

N°2 - MARCH 2018

## Mango value chain analysis in Burkina Faso

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

The European Union contributes to the development of the mango value chain (VC) in Burkina Faso through three programmes implemented by COLEACP (the Europe-Africa-Caribbean-Pacific Liaison Committee). These programmes aim to: reduce poverty by promoting the export of horticultural

products (PIP I & PIP II), reinforce food safety systems through sanitary and phytosanitary measures (EDES) and improve the sustainability of the value chain (Fit for Market).

The EU also finances the 'Project to support the regional plan to combat and control fruit flies in West Africa (FFCP 2014 – 2019) that directly benefits mango production.

### Context of the VC

In West Africa, mango is exported and consumed locally. With an annual production of 1.4 million t (out of a global production of 50 million t), the sub region as a whole (Ivory Coast, Mali, Senegal and Burkina Faso) occupies seventh place amongst the principal producers. The exports from this region (between 20 and 25.000 t annually) represent about 10% of the European market with a quality and reputation acknowledged by consumers.

Burkina Faso represents between 11% and 18% of the production in West Africa. Mango constitutes around half of the national production of fruit in terms of volume.

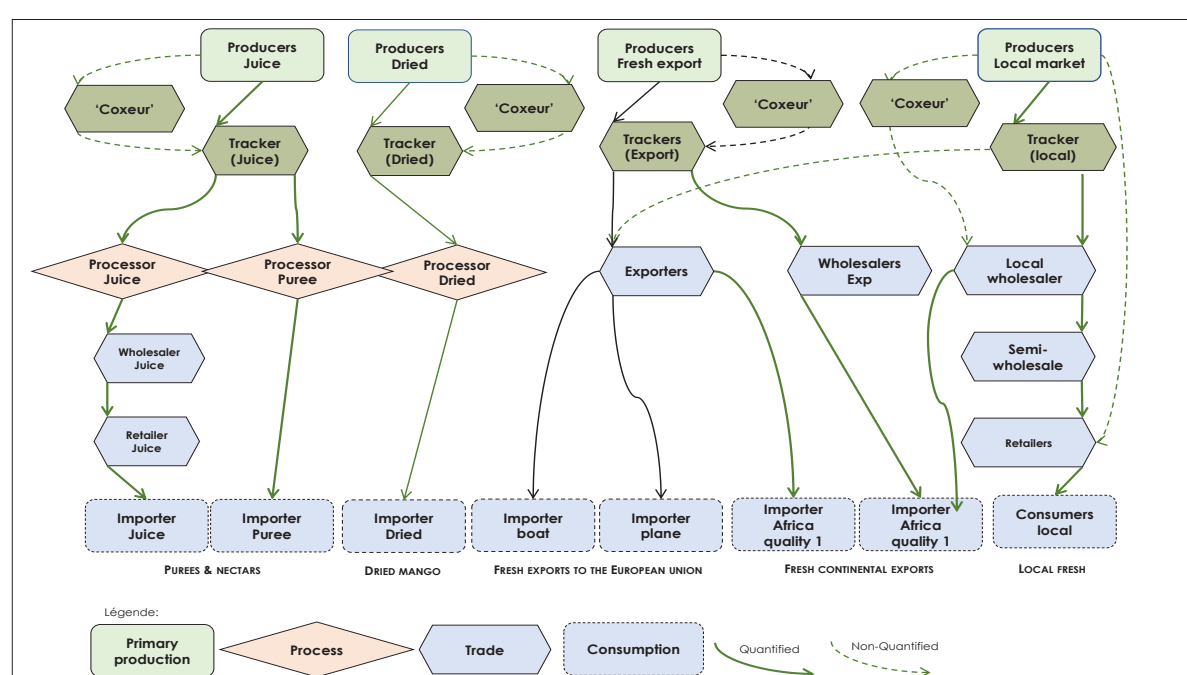


Figure 1: The key flows of the mango value chain in Burkina Faso.

## Functional analysis

### Mango sub-chains

5 sub-chains are distinguished depending on the final product and the market destination:

- **Fresh** mango for **export to the EU** (almost all certified organic).
- **Fresh** mango for **export to continental Africa**.
- **Dried** mango for the **international market**.
- Mango **puree** for the **European market** and mango **nectar/juice** for **national markets**.
- **Fresh** mango consumed **locally in Burkina Faso**.

