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1. Summary

1.1 Introduction

This report summarises research into the marketing, regulatory and value chains of a group of three meat and fish based traditional African foods, Lanhouin, Kitoza and Kong. It constitutes one of three summary reports that review the market for these traditional foods using value chain analysis as part of the European Union funded project the African Food Tradition Revisited by Research (AFTER).

The three products considered here are:

- Lanhouin, a fermented fish product used as a taste and flavour agent for traditional food in Benin;
- Kitoza, a smoked meat product from pork or beef often eaten as a social snack;
- Kong, a wet and dry smoked *Arius heudelotii* fish from Senegal

The purpose of this report is to understand all aspects of the markets, regulations and value chains for these food products and to use this information formulate marketing plans with a view to guiding efforts to re-engineer African foods.

The method used to undertake this research was a mixture of literature review and key informant interviews. A list of interviewees is provided at Annex 2 and literature consulted can be found at the end of this report. The field research was conducted during the period October to December 2011. The key elements of the method and initial value chain maps, elements of the marketing mix and market GAP analysis were developed by the teams collectively at a value chain workshop held in Dakar, Senegal from 28th to 30th September 2011. Key methodological tools included:

- Value chain analysis: considers the actors and governance of all elements of the product from primary production to consumption;
- Marketing Mix: describes the key elements necessary to bring the product to the market including, how the product is defined, its price, how it should be promoted, the place that consumers would like to buy it and how the people who consumer the product are defined;
- Strengths, Weaknesses, Opportunities and Threats (SWOT) analysis: defines the product in relation to its potential competitors; and,

- **Gap Analysis:** reviews the range of different products and markets available and assesses what might be needed to bridge the gap between where the current market for the product is and where it could be after re-engineering.

The scope of the analysis included all aspects from production to consumption.

Some challenges were encountered during the research. Lack of resources to undertake field-work limited the scope of some of the research.

The report consists of five sections covering the value chains for each of the three AFTER meat and fish based products in detail and, in this first Chapter, summarizing the key findings for each product and this group of products as a whole. For each individual AFTER product in this group the product is described, a value chain map outlined, the marketing mix reviewed (product, price, place, promotion and people), (SWOT) analysis completed, and market gap analysis conducted. The findings are summarized here and some conclusions and recommendations drawn.

One aim of value chain analysis is to find **key success factors** that will drive the market development for AFTER products. These key success factors include identifying potential bottle-necks that might prevent a product from reaching a market or opportunities to upgrade a product (e.g. improve its quality, process it, package it, promote it to a new and more value market and/or reduce its unit cost of production for example).

Individual reports were created by teams in each country as follows: Lanhouin - Victor Anihouvi, Janvier Kindossi, Joseph Hounhouigan, Victor Jeannoda, Kitoza - Danielle Doll Rakoto, Elisabeth Rabakonandrianina, Zo Lalaina Rajaokarivony, Rsaraso Jean Yves Razafimahatratra and Kong - Nicolas Ayessou, Cheikh Ndiaye and Mady Cissé. This summary was compiled by Ben Bennett.

1.2 Product descriptions

In order to establish which market norms apply to a product it is necessary to know what forms that product takes in the market. Different types of product enter different market chains. Different end products compete in different market segments. For these pre and post engineered African food products the first step is to clearly define what the products are and which market segments they currently occupy.

Lanhouin is a fermented whole-fish product made from a range of fresh fish. It is used to add flavour to traditional dishes in Benin. It is highly variable due to the range of ingredients and processes. It is sold informally in Benin and exported to Ghana and Togo.

Kitoza is a smoked meat product made from strips of prime cuts of port and beef. It is a delicacy in Madagascar often eaten as a snack and associated with important occasions or celebrations (e.g. it is a 'treat').

Kong is a smoked whole fish made from a specific species around which Senegalese consumers construct a range of dishes. It is largely sold informally though some small-scale export has occurred.

The three meat and fish based products considered here are, in various forms, produced by small enterprises in a ready-to-eat form and are the basis for traditional dishes. None of these products enters formal trade or has recognition as a formal food with a recorded standard format.

1.3 Value chain descriptions

Actors and processes were described for all the products and typologies developed. Using these definitions, value chain maps were created to show the relationships between actors and processes. On these maps additional information was overlaid including: the gender differentiation of each value chain, the prices of products at each stage in the chain and the relative share of each actor in the final on-shelf product price.

Key findings from the development of value chain maps are:

Lanhouin

Small-scale Lanhouin value chains tend to be family owned. Processors are almost exclusively women. Larger scale processors also wholesale. Currently, consumers are not differentiated by socio-economic factors and no market segmentation seems to occur.

Quality attributes are important to Lanhouin consumers: fresh, shiny and spongy products are preferred.

Packaging and presentation are traditional suggesting an opportunity for premium quality and well-presented products in higher value niche markets. Packaging materials and salt quality are important attributes for high-quality Lanhouin.

Price variability caused by seasonal supply gluts and shortfalls makes planning a business around Lanhouin challenging.

Kitoza

Kitoza is considered a premium product by most Malagasy consumers and this is reflected in the high level of value capture exhibited in the chain. The domestic market for Kitoza seems to be under-supplied suggesting that there are opportunities for expanding production.

The value chain for Kitoza has many levels reflecting the complexity of meat marketing value chains in general. The number of levels and high transaction

costs in the meat sector also means that the proportion of consumer value retained by the producer is low (8%)

Kong

The value chain for Kong is divided between artisanal and industrial and this may be important for upgrading decisions. Artisanal producers retail in the informal markets whilst industrial level producers have the potential to enter more formal market spaces such as supermarkets. Increase demand for value added products could impact on the viability of small-scale producers who are unable to gain access to scarce fish resources or who cannot meet quality and presentational demands.

Kong has a very short shelf-life and is usually traded without packaging and in non-standard formats.

Consumption patterns for Kong seem to be changing. Its popularity is increasing and consumers willingness to purchase it to store for future use (as opposed to same-day use) is increasing.

Higher quality forms of Kong with greater guaranteed quality and a known standard are desired by the market.

1.4 Marketing mix

Review of the key elements that make up the marketing mix (e.g. ‘product’, ‘price’, ‘place’ of sale, ‘promotion of the product and the ‘people’ involved) revealed in table 1.

Table 1: The marketing mix for reengineered AFTER products – key findings

	Product	Price	Place	Promotion	People
Lanhouin	<ul style="list-style-type: none"> Improved traditional Dried fillet Powder 	Highly seasonal Competes with ‘Afitin’ (CFA 165/100g), ‘Lanhouin Dakar and Maggi cubes (CFA 350/100g)	As a pre-packaged product in supermarkets	Various media	
Kitoza	<ul style="list-style-type: none"> Ready to eat pre-packed pork and beef 	Typical price for a high quality snack is Ar 500 per pack	In pre-packed form in supermarkets, garages, bars, hotels	Various mass media	Young men in higher income groups
Kong	<ul style="list-style-type: none"> Wet and dried smoked Pre-packed ready to eat 	Variable supply means having a fixed price will be difficult	In pre-packed form in supermarkets	Promote traditional qualities and safety of new product	Women in higher income groups

1.5 SWOT Analysis

For each existing and re-engineered product a Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis was conducted. This highlighted the range of internal values and external issues that need to be addressed during re-engineering. Highlights are shown in table 2.

Table 2: SWOT Analysis highlights

	Strengths	Weaknesses	Opportunities	Threats
Lanhouin	Unique flavour compared to other condiments	More expensive than competitors (e.g. Afitin)	Improved presentation could move it into condiment market	Cheap alternatives (Lanhouin Dakar) and competitors (Maggi)
Kitoza	Tasty, traditional and convenient	Relatively expensive compared with other 'snacks'	New retail outlets for snacks (e.g. garages) are under-exploited	Processed meat products that have not yet penetrated the Malagasy market such as biltong
Kong	In strong demand	Presentation and quality poor compared to other ready-to-eat foods	Growing demand from urban consumers	Food safety and quality uncertain

1.6 Market GAP analysis

GAP analysis considered the potential market space that the re-engineered AFTER product might occupy.

For Lanhouin the gap is for a product in the formal market place that can compete with existing food condiments such as Afitin and Maggie.

Gap analysis for Kitoza show some exciting new market opportunities, particularly for pre-packed Kitoza pieces in the snack market. Sales in taxi and bus stations show particular promise.

Kong looks particularly promising as a ready-to-eat product for a range of different outlets and markets.

1.7 Recommendations

Value chain analysis was conducted for three meat and fish products from Africa: Lanhouin from Benin, Kitoza from Madagascar and Kong from Senegal. This has revealed the actors and processes involved in current product and have pointed towards potential key success factors important for re-engineering.

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For Lanhouin a standardized and safe product that is offered in competition to existing flavour enhancers could greatly promote demand, but would require investment in quality management and market development.

Kitoza shows great potential as a pre-packed high value snack food. Existing Malagasy snack food markets are under-supplied so this looks like a good opportunity.

Kong needs to address safety and quality issues, but seems to have substantial market potential provided that supply side issues, such as seasonality, can be addressed.

2. Lanhouin

2.1 Introduction

This section deals with the value chain for Lanhouin, a fermented fish product, from Benin. It was completed by Dr Victor Anihouvi, Mr Janvier Kindossi and Prof. Joseph Hounhouigan between November and December 2011.

The purpose of this section is to scope out and reveal the value chain for Lanhouin. This value chain included key actors and processes. In addition, the analysis uses the value chain information to build Strengths, Weaknesses, Opportunities and Threat (SWOT) and GAP analyses for existing and re-engineered AFTER products. The work builds upon the AFTER survey (D1.1.2.2, WP1) and the literature search. The report should also be read in conjunction with the regulatory and market access report (D 5122, WP5).

