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Cartography of Pineapple Chains Values in Benin: A Miss Exploited Opportunity for Regional Integration

C. F. Biaou[1*], B. D. Yabi[2], V. J. Mama[3], G. Biaou[2], D. Acclassato[1], E. Agbossou[2] and D. J. Hounhouigan[2]

[1]Faculty of Economics and Management Sciences, University of Abomey-Calavi, Benin.
[2]Faculty of Agronomic Sciences, University of Abomey-Calavi, Benin.
[3]Institut National des Recherches Agricoles du Bénin (INRAB), Benin.

Authors' contributions

This work was carried out in collaboration between all authors. Author CFB designed the study, wrote the protocol and supervised the work. Author BDY collected and participated to the statistical analysis. Authors VJM and GB managed the analyses of the study. Author DA performed statistical analysis. Authors EA and DJH managed the literature searches and edited the manuscript. All authors read and approved the final manuscript.

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ABSTRACT

To cope with the high decrease of the cotton price on the international markets, the Government of Benin has emphasized the promotion of other crops like pineapple. To increase the competitiveness of this promising commodity and its links with other value chains, a study on value chain analysis was carried out to map out the different actors, their relationships, to put out the best chains and the factors influencing the availability of this commodity on some local markets. A methodological approach based on added values chains (AVC) analysis and on chains cartography is used. From a random sampling based on actor categories, 365 producers, 40 traders, 25 processors and 5 transporters were selected. From this study, seven (07) chain values animated by

**Corresponding author: E-mail: felchabiaou@gmail.com, felchabiaou2012@yahoo.fr;*

several unorganized actors in a competitive environment have been identified. The main chains of this commodity are fresh pineapple chain and juice processed. Fruit exportation is mainly directed to Nigeria (70% of the total pineapple produced) and to UE countries (5%). On the other hand, about 85 percent of juice produced is exported to hinterland African countries (Burkina, Mali, Niger, Morocco and Senegal). According to the recent development of the value chain network, pineapple appears as an important element of regional integration. Innovative policies should be provided to break down or to reduce the barriers that hamper the promotion of this commodity.

Keywords: Pineapple; value chain analysis; regional integration; policy exports.

1. INTRODUCTION

Pineapple is one of the most promising crops in Benin especially. This commodity was promoted in 2010, when cotton production could no longer be supportive to the economy of the country. The objective of this initiative was to substantially increase the production of pineapple in quality and to improve the implementation of the fresh fruit market and its derivatives. Like many other commodities, pineapple is characterized by high price fluctuations [1]. To overcome this situation, the challenge for the Ministry of Agriculture in Benin was to find out ways and opportunities to get control of the various marketing chains of this promising commodity. This control involves identifying the stakeholders and accessing the quantity of pineapple produced, processed and sold. Therefore, a value chain analysis is needed to map out the different actors, their relationships [2], the choice of best chains and the factors influencing the availability of this commodity on the markets.

Arinloyé [3] showed that farmers chose the best chain in exporting commodities. In fact, the best chains are considered to provide large added values which will be relatively equally distributed among actors. As explained by [4,5] in a value chain, most of activities are linked. At each step of the process, the product gains value from the previous activities. [4,2] distinguish different types of relationships established among actors. They include *inter alia*, relations between activities, relations between enterprises/actors, relations between enterprises and their buyers and suppliers. In total, a crop chain analysis explicitly takes into account the interdependence between buyers and suppliers in addition to the distribution of the added value among actors [6,7].

Many studies conducted on pineapple value chain in Benin focused on the chain profitability. Most of them recognized that value chains of pineapple produced in Benin are financially and economically viable and the best profitable chain is fresh pineapple export to Europe [3,8]. [9], after identifying 8 sub crop chains for pineapple produced in Benin compared the pineapple internal resource costs (IRC) to other crops such as cotton, maize, rice and cashew. It came out from their studies that pineapple production for exportation offers better way of profitability for more resource allocation. The main deficiencies noted from these studies are that they didn't analyze deeply the actor structures, the competitiveness and the links between different value chains. In addition, the added value distribution inside each value chain and the pineapple flow on different markets were superficially documented. To overcome these insufficiencies and promote the pineapple commodity at national, regional and international wide, this study strives to map several pineapple chain values and to exam the improvement possibilities of these chains identified.

2. MATERIALS AND METHODS

2.1 Data Collection Organization

This study was conducted in the 3 most pineapple producer Departments of the south Benin: Atlantic, Littoral and Oueme. A random survey was carried out on the 4 different actors categories identified. These actors included farmers, processors, traders and transporters. From above, 365 producer households, 40 traders of whom 4 exporters, 25 processors and 5 transporters, were randomly selected.

2.2 Data Collected

- Data used to characterize these value chains include:

  (i) Actors: age, gender and level of education;
  (ii) Commodity: pineapple quantity production, quantity consumed, processed and commercialized over different destinations;

(iii) Destination: Nigeria, Europe, hinterland countries;
(iv) Pineapple price per kg are determined on several markets of the country.

