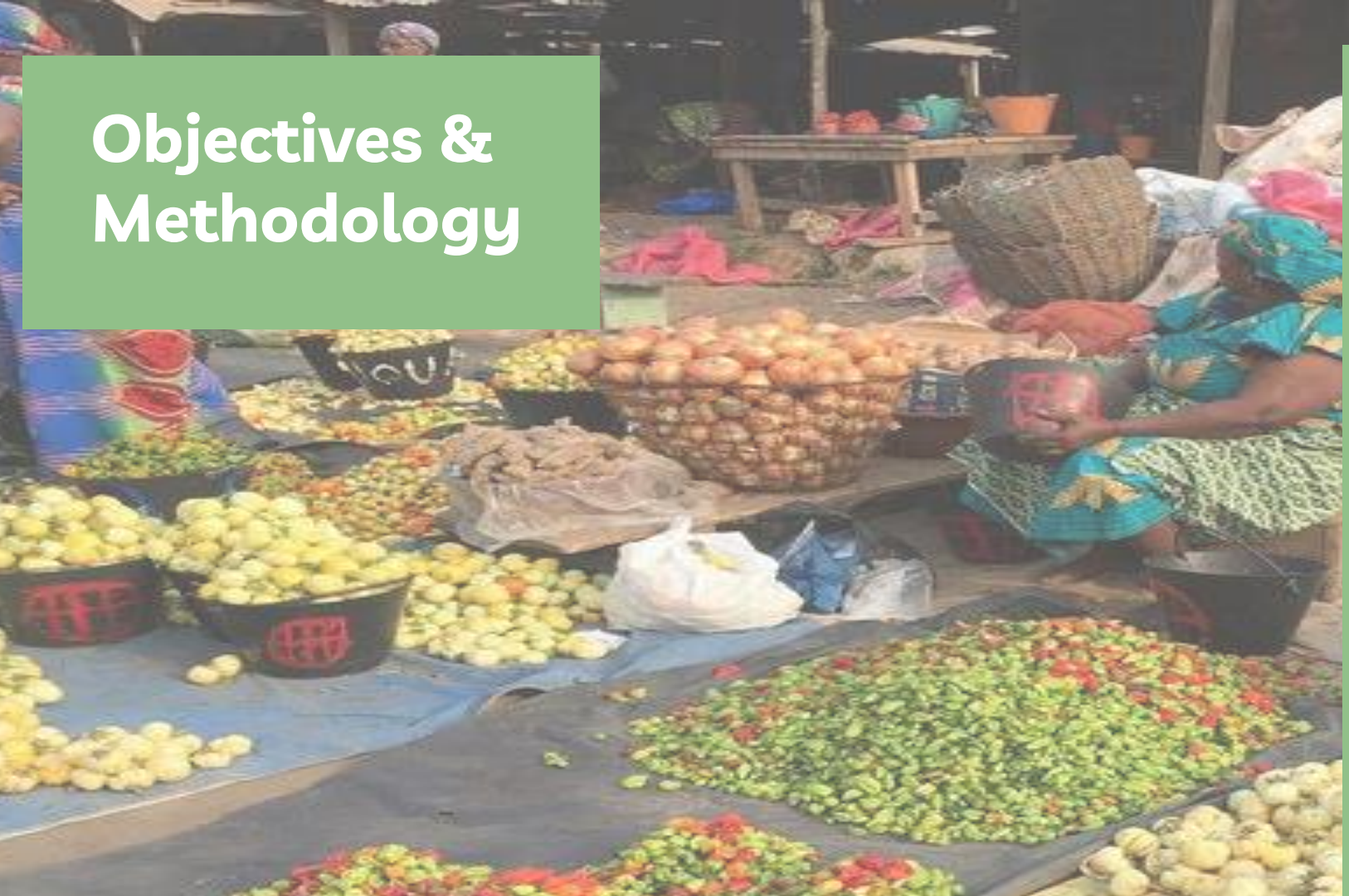


Objectives & Methodology

01

OBJECTIVES, FOCUS & SCOPE

The objective of this study is to analyze business opportunities for commercial horticulture in Northern Côte d'Ivoire.

In particular, the study focused on vegetable production and marketing opportunities in Bouaké, Korhogo and Ferkessédougou. The analysis includes information on production methods, marketing channels, key challenges, key policies, and the institutional environment.

As a background to this study the following context was provided by RVO and the Netherlands Embassy in Abidjan:

- The study builds on opportunities that have become apparent in the Hortivoire project. The Hortivoire project focuses on commercial vegetable production through protected cultivation.
- The study should have a private sector focus; collecting and analyzing information that is relevant for mapping private sector opportunities in the horticulture sector in Northern Côte d'Ivoire (both for the local private sector as well as foreign/Dutch companies).

BACKGROUND ON NORTHERN COTE D'IVOIRE

Northern Côte d'Ivoire has strong cultural and religional ties with bordering countries Burkina Faso and Mali. Korhogo is the largest city in the North and is known for its regional trade characteristics in Côte d'Ivoire. There is a close-knit commercial network of agricultural products between southeast Mali, western Burkina Faso and the Korhogo region.

The agricultural sector is the dominant economic sector in the Korhogo region, which provides more than 40% of the local gross domestic product and provides most income for the people.

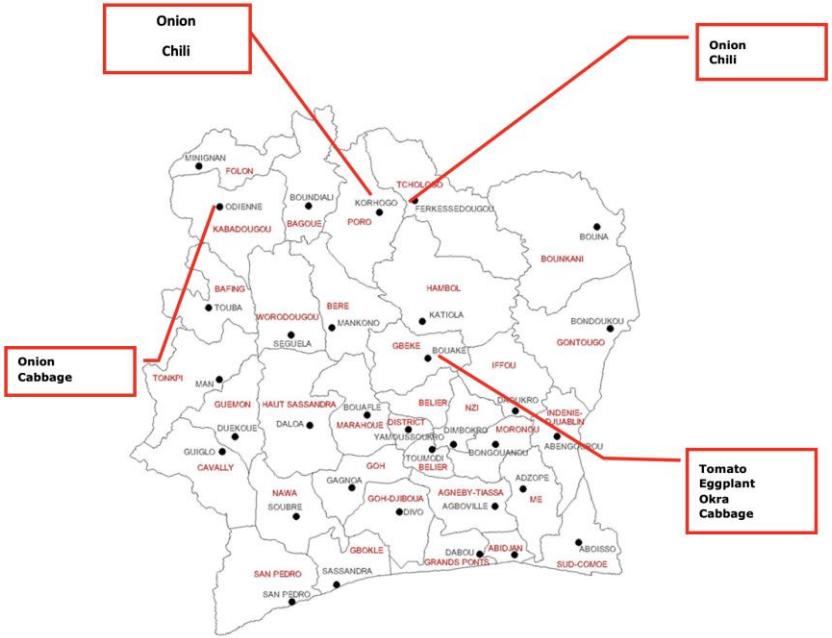
Over the past decades there have been several conflicts about division of land between ethnic groups. Land that was allocated to pastoralists has been used for agricultural production and the lack of rainfall and irrigation puts pressure on sedentary farmers.

The lack of investment in the agricultural sector (e.g., irrigation schemes) results in disinterest of youth as they only observe traditional agricultural practices. However, vegetable production can be interesting for young Ivorians as it is more capital and knowledge intensive.

According to FAO data, fresh vegetable production in Côte d'Ivoire was 740,000 tonnes in 2019, on a population of 26 million, or 28.5 kg/capita per year. Vegetable crops include cabbage, eggplant, okra, onion, pepper and tomato.

VEGETABLE HOTSPOTS IN NORTHERN COTE D'IVOIRE

In the North, the major vegetable production areas are Bouaké, Korhogo and Ferkéssedougou. Odienné is also part of the scope, though the city is better known for cereal and legume production (rice, maize and soya). The figure on the right shows the main vegetables produced in the focus regions.



Focus & Scope

VALUE-CHAIN APPROACH

The study uses a value-chain approach, looking at value-chain operators and functions, as well as value-chain service providers. Research questions were formulated for each of the value-chain elements:

I. Production

a. What are the most important production systems for vegetables in Northern Côte d'Ivoire? Who are input providers and what inputs are available?

b. What are current production volumes, prices and yields of the selected vegetables in Northern Côte d'Ivoire?

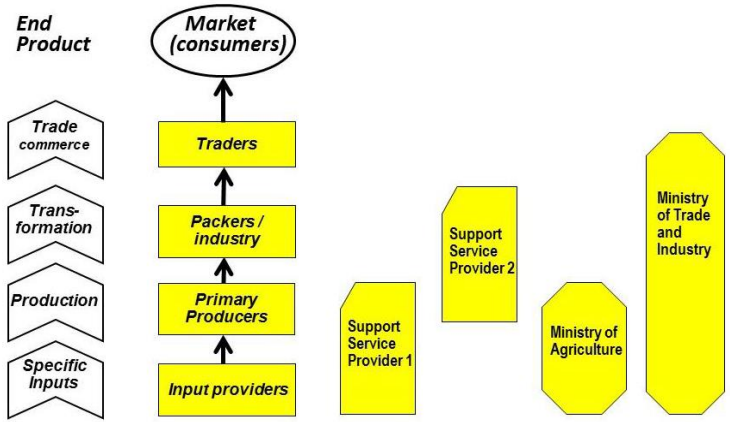


Figure 1: Example of a value-chain map (GIZ ValueLinks 2.0, p. 80)

II. Marketing

a. What are the main markets for vegetables produced in Northern Côte d'Ivoire (regional; domestic; international)?

b. Does Northern Côte d'Ivoire export vegetables outside of the country and are there opportunities to expand this?

c. How are vegetables packaged and transported?

d. Who are the main market players in the vegetables value chain of Northern Côte d'Ivoire?

