Kénédougou sweet potato value chain and market analysis

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Abstract

This study has the objective to analyse sweet potato market opportunities in Burkina Faso and describe its value chain in order to promote orange fleshed varieties under the framework of the project entitled “Jumpstarting Orange-fleshed Sweet Potato in West Africa through diversified markets”. The study is both descriptive and analytic and focuses specifically on the Kénédougou province where the project will be implemented. Interviews were conducted with producers, wholesalers, transporters, retailers, processors, consumers and local development actors to understand all aspects of this new market.

The results analysis shows that OFSP production has a huge potential for growth in Burkina Faso and for increasing farmers and value chain actors’ income but until now its production is still very low. The main sweet potato production in Kénédougou is the white-fleshed white-skinned variety because OFSP is still relatively unknown. As a consequence, there is a lack of OFSP vines and roots in the market. Some value chain actors are trying to diversify sweet potato market by processing but this is on a very small scale and the products are not yet well known by consumers. This study helped uncover some products that have interesting market potential such as flour for infant mixes, *déguè*, and couscous. Chips and juice can also be interesting to develop, however they may require greater investment and good marketing to be scaled up.

In spite of the many constraints described in the report, farmers and different economic actors perceive the promotion of OFSP as a great opportunity to increase their income and diversify their production.

Table

BRAKINA: Brasserie du Burkina

BRICOP: Burkina rice commercialization project

CIP: International potato center

COOPAK: Cooperative des transformateurs agricoles du Kénédougou

CM: Crédit mutuel

ENTRACEL: entreprise de transformation des céréales

FIPROXY: Financière de proximité

iDE : international Development Enterprises

INERA: Institut national de l'environnement et de la recherche agronomique

IRSAT: institut de recherche des sciences appliquées et technologies

JBF: Jean Baptiste et frères

OFSP orange-fleshed sweet potato

NAFASO: Neema agricole du Faso

VAD : Vitamin A defficiency

R&D research and development

RCPB: Réseau des caisses populaires du Burkina

UTAK : Union des transformateurs agricole du Kénédougou

SAPHYTO: Société africaine de produits phitosanitaire et d'insecticide

SOFITEX: Sociétié de filature et d'exportation de coton

SOFIB-savonnerie : société de fabrication du Burkina

SONACEB: Société national de carton et d'emballage du Burkina

INTRODUCTION

Malnutrition is a critical issue in developing countries, particularly in sub-Saharan Africa where 5.5 million children under the age of 5 suffered from malnutrition in 2013.

In Burkina Faso, the national nutritional surveys indicate that incidences of malnutrition are decreasing. The trend is encouraging but the situation is still worrisome. The national nutritional situation is also characterized by micronutrient deficiency, among which, vitamin A deficiency is very prevalent.

Government and development partners are aware of the problem and there are several efforts to mitigate it. Different strategies have been adopted to fight vitamin A deficiency (VAD) this last decade: targeted Vitamin A supplementation to the most vulnerable groups (children under 5, post-partum women and primary school students); fortification of industrially-produced cooking oils mandatory since 2012; approaches based on dietary diversification, namely promoting the production and consumption of vitamin A rich foods such as orange fleshed sweet potato (OFSP).

Background to the study

CIP's proof of concept project "Jumpstarting orange fleshed sweet potato in West Africa targeting diversified markets", like many other initiatives, wants to contribute to reducing vitamin A deficiency in Burkina. Compared to the different strategies used by government and development partners until now, the project approach is much more market-oriented. It assumes that OFSP has the potential to provide a source of income, food security, and good nutrition for small-scale farmers. The concept is to reduce VAD among the most vulnerable by developing the market for vitamin A rich sweet potato.

By promoting OFSP in Burkina through diversified markets, the project aims to create OFSP market opportunities to increase smallholder farmers' income. Thus, it was necessary to analyse the market. Smallholder farmers and small local enterprises lack tools and skills to understand market functions and thus cannot optimize and earn higher income from their activities. As a partner for the implementation of the project and an expert in market development, iDE Burkina wants to contribute to finding a solution for OFSP market and value chain development. Our first step in this process was to conduct a market and value chain analysis with the purpose of better understanding the sweet potato market and how to best develop it to sustainably increase stakeholders' benefits.

Terms of Reference of the study:

The study's terms of references were developed based on the objectives of the Jumpstarting project and the TOR for iDE Burkina as project implementation partner. The specific objectives are:

- Describe the process of the sweet potato value chain and map the stakeholders
- Provide a situation analysis of the market
- Compare the cost and benefits of each stakeholder
- Analyse whether the OFSP value chain can be developed on a profitable and sustainable basis
- Identify partners for commercialization and processing

Expected results

- The functioning of the sweet potato value chain is outlined
- A clear situation analysis of the sweet potato market is given
- The value sharing in the chain is presented
- Recommendations to promote OFSP are suggested
- Partners are identified for processing and commercialization

Outline of the report

The report is divided into five main sections. The first section gives a description of the project's target zone. Rainfall patterns, demography, and industrial and agricultural production focusing on sweet potato are outlined. Section 2 introduces the sweet potato value chain and analyses each stakeholder's activities. Operation cost, revenue and profit are shown and compared. In the third section, market opportunities for diversified products suitable for the market and potential partnerships for processing and commercialization are outlined. The last section presents a SWOT analysis of the chain and recommendations are made to improve and diversify the OFSP market. Before going further, the market analysis methodology is presented below.

I. METHODOLOGY

The analysis methodology applied is both descriptive and analytic. It is descriptive because it intends to give an explanation of sweet potato markets and actors. It is analytic because it aims to suggest action steps to promote and develop the OFSP value chain.

The study combines in-depth literature research and in-field primary data collection. Data was collected using participatory rapid research methods, designed according to the means and the secondary data available. It analysed the sweet potato value chain, focusing primarily on the market, in which market opportunities and activities of each stakeholder along the chain were analysed. With respect to the financial and logistical means available for the study, it was not possible to collect data through quantitative statistical sampling. Thus the study focused on the quality of the collected information instead of the quantity of people interviewed. Kénédougou province was chosen for this study because it is the target zone of the proof of concept project. However, the study goes beyond the administrative limits of the province to include main markets outside of Kénédougou where the sweet potato is commercialized and consumed.

The process of analysis consisted of the following:

- From the documentary information and field observation, a preliminary OFSP value chain map was drawn
- From that preliminary value chain map, production areas were identified for data collection, with selection criteria being the production size.
- The preliminary information also indicates that in the target zone, sweet potato is mainly grown as a cash crop. Production and consumption areas are different. Thus to understand the sweet potato market it was necessary to investigate those markets. The main markets where sweet potato from Kénédougou is sold were identified. Wholesalers, retailers, transporters, processors and consumers from those market places were interviewed.

- Shops and supermarkets in Bobo-Dioulasso, the regional capital, were also visited to identify sweet potato-based products or any product that could inspire OFSP processing.

The field survey of value chain agents and local development actors used questionnaires and semi-structured interviews. The questionnaires were simply used as a guide, and discussions were open to capture the maximum information available.

Many people were interviewed during the data and information collection, including:

- The provincial director of Kénédougou agriculture services in Orodara
- The head of Bobo Dioulasso fruit and vegetable market, Mr Sibiri Gilles MILLOGO
- The director of the West Region’s branch of the research institute, IRSAT, Ms KERE Christine KANDO
- The manager of BALO GNUMA Ms Koné Karidja
- The manager of NAFASO Mr Abdoulaye SAWADOGO
- DAFANI’s (located in Orodara) quality research and development director, Mr Tokida Yussef GUIGMA and the chief of the research and development department, Mr Moctar TAO
- AFRIQUE VERTE program assistant M. Soulama Adama
- ENTRACEL manager, Ms POODA Marie Pascale
- The Association WILIKATAAMA manager. Ms COULIBALY and treasurer, Ms Ouedraogo Scholastique
- WEND MANAGAA manager Ms Ouardé Matilde

Focus groups were organised with:

- Farmers and community development committees at Sokouraba, Mahon and Koloko
- Wholesalers in different markets: Bobo-Dioulasso fruits and vegetable market, Ouagadougou markets, Kaya market, Dori market, Medine market in Sikasso

Difficulties

The main difficulty of this market analysis was the lack of reliable secondary data on sweet potatoes and particularly on OFSP.

Data was collected during the rainy season, thus some meetings with stakeholders could not be held.

II. DESCRIPTION OF THE KENEDOUGOU PROVINCE

1. Geography

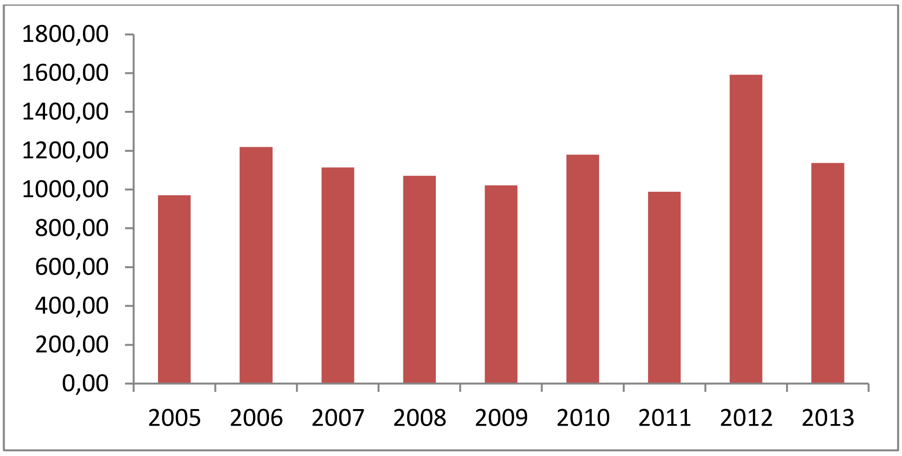
Kénédougou province is located in the western part of Burkina Faso in the Hauts-Bassins region. It covers an area of 8,307 km^2. The province is bordered in the north and west by Mali, in the south by Leraba and Comoé provinces and in the east by Houet province. The province is divided into 13 districts: Banzon, Djigouèra, Kangala, Kayan, Koloko, Kourinion, Kourouma, Morolaba, N'Dorola, Orodara, Samogohiri, Samorogouan, and Sindo. There are 172 villages in the province. Orodara is the province capital and Bobo-Dioulasso the regional capital.

Figure 1 Geographic position of Kénédougou province

2. Climate

The climate of the province is humid tropical south Sudanian, characterized by two principal seasons - one rainy season and one dry season. The rainy season begins in May and ends in November, with an average rainfall between 900 mm and 1200 m (Figure 2). The dry season begins in December and ends in April.

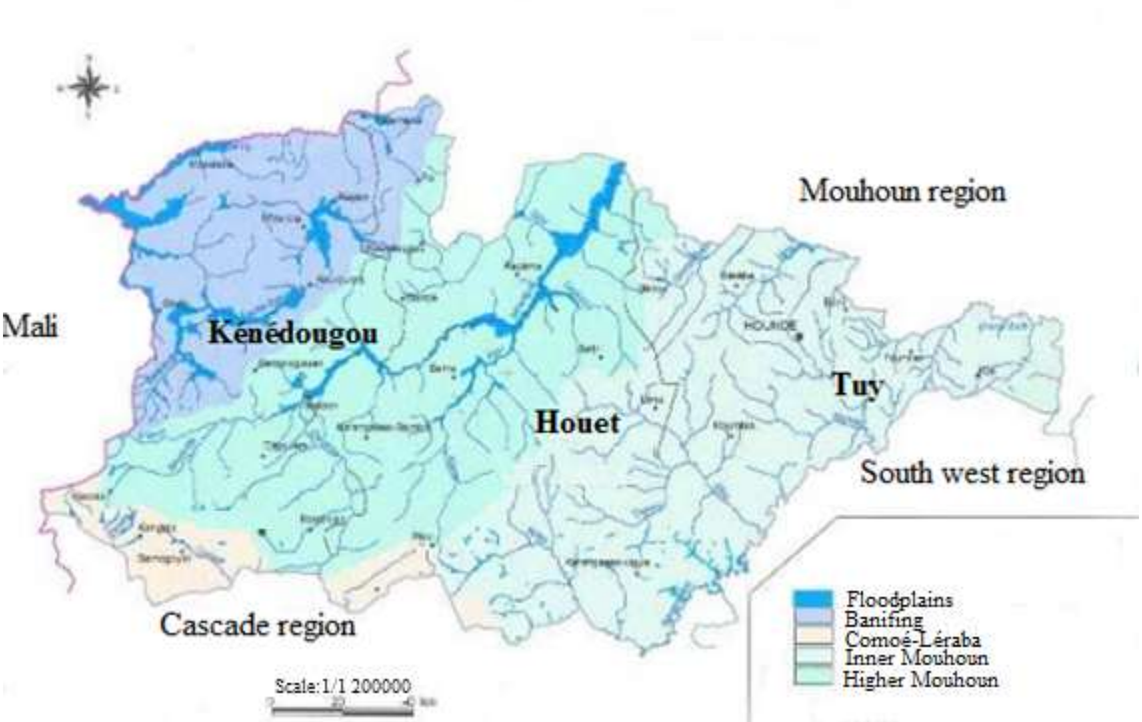
Figure 2 Kénédougou Rainfall from 2005 to 2013



Data of provincial agriculture direction

The seasonal variation in temperatures is characterized by four periods: two hot periods (highs of up to 34.2°C in April) and two relatively cool periods (lows of up to 24.9°C). The hydrographical network of the province is composed of two major rivers: the Mouhoun and the Banifing.

