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VCA4D
VALUE CHAIN ANALYSIS FOR DEVELOPMENT

Cassava value chain analysis in Ivory Coast

Value chain analyses assist in informing policy dialogue and investment operations. They help the understanding of how agricultural development fits within market dynamics. They permit an assessment of the value chains' impact on smallholders and businesses.

The methodological framework for analysis has been developed by the European Commission. It aims to understand to what extent the value chain allows for inclusive growth and whether it is both socially and environmentally sustainable.

EU Intervention

Under the 2014-2020 National Indicative Programme of the EU in Ivory Coast, the European Commission has been developing since 2016 a support programme to the food sector for vegetable and cassava value chains in rural areas. The aim is to promote efficient, well-organized job-creating activities.

The expected results are a sustainable growth in cassava production and producers' income, alongside an improved interconnection between production, processing and marketing activities.

VC context

Cassava is one of the principal food crops in Ivory Coast. National production amounts to around 5 million t per year and consumption is second only to yams and ahead of rice. Cassava has grown significantly over the last decade with production rising at an average annual rate of 8.5% between 2005 and 2015. However, the value chain may be susceptible to crises, as was the case in 2016 when production declined by 11% due to the drought, which led to a major shortage of cassava in the markets of Abidjan.

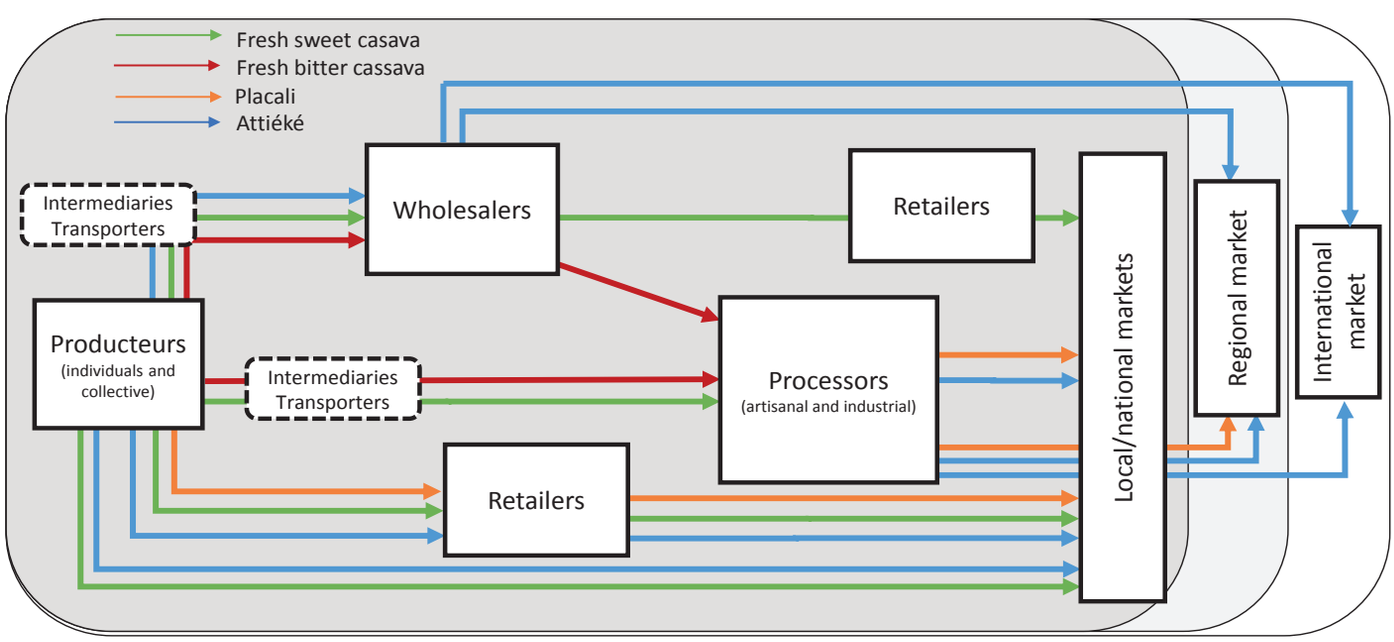

Figure 1 : The main flows of the value chain

Functional analysis

Geographical distribution of production

The map of cassava production has evolved rapidly in the last few years. The Southeast region was until recently the main centre (with more than 40% of national production in 2001), but is now declining. This is attributed to land competition with other plantation crops (cocoa, rubber, palm oil) which are more profitable, the prominence of peri-urban agriculture around Abidjan and continued urbanisation that weighs heavily on agricultural land. **Cassava production has since shifted towards the central and central west areas of the country** which are becoming the dominant production areas. This geographical shift from the main urban areas poses a number of logistical problems, both in terms of transportation and the preservation of a perishable product, as the fresh root must undergo the first transformation within 48 hours of harvesting.