The approach taken was developed at a value chain workshop in Accra (Ghana) from 3-5 October 2011 and involved interviews with key value chain actors such as Lanhouin processors, traders and consumers as well as the different support services. The sections scope includes all aspects of the value chain as far as was possible from the perspective of in-country research. Problems met included lack of some information to make the full chain analysis because the survey was done before the training on value chain analysis so that some few aspects of value chain were not taking into account during the survey conducted on actors of Lanhouin sector, mainly about the fishermen.

The section is laid out as follows: after a brief introduction, aspects related to product description, value chain map of Lanhouin, summary of opportunities, bottle-necks, problems and key success factors from value chain analysis of Lanhouin were pointed out. This is followed by the marketing mix and the market Gap analysis. A summary and conclusions can be found in the final section along with some recommendations relevant to AFTER project implementation.

2.2 Lanhouin product description

Lanhouin is a spontaneous fermentation fish product mostly used as taste enhancer and flavouring agent for traditional dishes in Benin. Lanhouin is generally processed in a traditional way in rural and informal small scales plants. The processing method of Lanhouin is not standardized; consequently the product is of variable quality which risks quality defects.

The main raw materials used for Lanhouin processing included fresh fish and salt. According to the survey conducted on Lanhouin processors, many species of fish can be used to produce Lanhouin, but the ones mainly used included: Cassava croaker (*Pseudotolithus senegalensis*), Lesser African threadfin (*Galeoides decadactylus*) Atlantic bumper (*Chloroscombrus chrysurus*),

kingfish/Spanish mackerel (*Scomberomorus tritor*) and Crevalle jack (*Caranx hyppos*). In addition, according to the information collected from official fishery service none of these species used to produce Lanhouin is on the list of protected species.

Lanhouin is sold directly to the consumer through informal traders and processors. At the market level, Lanhouin is mainly presented as whole fish or cut into pieces for sale. In Bénin, Lanhouin serves different markets: domestic (urban and rural) markets and sub-regional markets that contribute to an expanding market. Exports to neighbouring countries (Togo and Ghana mainly) are not recorded but represent significant amounts. According to Anihouvi et al. (2005) about 3 000 tons of Lanhouin are produced per year in Benin. The recent survey conducted on Lanhouin processors and traders in Grand-Popo municipality in the west region of Benin, revealed that the 140 processors interviewed produce together a rough average of 860 tons of Lanhouin per year (D1.1.2.2, WP1).

2.3 Value Chain Map

2.3.1 Actors

There are various actors engaged in the Lanhouin value chain in Benin. The main chain actors included the **fishermen**, the **processors**, the **traders** comprising the **wholesalers**, the **intermediary sellers** and the **retailers**, and the **consumers**. Other actors are ice suppliers, **salt vendors** and **fermentation materials suppliers**. The typology of actors is summarized in table 3.

The fishermen are fresh fish suppliers. They catch the fishes and store them onshore using a wood container lined with oilcloth and filled with ice. There are two categories of fishermen in the Lanhouin chain: the **artisanal** fishermen and the **industrial** ones; but the first category of fishermen is the main fish suppliers in Lanhouin chain; indeed, the artisanal fisheries sub-sector provides about 94% of the domestic fish supply because the industrial fishery remains embryonic in the country (Anonymous, 2005).

The processors are women who produce Lanhouin. They mainly buy the fresh fish from artisanal fishermen who is most of time their relatives. Three categories of processors are involved in the chain: the **large scale** processors who produce between 300 and 3,000 kg/month, the **medium scale** processors who produce 75 to 300 kg/month and the **small scale** processors who process less than 75 kg of Lanhouin per month. The majority of large scale processors and medium scale processors also act as wholesalers and are engaged in the transborder trade of Lanhouin while the small scale processors serve only local or domestic market.

Other types of actors identified are the Lanhouin traders. They usually buy Lanhouin from processors to serve both domestic and sub-regional markets. Three categories of traders were also detected during the survey. The first category is related to **wholesalers**; they usually sell a large quantity of Lanhouin

and mainly engaged in the transborder trade of Lanhouin in West Africa region. The main export countries are Togo and Ghana. The second category is composed of **intermediary sellers**; they buy Lanhouin from processors and wholesalers to serve domestic and regional market. They can also process. The **retailers** are the third category of traders; they buy small quantities of Lanhouin from medium scale processors and intermediary sellers, and sell to consumers; so they mainly serve local market. Some of them also process small amounts of Lanhouin.

The consumers are the last actors in the chain. Both high and low income consumers buy Lanhouin in the market from retailers and use it to season different types of dishes. At home, they may store the Lanhouin for a while when they purchase in order to use it during all the week. They expect good quality Lanhouin. The services and support necessary to the functioning of the value chain are discussed in section 2.3.3.

Table 3: Typology of actors

Actors	Role, Responsibility, Right	Discussion
<u>Fishermen (males)</u> - Artisanal fishermen - Industrial fishermen	Catch fish from the sea and sell to processors	The artisanal fishermen are the main suppliers of Lanhouin processors
<u>Processors (females)</u> - Large scale processors/wholesalers - Medium scale processors - Small scale processors	Process large quantities of fresh fish into Lanhouin Process medium quantities of fresh fish into Lanhouin Process small quantities of fresh fish into Lanhouin	Process between 300-3000 kg /month; they represent 41 % of processors interviewed; they mainly export their product. Process between 75-300 kg /month; they represent 23 % of processors interviewed Process less than 75 kg /month; they represent they represent 36 % of processors interviewed
<u>Traders (females)</u> - Wholesalers/Processor - Intermediary sellers/Processors - Retailers/Processors	Buy and sell large quantities of Lanhouin; they mostly export the product to Togo and Ghana Buy from processors and wholesalers during scarcity period of fresh fish Buy and sell small quantities of Lanhouin to consumers	They are mostly also processors; they mainly serve regional markets They can also process; they serve domestic and regional market They buy from medium scale processors; they serve local market; they can also process a small amounts of Lanhouin
<u>Other Suppliers (females)</u> - Local salt processors - Salt importers/ distributors - Vendor of salt - Vendors of fermentation	Process solar coarse salt Sell imported salt to processors	The quality of this salt is dubious They import the salt from various countries including Ghana; better quality salt Sell solar salt and imported salt quality salt

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Actors	Role, Responsibility, Right	Discussion
materials		
<u>Consumers</u> (Both sexes)	Purchase Lanhouin from retailers and use it to season dishes	They expect good quality Lanhouin

Source: AFTER Research

2.3.2 Processing

The main processes in the chain includes, at domestic level, fresh fish handling, dressing (scaling and gutting), washing, ripening, salting, fermentation, rinsing, sun drying, packaging, distribution/sale and consumption. In addition to all these processes we have to add export for the transborder trade. The typology of processes is summarized in table 4. For Lanhouin processing, the fresh fish is scaled, gutted, washed, ripened in sea water or without water for 10-15h, and then treated with 20-30% w/w salt by rubbing dry salt into the gills, the belly cavity and on the surface (Anihouvi et al, 2005). The fishes are then wrapped with cloth, arranged in a basket and allowed to ferment for 3 to 8 days at ambient temperature (28–30°C). At the end of fermentation, the fishes are sun dried for 2 to 4 days. The end product, called Lanhouin, is intended for direct consumption as a seasoning or condiment or ingredient for food.

Three types of Lanhouin are produced and commercialized at market level: dried Lanhouin, non-dried Lanhouin and Lanhouin zodéké (non-dried Lanhouin fermented within 24 h) mainly sold during scarcity periods. The main quality attributes used by the different actors (processors, traders and consumers) to appreciate the main two forms of Lanhouin (dried Lanhouin and non-dried Lanhouin) commercialized are the texture that should be soft, the consistency of the flesh and the colour. According to processors, apart from the species of fish, the added value of Lanhouin depend on its soft texture and the spongy consistency and the bright shining colour of its flesh.

Table 4: Typology of processes

Process	Description	Discussion
Raw material (fresh fish and salt handling)	Often, catches are landed ashore without ice	Under climatic conditions often involving temperatures of up to 32°C the fish deteriorate very rapidly since they are rarely provided with any protection against sun.
Dressing	Scaling, gutting, removal of gills	Gutting is a critical point to control biogenic amines production (histamine)
Washing	Normally done with seawater or water from a well	Risk of microbial and chemical contamination (promote the use of potable water instead of sea water)

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Process	Description	Discussion
Ripening	Fish left to ripen for 11-16h at room temperature (28± 2°C)	Proliferation of micro-organisms and production of histamine. Perspective for re-engineering: combination of ripening and salting; use of adequate salt ratio
Salting	Dry salting; salt is put in the gut and gill cavities, and on the skin of fish	Two types of salt are used: imported and local; the quality of salt used can affect the quality of the end product as well as the price The reuse of salt in subsequent fermentations could be a potential source of contamination by halophilic bacteria
Fermentation	Fish is arranged in a basket or a basket lined with cement and covered with plastic sheet or cloth for 3-9 days at room temperature; or fish is arranged in a jute sack and buried in a 2 meters depth hole and allowed to ferment for 15-30 days.	Fermentation may be aerobic, semi anaerobic or anaerobic, but the end product appeared similar
Rinsing	Fermented fish is put in a bowl containing water and washed with hand	The nature of water used may contaminate the fermented fish
Drying	Fermented fish is put on a wooden platform or raffia mat and allowed to dry for 1-2 days	Fermented fish should be turned regularly; this makes the activity time consuming. Possible contamination of the product during drying
Packaging	Lanhoun is usually packaged in baskets covered with old sacks, old clothes or cement paper bags or in jute bag and attached with an old fishing net.	The unhygienic nature of these materials could be potential sources of microbial of other types of contaminations
Storage	Lanhoun packaged in baskets or jute bag is stored at room temperature in the processing room Dried Lanhoun could be stored for 75-120 days while the non-dried one could be stored for 90-180 days with salt	Lanhoun is frequently subjected to insect infestation with possible losses of product. Continuous bacterial and enzymatic activity within Lanhoun leading to an unstable product

Source: AFTER Research

2.3.3 Services

The services and support necessary to make the chain work included transportation of fresh fish from the buying place to the processing site. Most of time the transportation of fish is done by **taxi motor-bike driver** when the quantity of fish is important. In addition, after processing Lanhouin is transported from the processing sites to different markets including internal and external by the **intercity car drivers**.