In total, data collected included the farm size, the pineapple quantity harvested, processed and sold, the selling market location, the transportation means used, each actor age and sex, education level of each actor, experiences of each actor, the transaction modalities (cash, credit, units, price). In addition to these data, products flows are measured in order to account the product quantity per chain and sub chain.

2.3 Data Analysis Tools

Various tools were used to analyze the data collected. The first data allow us to characterize the actors according to their activities in the value chains. The product flow among actors allow mapping its circuit and to differentiate the chains. From the product quantity processed into juice or dried, commercialized fresh, consumed and exported, we determine its share consumed fresh, exported, processed, etc. The quantity exported to EU is compared to those driven to Nigeria and to hinterland countries. The quantity of the juice sold locally is also compared with those destined to the hinterland countries (Mali, Niger, Burkina) and to Morocco and Senegal.

3. RESULTS AND DISCUSSION

3.1 Pineapple Market Structure in Benin

3.1.1 Socio-demographic characteristics of pineapple actors

3.1.1.1 Producer

It was observed that all pineapple producers recorded from the study area produce pineapple in addition to other staple crops such as maize and cassava. The analysis of pineapple farm size shows that no household under 30 years holds farm over than 10 ha (Table 1). On the other hand, no woman owns more than 5 ha farm land. It was also observed that 64.48% of households own pineapple farms with size at least equal to 2ha. In the same vein, only 1.63% of these households have farm size more than 10ha.With consideration to gender, the average of pineapple farm size per men and women households respectively are 2.48 ha and 1.06 ha (Table 2). According to education, these averages vary enormously from one level to another as show the standard deviations. This table indicates also that the average of pineapple shares in a farm size is less than 50% for female and those who have a secondary 1st level of education. These small land holdings reflect not only the pressure on land but also the rudimentary of the work plowing equipment and materials [10,11] Therefore, more than 90 % of pineapple producers are men, although some activities like processing are undertaken by women. It is also noted that pineapple plantation sizes occupy a great part of farm size.

3.1.1.2 Traders and exporters

More than 64% of traders are women with an average of 6 years of working experience. On the opposite, most of men are wholesalers or exporters with an average of 9 years of experience. The retailers are all women with low financial capacity. In terms of education, 30.6% of retailers including 45.5% women access primary school, 5.6% with 50% female start secondary school. This confirms the results of studies conducted in the south of Benin by [12,13].

Table 1. Householder distribution according to gender, pineapple plantation size and age (%)

Gender	Age	Less than 1 ha	[1 2]	[2 5]	[5 10]	10 ha and over	Total
Men	Less than 30 years	3,85 (9)	2,99 (7)	1,71 (4)	0,00	0,00	8,55 (20)
	[30 60]	26,50 (62)	26,92 (63)	24,36 (57)	7,26 (17)	1,28 (3)	86,32 (202)
	60 years and over	1,28 (3)	1,28 (3)	1,7 (4)	0,43 (1)	0,43 (1)	5,13 (12)
	Total	31,62 (74)	31,20 (73)	27,78 (65)	7,69 (18)	1,71 (4)	100 (234)
Women	[30 60]	45,45 (5)	54,55 (6)	0,00	0,00	0,00	100 (11)
Together	Less than 30 years	3,67 (9)	2,86 (7)	1,63 (4)	0,00	0,00	8,16 (20)
	[30 60]	27,35 (67)	28,16 (69)	23,27 (57)	6,94 (17)	1,22 (3)	86,94 (213)
	60 years and over	1,22 (3)	1,22 (3)	1,63 (4)	0,41 (1)	0,41 (1)	4,90 (12)
	Total	32,24 (79)	32,24 (79)	26,53 (65)	7,35 (18)	1,63 (4)	100 (245)

( ) number; Source: Data survey, 2013

Table 2. Averages of the Pineapple farm sizes and its share in the exploitation according to the instruction level and the gender

Criterions	Modalities	Pineapple farm size (ha)	Pineapple farm proportion in the exploitation (%)
Instruction level	No level	1.924 (2,583)	59.972 (25,69)
	Primary	2.866 (5,902)	58.765 (36,057)
	Secondary 1st cycle	1.875 (1,607)	46.519 (29,888)
	Secondary 2nd cycle	2.446 (2,226)	57.261 (31,742)
	Upper	2.347 (2,069)	52.958 (28,876)
	F	1.217	2.714**
Gender	Male	2.245 (3.636)	57.34 (30.03)
	Female	0.761 (0.388)	44.047 (28.363)
	F	2.491	2.828*
Total		2.184 (3.573)	56,785 (30.42)

( ) Standard deviation; Source: Survey data, 2013

To meet their customers' demands, exporters supplement the volumes of their exportation with those of small producers. The quantity of fresh pineapple exported represents3.5% to 6.2% of the total production of this commodity in Benin. Unlike [14] statement, all pineapple varieties produced in Benin are exportable. More specifically, two varieties are more commercialized: Smooth Cayenne and sugar loaf variety locally known as 'pain de sucre'. It is worth to note that Smooth Cayenne variety represents more than 70% of the exportation and the sugar loaf variety is gradually winning the UE market. This situation is due to the fact that Smooth cayenne variety is well appreciated abroad because of the yellow color of its fruit. In addition, because of its agronomic requirements, only very few well-trained farmers are able to produce large quantity of this Cayenne variety.

