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METHODOLOGICAL APPROACHES TO ANALYSIS OF FOOD SUPPLY AND DISTRIBUTION SYSTEMS

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Executive summary

This work is intended to provide an overview of the ways different disciplines approach analysis of food supply and distribution systems (FSDSs), showing the conceptual and methodological tools used. The list of approaches is admittedly incomplete and the description brief. The aim of the description is twofold: to define the area(s) covered by each discipline; and describe the specific role each can play in an interdisciplinary approach to research on

FSDSs. Research focuses on some general questions: Which disciplines are concerned with this subject? What are the bases on which they approach it? What methodologies do they use? What type of results do they reach? Are they alternatives, or complementary to one another? On what level(s) are they effective? Some portions of the present work are based on documents drawn up by specialists for this purpose (the geographical, nutritional and legal approaches). The following approaches are examined: economic (neoclassical, pipeline, evolutionary), historical, geographical, nutritional and legal. The pipeline approach is further divided into a socio-economic and geographical approach (a special section is also devoted to the latter). The point of this whole essay in methodological description lies not so much in the reading of each approach as in their juxtaposition. The various approaches belong to a wide range of scientific fields, but come together when the FSDSs are considered not as an abstract activity but as the outcome of dynamic processes arising in a given environment in some area, at a given moment in its development, and managed by agents with specific aims.

The economic approach to FSDSs varies, although it is in all cases concerned with analysis of the efficiency of distribution. The differences lie in the methodologies used, which in turn depend on the adoption of a variety of scientific premises. The neoclassical approach uses the neoclassical general equilibrium model, which is based on the comparison of supply and demand on all levels. It also uses other conceptual tools, which refine, modify or reject certain neoclassical hypotheses in order to comprehend complex realities extending beyond the simple market context (marketing channels, industrial organization, theory of the firm, institutional economics). Price is the means whereby economic agents learn about the relative scarcity of products or services, which then influences their behaviour. It is also the means whereby different markets are coordinated: with one another (from production to consumption), over time (processing and storage) and over space (transport). Market efficiency is linked to hypotheses on the economic environment, and a market system is efficient to the extent that there is perfect competition, free access, information available to all at zero cost, and agents respond to price variations in an economically rational manner. The analysis of real markets always entails comparison with this theoretical model: any departure from it indicates imperfections, calling into play the sphere and limitations of intervention policies. In terms of operational research, market efficiency is evaluated with the help of structure-conduct-performance analysis, which has been and is still frequently applied to African situations.

In the pipeline approach, the agent is an economic actor (or group) distinguishable by certain characteristics: economic function(s), powers of decision, goal-directed conduct (economic or other), and therefore strategies for intervening in the economic system. There is a clear attempt in this approach to move beyond economic data and to explain the dynamics of the economy by using concepts specific to the pipeline, i.e. the strategies of the actors, for it is in fact the actors who, through their strategies, give a structure and economic significance to the space in which they act, which would otherwise simply be the expression of physical potentialities, without further specific qualities. Similarly, research into connections between the economic and social spheres springs from the need to take into consideration factors that determine the behaviour of the actors outside their economic activities. Expanding the field of inquiry to include the social sphere entails the use of qualitative as well as quantitative data, and this additional information is obtained through surveys or interviews concerning the types of actor in the pipeline. Such life histories are particularly valuable evidence of social change, in other words of the dynamics through which these actors change, expand or reduce their roles and their power in the pipeline.

If FSDSs are to fulfil their tasks, they also have to face up to change, and in the economic sphere change has been approached with respect to innovation, especially technical, although innovation can also be considered more generally, including changes in organization. There are four main positions to consider: classical political economics, Schumpeter's approach, the macroeconomics of technological progress, and the evolutionary approach. The evolutionary approach focuses on the process of innovation, rather than on innovation itself. It has been applied especially to technical innovations (industrial or small-scale). Apart from these applications, perhaps the evolutionary perspective can also be applied usefully and innovatively to other sectors involved in FSDSs, rightly seen as systems in evolution, and thus requiring adaptation and being open to innovation, within a complex context of economic, social and institutional relationships.