Varieties and types of product

There are two types of cassava: **sweet cassava**, eaten as a paste or made into dough (placali) and mixed with plantain; and **bitter cassava** which is used to produce attiéke (ready-to-eat product) or pressed dough (uncooked product which is better suited for transportation over long distances). A number of cassava varieties, with differing suitabilities for processing, are cultivated: traditional (Yavola), introduced (Yacé, Yavo), or originated from local agronomic research (Bocou).

Artisanal and family activities/labour

Activities are mainly artisanal or family based across the whole value chain.

Cassava is grown on **small plots of land** (around 0.5 ha) that are not subject to fertilization use and only receive a small amount of herbicides. Crop rotation is practiced in order to preserve the fertility of the soil: a plot is cultivated for three years and then left uncultivated for 3 to 10 years.

The processing is mainly done in **artisanal village units** (family based or organised as informal associations within a village district) and more rarely in **semi-industrial units** (organised as a formal or entrepreneurial cooperative) based in the outskirts of urban consumption centres. There are also **some industrial units** recently installed in the central region of the country with a national dimension and sub-regional and international objectives.

For marketing, women often gather in buying groups to share the expensive transport costs. On the other hand, at sale points each retailer has his/her own clientele.

A dynamic value chain

In the past cassava was considered an inter-season crop intended mainly for personal consumption. Today, the growing **demand for cassava derived products (attiéké, pressed dough) in urban centres and for export** has created greater opportunities for revenue, notably in the processing and marketing activities, especially for women.

New leaders from rural areas, are beginning to appear, and are improving and structuring production and processing (by formal associations, cooperatives, platforms, federations, purchasing organisations...); some still need to strengthen their management capacities. Cassava also attracts new urban investors (graduates, former officials, entrepreneurs...) who are trying to develop integrated production and processing models (contract farming...) although few have succeeded until now.

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Economic analysis

Profitability

Value chains activities are profitable. Nevertheless, production costs and therefore farm operating income are still negatively influenced, to varying degrees regionally, by a number of factors (such as cultural practices, the degree of remoteness of farms, the type of labour and the land situation). Producers are also confronted with volatile prices and the risk of a slump in sales. Moreover, artisanal processing units are breaking even. Industrial units are the most profitable, but only represent 5% of processed volumes. The situation for traders is more comfortable due to the expansion of urban markets.

Creation and distribution of value added

The **direct value added** of the cassava value chain amounts to **514 billion CFA**, 56% of which is generated in the processed products sub-chain, 37% in the fresh sub-chain and 7% in the export sub-chain.

Agricultural producers generate an important part of this value added: 40% on average and up to 47% in artisanal and rural circuits.

Processors create less than 10% of the direct value added. Industrial units could become increasingly important in the coming years if public and private investment plans materialise. In particular, they could influence prices paid to producers, and compete with semi-industrial units, already in a rather fragile situation, on secondary urban markets, major national markets, and other African countries.

Traders, wholesalers and retailers, generate almost 50% of the direct value added, and close to 60% in urban circuits thanks to higher selling prices.

Jobs

The number of jobs generated directly by the value chain represent more than **425,000 full-time positions** (Figure 3). A large proportion of these jobs are found in the retail trade, agricultural production and artisanal processing. The value chain, with 9 million workers in 2016, accounted for **4.7% of employment in the country**.

Macroeconomics of cassava

Activities along the value chain generate **knock-on effects in the national economy of 83 billion CFA** (grinding services, manual pressing, guarding, transport, purchases of energy, packaging, etc.). With 597 billion CFA in total value added (direct + indirect), the value chain contributes **12.4% to the agricultural GDP and 2.8% to the national GDP**.

The **contribution to public finances is low** for this product which is still very manual and artisanal. Besides, direct taxes on herbicides, energy, imported material and the market fees do not exceed **13 billion CFA**, or 0.2% of the state budget.

The cassava crop presents **a weak positive trade balance** of around **4 billion CFA**. The share of exports could however increase in the coming years due to the international reputation of processed cassava products (attiéké & placali).

