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THE EFFECTS OF PRODUCE PROPERTIES ON THE ORGANIZATION OF VEGETABLE COMMODITY SYSTEMS SUPPLYING SELECTED AFRICAN CITIES

Revised version of paper presented for CIRAD/CDR workshop "the coordination of African-based Agro-Commodity Chains". Copenhagen, 17-19 December 2000

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Summary

In order to supply a growing urban demand for vegetables in Africa, the efficiency of local market organization is commonly debated by decision-makers and market specialists. The paper examines the organization of vegetable commodity systems supplying cities of West and Central Africa and its relation to produce properties. The hypothesis of longer marketing chains and decreased patterns of integration with lower perishability and instability of supply and demand is tested, based on the comparison of leafy-vegetables and onion markets. The research is based on surveys on the individual and collective strategies of different stakeholders from production to consumption stages in Congo, Cameroon, Ivory Coast, Guinea Bissau, Madagascar, Guinea Conakry, Senegal. The paper concludes that the relevance of commodity-specific characteristics needs to be qualified by taking into account other factors including access to credit at all the levels of marketing chains and the difficulties in enforcing contractual arrangements. Attempts to change the present organization of vegetable markets should take account of their identified rationale.

Key-words : market, food supply, vegetables, organization, Africa

The effect of produce properties on the organization of vegetable commodity systems supplying selected African cities

I. Introduction

The paper is concerned with the organization of vegetable commodity systems in French-speaking African countries. The paper is focused on vegetable *filières* supplying the domestic market, which represents most of traded vegetable production in those regions[1]. Even in countries like Senegal which is the third vegetable exporter in Africa, exports were estimated at 5000 tons in 1995 while local production amounted to 150 000 tons, 45% of which was marketed to Dakar (Mbaye and Moustier, 2000). In Africa, more than half of the population is living in cities of more than 100 000 inhabitants which represent the bulk of the market for foodstuff, with the biggest city commonly exceeding one million inhabitants (OCDE/BAD/CILSS, 1994).

In Africa, researchers and policy-makers have often characterized local trade systems by its complexity, lack of organization, and anarchy. These characteristics are supposed to lead to a number of deficiencies, including depressed revenues both for producers and urban consumers, and lack of competitiveness relative to food imports (see for instance Vennetier, 1972). Yet the public attempts of organization of the food sector have proven little successful (Guyer, 1987). Hence the need to better identify the present organization patterns and rationale in African food channels.

In the paper organization is considered to encompass three main dimensions:

- Space organization: how the produce circulates between locus of production and consumption, what is the level of concentration versus scattering of supply and demand, in the tradition of French geographical insights on African food marketing (see for instance Chaléard, 1996).

- Functional organization: the different stages between production and consumption of the produce, which correspond to changes in place, time, form and/or property of the produce (Timmer, Falcon and Pearson, 1983).

- Socio-economic organization: the social and economic relationships between the economic agents participating in the produce supply and demand. These refer to:

(i) Competition relationships: number of sellers and buyers, and their weight on the market; barriers to entry - which we term as the structure of the market, drawing from the structure, conduct and performance school (Bain, 1959; Jones, 1972). These variables influence bargaining powers of the market participants and consequently the distribution of income, incentives to increase supply and quality of the produce, and to diminish per unit costs.

(ii) Coordination relationships : Coordination refers to the intended confrontation of decisions and plans relative to the transaction (Ménard, 1990). Coordination is necessary between agents' behavior not only to transfer the produce and but also to transfer all the resources necessary for marketing, including capital and information.

To get access to those resources, a diversity of coordination forms may be more efficient in terms of costs and security of income than the sole anonymous market coordination in a situation of information and risk problems (see Hoff, Braverman and Stiglitz, 1993). Coordination involves agents who have the same function in the marketing chain, which may be termed as horizontal coordination, or complementary functions (vertical coordination).

According to some authors drawing on Williamson (e.g., Binswanger and Rosenzweig, Ward, 1997; Jaffee, 1995; Braadbaart, 1994), commodity-specific characteristics are at the core of differences in organizational forms. Commodity-specific characteristics include the internal characteristics of the produce, e.g. bulkiness, as well as the technological characteristics of the production process, e.g. impossibility of mechanizing the process. Space and functional organization is influenced by the perishability of the product, which influence the optimal location of the production area with respect to the market outlet (Huriot,1994). Commodity-specific characteristics influence the concentration of capital and expertise control along the production process, and hence, the structure of the market. They determine the level of transaction costs, which refer to search costs, and the costs of negotiating and

safeguarding an agreement. Transaction costs are the highest when transactions are characterized by high asset specificity, uncertainty and frequency. Jaffee has proposed the following relationship between the efficiency of types of marketing arrangements in decreasing transaction costs and characteristics of transactions (Table 1). The different produce properties bearing impact on market organization are summarized in Table 2.