The historical approach focuses on shifting the interpretation of phenomena connected with food supply from disciplinary particularism towards a more general perspective in which the performance of the distribution system is analysed in terms of its development in a physical, economic, social and political territory. Two elements can help in grasping its specific features: the role of cities

in the methodology of analysis, and the need to integrate the economics of food distribution into the system of relationships and social, institutional and political factors in which it is embedded. The need for a comprehensive interpretation is met through the use of a methodological approach linked to the choice of the geographical level of analysis, i.e. the city – the place and level on which the problems of the African food crisis have to be observed. Since food distribution is not simply a technical matter, it is a question here of reorganizing and assembling the various disciplinary approaches into a structured conceptual framework capable of combining the technical and economic aspects of distribution with the dynamics of the social and political context in which they operate. Use of the social history of cities in this procedure entails definition of (a) uniform periods in socio-institutional terms, and (b) key moments marking the shift from one period to another. The latter would be related to crises of adaptation to major changes in the political and economic framework of the city, region or world environment.

There is a clear relationship between nutrition and FSDSs, since consumption is the proper goal of FSDSs and an essential determinant of nutritional status. Furthermore, no policy concerned with food can ignore consumption models and nutritional requirements. When discussing FSDSs, it is wise to make a clear distinction between the spheres covered by the two aspects of supply/marketing and desirable nutritional status. The question is how FSDS operating structures can carry nutritional information. According to accepted hypotheses, the nutritional aspect can be considered one of the dimensions of FSDS efficiency.

In geography, the concept of space assumes scientific and analytical significance when it is differentiated and takes the form of a complex of structures, forms, functions and relationships anchored in physical space. The particular sphere of interest for geographers is the process of differentiation and its results. Thus they study relationships between urban space and the supply of food to urban inhabitants. Space is a scarce and limited resource, and geographers explain how it is organized, its specific internal workings, and how best to use it in view of the varied needs of people. They have a conceptual apparatus – the classical principles of economic and spatial organization of urban models – that lends itself to application to the very specific perspective of urban food supplies. In economically backward countries, urban growth – a critical process in the development of cities – has pathological aspects, and proceeds independently of the development of productive activities. This leads to the phenomenon of urban malaise, which is analysed by geographers, including their immediate

repercussions on FSDSs. The question is thus to discover the effects of urban structure on the ways in which food is supplied to cities. And the answer is found in many situations highly typical of FSDSs: segregation, isolation, overloading of market spaces, urban and peri-urban agriculture, etc.

Activities within and around FSDSs take place with reference to a framework of rules, either written or customary, which have structuring effects on FSDSs. This framework is the focus of the legal discipline, and specifies the rules of the game, which apply to the actors. From the legal viewpoint, FSDSs are highly complex systems with many ramifications, and cannot be reduced to a simple definition. This means that FSDS law is to be seen as composite and open. It can be explained with the help of disciplines specializing in analysis of the social sphere (anthropology and sociology). The application of legal methodology to FSDSs involves identifying first the sources of the framework of rules in force, and then the various sectoral laws affecting FSDSs. The various elements of the framework are not necessarily in agreement, so that its operation leads to conflict situations, and thus requires procedures for social regulation. Such contradictions give rise to types of relationship that are also well-known phenomena in Africa (corruption, informal relations, etc.) and can be sources of inefficiency. It should be noted here that the legal approach introduces a new dimension of efficiency into analysis of FSDSs – one reflecting the consistency of the framework of rules and its compatibility with local traditions.

The conclusions are grouped according to their spheres in order to highlight topics that spread across different disciplines. Thus there is the concept of efficiency, which assumes specific meanings through the approaches described, the importance of choices in defining the field concerned with FSDSs in physical, economic and temporal terms, and the need to encompass the complex whole beyond the scientific and methodological limitations of traditional viewpoints. The broad range of questions that arise, the complexity of the subject, and the need to grasp it as a whole call for a comprehensive approach, which finds its methodological reference points in the internal dynamics of the system and an interdisciplinary framework.

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Acronyms and abbreviations

BMI	Body Mass Index (height/weight^2)
EU	European Union
EUNETIC	European Network on the Economics of Technological and Institutional Change
SCP	structure-conduct-performance
SMA	standard metropolitan area

Boxes

Introduction

This work is intended to provide an overview of the conceptual tools and methodologies used by different disciplines in analysing food supply and distribution systems (FSDSs). A brief description of an obviously incomplete list of approaches is provided with the twofold aim of:

- identifying area(s) covered by each discipline with a bearing on the FSDS issue; and

- defining the specific roles that each discipline can play in an interdisciplinary approach to research on FSDSs.