Another important support service to the functioning of the value chain is the **basket makers**. Indeed, the basket is one of the most used materials during the fermentation step when processing Lanhouin. Other fermentation materials (**jar, plastic barrel and plastic can**) **suppliers** must also be taken into account in the chain support services. **Salt vendors** supplied processors with different types of salt (e.g., 'solar salt' and 'imported salt') they need to process Lanhouin.

As Lanhouin is processed by the traditional and informal food sector, the rules related to fishery sector are not mostly applied. The reason is that there are no specific rules about the traditional food products. However, the rules concerning fish capture and fish handling is observed mainly the icing of fish on shore is controlled by " la Direction des Pêches" which is the official service of the Ministry of Agriculture, livestock and fishery in charge of this type of control. Other supports for official export are the official laboratories in charge of quality control. In the "Union Economique et Monétaire Ouest Africaine" (UEMOA) zone there is free trade of goods; this means that Lanhouin processors don't need any permit before exporting, but they have to prove that their product is safe through the report of analysis done on the product by an official laboratory (DP or DANA laboratory) followed by the safety certificate given by la "Direction des Pêches (DP)" which is the only official control service in charge of such activity.

A number of service needs were pointed out by Lanhouin processors and traders during the survey; but the one mostly evoked is related to the opportunity of credit from financial structures. In this respect, the bank and other micro-finance structures would play a significant role in the promotion of Lanhouin sector.

The value chain analysis reveals that the chain is differentiated by gender; thus the fishery is only done by men while Lanhouin processing and commercialization are mainly done by women.

2.3.4 Summary of opportunities, bottle-necks, problems and key success factors from value chain analysis

The major problems observed with the Lanhouin production are the general unhygienic conditions of the processing environment as well as the equipment used for processing. Other improper handling practices noticed include the use of dirty water for washing the fish and improper packaging of the product. Washing the fish with dirty water can cause contamination of the fish.

The ratio of salt used changed from one production site to another and from one processor to other, and is not usually quantified. In addition the salt is not

stored under good conditions and most of time the salt is reused in subsequent fermentations. This practice could be a potential source of contamination by halophilic bacteria.

Flies also were a big problem to the processors leading to the illegal use of household insecticides to prevent flies setting on the product. Drying on the ground exposes the end product to domestic animals and may also be contaminated with sand. Processors usually package Lanhoun in baskets covered with old sacks, old clothes or cement paper bags during fermentation, storage and when transporting the product to the market. The unhygienic nature of these materials could be potential sources of microbial of other types of contaminations.

Another type of bottleneck noticed is a lack of standardization of the processing and the quality of the product could change from batch to batch or from one processor to another. The spoilage of Lanhoun during storage due to the lack of appropriate packaging material and insect infestation is other constraint identified. The packaging materials such as basket do not offer any barrier to insect infestation. In addition, the continuous bacterial and enzymatic activity within Lanhoun leading to unstable product with losses of product is other type of bottle-neck for Lanhoun sector. These types of problems led to the illegal use of substance such as petroleum and insecticide during storage period.

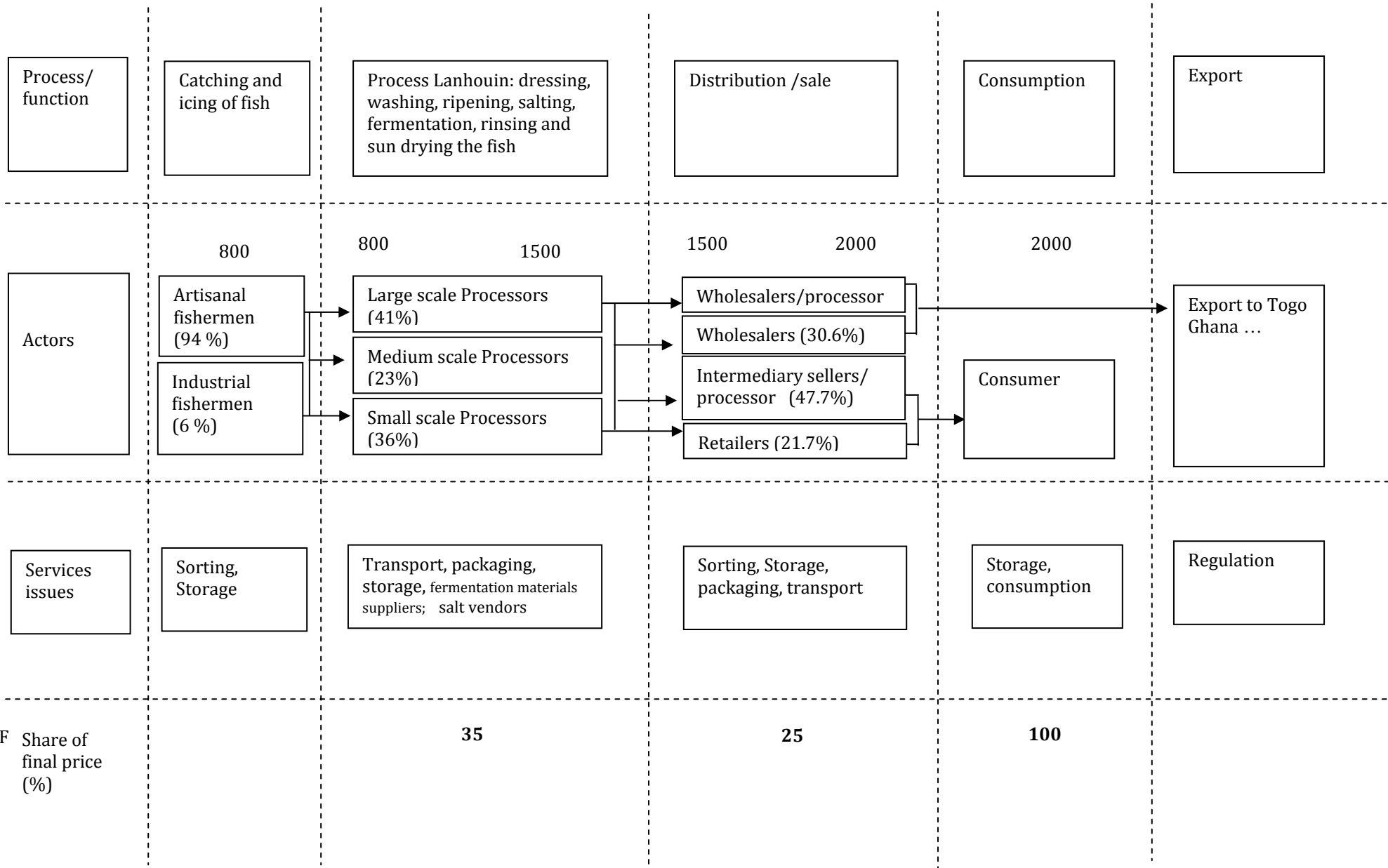
There is also a lack of association of Lanhoun processors to regulate production and price; consequently, there is slump in sale and price mainly during periods of glut and the product is sold under the normal price. The variation of selling price of Lanhoun is discussed below.

The upgrading opportunities are seen here in terms of production of new types of Lanhoun with higher safety standards and a new presentation through the reengineering of processing methods. The reengineering perspectives will take into account a number of constraints identified during the survey. These include in addition to hygienic problems, the processing techniques mainly the steps of ripening, salting, fermentation and drying. For example, the ripening and salting steps will be combined with the objective to reduce the production of biogenic amine at acceptable level, to limit the growth of non-desirable micro-organisms and stabilize the product during storage (combination of two steps, use of adequate salt ratio, use of some preservative additives (ascorbic acid, citric acid, lemon juice). In total, the upgrading actions will lead to the upgrading of traditional Lanhoun processing into a modern food condiment which can be adopted by the formal food industries and produced as a commercial flavouring agent.

So, in addition to traditional Lanhoun, we are expected to put up for sale two new forms of presentation of Lanhoun after the reengineering: dried file of Lanhoun and powdered Lanhoun. The target customers are: at national level, both high and low income groups, traditional caterers, street food vendors, restaurants and boarding schools, and other African countries, and Africans in the diaspora (UK, France and USA) and Europeans (UK and France) for external customers. The value chain map for Lanhoun is represented by the Figure 1.

Figure 1: Value Chain Map for Lanhouin

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Socio economic data collected along the chain during the survey revealed that the processors purchase the fresh fish for 600-1000 F CFA/kg and after processing sell the product for 1000-2000 F CFA/kg to traders who finally sell for 1500-2500 F CFA/kg to consumers and this according to the species of fish and the period of sale; the rough averages share of the final price along the chain are 35 and 25 % for processors and traders respectively. This means that the processors and the traders share 60% of the final price of Lanhouin while the fishermen and other actors of the chain share about 40 % of the final price. Exports to the neighbouring countries (Togo and Ghana) are not recorded but represent significant amounts. According to the large-scale processors who are mainly engaged in the transborder trade of Lanhouin, more than 50% of their production is exported to Togo and Ghana.

2.4 The Marketing Mix

2.4.1 Product

Three types of Lanhouin are expected to put up for sale: improved traditional Lanhouin, dried fillet of Lanhouin and powder of Lanhouin. These products will be made from two species of fish: one lean fish Cassava croaker (*Pseudotolithus senegalensis*) and one fatty fish kingfish/Spanish mackerel (*Scomberomorus tritor*).