Figure 3 Hauts-Bassins region hydrography

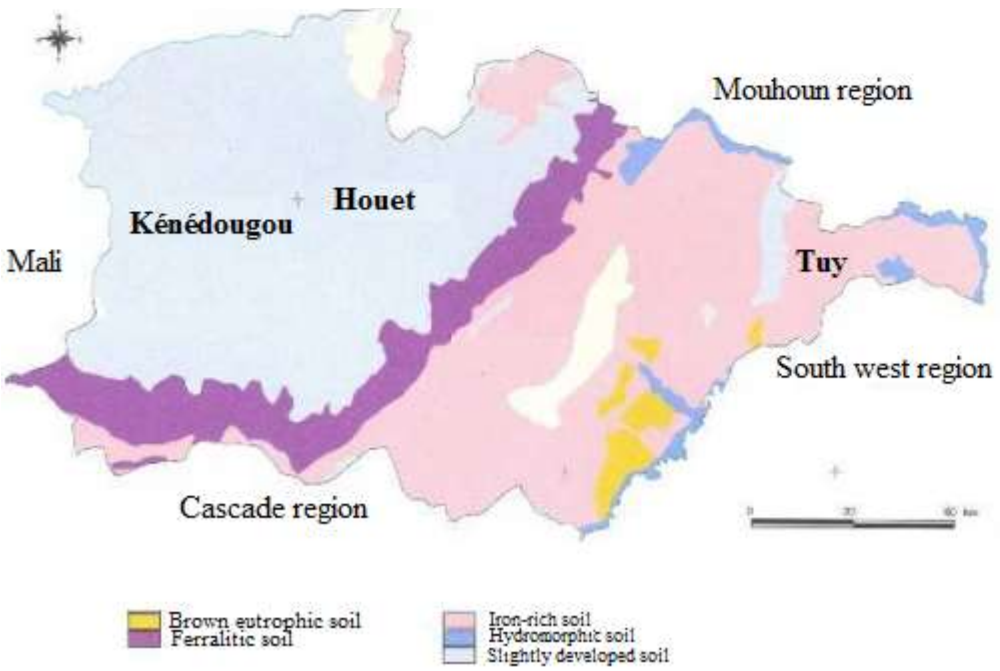


As shown in figure 3, Kénédougou province is well-drained compared to the other parts of the region.

3. Physiography and soil

In general, the provincial relief is very rugged consisting of hills, plateaus and plains. The altitude is between 500 and 700m with the highest point, mount Tenakourou at 749 m being the highest mountain in Burkina Faso..

Figure 4 Hauts-Bassins region soil map



Kénédougou soils are slightly developed, which is a fertile soil type. There are many plains among which some developed ones, namely the plains of Banzon, Niena, Dionkele, Sourou, Sikorla and Temetemesso.

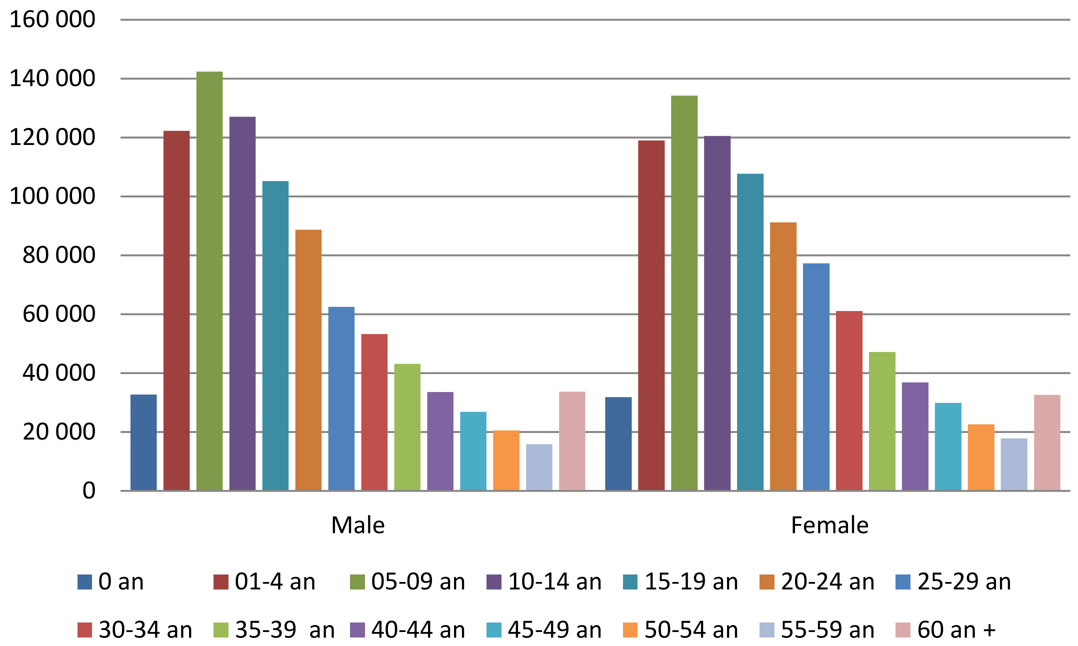
4. Socio economic context

Based on projections from the 2006 population and household census, Kénédougou's estimated population in 2013 stood at 358,150, with 181,293 females[1]. The annual population growth rate is at 3.1 per cent. Almost 92% of the province population lives in the rural areas. The population is very mixed with more than ten ethnicities, the main ones being: the Senoufo, the Toussian, the Samogo, the Siamou, the Fulani, the Dioula and the Dagara. Over 70 per cent of the population is Muslim.

[1] Ministry of Health data

Bobo-Dioulasso, the regional capital represents 30% of regional population. The structure of the regional population indicates that 17% are aged between 0 to 4 years old. In 2013, 1,480 mild cases of malnutrition and 1,619 severe cases of malnutrition were registered in Kénédoudou province[2]. The figure below presents the Hauts Bassins population structure.

Figure 5 Haut-bassins estimated population structure



Data of the Ministry of Health

The local economy, similarly to the national economy, is based on agriculture and pastoralism. Agriculture employs almost 90 per cent of the working population in the region and creates a large part of the local wealth. As elsewhere in the country, it is mostly subsistence agriculture, dominated by small family farmers (3-6 ha for 7-8 workers per farm) using mostly basic hand tools (more than 70% of farmers use the hoe) and making marginal use of pesticides and mineral fertilisers.

With fertile soils and relatively good rainfall pattern, Kénédougou is one of the biggest agriculture production areas of Burkina.

The southern part of the province, around Orodara, is specialised in fruit production (mango, lemon, orange, banana, and cashew nut). The north and the centre mainly

[2] Data of Kénédougou CISSE

produce wheat, rice and cotton. The western side around Koloko is specialised in roots and tuber production (sweet potato, yams, cassava and taro).

Wheat and rice are produced for home consumption, while fruits, cotton, ground nuts, sesame, and soya are produced for the market. Roots and tubers are produced both for market and home consumption. Sweet potato represents 80% of roots and tubers production in the province.

5. Kénédougou sweet potato production

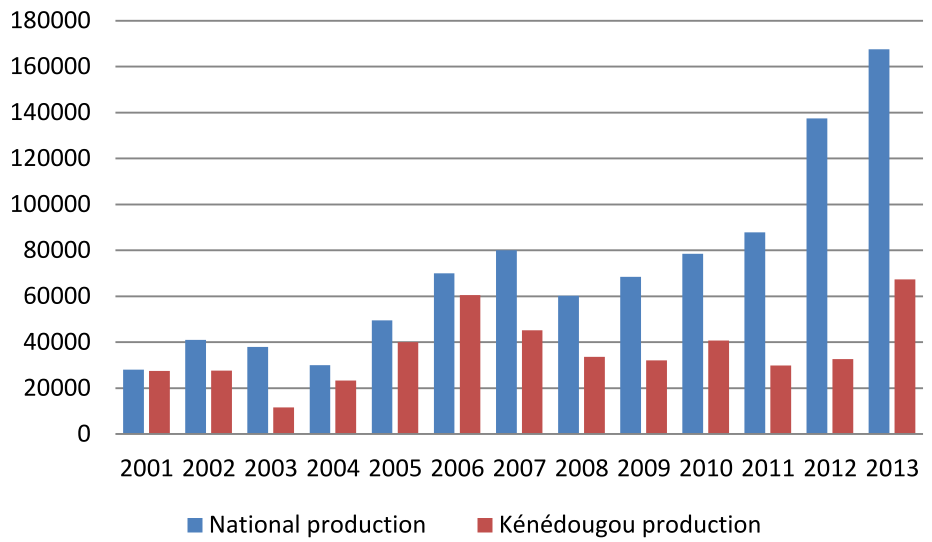
In Burkina there are many areas of sweet potato production as shown in the diagram below. But the production level and history are different from one production area to another. In the east of the country, Gourma and Kouritenga provinces are relatively new areas of production. In the west, Banwa province is also a new area of sweet potato production. In those areas the production size is modest. Bazega province is one of the oldest areas of production, but currently its production is decreasing. Sanguié, Sissili and Nahouri are provinces where the production is increasing faster than in Kénédougou province, the oldest and biggest area of production.

Figure 6 Provinces producing sweet potato in Burkina

Author's mapping

Before 2011, Kénédougou contributed more than 50% of the national production. But for a few years now, Léo province's production is growing faster. Kénédougou province produced an average of 42,600 tons/year these last five years.

Figure 7 Kénédougou and national SP production tons/year



National Statistics and * Kénédougou Agriculture Services statistics

6. Local industries

Compared to other parts of the country, local agro-processing is well developed in the province and consists mainly of fruits and vegetable processing enterprises. Since 2006 one of the most successful agro-processing companies in Burkina, Dafani, produces mango and orange juice in the province. Several small-scale units for drying mangoes and Irish potatoes and shelling cashew nuts can also be found. UTAK, a cashew nut processing union, is very active. Many processing units are managed by Kénédougou Producer Cooperative (COOPAK). Of note are also the businesses JBF (Jean Baptiste and Florentine) enterprise and BKF. There is also a cotton hulling factory run by SOFITEX located in Kourouma and Ndorla districts.

There are thirteen main markets in the province, one in each district, where transactions are done, but the most important part of transactions take place in the Bobo Dioulasso markets.

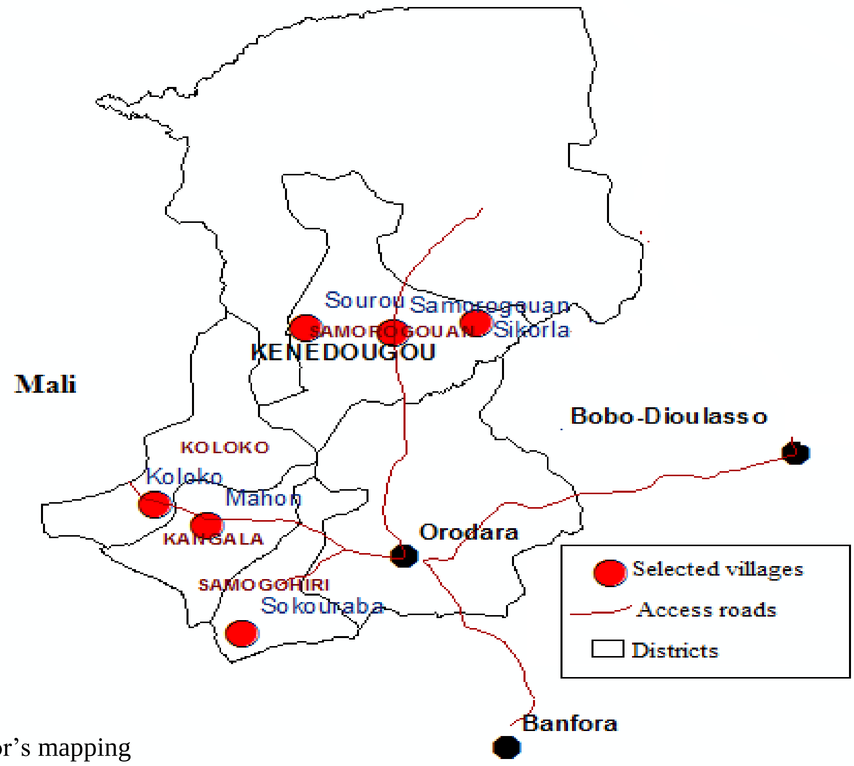
Bobo Dioulasso the regional capital and second largest city of the country accounts for 20% of national enterprises, compared to 58% for Ouagadougou, the capital. In Bobo-Dioulasso the bulk of the industrial fabric is composed by agro-food (Brakina, Citec for oil), agro-industries (Sofitex, Sofib, Mabucig), light industries (Sonaceb Cartonnage, Winner), mechanics and metallurgy (FAS, CBTM, Profimetaux, ERIA-BF, AUMI) and chemistry and its derivatives (Saphyto, SAP). The industrial zone is located along the railway that crosses the city. There are also around 20 cooperatives and associations that run small-scale agro processing units.

There are three microfinance institution and two banks in Kénédougou province.

7. Selected villages for the proof of concept project and data collection

Based on production size, the main production areas selected for the proof of concept project are Sokouraba, Koloko, Kangala, Samogorogoan, Sikorla, and Sourou. These villages produce 48,400 tons or 70% of provincial production. For the market analysis, primary field data was collected in these production zones. Figure 5 indicates the location of the villages and access roads.

Figure 8 Selected production areas in Kénédougou and access roads



Author’s mapping

Sikorla, Samorogouan, Sourou are located in Samorogouan district around 50 km from Orodara; Mahon in Kangala district 45 km from Orodara; and Koloko in Koloko district 55 km from Orodara, close to the Malian border.

8. Selected markets for data collection

There are several markets where sweet potato is commercialized and those in the towns of Kaya, Dori, Yako, Koudougou,Ouahigouya, Ouagadougou, Bobo Dioulasso and Léo are the biggest. Of these, the Bobo Fruits & Vegetable market, Ouagadougou, Kaya and Dori markets have been selected for primary data collection based on the volume of transactions, the number of sweet potato trucks arriving from Bobo and the quantity sweet potato sold. The Medine market in Sikasso in Mali has also been selected due to its proximity to production areas and the high volume of sweet potato from Kénédougou commercialised there.

Figure 9 Selected markets for data collection

Author's mapping

In Bobo-Dioulasso (85km from Orodara), the fruits and vegetable market is one of the collection points for Kénédougou sweet potato. Ouagadougou the capital is 360km from Bobo with 1.5 million inhabitants. Kaya is 460km from Bobo in Oubritenga province which has 240,000 inhabitants (of which 19,000 urban). Dori is 630km from Bobo in Seno province which has 290,000 inhabitants (of which 21,000 urban). The

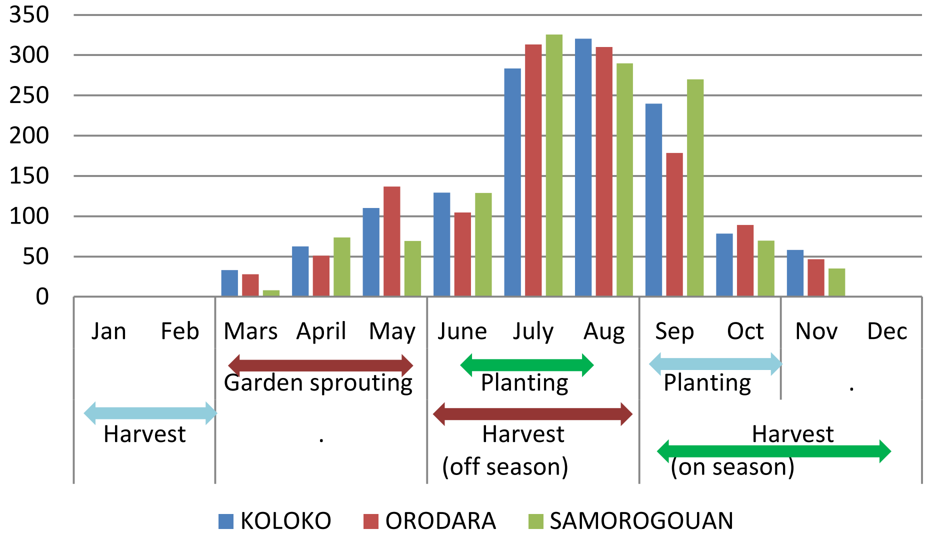
Sikasso Medine market, 100km from Orodara, is the second biggest collection point for Kénédougou sweet potato.