In undertaking this the following questions had to be addressed: Which disciplines are concerned with the subject? On what basis do they approach it? What are the methodologies used? What type of results do they reach? At what levels are they effective? Are different approaches alternatives or complementary to each other?

The list of approaches discussed is neither complete nor, perhaps, very thorough. A number of contingent reasons, including lack of expertise in the specific areas, prevented any exhaustive description of all the possible approaches. Indeed, apart from additional bibliographical references, some parts of this article were incorporated by the author from documents produced by other specialists (see the geographical and nutritional approaches). The sociological and anthropological approaches are not covered in depth although the former is included in the pipeline approach. The geographical approach is also mentioned under the pipeline approach, with of course a special sub-section on the town-planning aspect. Here it should be stressed that the name given to each approach is more or less generally accepted. The term “economic” is also applied to other approaches as a secondary element (the historical approach is in fact regional economic history, while the geographical approach is economic geography). This aspect is less evident in the nutritional approach.

The aim was to summarize the essential elements of each approach, highlighting those aspects that bear directly on urban FSDSs. This approach started with bibliographical research to identify the various ways (disciplinary and methodological approaches) in which the subjects of urban food supply and distribution have been handled over the past ten years. This means that the

citations used, even those that are strictly theoretical, come mainly from works and articles dealing specifically with FSDSs. The point of this whole essay in methodological description therefore lies not in the reading of each approach but in their juxtaposition, which then allows more general conclusions to be drawn.

Lastly, the various approaches described, which refer to widely separated scientific areas, come together when FSDSs are considered not as an abstract activity but as the outcome of dynamic processes arising in a given environment in some area, at a given moment in its development, and managed by agents with specific aims. This definition is not a methodological manifesto, but rather a working hypothesis for our research. However, it has to be taken as a starting point if we are to reach an interdisciplinary view of the subject, while any supposition or methodology can be criticized or rejected at the end of the work.

1
The traditional economic approach

Although the economic approach to the study of FSDSs varies, all such approaches are generally concerned with analysing the degree of efficiency of distribution. The differences lie in the methodologies used, which depend on a variety of technical assumptions. One of these approaches, described as *the traditional economic approach*, takes as its basis the general equilibrium model of neoclassical economics. This approach sees an FSDS as a group of coordinated markets where supply and demand equilibrate at all levels. In this model, price is the main means by which economic agents learn about the relative scarcity of products or services, which then influences their behaviour. Price is also the means by which different markets are coordinated with one another (from production to consumption), over time (processing and storage) and over space (transport). Market efficiency is linked to neoclassical assumptions regarding perfect competition and information, market access and agents' rationality.

A market system is efficient to the extent that there is perfect competition, free access, information available to all actors at zero cost and agents respond to price variations in an economically rational manner. Under such conditions every commodity (means of production, products and services) is exchanged at a price that reflects its economic value. This represents the optimum for the system (since this mechanism ensures that resources are optimally allocated) and for consumers (since they do not incur additional costs due to failure of one or more of the basic hypotheses). The analysis of real markets entails comparison with this theoretical model; any departure from the latter indicates imperfections, defining the sphere and limitations of policy interventions.

1.1
Market efficiency

In terms of operational research, market efficiency is evaluated with the help of structure-conduct-performance (SCP) analysis, which has been and is still frequently applied to African situations:

> *"'During the 1960s and 1970s, urban centres grew rapidly, and marketing of local products became more important. The existing food supply system came under increasing pressure. As a result, research on*

> *economics and performance of private trade and local markets began to receive substantial attention …. Most of the research carried out in the 1970s supported Jones' conclusion that African markets are reasonably efficient and competitive in the face of numerous obstacles and his policy recommendation was that governments should restrict their role to improving marketing intelligence and roads.' (Eicher and Baker, 1982). This point of view was shared by the World Bank in its World Development Report of 1981. The methodology used for analysing market performance was generally an adaptation of the structure-conduct-performance analysis, which is a standard tool for market analysis in industrialized countries"* (Goossens, 1994).

In the SCP approach, the main elements for analysing the workings of a market are the basic conditions (the physical, legal, social and economic environment in which the market operates) and variables of structure, conduct and performance. Market structure consists of the organizational features that influence the nature of competition and price formation within the market (number and trading volume of economic agents, credit, restrictions, etc.). Market conduct consists of models of behaviour used by firms to adapt to the market (price determination, trading strategies, exclusion or participation strategies, etc.). Performance is the economic result of structure and conduct (Goossens, 1994; Lutz, 1994). It refers to market efficiency in relation to employment, economic well-being, food availability, level of supply prices and the way and extent to which benefits are distributed throughout society (Goossens, Minten and Tollens, 1994).