Table 1 - Transaction characteristics and efficiency of forms of vertical coordination

	Spot market	Market reciprocity	Forward contract	Forward management and resource contract	Vertical integration
Asset specificity	+	++	+++	++++	+++++
Unstability of supply	+	++	+++	++++	+++++
Unstability of demand	+	++	+++	++++	+++++
Perishability	+	++	+++	++++	+++++
Length of production cycle	+	++	+++	++++	+++++
Quality heterogeneity	+	++	+++	++++	+++++

Source : Jaffee (1993)

Table 2 – The nature of produce properties impacting on market organization

Organizational level	Produce property
Spatial organization	Perishability
Functional organization	Perishability
Structure of the market	Economies of scale
Horizontal coordination	
Vertical coordination	Asset specificity Instability of supply and demand Perishability Length of production cycle Quality heterogeneity

Deriving from these insights, the paper aims at drawing a relationship between vegetable produce properties and observed patterns of organization in vegetable commodity chains supplying African cities. The paper is based on fieldwork on vegetable *filières* supplying the capital cities of Congo, Central African republic, Cameroon, Guinea Bissau, Guinea Conakry, Ivory Coast, Senegal and Madagascar. The fieldwork involved surveys on the individual and collective behavior of consumers, producers, marketing and other service enterprises, and the regular monitoring of some quantitative data, e.g. prices, costs and incomes at different stages and indicators of quantities traded.

The paper starts by pointing out important characteristics of vegetables produced in these countries: technical limits to the scale of production, seasonality and instability of supply, perishability. Then the main types of commodity systems are described, with space and functional organization of marketing chains being highlighted. Finally, a discussion on the structure of the market and forms of coordination is provided.

II. Important characteristics of the produce

II.1. Main vegetable production systems

The main types of vegetable production systems supplying African cities are outlined below, as they in part explain the characteristics of vegetable products.

1) Non specialized rural rainfed vegetable production, where local vegetables like bitter eggplants or okra are grown in association with staple foodstuff (cassava, plantain, yam, groundnuts), mostly grown for self-consumption with some sold surplus.

2) Specialized commercial irrigated rural vegetable production, which is typical cultivation system for tomato and onion (examples of location are West Cameroon for tomato, Madaoua area in Niger, North Cameroon and Northern Mali for onion)

Rural farmers draw the bulk of their food consumption from staple foodstuff cultivation - cereals, tubers and/or plantain, and the sale of vegetables - together with other crops - brings the cash necessary to buy additional food - e.g. fish - and other basic consumption goods. Rural vegetable production is usually carried out in the dry season.

3) Full time family-type specialized urban and peri-urban vegetable production

This production is usually the sole or main source of income for urban and peri-urban farmers, both male or female although female usually predominate. Farmers grow local and temperate vegetables, often in association, in order to combine different lengths of cycles and degree of production and marketing risks. The bulk of leaf-vegetables, e.g., amaranth, cabbage or lettuce, originate from urban and peri-urban areas

as they are highly perishable. Labor force is mostly family-type although some salaried workforce may be used for some specific tasks, e.g., weeding or watering.

4) Business-type peri-urban vegetable production

Urban businessmen, usually civil servants or immigrants, invest in intensive specialized temperate vegetable production, in association with other agricultural and non agricultural occupations, e.g., fruit, poultry, fish production. They invest in infrastructures, e.g., motorpumps or shelters, and attempt at mechanizing some operations, e.g., irrigation or land tillage. They rely on salaried labour force for most of the tasks. They may lack agricultural background and technical competence and often face marketing losses and the cases of failure are numerous.

II.2. Technical and economic limits to the scale of production

In all the types of production systems, the size of the vegetable field is generally limited :

- More than 90% of vegetable growers work on less than 1000 m^2 in Congo, Central African Republic, Guinea Bissau and Madagascar (Moustier, 1997).

- More than 90% of vegetable growers have plots between 2000 and 5000 m^2 in Niayes, the largest production area of Senegal (de Bon, Fayes and Pages, 1997).

This is explained by several factors. The larger the plot the more difficult it is to control pests and diseases. Some operations, e.g., land preparation, irrigation, pest treatments, can be mechanized, yet a lot of operations need to remain manual, e.g., harvesting and pest control. As production is labor-intensive and implies many specialized skills, recourse to salaried workers involves high supervision costs and is generally avoided apart from routine tasks, e.g., watering or weeding. Hence the amount of the available permanent family manpower can be a binding factor to output development. Availability of water and in a lesser extent fertilizing resources can constrain the possibly cultivated size of plot. As vegetables are high-added value crops, the business can be profitable on plots less than half an hectare where other crops would not yield sufficient income for a household reproduction. In urban and peri-urban areas, the size of plots is further constrained by the high opportunity cost of land (Moustier and Pages, 1997). Another

constraint to increased investment and output development is instability of demand (see II.4). Urban entrepreneurial farmers exemplify the technical and economic limits to scale in a situation of strong instability of demand for temperate vegetables in Africa.

II.3. Seasonality and instability of supply

Vegetable production is characterized by a strong seasonality, as well as irregular supply variations inside a given season. This is mainly determined by the climatic conditions, especially in developing countries where production is very sensitive to water shortages and excess. Production constraints result from the combination of climatic conditions, characteristics of soils and phytopathology. Out of the season, i.e., between three and six months a year, both output and quality are substantially reduced. Production instability creates availability problems and price rises which may constrain consumers' demand and create incentives to resort on imports. It generates uncertainty about the state of supply and demand for the agents of the commodity system, all the more than production is often characterized by its atomicity.

II.4. Instability of demand

Demand is generally much less seasonal than production. In the tropics where the main difference between the seasons is not temperature but hygrometry, demand is less determined by climatic conditions than in temperate countries where it is preferred to eat tomato salads in the summer and potatoes and cabbage in the winter. Yet demand is characterized by instability, which varies according to the nature of vegetables as they display varying levels of income elasticity. Some vegetables can be termed as basic as they are part of most of the prepared dishes, and the frequency of their consumption is higher than three times a week: onions and ordinary tomatoes participate in this category, as well as leaf-vegetables in Central Africa, Madagascar (e.g., amaranth, local sorrel, cassava leaves, potato leaves). Ordinary tomatoes refer to cherry tomatoes and olive-shaped tomatoes, which can be grown without much input use, and are used in relishes, by contrast with big round tomatoes which have to be grown under special conditions of input use, water and temperature control, and are mostly consumed in salads. The consumption of basic vegetables is little elastic with respect to income and price. The market for basic vegetables can be termed as little risky. The consumption of most vegetables of temperate origin, e.g., carrots or green beans, is more sensitive to income and price and consequently the market is more risky.