### Products and varieties

Mango trees are a **long-term investment** (it takes ten years until they reach full production capacity). Fresh mangoes are very susceptible to fruit flies and are also a **perishable product**.

Among the roughly **ten varieties of mango** grown in the country, four are of major interest and have specific uses and markets: the Amélie matures early and is therefore less attacked by the fruit fly and is used for processing, the Kent is in great demand in the international market, Lippens is popular locally and Brooks is well suited to processing.

### Production and flows

The mango tree is subject to natural fluctuations of production and as such annual production differs from year to year resulting in economic uncertainty. The 2017 yield was well below that of 2016 which was the reference year for the study.

**The total volume of production is estimated between 100,000 and 200,000 t. The flows are poorly known** except for the flow of exports to Europe:

- Export to the EU: 4,000 t of fresh mango by boat, 400 t of fresh mango by plane, 500 t of mango puree, 1,900 t of dried mango mostly via international companies, representing a total of 50,000 t of fresh mango.
- Continental Africa exports (Ghana, Niger, Algeria, Morocco): estimated at 8,000 t of fresh mango by truck, but in reality it is probably more.
- National market: **estimated at between 50,000 and 150,000 t.**

Post-harvest losses are estimated to be between 5-15% depending on the VC stage.

### Location

The production is concentrated in the **region of Hauts Bassins** (57% of national production) which is in the South West of the country and to a lesser degree in the Cascades (10%) and Central Western region (14%). These regions are situated in the centre of the vast Sahel region of mango production in West Africa. The flow of products to external markets from Burkina Faso is hampered both by the fact that it is a landlocked country without access to a major river and that it is situated within an unstable zone (Mali, Niger...).

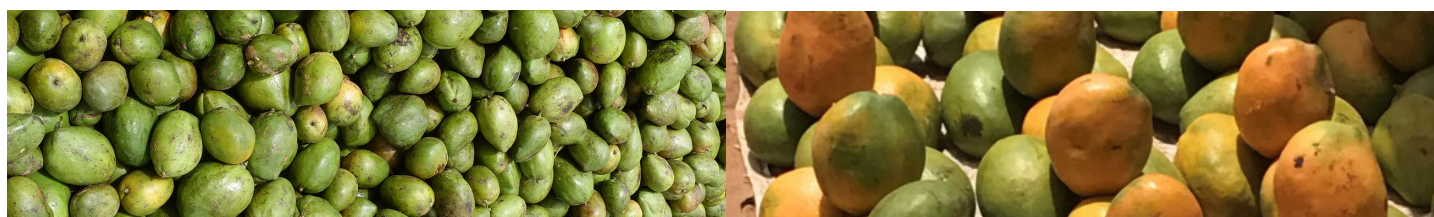
### Policies

**Several political and national strategies** aim to improve the business climate and support the public-private sectoral dialogue for agricultural development. The VC benefits from significant support from the State and from the World Bank since 2007 through the project PAFASP (Support Programme to agro-sylvo-pastoral value chains).

However, **economic operators face several constraints, which require public policy responses:** transportation difficulties, power and water cuts (which results in equipment breakdowns, deterioration of the quality of fruit processing and packaging, losses), cross-border trade difficulties (slow administration/bureaucratic problems, illicit expenses...), mismanagement of the land in municipalities where processing units are located (proximity to houses, risk of fires...) and in rural villages where the orchards are located.

### Reorganisation

**The VC is rapidly changing in the face of a strong growth in demand** from the various markets, resulting in: investments for the modernisation of orchards (supported by the World Bank), drying units using modern technology called 'tunnels' near areas of production (by African private sector actors), diversification of production and marketing activities of several processing and export units (other fruits, national market) to cope with production fluctuations and competition. Technical changes currently in progress aim to improve the quality of the products and of their supply.



Mango in Burkina Faso © Laurent Parrot & Yannick Biard

## Economic analysis

### Viability of activities

In 2016 all sub-chains appeared profitable and viable. However, the viability of many processors of dried mango is dependent on the demand from a few international companies. This sub-chain is being reorganised through a quality approach either towards a business model based on a conventional product using improved technologies, or towards a certified organic production.