VALUE-CHAIN APPROACH & ADDITIONAL INTERESTS

III. Value-chain service providers and the institutional environment

a. What are the most important institutions in Northern Côte d'Ivoire that work on vegetables, including agricultural extension, research, both from a government and NGO perspective?

In addition to the value-chain analysis we looked at the specific role Dutch companies and technology can play, as well as developed a number of business cases.

IV. The Dutch supply side

a. What does the Netherlands have to offer in terms of inputs, technology, knowledge and services in the horticulture domain in Northern Côte d'Ivoire?

b. What private sector instruments can the Netherlands employ to support private sector projects and investments in the horticulture sector in Northern Côte d'Ivoire?

V. Business cases

Which business cases can we recommend that combine a business opportunity, a (group of) companies and other organizations, and an RVO-instrument?

METHODS USED

Desk study

The study started with the analysis of existing data and reports on horticulture in Northern Côte d'Ivoire and the wider region We consulted both country-specific sources like policy documents from Ministries and dedicated agencies, as well as international sources. Studies included the market study conducted by AGRIFER as part of the HortIvoire Impact Cluster project and the horticulture study of Nugteren (2018), see also Annex 1 (References).

Key informant interviews

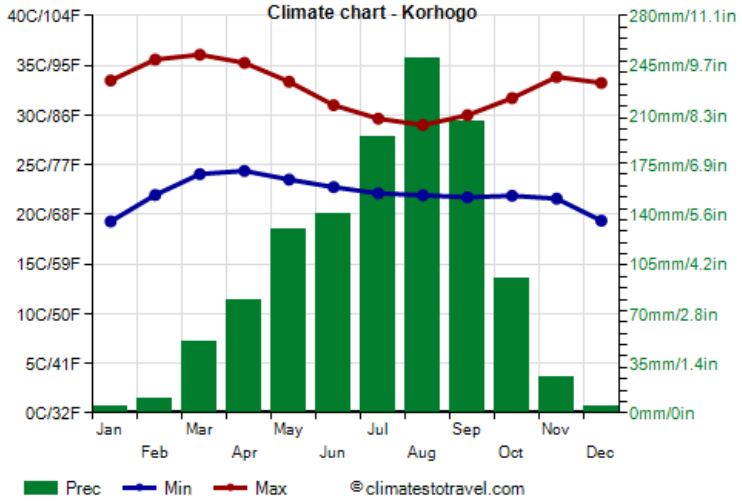
We organized more than 20 interviews with key experts on horticulture in Northern Côte d'Ivoire. Interviews took place with representatives from the public sector, companies, research institutes and NGOs. See Annex 2 (List of interviewed persons) for the full overview.

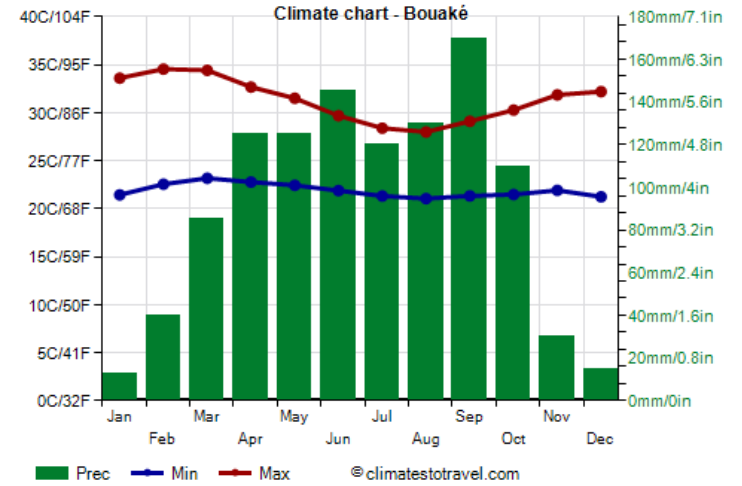
Field mission: Farm and market visits

In addition, to the key informant interviews, a field mission was organized to the region, which included visits to producers, local markets and existing horticulture projects.

Production systems

02





PRODUCTION SYSTEMS

- Two distinct growing seasons in the North: rainfed in Korhogo and Bouaké between May and October and irrigated during the colder dry season of November-February. Rainfall in Bouake is more evenly spread between March and October.
- The most popular vegetables are tomato, onion, okra and chili.
- Imports of vegetables from Burkina Faso and Mali during the winter months are high, especially for onion and tomato. In general it is understood that vegetable production in Mali and Burkina Faso is at a higher level than in Northern Côte d'Ivoire; and many of the better vegetable farmers have their origins in Burkina Faso.

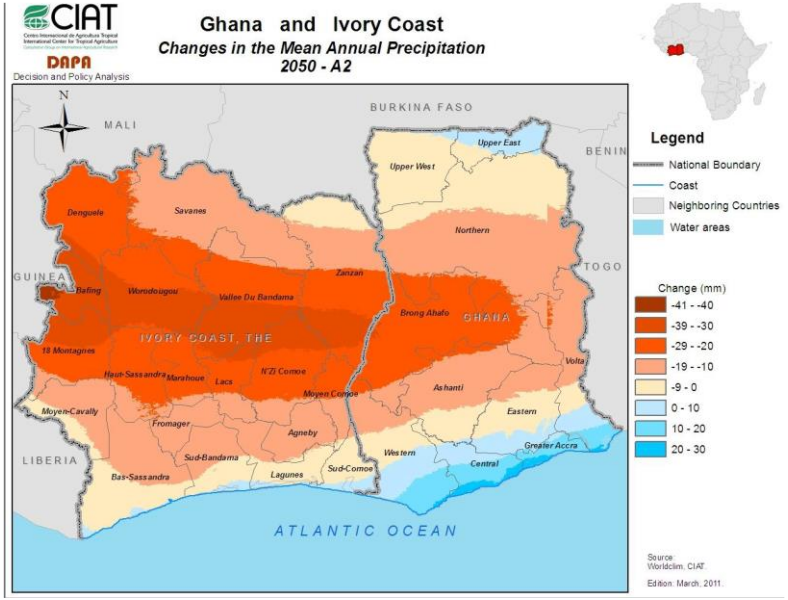
General characteristics

CLIMATE CHANGE

- Climatic change is causing temperatures to rise and rainfall to become more erratic. The figure on the right shows that towards 2050 average annual rainfall will decrease by 10-40 mm in Northern Cote d'Ivoire.

- The middle belt will be hit hardest, with the area around Bouake receiving 30-40 mm less on an annual basis. At the same time extreme weather events, that include very heavy rainfall and floods, are on the increase.

- Reliability of rainfall decreases which will trigger the necessity to invest in irrigation; either for full irrigation during the dry season or as supplementary irrigation during the rainy season.



Characteristics of production systems

PRODUCERS AND PRODUCER GROUPS

There are four types of producers in Northern Côte d'Ivoire:

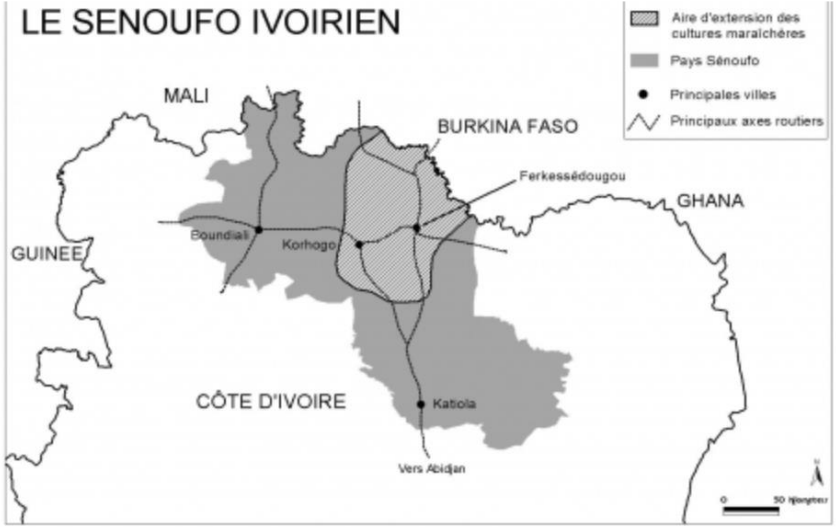
- **Small-scale rainfed:** Producers that produce on small plots of land during the rainy season, both for home consumption and market sales.
- **Commercial irrigated production:** Individual farmers and farmer groups that use pumps and furrow irrigation (including California system) for high productive vegetable production.
- **Small-scale irrigated production by women groups:** This production takes especially place just after rains, using tubewells and surface water, often by labour intensive bucket irrigation. For the two biggest producing districts of Poro and Tchologo it was found that 90% of onion production takes place in this way (Dagnogo et al, 2018). Below a box with more details:
- **(Peri)-Urban irrigated production:** In cities like Korhogo and Bouaké there is much horticultural production within the cities, on riverbanks along streams (see map below on the right of vegetable production in Bouaké).