2.4.2 Price

Traditionally, at market level, Lanhouin is mainly presented as whole fish or cut into pieces for sale (approximately 100 g of Lanhouin for 200 F CFA); it's sold to consumer through informal traders and processors for direct use as condiment, seasoning or ingredient for dishes. Lanhouin is also sold in small wholesales to retailers or Wholesalers in the market or at the processing sites. One (I) kg of Lanhouin cost approximately between 1500 and 2500 F CFA according to the period, showing that there is a variation of the selling price during the year, variation which mainly depend on the variation of the selling price of fish according to the season.

A number of factors are involved in the marketing mix of Lanhouin. These include: the species of fish used, the type of salt used, the season (fish is cheaper in the rainy season than in the dry season) and the transportation of Lanhouin from the processing place to the market. Generally cost of labour is not calculated in spite of this labour is intensive, because the unit operations such as dressing, salting, washing and drying are time consuming activities. In general, Lanhouin is more expensive during the months of December and January because of high demand, and from March to July because this period corresponds to the scarcity period of marine fish in Benin. In addition, the period from March to July corresponds to the raining season, and the artisanal fishermen who constitute the main marine fish suppliers do not go often to fish because they don't have adequate equipment to deal with adverse weather conditions.

For the three new types of Lanhouin, in addition to factors evoked above, the price of competitive product such as “Afitin” [fermented African Locust bean (*Parkia biglobosa*) product used as condiment, 165 CFA/100 g], imported Lanhouin like-product called “Lanhouin Dakar” (imported Lanhouin from Dakar) and “Maggi” range of condiments [(CookZen, 250 CFA/100g), (Maggi prepared with crayfish, 350 CFA/100g), (Maggi prepared with chicken, 350 CFA/100g)] should be taking into account to fix their selling price. From these ranges of prices it appeared that Lanhouin is currently more expensive than the competitive products cited above because the raw material used to produce Lanhouin is cheaper than the fish.

2.4.3 Place

Lanhouin is currently only sold in open market. However, the survey showed that most of consumers would prefer to buy it in a well-packaged form in a supermarket. There is also a potential for Lanhouin being sold in other African countries and in some European countries after reengineering, and this mainly because of the diaspora from West Africa who know very well the fermented fish products. The main selling places are the supermarkets and the target customers are both high and low income groups at national and international levels.

2.4.4 Promotion

As indicated above in section 2.4.1, three new types of Lanhouin (improved traditional Lanhouin, dried filet of Lanhouin and powder of Lanhouin) are expected to be promoted after reengineering. These products will be promoted through a number of actions such as Nutritional information on the packages, radio advertisements, catchy TV advertisements, TV documentary, sponsoring of educational programs to attract the youth (free dishes containing Lanhouin, T-shirts advertising Lanhouin), attractive phrases, national Lanhouin day and participation to international food fairs.

2.5 SWOT Analysis

The strengths, weaknesses, opportunities and threats (SWOT) for traditional Lanhouin and the two new forms of Lanhouin are summarized in table 5.

Table 5 SWOT analysis for Lanhouin production

STRENGTHS	WEAKNESSES
Long tradition of production of Lanhouin in Benin	Improper presentation of finished product in the market
Lanhouin is culturally accepted by a large fringe of population	Food safety issues associated with Lanhouin e.g. histamine
Geographical location of the country (having a coastal line) – ensures availability of raw materials	Lanhouin is more expensive compared to similar condiments e.g. Afitin
Availability of ready market (internal and external)	Inappropriate processing technology (e.g. fermentation containers, exposure of Lanhouin to the environment (dust and flies) during

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Unique flavour compared to similar condiments e.g. Afitin Cheap source of protein for poor consumers	drying process
OPPORTUNITIES	THREATS
Improve presentation (packaging) Reengineering will improve the physico-chemical quality and the microbiological status of the product; consequently the safety of the product will be improved Look for new market for the re-engineered Lanhouin especially in Europe among Africans in the diaspora and among the elite population	Competition from other imported condiments such as Lanhouin Dakar and Maggi range of condiments Behavioural changes in elite/youthful consumers Fish species used for Lanhouin going into extinction

Source: AFTER Research

Through the SWOT analysis it appeared that there is a potential to promote Lanhouin with the reengineering perspectives of the processing method of this product. The reengineering of the processing method of Lanhouin will contribute to improve both the new versions of Lanhouin and the traditional Lanhouin, since a part of the reengineering results will be applied to the traditional sector. The production of good quality Lanhouin will offer opportunities to attend new markets in Africa, EU and US as well.

Two assumptions are formulated to support this SWOT analysis: i) species of fish used for Lanhouin will always be available and 2) after re-engineering Lanhouin can be produced on an industrial scale.

2.6 GAP Analysis

Currently Lanhouin is only sold in open market which is an informal market. After reengineering the new products are expected to attend the formal trade market. For this we have to improve the processing method and the safety of the new products as well. The traditional Lanhouin is known as poor quality product on both microbial and physico-chemical aspects (Anihouvi et al., 2006). So the re-engineering will be done with the objective to overcome the Gap observed mainly in terms of safety.

2.7 Summary, conclusions and recommendations

Summary

This report summaries the value chain for Lanhouin in Benin. Different actors are associated to Lanhouin production e.g. fishermen, Lanhouin processors and traders; other services suppliers identified were salt vendors, fermentation materials vendors.

Conclusions

This work revealed that the value chain is differentiated by gender. Fishing is only done by men, whilst the processing and the trade of Lanhouin are ensured by women.

The main unit operations for Lanhouin processing included the dressing (scaling, gutting), the ripening, the salting, the fermentation and the drying, but the major ones that could affect the safety of the product are the gutting and the salting. The prices of raw materials (fish and salt) are determining factors for the price of final product. Generally cost of labour is not calculated. The key competing products identified for the three new types of Lanhouin are Afitin, Lanhouin Dakar and imported Maggi range of condiment.

Recommendations

Lanhouin is usually sold in open market but it is expected that reengineering and improvement in quality, packaging and presentation will achieve the objective of having the product on supermarket shelves in Benin as in other parts of the world. The processing method currently used to produce Lanhouin gives a product which is in agreement with the consumer's acceptance in terms of sensory attributes. However, there is a big gap to overcome when talking about the safety of the product. In this respect, there is a need to provide appropriate training to traditional processing actors in terms of fish handling and hygiene to ensure a permanent promotion of Lanhouin sector in Benin.

3. Kitoza

3.1 Introduction

This report shows value chain for kitoza in Madagascar. It was completed by Rajaokarivony Zo lalina and Razafimahatratra Tsaraso Jean Yves between October 14th and November 2011.

The purpose of this report is to scope out and reveal the value chain for kitoza. This value chain included key actors and processes. In addition, the analysis uses the value chain information to build SWOT and GAP analyses for existing and re-engineered AFTER products. The work builds upon the AFTER survey and the literature search. It should also be read in conjunction with the regulatory and market access report.

The approach used to undertake this research was based around a value chain workshop held at CERSAE, Madagascar from October 11th to October 13th with follow-up interviews with key value chain actors. A list of key informants is at Annex 2 and a list of participants in this workshop is at Annex 3. The scope of the research included all aspects of the value chain as far as was possible from the perspective of in-country research. Problems included the difficulties of access to online information due to the bad quality of Malagasy connection and the high frequency of power cut.

This section will begin with the Kitoza product description. The value chain analysis for Kitoza product will be presented in next section followed by its marketing mix. Then, the details of SWOT analysis will be explained, and finally results GAP analysis will be given. A summary and conclusions can be found in the last section along with some recommendations relevant to AFTER project implementation.

3.2 Product description

Kitoza is prepared with beef or pork meat. The main ingredients are salt and spices, such as garlic, pepper and ginger. The retailers of smoked Kitoza are mostly producers themselves, but some are retailers only.

The types of commercialised Kitoza are:

- Smoked beef Kitoza 72.72% (of which 27.3% only upon request by individual buyers e.g. pre-order product)
- Smoked pork Kitoza 81.81%
- Other types of Kitoza 9.09%

The products could be vacuum-packed or kept as it is according to the producer. Kitoza is sold on the same day but it could be stored in a refrigerator. It is delivered by car in ice boxes.

The place of sale is usually the local markets (40%) or shops at the merchant's homes (40%).

The size of all markets (local market: producers-retailers, supermarkets) of Kitoza is small (niche-a few tones).

3.3 Value Chain Map

3.3.1 Actors

The chain actors for Kitoza beef and Kitoza pork are listed in tables 6 and 7 with their functions.

Table 6: Typology of actors for Kitoza (beef)

Actor	Role / relationship, responsibility, rights	Discussion
Farmer	Supplies stock breeder with fodder	Extensive breeding
Stock breeder	Breeds, takes care of animals health	Local breed (<i>zafindraony</i>)
Veterinary	Prevents the disease (vaccination and parasites elimination)	
Collectors	Purchases the live animal	
Controller	Checks the animal identity	Police force, local authorities agent
Transporter	Carries the animal to the slaughter house	Private subcontracting
Squarer	Kills and undertake the pieces selections	Two kinds of killing sites
Butcher	Sells the meat	Retailer and wholesaler
Transformer	Selects the appropriate meat piece, adds the ingredients	Tranche fine, fillet
Supplier (input and materials)	Supply	Woods quality, drier, ingredients
Distributor (wholesaler manufacturer, reseller, exporter)	Delivers, commercializes and supplies the trader	Quantity and conservations
Consumer	Consumes the finished product	Quality and price

Source: AFTER Research

Table 7: Typology of actors for Kitoza (pork)

Actor	Role / relationship, responsibility, rights	Discussion
Farmer / Animal feed supplier	Provides animal feed	The quality of meat depends on the animal feed
Fire woods supplier	Supplies the transformer with fire wood	Local breed (<i>zafindraony</i>)
Veterinary	Prevents the disease (undertakes vaccination and parasite elimination)	
Small scale stockbreeder	Breeds around 10 animals	

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Actor	Role / relationship, responsibility, rights	Discussion
	(pork)	
Collector	Collects the animal from the stockbreeder and sells them to the wholesaler	Change from small scale business to large scale business
Transporter	Transports the live animal to the wholesaler	Private subcontracting
Wholesaler	Furnishes the slaughter house	
Slaughter house	Slaughters and selects the appropriate meat pieces	
Butcher	Sells the meat	
Transformer	Chooses the meat pieces, mix the ingredients	Tranche fine, fillet
Supplier (input and raw materials)	Supplies	Fire woods quality, drier, ingredients
Distributor (wholesaler manufacturer, reseller, exporter)	Delivers, commercializes and supplies the trader with the product	Quantity and conservation processes
Consumer	Consumes the finished product	Quality and price

Source: AFTER Research

3.3.2 Processes

The processes in the chain for Kitoza are listed in table 8.