Purchasers of temperate vegetables usually belong to high-income categories, are mostly European or high civil servants. Wealthy urbanites are quite demanding in terms of physical aspect and packaging. The European population is usually quite fluctuating in terms of residence - moving off their main residence at holidays or in times of political troubles. The demand of African civil servants is also unstable because of salary cuts or payment delays.

II.5. Perishability and quality heterogeneity

The vegetables are characterized by a strong perishability because of the physiological evolution of the produce still going on during the postharvest stage. The tropical temperature strengthens the perishability and fragility of the vegetable by its impact on the production process and on the postharvest evolution. Once harvested, the length of conservation at the open air without degradation is less than two days for leaf-vegetables, less than four days for mature tomatoes. Sometimes processing and drying can be conceived as a solution to the storage issue, but most of the vegetables are consumed fresh. A major exception is onion which can easily be dried and kept at least three months without degradation, and canned tomatoes the conservation of which is more than one year. Cooling at low positive temperatures prolongs the postharvest life. But the high financial and organizational costs of cold storage often results in its being not adopted. Besides most of the vegetables cannot be stored for a long time, not more than few days. Because of the fragility of vegetables, packaging is crucial as a way to protect the produce during postharvest handling and dividing it in more manageable units. Most of the postharvest handling operations have to be by hand.

Perishability generates quality heterogeneity of the harvested produce when not sold immediately.

Perishability strengthens risk and information problems generated by time variations of production, as regards quantity and quality of the produce. It makes the availability and cost of transport and storage relative to the price consumers are ready to pay crucial elements in the location of supply area, and consequently creates some protection relative to long-distance imports.

II.6. Other product characteristics

Vegetables are characterized by short production cycles; the shortest for leafy-vegetables (less than one month), and the longest for temperate vegetables (for example, three months for tomato).

Asset specificity is limited because the use of vegetables is quite homogeneous among African consumers. As regards tomato used in processing units, the specifications are few.

II.7. Summary

Table 3 summarizes produce properties of two types of vegetable with contrasted supply and demand characteristics, leafy-vegetables and onion.

Table 3 - Specific characteristics of domestically traded vegetables

	Leafy-vegetables	Onion
Perishability	Very High Conservation length ≅ 1 day	Medium to low Conservation length ≅ 3 months for dried onion; > 1 year for canned tomato
Limits to scale and economies of scale	Technical limits to scale (labor supervision) Limits to scale in terms of outlets (low and variable purchasing power) Limits to scale at retailing stage (lack of consumer access to fridges and cars))	
	Grown in land-constrained plots (urban/peri-urban)	Economies of scale on storage and processing
Instability of supply	High because of climatic conditions (water shortages and excess); fragmented supply 3-6 months of deficits	
Instability of demand	Low (low income elasticity)	Medium
Length of cycle	Short (<1 month)	Medium (3-5 months)
Asset specificity	Low (homogeneous uses)	
Quality heterogeneity	High because of product perishability	Medium because of product perishability

II.7. Expected consequences on commodity chain organization

Given the technical and economic limits to scale, the structure of the market is expected to be competitive. Oligopolies are yet expected to be the more frequent the less perishable the vegetables. The perishability of the product calls for short marketing chains, except for vegetables which can be stored like onion and canned tomato.

Given the produce characteristics, and using Jaffee framework, the expected coordination forms lay in between market reciprocity and forward contracting (see Tables 4 and 5). It is expected that there should be more recourse to contracting for the more perishable vegetables, with high instability of supply and short length of production cycle, e.g. leaf-vegetables as compared to onion.

Table 4 - Expected forms of coordination in the market for leaf-vegetables

	Spot market	Market reciprocity	Forward contract	Forward and resource contract	Vertical integration
Asset specificity	+				
Unstability of supply					+++++
Unstability of demand				++++	
Perishability					+++++
Length of production cycle	+				
Quality heterogeneity			+++		

Table 5- Expected forms of coordination in the market for onion

	Spot market	Market reciprocity	Forward contract	Forward and resource contract	Vertical integration
Asset specificity	+				
Unstability of supply				++++	
Unstability of demand				++++	
Perishability				++++	
Length of production cycle		++			
Quality heterogeneity			+++		

We now turn to observed organizational forms in vegetable systems supplying African cities.

III. Space and functional organization of commodity chains

III.1. Consumers' source of supply

In Africa the bulk of vegetables is purchased by urbanites in urban retail markets, which are chosen according to the proximity of the household. A number of urbanites - 10 to 40% - are also supplied by home gardens yet self-production is generally limited to the rainy season and to indigenous vegetables.

Supermarkets only address the wealthy clientele made of expatriates, African high civil servants and businessmen. In Brazzaville, in 1994, supermarkets would market less than 15 tons of tomatoes while the total purchases in the retail markets averaged 4000 tons (Moustier, 1994a). This is due to the higher price of food in supermarkets, and also to the fact that most of the population do not own cars and prefer to get food on the retail markets which are available in the heart of every district. Vegetables purchased by urbanites originate from local production, trans-border imports and imports from Europe. Imports from Europe are made of onions which are moved by boat and of temperate vegetables for supermarkets.