Box 1: Vegetable production by women groups in the North: The North is the region of Côte d'Ivoire where collective vegetable production by women's groups is common. This often takes place at the beginning of the dry season as long as irrigation water is available. This form of organization allows women to engage in this activity without much land and capital needs. It provides them with supplementary income and a high quality nutritional food for their families. This organization should also be seen as a desire on the part of the women to have a place where they can meet, share earn income and share experiences and earn an income.

IRRIGATION SYSTEMS

The North is an area with a large livestock population. As such, there is competition for water between irrigated agriculture and grazing lands, especially in the dry season. There is no real fencing of irrigated areas to: 1) protect them from invasion by herds when there is no vegetation left to feed them in the dry season, 2) prevent them from passing through to access water for drinking. Rainfed agriculture, dry season migration and livestock rearing are therefore the three main activities that traditionally enable Ivorian peasantry to ensure their subsistence. Horticulture production has recently been added to this trio. Most irrigation is through pumping water from rivers and streams, and by shallow tube wells.

There has been limited investment in collective irrigation infrastructure (e.g., unlike Mali and Burkina Faso). And the systems that have been developed are poorly managed. Projects supported by the Ivorian government and international donors are carrying out market gardening schemes to facilitate access to irrigation water (e.g., PROPACOM, PARFACI).



The figure above visualizes the main watershed of Northern CIV and the area where most water is extracted from (light grey).

Through the PROFIAB project, GIZ initiated implementation of drip irrigation systems for horticulture production. The project implemented this type of irrigation system for the northern zone for onion production with limited success (much of the drip irrigation is abandoned at the moment).

Characteristics of production systems

IRRIGATION SYSTEMS

- Producers in Ferkéssedougou use the Bandama river as main water source.
- There is sufficient water available through this river and irrigation can be expanded. At the moment, most irrigation is implemented by farmers themselves through small pumps and furrow irrigation.
- Popular other irrigation systems are the so-called California system with underground plastic hoses for distribution of water and furrow for field irrigation (see photo on the top right). Water is pumped from rivers and streams and distributed by gravity irrigation over the field.
- Drip irrigation systems have been introduced through projects. But after a project's exit, such systems are often no longer used by the farmers (see photo on the right below). Irrigation tubes come with different challenges for farmers, the tubes get clogged and insufficient knowledge transfer is done after implementation of such irrigation systems.
- Other systems used are the very labor-intensive bucket irrigation system (often used for smaller fields).

IRRIGATION TECHNOLOGIES

Despite the challenges producers face with the implementation of new irrigation schemes in the North like with the large- scale irrigation systems and drip irrigation pilots, there are good alternatives available. Below we present a number of options and their pros and cons; in particular for the dryer winter season in the horticulture hotspots of Korhogo and Ferkéssedougou.

Type of irrigation system	Pros	Cons
Bucket irrigation from rivers and stream	Cheap option to irrigate small plots of land	Very labour intensive (treadle pump could be considered to reduce labour requirements)
Shallow tube wells with furrow irrigation	Possible throughout the region after the rainy season, relatively low cost	Not sufficient water supply in the main winter season, high evaporation and drainage (because of furrow)
Diesel pump and furrow irrigation system next to river or stream	Pumps easy to repair, water availability year round	Costs for diesel, low water use efficiency because of evaporation and drainage (because of furrow)
Diesel pump and drip irrigation system next to river or stream	High water use efficiency, balancing water needs of plants with water supply	Expensive system; drip lines clog easily and require maintenance and replacement
California system with furrow irrigation	Can irrigate larger areas of land with limited evaporation during water distribution	Expensive system that requires farmer organization and centralized management

PRELIMINARY CONCLUSIONS: MAIN PRODUCTION CHALLENGES

- Pesticide use in Northern Côte d'Ivoire is high. There are issues with using the right type of pesticides and their application. Especially for cabbages it is said to be a big problem. It is worthwhile exploring introducing Integrated Pest Management looking at better scouting of diseases, crop rotation and biological control (and low-risk pesticides).

- Compared to neighboring countries there is limited organized irrigation schemes. Most irrigation takes place ad hoc by farmers themselves or in small-scale irrigation schemes. This favors a more farmer-led irrigation support approach (building on existing practices).

- General support for vegetable producers in the North has been low (compared to other parts of the country). This also has historical reasons.

Crop-specific characteristics

03

TOMATO

National production: There is limited data available on tomato in the national statistics. Different news sources state that there is more than 300,000 tons of tomato production in the country and that it is the biggest vegetable crop cultivated.

Main production areas and seasons: Best yields are observed in the forest-savannah transition zone (around Bouaké). However, more extensive production takes place in the northern regions, particularly in Poro and Tchologo under rainfed conditions during the rainy season. We estimate that the northern zone represents around 30% of national production.

Production challenges: There are production challenges because of *Tuta Absoluta*, a tomato leafminer that can destroy entire harvests. Other diseases include bacterial wilt, fusarium and tomato mosaic virus.

Other production characteristics: Highest yields are achieved during the dry off-season and under more controlled conditions (like greenhouses / ABRIs). Varieties available are Roma type, hard-skinned, durable for long transportation distances.

TOMATO

Market dynamics: Prices in July in Bouaké and Korhogo were resp. CFA 500 and CFA 300 per kg. Prices go up during the dry winter season in December and January, with prices of CFA 1,000 quotes for Ferkéssedougou. Input use is high for tomato at CFA 350,000 per hectare.

Other market issues: There is strong competition from Burkina Faso in the winter season (January-March). There has been a relatively new investment in a tomato processing factory, Tomates de Côte d'Ivoire (TOMACI), part of the Carré d'Or Group, in Abidjan.

Bouaké is the central collection point for the trade corridor of West Africa, linking North and South.

ONION

National production: Onion production started late in Côte d'Ivoire and some studies indicate that around 90% of onion is still imported (mostly from Burkina Faso, Niger and the Netherlands). The main production season runs from October till March (see production calendar below), with sales up to June.

Main production areas and seasons: Most important production areas include: Tingrela, Odienné, Boundiali and Korhogo. Yields are below 10 tons per ha and far below yields obtained in neighboring countries: Burkina Faso and Niger. Production around Odienné, Korhogo, Ferkéssedougou and Bouaké is almost solely for the supply of urban markets in the period up to June.

Production challenges: Earlier planting of onions in August and September (during the end of the rainy season) can help to extend the current growing season in the north. Such a change of calendar would imply the implementation of under-cover nurseries that reduce the risk of excess rainfall at the end of the rainy season. This could push the harvest to January when prices are still high.

Other production characteristics: Much of the onion production in the North takes place using remaining water from the rainy season (either through surface or shallow tube well irrigation). Many women groups are involved in this, often cultivating small plots of land.

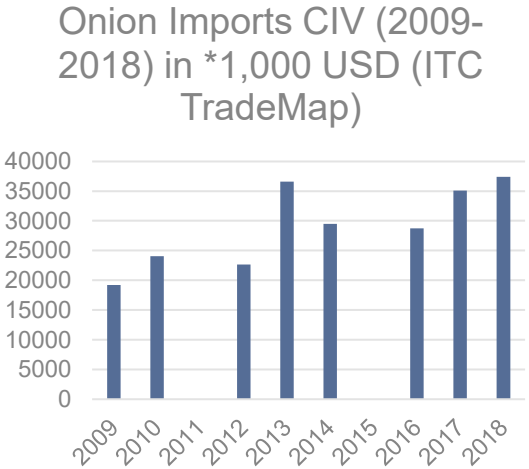
Activités		Août	Sept	Oct	Nov	Déc	Jan	Fév	Mar	Avr	Mai	Juin	Juil
Pluvio Nord	Min	50	50	50	0	0	0	0	0	20	50	50	100
RCI (mm)	Max	300	400	300	150	50	10	100	200	200	250	300	300
Pépinière													
Repiquage													
Sarclage													
Récolte													
Vente													
Pics de travail				Récoltes céréales/tubercules						Semis céréales/tubercules			

Crop specific characteristics

ONION

Market dynamics: Some studies indicate that more than 80% of onion is imported mostly from Burkina Faso, Niger and the Netherlands. In total 120,000 tons were imported at a value of close to USD 40 million (see figure below). Red onions are imported from Niger and Burkina Faso, while brown onions come from the Netherlands. For the Netherlands Côte d'Ivoire is the second largest buyer of onions outside of the EU (after Senegal). Prices during July were CFA 600 per kg and equal for onions from Burkina, Niger and Ferkéssedougou. Prices drop to CFA 150-200 per kg during March-April.