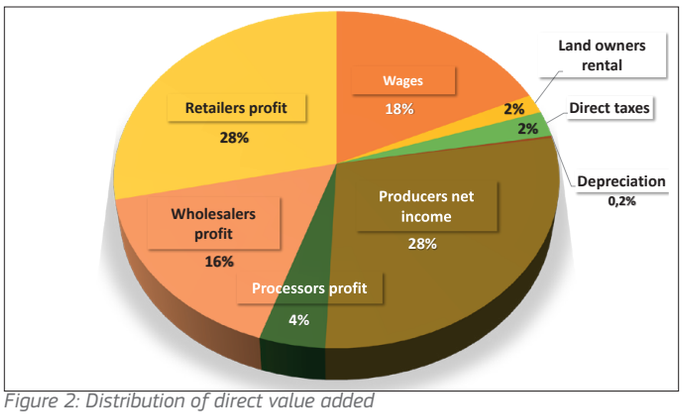

Figure 2: Distribution of direct value added

Figure 3: Distribution of direct employment

WHAT IS THE CONTRIBUTION OF THE VALUE CHAIN TO ECONOMIC GROWTH?

Cassava-related activities are profitable and are developing through the emergence of new retail outlets in urban centres and through export channels, particularly for attiéké. However, income remains limited for agricultural production activities (Annual Gross Operating Income (GOI) between 25,000 and 39,000 CFA per farm) and especially for processing (annual GOI between 10,000 and 33,000 CFA per processing unit). Thus, the farmer's gross monthly income is only about CFA 15,000; and for processors, a 10% change in the purchase price (on the rise) or sale (on the decline) can provoke negative margins.

At the national level, the cassava value chain contributes substantially to the agricultural GDP. However, given the nature of many of the activities, often manual, artisanal and informal, the value chain contributes little to public finances and the balance of trade. However, it does not widen the deficit of the State nor the trade balance.

Social analysis

The value chain has positive effects in the area of food and nutrition security. It also contributes to progress in the areas of gender equality, living and working conditions and social capital. However, **access to land is problematic**.

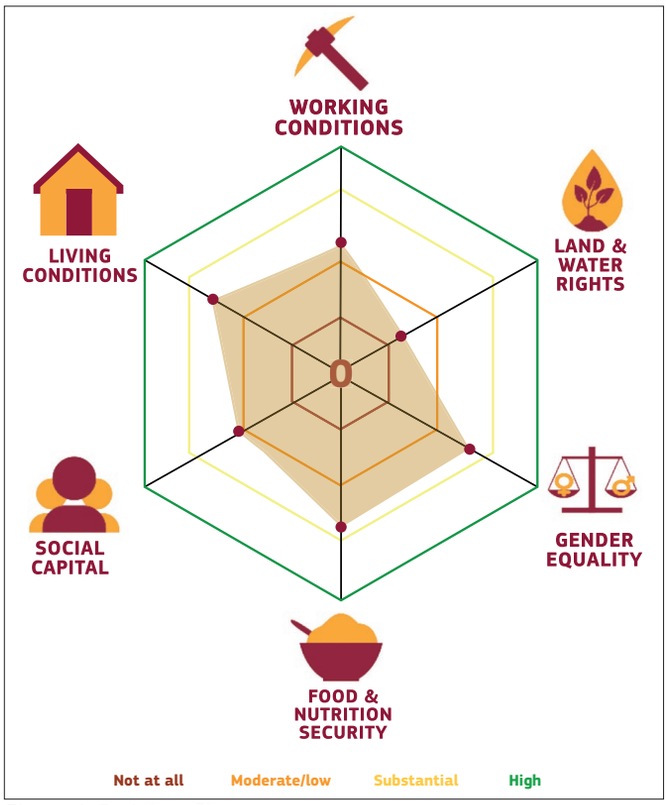

Figure 4: Social profile

Working conditions	• Ratification but lack of knowledge of international and sub-regional conventions (ILO and OHADA), • Risk of wage exploitation, • Children assist only on minor tasks, • Absence of insurance.
Land and water rights	• Limited familiarity with voluntary guidelines and poor application of the law on land rights, • Land resources reserved for cash crops in situation of scarce land, • Unsecured rights to land.
Gender equality	• Strong presence of women in all stages, • Access to land (inheritance, rental, donation), • Increasingly associated with decision making (household, community), public speaking and leadership in associations, • Weak access to financial structures, • High illiteracy and burdensome female tasks.
Food security and nutrition	• Markets are supplied but there is a risk of outflow to markets in neighbouring countries, • Diversity of food preparation, • Interest in cassava leaves as food product, • Increased prices due to transport costs.
Social capital	• 40% of producers are in professional organisations, • There are some inter-professional associations and informal groups, • However, weak bargaining power and access to credit.
Living conditions	• Increasing access to basic infrastructure (housing, care, education...), • Improvement of living conditions, • Many locations endowed with equipment for transformation.