### Contribution to the national economy and viability within the international economy

The **total value added** within the country is **30 billion FCFA**, 26 billion FCFA of which is value addition by the VC actors and 4 billion FCFA is generated by input suppliers. Its contribution to the GDP of Burkina Faso is 0.5% and **2.9% to the agricultural GDP**. The VC contributes 1.6 billion FCFA to the state budget through direct and indirect taxes and represents **0.6% of FOB exports**. The VC **makes good use of domestic resources** (Domestic resource cost of 0.16) and is competitive within the international economy (Nominal protection coefficient of 0.97).

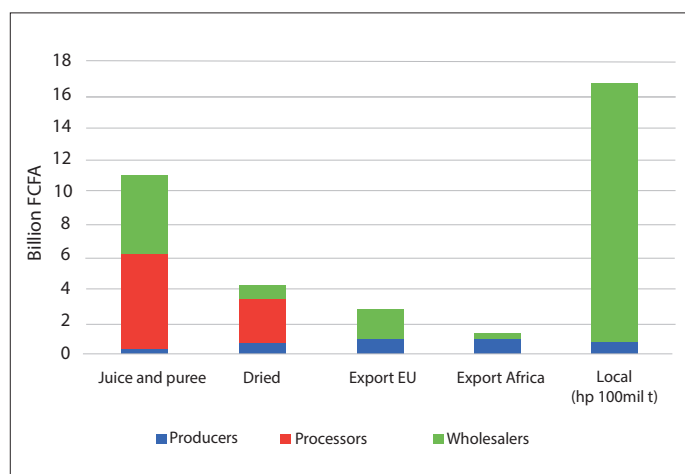


Figure 2 : Distribution of the value added for each sub-chain

### Income distribution

The puree and juice sub-chain creates a significant part of the value added thanks to its volume and high retail prices. The difference between the sub-chains in terms of the distribution of value added is explained by the number of intermediaries, by the price paid to producers (which varies from 10 FCFA for the local consumption sub-chain to 100 FCFA for the export quality mangoes destined for the EU), by the processing or not of the fruit. This distribution appears **globally fair for producers** in the export sub-chains: the dried mango and the fresh mango exported to Europe or to other African countries.

### Jobs and salaires

The VC is a provider of employment. Its activities employ around **28,000 people**: 21,000 as entrepreneurs or similar (farmers, trackers, retailers, etc.), about 350 in permanent jobs in processing and packaging for export of fresh mango, and 6-7,000 in seasonal jobs throughout the chain. The seasonal marketing of fresh mango in the local market also supports nearly 10,000 retailers. The total salaries across the chain amount to FCFA 1.2 billion.

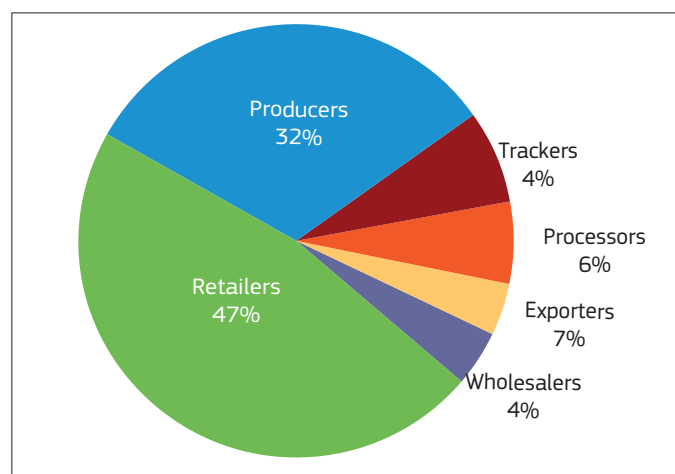


Figure 3: Distribution of direct employment: number of people working across the whole VC (part of the year).

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

Although of limited size, the VC makes a real contribution to economic growth whilst creating jobs, particularly for women. The indirect effects on the national economy relate to transport services and some packaging.

The production is subject to the constraints of the international markets in terms of product homogeneity, varietal diversification, and organoleptic qualities. Mango remains a product with a strong export demand, but it is not clear whether the actors will succeed in adapting to the increasingly stringent sanitary controls, entailing increasing costs of adaptation.

The emergence of national and continental markets should provide growth opportunities for companies able to diversify into niche markets or new products in addition to mango.