Other market issues: Especially in March-April there is much supply of onions from neighboring countries Burkina Faso and Niger. And Côte d'Ivoire cannot compete with these market prices. It is mentioned that horticulture receives much more government and donor support in these countries.



Crop specific characteristics

CHILI

National production: According to FAOStat (2020) Côte d'Ivoire produced 26,522 tons of green peppers and 127,642 tons of dried peppers. Types of chillies include the bird's beak chilli (elongated) and Scotch Bonnet (Madame Jeanette, very hot pepper, portrayed on the left).

Main production areas and seasons: Chili is grown throughout Côte d'Ivoire. There are two cropping cycles: irrigated from September to April, and rainfed from April to August. There is some chili production in the North. Since the mid-2010s, chili has become a more popular crop, especially in Ferkéssedougou: farmers of Ferkéssedougou increasingly involve themselves in the cultivation of chilli peppers, which are sold at a high price on the local market, according to de Agence Ivorienne de Presse (AIP), in the large riverbeds of the Bromakoté district.

Production challenges: Chilli is susceptible to six viruses, some of which are seed-borne. It is also very susceptible to anthracnose and to the fruit fly Ceratitis capitata in the wet season. The bird's beak chili is one of the most popular varieties because of varietal improvements that were led by CNRA.

CHILI

Market dynamics: Chilli prices in July stood at CFA 500-600 per kg in Bouake and Korhogo. Prices in general go down towards the end of the rainy season (September-October) to CFA 200-300 per kg. During the dry season (December-April) prices go up to CFA 800-1,000

Other market characteristics: Much of the chilies are dried under traditional circumstances in the North (outside dried by the sun on plastic sheets). In Yamoussoukro, a few mechanical drying factories exist. These operate on a toll processing basis, with especially women supplying the chilies. Input use is high for pepper at CFA 300,000 per hectare.

OKRA

National production: Okra is a very popular product in Côte d'Ivoire and FAOStat (2020) indicates a total production of 188,736 tons per year.

Main production areas and seasons: The crop is well adapted to Northern Côte d'Ivoire. The most favourable period is the rainy season. Two species are identified in Côte d'Ivoire: *Abelmoschus esculentus* and *Abelmoschus caillei*. For each specie, CNRA developed an improved variety, resp. Koto and Tomi. Especially Koto is well adapted to the conditions of Northern Côte d'Ivoire and can yield up to 11 t/ha. Main production takes place during the months of June-September.

Production challenges: Powdery mildew is important especially in the northern half of the country. In addition, nematodes can reduce crop productivity.

Market dynamics: Okra prices in July in the North were average at CFA 500 per kg. Prices go down during the end of the rainy season (September-October) to CFA 200-300 per kg. Afterwards they go up again during the dry season, CFA 600-900 in March-June.

Other market dynamics: Okra from Bouaké is known for its good quality (Gombo Boualé); prices for this variety are also higher. Input use for okra is low at CFA 90,000 per hectare.

AFRICAN EGGPLANT

National production: FAOStat estimates that Côte d'Ivoire produces 109,052 tons of eggplant in 2020. Production is mostly small-scale and throughout the country. European eggplant (aubergine) is much less popular.

Main production areas and seasons: African eggplant is well adapted to the growing conditions in Côte d'Ivoire. It can be grown in all seasons.

Production challenges: Main diseases include bacterial wilt, crown rot and root-knot nematodes. The plant is also susceptible to mites.

Other production characteristics: The N'Drowa variety remains one of the most popular among those produced locally.

Market dynamics: Prices in the north were high at CFA 400 per kg in July (in Korhogo and Bouaké). Later during the rainy season, they go down to CFA 150-300 per kg. Also, in the irrigated winter seasons they are low at CFA 100-150 per kg (December-February).

Other market dynamics: Smaller sizes fetch a higher price. Input use for eggplant is low at CFA 100,000 per hectare.

CABBAGE

National production: There is no production data available on cabbage production in Côte d'Ivoire.

Main production areas and seasons: Cabbage is widely grown in Côte d'Ivoire. It was seen in two irrigated schemes in the north with good development. It is less popular than other vegetables and there is limited attention for the crop by research institutes. There is low availability for over six months of the year (February to July). During these months cabbage is heavily imported from Burkina Faso.

Production challenges: There is a wide choice of varieties depending on the length of the crop cycle, the shape of the head and adaptation to the seasons. While the choice is relatively wide in the dry and cool seasons, in the rainy season, varieties with good tolerance to black knot disease caused by Xanthomonas campestris are needed. The main limiting factor is the diamondback moth Plutella xylostella, especially in the dry season, against which pesticide applications are necessary.

Other production characteristics: There is a lot of misuse of pesticides for this crop (overapplication of pesticides).

Market dynamics: Prices in July were CFA 400 per kg in Bouaké. Prices go down towards the end of the rainy season in August-September, to CFA 150-200 per kg.

Other market dynamics: Input use is high at CFA 250,000 per ha.

SUMMARY: SELECTED VEGETABLES AND MAIN SUITABILITY IN THE NORTH

Crop	Opportunities	Challenges
Onion	Good production conditions in the North in wintertime, with irrigation, opportunities for empowerment of women producer groups	Competitive sector, with high imports from Burkina Faso, Niger and the Netherlands. Low literacy levels and access to finance to further invest in productivity increase (irrigation & inputs)
Tomato	Relatively high market prices during the winter season (December-January). Best yields observed in the middle Belt (incl. Bouaké). Productivity increase possible with better seeds and production practices.	Tomato is susceptible to several pests and diseases of which some are soilborne (bacterial wilt). Also, pests like the tomato leafminer, *Tuta Absoluta*, are present and can destroy entire harvests.
Okra & African Eggplant	Both crops are well adapted to the growing conditions of Côte d'Ivoire and are consumed widely in local dishes. Varietal improvement has taken place thanks to CNRA.	Market prices are lower and there is limited attention from international seed companies for the crop.
Chilli	Chili is grown throughout Côte d'Ivoire. Most of the production is small-scale. Further productivity increase is possible as well as value addition through drying.	Chilli is susceptible to six viruses, some of which are seed-borne, current yields are low.
Cabbage	There is a wide choice of varieties depending on the length of the crop cycle, the shape of the head and adaptation to the seasons.	Misuse of pesticides lead to the intake of harmful substances among producers/ consumers.

Value-chains & market systems

04

MARKET SYSTEMS

Wholesaler-intermediaries are the buyers most valued by urban farmers over small-scale buyers at the field level. This preference is mainly due to supply security. Producers feel that transactions with the wholesale intermediaries provide them with more consistent and secured sales than that of other clients (e.g. retailers or direct sales to consumers).

In Bouaké, intermediary wholesalers supply retailers and other purchasers in the city or those living outside Bouaké (including Abidjan).

This Chapter describes a few examples of market systems in Bouaké and Ferkéssedougou. We also describe the main challenges pertaining to packaging and postharvest losses.

THE MARKET SYSTEM IN BOUAKE

The chain of production to sales can be long in Côte d'Ivoire. There are many commercial intermediaries that link farmers to consumer markets. In the marketing chain of products grown in the peri-urban horticulture system of Bouaké, the intermediary-wholesaler is an important link. These intermediaries serve as a bridge between the producer and the retailer. Generally, the wholesalers rarely deal directly with consumers. Their primary goal is to have a considerable amount of product in order not to slow down or break the relationship with retail customers. Products purchased from producers in different locations in the city are transported to the twenty or so local markets throughout the city or to markets outside Bouaké. The radius of activity of the wholesaler is very wide.

The cultivation of vegetables in the peri-urban area of Bouaké dates back to the colonial period. Products are marketed locally through short circuits, or on urban markets, with long circuits involving collectors, transporters, wholesale traders and retailers.

In Bouaké, the majority of intermediary-wholesalers are women, with an estimated proportion of 90%, in contrast to the past when the majority were men. Moreover, this group of intermediary-wholesalers is not only of Dioula ethnicity. Indigenous Baule women, originally from the region, have been active in vegetable marketing for several decades. Quality criteria for vegetables strongly depend on the market destination. As such, products that are sold to external markets require higher quality criteria, in terms of size, texture and colour.

Okra, tomato, chilli and aubergine are the most important vegetable crops in terms of quantity at national level. Vegetables are produced as field crops in market gardening areas (lowlands, irrigated areas), generally in peri-urban areas, and, to a lesser extent, on soilless farms (greenhouse cultivation).

THE MARKET SYSTEM IN KORHOGO

- For Korhogo, it's difficult to satisfy the urban market with peri-urban vegetables production alone. The villages near to the city (in a 5 km radius) supply directly through the urban markets (E.g.: Grand Marché, petit Marché de Belleville, Marché de Koko) each Saturday. The gap of Korhogo's demand is filled with imports from Ferké and neighboring countries.

-There has been a lack of appropriate storage facilities in the city and as a result market prices fluctuate substantially. When supply is high small-scale producers must sell their products at low prices (as they cannot be preserved for a longer period of time).

- As a reaction to this, a former cereal storage has been transformed into a storage facility for vegetables. In July 2022 the storage was renovated, and it is expected that this facility will become a central marketplace where vegetables can be stored for a longer period of time; reducing postharvest losses and buffering for price fluctuations. The storage facility is managed by the Bureau de Vente et Production (see also slide 35).