Figure 5: Main observations by domains

IS THIS ECONOMIC GROWTH INCLUSIVE?

Economic growth generated by the cassava value chain can be considered inclusive. In fact, of the total direct income distributed in this value chain, 28% is net operating income for producers, who are mostly smallholders, and 18% are wages paid for various activities, therefore representing almost half of the total (Figure 2).

The value chain overwhelmingly employs women; they represent about 80% of producers, 90% of traders and almost 100% of processors.

Cassava-related activities are also becoming more and more attractive to the young including: production, jobs related to manufacturing of traditional processing tools (press, grater ...), local services for farming tasks and processing operations. There has been a deceleration in the departure of rural youth to the city, which can also be attributed to the attraction of cassava-related activities.

It should be verified whether or not the recent uptake in cassava cultivation (by new players) calls into question the inclusiveness of this value chain.

IS THE VALUE CHAIN SOCIALLY SUSTAINABLE?

The cassava value chain is socially sustainable, yet significant areas for improvement remain. The main positive effect is the contribution of cassava in its various forms to food and nutritional security. The involvement of women in the value chain provides leadership opportunities and financial autonomy.

Living conditions, in terms of access to infrastructure, housing and drinking water, are gradually improving in areas where cassava-related activities are developing. Cassava also provides employment in rural areas.

Nevertheless, these positive impacts are tainted by a great precariousness and insecurity over access to land for the producers, which call into question the social sustainability of the value chain.

Environmental analysis

The environmental footprint of the value chain in Ivory Coast is modest compared to intensive systems (with fertilized fields and fully mechanised factories).

Production

Cultivation practices (technical itineraries) are not intensive. Cassava is produced by mainly alternating crop rotation and fallow periods to maintain soil fertility (3 years of cultivation and 3 to 10 years of fallow depending on the region). There is little or no mechanisation of tillage, limited use of inputs, small amount of fertilizer (nitrogen and other) and herbicides (glyphosate 8l / ha) only for initial weed control.

Agricultural production represents less than 10% of total environmental impacts (eutrophication), which is far removed from the 40-70% that has been recorded in countries where cassava is produced through intensive systems and use of fertilizes.

Transformation

The transformation is largely un-mechanised. The two energy consuming stages are root grinding (use of electricity or gasoline) and cooking (use of wood or gas). **The main environmental impacts** result from the **treatment of wastewater** and the **use of wood.**

Attiéké can be cooked using on the one hand wood, a renewable energy source that has negative impacts on human health (emissions of fumes and particles) and ecosystems (deforestation, loss of biodiversity), or through the use of butane gas, a non-renewable energy that has significant impacts on resource depletion.

Transport

The transport of roots by small vehicles (pick-up…) multiplies the roundtrips and diesel consumption, with consequences for human health (particle emissions, climate change) and non-renewable resources.

The condition of secondary roads (excluding major traffic arteries) increases fuel consumption and weighs heavily on environmental impacts.

IS THE VALUE CHAIN ENVIRONMENTALLY SUSTAINABLE?

Cassava value chain activities do cause some environmental damage, affecting in decreasing order: human health, resources depletion and the quality of ecosystems (Figure 6).

However, the value chain has limited effects on the environment and is therefore sustainable. This is due to the extensive nature of agricultural production with few damaging inputs followed by several years of fallow to maintain soil fertility; and a weak environmental footprint for the processing into attiéké and other derived products.

Nevertheless, it also shows several risks for sustainability that should be taken into account: population growth can call into question the possibility of fallow, the equipment used for processing in attiéké consumes more energy than necessary (inefficient), small vehicles transport systems that use poorly developed road infrastructure which add to the environmental costs.

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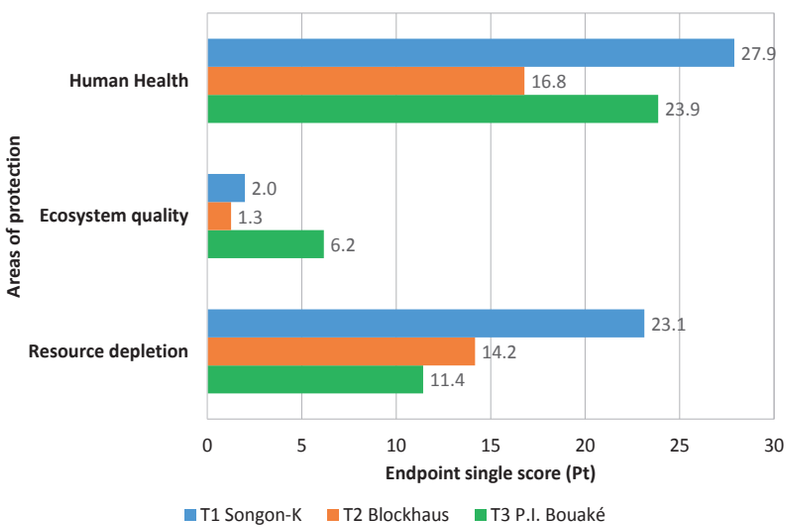