9. Descriptive analysis of sweet potato production system in Kénédougou

In the province, sweet potato is mostly grown by young men in mono cropping system. The zone has a long history of producing sweet potato, an average of 30 years. Sweet potato has a multiple uses in the region: food security crop, regular food crop, and primarily, a cash crop. On average 0.6 ha/farmer is allocated to sweet potato but one single family may be have several sweet potato fields. Larger-scale farmers crop 3 to 5 ha, while some farmers crop less than 0.2 ha in kitchen gardens.

Because of the relatively long rainy season there are three periods of sweet potato production in the province. In-season production, the most common, is planted from June to July. For that production, farmers sprout the vines by planting roots during the months of January and February in irrigated protected gardens. They harvest the crop in October to December. For the second production, some farmers manage to plant vines in September/October to harvest in January/February. The plants end the cycle using atmospheric humidity as there is no more rain in that period. This planting pattern is mostly seen in Sikorla and Sourou. The third production is off-season and farmers using irrigation plant during the months of March and April. That production is done by vines multipliers for vine production first, and after cutting the vines, letting the plant continue its cycle. Harvest is from June to August. Samogohiri and Sokouraba are the main sites of this kind of production. The figure below shows average monthly rainfall in Kenedougou province and the planting and harvesting periods. The rainfall is captured by three of the four rainfall stations in the province, one in Orodara, one at Koloko, and one at Samorogouan. The fourth one, located in Ndorla district, is not shown here because it does not cover the selected villages.

Figure 10 Average monthly rainfalls with planting and harvest periods



Data of Kénédougou Agriculture Direction

March to May is the period in which sweet potato is not harvested.

9.1. Varieties

The sweet potatoes are generally white-fleshed and white or red skinned; orange-fleshed sweet potato (OFSP is very marginal). Among those varieties there may be different types. White-skinned white-fleshed sweet potato is the most cultivated in the province occupying 80% of sweet potato growing areas, followed by the red-skinned white-fleshed variety occupying 18% of growing areas, OFSP represents only 2%. The white skin white flesh sweet potato is locally called “Fadanga”, which means “father’s curses” in Dioula referring to a local saying that even if your father cursed you, if you planted the white skin white flesh sweet potato you were sure to harvest something.

This variety is generally planted in June/July to be harvested from September-December. It is mostly produced in Samogohiri, Sokouraba, Mahon and Koloko. The red skin variety is generally planted in September/October to be harvested in December/ January. It is most cultivated in Samogorogouan district. In December white and red skin are commonly seen together in market places, but the red skin predominates at it is its harvest period. A very limited quantity of OFSP appears on the market in December. The OFSP varieties are late maturing in general and end their cycles in 4 to 5 months.

9.2. Land preparation

Sweet potato is most commonly grown on mounds, less commonly on ridges and occasionally on raised beds. When preparing the land, some producers hire farm workers or the youth cooperative to build the mounds. They are paid 10 FCFA/mound and the total cost on average comes to 50,000 FCFA/ha. Among the youth, they help each other for mounding, working in groups doing one field before moving on to another. There are two kinds of mounds, big mounds and small mounds. The big mounds are widely spaced with 1.5 meters in between mounds, this makes around 4,000 mounds/ha. The small ones only have 80 cm to 1 m in between mounds. Only few farmers who have access to tractors make ridges.

Planting

Both men and women are involved in planting. They use long vine cuttings with 6 to 7 nodes per cutting. They fold up the vine on the mound and cover it with soil. Farmers explain that they use long cuttings to make sure the vines survive even if there is a pocket of drought during the season. Most producers rely on their farms as source of planting material and try to produce their own vines, but this is often insufficient as it is very difficult to manage vine multiplication gardens during the dry season. Many end up buying vines and/or getting some from neighbours or family for free.

In Kénédougou they sell vines in bags of 50kg or per fully-charged motorbike. A 50kg bag costs 5,000 FCFA and a motorbike 10,000 FCFA. During the transaction it is up to the buyer to pack the vines on his motorbike, which makes the quantities of vine bought very variable, depending on the ability of the buyer to pack it tightly. While it would cost, on average, 75,000 FCFA/ha if all planting material was purchased, most producers spend only 20,000 FCFA to supplement the material they have.

9.3. Fertilization

As everywhere in the country, use of fertilizers is very limited in the province. Some farmers use both chemical and organic fertilizers, but most of them only use organic fertilizers. Organic fertilizer is applied before preparing the land.While chemical fertilizers, NPK (nitrogen, phosphorus, potassium) and urea, are applied 2 to 3 weeks after planting. The farmers who use the chemical fertilizers do it on the fly. In general they apply 100 kg/ha of NPK, and 50kg/ha of urea. Some farmers reported that they do not use chemical fertilizers because when used the roots do not store well and are susceptible to damage.

9.4. Pest and disease management

Husbanding it is mostly done by women, through women’s groups, with 15 to 25 women per group, organized for husbandry. Producers hire them to weed their plantations paying each woman 300 to 500 FCFA per day, and offering a small collation. But each woman brings their own lunch. The women are paid when the producers sell their production. In general the farmers weed only once.

Farmers reported that weevils and nematodes cause a lot of damage to their production, but very few of them apply pesticides.

9.5. Harvesting and storage

Men and women are both involved in harvesting. The men uproot the sweet potato and women and children collect it. When the production is significant, buyers come to the farm gate with trucks; when production is insufficient to fill a truck, farmers take it to a collecting point in the village where all the small producers bring their production. That production is weighed before selling. There are one to two collecting points in each village. Farmers use donkey carts, bicycles, motor cycles, bags and basins to carry the sweet potato to the collecting points. Some producers take their production to the local market themselves. The yields are very variable from 10 to 25 tons/ha depending on the varieties, farmer practices and rainfall patterns. According to the farmers interviewed, most of them reported that the white-fleshed white-skinned sweet potato has the better yield.

Sweet potato storage is not common in the province. Some of the farmers’ practises on- ground storage. They leave the sweet potato in the field and harvest it according to their home-consumption or market needs. They can manage the harvesting that way up to 45 days after the roots mature. Most farmers know the pit storage method but do not use it. Some reported that they do not store because sweet potato is available all year long.

III. VALUE CHAIN ANALYSIS

1. Functional analysis

The main stakeholders of sweet potato value chain are producers, middlemen, transporters, wholesalers, retailers and consumers. Besides those stakeholders there are also finance institutions, agriculture extension personnel and some NGOs that contribute to the good functioning of the subsector. In this section, each group of actors and their activities are described.

1.1. Upstream from production

Upstream from production, the main actors are farmers, input retailers, government, finance institutions, agriculture extension personnel and some NGOs.

a. Input supply

Producers are also vine multipliers who mostly select vines from their own farms for multiplication and grow them in small irrigated gardens during the dry season. Very few farmers sprout roots to get vines. There are also farmers specialized in vine multiplication for the market. INERA, the national institute for agronomic and environment research work to supply some national program in planting material. Since 2011, the government has started distributing vines, but very few farmers have access to those vines because of limited supply. NAFASO, the biggest seed producer in the region multiplies for the government vine distribution program; other big farmers also supply the program. The vines are sold at 15 FCFA per cutting to the government. In 2013, the government distributed 2.5 million cuttings in Kénédougou province. In 2014, only 5 million cuttings were distributed across the whole country, because suppliers could not meet the order. Kénédougou producers received 700,000 cuttings. The cuttings are packed in bags, of 1000 cuttings per bag. The vines are distributed through local agriculture extension workers. When interviewed, the director of NAFASO ensures that they will be able to supply any demand of cuttings the next season, since they have planned to produce large quantities.

The extension workers are supposed to provide technical support to the farmers, but all farmers interviewed reported that they had never received advice on sweet potato production. In fact, the extension workers have no specific skills on sweet potato production, since no training on sweet potato is delivered in the institution where most of them trained, CAP Matourkou.

A few input retailers are located in some villages. They sell NPK, urea, and less commonly, pesticide to the farmers. A bag of NKP costs 18,000 FCFA and urea is 16,000 FCFA per bag of 50 kg. When an input retailer is found in the villages he supplies local farmers, but in general, farmers buy their fertilizers and pesticides in the district markets.

There are three micro finance institutions in the province. RCPB, Mutual Credit, and Fiproxy which is proximity finance. RCPB is the biggest micro finance institution in Burkina. The director of the Orodara branch reported that they are used to giving loans to farmers for sweet potato production; the same holds for Mutual credit and Fiproxy. From the field inquiry it appears that less than 1% of farmers questioned have taken a loan for sweet potato production. The average loan per farmer is 500,000 FCFA. There is also a commercial bank, Ecobank, which mostly finances cotton production. Recently, Coris Bank has opened a branch in the province.

Concerning government policies to develop agriculture, strategies have been value chain oriented for a few years now. Among the value chain development strategies prepared by the Ministry of Agriculture there are projects to promote cassava, but none for sweet potato which shows the lack of attention to this important crop. Nevertheless these last years, sweet potato is getting more attention. Dr Somé, a roots and tubers specialist at the research institute, INERA, has called sweet potato “the crop that promotes itself”.

b. Production

Sweet potato is mostly produced by men who crop it primarily for the roots. The production is done by a multitude of small-scale farmers. Considering the total land area for sweet potato, which is around 4500 ha, and the estimated average area of the land allocated, 0,6ha/farmer, the estimated number of sweet potato farms is around 7400. Most of the farms are located near villages. Each farmer works alone and there is no association around sweet potato in the province, whereas you can find associations for cotton, cashew nut, maize, and horticulture producers.

Sweet potato is produced almost everywhere in the province, but at different scales. Some farmers produce small quantities for home consumption in small home gardens. The medium and large producers are market oriented and are mostly located in Sikorla, Sourou, Samogorogouan, Sokouraba, Mahon, Koloko and Banzon. The average production volume per year is increasing in the province as in the country in general. In Kénédougou production has grown from 12,000 tons in 2003 to 67,000 tons today. The estimated average yield is 11.5 tons/ha. Sweet potato is mostly available from November to January, which corresponds to on-season production. According to farmers there have been some changes in the production system for OFSP, with several farmers abandoning OFSP for several reasons:

- Low yield comparing to the other varieties
- Fewer market opportunities, as Malian traders, who constitute the main market prefer the white-skin white-flesh variety
- OFSP is very susceptible to damage from weevils and nematodes
- Lack of planting material
- Low storability compared to other varieties
- The belief the OFSP causes male impotency

Most farmers sell their sweet potato at farm gate and prices vary from 250,000 FCFA to 600,000 FCFA for a 7-ton truck of the red skin variety, and 400,000 to 750,000 FCFA for the white skin variety which is more expensive. Farmer reported that they had never packed a full 7-ton truck with OFSP and so they could not provide a corresponding price.

The insights from farmer interviews regarding their agronomic practices and marketing skills are summarized in the table below.

Table 1 Insight from farmer interviews

- Most farmers practice land rotation
- Most farmers use vines with more than 6 nodes/ cuttings as planting material
- Most farmers mound for planting
- Some of the farmers lift up the vine and hill, others do not
- Farmers do not know about curing before harvesting
- Most farmers know about pit storage but very few practise it
- Most farmers have never received advice on sweet potato production
- Most farmers interviewed do not know their operating cost
- Some farmers do not know their yield and their production in tons
- Most confused income and profit
- Most farmers sell their production at farm gate
- Most farmers do not have any contacts of wholesalers, buyers or transporters
- Most farmers know OFSP and have cropped it at least once in the past
- Most farmers are not aware of the virtues of OFSP

1.2. Downstream of the chain

1.2.1. Commercialization

Sweet potato from Kénédougou province is mainly commercialized in Sikasso, Bobo Dioulasso, Kaya and Dori markets. They mostly sell the roots, only few producers around Bobo Dioulasso commercialize the vines, and the buyers for these come from Bobo. The main actors are middlemen, transporters, wholesalers and retailers. There are also local development actors such as NGOs that support some small-scale agro-processing units. Financial institutions are also involved.

a. Intermediaries

Middlemen are the persons that have contacts with both producers and buyers. Their collaboration with farmers is based on long-term relationships. There are two kinds of middlemen. The first type just informs the wholesaler when there is sweet potato for sale and they receive a commission for that. These middlemen live in the production villages. The second type are in fact collectors, they buy the product themselves in the collecting markets. Those middlemen or wholesale-collectors come from Bobo or Sikasso and in general they are in contact with the village middlemen. There is an average of 5 middlemen in each production village from our estimation. The middleman's job was initially to find the buyer. Farmers reported that most of the time they also bargain and sell the sweet potato for them. According to both Malian and Burkinabe wholesalers, it is practically impossible to buy sweet potato without a middleman being involved in the transaction for various reasons:

- Farmers are difficult to bargain with
- There are long-term relationships between farmers and middlemen.
- Wholesalers do not know the villages and producers

Middlemen that inform buyers for a commission receive 10,000 to 15,000 FCFA per truck depending on the availability of the product. The other category of middlemen, the wholesaler-collectors, buy the production at collection points and organise transportation to the Bobo Fruit and Vegetable market, where they resell to wholesalers from different regions of Burkina. The intermediary wholesalers, generally from Burkina, buy the sweet potato per truck without weighing it; the potatoes are later repacked in bags estimated at 90 to 110kg.

b. Transportation

The transporters play a key role in the distribution of sweet potato to the different markets and consumption centers as most producers and wholesalers do not own a truck. Wholesalers hire the trucks to carry the product to the market and the truck owner provides the driver. There are two main collecting markets where the production is transported to - the Bobo Fruit and Vegetable market and the Medine market in Sikasso. In Orodara, Bobo and Sikasso there are transporters specialized in agriculture product transportation. Most transporters are based in Bobo and Sikasso, very few are based in Orodara, the province capital. According to transporters interviewed, there are only 4 to 6 trucks in the Orodora market. From field observation, sweet potato transporters use 7-ton trucks and 10-ton trucks. Malian buyers commonly use 10-ton trucks while those from Bobo Dioulasso use the 7-ton trucks. Transporters reported that it takes on average two days to collect and transport sweet potato from the different production sites to the Bobo or Sikasso market. With the 7-ton trucks, transporters reported loading an average of 13 tons of sweet potato, and with the 10-ton trucks, up to 17-18 tons. The transporters generally work for rich traders who own the trucks. Most of them are paid per month but some are also paid per trip. They work with apprentices who help to load the sweet potato. The trucks generally arrive in the villages the night before loading is scheduled to take place. It takes on average 3 hours to travel both from the Bobo and the Sikasso market to the production sites with the empty truck, while with the loaded truck the average trip to go back takes 5 to 6 hours. The average number of trips per transporter during harvest time is 3 per week.