III.2. Commodity chains supplying retail markets

The most frequently encountered marketing chains are listed below.

1) P →C

2) P →R →C

3) P → (A) → W→ R →C

4) P → (A) → RW→ UW→ R →C

P: Producer; C: Consumer; R: Retailer; W: Wholesaler; RW: Rural-based wholesaler, UW: urban-based wholesaler; A: Assemblers

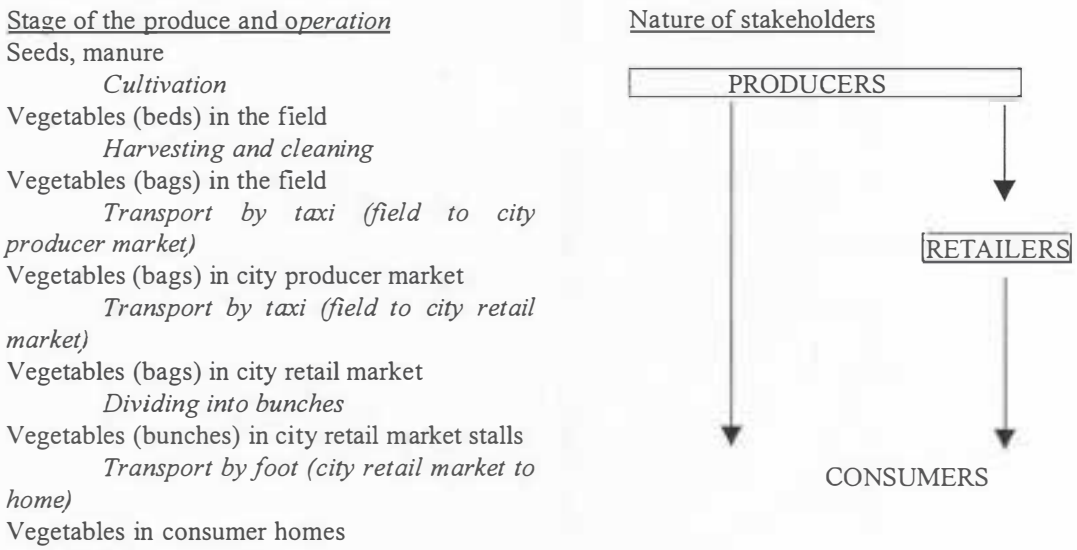
→ : transfer of produce ownership

1) The producer sells directly the produce to consumers in urban retail markets. Direct sales happen mostly for perishable vegetables produced in urban and peri-urban areas, e.g., leaf-vegetables. Transport takes place by foot, bus or taxi. The percentage of retailers who are producers varies between 20 and 30% in the cities researched on. Bissau is an exception as this percentage is as high as 80%. This is due to the recent development of market-gardening in this country (David, Moustier, 1993).

2) Most of the transactions go through an intermediate retail stage. The retailer is defined as the agent who sells the produce to the final producer. This marketing chain is the most widespread for peri-urban vegetable production. Retailers move to producers' gardens or producers move to specific wholesale markets according to the pressure of demand over supply.

The transaction chains in the leaf-vegetables markets of Brazzaville, Bangui, Bissau and Antananarivo, with zero or one intermediary between producers and consumers, are sketched in Figure 1. Upstream production, operations are limited to harvesting and cleaning, packaging into salvage bags, transport, and dividing into bunches.