- There are insufficient funds to install a cold room in the storage.

EXAMPLE OF A WHOLESALER IN FERKESSEDOUGOU

Inputs

A few wholesalers have agreements with input suppliers, such as Phytotop (seeds and fertilizers) and provide these to farmers. After harvesting, the value of the input for fertilizers will be reduced from the price the wholesaler pays for the produce. This particular person does not import from Burkina Faso, but others do import onions from neighbouring countries and even the Netherlands.

Trade

Wholesalers sell their purchased produce at Ferkéssedougou, Korhogo and Abidjan. For the local market, they go to markets on the market days by truck to sell produce to women. This wholesale trader (and a few more) also delivers vegetables directly to consumers at home. This is an upcoming trend. For Abidjan, they have organized a distribution system with other wholesalers to supply Marché Siporex (Yopougon), Marché Gbêba (Adjamé) and Grand Marché Abobo.

PACKAGING & POSTHARVEST LOSSES

- Produce is often transported in wooden boxes that cause losses. An Ivorian company, called Prosuma is one of the biggest fruits and vegetable suppliers in Côte d' Ivoire. They could be interested in providing good quality packaging materials. Another company that works in the country already for some time is the Dutch-Belgian company LC Packaging.
- Packaging and infrastructure are, among others, affecting the shelf life of produce and the cause of losses. Fresh produce is packed in big boxes or bags of around 50 kgs.
- Vegetable transport to Abidjan takes place under very basic conditions: boxes of 20 to 40 kg (tomatoes) or in large bags of 30 to 50 kg (okra, African aubergine, chilli pepper, etc.).
- Packaging causes majority of post harvest losses, (sometimes up to 1/3). Improvements can be made in the size and type of packaging; e.g. smaller plastic crates; as successfully introduced in northern Nigeria.

EXAMPLE: BUREAU DE VENTE DES PRODUCTEURS

- The Bureau de Vente des Producteurs is an agricultural government structure facilitating marketing of agricultural products. An agreement was signed between the Bureau de Vente des Producteurs (BVP) and the World Food Programme (WFP) in 2018 to provide assistance in marketing the agricultural products of 20 women's groups in the Poro and Bagoué regions.
- The BVP offers e-commerce and agribusiness services to promote the link between producers and buyers in a privileged framework focused on local supply and a targeted and aware demand.
- This involves: (1) the design of a database of producers and potential buyers, (2) facilitating group sales on a direct contract model of local commodities and (3) the design of a marketing platform for the agricultural products of 20 women's groups in the Poro and Bagoué regions. The first phase of this project consisted of the realization of the electronic platform to allow direct (and low-cost) contact between buyers and producers without intermediaries.

PRELIMINARY FINDINGS AND CONCLUSIONS

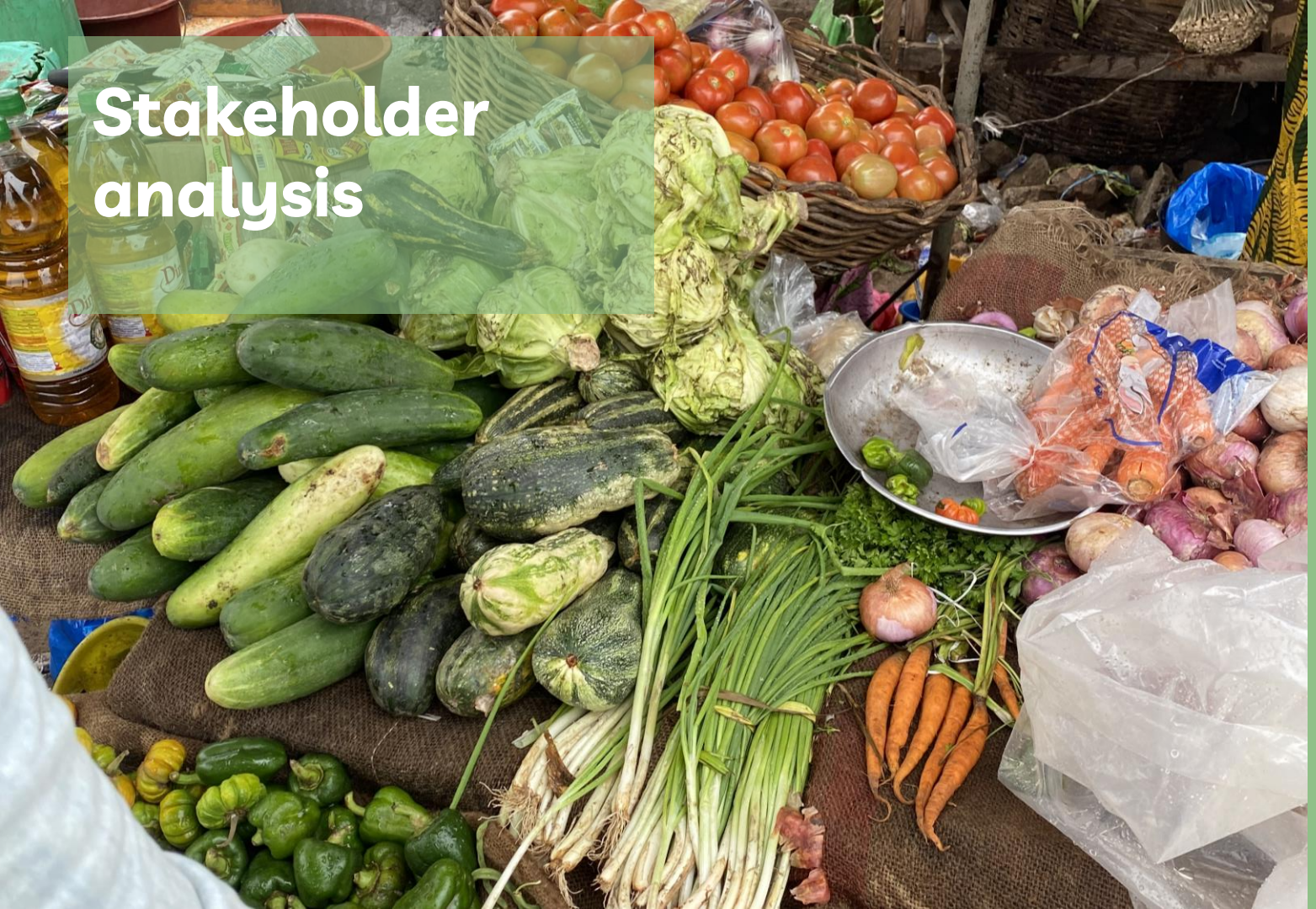
- Especially during the winter months there is much supply of vegetables (and especially tomato and onion) from neighboring countries Burkina Faso and Mali. The vegetable sector in West Africa is dominated by the Hausa people originating from Niger/ Nigeria.

- Korhogo and Bouake are the main centers for vegetable trade. Korhogo has a new vegetable storage facility that could facilitate better distribution of fresh fruits and vegetables from the North (as a supply buffer).

- There is room for improvement in terms of packaging and postharvest management. Vegetables are transported in large crates (for tomato) or big bags (for onion and cabbages) which increases postharvest losses.

- The challenge for vegetable production is to adapt to the growing demand in urban centres by modernising packaging and distribution channels, mainly through investments in packaging and cold chain.

- Neighbouring countries outcompete the local production, which could be perceived as both a threat and an opportunity. The steady supply in wintertime keeps prices for consumers low, while at the same time Ivorian farmers (especially in Korhogo and Ferké) can learn from the neighbouring production systems. Climatic conditions in the north are more or less the same as in Burkina and Niger while transport routes are shorter.



Stakeholder analysis

05

INTRODUCTION STAKEHOLDER ANALYSIS

We have organized the stakeholder analysis in three parts:

(1) Private sector stakeholders, including input suppliers (Callivoire and Agrifer), large-scale producers (Capsikan), buyers (Prosuma), consultancy companies (BFDC) and four Dutch vegetable seed companies.

(2) Public sector stakeholders, including research and education institutes like CNRA and the University of Korhogo, as well as extension and development organizations like ANADER and FIRCA.

(3) Development projects, e.g., IFDC and 2SCALE

INPUT SUPPLIER: CALLIVOIRE

- A private company which focusses on the distribution of inputs and spray equipment.
- Provides drip irrigation systems to producers, most customers are the 'Sunday gardeners' who garden during their free time after working hours.
- Callivoire offers courses on good agricultural practices and provides coaching to producers.

Challenges in the North are:

- The system is not organized (from buying the inputs to selling the produce).
- There is a lack of knowledge on good agricultural practices.
- The market is not stable, prices fluctuate.
- Biological control is not affordable for local farmers.

INPUT SUPPLIER: AGRIFER

- Offers an integrated soilless system through the INNOFER concept, which consists of a package of equipment and quality inputs for the intensive production of market garden crops and technical support for the production and marketing of market garden products.
- Agrifer also works in open field and provides inputs for *plein sol* horticulture, including seeds of Rijk Zwaan, specialty fertilizers of Van Iperen and irrigation equipment.