Table 2 Transportation cost FCFA/truck

Main collecting point	Bobo (7-ton trucks)	Sikasso (10-ton trucks)
Main production areas	Transport cost	Transport cost
Sourou	125 000	225 000
Sikorla	120 000	200 000
Samorogouan	110 000	200 000
Mahon	100 000	180 000
Koloko	110 000	160 000
Sokouraba	115 000	210 000

According to Malian transporters the main difficulty they face is obtaining the pass to cross the border to Burkina.

Bobo transporters reported that they do not transport sweet potato to Ouagadougou, Kaya and Dori, the main sweet potato distribution markets. The wholesalers from those markets themselves send their own transporters who usually use 10-ton trucks like the Malian buyers. Those transporters charge transportation fees by the bag; they load an average of 170 to 175 bags of 100 kg which can contain up to 120 kg.

Table 3 Transportation cost from Bobo to the main markets in FCFA/100kg bag

Markets	Ouagadougou	Kaya	Dori
Price/bag in FCFA	2000	2500	3000

Transporters from those distribution markets reported that their main problems are the poor quality of the roads and the bulkiness of the product. These last years, they are also having difficulties with ONASER[3], the national road security agency. The maximum load allowed by ONASER for a 10-ton truck is 18 tons, the weight of the

[3] ONASER : Office national de la sécurité routière

truck included. For each exceeding ton the penalty is 20,000 FCFA. In the past, transporters used to carry up to 190 bags but now this is limited to 175 bags. Retailers use donkey carts in the provinces to distribute the sweet potato to surrounding villages and markets. Most commonly they use common transport or motor-tricycles that have recently appeared on the scene.

c. Wholesaling

Sweet potato produced in Kénédougou is mainly sold wholesale at Sikasso and Bobo Dioulasso markets. As seen, the wholesalers buy truckloads at the farm gate. A few wholesalers from Orodara also buy sweet potato in the villages or district market. The prices depend on the availability which depends on the period and the variety. Most wholesalers reported that they prefer white-skinned white-fleshed sweet potato because it does not spoil during transportation, can keep up to 2 weeks in their warehouse and most demand from retailers is for this variety. When the white or red-skinned white-fleshed potatoes reach the market, they are repacked into 100kg bags at the Bobo Fruit and Vegetable market and 80kg bags at Medine market.

From Medine the sweet potato is distributed to the different regions of Mali, mainly Bamako, Kaye, Ségou and Gao. Some transporters reported sending the sweet potatoes as far as Senegal. From the Bobo market, sweet potatoes are distributed mainly to Kaya, Dori and Ouagadougou markets. Wholesalers interviewed estimate that there are about 30 Malian wholesalers who cross the border to Burkina to buy sweet potato. In the Bobo market there are an estimated 20 wholesalers. At the Medine market sweet potato is weighed before selling. The prices vary from 40 FCFA/kg to 100 FCFA/kg.

The Bobo market is well built and relatively well organized. Sweet potato wholesalers and retailers occupy strategic places in the market. They are all positioned at the entry of the market. These past years traders have been trying to organize themselves into an association. It is important to mention that the Fruit and Vegetable market was not intended for roots and tubers, but sweet potato vendors have found a place in the market due to their dynamism. There have been many attempts by the market administrators to chase roots and tuber vendors out of the market, but in vain.

Currently there are around 20 wholesalers and 30 retailers reporting some whole-selling in the market. In 2013, 236 7-ton trucks were registered at the Bobo market and 97 trucks in 2014. There is no record before 2013 because sweet potato vendors only started paying the duty-tax of 2000 FCFA per truck in 2013.

In the market there are young men whose job is to unload the trucks, repack the product in bags and load the trucks from different market places. The baggers are paid 750 FCFA to repack a bag of sweet potato and 250 FCFA/bag to load it in the truck. There are an estimated number of 40 baggers at the Bobo market and 60 baggers at the Medine market.

At the Bobo market the red-skin sweet potato prices vary from 3500 FCFA up to 15,000 FCFA for a 100kg bag. The white-skin prices vary from 4000 FCFA to 17,500 FCFA and OFSP prices from 5000 FCFA to 20,000 FCFA.

In the Kaya, Dori and Ouagadougou markets, wholesalers work together and communally hire trucks to go to Bobo Dioulasso. Each wholesaler pays according to the numbers of bags he owns. The estimated quantity of sweet potato bought per wholesalers in those markets is 30 to 50 bags of 100 kg per week during production season. Kaya wholesalers are well organized and are members of a very dynamic fruits and vegetable association. According to some interviewed wholesalers, sometimes when sweet potato is scarce on the market, Ouagadougou wholesalers resell a part of their sweet potato to Kaya wholesalers who resell a part to Dori wholesalers. That situation occurs generally at beginning or at the end of the on-season production.

At the Kaya market, most wholesalers have their own warehouse. This is not the case in Dori; there sweet potato arrives on Friday, the weekly market day, and retailers wait for its arrival. They repay what they took on credit at the previous week’s market and then obtain the current week’s quantity they on credit again. Dori wholesalers reported they sell on credit all the time, except to clients from Niger to whom they sell cash. The price for a 100 kg bag in the Ouagadougou, Dori and Kaya markets varies from 8000 FCFA up to 27,500 FCFA for the white-skinned white-flesh variety. The red skin variety is little bit cheaper and the OFSP little more expensive.

Some wholesalers reported that because of the roads security agency checkpoint in Bobo, their activity is less profitable as they cannot load their trucks as much as previously. Thus some wholesalers in Kaya prefer to buy their sweet potato from the Léo market when possible because ONASER does not have any checkpoints on that road to Kaya.

Table 4 Insights from wholesalers' interviews

- Most wholesalers buy in cash
- Most wholesalers use middlemen to get their supplies
- Most wholesalers do not have contacts of farmers
- Most have contacts of retailers
- Most have contacts of middlemen
- Most prefer white-fleshed white-skinned sweet potato
- Most know OFSP but are not aware of its virtues
- Most finance their activity with their own funds
- Most sell to the retailers on credit
- Most do not keep record of their activity

d. Retailing

Sweet potato retailers are mostly women. In the Orodara market most retailers themselves go to the production villages to supply themselves, buying sweet potato in 50 kg bags.

In the Bobo Dioulasso market, after repacking the sweet potato in bags with the first quality product, the second quality which is average-sized sweet potato is also packed in bags of 80 kg or gathered in heaps to be sold per 50 kg basin. The second quality sweet potato is mostly sold to local retailers. Some retailers also supply themselves from the Ouezzinville market in Bobo where sweet potato from the Kou Valley arrives.

In Ouagadougou, sweet potato retailers are present in many markets namely: Pagalayuni, Bousskaré, Sangkarayari, and Toécin markets.

In Kaya and Dori retailers mostly come from the neighbouring villages and generally buy on credit to pay after a week. Kaya retailers mainly sell their sweet potato at

Korsi; Mané; Zianco; Basséré; Pibaoré; Pisla; Barsalgo; Pensa, Dablo; Kolga and Rite. A wholesaler reported that there are 15 markets around Kaya where the retailers come from. Dori retailers mostly sell at Bari; Sapaalga; Ceba; Bondoufa; Gorogayi markets

In the Kaya market wholesalers have warehouses to store their sweet potato and so they also sell as retailers.

One notes that in all the towns, there are many urban retailers who sell their sweet potato in the markets; sometimes close to the place where they just supplied themselves - in stations, along main roads and in some small markets. The retailers' clients are mainly women who fry or boil sweet potato, restaurants, and households. In general, the retailers do not sell by weight but by heap of different price depending on the size and the number of roots. There are heaps of 200 FCFA, 500 FCFA, 1000 FCFA and 1500 FCFA. Retailers sell a 100kg bag on average at 15,000 FCFA to 35,000 FCFA.

Table 5 Insight from retailers' interviews

- Most retailers supply themselves on credit
- Most reported that their clients prefer white-fleshed and skinned SP
- They reported that white-fleshed and skinned SP stores much better
- Most sell on credit to women that fry or boil SP
- Most do not keep record of their activity
- Most know of OFSP
- Most said OFSP is not available
- They reported that OFSP stores less well

1.2.2. Processing

Sweet potato processing is mainly done by women. They mostly fry or boil it. Both in the urban and rural areas, women are seen in the afternoon frying sweet potato on street corners, in bus stations, in markets places, etc. They are also present in schools compounds where students come to buy sweet potato at break time. Some restaurants, mainly in the cities, cook sweet potato ragout, or add it as a piece of vegetable in fried rice. In the rural areas sweet potato processing is limited to frying or boiling while in the urban areas there is greater diversification. Urban processors try to make cakes, biscuits, couscous, infant mixes and sweet potato chips, but most of this is at very small scale, mostly for demonstration or home consumption. For instance visits to shops and supermarkets in Bobo Dioulasso the regional capital of Hauts-bassins revealed that only infant mixes based on sweet potato were available in a few shops. Those women who do go further with the processing to make *dègué*[4], couscous, infant mixes and cakes are not well known. Recently in Ouagadougou, a woman has started producing OFSP juice. In Bobo some women use sweet potato flour in pastries. These products are not well known and commercialized at a very small scale.

IRSAT, the national institute for applied sciences and technologies has started some experimental processing with sweet potato. They make biscuits and cakes, but at very small scale, mainly for demonstration purposes.

In Orodora there are many small-scale agro-processing units, but most are in mango or orange juice processing and cashew nut shelling. Some women process sweet potato but they work alone and are not organized and are mainly just frying or boiling. The director of local agro-processing in the provincial agriculture services in Orodara reported that only one sweet potato agro-processing cooperative is known, WILIKATAAMA cooperative. It is a women's cooperative that produces flour, couscous and chips from sweet potato, among other things. According to the president of the cooperative sweet potato processing represents 20% of their activity.

In Bobo Dioulasso, there are 20 women's association for agro-processing known and registered according to some local development actors. Among those associations none is specialized in sweet potato processing. But few of them use sweet potato as raw material, namely ENTRACEL, ETRAFILS, BOURHANDINE and WEND MANAGAA, a private small scale plant run by women. They mainly make infant mixes, couscous and déguè.

[4] Dègué is a mixture of semolina and milk, traditionally made with millet and consumed as a dessert. Lately some women have tried making it with sweet potato.

The experiences of some agro processing units in processing sweet potato are presented below.

WEND MANAGAA is an agro-processing association located in Bobo Dioulasso created in 2002. There are six members in the organization. Mrs Ouardé Martilde is the president. The association processes diverse raw materials - fonio, millet, maize, and sweet potato. They started processing sweet potato in 2010 and now it represents the raw material they use the most. They produce dègué, couscous, and chips, with the first being their main products. They mostly make the chips for sale at fairs. The association often exposes their products at SIAO, FESPACO and during the Burkinabe National Farmers day fairs. They have also participated in fairs in Dakar, Abidjan and Niamey. They were supported by the NGO Afrique Verte to start up their activities.

They started up their processing activities with 1 million FCFA, both for investment and working capital. The equipment they bought are a dryer and drying tables. They took a loan once from the RCPB at a 12% interest rate and one-year repayment period.

During the sweet potato season, they buy one 100kg bag of SP per week. When sweet potato becomes scarce on the market they use only 20 to 30 kg per week due to the high cost. They use the red and white-skinned white-fleshed varieties for *déguè* and couscous and the orange flesh variety for chips. Mrs Dembélé, the president of the association prefers the white-fleshed and white-skinned sweet potato for processing because it is easy to dry.

The *déguè* and couscous are packaged in 0.5kg and 1kg bags. 1kg of *déguè* is sold at 1000 FCFA and and 1kg of couscous at 1200 FCFA. Around 30% of production is distributed to supermarkets and shops in Ouagadougou and Bobo Dioulasso. At the beginning of their activity, they were selling on consignment, but now the supermarkets pay cash. 40% is sold by street vendors in Bobo Dioulasso and the remaining 20% is sold door-to-door to offices. Some clients in Bobo export their products to Côte d'Ivoire and Europe. The chips are packaged in small bags which sell at 100, 200 and 300 FCFA.

The sweet potato processing activity generates on average 3,320,000 FCFA per year in income for the association.

BALO GNUMA is a local agro-processing unit based in Banfora, 45km from Orodara and 85km from Bobo Dioulasso. The enterprise was created in 2006 and at the beginning it was an association with 10 women members. Today the enterprise is run by Mrs Koné Karidja who employs 3 women. Their main activity is producing and infant flour mix. The enterprise processes 200 to 250 kg of OFSP per week. The raw material is bought locally in Banfora from February to June when it is readily available. To continue their activity when OFSP becomes scare on the local market, they slice and dry the potatoes. Those dried pieces called "*cossettes*" are then stored in big plastic bucket of 500m^3. The *cossettes* are processed from June to October when OFSP is not locally available. The OFSP price varies from 4500 to 7500 for a 50kg bag in Banfora.