Table 8: Typology of processes for Kitoza

Process	Description	Discussion
Selection of the piece of meat	“Escalope”, “tranche fine”, “fillet”, “roast beef”	
Supplying	Fire woods, smoking equipment (furnace, drier), ingredients	The taste depends on the types of fire woods (eucalyptus, palissander, ...) to be used
Preparation	Clean the selected pieces, slice into thin straps, salting and maceration	- Keep the appropriate temperature to avoid fermentation ($T^{\circ} \leq 6^{\circ}C$) - Required maceration time ranges 4 to 5 hours
Smoking	Put into furnace and drier for 3 hours until 30% weight loss	Organoleptic characters of the product depend on the types of fire wood used
Conditioning	Vacuum packaging, plastic bag or in bulk	For in bulk sale, food safety and stockage warranty limited.
Consumability analysis	Delivery of consumption certificate	
Marketing and distribution	Communication, prospection, logistics, ...	
Consumption		

Source: AFTER Research

Our main product is Kitoza made of beef and pork meat. Typically, kitoza are produced for local consumption and as a perspective for exportation.

The key actors for Kitoza beef have been identified as follows: Producer, collector, squarer, butcher, transformer, distributor and consumer. Each actor has its own task on this value chain (see Figures 2 and 3). On the benefit share, the collector take the most value with 35% of the final price followed by the producer with 20.83%, then come distributor and the transformer, the latter has 16.87% of the final price. The butcher takes the lowest part of the final price with only 8% of the final price.

The actors for Kitoza pork are listed as follows: small stockbreeder, veterinary, slaughterhouse, butcher, transformer, seller, and consumer. Regarding the benefit share it was the seller who takes the greatest part on the final price i.e. 48% of the final price.

The main problem we have encountered is that of legislation and regulatory policies on the national level regarding exports to the European markets and other countries markets. Further difficulties are related to production. The Kitoza process uses a very reduced part of the whole animal (less than 0.5 per cent of the entire mass bulk). Therefore honouring the international market demand is a big challenge for the producer. Additional problem concerns benefit sharing which is rendered significant due to the lack of profit and price control.

Nevertheless, it is possible to upgrade the Kitoza value chain by introducing the concept of fair trade. Therefore, it is required to control the activities of middlemen who receive most of the benefits.

Figure 2: Value Chain Map for Kitoza (Beef)

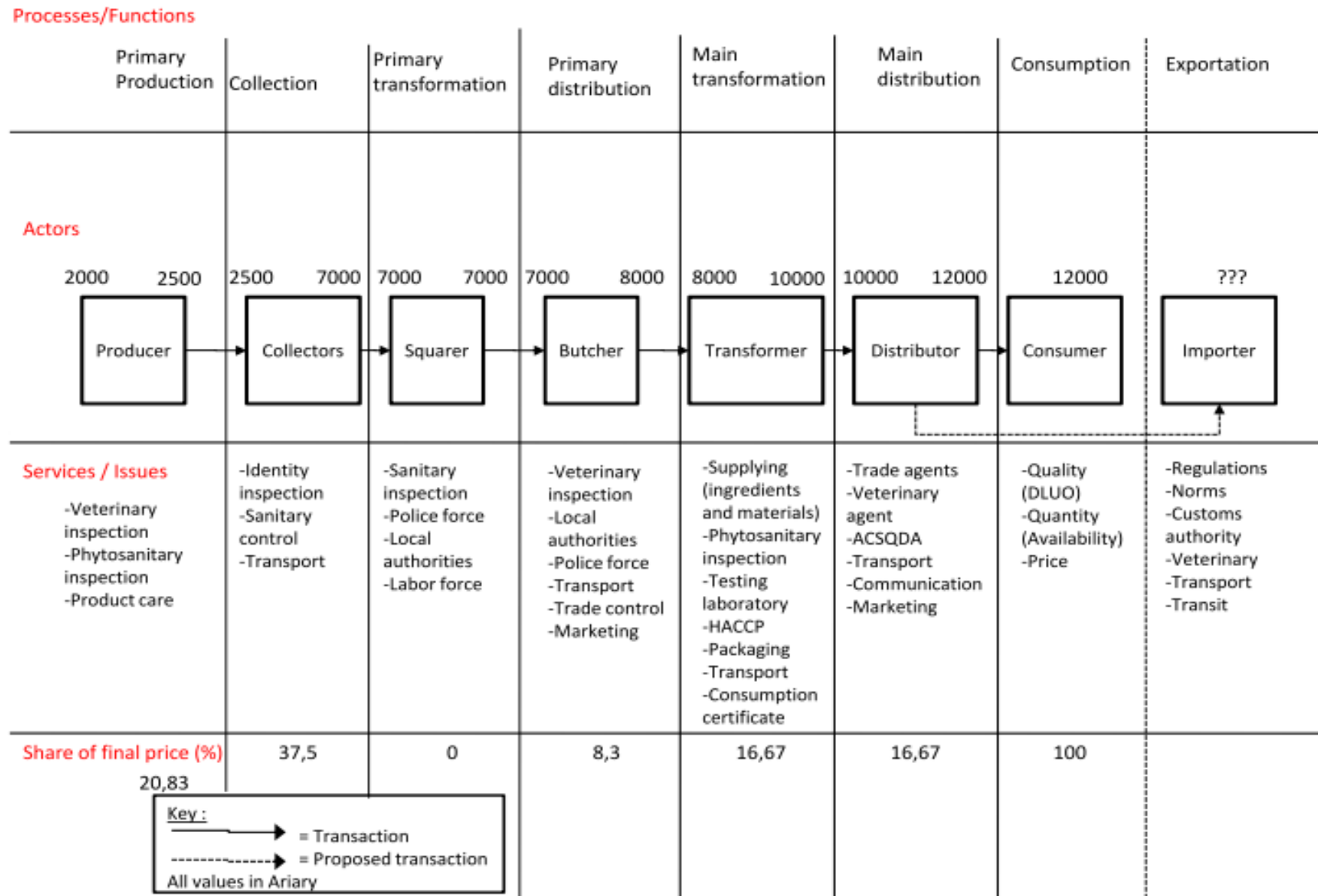
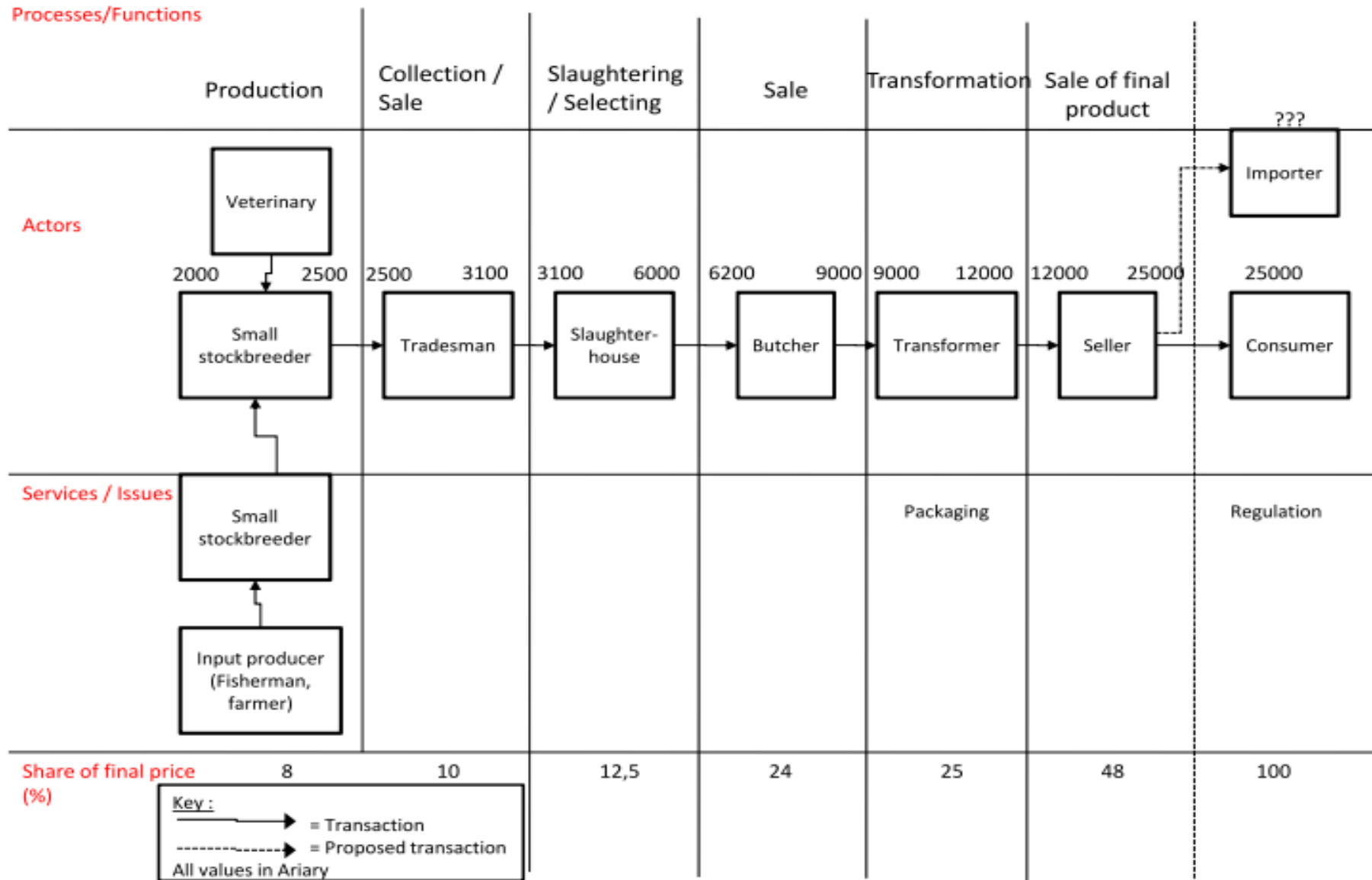


Figure 3: Value Chain Map for Kitoza (Pork)



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3.4 The Marketing Mix

3.4.1 Product

Pork

The smoked pork kitoza products are commercialized as sliced meat. They are clean, healthy and conformed to manufacturing standard. They are natural products which are packed within a bag of 100g and also within individual package which contains less than 100g.