In general, all the pineapple exporters to Europe are also large farm size pineapple producers. In addition, most of them are private entrepreneurs with a very big financial capacity and a high education level. Some farmer organizations join their production to those of these private to export their products. Some well-known private are FRUITILOU, SATOLA and cooperatives ones are as follows: the Network of Pineapple Producers of Benin (REPAB), the Union of Farmers of southern Benin (UPS Benin).

3.1.1.3 Processors

Pineapple is a perishable product and different sizes of processing units are created every year. Some of them are well equipped and they vary from traditional small to medium scale units. 60% of owners of these factories are men. Processing activities are performed either individually or by a group of 12 to 15 people with at least 60% of women. The owners of these processing units benefit from an easy access to credit and to projects or NGOs supports. These associations allow credit recovery and best application of lessons learnt from training and other experiences.

In terms of education, 28% of the processors accessed primary level (with 42.9% of women), 44% have a secondary school level with 27.3% women. In the same vein 24% of these processors, have a higher level with 50% of women. Unlike producers and traders, most of processors have better level of education. In general most of them are either retired civil academic servants or entrepreneurs.

It is noted a high concentration in the installation of the processing units around Allada (36%) and Tori (24%) municipalities of Atlantic Department. The remaining of these processing units (40%)is widespread around Cotonou, Abomey-Calavi and Porto-Novo. Easy accessibility and high production of pineapple in Allada explain the concentration in the installation of processing units in this municipality. Pineapple juice is produced using semi-modern or traditional processors, which represent more than 90% of the total pineapple juice processors installed in the country. The juice produced is locally consumed. It accounts only for less than 10% of the volume of juice produced. In the opposite, modern and well-equipped processors produced 90% of juice for exportation.

Actually, a strategy developed by some modern processors and wholesalers consists at recruiting technicians to assist and follow producers (less than 3% of producers). This strategy consists either to create farmer cooperatives per municipality, or to sign contracts with farmers in order to collect from them the fruits. This strategy at first has the advantage to perpetuate by

encouraging the pineapple production. On the other hand, it will help to reduce the informal exchange with Nigeria, which is not sustainable.

3.1.1.4 Transporters

Transporters are young men with an average of 37 years and at least 5 years of experience and an education level that doesn't exceed primary school. They transport pineapple from fields to points of sale. The average load capacity is 2.5 tons. Means used to transport pineapple fruit from production area to places of sales include vehicles and trucks have capacities ranging between 8 and 25 tons [13]. The destination countries are mainly Nigeria and in some extent, Mali, Niger and Burkina Faso. For the hinterland countries, drivers used to take advantage of their trips to Benin by loading about one ton or more of fruit over their tanks.

3.1.1.5 Consumers

Fresh pineapple is consumed mainly in cities and very few in the production zones. All socio-professional categories consume fresh pineapple. This is facilitated by an important number of micro retail markets within Cotonou and in its surrounding cities. These retailers sell pineapple by unit. They peel it and cut it in small pieces after they are agreed with the customer. These retailers are met in the markets, at the crossroads, and in public places (school, health center and university of the municipalities of Cotonou, Porto-Novo).This study confirms [15] who stated that fresh pineapple in Benin is consumed mainly in towns and within its production area.

3.2 Pineapple Chain Cartography and Value Chain Identification

To provide a good understanding of pineapple value chains, actor distribution functions, product distributions and the services associated at different levels, a distribution flow of pineapple production is developed as indicated in Fig. 1. This figure shows that no actor stock pineapple because of its perishability. In addition, it highlights the three groups of producers identified, which include: producers without assistance (more than 90%), producers followed by public institutions (project, government structure) (2% to 5%) and producers assisted by transformers, NGO and exporters (at least 3%).The input supply is normally ensured by public structure but more than 80% of these inputs are bought from informal private sector, due to the miss functioning of the famer organizations.

To deal with pineapple, traders identify three groups of fruits as follows: selected fruits (10 to 15%), rejected fruits (60 to 75%) and no controlled ones (15 to 25%) directly sold in the markets. These fruits are sold, processed and consumed locally or exported.

Almost 80% of the selected fruits are exported to UE. These represent a maximum of 5% of the fresh pineapple national production. In total, the records reveal that more than 70% of the pineapples produced are exported to Nigeria and 5.2% to the hinterland countries. The rest of the fruits (about 20%) is locally consumed fresh. There are different chains as shown in Fig. 1. Some are more or less long and the shortest chain is from producer to consumer. From figure 2, 7 value chains can be defined:

- The fresh pineapple Value Chain for local markets;
- The fresh pineapple Value Chain for regional markets;
- The fresh pineapple Value Chain for European markets;
- The pineapple juice Value Chain for local markets;
- The pineapple juice Value Chain for regional markets;
- The dried pineapple Value Chain for European markets.
- The pineapple seed Value Chain for production.