1.2 A modified neoclassical model

In some recent studies, the neoclassical model has been refined and modified in order to encompass complex realities extending beyond the simple market context. In his study of the maize market in Benin, Lutz (1994) adopted a framework incorporating theoretical concepts on "marketing channels", "industrial organization", "the theory of the firm" and "institutional economics". His analytical framework takes account of such issues as market integration, connections between business conduct and market efficiency, agents' power of arbitrage, transaction costs, real competition conditions, restrictions on entry, role and handling of information and bargaining power[1].

In modifying the neoclassical, Lutz criticized the SCP tool of analysis. He argued that:

> *"Most studies are based on cross-section analysis and these are appropriate only if the structure of the market is rather stable. When markets are in disequilibrium it is difficult to trace causal linkages between elements of structure, conduct and performance. The existence of uncertainty and imperfect information was neglected in the traditional SCP studies. This seriously limits the applicability of the paradigm to real world problems. Harris criticizes the structure-conduct-performance and marketing channel approach [because] the commodity market cannot be considered an independent entity. It diverts attention from the structural interrelation between production, exchange and distribution ... between several commodity markets and between the circulation of commodities and that of money"* (Lutz, 1994).

Lutz criticizes the classical form of the SCP model for being deterministic, noting that interactions can take place in all directions in imperfect market conditions. He emphasizes the marketing channels approach within the framework of SCP analysis, making this choice because of the specific need to analyse the arbitrage process in the maize marketing channel[2].

Goossens makes a similar choice for his study of cassava marketing in Zaire. His choice of methodology is also very clear and specific:

> *"The methodological approach adopted to evaluate the cassava marketing chain is pragmatic: a system approach, combined with elements of the structure-conduct-performance approach to analyse the horizontal and vertical relationship between traders, and completed with concepts of institutional economics (transaction, search, bargaining and enforcement costs)"* (Goossens, 1994).

The system approach adopted by Goossens is based on the general systems theory, which seeks to describe complex phenomena by treating them as part of a system. From this point of view, a market system is a mechanism that transforms agricultural products and inputs into intermediate and consumer products distributed in both space and time. Functions are envisaged from the perspective of a marketing system characterized by horizontal relationships (competitive relationships between similar functions) and vertical relationships

(between different types of firms in the chain). This approach is not typical of SCP analysis but helps to remedy its limitations, especially its lack of a dynamic perspective.

1.3 Basic points of the traditional economic approach

The essential elements in SCP analysis can thus be summed up as including:

- The description of actors and their roles and conduct with regard to each other in trade transactions. In an economic sense, the conduct of actors is reflected in the operating conditions of the market structure, including: competition between actors (wholesaler/wholesaler, retailer/retailer, etc.); bargaining and price formation between actors at different levels or with different roles (wholesaler/retailer, retailer/consumer, wholesaler/transporter, etc.); market participation (restrictions on entry); information management; and, access to credit.

- Analysis of how far markets are integrated spatially and temporally, in other words differences in product prices over space and time inasmuch as these reflect market imperfections. The state of the market structure and conduct are seen in a price system that covers not only the value of a traded commodity and included services (storage, transport, processing, etc.), but also extra costs resulting from imperfect situations (monopoly, collusion, entry restrictions, etc.).

Tomek and Robinson (1981) define the conditions for spatial price integration as follows:

- price differences between two regions (or markets) that trade with each other will just equal transfer costs;

- price differences between any two regions (or markets) that do not engage in trade with each other will be less than or equal to transfer costs.

Lutz argues that for temporal arbitrage the same principles may be operationalized and used as conditions for market integration, where price differences in time have to be smaller or equal to transfer costs. Price differences that are structurally greater than transaction costs are supposed to be the

consequence of an imperfect market system. Market imperfections that result in higher prices cause welfare loss for actors, especially consumers. Arbitrage assumes relative importance in the process of trade as actors seek to take advantage of price differences that are greater than transaction costs (Lutz, 1994).