The flour is a mixture of OFSP, green beans, soya, fish, wheat, maize and carrot. Sweet potato represents 30% of the raw materials used. They pack the flour in packets of 500g and 250g with good packaging. The 500g packet costs 1000 FCFA and the 250g sachet costs 500 FCFA when bought directly at the business. The packets are packed in cartons of 40 and 50 packets and distributed all over the country and in the sub-region using public transport. Transportation fees vary from 1000 to 2500 FCFA per carton. Nationally, the flour is distributed to public health centres, pharmacies, shops, and supermarkets. The enterprise has participated in fairs such as the SIAO, FESPACO, and the Agrofood Days Fair in Burkina. In the sub-region they have gained exposure in Niger, Ivory Coast and Senegal. They have worked with several partners such as IRSAT, CORAF and an NGO named Green Africa who have provided them with training in marketing and communication and helped them standardize their product. They have obtained loans from Coris Bank, a commercial bank, and RCPB (a microfinance institution) to finance their activity. In 2013, Mrs Koné the CEO of Balo Gnuma won the Burkina entrepreneurship prize at the Sindou fair.

ENTRACEL (Cereal processing enterprise) is a private small-scale agro-processing plant based in Bobo. It is run by Mrs POODA who works with two women. Initially she used only cereals as raw materials to produce infant flour mix and couscous. But for a few years now she has started using OFSP. She buys the sweet potato at the Bobo Fruit and Vegetable market and uses 200 to 250kg per week from October to March. She distributes the couscous and infant mix to supermarkets and shops, and the infant mix is also sold in pharmacies. The couscous and infant mix are sold in 500g packets at 750 FCFA. Initially Mrs Pooda used to sell on consignment but she produces on demand. She has received training from IRSAT and has participated in several fairs all over the country and the sub-region.

WILIKATAAMA is an agro and non-agro processing cooperative based in Orodara. It produces soap, juice, cakes, flour and clothes. There are 12 women in the cooperative. The main raw materials they use are sweet potato, yams, Irish potato, cereals, mango, orange, tiger nuts, and shea. Three years ago they started processing OFSP into flour and chips. They process around 300 kg of sweet potato per year. Some women in the cooperative also fry and boil sweet potato for sale. The president of the cooperative says she prefers OFSP to other varieties because of its sweetness. However, it is more difficult to find. The cooperative is supported by the PAD, OCADES and some other NGOs. They mostly sell their products at the cooperative and on the local market. They sell a 1kg of flour at 500 FCFA and the price of chips starts at 100 FCFA.

The processing units presented above use a marginal part of sweet potato produced. The majority is used by the women frying or boiling sweet potatoes.

Besides sweet potato processors, DAFANI, one of the biggest agro-processing factories in Burkina was also contacted. DAFANI is located in Orodara near to sweet potato production areas and the study team wanted to explore the partnership opportunities for processing sweet potatoes, for instance, into juice.

DAFANI processes an average of 4500 tons of mango per year into juice and the company is currently growing. According to the Research and Development director, Dafani's strategies include product diversification and they are currently testing new raw materials. They could be open to the idea of processing sweet potato into juice but raised many issues during discussions.

First, they are not sure of the suitability of OFSP for producing juice because of the starchy nature of sweet potato and would thus like to have a sample of OFSP juice to taste and assess. Secondly, they would like to contact any businesses producing OFSP juice for experience sharing. If it avers interesting for their R&D, they could then do tests. But testing may involve costs and who would pay for these costs? Lastly, they would like to be sure they can get sufficient quantities of raw material. For the size of the enterprise, the critical volume of processing raw material is 200 to 300 tons per year; would that quantity be available sustainably? Furthermore, how well does OFPS store? And are there any businesses that could supply them with OFSP pulp?

These are the questions that DAFANI brought up.

The following table presents some insights from sweet potato processors interviews.

Table 6 Insight from processors interviews

- Most processors are women who fry or boil sweet potato
- Most obtain their raw material on credit
- Those who fry mostly prefer white-fleshed white-skinned sweet potato
- A few processors produce couscous, infant mix and *dègué* for the market
- Some produce biscuits, cakes and chips only for fairs
- Those that produce couscous and infant mix need finance to scale up
- Most processors do not keep records nor accounts of their activity
- Most processors' products are not well known
- Most processors know OFSP but say it is not readily available
- Some fryers reported that OFSP consumes a lot of oil when frying
- Most reported that OFSP stores less well than other varieties
- Some said OFSP is not good for making flour because the color changes
- Most processors lack processing equipment

1.2.3. Consumption

Sweet potato is grown as a cash crop. Nevertheless, it is also important in household consumption and in rural areas helps families through the lean period. During the harvest period, most families in the production zones consume sweet potato.

In general sweet potato is more consumed in the provinces and villages than in the cities. In the villages people consume it at any time of the day, at home as well as outside. And it is often a main staple food, while in the urban centres it is mainly consumed as a snack in road-side restaurants. The leaves are also used to prepare a sauce.

A huge quantity of sweet potato produced is consumed boiled or fried, which is the main form of processing. In urban areas, restaurants also serve sweet potato ragout and sweet potato tends to be consumed at lunch time or during ceremonies. The table below presents some insight from consumer interviews in Bobo, Orodara, Kaya and Dori on how they consume sweet potato, their preferences in terms of varieties and their awareness of the virtues of OFPS.

Table 7 Insights from consumer interviews

- Most consumers boiled or fried sweet potato
- A few cook ragout or couscous with sweet potato
- In villages, sweet potato is most frequently consumed from November to January
- In cities, it is consumed less frequently
- Most consumers do not know any other recipes apart from the traditional one
- Most consumers questioned have no preferences between the varieties
- Some women, however said they prefer OFSP because it is sweet and well-liked by children; the color is nice and it’s attractive
- Most consumers are not aware of OFSP virtues, but a few have recently heard about these
- Most said OFSP is not available

1.3. Functional analysis summary

The chart below displays the organisation of stakeholders in the sweet potato value chain showing main markets, stakeholders and the estimated average percentage of sweet potato mobilized by each link.

Figure 11 Sweetpotato stakeholders map

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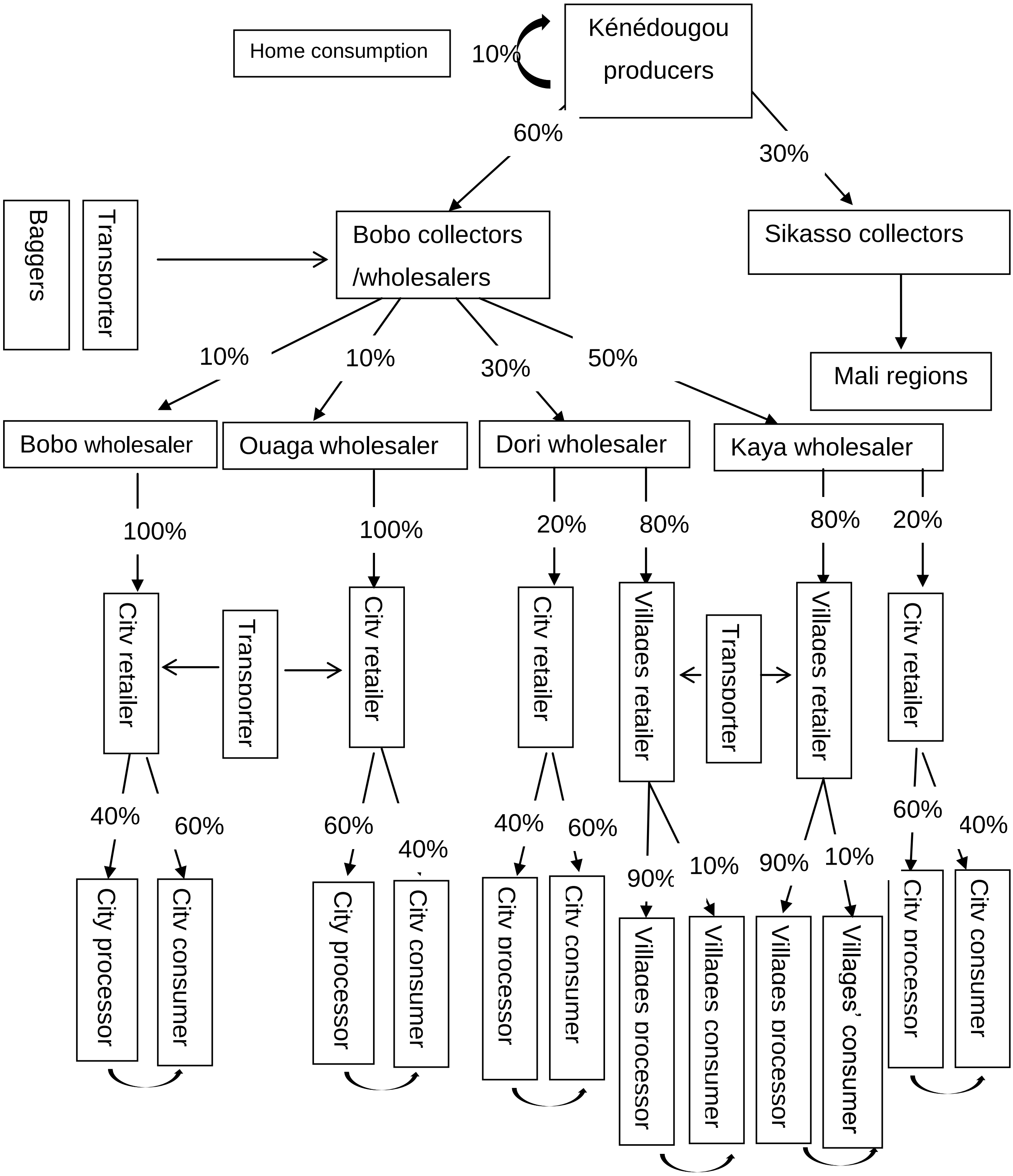


2. Gender analysis

[5] The presented map is a picture of a more complicated reality thus it mays not capture all circuits

In Kénédougou province sweet potato fields are mostly owned by men, but women are very involved downstream in the chain. Retailing is done by women who handle the last mile distribution (processing and selling to direct consumers). Women are also involved in production mostly in weeding and harvesting (taking the roots to the village collecting point or loading). Men own the fields and mound, plant and uproot during the harvesting. They also handle the wholesaling and transportation to the collecting and distribution markets. Thus, in Kénédougou the gender inequity is mostly in the production phase, at the value chain level both men and women are involved. Some farmers reported that women do not own sweet potato fields nowadays because of limited market opportunities, otherwise in the past women used to grow their own sweet potato. Others said that it is because mounding is too difficult for women since it is done with big hoes. Exceptionally, in Douna a village in Cascades Region many women own sweet potato fields. Experience-sharing between with this production zone could probably reinforce gender equity in the Kénédougou sweet potato production system.

3. Transaction and market place analysis

3.1. Market organisation

As previously mentioned, farmers sell their product at farm gate. In the past they used to organise for transport to take their production to the market themselves but they were faced with many difficulties. When the sweet potato arrived in the market middlemen or wholesalers/collectors colluded to reduce prices, knowing that the farmers could not stay long in town because they had nowhere to sleep, and farmers were sometimes forced to sell at very low prices. So for a few years now, most sell at the farm gate where they have better bargaining power. The sweet potato can stay on ground for a long time without spoiling.

The Bobo Fruit and Vegetable market was built in 2011 and sweet potato wholesalers have their place where they organize their transactions and repack the sweet potato in bags. The place is located at the entry of the market with good access for trucks. But it is quite narrow; the wholesalers estimated the storage capacity of their market space at 50 tons. Thus when the sweet potato arrives in the market, the baggers have to repack it as soon as possible. There is no specific market day in Bobo, the market is open every day. Thus wholesalers from the distribution markets can supply themselves anytime. The market in Sikasso, like the Bobo market, is also organized. But wholesalers at the Medine market have much larger storage capacity with some wholesalers reporting that their space can hold up to 500 tons.

In Ouagadougou there are a few sweet potato warehouses at Pagalayuni, Bouskaré, Sangkaryaré and Toécin markets.

In Kaya market wholesalers rent warehouses to store their sweet potato. The average warehouse rental is 4000FCFA/month. The warehouses are concentrated at the entry of the market. Contrary to Bobo and Sikasso markets, trucks cannot enter inside the market and there is no space to offload. The sweet potato is offloaded at the gate and each wholesaler takes to his warehouse the quantity he owns. Kaya market day is every three days. Most of the wholesalers reported that they go to Bobo to buy sweet potato each day after Kaya market day so that new sweet potatoes arrive on the next market day.

Dori market day is each Friday and wholesalers organise themselves so that sweet potato arrives on Thursday or Friday. At the market wholesalers do not have built warehouses like in Kaya, so most of time, retailers come to supply themselves on market day. If there is still sweet potato remaining after market day, this is stocked in hut-like structures that are mostly owned by wholesalers. In Dori most retailers also wait for the sweet potato arrival on market day so that they can choose the quality they desire. Some wholesalersin Dori, Kaya and Ouagadougou reported that they supply themselves in OFSP in Kombissiri.

In sweet potato value chain, retailing transactions are mostly done on credit. The women who handle the last mile distribution mostly supply themselves on credit. They work with the wholesalers in a kind of informal partnership. After frying or boiling the sweet potato they sell it and then pay back their suppliers. Wholesalers reported that this limits how much they can supply, as retailers do not always pay back after a week therefore reducing the cash that wholesalers have on hand to buy more sweet potato.

3.2. Price analysis

Sweet potato prices depend on many factors: the quantity available in the market; the size of the roots; the varieties; and the market place. The prices in the distribution markets depend on the prices in the collecting market. At the Bobo market the prices are as follows: at the beginning of harvesting the price is a little high around 7500 FCFA for a 100kg bag. Then it goes down to around 4000 FCFA by December/ January. After that period the prices rise again to reach 15,000 FCFA by March. The prices stay high until the new production season.

Table 8 Average minimum and maximum prices in FCFA/100 kg bag

Variety	Farm gate	Sikasso	Bobo	Ouaga	Kaya	Dori
White skin	2500 7500	3000 17500	4000 15000	10000 25000	12500 27500	12500 28000
Red skin	2000 7000	2500 15000	3000 14000	7000 22000	12000 27000	12000 28000
OFSP	2000 7500	2500 15000	5000 17000	15000 27000	16000 28000	16000 29000

The price differences in the main markets seem to be explained by the distances. The further the market is from place of production, the higher the price. The table above shows the average minimum and maximum prices.

Regarding retail prices, the same prices are found in the different market places, but there may be differences in the quantity of roots given for the same prices in the different markets. For instance, the heap of large roots can cost 500 F in the four main markets, but while the heaps consist of 5 roots in Ouagadougou, there are 8 roots in the heap in Bobo and 3 in the Dori markets. Most wholesalers and retailers claim to prefer white-skinned white-fleshed sweet potato, yet OFSP prices are a little bit higher in the market places in Burkina. This is probably due to its scarcity on the market and the fact that it appears late in the season by December to January.