- Agrifer is a key partner in the Hortivoire project (in Tiébissou) and has a demonstration site at the University of Korhogo

LARGE-SCALE PRODUCTION: CAPSIKAN FERKESSEDOUGOU

- Capsikan has an agreement with the government to produce on 350 ha with producers from surrounding villages. Most plots are used for cash crops and a small amount is used for vegetable production.
- Most common vegetables they produce are tomato, eggplant, chili, zucchini and cucumber.
- Vegetables are sold at surrounding markets.
- Farmers irrigate their plots with water from the Bandama river by bucket and furrow irrigation.
- Soil is deteriorating because of its rotation history, which results in different pests like nematodes and bacterial wilt (especially for onions and chilies).
- When the mango season has ended, white flies destroy crops since they usually target mango trees.
- There is a misuse of pesticides, and it is frequently purchased from abroad.
- Capsikan has an objective to develop a farmers' school in Ferkessédougou

MORE ADVANCED WHOLESALER: PROSUMA

- Distributor of vegetables to supermarkets in Abdijan
- Most vegetables are imported from abroad (e.g., Morocco)
- Supplies to the supermarkets in Abidjan: Cash Ivoir, Bon prix, HAYAT, Pro cash, Sococe II Plateaux and has 17 big shops and around 100 small shops.
- There is an increase in the focus on local vegetables, but the current supply does not meet the demand
- Works with middlemen who have contracts with producers
- There is no transparancy in the origin of the local product
- In 2022, Prosuma wants to start operations in Bouaké, where producers can supply their produce
- So, there is a shift in the focus of Prosuma towards the north of the country.
- There is need to diversify the types of vegetables, producers should differentiate and focus on different tomato varieties to interest big players such as Prosuma.

TECHNICAL & CONSULTANCY ADVICE: BUREAU DE FORMATION ET DE CONSEIL EN DEVELOPPEMENT (B.F.C.D)

- BFCD is a company that works as technical advisor within projects together with producers (e.g.: Propacom project).
- They have expertise in the organization and training of farmer groups and technical support on irrigation systems.
- They works in the Propacom project of GIZ on irrigation systems: best applied by farmers is the semi-California system.

Private sector stakeholders

INTEREST OF DUTCH COMPANIES

We interviewed four Dutch vegetable seed companies. Feedback received includes:

- The northern part of Côte d'Ivoire is generally less developed than neighboring countries where they have substantial sales (Burkina Faso and Mali). This mainly has to do with the absence of large-scale irrigation schemes and lack of government support to the sector (historically). E.g., onion seed sales are very low in Northern Côte d'Ivoire. As such one of the four companies is not interested to further work in (Northern) Côte d'Ivoire, and another prioritizes other West African countries first.

- However, the two other companies see good opportunities and have prioritized Côte d'Ivoire in their West Africa strategies. As such they want to further invest in seed promotion and extension activities. For these two companies the main areas where they sell seed are around Yamoussoukro and Abidjan and less in the north. Important crops are tomato, onion, hot pepper, bell pepper, cucumber, okra and African eggplant.

GOVERNMENT EXTENSION: ANADER

- The Agence Nationale d'Appui au Développement Rural (ANADER) is a government extension service that focuses on agricultural development.
- ANADER has implemented different strategies to solve the problems encountered in the agricultural sector, namely the lack of infrastructure and appropriate jobs in the sector, the lack and poor adoption of modern technologies and appropriate means of drainage as well as the waste of water resources.
- The objective of the Agricultural Sectors Development Program is to improve post-harvest activities, notably packaging, storage, processing and marketing in the three strategic sectors, namely rice, vegetables and mangoes.
- ANADER has set up a team that should be dedicated to the horticulture sector, but there are no specialists for market gardening in the regions. This means that support for market gardening has been integrated with support for food crops.

GOVERNMENT RESEARCH: CENTRE NATIONALE RECHERHE AGRICOLE (CNRA)

CNRA is the national research organization focusing on agriculture. It has a program that is focused on market gardening, which comprises a few researchers and focuses on seeds and vegetables (CIRAD, 2019). The interprofessional fund for research and agricultural advice (FIRCA) has set up a national strategic plan.

CNRA aims to work with research & development projects and private sector companies (Nestle, Unilever).

CNRA focuses on building value chains by prioritising the management of genetic resources. However, they face challenges like the lack of structure in the sector. There is an extensive need for training of the different actors in the value- chain for seeds. At the moment pre-basic seed is produced by CNRA, and the seed companies must be trained before they can produce the subsequent certified seed. Seed growers must be trained, organized and monitored for their professionalisation.

<u>Opportunities in the North with CNRA:</u>
- Promotion of local genetic resources
- Creation of new jobs in VDCs
- Added value in terms of monetary species
- Development of specific pesticides for vegetables
- Development of soil-less cultivation (hydroponics, aquaponics, aeroponics)

Public sector stakeholders

GOVERNMENT RESEARCH & ADVICE: FIRCA

The interprofessional fund for research and agricultural advice (FIRCA) has set up a national strategic plan. The strategic plan of 2021-2026 consists of two main objectives of mobilizing resources and to ensure the sustainable financing of service provision programs in the plant, forestry, animal, and fisheries production sectors (FIRCA, plan stratégique 2021-2026).

The 'Fonds Interprofessional pour la Recherche et le Conseil Agricole (FIRCA) carried out a project in the horticulture sector of Côte d'Ivoire, which is called Pro2M. with the PRO2M project, four agricultural service centers have been established in different cities, among others Bouaké. This center is provided with agricultural equipment, such as, tractors, 1 plough, and others. 1 of the 4 centers is established in Bouaké. The management of the centers has been entrusted to private operators, recruited following a call for projects. These operators will be responsible for starting up activities immediately after receiving the agricultural equipment to respond to all requests from producers (FIRCA, 2021).

RESEARCH & EDUCATION: UNIVERSITY DE KORHOGO

- The University has four faculties, of which one is agriculture which is divided in bachelors and masters.
- Alumnis often find work in projects (e.g. : PROPACOM).
- Ferkéssedougou is the area where onions are being produced and there are some cooperatives there as well that work with the University.
- There have been many diseases and pests in the vegetable production, for example chili is having major issues at the moment. There is a disease (Mosaic virus) that the farmers struggle with.
- The University collaborates with CNRA on research.
- There is a demonstration plot at the University with input that has been supplied by AGRIFER and Rijk Zwaan.
- In the north, producers have not yet attended the level to produce large quantities and to professionalize. This is mainly because it is seen as a woman's activity and most are illiterate.
- Farmers apply a lot of pesticides and there is a lot of misuse. The university did an analysis on cabbage and the level of pesticides, and they recommend not to consume cabbages. It is even so that cabbages have developed a resistance to pesticides in the North as a reaction to the misuse. It is often the case that producers use the pesticides of cotton.

NGOs & Development Projects

IFDC

enGRAIS Regional project focused in the African region

Developed laboratories for fertilizers and the fertilizer response on soils and crops in Ivory Coast.

No cartograph of soils in ivory coast, but does have experience in other countries to develop one

In the North of Ivory Coast, it is necessary to analyse soils because of the cotton activities. There are not (yet) cartographs of soils in the North of country.

In 2015/2016 IFDC worked with an application ***microdose engrais***; to control losses in production. This was for rice, so not for vegetables. However it could be interesting for the vegetable sector.

The vegetable sector is not yet a priority.

2SCALE

Focused on vegetable sector in Ivory Coast through Canaanland but not in the north because of the difficulties of the market for vegetables.

In the north near Ferkéssedougou and Korhogo, cereal activities dominate (maize, cotton and rice). Vegetable production is done parallel to the production of cash crops, often by women.

Cooperatives work around cash crops and do some side activities for vegetables, they use the same fertilizers and pesticides for vegetables.

The difficulty is access to market, perishable produce and poor infrastructure (though infrastructure has improved substantially in recent years).

Aubergine, gombo, chili are easier to market than tomato for example → in the North there is more concentration in these vegetables.

Main challenges lay on the production level, there is a lot of misuse of pesticides.