3.3 Analysis of Different Values Chains

The seven value chains identified from mapping are examined to better assess the bottlenecks that hamper their functioning.

3.3.1 The chain value of fresh pineapple for local markets

The national pineapple flux is divided in two axes: the south and the north axis. The south axis is mainly in Atlantic and Oueme departments where great towns exist. These towns are daily supplied with pineapple fruit from production areas. The retailers in urban centers (Cotonou, Porto-Novo, Abomey-Calavi and Sèmè) receive fruits from different ways (Fig. 3). These actors don't have business registration and work in informal sector.

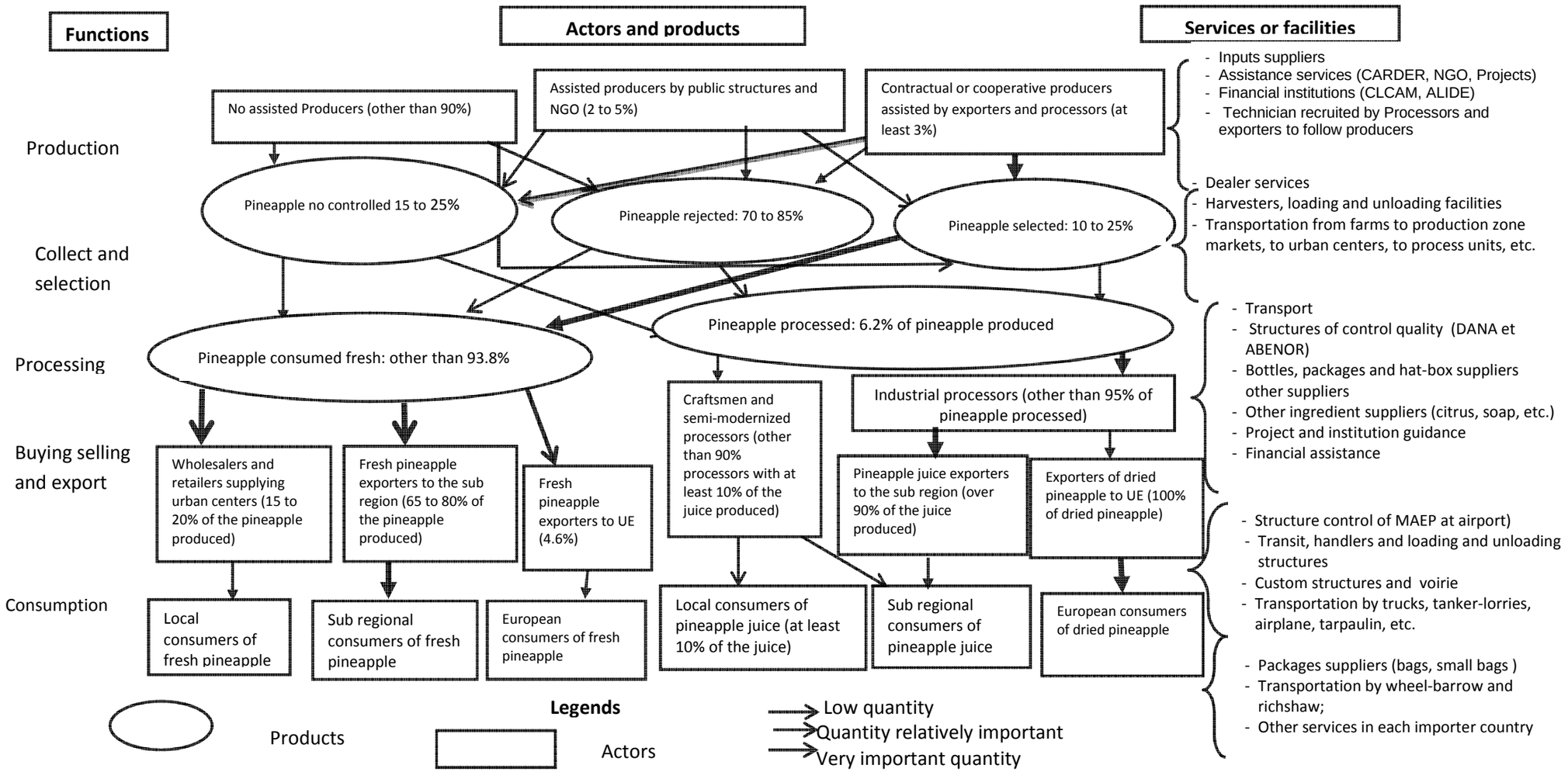

Fig. 1. Distribution flow of Benin pineapple production

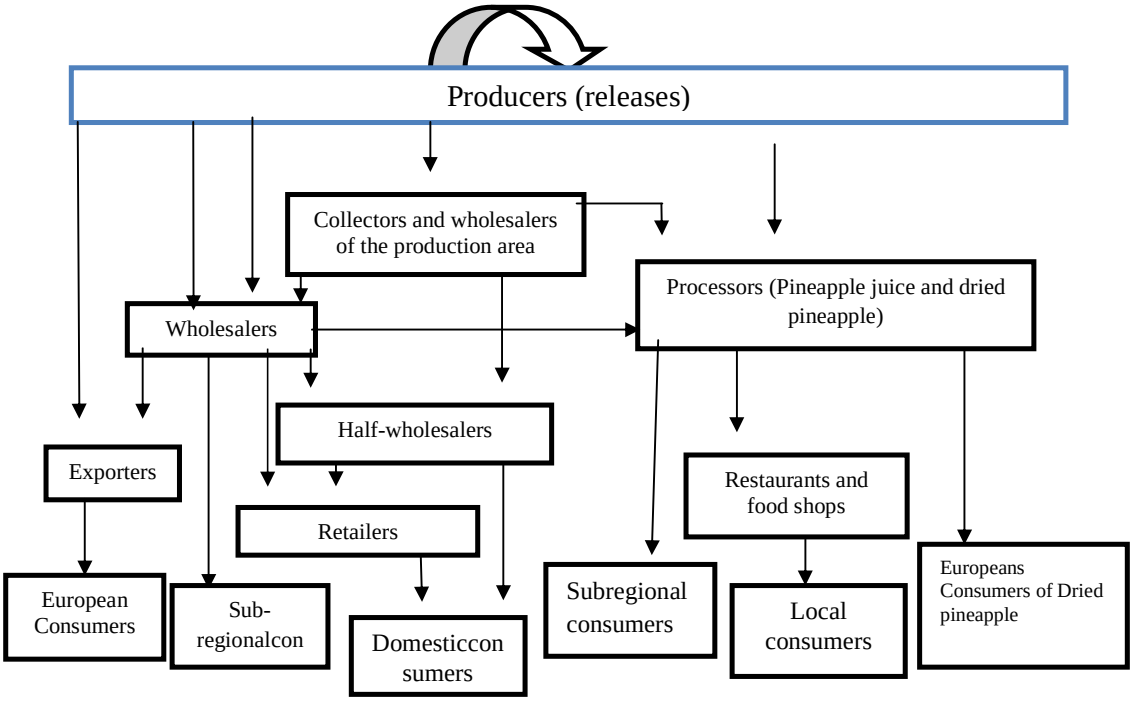

Fig. 2. Cartography of Benin pineapple chains

The north axis is subdivided into two sub axes. The sub axis of Bohicon Parakou and Malanville is regularly supplied with pineapple by national wholesalers, some fuel tankers in transit to hinterland countries. In contrary, in the sub axis of Savalou, Bassila Djougou Natitingou, very few pineapple quantities are accidentally recorded when fuel tankers Lorries that carry fruits are on the way to Burkina and Mali. This result confirms that distance can influence the chain chosen [3,7,15]. In addition, policy worries constitute the great risk for pineapple commercialization inside the country. The other constraints of this value chain are the unused of standard units of weights, the lack of farmer well-structured organizations, the fruit selection system developed at different levels and the lack of transportation means.

3.3.2 The value chain of fresh pineapple on the regional market

These flows concern Nigeria and the hinterland countries. As shown in Fig. 4, wholesalers who collect pineapple fruits directly from producers spread the exported pineapple within the sub-region. These wholesalers invest in means of transportation. It is a vertical integration, which reduces transaction costs, increases the profit, reduces the risk of losing time and allows honoring customer commitments. First, trucks that can carry up to 8 and 25 tons gradually replace these cars, small tarpaulin 404 or 504 cars. This increases their ability to purchase more fruit. Ignorant of the rules governing international trade, these informal exporters will have to pay 10,000 to 25,000 FCFA according to the loading when to cross the border.