## Social analysis

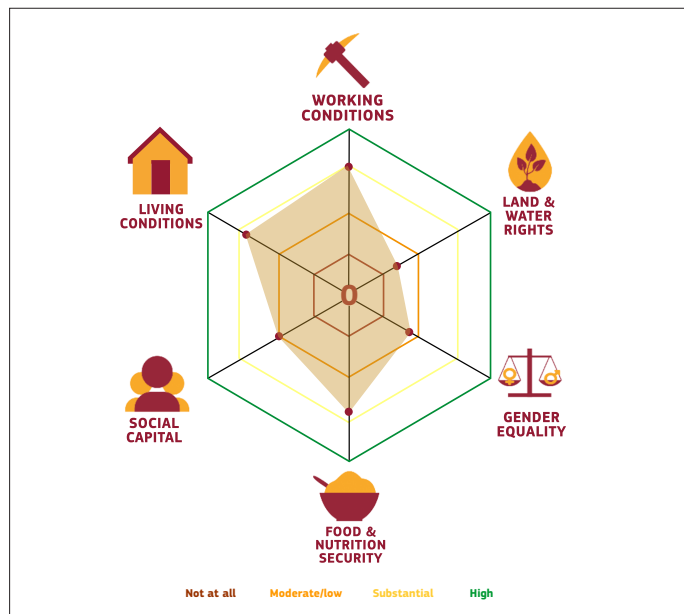


Figure 4 : Social profile

- Mango plays a **strategic role in food and especially nutrition security of the producers and workers**. The self-consumption of mango combats the deficiencies of micro-nutrients of vulnerable and marginalised populations (pregnant women, infants...). The activities in the VC provide monetary resources for food consumption especially during the lean periods of hunger. Revenues from mango also serve **to pay the costs of healthcare, schooling, and the construction of houses** (where the quality is better in areas with a high concentration of mango trees). **The working conditions are acceptable** in the export sub-chains.
- The processing, packing and export sectors of fresh mango to the EU, employs a **large seasonal female workforce** (around 4,000), paid on average 1,000 FCFA per day (less than the minimum wage) for 2 months work per year. **These salaries increase their flexibility and status vis-à-vis their husbands**.
- The level of organisation between producers is low,**

### IS THIS ECONOMIC GROWTH INCLUSIVE?

The distribution of incomes between the actors differs according to the sub-chains but remains quite egalitarian except for the domestic sub-chains.

The economic growth of the VC is inclusive, but the VC faces challenges such as: the low level of trust and circulation of information between actors, the difficulty to accept women undertaking traditional masculine roles, such as the production of mango, their tracking, as well as management positions in processing or packing units.

Working conditions	Disparities, with better conditions in export sectors.
Land and water rights	Critical situation with dominance of the traditional system.
Gender equality	Distribution of roles according to tradition, but women's income can change relationship dynamics within the household.
Food and nutrition security	Strategic role for self-consumption and monetary resources for food purchases.
Social capital	Low level of producer organisation, fragility in the export sectors
Living Conditions	Contribution to health and schooling costs and construction of houses.

Figure 5 : Main observations by domain

- no more than 30%. The institutional capacity of groups and cooperatives is slowly improving in the certified sectors with the support provided by the companies that buy the mango. On the other hand, their future within the export sector is uncertain due to the lack of dynamism (family orchards, ageing members...), and to companies preferring to deal directly with high-yield producers. **The flow of information is limited**, especially when the processing and conditioning units use trackers. **There is still room for improving trust** between actors in the VC, including between producers who are members of a same group or cooperative.
- For **access to land, the land laws and regulations are not enforced** and the State services responsible for enforcing them are not in place. Customary law tends to exclude property rights for women, migrants, youth and pastoralist farmers.

### IS THE VALUE CHAIN SOCIALLY SUSTAINABLE?

The mango VC contributes modestly to socially sustainable development. It makes a positive contribution to working and living conditions and to food and nutrition security. It contributes moderately to gender equality and social capital. The situation remains problematic in relation to access to land.

The following challenges exist: land insecurity and the exclusion of migrants, women and young people from land ownership rights necessary to start an orchard, child labour in the domestic sector at the expense of school attendance, heavy burden on women who combine work at processing units and housework, the low level of collective organisation of producers in groups and cooperatives as well as their poor access to information.



## Environmental analysis

On a per kilogram basis, **the sub-chain of the fresh mango consumed locally in Burkina Faso entails the least environmental damage.** The impacts are proportional to the distance mango is transported.