The most common processed product, boiled and fried sweet potato, are available for any price beginning at 25 FCFA. The other processed products which call for more industrial processing - flour, chips, couscous, déguè - are generally distributed in 1kg package or sachet. Chips are generally available at any prices starting from 100 FCFA. The table below shows the average price at agro-processing units and at some supermarkets.

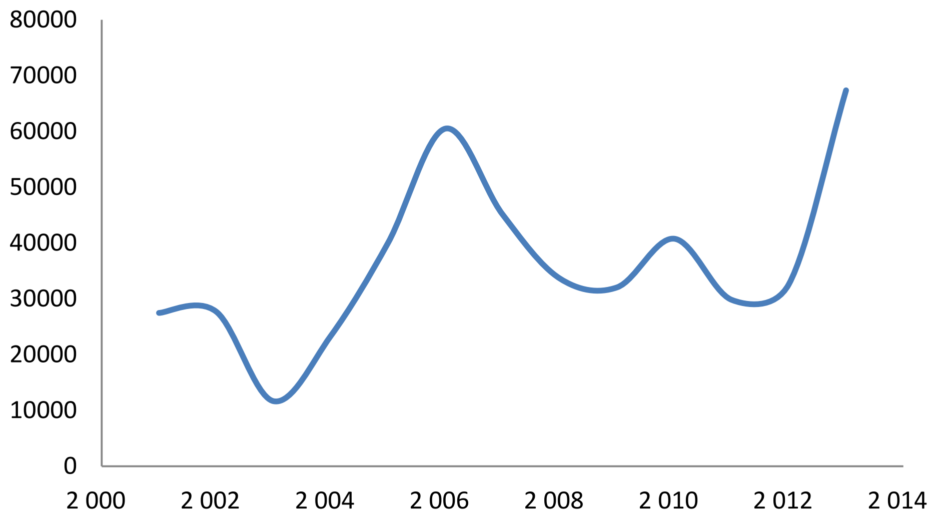
Table 9 Processed product price FCFA/kg

Market places	Flour	Infant mix	Déguè	Couscous
Processing unit prices	800	1000	1000	850
Super markets prices	1000	1250	1300	1000

3.3. Supply analysis

The paragraph presents the analysis of sweet potato supply in Kénédougou province. The figures below show the production level in tons/year.

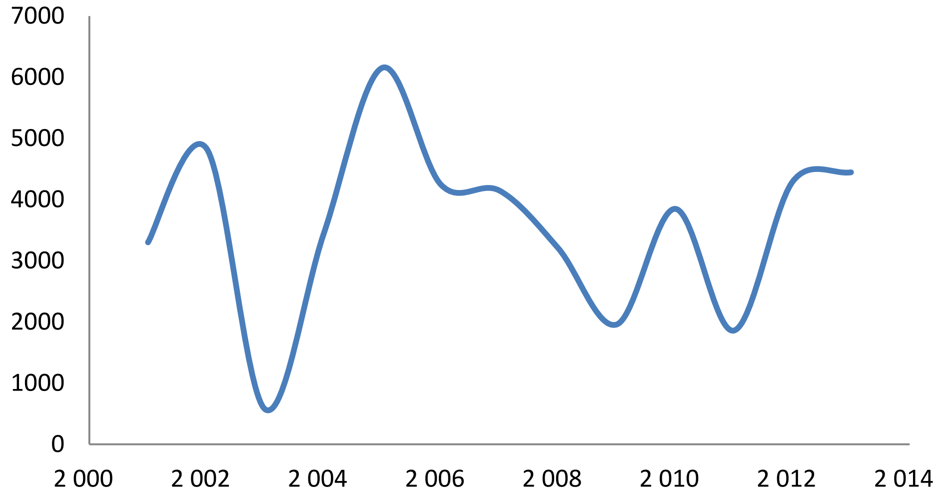
Figure 12 Sweet potato production in Tons/year in Kénédougou from 2001 to 2013



Kénédougou provincial agriculture direction data

The trend is going upward, but the curve is not stable: average annual production is increasing but there is a lot of fluctuation from one year to another. Many factors can explain this variation including poor harvesting due to lack of rain or damage by pests and disease or simply reduction in the amount of land allocated to sweet potato. The figure below shows the land allocated to sweet potato annually from 2001 to 2013.

Figure 13 Production areas in Ha/year from 2001 to 2013



Kénédougou provincial agriculture direction data

This curve fluctuates a lot and we note that there is a similitude between the variation of the land allocated curve and the production level curve and it can be assumed that the production level varies because of variation in sweet potato cropping areas. Some farmers reported that some years when production is good, prices are very low, and they have difficulties to find buyers. A part of the production spoils on the fields. Because of that the following year, lot of farmers refuse to produce. Then that year the production is low and the prices rise, those who have produced earn good incomes. Seeing those good results many farmers start producing again and the same phenomenon appears again. The farmers are market oriented and that confirms that sweet potato is grown as cash crop. They decide to crop sweet potato or not according to their perception of the market opportunity. That probably explains the fluctuations in land allocated and quantities produced.

There is no data on OFSP production quantities, but field observation and interviews indicate that currently it is very low. It may represent 2% of Kénédougou production.

4. Financial analysis

The financial analysis presents the costs, the gross income and profit for each stakeholder and the distribution of margins along the chain. The calculations are made for the white skin variety to give an overview of what the profits of stakeholders can be like and the added value along the chain. The calculations are done with an estimated yield per hectare of 11.5 tons, and a volume of ten tons for the other stakeholders.

While analysing these data, one should keep in mind the real quantities of sweet potato handled by the different stakeholders during the on-season harvest:

- The average area cropped by farmers is around 0.6 ha, which can produce 7 tons on the basis of the average yield of 11.5 tons/ha
- The average volume of sweet potato collected and sold by collectors/wholesalers is two to three 7-ton trucks per week
- Bagger/loaders pack and load 20 to 25 bags per day
- The average quantity of sweet potato sold by wholesalers is 15 to 20 100kg bags per week
- Retailers sell two to three 100kg bags per week on average
- Processors (women that fry or boil SP) process 50 kg per week

Table 10 Average production operating cost and gross operating profit per ha

Operating	Cost in FCFA
Land preparation	50 000
Vine (assumes all vines are purchased)	75 000
Fertilizer (50 kg of NPK and 50 kg of urea)	34 000
Organic fertilizer	20 000
Planting	25 000
Weeding	15 000
Harvesting	10 000
Selling information cost	10 000
Total operating cost	239 000
Gross income (average yield 11.5 tons/ha; average selling price 45 FCFA/kg)	517 500
Gross operating profit	278 500

Table 11 Collecting average operating cost and gross profit for 10 tons

	Bobo	Sikasso
SP purchasing	450000	450000
Transport	120000	200000
Information	10000	10000
Offloading	10000	10000
Tax	2000	25000
Operating cost	542000	743000
Gross income	700000	950000
Gross profit	108000	157000

Table 12 Transportation operating cost and gross profit for 10 tons

	To Bobo	To Sikasso	To Ouaga	To Kaya	To Dori
Driver	15000	15000	20000	25000	25000
Apprentice	5000	5000	5000	7500	7500
Fuel	50000	75000	220000	280000	340000
Driving team meal	5000	5000	5000	5000	5000
Roads tax	3000	15000	7500	10000	10000
Operating cost	78000	115000	257500	327500	387500
Gross income	120000	200000	360000	450000	540000
Gross profit	42000	65000	102500	122500	152500

Table 13 Wholesaling operating cost and gross profit for 10 tons

	Bobo	Ouagadougou	Kaya	Dori
Sweet potato cost	700000	700000	700000	700000
Transport fees	120000	360000	450000	540000
Information cost		10000	10000	10000
Offloading	35000	35000	35000	35000
Market tax	2000	4000	2000	2000
Bagging	90000	127500	127500	127500
Loading	45000	45000	45000	45000
Warehouse rent	15000	25000	10000	10000
Operating cost	1007000	1306500	1379500	1469500
Gross income	1150000	1550000	1650000	1750000
Gross Profit	143000	243500	270500	280500

Table 14 Retailing operating cost and gross profit for 10 tons

	Bobo	Ouagadougou	Kaya	Dori
Sweet potato cost	1 150 000	1 550 000	1 650 000	1 750 000
Transportation	30 000	45 000	35 000	32 500
Warehouse	10 000	15 000	10 000	10 000
Operating cost	1 190 000	1 610 000	1 695 000	1 792 500
Gross income	1 750 000	2 750 000	3 250 000	3 500 000
Gross profit	560 000	1 140 000	1 555 000	1 707 500

Table 15 Processors average operating cost and gross profit for 10 tons

	Bobo	Ouagadougou	Kaya	Dori
Sweet potato cost	750 000	1 500 000	1 600 000	1 750 000
Hoods cost	100 000	150 000	75 000	75 000
Salt and pepper	50 000	75 000	30 000	50 000
Oil cost	250 000	250 000	250 000	250 000
Operating cost	1 150 000	1 975 000	1 955 000	2 125 000
Gross income	3 000 000	4 000 000	3 500 000	3 700 000
Gross profit	1 350 000	1 525 000	1 045 000	1075 000

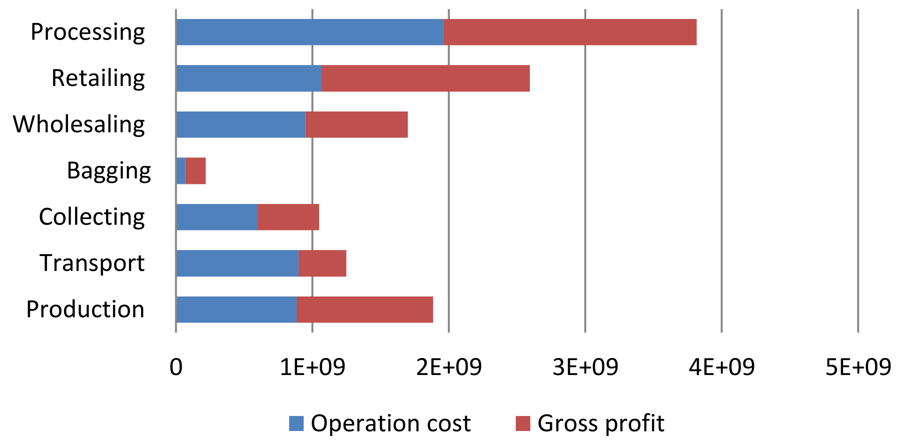
The cost and profit for the different stakeholders vary from one market place to another. The additional cost in Ouagadougou, Kaya and Dori markets compared to Bobo Dioulasso market can mainly be explained by distance. The profit of stakeholders in those markets is higher than in Bobo market. For instance, while Bobo retailers earn an average gross profit of 5600 FCFA/100 kg, in Ouagadougou retailers earn 11,400 FCFA/100kg, in Kaya 15,500 FCFA/100kg and in Dori 17,000FCFA/100 kg.

One notes that even if the volume of sweet potato handled by each retailer or processor on the market is low, profit per unit for retailers and processors is higher than profit per unit for wholesalers and producers. The profit increases with the retail level of the activity. Sweet potato retailing is much important in terms of volume in the provinces and rural areas. Even though a 100kg bag seems to be expensive in the cities where most of the wholesalers are based, the retailers from the neighbouring villages still earn a higher profit per unit by retailing it.

The operating cost per player is much higher in the collecting part of the chain. In fact, a significant investment is required for a single collector to start his activity. That link of the chain is mainly handled by players with relatively large financial means. Thus the collecting activity is not accessible to the poor and that probably explains why most of collectors and wholesalers are men. In the Burkinabe context women have less access to financial means.

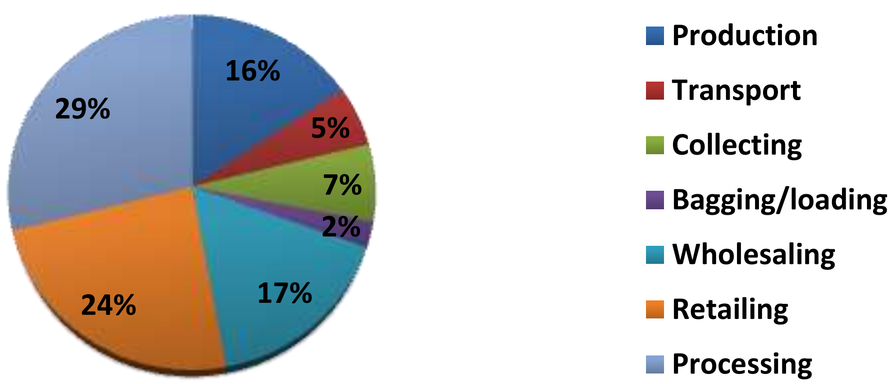
The operating costs and gross profits for each player are presented in the figure below for comparison.

Figure 14 Estimated operating cost and gross profit along the value chain



The structure of the operating cost and profit shows that processing, retailing and bagging are the more profitable links of the chain, followed by production. Collecting, transport and wholesaling are less profitable. Yet the actors in those links handle large volumes and thus make more profits. The figure below presents the sharing of the created value in the subsector.

Figure 15 Sharing of the created value along the chain

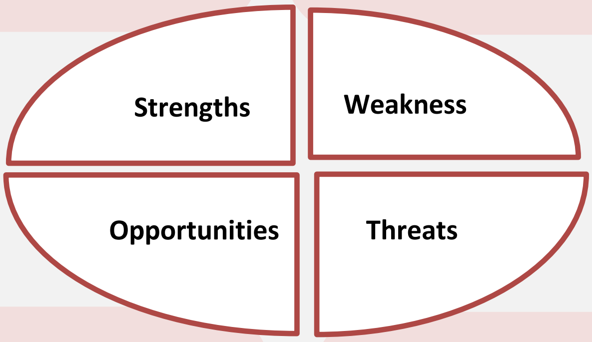


The created value of sweet potato from Kénédougou production areas to the main markets places is estimated at almost 6 billion FCFA which represents 0.005% of the country's agricultural GDP. Retailers and processors create 53% of that added value. That created value is very important for local economies and development committee members reported that since the increase in sweet potato farming in the province, many young men stay in the villages to crop instead of travelling to Cote d'Ivoire. With that income most of them can buy motor bike and get married.