The value chain to Nigeria was developed as to compensate the fact that European exporters reject most of fruits, which do not respect the norm. Producers came to sell the rejected fruits at the market of Cotonou, where they meet Nigerian. The chain became a reality since 2006 or 2007. From this period, producers supply their fruits to Nigerian wholesalers who used to pay cash. So progressively, this chain was created and became the greatest chain of the pineapple chains. This chain benefits mainly to transporters, and to brokers who inform the wholesalers on product availability.

3.3.3 The value chain of fresh pineapple to the European market

As shown in Fig. 5, the pineapple directed to European markets is collected from either directly from the producers and / or collectors or through brokers. Producers are informed a week

before to harvest in order to prepare the fruit to be well appreciated. In many cases, there is no format contract between the producers and the sellers. This can lead to situations where either the producer finds a better offer or the exporter doesn't come to harvest leaving the fruits perished. In some cases, the exporter was supplied with the products harvested and doesn't pay in totality. It is important to note that this chain is supported by the Health Plant Service that certifies pineapple (MRLs, traceability ....) to export.

3.3.4 The value chain of the pineapple juice on the local market

Artisanal, semi-modern or modern processing units installed progressively every year within the region process pineapple fruit into juice. Pineapple producers deliver their fruits directly to processors or to wholesalers or collectors who sell it to processors (Fig. 6). For internal markets, these processors use to deliver their juice produced to urban restaurants or feast consumers. The local chain has significant supports of the Directorate of certification and inspection service of Food and Applied Nutrition (DANA) or the Beninese Agency for Standardization (ABeNOR) and other support structures which assist technically and/or financially like the Project Supports Rural Economic Growth (PACER), IFAD Intervention Program in Rural in Benin (PROCAR) and organizations such the REPAB, and the Federation of pineapple transformers Networks of Benin (FRETAB).