Figure 1 – Transaction chains in the leaf-vegetables market

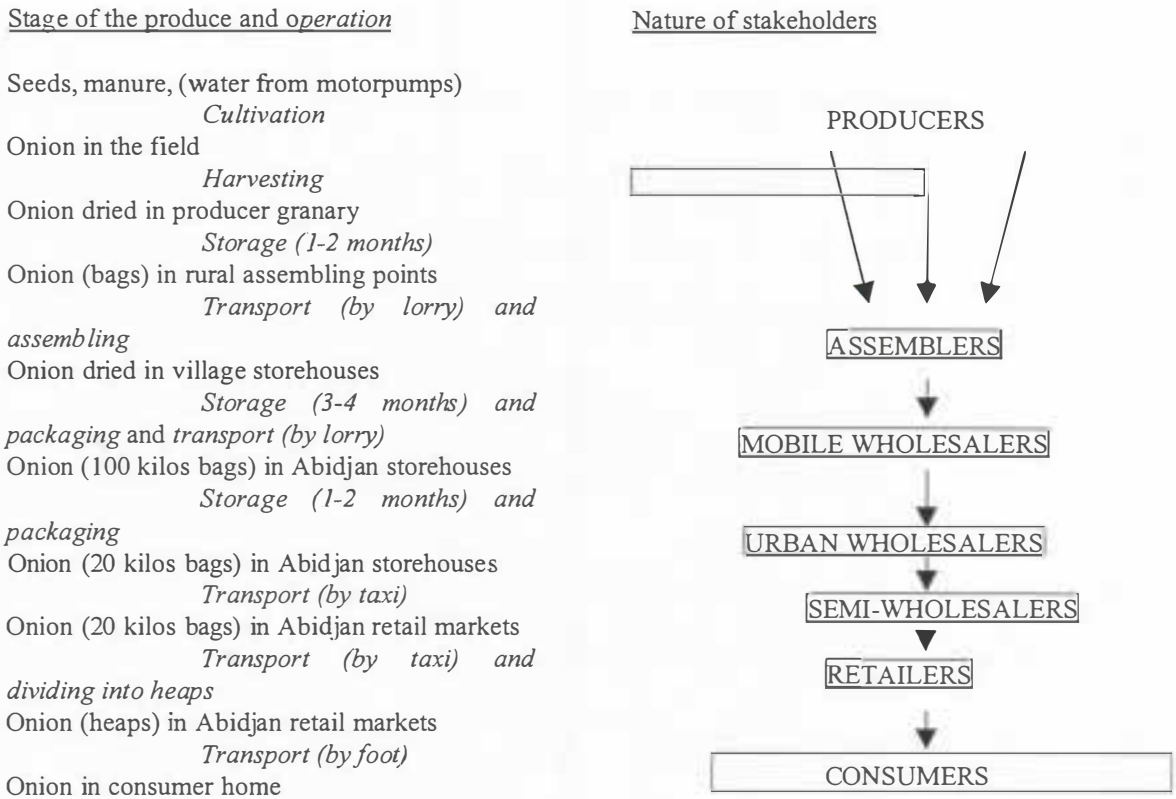


3) The involvement of assemblers and wholesalers mostly applies to vegetables produced in rural areas, further than 30 kilometers of the city center. It may also correspond to the produce of peri-urban areas which are difficult to reach because of transport constraints like in Bangui periphery where the taxi and bus network is highly fragmented. Wholesalers move to producers' fields or to village wholesale markets where the produce is sold by producers or by rural assemblers. In Madagascar wholesalers may collect the output at established points along the road and sell the produce to retailers in urban wholesale markets.

4) In the case of trans-border onion trade between Niger and Abidjan where onion travels along more than 2000 kilometers, the produce is first assembled at the level of villages, bought by few rural-based wholesalers (less than twenty) and re-sold to urban-based wholesalers (7) to whom the rural wholesalers are linked by credit dependency.

Figure 2 summarizes the different stages of produce transfer between production in Niger and consumption in Abidjan.

Figure 2 -Transaction chains in the onion market from Niger to Abidjan



Wholesale transport takes place by road and train. The cases of wholesalers owning transportation means are few. The typical situation is the wholesaler using lorries owned by transport entrepreneurs and being charged a certain fare according to the volume of the produce. He/she usually travels with passengers and other traders with the commodity on board. If the volume of vegetables is high, he/she may rent a lorry. Urban wholesale markets have developed as transactions take place at the place of arrival of lorries and trains and they are not supported by public investment. In the case of multi-cropped field vegetable production, vegetable wholesale is seldom specialized and is mostly carried out by women.

Traders and hauliers collect a whole range of foodstuff according to the harvests of multi-cropped fields. The trade of temperate vegetables and onions produced in specialized rural

areas is more specialized and male dominated. Yet traders may get involved in the trade of other commodities in times of fall in the vegetable supply. Like production, marketing is usually carried out on an individual basis, except in the few cases where the producers have tried to coordinate their sales (see IV.2).

Between wholesalers and retailers there may be an intermediate stage of brokerage, i.e. brokers who sell the produce on commission and who are active in identifying potential customers and negotiating prices. This happen in Senegal, Cameroon and Madagascar where wholesale vegetable production is dominated by men without personalized relationships with female retailers (see IV.2).

Some important features of the marketing chains are highlighted below.

- The time necessary to transport the produce from the farm gate to the retail market is crucial in determining the number of stages between production and consumption. This time is a function not only of distance but also of the state of transport.

- Marketing chains are short for local production - less than two intermediaries between production and consumption.

- Trade is mainly female apart from some cases of male wholesalers - frequently former producers - who are present in the areas of concentrated and specialized supply.

III.3 Commodity chains supplying supermarkets and restaurants

These establishments are supplied in a combination of ways: (i) imports - mostly from Europe for some specific vegetables which cannot be grown in the country - e.g., chicory, or at the times of the year when local production is at its highest price and worse quality; (ii) direct supply by a few number of producers (usually less than ten); purchase of vegetables in wholesale markets by a salaried marketing agent.

III.4. Flexibility of commodity chains

Marketing functions are characterized by some flexibility but also by some level of specialization, which is highly adapted to the instability of supply and demand, and to the necessity of a specialized savoir-faire, as well as secure supply and resale networks. The combination of wholesale and retail function is frequent. Wholesalers sell most of the output to retailers, yet if some of the output is left they may go on selling retail on a different spot of the market (markets often combine wholesale and retail functions). Some retailers may sell the output to other retailers and act as semi-wholesalers. This happens because they have found the commodity very early in the morning and re-sell to late comers or because they have privileged links with suppliers in a context of constrained supply. Yet there is a real although not always clearly visible division of time, tasks and place between retail and wholesale functions. Wholesale marketing commonly takes place in the night and early morning (between two and seven a.m.).

The combination of production and wholesale functions is frequent. Wholesalers are commonly former producers who have marketed their own production and added the output of their neighbors. They sometimes give up their production activities to get fully involved in marketing but generally they are keen on keeping some production in order to secure their supply. The combination of production and retail function has been mentioned above. Apart from the case of tomato purée, there is an absence of specialized functions of vegetable processing, storage, bagging, sorting and transport. Some processing might be carried out at a very minor degree by retailers, e.g., preparing glasses of hot pepper paste, cutting slices of *koko* or okra. For fresh vegetables, storage is only provided as an occasional service by meat or fish storing enterprises. Onion storage is the task of producers or wholesalers. Bagging is provided by traders, who use home or salvage material. Traders are also involved in the sorting and transport of the produce.