5. SWOT analysis of OFSP value chain development

- Farmers have a long history of growing sweet potato
- A lot of farmers are motivated by the idea of developing the OFSP market; they see it as an opportunity to increase their incomes

- Lack of OFSP quality planting material that respond to the actors' needs (high yield, good storability, big size, early maturing, disease free)
- Poor storage systems that cause postharvest damages
- Farmers' low technical know-how both in production and marketing
- Poor market network
- Diversified processed products not developed
- Lack of consumer awareness of OFSP virtues



- Good climatic conditions
- Huge demand for sweet potato across the country
- High consumption in the provinces and rural areas
- Competitive advantage compared to other roots or tubers (yam and cassava)
- Growing interest from government and partners

- Competition between sweet potato and other roots and tubers (yam and cassava)
- Farmers could shift to rice production because of government policies (there is government rice project, named Burkina Rice Commercialization project, BRICOP, in Kénédougou)

IV. PROPOSED INTERVENTIONS AND MARKETS SUITABLE PRODUCTS

Sweet potato is grown as cash crop and as shown in the supply analysis, farmers are market driven. To get them on board they have to be assured of the benefits of our interventions. To develop the OFSP market and consumption, production, market networks, processing and consumer' skills and awareness have to be strengthened.. One of the issues is the fact that actors within each link are seeking their maximum profit. Thus any intervention has to take into account the desire of each stakeholder. If not those who currently take advantage of the existing system may rise against. Intervention should then seek to increase benefits for all players.

Increasing production does not ensure an increase in farmers' incomes. As some farmers reported there are years with very good yield but low prices. And they finally end up with low incomes. Farmers are thus the most vulnerable in the chain. Likewise, the small-scale processors, mainly women who handle small quantities are also vulnerable. A starting point is increasing the incomes of these actors through their empowerment both in production and marketing.

Currently, what is mostly done in sweet potato processing is frying or boiling. But some processed products, such as infant mixes, dègué, couscous, flour, juice, biscuits, cakes and chips could be an opportunity for many small scale processors. Yet most of these products are not well known by consumers because of poor marketing and communication. From shops visits and interviews with consumers and processors, three products seem to be more suitable for the market: infant mix, déguè and couscous. Processors know how to produce them, they require little investment and processing skills, and they are consumed both in rural and urban areas.

Juice, biscuits, cakes and chips are also of interest, but much more for the city and they require greater investment and processing skills. OFSP flour can also be interesting for pastry-making. Most processors do not know how to produce sweet potato juice and consumers are unsure of what OFSP juice can be like. Nevertheless DAFANI showed an interest in processing OFSP juice if some conditions were met (see processing chapter and proposed interventions). The suitable products selection criteria are presented in table 16 and the proposed intervention in table 17 below.

Table 16 Market suitable products selection criteria

	Selection criteria							
Product	Known by consumers	Process is known	Already processed	Available in the market	Consumed in rural area	Consumed in urban area	Affordable	Need lot of investment
Fried OFSP	+++++	+++++	+++++	+++++	+++++	+++++	+++++	+
Boiled OFSP	+++++	+++++	+++++	+++++	+++++	+++++	+++++	+
OFSP couscous	++	+++	+++	+	++	+	++	++
OFSP Déguè	++	+++	+++	+	+	+	++	+
Flour	+	+++	++	+	+	++	++	+
Infant mx	++	++	+++	+++	+	++	+	+++
OFSP Chips	+	+	+	+	+	+	+++	+++

+ From less important to +++++ very important

Table 17 Proposed interventions

PRODUCTION		
The current situation	**Farmers wishes**	**Proposed intervention**
• Farmers do not produce OFSP • Farmers are disconnected from the market • Farmers are not well organized among themselves • Farmers lack some agronomic and marketing know-how • Yields are low, far from potential	• Access to OFSP good planting material with high yield, big size, good storability and less sweet • Want to be sure they will find buyers at the end of the production	• In each selected village, lead campaign on OFSP virtues and benefits • Support farmers to create sweet potato producers associations, including the participation of women • Train a core group on good agronomic practices and marketing • Distribute OFSP vines to those farmers for the first year • Monitor the farmers and analyse their feedback • Support them to sell the OFSP produced
Commercialization		
The current situation	**Wholesalers wishes**	**Proposed intervention**
• Wholesalers prefer white fleshed and skinned sweet potato • They sell on credit to retailers and that limits their supplying capacity • They are much better organized than farmers	• They want access to finance to be able to buy large quantities of sweet potato • They want transportation facilities	• Invite wholesalers to discussions on the platform • Create OFSP demand by marketing and communication • Build traders capacities in filing loan applications

Processors		
The current situation	**Processors wishes**	**Proposed intervention**
• Most processors are fryers or boilers • Some produce infant mix, déguè and couscous for the market • Others produce biscuits, cakes and chips for fairs • The processed products are not well known apart from fried and boiled OFSP • DAFANI doesn’t know OFSP juice	• They want access to finance to be able scale up their activity (for investment and working capital) • They want the OFSP roots to be available all the time • They want roots that can be stored for long periods • Those who fry want big potatoes and potatoes that do not absorb a lot of oil • Those who boil want medium size roots • DAFANI wants a sample of juice to taste • DAFANI wants to learn from experiences of enterprises that already produce juice • DAFANI want to know who will finance R&D on OFSP juice production • DAFANI want to be assured that they	• Organize the processors around a sweet potato platform • Build their capacity on processing and marketing (we could start with Balo Gnuma, Wilikataama, Entracel and Wende managaa) • Link the processors with producers at the beginning of the project • Currently the main processors are those who fry or boil sweet potato; support them with small loans if need be • Promote the suitable products (infant mix, déguè and couscous) through marketing and communication. • Continue discussion with DAFANI on juice production and try to meet what they requested

<table>
<tr><td></td><td>can be supplied in raw material when needed</td><td></td></tr>
<tr><td colspan="3">Required conditions

• The vines should be available on time, before the training starts
• Make sure some farmers multiply the OFSP vines to supply others
• At the end of the training, farmers should have some buyers contacts
• It has to be a platform where stakeholders can meet
• Means have to available to create all the stakeholders awareness
• Strong marketing to create OFSP demand</td></tr>
<tr><td colspan="2">Risks assessment

• Farmers may be disappointed by the first results and reject OFSP
• Lack of OFSP vine if lot of producers come to desire it
• OFSP is sold in the market but not locally consumed</td><td>Risks management intervention

• Start up with a very small groups
• Support some farmers to multiply vines in protected gardens with drip irrigation
• Encourage local processing and consumption</td></tr>
</table>

CONCLUSION

In a context characterized by climate change and water scarcity, crops with few requirements are better adapted and greatly appreciated by farmers in Sahelian countries. Sweet potato is one of these crops. In fact some OFSP varieties can be grown on relatively poor soils, with few requirements in terms of fertilizer and water and still give good yields when compared to traditional crops such as maize or millet.

In Kénédougou province (western Burkina Faso), sweet potato production is significant and constitutes a whole value chain in itself. It is a source of income for approximately 7500 small-scale farmers and different players that are transporters, middlemen, wholesalers, retailers and processors. The average income per farmers is around 300000 FCFA/campaign; processor earn an average income of 17500/week and vendors' average income per 10tons is 1750000 FCFA.

In the province, the production potential is high but our market analysis showed that the OFSP subsector is not as developed as it could be. The main production is the white-fleshed white-skinned variety and processing is mostly limited to frying or boiling. OFSP is perceived as a new product and our study has demonstrated that it presents great opportunities for helping farmers diversify their production and enhance their economic revenues, with additional nutritional benefits in terms of vitamin A uptake for the consumers.

Currently OFSP represents less than 2% of total sweet potato production in Kénédougou province. OFSP's low yields, greater perishability, small size, and susceptibility to attack by weevils, as well as lack of planting material and market opportunities are the main constraints farmers mentioned during our field interviews and this is the reason why OFSP production is not as high as it could be. Wholesalers and retailers also presented other issues such as lack of storage systems considering the large volume of the roots as well as the quality of product requested. Another important limit of OFSP is also the fact that fryers (processors) criticized the product as it consumes a lot more oil than other potatoes and thus reduces their profit.

Our market analysis demonstrated that on the consumer side, women and children appreciate this product because it is sweet and attractive while men tend raise its sweetness as a disadvantage. In general most of the consumers do not know OFSP as a vitamin A source which demonstrates a lack of awareness rising.

Regarding opportunities, products such infant mixes, *déguè*, and couscous show interesting potential and are suitable for the market in Burkina Faso. Those processed products represent an opportunity to enhance added value in the chain, but currently they are not well known by consumers. OFSP chips, despite the oil factor, and OFSP juice may also be worth developing.

To develop the OFSP market, farmers' technical skills and agronomic know-how and their linkages to the market clearly have to be improved and the "Jumpstarting Orange-fleshed Sweet Potato in West Africa through diversified markets" project will support such dynamics.

Different opportunities exist such as setting up a stakeholder platform which may facilitate communication among the players and market networking.

The development of processing could also be key to ensuring the availability of diversified products on the market and a solution for reducing postharvest spoiling.

Currently few small agro-processing units are processing OFSP in Bobo Dioulasso and they clearly need access to finance and capacity-building to scale up their activities.

Our conclusion is that OFSP presents good opportunities to stimulate an increase in farmers' incomes but for the development of the OFSP market it will be necessary for farmers to access planting material (free, at least the first years) with good yield, big size roots which are less sweet and less perishable. It will also be important that the planting materials are available at the right time in the production areas. During the dry season, some farmers could multiply OFSP using drip irrigation technology in protected gardens.

Marketing and communication have to be strengthened to create consumer awareness and demand as it is now extremely low in the provinces of intervention and in the country in general.

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ANNEXE QUESTIONNAIRES

Producers questionnaire

Date	Enquêteur	Localité	Nom et Prénom du pro.	Contact
PRODUCTION DE LA PATATE DOUCE				

Produisez-vous la patate douce ?	Oui / Non	Depuis quand ?	

Superficie, mode de travail du sol

Superficie total	Superficie PD	Buttes-en vrac	Billon	Zéro labour

Différentes variétés produite

Nom local	Couleur peau	Couleur chaire	Durée du cycle	Particularité

Si pas de PDCO dans les variétés produites		
Connaissez-vous la PDCO	Oui	Non
En avez-vous déjà produit	Oui	Non
(Si Oui) Pourquoi avez-vous arrêté		

Comparez la PDCO aux autres variétés

	PDCO	Peau rouge	Peau blanche	
Rendement plus élevé				
Plus apte à la conservation				
Apte à la transformation				
S'écoule facilement				
Apprécié des acheteurs				
Susceptible aux attaques				
Qualité culinaire				
Apprécié à la consommation				

Origine des boutures

Propre bouture	Du voisinage	Achetées	Données	Autre :

Achat de boutures (si les boutures sont achetées)

Prix actuels de boutures	Appréciation de la qualité	Prêt à acheter des boutures d'OFSP	
		Oui	Non

Disposez-vous de contact de vendeur de bouture	Oui	Non
Contact :		

Période de plantation

Jan.	Fév.	Mar.	Avr.	Mai.	Juin	juil.	Aout	Sept.	Oct.	Nov.	Déc.

Engrais chimique ou organique. Type, période d'application, les quantités appliquées

	Type	Avant	15J après	30 jours	45 jours	Autres	Quantité
Chimique							
Organique							

Maladie/attaque, traitement appliqué

Maladie	Charançon	Nématode	Virus
Traitement			

Désherbage ; fréquence, mode et période,

Nombre	Manuel		Chimique	
	15 jours après	30 jours après	45 jours après	Autre

Buttage, renchaussage et Coupe des feuilles avant récolte

Buttage/ramification		Renchaussage/tubérisation		Coupe des feuilles/récolte		
Oui	Non	Oui	Non	Oui	Non	J av.

Coût des opérations et intrants de production

T du sol	Boutures	EC	FO	Plant bout	Désherbage	Récolte	autre

Période de récolte

Jan.	Fév.	Mar.	Avr.	Mai.	Juin	juil.	Aout	Sept.	Oct.	Nov.	Déc.

Quantité récoltée, mode de récolte, pourquoi

Quantité	Plusieurs fois	Une fois	Pourquoi			
			Auto conso.	Acheteur	Marché	Autre
VENTE DE LA PATATE DOUCE						

Vendez-vous la patate douce	Tubercule		Feuille/tige	
	Oui	Non	Oui	Non
Lieux	Bord-champ	Marché local	Marché de district	Autre

Comment Vendez-vous ?

Tubercule	Kg	Tas	Sac	Autre :
Feuille/tige	Kg	Tas	Sac	Autre :

Combien de temps mettez-vous pour aller au marché ?

Pied :	Âne :	Vélo :	Moto :	Voiture :

Contactez-vous l'acheteur/ intermédiaire avant/après la récolte ?

A des contacts d'acheteurs		Producteur contact acheteur			Acheteur contact producteur		
Oui/nombre	Non	Avant	Après	non	Avant	Après	non

Quelle variété de patate est la plus demandé par les acheteurs ?

Peau rouge	Peau blanche	Chair orange	
Pourquoi ?			

Comment appréciez-vous la qualité de vos patates douce ?

Appréciation			Calibre			Existence de dommage		
Mauvais.	Accepta.	Bon	Petit	Moyen	Gros	Trou/galerie	Fissure	

Subissez-vous des pertes post récolte, % de perte, cause des pertes ?

Pertes post récolte		Quantité perdue				Cause des pertes			
Oui	Non	5%	15%	30%	autre	Rat	Pourriture	Charançon.	
STOCKAGE									

Stockez-vous, possibilité de stockage ? Connaissance des techniques de stockage

Stockage		Technique de stockage utilisée	Connaissance technique de stock.		
Oui/durée	Non	Décrire :	En terre	Triple S	Autre
FINANCEMENT ET BENEFICE					

Financement de la production

Fonds nécessaires pour démarrer en FCFA		
Financement	Fond propre	Crédit
Difficulté d'accès au crédit	Oui	Non
Quelles sont les difficultés rencontrées		

Emprunteur	IMF	Commerçant	Famille	
Taux d'intérêt des emprunts	15%	18%	25%	
Délais de paiement	3 mois	6 mois	1 an	

Coût et bénéfice estimés par le producteur

Superficie	Coût	Bénéfice
ACCES AUX CONSEILS ET A L'INFORMATION		

Echange d'expérience avec d'autres producteurs ?

Oui/non	Choix des variétés	Pratique culturale	Commercialisation

Association de producteur de patate

	Date/Age	Membre	N de Femme	Utile	Souhaitable	possible
Oui/non				Oui/non	Oui/non	Oui/non

Membre d'une association ou coopérative

	N de membre	N de femme	Utile	Souhaitable	Possible
Oui/non			Oui/non	Oui/non	Oui/non

Existence d'autres associations ou coopératives de producteurs

Oui	Non	Citer :

Connaissez-vous des transporteurs, acheteurs ou transformateurs ?Des contacts ?