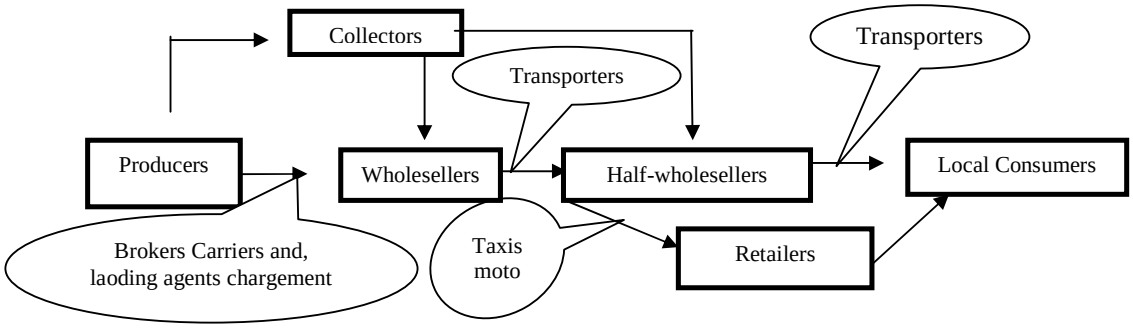

Fig. 3. Cartography of the value chain of fresh pineapple for local markets

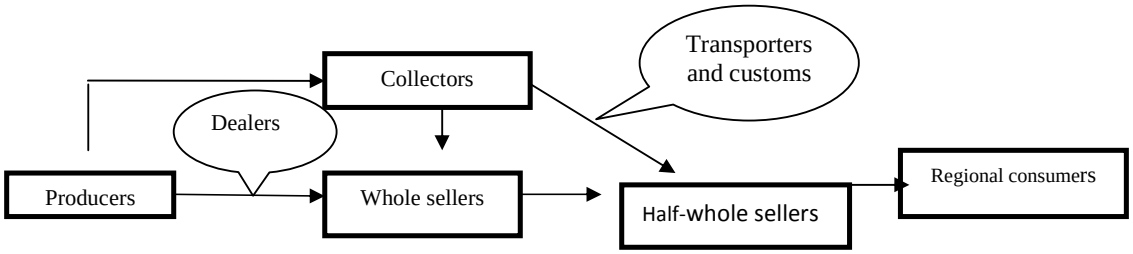

Fig. 4. Cartography of the value chain of fresh pineapple for regional markets

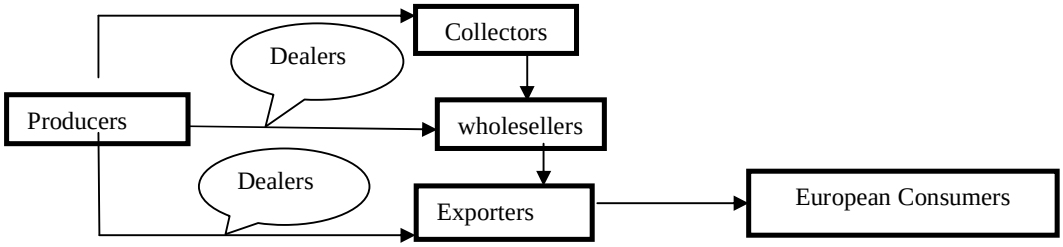

Fig. 5. Cartography of the value chain of fresh pineapple for European markets

3.3.5 The chain value of the pineapple juice on the regional market

The regional juice market is structured like the previous chain value. Juice producers receive fruits from different actors (Fig. 7). Some of these transformers are also producers and use their own pineapple. Juice production has been encouraged by the rapid pineapple gradation. Processors sell their juice in the major towns of importing countries. Only large processing pineapple regularly exports to Ghana, Senegal, Niger, Burkina Faso and to Morocco. Small units juice producers only enjoy regional fairs. Processors Team service and DANA and ABENOR also support this chain.

Like the first chain, the major constraints facing this juice chain are the lack of funding which limits the quality of packaging and the high level of certification cost that a high burden for most of the small enterprises.

3.3.6 Dried pineapple chain value for European markets

The dried pineapple value chain for European markets is driven by very few (2 to 3) stakeholders (Fig. 8). The producers processed using their own pineapple production. They supply the European capital markets by exporting their juice without other intermediaries. The major constraint in this chain, like most of the other ones is the high cost of energy, lack of packaging, financing and specialized labor.