**In terms of fresh exported mango,** for activities ranging from production to packaging, **it is the transport from orchards to the packaging unit that has the greatest impact on the environment** (about 70%), followed by the packaging itself. Taking into account the totality of the VC by including the activities of the export phase, air-freight causes the greatest damage (35 times greater than that from the production to packaging activities), whilst transport by sea to Europe causes the least impact. Comparatively, by kilogram, the damage caused by the exportation in refrigerated trucks to other African countries in the sub region amounts to only 17% of fresh mango exported by air-freight to Europe whilst the damage caused by transport by sea amounted to 9% (see figure below).

**In terms of dried mango, the environmental harm derives mainly from the drying technology used.** By concentrating the products (22kg fresh mango on average to produce 1kg of dried mango), this sub-chain has a high level of damage.

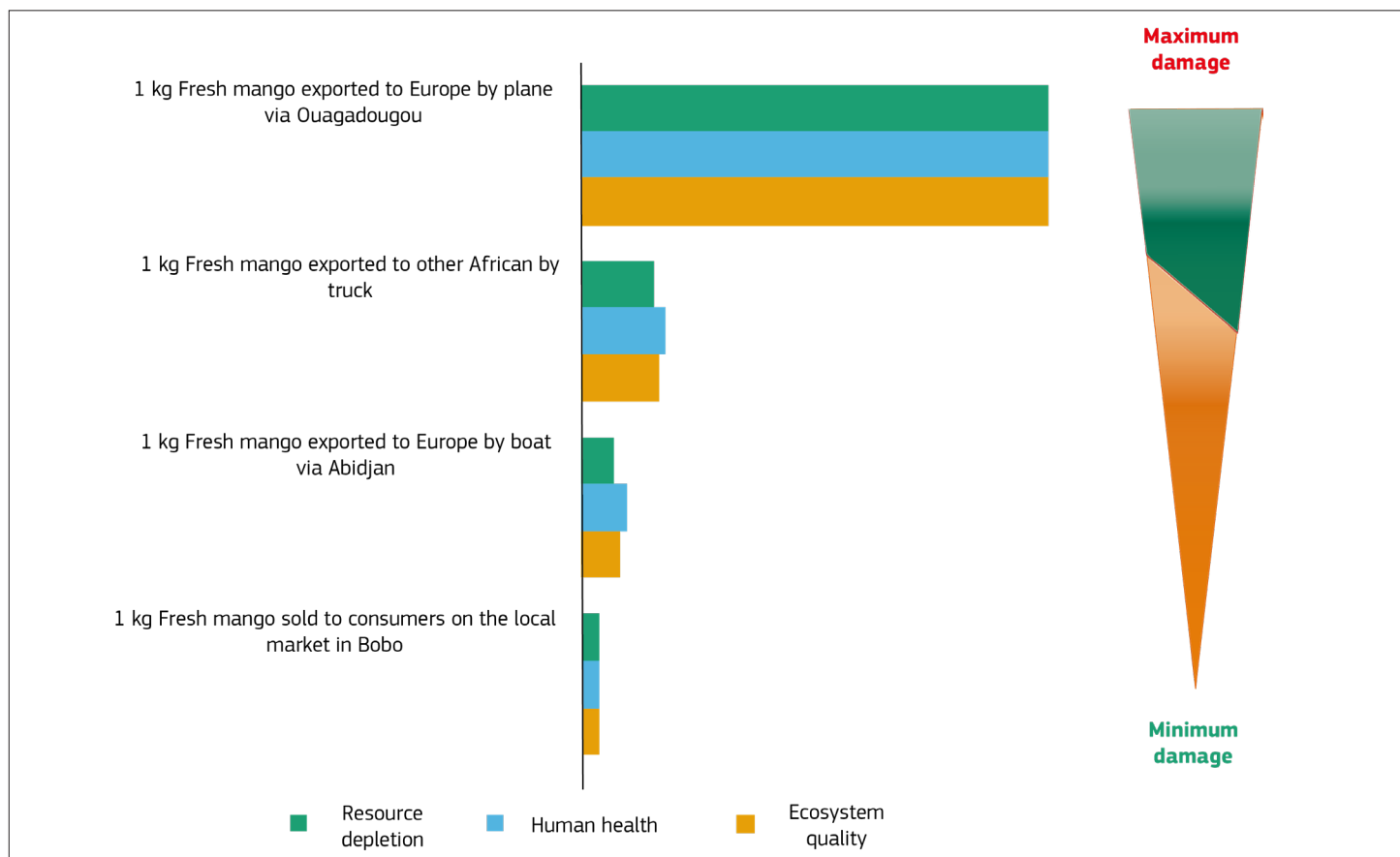
If similar drying technologies are used, there is no significant difference between organic dried mango and conventional dried mango.