A model for analysis of price integration is constructed through the use of statistical techniques for data processing (Lutz, 1994; Goossens, 1994; Goossens, Minten and Tollens, 1994). It is completed with calculations of the costs and economic margins at each level of the marketing chain (wholesaler, sub-wholesaler, retailer, transporter, etc.) to obtain an idea of the actors' returns. In the SCP analysis this approach is used in the evaluation of the efficiency and performance of marketing systems.

As stated earlier performance under the SCP analysis depends on the structure and conduct of markets. Its evaluation requires a conceptual reference point to be used as a standard or yardstick and definition of the objectives that the system seeks to achieve. With respect to the first, the neoclassical standard, which uses a model of conditions virtually impossible to find in actual reality, is sometimes rejected or modified, with concepts of "workable competition" or "contestable market" being adopted as models closer to the way real markets work.[3] The economic benefits (improvement in the level of well-being) from marketing channels are evaluated in relation to these concepts. In brief, market performance is a complex, multidimensional concept, evaluated on the basis of a range of different criteria:

> *"Scherer (1980), Harrison et al. (1975) and Scarborough and Kydd (1992) identify two broad efficiency criteria used in evaluating market performance: economic (efficiency in pricing and allocation of resources) and non-economic. Economic efficiency consists of technical efficiency, operational efficiency and exchange efficiency. The non-economic efficiency performance criteria are developmental in context: technical and other innovations (progressiveness), equitable income distribution (equity), food security, employment, the inter-sectorial resource transfer, coordination efficiency"* (Goossens, 1994)[4].

Problems often arise in the analysis of prices and their variations, especially in placing value on each criterion and assessing its contribution to the overall performance of the system. There are many data processing techniques and

models that can be used to overcome this, and once data is available the problem is more technical than conceptual. However, the lack of data often hampers the application of economic concepts. For example, although there may be no major problems in analysing market integration (economic efficiency, price efficiency), the lack of specific data generally prevents the development of comprehensive indicators to cover many aspects of performance. Recourse is then made to indirect indicators, which may be quantitative (e.g. level of concentration of sellers/buyers, speed of stock turnover, length of transport time) since these are all indicators of technical and operational efficiency. With respect to other aspects of performance, problems also arise from the lack of a precise conceptual framework, as is the case with performance in terms of innovation. Questions arise as to how to assess the adoption of an innovation "X". There are similar problems with regard to equity (How should income be distributed in order to ensure an equitable distribution? Should an economic or social criterion be adopted?).

1.4 Summary

The SCP approach originates from neoclassical economics and primacy of market mechanisms in resource allocation. The rigidity of the original model is adapted to particular market conditions by means of individual hypotheses on how they work. These hypotheses ultimately involve market conduct. From the methodological point of view, they are also the deciding factors in analysing performance, which is studied at different levels through the use of a multidimensional approach. From the operational point of view, the problem is to define indicators for evaluating performance at each level. The most reliable tools for assessing the quantitative efficiency of the arbitrage process are spatial and temporal price integration and the production costs of services provided by the marketing chain, whereas the other dimensions of performance can in fact be assessed only qualitatively.

This brief overview gives an idea of the strengths and weaknesses of the SCP analytical tool. It provides useful information on the way markets work, particularly on structure and conduct. The value of an interpretative model, however, is clearly dependent on the extent to which the actual behaviour of economic agents reflects the accepted hypotheses, and which complementary hypotheses are able to take in the features of specific markets (for instance in the case of Africa). It has to be considered whether a market rationale, while

certainly important, is the only explanation for agents' choices at all levels. Furthermore, how far can an economic (sub-)system (of a product or a segment such as marketing) be isolated from its context (other products, production, consumption), while retaining the possibility of judging performance independently of exogenous factors. These questions cannot be ignored since a correct diagnosis is essential for ensuring that strategies for improving performance do not end in failure. With these caveats, it can be said that the SCP tool of analysis retains its validity for a general assessment of the efficiency of the marketing structure. In addition, if real conditions are well reflected in the interpretative model, the SCP analysis has the advantage of providing a comprehensive view of problems as well as possible solutions, which is certainly a major advantage, operationally speaking.