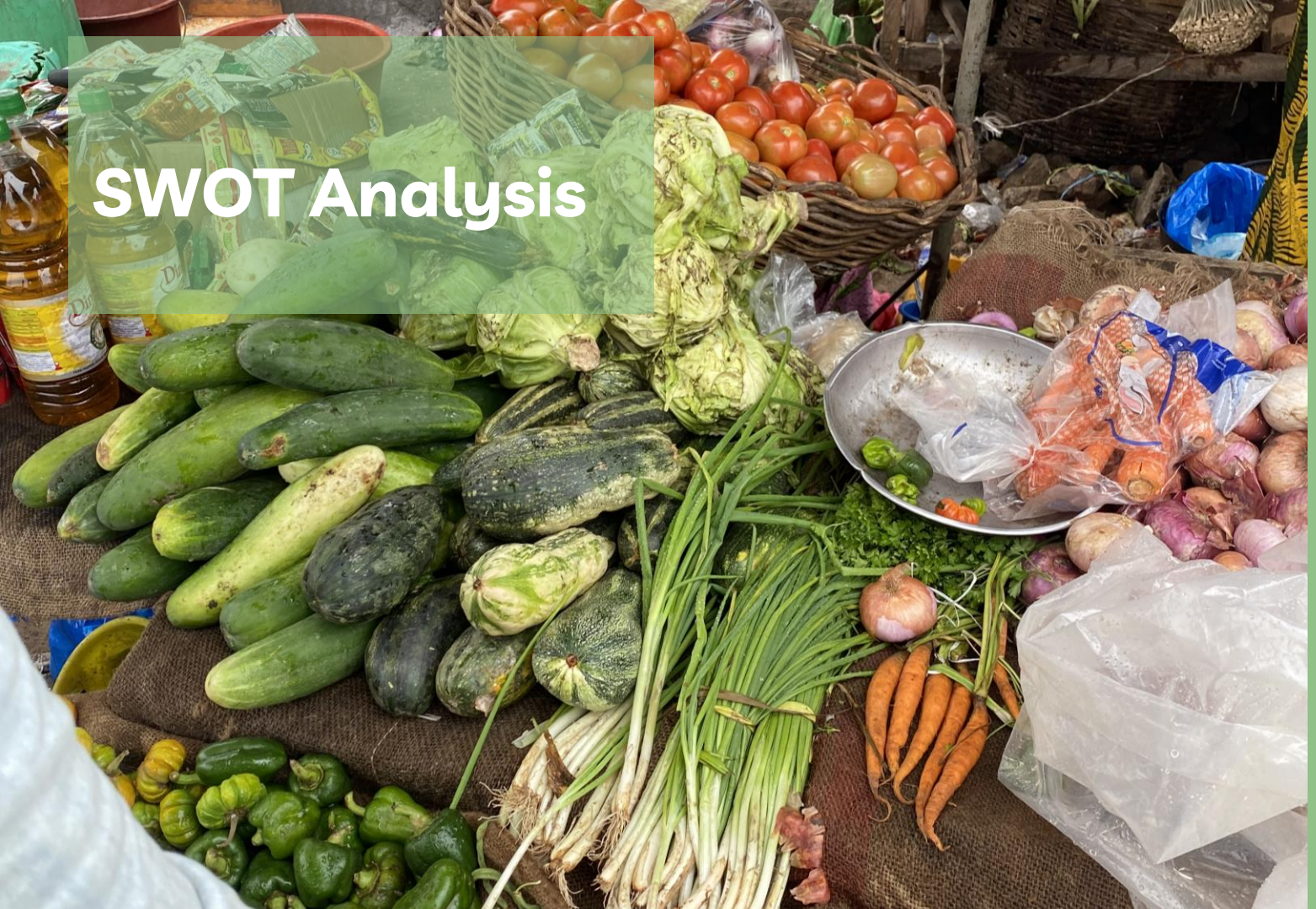
PRELIMINARY FINDINGS AND CONCLUSIONS

- There are a number of government organizations active in the North, with especially CNRA and the University of Korhogo as important players in the vegetable sector. FIRCA and ANADER have fewer vegetable activities at the moment.

- In addition, for the implementation of development projects both the company 'Bureau de Formation et de Conseil en Développement' and the international NGO IFDC have experience supporting farmers technically and strengthening group formation.

- Depending on the type of project (e.g., more focusing on applied research or agricultural extension) the four above mentioned organizations can be engaged. Generally, CNRA is better positioned for applied research activities, the University of Korhogo for applied research and education, while IFDC and BFCD are better positioned for farmer training and extension activities.

- Prosuma is a serious player in the distribution of vegetables in supermarkets but is forced to import produce due to lack of sufficient and quality local supply. Depending on the project, Prosuma could play a role as a vegetable buyer.



SWOT Analysis

SWOT ANALYSIS

Strengths	Weaknesses
• Sufficient water for irrigated horticulture around the Bandama river in Northern Côte d'Ivoire • Several government organizations active in horticulture (CNRA, University of Korhogo) • A production and marketing hub around the city of Korhogo (including Ferké) including new storage facilities • Prices for most vegetables are high almost year round	• High levels of illiteracy amongst farmers; difficult to organize trainings or access (micro-) finance • Limited economy of scale and low levels of farmer organization • Limited price transparency and lack of direct relations between producers and wholesalers • No large-scale government supported irrigation schemes • High use of inappropriate pesticides • Limited level of organization of producers
Opportunities	**Threats**
• Yield gap is large. There is much opportunity for more intensive 'high input - high output' production systems using better seeds, fertilizers, and crop protection products (incl. ISFM, IPM) • Improving existing irrigation systems and support for women groups already producing vegetables • Quality vegetables sales to urban consumers in regional centres like Bouaké and Korhogo	• Insecurity and clashes between pastoralists and sedentary agriculturalists • Strong competition from neighbouring countries • Climate change reduces rainfall and increases temperatures

Business & Development Opportunities

07

LESSONS LEARNED FROM HORTIVOIRE FOR THE NORTH

Hortivoire project elements	What knowledge or technologies can be transferred?
Development technology (INNOFER hors-sol system)	Works well in the north and the middle belt. The middle belt includes Bouaké. Good experience in Korhogo and Ferkéssedougou.
Intensive training for youth (at least 4-months on-site)	Can work well in the North for youth that have finished secondary school, though it would exclude illiterate farmers (that currently comprise 90% of the farmers).
Collaboration with a government research/extension organization	The University of Korhogo is well positioned to include new technologies in their research and education activities.
Adaptations required	For Korhogo and Ferké it will be important to add options for *plein sol* (in addition to hors sol) these can include mulching, drip irrigation and trellising. Important to include integrated pest management for *plein sol* production.
Other lessons learned that can be applied in the North	Explore the possibility to manage the training centre semi-autonomously within an existing organization (e.g., University of Korhogo) with efficient day-to-day decision-making (e.g., in the form of a separate Project Management Unit).

BUSINESS OPPORTUNITY 1: INCREASING PRODUCTIVITY IN THE NORTH

Background: Vegetable yields in Northern Côte d'Ivoire are low (and much lower than in neighboring countries Burkina and Niger) and production practices are traditional. There are a number of more commercial farmers that use irrigation (Californian system/furrow) and use improved crop varieties. There is still much room to increase productivity and make use of new (hybrid) varieties. Two interviewed Dutch seed companies have selected Côte d'Ivoire as one of their priority countries in West Africa.

Opportunity: Professionalizing and increasing productivity through quality seed of improved varieties linked to training and demonstration activities. Like in other West African countries Dutch vegetable seed companies can invest in demonstration and training activities for Northern Côte d'Ivoire. Already two seed companies are active. Together with one or two other seed companies they could develop demonstration and training activities, both on rainfed and irrigated vegetable production (e.g., like the Seeds4Change project in Nigeria).

Financing: This opportunity could benefit from RVO/EKN support as Northern Côte d'Ivoire is not an easy place to work. The level of development, remoteness and security situation justifies public support in the context of trade, aid and investment. As such, the Impact Cluster co-financing instrument could be explored; or direct Embassy funding (like is used in Ghana for skills development with a government training institute).

Focus: All vegetables are suitable for this business case. With the right production method and inputs (e.g., seeds) yields can double (comparable to neighboring countries like Burkina Faso). Input partners of such a business case could be the two seed companies, while a technical NGO partner or consultancy could support project implementation. In addition, the University of Korhogo and/or CNRA could assist with variety trials, demos and trainings.

BUSINESS OPPORTUNITY 2: YOUTH SERVICE PROVISION

Background: Vegetable yields in Northern Côte d'Ivoire are low (and much lower than in neighboring countries Burkina Faso and Niger) and production practices are traditional. Especially the high use of pesticides is a concern as well as the low level of knowledge on basic agronomic principles (e.g., soil fertility management, water supply, and pest and disease management). In addition, there is high youth unemployment in the North while there are a number of colleges and universities that deliver graduates to the labour market.

Opportunity: Youth service provision to increase sustainable vegetable production (agronomic advice related to soil scans, and related tailor-made crop-specific fertilizer advice, spray service providers and coaching/digital tools. Together with CropLife a project could be developed on good practices, by developing job opportunities for young people in the North and collaborate with farmers in such a way that they reduce the use of pesticides and apply the pesticides in a safe manner. Something similar can be explored for integrated soil fertility management, combining soil testing with soil fertility advice.

Financing: Also, here RVO or EKN could support the initial startup training for the youth, so that they can set up their own agronomic services. This could be organized together with a college or University in the North (like the one in Korhogo). The activity could be organized as an incubator top-up program at one of the agricultural colleges. Possibly Orange Corners or Nuffic (TMT) can support an incubator and fund these type of activities.

Focus: All vegetables are applicable for this business case, with the good agricultural practices and support from young experts, the yields could increase, and vegetable quality will increase. Partners could include the Innovation Hub and the University of Korhogo.

BUSINESS OPPORTUNITY 3: DEVELOPING A DIGITAL TRADING PLATFORM

Background: The value-chain analysis shows that there are gaps in matching demand and supply, and that access to market information is limited for vegetable producers in the North. In other countries (e.g., Kenya) new initiatives have emerged that try to link producers and buyers through a digital trading platform (e.g., Twiga). Given the fact that smartphone penetration is still low in Northern Côte d'Ivoire an SMS service could be considered as well.