Beef

Smoked beef Kitoza is a new product which is presented in different form: sliced, diced or in thin straps. It is a pre-prepared food, presented within “vacuumed packages” or “nitrogen air packaged plastic bags”. Smoked Kitoza is a dietetic and a medium/top-of the range product. It is certified by a national organism and the Optimal Date Limited Use (ODLU) is marked on the package.

3.4.2 Price

Pork

The smoked pork Kitoza products are sold at different prices according to the sale sites. At the butcher’s and the grocer’s, they are sold Ar 25000 the kilo while at the supermarket they are sold between Ar 35000 and Ar 36000 the kilo.

Beef

Smoked beef Kitoza is sold between Ar 3000 and Ar 10000 according to its weight. The price is cheaper than that of sausage, an alternative product. It could be sold to the pupils or for everyone as a snack at the price of Ar 500 per package.

3.4.3 Place

Pork

The smoked pork Kitoza products are sold in different places namely at grocer’s, fast food, snack, butcher’s, delicatessen and supermarkets.

Beef

Smoked beef Kitoza is sold in different areas namely at supermarket, delicatessens, restaurant, hotel, gas station, grocer, snack, bar, festival.

3.4.4 Promotion

Pork

The smoked pork Kitoza products are delicious, easy to eat everywhere, easy to prepare, easy for conserve, easy as takeaway. They could be combined with other meals and they contain necessary ingredients.

Beef

There are different ways to promote smoked beef Kitoza products. It can be promoted via internet, advertising displays, billboards, advertising leaflets to put on air plane flights, in hotel-restaurant, in travel agency. It can be also promoted using audiovisual advertisement. National, regional and local trade fairs are good promoting opportunities. Another way to sell smoked Kitoza is the door-to-door approach. Finally, the packaging could be used to indicate the sanitary quality of the smoked Kitoza beef products.

3.4.4 People

Pork

Everybody particularly the youth and men, middle and high classes.

Beef

The people targeted are especially travellers, tourists, missionaries, drivers and highly mobile individuals. Students, young people, family are also potential targets to be considered. Smoked Kitoza beef product can be served during cocktail parties as well as snacks in bars.

3.5 SWOT

3.5.1 Beef Kitoza

Strengths:

Smoked beef products have a Malagasy traditional and cultural value because beef is an important part of Malagasy culture. It tastes good and has protein rich nutritional values. Regarding the price, smoked beef is cheaper and affordable at all levels of society. The process is not complicated since the ingredients are readily available and manufacturing methods easy. Furthermore, smoked beef products are easy to store.

Weakness:

Kitoza products are not clearly defined. The quantity of smoked beef Kitoza is limited to local consumption. There is no structure for exports and the production rules are not well identified. The lack of information about intellectual property rights represents also a real weakness for the product. Furthermore, the reduced meat part used for Kitoza compared with the whole animal meat mass renders the enterprise difficult.

Opportunities:

There are many new local sale sites opportunities which can be exploited. Valuation and research and development for Kitoza products represent a real potentiality for trade development. The finalization of regulatory text complying with the European Union text is an asset for exportation.

Threats:

The deterioration of purchase power is a serious threat for Kitoza business. Moreover, food habit change could be a threat to the trade of Kitoza. In addition, there is strong and unfair competition with other meat products such as pork and chicken. Cattle farming in Madagascar is still a risky enterprise due to the issue of unpredictable diseases. It is also unfortunate that the lack of the government commitment hinders the success of Kitoza business.

Assumption:

The result of this “AFTER Project” will attract the operator in Kitoza business.

3.5.1 Pork Kitoza

Strengths:

Production of pork Kitoza is fast. Pork Kitoza is tasty, nutritive, tender, endemic and has a long good storage span.

Weakness:

Pork Kitoza is expensive when produced only in low quantities.

Opportunities:

Different types of fire wood could be used for smoking. Pork Kitoza products are also a ready meal.

Threats:

Pork derivative products are a forbidden food for some religions or other social reasons. The decrease of purchase power threatens also this business.

Assumption:

Pork Kitoza products are free of diseases.
The food habit change is also a possibility.
Kitoza pork is an accepted product.
Packaging improvement is feasible.

3.6 GAP Analysis

The market space or GAP that Kitoza products will enter is marked with a cross in tables 9 and 10.

Table 9: beef Kitoza gap analysis

	Traditional shapes: Thin strips	Sliced	Powdered	Diced	Spicy	Mixed (cocktail with chips and pistachio)	Tined
Gas station	X	X		X	X	X	X
“Taxi-brousses” terminals station	X			X	X		
Supermarket	X	X			X		X
Restaurant	X			X	X	X	
School and/or factory Canteens	X		X				X
Nutrition NGO	X		X				X
Grocer	X				X		X
Delicatessens	X	X	X		X	X	X
Bar	X			X	X		
Fair, festival, cocktail	X	X	X	X	X	X	X
Airplane				X	X	X	X
Hospital	X		X				
Military headquarters	X		X	X			

Source: AFTER Research

Table 10: pork Kitoza gap analysis

	Thin strips		Piece		Package		Powdered	
	Natural	Spicy	Natural	Spicy	Natural	Spicy	Natural	spicy
Butcher	X	X	X	X				
Delicatessens	X	X	X	X	X	X	X	X
Grocer	X	X	X	X	X	X	X	X
Gas station	X	X	X	X	X	X	X	X
Snack / fast food	X	X	X	X				
Restaurant	X	X	X	X	X	X	X	X
Cafeteria / refreshments	X	X	X	X				
Bar	X	X	X	X				
Door to door	X	X	X	X	X	X	X	X
Fair	X	X	X	X	X	X	X	X
Supermarket	X	X	X	X	X	X	X	X
“Taxi-brousses” terminals station			X	X				

Source: AFTER Research

“Taxi-brousses” terminals:

Following the GAP identification step we found for both beef and pork that taxi-brousses stations are an open positive sale site for the new products. Indeed the most used means of travelling outside Antananarivo into the provinces is the taxi-brousse. These sites thus are almost everyday crowded. The trip usually lasts over a day and therefore travellers need to eat during the travel.

Gas station:

Gas stations are numerous within the urban areas. They are often patronised all day long. Therefore, passing refilling customers have the opportunity to snack or to take home the ready made products.

Supermarket:

Recently, the urban areas have seen the increase of new supermarkets. Kitoza is already an accepted product. Supermarkets revealed to be an appropriate site to purchase the products as customers especially in cities regularly do their food and other items shopping in supermarkets.

3.7 Summary, conclusions and recommendations

Summary

The markets, regulatory and value chains for Kitoza have been characterised.

Conclusions

Made with pork and beef, Kitoza is usually sold in the local markets and shops. Kitoza market opportunities are still limited (niche-a few tones). Smoked Kitoza enterprise will enhance the development of Kitoza products exports into European markets provided that the European Union safety and quality requirements are met. The success of these efforts will truly contribute to the blooming of Malagasy Kitoza industry.

Before the AFTER Project no initiative to develop Kitoza has been organized.

Recommendations

Thanks to AFTER project, it is now possible to undertake the re-engineering of Kitoza industry by improving the present Kitoza production through upgrading all processes in the value chain. Moreover, the contribution from the Malagasy government to solve specific problems such as meat exports is a step to open new market opportunities.

4. Kong

4.1 Introduction

This section shows value chain for smoked fish called “kong” in Senegal. It was completed by Nicolas Ayessou, Mady Cissé and Cheikh Ndiaye between 16 January and 3 February 2012.

The purpose of this report is to scope out and reveal the value chain for smoked kong. This value chain included key actors and processes. In addition, the analysis uses the value chain information to build SWOT and GAP analyses for existing and re-engineered AFTER products. The work builds upon the AFTER survey [D1.1.2.2 and D1.1.2.3] and the literature search [D 1.1.12]. It should also be read in conjunction with the regulatory and market access report [D 5.1.2.3].

The approach was done according to value chain workshop at Dakar on 27-29th September 2011 with follow-up interviews with key value chain actors (Annex 2). Its scope included all aspects of the value chain. Furthermore, the scale and the informal character of the smoking activity have been investigated.

The reports are laid out as follows: the description of the product; the value chain map; the marketing mixed; the SWOT analysis and the market gap analysis. A summary and conclusions can be found in the final section along with some recommendations relevant to AFTER project implementation.

4.2 Product description

Smoked “kong” is the fish named *Arius heudelotii* which is hollowed out, cleaned, drained and smoked in traditional way. This technology produces two types of end-products: a wet smoked Kong and a dried one. Smoked Kong is sold directly to consumer through informal traders and processors. It is wrapped up in papers and then packed in baskets during the transportation. It is usually sold without any additional packaging. For Export markets, it is always found refrigerated or frozen. The scale of Kong market is a medium size (12000 tons produced and really booked). In fact, almost 100% of fished Kong is smoked. The unrecorded quantity is sold within regions of Senegal or neighbouring countries (about 8000 tons). Unfortunately, since 2006, the export market to Europe is becoming non-existent.