### IS THE VALUE CHAIN ENVIRONMENTALLY SUSTAINABLE?

The production of fresh mango by traditional extensive orchards does not create environmental damage. The impacts come from the processing and logistical stages (in ascending order): transport to direct consumers in Burkina Faso, packaging, transport to Europe by boat, transport to other African countries by refrigerated truck and transport to Europe by air-freight. The dried mango sub-chain has high impacts due to the transportation of the large quantities of fresh mango needed and the energy consumed by gas drying.



Mango in Burkina Faso © Laurent Parrot & Yannick Biard



## Conclusions

### Prospects

The VC contributes to an **inclusive growth**. It contributes to the food and nutrition security of vulnerable or marginalised populations, creates jobs in rural areas and is competitive in world trade.

Demand is stimulated by the breakthrough of this fruit in the consumption patterns in Europe. However, it is difficult to meet the increasing demand due to growing competition from neighbouring countries and of the fluctuation of the mango supplies.

The actors are organising themselves to address market issues: planting of more productive mango orchards, development of more efficient processing technologies and diversification of activities to sustain employment, which is largely seasonal.

For dried mango, **the VC operates along two axes**: companies engaged in a competitive economic model based on a conventional product and companies committed to a 'social' model based on organic labelled products.

### Main risks

The **fruit fly** constitute a major threat to all actors throughout the VC from producers to consumers. It generates significant losses, a shortfall and a waste of resources. The measures in place are often partial whereas the approach should be global and collective.

The increasingly **stringent application of standards**, in a context where diseases and pests are poorly controlled, is a permanent constraint for supply chains targeting EU markets.

**Packaging material shortages** are also a recurring problem. The agents have trouble coordinating themselves to stock up properly.

Failure to enforce **land access laws** and procedures will increase conflict between new actors wanting to set up their own orchard and rural people.

### Recommendations

Technical innovations (orchards, 'tunnels') are expected to improve productivity in the VC, but their effects on small producers and processors will need to be addressed.

Several conditions are necessary to increase the social sustainability and inclusive growth of the VC: accelerating the establishment of land structures and improving their accessibility for producers; increasing the availability and quality of secondary education and the strengthening of relationship between actors at different stages.

Upgrading and renewing the means of transport of goods would limit the loss of fruit and the environmental impact of the VC. The diffusion of new energy efficient drying technologies should reduce the environmental impact.

### Areas requiring deeper knowledge

It is suggested to delve into the following topics:

#### Food security for vulnerable people:

- assess the risk of competition between local consumption and exports in the long-term;
- assess the potential contribution of nectar to nutrition security and its access by the most vulnerable population.

#### Mango orchards:

- Explore the prospects for ecological intensification to free up land resources, enhance them with other crops, and help increase the income of marginal and vulnerable populations;
- Improve understanding of the different opportunity costs of managing mango orchards and their integration into the household economy.

**Value Chain Analysis for Development (VCA4D)** is a tool funded by the European Commission / DEVCO and is implemented in partnership with Agrinatura.

**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 is based on the report "Analyse de la chaîne de valeur Mangue au Burkina Faso", réalisé par Laurent Parrot (CIRAD), Dieuwke Klaver (WUR), Yannick Biard (CIRAD), Edit Kabré (expert national) and Henri Vannière (CIRAD). Only the original report binds the actors. The experts consulted around 150 documents and conducted nearly 80 interviews with VC stakeholders in March and May 2017 during the mango harvest campaign.

The contents of this publication do not necessarily represent the official position or opinion of the European Commission. Neither the European Commission nor any person acting on behalf of the Commission is responsible for the use that might be made of information in this publication. Directorate General International Cooperation and Development – EuropeAid, Rue de la Loi 41, B-1049 Brussels; email: [europaaid-info@ec.europa.eu](mailto:europaaid-info@ec.europa.eu). Published by Directorate General International Cooperation and Development – EuropeAid, Directorate Sustainable Growth and Development. March 2018. For further information: <http://ec.europa.eu/europaaid/>