Opportunity: An existing or new (start-up) company can experiment with linking vegetable producers and producer groups in the North with the main consumer markets. A company like Prosuma is interested in this type of solution and is establishing a new wholesale facility in Bouaké. A partner like Prosuma could support with the packaging as well. Other partners could support in ensuring good quality, food safety for the region of Korhogo and Bouaké, e.g., looking at the development of a local label (for good agricultural practices and food safety, like Sûr et Sain). Another angle could be to include the Bureau de Vente des Producteurs (BVP) who are already providing a platform for 20 women groups that produce vegetables.

Financing: Also here, RVO or EKN could support the initial stage of product development and market introduction. The new BHOS prioritizes digital tools (and sustainability) and as such it fits the policy priorities well. The Impact Cluster instrument could be explored as well, though this does require at least four Dutch companies. Other potential funding mechanisms include Orange Corners (as part of a larger business incubation or acceleration program).

Focus: All vegetables could be included for this case. However, Prosuma stressed that producers should be more innovative with their varieties. Therefore, seed companies could be partners. CNRA could play a role as well, with its focus on research and varietal development.

BUSINESS & DEVELOPMENT OPPORTUNITY 4: FARMER-LED IRRIGATION

Background: Irrigation in Northern Côte d'Ivoire is small-scale and fragmented. There are hardly any large-scale irrigation schemes, and water use efficiency is low. Farmer-led irrigation approaches build on existing irrigation practices of smallholder farmers and aim to improve irrigation and production practices gradually (as well as linking farmers to markets). The focus area could be Ferkéssedougou and Korhogo, as most irrigation and commercial vegetable production currently takes place there.

Opportunity: As such a new initiative could be started with young and entrepreneurial farmers to improve irrigation and agronomic practices. This initiative would most likely be more of a development activity than a pure business opportunity. The challenges in the North (related to conflict, climate and underdevelopment) would justify such a more integrated development approach.

Financing: Probably Embassy or BHOS financing would best match the development objectives of this opportunity. The Netherlands has much to offer in this area, having had good experience with these type of activities in Kenya (Smart Water for Agriculture) and Mozambique (APSAN-VALE).

Focus: Since the focus of this case is on irrigation, all vegetables can be included. Agrifer and Callivoire could support this business case since they offer courses and coaching on good agricultural practices and provides drip irrigation systems to producers who are interested. Knowledge transfer on good practices with the University of Korhogo and CNRA.

SUMMARY: COMPARISON BETWEEN BUSINESS OPPORTUNITIES

Business and development opportunity	Public / Private sector opportunity	Target group	Financial size	Possible partners	Possible financing	Comments
Increasing productivity in the North	Public-private partnership	Smallholder commercial farmers	For sustainable impact: multi-million (EUR)	IFDC, BFCD, University of Korhogo, CNRA, Agrifer, seed companies	Impact cluster or EKN funded larger-scale project	Requires integrated approaches, i.e. ISFM and IPM
Youth service provision	Public-private partnership	Young agronomists / extensionists	For an incubator: EUR 250K – 3-year implementation	Innovation Hub, University of Korhogo	Orange Corners or Nuffic	Can well be linked to project 1
Developing a digital trading platform	Private sector business opportunity	SMEs	Targeted support to few SMEs: 100k+	Prosuma, Sûr et Sain, BVP (Possibly CNRA)	Impact Cluster or Orange Corners	Could be part of a larger business case as well (e.g., nr. 1)
Farmer-led irrigation development	Predominantly public sector oriented	Smallholder commercial farmers	For sustainable impact: multi-million (EUR)	Input suppliers, University of Korhogo, CNRA	EKN or BHOS	Needs attention for conflict sensitivity (with pastoralists)

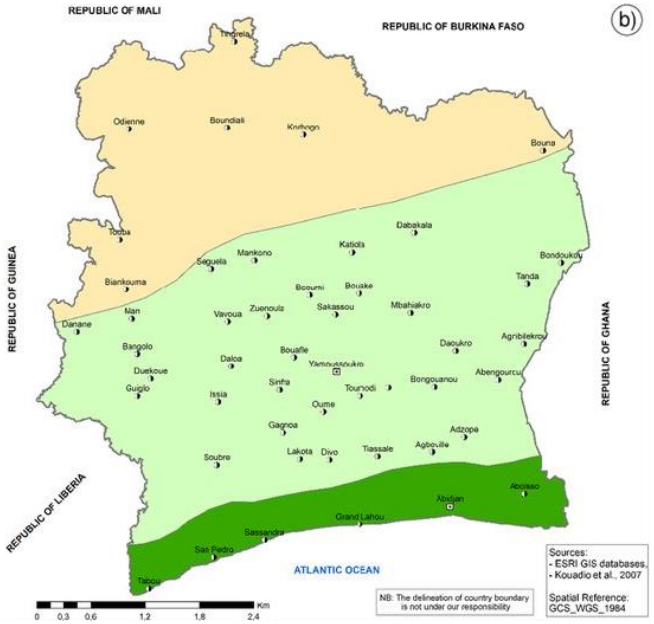
CORPORATE SOCIAL RESPONSIBILITY

Business case	Environmental	Social	Governance
Increasing productivity in the North	Focus on integrated approaches like IPM and ISFM.	Inclusion of youth and women producer groups.	Ensuring embedding with local government organizations as well as regional organizations like CNRA and the University of Korhogo.
Youth service provision	Focus on better use of the right chemicals through professional spray services providers, and tailored advice on IPM and ISFM by youth extensionists/agronomists.	Special attention for young agronomists (f/m), also looking at extension methods for illiterate farmers.	Ensuring embedding with local government organizations and linkage to regional government organizations like the University of Korhogo.
Developing a digital trading platform	The platform could reduce postharvest losses and sustainable options can be explored for packaging materials (re-usable plastic crates and biodegradable packaging materials).	The arrangements between the producers and off-takers need to be looked at so as to ensure farmers receive a reasonable price for their products.	Ensuring embedding with local producer organizations and linkage to a regional initiative like the Bureau de Vente des Producteurs.
Farmer-led irrigation development	Looking at increasing water use efficiency and sustainable production practices.	Inclusion of women producer groups and young farmers.	Pro-active actions for conflict sensitivity (with pastoralists). Working closely with local governments and communities and linking to regional organizations like the University of Korhogo, CNRA and possibly ANADER.

APPROPRIATE TECHNOLOGIES FOR THE THREE CLIMATIC ZONES

Additional information is provided below to distinguish between production conditions in the three climatic zones of Côte d'Ivoire, and appropriate technologies for each of these zones.

Climatic zone	Horticultural suitability	Crop preference	Technological preference
Northern zone (incl. Korhogo and Ferké)	Especially in wintertime with irrigation	All vegetables with long shelflife: Onion, pepper, okra, eggplant	Furrow irrigation along rivers and streams, open field
Central zone (incl. Yamoussoukro and Bouaké)	Year-round, rainfed and irrigated	All vegetables except onion (because of nematodes and humidity)	Both open field and hors sol, more capital intensive
Coastal zone (incl. Abidjan and San Pedro)	Less suitable due to high humidity, peri-urban intensive production	Peri-urban fresh: tomato, bell pepper, lettuce, cabbage, herbs	Irrigation, drip and capital intensive



Follow-up research

REQUIRED FOLLOW-UP RESEARCH

Specifying the extent of irrigated vegetable production in Northern Côte d'Ivoire

Preliminary analysis of geo-data shows that there is some irrigated agricultural activity in the Northern part of Côte d'Ivoire (map of 01/01/2019 on the right). A more detailed analysis using satellite information (obtained in the winter months) can give insight into the type of irrigation and production systems. At the moment we simply don't know how much irrigated production takes place in the Northern part of Côte d'Ivoire. And there is a feeling that irrigation acreage is underestimated. Knowing how much irrigation takes place and where exactly can inform proposed implementation of support activities 1, 2 and 4. Initial focus can be on the area around Korhogo and Ferkéssedougou (see also the map on p.14).

Follow-up Research

Merci !

If you have any questions?

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Annexes

ANNEX 1: LIST OF INTERVIEWED PEOPLE

- Jan Jansen, Horti-Solutions, NL
- Pierre de Moulin, Horticulture Max Ivoire, CIV
- Fer Weerheijm, Agrifer
- CNRA Bouaké
- FIRCA, M. Gondo
- Direction Regionale Agriculture Korhogo
- Bureau de Vente de Production Korhogo
- Women's producer group
- University of Korhogo
- Bureau de formation et en conseil de developpement
- Capsikan Ferkéssedougou
- Prosuma
- Callivoire
- Wholesaler Ferkéssedougou
- Producer Korhogo
- Croplife Côte d'Ivoire & Ghana
- Market women Korhogo, Bouaké
- Van Iperen, Laurent Gregoire
- Ferme Malabro Bouaké
- Wholesaler Ferkéssedougou
- Wholesaler Korhogo

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