4.3 Value Chain Map

The smoked Kong’s value chain is simple. Usually, the producers have direct relationship with fishermen (table 11). In this situation, few actors are found till consumers. The main actors are producers and sellers. The explanation is that fish and related products are easily spoiled. Therefore, the raw material is

usually transformed as quickly as possible. The different support services are carriers and inspectors of Sea fishing Department. Carriers operate generally between fishermen, producers, traders and sellers. Inspectors have their duty bound to the sanitary quality verification and the quantity traded. Table 11 sums up actors of the chain and Figure 4, shows relationships between the different actors in the chain.

4.3.1 Chain actors and functions

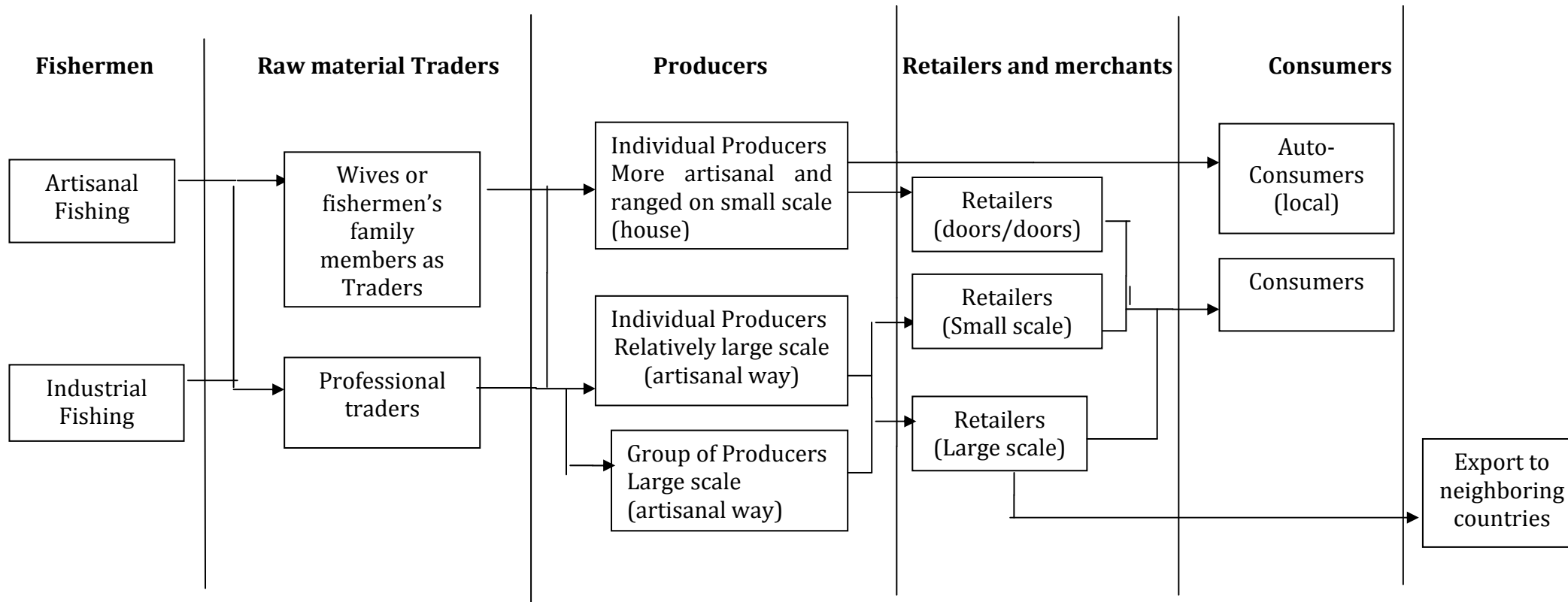
Table 11: Value chain actors of smoked Kong

The chain's actors	<ul style="list-style-type: none"> - Fishermen - Traders for small scale fishery - Producers - traders for large scale production - retailers in market, sellers doors to doors - Control services specially men for the production and trading; but women are more organized on using economic interest groups
Functions of actors	<ul style="list-style-type: none"> - Fishermen to capture the fish, - traders of raw material -producers of smoked Kong by traditional process -traders of end product, - sellers and retailers in the markets
The main processes in the chain	- Fishing – smoking – holy packaging - trading
Services and support within the chain work	<ul style="list-style-type: none"> - Sea Fisheries Department. - Control Division of Trade Ministry and Public Health Ministry. - The Senegalese Standards Association “ASN” - Associations gathering all producers (present in each area of fisheries’ processing products). - Women producers federation called “FENATRAMS - ASEPEX : Senegalese agency of promotion of the exports - ADPME : Agency of development and frame of small and medium-sized enterprises - AAFEX : African association of the exporting companies - Department of external trade

Source: AFTER Research

The value chain map is represented in the following flow chart (Figure 4).

Figure 4: smoked Kong value chain map



3.4 Analysis and diagnosis of the chain

According to the requirements on the raw material, the wet Kong has a very short shelf life (4 days) in the chain from the producer to the consumers. For the dried smoked Kong, there is a longer shelf life and are authorized for trading between the main actors. Otherwise the end product is stocked at ambient temperature with no additional packaging. Bottle-necks identified can be listed as the lack of quality standards for Kong to be exported to Europe, a lack of good conservation and packaging.

Some opportunities on the chain of smoked Kong can be resumed as follow:

- Sufficient availability of the natural raw material and;
- An upgrading demand of consumers.

In spite of lack toward European export markets, the production is not disturbed. According to a brief survey (Annex 4), a change of consumers' habits seems to be notified. From decades until now, smoked Kong has been often used for two special meals called respectively "soup kandja" and "thiou". Nowadays, 63% of consumers introduce smoked Kong in more varieties of meals. In fact, 43% of consumers are willing to buy refrigerated smoked Kong in additional packaging (with more added value).

Key success factors from value chain must consider new process and new packed products, well-dried end-products, and adapted packaging and storage conditions. The new process should give more information about the level of Polycyclic Aromatic Hydrocarbon and sanitary quality of the end-product. An upgrading and re-engineering should come with the end-products of Kong.

4.4 The Marketing Mix

The issue of prices in the chain depends on the season and the type of available smoked Kong. Nevertheless a range of prices can be obtained in spite of seasonal variations. For example, fresh fish sample can be evaluated from FCFA 400 to FCFA 1200. The end-products of trading are ranged from FCFA 800 to FCFA 2000 for the same sample. Finally, the retailers sell in the market between FCFA 1200 and FCFA 2500. For a short value chain, producers and retailers have respectively 50% and 40% of the benefits. These benefits sharing are quite different for a long chain which introduces traders. In this case, producers seem to share most of the benefit (40- 50%), following by traders (20 to 25%), and retailers (30 to 35%). In this evaluation, no differentiation on gender has noticed. This analysis of the smoked Kong's value chain shows that an improvement within the chain is essentially profitable to the main actors (producers). Wet smoked Kong is mostly sold in the markets of big cities (in Senegal) and show a real challenge in the value chain as shown in table 12.

Table 12: Presentation of the marketing mix

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The products		wet and dried smoked Kong
Range of prices for sell		FCFA 1200 – 2500
	Area of Production	Main fisheries areas (Mbour, Fatick, Ziguinchor, Kafountine, Dakar)
	Area of selling	Markets of production zones, Senegalese regions, neighbouring countries (Mali, Guinea, Burkina Faso...)
Promotion and Marketing		<u>Re-engineering the process</u> <ul style="list-style-type: none"> • Improve the process • Produce a new quality of smoked Kong <u>Re-engineering the product</u> <ul style="list-style-type: none"> • Individual packaging • Refrigerated storage condition • Smoked filets of Kong • Ready meal for Kong <u>Promotion</u> <ul style="list-style-type: none"> • Promote likely “traditional way of smoking “ • proximity in markets promotion • using womens’ TV program • website <u>Place of selling</u> <ul style="list-style-type: none"> • super market • mini-market • doors to doors • export market <u>Review of price</u> Reduction of price (10% to 20%)
How to convince consumers		<ul style="list-style-type: none"> • presentation of new packaging advantages • quality assurance • sanitary certificate • all information according

Source: AFTER Research

4.5 SWOT

<p><u>Strengths</u> for wet /dried smoked Kong</p> <ul style="list-style-type: none"> • <i>A. heudelotti</i> is the only fish species used for smoking; no competition with other species • Very appreciated taste and well consumed • Availability of raw material within the year • Versatile (use in many meals) • Easy to cook • Essential protein source • Well dehydrated (only for dried smoked Kong) • Long shelf life (dried smoked Kong up to 60 days) <p><u>Strengths</u> for Smoked filets/ Ready meal</p> <ul style="list-style-type: none"> • Possibility of individual packaging • Easy for cooking or eating • Very long shelf life • No sanitary hazard 	<p><u>Weaknesses</u> for wet /dried smoked Kong</p> <ul style="list-style-type: none"> • high water content of the end product (for wet smoked Kong only) • short shelf life (3 -5 days for wet smoked Kong) • bad sanitary quality • no additional packaging
<p><u>Opportunities</u> for wet /dried smoked Kong</p> <ul style="list-style-type: none"> • High demand market (local, regional and export) • availability of smoked Kong (in all year) • possible industrialization • re-engineering (this can increase benefits for actors) <p><u>Opportunities</u> for Smoked filets/ Ready meal</p> <ul style="list-style-type: none"> • very large distribution • new markets • increase the benefits 	<p><u>Threats</u> for wet /dried smoked Kong</p> <ul style="list-style-type: none"> • artisanal scale • no standard • no regulation and/ or standards • main sites of fishing far from the capital • weakness on financial capacity of producers, especially women • limited fuel: environment threats • bio-availability and supplying <p><u>Threats</u> for Smoked filets/ Ready meal</p> <ul style="list-style-type: none"> • expensive • chemical quality