There is also a big flexibility in terms of the choice of the place of supply and resale although generally one place is visited in priority. There may be different points of sale and supply according to the types of vegetables grown. For African peri-urban growers leaf-vegetables are generally sold in the garden to urban retailers while temperate vegetables may be brought to specific markets and supermarkets.

Moreover a combination of flexibility and specialization is observed as regards vegetables traded. Retailers generally do not sell other commodities than vegetables, but the range of commodities is still wide. Some categorization can be sketched: (i) retailers who sell temperate vegetables; (ii) retailers who sell leaf-vegetables; retailers who sell tomatoes and other condiments; retailers who sell onions and other condiments. In wholesale and retail markets there is some spatial specialization according to the type of vegetables sold except in the cases where space is very constrained like in Yaoundé where the retail markets have been very badly designed and are little used by retailers who prefer selling along the road.

III.5. The private nature of the business

All the functions are carried out by private agents. There is no public institution involved in the sector apart from some development projects financed by the public sector or foreign aid mostly involved in the supply of inputs, irrigation, training and - often unsuccessful - attempts at organizing collective marketing (see IV.2). These projects have moderate scope (generally they deal with less than 100 vegetable growers).

IV. Structure of the market and forms of coordination

IV.1. The structure of the market

The structure of the vegetable market greatly varies according to the ability of the produce to be stored and imported, both being narrowly connected.

Structure of the market for vegetables sold fresh on wholesale and retail markets

The structure of this market can be defined as competitive with a high number of suppliers without any significant individual weight on the market, and few barriers of entry into the market in terms of capital. Access to capital, to savoir-faire and to suppliers is often family-type. Yet there are patterns of vertical coordination which create some barriers of entry to potential entrants (see IV.2). On the other hand, the instability of supply, demand, and transport availability, constrains access and timeliness of market information and may create information asymetries. Hence competition can be termed as imperfect. No excess profits were brought to the fore as traders earn little more than is necessary to cover their business expenses and the basic consumption needs of the household, even though the margins relative to the purchase price may appear high especially at the level of retailers (50 to 100%). This paradox is due to the small volumes of transactions. Retailers sell less than 10 kilos of vegetables per day, wholesalers less than 200 kilos of vegetables per day. Small volumes have to be put in relationship with credit constraints, limited and unstable supply and demand, lack of storage facilities.. Some cases of traders' oligopsonies and unbalanced bargaining powers are observed in the situations of production areas badly served by transport infrastructures - the ability of producers to move to the city in less than one day can be taken as a proxy for observed balanced bargaining powers.

The structure of the market for stored/imported vegetables

The cases of oligopsonies are more widespread for vegetables which are imported and transported on long distances - more than 2000 kilometers. Only onion and canned vegetables can be imported by road from neighboring countries or by boat from removed countries. Imported fresh vegetables have to be transported by air which generates very high costs - $5 per kilo from France to the Central African republic in 1994. These costs can only be supported

by supermarkets as they are able to shift them to the consumer price.

In West and Central Africa more than 90% of vegetables imports are made of onions, potatoes and canned tomatoes. There is a combination of factors which create competitiveness problems for onion production :

- Shortage of production in the rainy season. In all the countries where onion is produced there is no onion import - or very few, less than 100 tons - in the few months of highest onion harvests, which shows that imports can fall with increased supply at certain periods of time (David, 1999).

- Some traders will always prefer to sell imported onion whatever its price when compared with local onion because they are granted credit, and sometimes bagging by importers, and also because they can be supplied with a whole range of imported goods, e.g., oil and sugar.

- Dumping strategies have been mentioned and can only be hindered by political will and pressure from local producers like in Guinea-Conakry where producers regularly campaign against imports. In April 1996, the wholesale price of imported onions in Conakry was less than the local producers' price (260 FCFA/kilo) which include less than 10% margin on the cost of production whereas onion imports officially are taxed by 30% over the mercurial value of 450FG/kilo (Chaléard and al, 1997).

As regards canned tomato, there are only two successful experiences of local production in West and Central Africa : Senegal (SOCAS) and Cameroon (SCAN), while there have been at least one attempt in every country. When examining the history of their development compared to the history of other firms' failures, it turns that the main factors of success are : (i) location close to a geographically concentrated area of production served by a good transport system; (ii) ability to resist to demand fluctuations through diversification of activities and access to foreign capital; (iii) flexible contracts with farmers (see IV.2). It should be said that in

Cameroon more than 70% of the price of the final produce is made of the empty tin, which makes it roughly equivalent to imported Italian tins (Tasse, 1997).

Onion imports from Holland are controlled by few - less than ten - urban-based import enterprises mostly from Lebanese origin and with strong political links which enable them to escape some of the duties and carry out dumping strategies. The capital content of the imported channels is much higher than the local ones and the control of capital, together to the knowledge of suppliers, generates market power for a few urban-based wholesalers. In Abidjan, onion mostly originates from Niger (25 000 tons in 1994) and Holland (5000 tons). Wholesale distribution is controlled by seven wholesalers originating from Niger, who are all linked to one wholesaler who have started twenty years ago the marketing of onions produced in Niger together with imports from Europe. The main wholesaler own 5 lorries with which he collects onions by using a network of assemblers and wholesalers in Niger. This network is strengthened by credit dependency, as well as religion and common regional origin. Collusive behavior is observed among the urban-based wholesalers with monthly meetings in order to discuss on price setting (David, 1999). The analysis of distribution of margins among stakeholders show that the revenues are by far the larger for urban wholesalers, and the lower for producers and retailers, even though the retail stage absorbs more than 50% of the final price (see Table 6).