3.3.7 Pineapple chain value network in Benin, in the sub-region and toward Europe

As it shown in Fig. 9, 70.14% of pineapple produced in Benin is exported to Nigeria. This is followed by domestic consumption (20.15% to whom Cotonou only consumes 10.55%; 7.12% at production area and 2.43% at Porto-Novo and within the borders of the country). From 7.12% consumed at production area, 6.2% are processed into juice and dried pineapple. So 93.8% is consumed as fresh pineapple (exported or not). This distribution of pineapple partners shows that Nigeria is the main one. Fresh pineapple exports to hinterland countries (5.2%) and to UE (4.46%) are very inferior to those exported to Nigeria. Because of the vicinity of this partner to Benin it is an advantage for Benin to increase its pineapple processing by facilitating credit, subvention, training and other facilities and to encourage the pineapple exports to other countries.

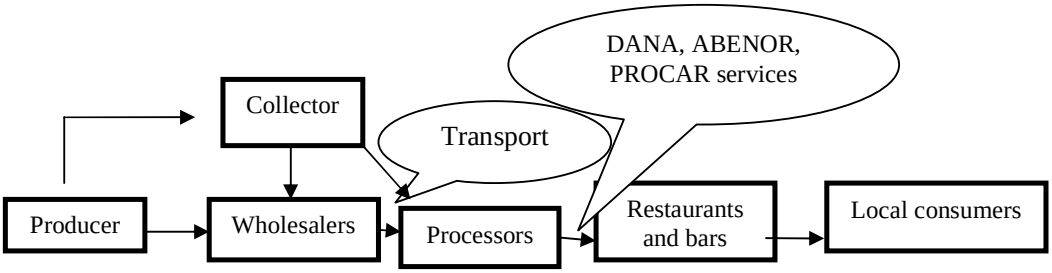

Fig. 6. Cartography of the value chain of pineapple juice for local market

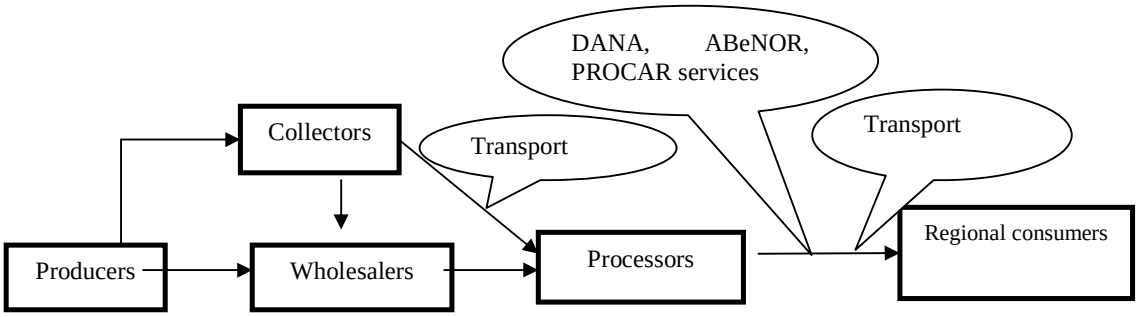

Fig. 7. Cartography of the value chain of pineapple juice for regional market

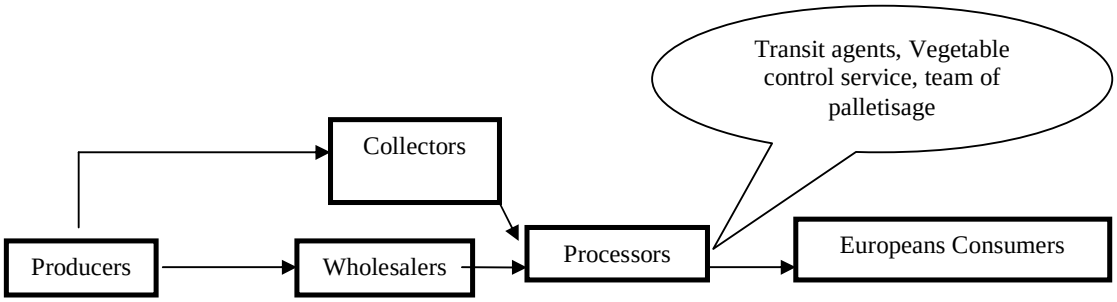

Fig. 8. Cartography of the value chain of dried pineapple chain for European markets