Source: AFTER Research

<p>Strengths</p> <ul style="list-style-type: none"> • Complicated processing procedures can be used as a business opportunity • Ready-to-eat • Can be eaten anytime of the day • Has milder taste and easier to sell than kenkey or banku • It's cheap • Can be consumed as stiff or thin porridge • It is patronized by all • It is profitable • It is more attractive 	<p>Weaknesses</p> <ul style="list-style-type: none"> • Has acquired taste • Variable texture due to processing • Primitive packaging • Product is not very well known compared to Ga and Fanti kenkey • The product does not appear to have any unique nutritional and sensory advantages
<p>Opportunities</p> <ul style="list-style-type: none"> • Novel Product to new-consumers • Amendable to re-engineering to increase the shelf-life, reduce food safety concerns and improve consistency of quality • Shelf-life can be enhanced by addition of sweeteners, vacuum packaging, storing at lower temperatures. • Scientific knowledge can be exploited • European market can explored 	<p>Threats</p> <ul style="list-style-type: none"> • Could contain mycotoxins • Lack of traceability of raw material with existing VCs • Access to markets • Changing food habits • Competition with other African foods. • Leaching of lead into Kenkey from cooking pot. • Price of reengineered product may be too

• Diaspora market	high
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Source: AFTER Research

According to this SWOT, many steps can be attempted to increase the chain value of smoked Kong:

- * The packaging
- * The review of the process (for a better sanitary and chemical quality of end products)
- * The storage conditions of the end products

4.6 GAP Analysis

Three types of market spaces must interest the re-engineering products: export, mini-market, and super-market (table 13). The classification of all new kind of products from the scale (1 to 6) is mentioned in table 13. Traditional wet and dried smoked Kong with a new packaging may still occupied traditional markets, doors to doors sellers' spaces and district markets. In addition, they can be sold in mini-market. The real gap in this chain must be obtained by new products such as filets, pieces of smoked Kong (without head) and ready meal. Results of survey proved that a real challenge will come up by making re-engineering products. The new products are supposed to be sold in mini-market, super-markets and export markets. Unfortunately, traditional markets are not fit to respect the refrigerated chain. Only re-engineering products for exportation can strike with other competing products. However, those competing smoked fishes are interested by another category of consumers according to their particularity.

Table 13: Gap strategy of smoked Kong (traditional and re-engineering process)

	Traditional	Re-engineered products			
	Wet/dried Kong	Filets	Smoked Kong without head	Industrial smoked Kong	Ready meal
Traditional market	1	0	0	0	4
Door/door	3	0	0	0	5
District market (small scale)	2	0	0	0	6
Mini-market	0	3	3	3	3
Super-market	0	2	1	1	2
Export market	0	1	2	2	1

NB: classification occurs from 1 (first) to 6 (sixth); 0 (not classified then not be sold)

4.7 Summary, conclusions and recommendations

Summary

The marketing, regulatory and value chain for Kong has been evaluated.

Conclusions

The value chain of smoked Kong, obtained from traditional way processing, is very short from fishermen to consumers. Within this chain, producers capitalize

at less 50% of the generated profits. Through many surveys, it appears from actors that smoked Kong is one of the most consumed seafood products in Senegal.

Recommendations

The solving of strengths noticed in the SWOT using re-engineering is based on improvement quality and self-life of end-products. However, the gap strategy shows that re-engineered products should live its traditional market (habitual markets). From that establishment, two upgrading ways must be chosen: one for traditional market (57% of local consumers) and other for mini-markets (43% of local consumers) and export market.

1. Re-engineering for the traditional market may consider
 - * The energy optimization of the smoking
 - * An increase of the shelf life of end-products
 - * The improvement of selling conditions

2. Re-engineering for modern markets, should be
 - An industrial process
 - A new packaging

For a sustainable development of the chain value it will be important to manage the raw materials according to following laws or scripts.

- The legal framework according to Law No. 2008-29 of 28 July 2008 on the promotion and development of Small and Medium Enterprises (SME) in Senegal
- SME Sector Policy Letter and "SME's Growth Program strategy".

- The Fisheries and Aquaculture Sector Policy Letter (LPS-PA). It defines the basic principles of a new reform strategy of the fisheries and aquaculture development sector up to 2015.
- A technology transfer of benzo(a)pyren analysis.
- A real application of export development strategy through the purpose of Senegal's Export Development and Promotion Strategy (STRADEX), established by Decree No. 2005-108 on February, 15th 2005.

Annex 1: Abbreviations and acronyms

AAFEX	African Association of Exporting Companies
ADPME	Agency for the Development of Small and Medium-sized Enterprises, Senegal
AFTER	African Food Tradition Revisited by Research
Ar	
ASN	Senegalese Standards Association
ASEPEX	Senegalese Export Promotion Agency
°C	Degrees Centigrade
CERSAE	Centre de Ressources Scientifiques pour l'Agriculture et l'Environnement, Madagascar
CFA	
DP	Direction des Pêches, Benin
FCFA	
FENATRIMS	National Federation of Women Fish Processors and Fishmongers of Senegal
g	Grams
h	Hour
kg	Kilograms
LPS-PA	Fisheries and Aquaculture Sector Policy Letter, Senegal
ODLU	Optimal Date Limited Use
SME	Small and Medium Enterprise
STRADEX	Senegal's Export Development and Promotion Strategy
SWOT	Strengths, Weaknesses, Opportunities and Threats
UEMOA	Union Economique et Monétaire Ouest Africaine
VCA	Value Chain Analysis

Annex 2: List of interviews conducted

Kitoza

Mr RAZAFIMAHAFALY Seraphin responsible of norm certification in the BNM
(tel 22 279 70)

Doctor ANDRIAMAINTY Fils chief doctor in the DSV

Mr RAOBELINA Armand Joseph the chief planner of the exportation department
(tel: 033 14 036 18 and e-mail: araobelina@yahoo.fr)

Kong

ADPME : Agence de développement et d'encadrement des Petites et Moyennes
Entreprises. 9, Fenêtre Mermoz, Avenue Cheikh Anta Diop
BP 333 Dakar Fann – Senegal. Tel : +221 869 70 71 - Fax : +221 860 13 63
<http://www.adepme.sn>

ANDS : Agence Nationale de la Statistique et de la Démographie

Rue de St Louis x Rue de Diourbel –

Point E BP 116 Dakar RP - Sénégal

Tél : (221) 33 869 21 39- Fax (221) 33 824 36 15

Email: statsenegal@ansd.sn ; statsenegal@yahoo.fr

ASEPEX : Agence sénégalaise de promotion des exportations

Sicap Amitié 3, n°4426 BP 14709 Dakar Peytavin

Tel : +(221) 33 869 20 21 Fax : +(221) 33 869 20 22

Email : asepex@asepex.sn

<http://www.asepex.sn>

ASN : Association Sénégalaise de Normalisation

21, lotissement front de terre, BP 4037 Dakar

Tél. : 33 827 64 01, Fax : 33 827 64 12

Email: asnor@orange.sn

DPM : Direction des Pêches maritimes : division pêche artisanale

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Poste de contrôle des produits halieutiques Aéroport de dakar

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Annex 3: List of value chain workshop participants

Kitoza

N°	NAME	Institution/Quality
1	AH-LONE ESTEL	Producer/Trader
2	RAZAKARIASA Marka	Producer/Trader
3	RAKOTOMBELO Mamy Jean Christophe	Producer/Trader
4	RAFENOMANANTSOA Hasina	Trader
5	TINAHY Fanomezantsoa Jaona	Ministry of public health representative
6	RAOBELINA Holy	National Office of Nutrition representative
7	ANDRIAMAINTY Fils Bienvenu	Responsible at Veterinary Service Direction/Ministry of Livestock
8	ANDRIANANTENAINA Bruno	Dean of Faculty of Sciences/UT
9	RAKOTO Danielle A. Doll	Head of Department of Fundamental and Applied Biochemistry/UT Scientific and technic responsible of After/UT
10	JEANNODA Victor	Teacher-Researcher in Department of Fundamental and Applied Biochemistry/UT LEAR of After/UT
11	RAZANAMPARANY Louisette	Teacher-Researcher in Department of Fundamental and Applied Biochemistry/UT Researcher in After/UT
12	RAHERIMANDIMBY Marson	Teacher-Researcher in Department of Fundamental and Applied Biochemistry/UT
13	RANDRIANIERENANA Ando	Teacher-Researcher in Department of Fundamental and Applied Biochemistry/UT
14	TSIRINIRINDRAVO Herisetra Lalaina	Teacher-Researcher in Department of Fundamental and Applied Biochemistry/UT
15	RAZAFINDRATOVO Valérie	Teacher-Researcher in Department of

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		Fundamental and Applied Biochemistry/UT
16	RAMAROSON Roseline	Teacher-Researcher in Department of Fundamental and Applied Biochemistry/UT
17	RABAKONANDRIANINA Elisabeth	Teacher-Researcher in Department of Vegetal Biology and Ecology/UT
18	RAJAKARIVONY Zo Lalaina	Student in Master of Economy
19	RAZAFIMAHATRATRA Jean-Yves	Student in Master of Economy

Annex 4: Brief survey of Kong consumers (women)

Question		Answers
Name		
Years old		
Dans quels mets utilisez-vous le kong fumé ?		
Utilisez-vous aussi le kong frais pour d'autres mets?		
Connaissez-vous de nos jours de nouvelles utilisations du kong fumé? Citez-les		
La conservation du kong fumé pose des problèmes autant chez le vendeur que le consommateur. Etes-vous prête à l'acheter sous la forme suivante : en emballage unique et réfrigéré? (circuit des produits frais)	1)	Non
	2) au même coût	Oui
	3) voir plus cher	Oui

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