Tableau 6- Distribution of margins from onion production in Niger to retail sale in Abidjan in 1995

	Number of stakeholders	Tons/ stakeholder	Sale price (FCFA/kilo)	Costs/kilo (apart from purchase price)	Margin/kilo/ stakeholder	Total margin/stakeholder (FCFA)
Producers	6950	4	72	22	50	212 750
Assemblers	15	1565	79	3	4	6 263 600
Mobile wholesalers	30	703	149	64	6	4 215 700
Urban wholesalers	10	1984	191	8	34	67 469 000
Semi-wholesalers	175	113	265	11	63	7 108 100
Retailers	11200	2	473	22	186	319 000

1 FCFA ≅ $0.002

IV.2. Forms of coordination

Horizontal coordination

Horizontal coordination is little developed. At the level of African producers, there may be the management of common infrastructure, e.g., storage and irrigation, but this has mostly been set up by public or NGO projects. In Guinea Conakry, potato and onion producers have organized themselves for a number of purposes: getting access to imported seeds, benefiting from technical assistance, constituting funds to finance the production cycle, bargaining prices with traders, investing in collective storage and stores, obtaining protection from imports during season of production. At the moment, collective organization mostly remains for input supply, for credit, and protection from imports (Chaléard and al, 1997). At the level of traders, associations are limited to savings and solidarity purposes. Attempts at collective marketing by producers and setting homogeneous price lists in wholesale or retail markets generally fail, as exemplified by the end of MIDEVIV in Cameroon (Autissier, 1992) or Boko project in Congo (Moustier, 1996). A rigid setting of prices and quantities purchased and resold is unfavorable to price quick fluctuations according to the changes in supply and demand and to differences in quality across suppliers. In a context of sharp differentiation among suppliers and vendors as regards their results in terms of quantities and quality, cooperation for marketing has more to do with ideology than with economic rationality.

Horizontal coordination is more developed at the level of exports (green beans in Africa) because producers may pursue the common objective to negotiate with big transport companies which hold an oligopolistic position, and their position in terms of quantities supplied is quite homogeneous.

Vertical coordination

The most widespread form of coordination can be termed as bilateral commitments of exchange or clientization, which are described below.

- Bilateral commitments

Vegetable transactions are commonly characterized by a high proportion of continuous personalized and long-term relationships. Buyers and sellers develop groups of suppliers or customers with whom they are more inclined to deal than with anyone else. These specific parties "*with whom personalized, repetitive trading relationships develop under the aegis of unwritten, informal understandings*" (Jaffee,1990), may have specific terms used by traders, e.g.,"clients" in Congo, "assos" in Cameroon.

The commitment of both parties in such relationships are actually stronger than the personalised relationships described by Porath (1980) which involve only strong presumptions of continuous and long-term trade. In the case of "clientalization", suppliers and purchasers are committed by an implicit reciprocal priority convention: the "client" is given priority over other potential buyers or suppliers, in all circumstances. Before she or he is able to sell to any other customer, the supplier has to wait for her customer to have first choice with the commodity, even if the "non-client" customers are able to offer more advantageous pricing arrangements. These behavior often comes together with the possibility of delayed payments: traders can pay their regular suppliers after the sale. The price negotiated before the sale may be revised after the sale, even though the decrease is generally less than 10% of the negotiated price. A similar situation is described by Lyon (2000) in the case of tomato trade in Ghana.

Personalized relationships influence price setting as clients get more advantageous conditions than anonymous partners. The confidence premium can be estimated to reach 20 to 30% of the "perfectly competitive" purchase price for the strongest relationships. Yet the competitive

market where prices fluctuate according to the variations in supply and demand is always the reference even for personalized price setting as traders take the state of supply and demand in the wholesale markets into account, even when they get most of their supply directly from the fields.

Other types of vertical coordination are outlined below.

- Vertical integration

The combination of production and retail sale can be termed as vertical integration. Integration of production and trade ensure security of supply and guaranteed retail outlet. There can be no cheating regarding the quality of the produce. As regards price bargaining, it cannot be concluded that vertical integration bears a strong impact on it, although it is a common goal of producers to get fairer prices by bypassing traders. Producers' involvement in marketing gives them access to information about the state of the supply and current prices, and may allow them to get a more favorable price for their commodity; but at the same time it involves spending time and resources in the process of marketing which could perhaps be better allocated to production activities. In addition, producers may not have the experience or competence of specialized traders to gain access to outlets and to bargain favorable prices with their customers.

- Vertical integration involves people belonging to the same family, it never involves salaried people under a hierarchical centralized power. The delicate nature of vegetable production and marketing generates high supervision costs when transferred to salaried labor force as exemplified by the failure of Mbamou enterprise in Congo who tried to integrate large-scale tomato production, transport, wholesale and retail sale (Kassa, Ali-Gaye, Moustier, 1995).