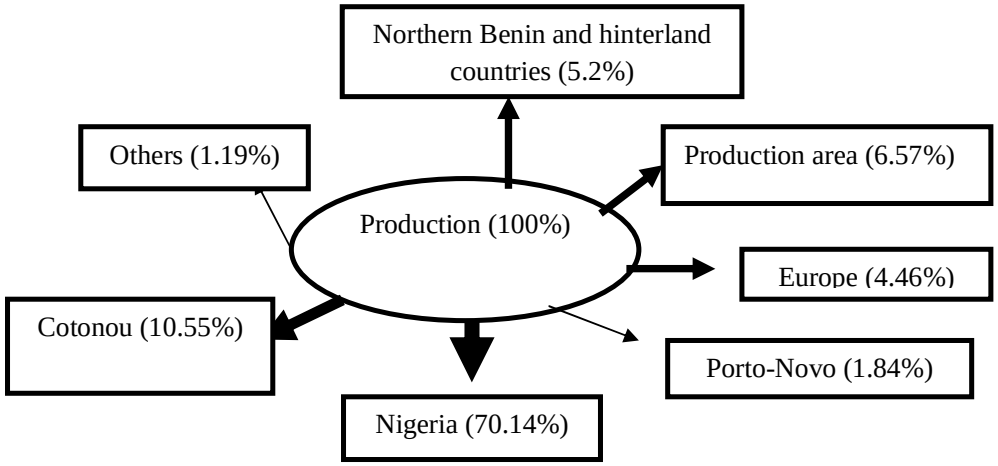

Fig. 9. Flow distribution of Benin pineapple towards the world

In total, these results show that almost 80% of Benin pineapple is exported to Nigeria and to hinterland countries. From above, it could be concluded that pineapple is among the commodities that facilitate best regional integration by increasing exchanges between Benin and its neighbors. But no liable statistical data exists to support the volume of these exchanges. On the other hand, about 85 percent of juice produced is exported to hinterland countries, Morocco and Senegal. These exports are very important and need to be registered by organizing actors (producers, wholesalers, carriers) and by reorienting customs activities in facilitating and registering them. The pineapple flow analysis shows numerous opportunities for the country and need actor organizations to take advantages of these opportunities [16].

4. CONCLUSION

The large adoption by pineapple exporters of sugar loaf variety well appreciated by Nigerian markets, and the short distance from production zone to reach Nigerian borders explain the shift to export this variety of pineapple from Europe to Nigeria. The pineapple commodity, with its seven value chains, suffers from insufficiencies that hampered its value chains performance. The most important insufficiencies identified are as follows: (i) lack of technical assistance to producer, (ii) lacks of actor financial supports and credits, (iii) farmers and producer organizations not well functional, and on top the previous, (iv) lack of proper value chain policy to increase production and exportation. Efforts should be continue to be provided to encourage more processing pineapple, to reduce control costs and to create more employment and added value.

With regard to the Pineapple value chain network, it appears that this commodity is an important element of regional integration and efforts have to break down or to reduce the barriers that hamper the promotion of this commodity, despite the various agreements developed by ECOWAS and UEMOA. In this vein, more economic analysis is needed to provide knowledge that will shade light and help to promote this commodity.

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COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Loeillet Denis. Le marché mondial de l'ananas frais in FRuitrop. 2015;236: 32-41.
2. Cantin L. L'approche chaîne de valeur: Une nouvelle façon de générer de la valeur et des profits. 2005;74.
3. Arinloyé AADD. Governance, marketing and innovations in Beninese pineapple supply chains: A survey of smallholder farmers in south Benin. Thesis submitted in fulfilment of the requirements for the degree of doctor at Wageningen University. 2013;194.
4. Porter M. Choix stratégiques et concurrence. Economica. Paris. 1982;426.
5. Krugman P. Growing world trade: Causes and consequences. Brookings Papers on Economic Activity. 1995;1:327–362.
6. Rich KM, Ross RB, Baker AD, Negassa A. Quantifying value chain analysis in the context of livestock systems in developing countries. Food Policy. 2011;36:214-222.
7. Obi A, Pote P, Chianu J. Market access: Components, interactions and implications in smallholder agriculture in the former homeland area of South Africa. Innovations as Key to the Green Revolution in Africa. 2011;1161-1167.
8. Sohinto D. On analysis of the economic profitability of the pineapple added value chain in Benin. Consultation Report. 2008;76.
9. Afomassè D, Arouna A. Competitiveness analysis of the pineapple crop chains. Program for Agricultural Policy Analysis (PAPA). Final Report; Cotonou. 2008;27.
10. Biaou G. Land tenure in the Atlantic department: Operation, land and litigation market. Economics and Rural Sociology Series No. 4; December. 1994;31.
11. Biaou CF. Economic analysis of possibilities for production of the firewood in the peasant farming system of southern Benin. Thesis of 3rd cycle CIRES / Abidjan. 1995;219.
12. Assogba-Komlan F. The production and commercialization of traditional vegetables. In Achigan E, Pasquini M, Assogba Komlan F, Ndanikou S, Dansi A, Ambrose-Oji B. Traditional vegetables in Benin: diversity, distribution, ecology, agronomy, utilization. Cotonou ed Imprimerie LSSEE/ INRAB/Bénin. 2010;80-85.
13. Ifon D, Aïdoté S. Efficiency of the pineapple marketing in southern Benin. Licentiatura, FASEG / UAC. 2013;57.
14. Agoundoté E. Strategy actors and distribution of added value produced in an emerging sector in Benin: The case of pineapple, Engineer Agronomist Thesis, UAC / FSA. 2007;140.
15. Gnimadi A. Study for the identification of priority industrial agro sectors (Benin). Report Restructuring Program and Upgrading of Industry of WAEMU Member States (NRP). UEMOA, UNIDO. 2008;118.
16. Schuh Edward G. Challenges to food production and security. In CASIN/ SAA/GLOBAL 2000 "Food security in a changing Africa" Steven A Breth editor. Centre for Applied Studies in International Negotiations. 2002;33-37.

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