Acheteurs	Oui	Non	Transporteurs	Oui	Non	Transformateurs	Oui	Non

Etes-vous conseillé par des agents d'agriculture ou autre

Conseiller	Nombre de visite	Type de conseils			
Oui/non		Choix var.	Itinéraire Tech.	Stockage	Commercial.
Contact d'1 agent					
AUTOCONSOMMATION ET UTILISATION					

Bouillie	Ragout	Couscous	Tô	Déguê	Purée	Frite	
Le plus courant							
Bouillie	Ragout	Couscous	Tô	Déguê	Purée	Frite	
Connaissez-vous des produits transformés à base de patate douce ?						Oui	Non
Citez :							

Transporter questionnaire

Date	Enquêteur	Localité	Nom et Prénom du transporteur	Contact
TRANSPORT DE PATATE DOUCE				
Transportez-vous la patate douce ?			Oui	Non

Quelles sont les différentes localités dans lesquels vous chargez la patate douce ?

Dans ces localités où vous chargez vos patates douces ?

	Point de chargement				
Localités	Bord-champ	Point de collecte	Marché local	Marché district	
Le coût du transport est-il différent selon les localités et les points de chargement et les localités				Oui	Non
	Point de chargement et coût				
Localités	Bord-champ	Point de collecte	Marché local	Marché district	

Quel type de camion utilisez-vous ?

4 tonnes	7 tonnes	10 tonnes	

Quelles quantités chargez-vous en moyenne

Type de camion	4 tonnes	7 tonnes	10 tonnes	

Quantité moyenne				
Combien de chargement faites-vous en moyenne par campagne ?				

Quelle est votre capacité maximale chargement ?

Type de camion	4 tonnes	7 tonnes	10 tonnes	
Capacité maximale chargement				
Expliquez comment vous réalisez le chargement :				

Où transportez-vous les patates ?

Orodara	Bobo	Dori	Kaya	Ouagadougou	Sikasso	

Quel est le coût du transport

Type de camion	Point de départ	Coût de chargement	Point d'arrivé	Coût de déchargement	Coût du transport

Frais du transport

Type de camion	Frais du chauffeur	Frais apprentis	Frais carburant	Frais alimentation

Quelle est la durée du voyage ?

Type de camion	Point de départ	Point d'arrivé	Durée à vide	Durée avec charge

Quelles sont les périodes d’intense activité ?

Jan.	Fév.	Mar.	Avr.	Mai.	Juin	juil.	Aout	Sept.	Oct.	Nov.	Déc.

Combien de temps mettez-vous en moyenne pour répondre à une demande chargement ?

Avez-vous de contacts ?	Producteurs		Commerçant		Transformateur		Transporteur	
	Oui	Non	Oui	Non	Oui	Non	Oui	Non
Quelques contacts								

Quels sont les autres produits que vous transportez :

Traders questionnaire

Date	Enquêteur	Localité	Nom et Prénom de l’acheteur	Contact
ACHAT DE PATATE DOUCE				
Achetez-vous la patate douce ?	Oui		Non	

Quelle variété de patate douce achetez-vous ?

Peau blanche	Peau rouge	Chair orange	

Avez-vous une préférence particulière pour une variété donnée	Oui	Non

Laquelle	
Pourquoi ?	

Quelles sont les différentes localités dans lesquels vous achetez la patate douce ?

Dans ces localités où achetez-vous vos patates douces ?

Localités	Point d'achat				
	Bord-champ	Point de collecte	Marché local	Marché district	
	Bord-champ	Point de collecte	Marché local	Marché district	
	Bord-champ	Point de collecte	Marché local	Marché district	
	Bord-champ	Point de collecte	Marché local	Marché district	
	Bord-champ	Point de collecte	Marché local	Marché district	

Y a-t-il des différences de prix selon les localités et les points d'achat ?	Oui	Non

	Prix d'achat en fonction du point d'achat				
Localités	Bord-champ	Point de collecte	Marché local	Marché district	

Comment achetez-vous ?

Kg	Tas	Sac	Camion 7T	Camion 10T	

Quelles quantités chargez-vous en moyenne ?

Type de camion	7 tonnes	10 tonnes	
Quantité moyenne			

Combien de chargement faites-vous en moyenne par campagne ?	
Qu'est ce qui limite vos achats ?	

Comment vous informez-vous de la disponibilité de patate douce en vente ? Via :

Producteurs vous contactent	
Vous contactez les producteurs	

Des intermédiaires vous contactent	
Vous contactez les intermédiaires	
Vous faites des sorties dans les villages	
Vous avez des informateurs dans les villages	
Autre :	
Combien vous payez vos informateurs ?	

Achetez-vous sans passer par des intermédiaires ?	Oui	Non
Pourquoi :		

Disposez-vous de contact de :	Producteur		Intermédiaire		Transporteur		Transformateur	
	Oui	Non	Oui	Non	Oui	Non	Oui	Non
Donnez-nous en quelques-uns								

Quand démarrez-vous l'activité d'achat/vente de patates douces

Jan.	Fév.	Mar.	Avr.	Mai.	Juin	juil.	Aout	Sept.	Oct.	Nov.	Déc.
Pourquoi :											

Quelles sont les périodes d'abondance de la patate douce ?

Jan.	Fév.	Mar.	Avr.	Mai.	Juin	juil.	Aout	Sept.	Oct.	Nov.	Déc.

Quelles sont les périodes de rareté de la patate douce ?

Jan.	Fév.	Mar.	Avr.	Mai.	Juin	juil.	Aout	Sept.	Oct.	Nov.	Déc.

Quelles les périodes de disponibilité de la PDCO

Jan.	Fév.	Mar.	Avr.	Mai.	Juin	juil.	Aout	Sept.	Oct.	Nov.	Déc.

Est-ce qu'il est difficile de commercialiser les patates douces	Oui	Non		
Pourquoi :				
Achetez-vous à crédit	Oui	Non		
Délais de remboursement	1 jour	1 semaine	1 mois	

Quels autres produits achetez-vous ?					
Comment financez-vous vos achats	Fond propre		Crédit		
Emprunteur	IMF	Commerçant	Famille		
Taux d'intérêt	10 %	15%	18%	20%	25%
Délais de remboursement	1 mois	3 mois	6 mois		

TRANSPORT

Quel est le coût du transport ?

Point de départ	Point d'arrivé	Coût de chargement	Coût de transport	Coût de déchargement
Observez-vous des pertes durant le transport	Oui		Non	
Taux de pertes				
Difficultés du transport :				
VENTE DE PATATE DOUCE				
Vendez-vous en détails ou en gros Comment réalisez-vous la vente ?	Détails: Kg	Tas	Gros: Sac	caisse, camion

Prix de vente

Kg	Tas	Sac	Caisse	Camion 7T	Camion 10	Autre

D'où viennent vos acheteurs ?

Kaya	Dori	Ouaga	Koudougou	Sikasso	
Avez-vous des acheteurs ou revendeurs réguliers	Oui		Non		
Si oui, quelques contacts :					
Vendez-vous à crédit	Oui		Non		
Délais de remboursement	1 jour	1 semaine	1 mois		

Y a-t-il 1 association de commerçant	Oui	Non	Commerçant de patate	Oui	Non	
Quel est son objectif						
STOCKAGE DE PATATE DOUCE						
Stockez-vous la patate douce	Oui	Non				
Lieu de stockage						
Durée de stockage						
Quantité stockée						
Coût du stockage						
Technique de stockage utilisée						
Sinon connaissez-vous de techniques de stockage	Oui	Non				
Citer :						

Processors questionnaire

Date	Enquêteur	Localité	Nom et Prénom de la transformatrice	Contact

Transformez-vous la patate douce	Oui	Non	Depuis quand ?	

Les différents types de produits transformés que vous faites à base de patate douce

Dêguê	Biscuit	Frite	Chips	Jus	Farine	Gâteau	Couscous	Autre

Les différentes variétés de patate douce que vous utilisez

Peau blanche chair blanche	Peau rouge chair blanche	Peau blanche chair orange	Peau rouge chair orange

Avez-vous une préférence particulière pour une variété donnée ?

Oui	Non	Laquelle :	
Pourquoi :			
Achetez-vous ou produisez vous la patate douce		Acheté	Produit
Lieu d'achat	Citer :		

Lieu de production	Citer :

Dans quelles conditions achetez-vous les tubercules crus

Lavé	Pas lavé	En sac	En vrac	Au kg	Au tas	Autre
Obtenez-vous toujours les quantités que vous désirez				Oui		Non

Quelles sont les quantités en Kg de patate douce que vous achetez ?

Par jour	Par semaine	Par Mois	Par an

Les quantités de produits transformés que vous réalisez en kg par :

Jour :	Semaine :	Mois :	An :

Il y a-t-il des sous-produits de la transformation, qu'en faites-vous ?

Oui	Non	Sous-produits :

Est-ce que vous réalisez l'activité de transformation toute l'année ?										Oui		Non
Période d'activité	1	2	3	4	5	6	7	8	9	10	11	12

Connaissez-vous d'autres produits à base de patate vendus sur le marché ?

Oui	Non	Citer :

Vous arrive-t-il de chercher la patate douce sans en trouver ? A quelle période ?

Oui	Non	1	2	3	4	5	6	7	8	9	10	11	12

Quel est le prix moyen de la patate douce durant cette période de manque ?

Kg :	Tas :	Bassine :	Sac :

Quels sont les produits de substituts de la patate douce en cas de manque ?

Connaissez-vous des périodes d'abondance de la PD ? Quelles sont ces périodes ?

Oui	Non	1	2	3	4	5	6	7	8	9	10	11	12

Connaissez-vous la PDCO ?	Oui	Non
Avez déjà utilisez la PDCO dans la transformation ?	Oui	Non
Utilisez-vous la PDCO dans la transformation ?	Oui	Non

Si oui, comparé aux autres variétés de patate douce, que pensez-vous de la PDCO ?

Si non, pourquoi ne l'utilisez-vous pas ?

Est ce qu'il arrive que des clients demandent des produits à base de PDCO	Oui	Non

STOACKAGE

Connaissez-vous des techniques de stockage	Oui		Non	
Techniques de stockage utilisées				
Stockez-vous la PD avant transformation ?	Oui		Non	
Capacité de stockage				
Durée de stockage	Jour	S	Mois	Autre
Des pertes de stockage ?	Oui		Non	
Proportion des pertes si oui	5%	10%	15%	Autre
Stockez-vous les produits transformés ?	Oui		Non	
Capacité de stockage				
Durée de stockage	Jour	S	Mois	Autre
Des pertes de stockage ?	Oui		Non	
Proportion des pertes si oui	5%	10%	15%	Autre

MARKETING

Comment commercialisez-vous les produits transformés	Lieu de vente	Prix	Clientèle	Vente à crédit	Dépôt vente

Combien de temps mettez-vous pour vous rendre le marché ?

Pied	Âne	Vélo	Moto	Voiture

FINANCEMENT DES ACTIVITES

Fonds nécessaires pour démarrer en FCFA				
Financement des achats	Fond propre	Crédit		
Difficulté d'accès au crédit	Oui	Non		
Quelles sont les difficultés rencontrées				
Emprunteur	IMF	Commerçant	Famille	Autre
Taux d'intérêt des emprunts	15%	18%	25%	Autre
Délais de paiement	3 mois	6 mois	1 an	Autre

Consumers questionnaire

Date	Enquêteur	Localité	Nom et Prénom du consommateur	Contact

Consommez-vous la patate ou des produits à base	Oui	Non

Lieu de consommation

A la maison	Au restaurant	Autres

Type de produits à base de patate douce consommés

Ragout	Couscous	Tô	Dêguê	Purée	Frite	Chips	Jus	Gâteau	Autre

Les trois produits les plus consommés

Ragout	Couscous	Tô	Dêguê	Purée	Frite	Chips	Jus	Gâteau	Autre

Si non, pourquoi ne consommez-vous pas la patate douce ?

N'aimez pas	N'en trouvez pas	N'en voyez pas	Coûte cher	Autre
Expliquer				

Si oui, la fréquence de consommation de la patate douce

Chaque jour	1 fois/semaine	1 fois/mois	1 fois/an	Autre

Moment de consommation dans la journée

Matin (petit déjeuner)	Midi (Déjeuner)	Soir (gouté)	Nuit (diner)	Autre

Achetez-vous la patate douce ?	Oui	Non

Lieu d'achat	Citer :

Dans quelles conditions achetez-vous les tubercules crus

Lavé	Pas lavé	En sac	En vrac	Au kg	Au tas	Autre

Obtenez-vous toujours les quantités que vous désirez	Oui	Non

Combien de temps pour gagner le marché ?

Pied	Âne	Vélo	Moto	Voiture

Connaissez-vous des produits à base de patate vendus sur le marché ?

Oui	Non	Citer :

Quelles sont les quantités en Kg de patate douce que vous achetez ?

Par jour	Par semaine	Par Mois	Par an

Citer les principaux aliments à base que vous consommer et classez par importance

	Principaux aliments	Classement	Pourquoi
1			
2			
3			
4			
5			

Qui décide du menu du jour

Maman	Papa	Enfants	Autres

Vous arrive-t-il de chercher la patate douce sans en trouver ? A quelle période ?

Oui	Non	1	2	3	4	5	6	7	8	9	10	11	12

Quel est le prix moyen de la patate douce durant cette période de manque ?

Kg :	Tas :	Bassine :	Sac :

Quels sont les produits de substituts de la patate douce en cas de manque ?

Connaissez-vous des périodes d'abondance de la PD ? Quelles sont ces périodes ?

Oui	Non	1	2	3	4	5	6	7	8	9	10	11	12

Connaissez-vous plusieurs types de patate douce

Oui	Non	Citer :

Avez-vous une préférence particulière pour une variété donnée ?

Oui	Non	Laquelle :
Pourquoi :		

Connaissez-vous la patate douce à chaire orange ?	Oui	Non
En avez-vous déjà consommé ?	Oui	Non

En consommez-vous régulièrement	Oui		Non		
La fréquence de consommation, nombre de fois /	J	S	M	A	
Si oui, comparés aux autres variétés que pensez-vous du gout ou de la qualité					
Quels sont les plats à bases de PDCO que vous connaissez					
Connaissez-vous ses vertus contre les CVA ?	Oui		Non		