➢ Contracts on resources and products

Producers granting credit to traders may seem surprising while the literature often presents cases of the reverse as producers need cash before the sale in particular to buy inputs. The latter behavior is actually observed in the countries where there are specialized vegetable assemblers with sufficient financial weight, e.g., Senegal and Ivory Coast and for long-cycle vegetables, e.g., tomatoes and cabbage requiring high investment in seeds for cultivation. The trader is then granted priority sales. Contracts on resources and products are also resorted to by processed tomatoes enterprises in Senegal and Cameroon. For processing industries the regular access to abundant supply at stable cost is crucial - their capacity approximates 40 000 tons of fresh tomatoes per year. In Senegal and Cameroon there is a range of possible contracts granted by SOCAS, the main processing firm: delivery of inputs, land preparation, technical expertise, and purchase of a specified quantity of product at a specified date and price; or only the specification of quantities and price. Spot market transactions are also accepted, yet the price is always fixed. Price setting results from long bargaining with producers' representatives at the beginning of every campaign. The firm deals with around 1000 family-type farms. There is no constraint for producers on SOCAS being the sole purchaser and producers may sell tomatoes to private traders as long as their commitment is fulfilled. SCAN in Cameroon have similar contracts with producers. Both firms accept whatever quantities can be produced as they do not face storage problems. Both SOCAS and SCAN cannot actually fulfill the demand for canned tomato at the moment (authors' surveys and Tasse, 1997).

Supermarkets and hotels also deeply need supply regularity in terms of quantity, quality and cost and are interested by contracts with suppliers. Yet recorded cases of producers not fulfilling their orders are numerous, especially in Africa, which explain why supermarkets prefer to deal with local producers with on-spot transactions and why they heavily rely on imports.

VII. Conclusion

The paper points out that important characteristics of the commodity systems across the areas can be put in relationship to the characteristics of the produce, the latter depending on the specific conditions of production and consumption observed in African domestic market. However, this relationship does not result in "once-for-all" expected forms of coordination. Stakeholders may resort to a combination of marketing and coordination options for the same type of product, to answer anti-risk strategies and adapt to changing patterns of supply and demand. Moreover, there is not a clear increase in contractual forms as perishability and instability increases, because of the difficulty in enforcing contracts.

With increased perishability of the product, there is reduction in the number of stages between production and consumption. Yet, the degree of involvement of producers in marketing also depend on changing patterns of supply and demand. Limited scale of production generates competitive structure of exchange for perishable vegetables. Access to capital and information required for onion marketing results in oligopolistic structure of the market for this produce. The ability to recourse on imports - which favors oligopolies - is narrowly connected to the cost of long-term storage relative to the final price, to the characteristics of retail distribution and to protection policies. These not only depend on the produce, but also on the consumers' purchasing power and to political organization of local producers. Instability and perishability explain that market reciprocity based on bilateral commitments of exchange - termed at clientization - are the dominant form of coordination as they are efficient in securing access to supply and demand. Stronger commitments often fail because of the lack of reliability of both parties. Hence there is a paradox as market instability generates incentives for market commitments yet it may jeopardize the possibility of their execution. This explains that contracting is little developed even for the less perishable vegetables like onion. Diversity and flexibility in the organizational forms is also a response to instability.

Hence the paper suggests that product properties in the broad sense (storability, demand and production characteristics), appear to possess relevance in explaining the nature of organizational forms in the vegetable sectors analyzed (see Tables 7 and 8). Yet these characteristics themselves depend on the social and economic conditions of supply and, mostly, demand by African urban households, characterized by low and unstable purchasing power jeopardizing investments in cool storage and concentration at the retail level. Moreover, contracting may be hindered by institutional and economic barriers to enforcement, whatever the produce properties. Finally, the focus on produce properties and transactions should be extended to take into account interlinkages between credit, input and product markets, as well as traders' diversification options which bear impact on market power. As long as technical is little available support at the stages of cultivation and packaging, that access to inputs, credit and information is highly unequal, and that contract enforcement mechanisms remain weak, it is likely that alternative organizations will be less efficient in supplying African consumers with fresh food than the observed flexible and decentralized commodity systems.

Table 7– Patterns of organization in the leaf-vegetables and onion markets

	LEAF-VEGETABLES	**ONION**
Spatial and functional organization	**Short marketing chains** (less than 50 km and 1 intermediary between production and consumption)	**Long marketing chains** (more than 200 km and 4 stages between production and consumption)
Structure of the market (competition and power relationships)	**Imperfect competition with balanced power** Competitive conduct and price setting Balanced incomes Imperfect information Market segmentation	Oligopolies, mostly due to **credit and information control** + diversification options of urban-based wholesalers
Horizontal coordination	**Failure of producers' collective marketing** hit by instability of supply and quality heterogeneity	
	Limited to traders' savings groups and collective transport	Collusive conduct of urban-based wholesalers
Vertical coordination	**Spot marketing** **Market reciprocity** (often supported by common regional origin)	Vertical integration (producer's involvement in retail marketing) Patterns of **forward contracts and vertical integration (buyer-driven)** supported by common regional and cultural origin

Table 8 - Suggested relationship between produce property and organizational forms of commodity systems studied

Produce properties	Technical limits to scale	Instability of supply	Perishability
	Limits to capital concentration	Information problems Search costs	Risks of losses Quality heterogeneity
Space organization	Atomized and decentralized with some wholesale markets		Time to transport the produce is strategic in determining the location of supply areas
Functional organization	Flexible		Flexible Short chains for leafy vegetables Longer chains for onion
Competition	High	Imperfect	High for leafy vegetables, Medium for onion
Horizontal coordination	Low	Low	Low
Vertical coordination	Decentralized Bilateral flexible commitments		

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[1] The paper refers to vegetables as the annual plant leaves, stems, berries or roots consumed as ingredients of starters and relishes. They include tropical leaf-vegetables like cassava leaves, tropical fruit-vegetables like okra and hot pepper, onion and garlic, as well as temperate vegetables, e.g. cabbage, carrots and tomatoes. We do not consider tubers like cassava, yams or potatoes which are usually consumed as staples