*Figure 6: Environmental damage of the value chain across three areas of protection**

* Measured by aggregating the different impact categories (climate change, toxicity, acidification…) for three circuits in different regions of Ivory Coast
(T1: root production in Abidjan, transport + 49 km (pick-up trucks), transformation in the Abidjan area, transport 10 km (pick-up trucks), and Abidjan market.
T2: root production in Abidjan, transport + 148 km (camion 40t) and 10 km (pick-up trucks), transformation in the Abidjan area, transport 10 km (pick-up trucks), Abidjan market.
T3 : root and attiéké production in Bouaké, transport + 30 km (pick-up trucks), transformation in attiéké in the Bouaké area, transport +10 km (pick-up trucks), markets in Bouaké and neighbouring towns.

Conclusions

	Positive	Negative
Internal	**STRENGTHS** • Market in expansion: growing demand for derivative products in local and export markets • Processor know-how • Sustainable cultivation and processing practices: low inputs, no nitrogen fertilizer, soil fertility maintained (crop rotation, fallow)	**WEAKNESSES** • Market access conditions: lack of information on markets and prices • Remoteness of producers and infrastructure: poor road conditions, expensive transport • Land: problem of access • Cultivation practices: no treatment for diseases
External	**OPPORTUNITIES** • Orientation towards a cash crop: development of cooperatives for production and processing, valorisation of by-products (peelings, biogas) • New players: investors in industrial processing in quality starch and flour, new markets for processed cassava • Valorisation of the image "Attiéké from Ivory Coast" for the export market ...	**THREATS** • Land pressure and intensification (fallow time reduction and greenhouse gas emissions) • Evolution of the market: future demand faltering, risk of excess supply after the shortage 2015/16, size of the market for starch and flour. • Greater dependency of small producers on a vertical integration model orientation • International competitiveness: high cost of roots compared to the world market for industrial processing, threat of mechanization of processing for the income of day laborers ...

The main **economic risks** can be mitigated by improving the technical skills of the actors; improving the management capacities of cooperatives and groups (financial and human management); improving access to capital (bank loans) to facilitate investment in cassava production and processing techniques.

From a **social point of view**, the main recommendations are to raise awareness of the land law in order to facilitate its application; to encourage actors to organize themselves to defend their interests, to create economies of scale and obtain more profitable prices; to set up marketing credit lines to improve the storage capacity of producers; to support the development of cassava export strategies by producers and traders.

From an **environmental point of view**, the expected population growth in the next 20 to 30 years will lead to an increase and intensification of cassava production, as well as processing to attiéké and other derived products. In this context, it will be necessary to maintain the sustainability of the sector through well-structured agricultural practices to mitigate the impacts of production intensification which uses nitrogen fertilizers; better vehicles and road infrastructure; energy efficient processing technologies and consideration of types of fuel used.

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Agrinatura (http://agrinatura-eu.eu) is the European Alliance of Universities and Research Centers involved in agricultural research and capacity building for development.

The information and knowledge produced through the value chain studies are intended to support **the Delegations of the European Union** and their partners in improving policy dialogue, investing in value chains and better understanding the changes linked to their actions

VCA4D uses a systematic methodological framework for analysing value chains in agriculture, livestock, fishery, aquaculture and agroforestry. More information including reports and communication material can be found at: https://europa.eu/capacity4dev/value-chain-analysis-for-development-vca4d-

This document has been adapted from the full study report 'Analyse de la chaîne de valeur du Manioc en Côte d'Ivoire' for the European Commission, DG-DEVCO. Value chain Analysis for Development Project (VCA4D CTR 2016/375-804). The study was conducted by Patricio Mendez del Villar (Cirad), Akoua Adayé (Université Félix Houphouët-Boigny), Thierry Tran (CIRAD), Konan Allagba (expert national), Victoria Bancal (CIRAD). The authors are bound only to the original report.