2
The pipeline approach

While the researcher can make an operational choice to restrict the field of inquiry to marketing channels, enlarging it to include situations beyond the commercial sphere is defined not only by convenience but also entails the use of new conceptual frameworks. The choice of this more complex path springs from the view that no economic activity can be considered in isolation from its context because it is embedded in a complex of economic relationships which influence it, and are in turn influenced by it. Similarly, relationships affecting the supply and distribution of a product (the ways in which these are established and/or changed) cannot be considered in isolation from their links to economic situations upstream and downstream. If these factors are to be taken into account, appropriate analytical tools and, hence, innovative methodologies will be needed. One of these tools is the concept of the production pipeline.

> *"What is called a production pipeline is the collection of economic agents (or parts of an agent) who contribute directly to the preparation of a final product. Thus, the pipeline covers the sequence of operations that starts upstream with a raw material or food and ends downstream, after many processing/enhancement stages, as one or several finished products, with the consumer. More precisely ... the collection of agents ... who contribute directly to the production, processing and onforwarding to the end market of a single agricultural (or animal) product*" (Fabre, 1993).

In this process the agent is an economic actor (or group) who performs various

economic functions, and possesses powers of decision and conduct in relation to goals (economic or other). The agent therefore develops strategies with which to intervene in the economic system.[5]

2.1
Limitations of the pipeline

A preliminary problem in applying this approach is identification of the outlines of pipelines, their structure and the way they work. This is achieved by identifying flows of goods, services and finance), technical and economic operations and agents. It also entails an operational analysis which involves isolating the various technical and economic stages in a given pipeline from raw material to consumption of the end product, including flows of goods and services related to the completion of each stage. The pipeline approach logically means following a product to its final destination downstream (consumption, export, any processing) and in the reverse direction to the supply of resources used. However, in operational terms some restrictive choices or conceptual simplifications of the complexity of the pipeline are needed. Functions are usually reduced to production, processing, distribution and consumption. Analysis sometimes focuses only on the more interesting aspects or segments of a pipeline such as concepts of sub-pipeline, technical pipeline and methods of demarcating the economic field concerned. These choices divide up the analysis and also provide it with a structure, partly on the basis of its aims.

> *"In practice, demarcation into sub-pipelines, like the decision on the elements to be considered as part of the pipeline under study, depends not only on existing channels but also on the analyst's aims. Depending on the questions being asked, it may be appropriate to adopt a division based on current technical processing methods or one based on the nature of the institutional actors, their geographical location and the type of end market on which their products are released"* (Fabre, 1993).

This initial process of description results in a grid on which data on functions, agents and products cross one another at each stage in a pipeline, in accordance with the specific type of analysis used and the underlying concepts applied. The point can be illustrated with some examples. According to Fabre, agricultural food production activities are currently divided into official, private and small-scale farmer sub-pipelines, depending on the type and size of the end market. Griffon draws a distinction between sub-sets and agents in the agrofood

pipeline, depending on their technical and economic function in terms of production: upstream pipelines (supply of inputs or agro-supply pipeline); agriculture and animal husbandry, leading to standardized products; processing, marketing, transport and distribution industries; additive and packaging ancillary industries; non-agricultural food pipelines; processing industries for industrial and energetic items produced by agriculture; financial institutions; research/extension services (innovation pipeline) and credit services; consumers; and catering (Fabre, 1993).

Referring to the African situation in particular, Hugon uses the variables of technology, the organization system, the regulation method and spatial dimension in order to divide up the agrofood system. This leads to a division into four types of pipeline: domestically regulated pipelines with a local dimension; trader-regulated small-scale pipelines with a regional dimension; state-regulated industrial pipelines with a national dimension; and capitalist-regulated pipelines with an international dimension (Hugon, 1985).

On the basis of this schematic picture, and with the aid of the concepts of traditional economic analysis (production cost, added value, trading margin, etc.), pipelines are then interpreted in terms of the way they operate.

2.2
Actors and strategies

Pipeline analysis allows analysis of goals and strategies specific to the actors themselves. Hugon (1985) suggests that:

> "*The pipeline allows us to highlight, beyond seller-customer trading relationships, the synergies, external effects, cooperative relationships and strategic junctions, control of which ensures domination; it creates a space for the actors' strategies*".

Analysis of the strategies used in the pipeline allows us to grasp features of the agents' conduct beyond the strictly economic hypotheses which constitutes the basis of the "traditional" approaches.[6] In analysing market attributes (market imperfection), the focus is not on rejecting a given model (the neoclassical model) but rather on identifying and explaining these attributes and their effects on the productive apparatus (in the broad sense of economic efficiency, social efficiency, utilization of space, etc.). Such an approach involves opening

economic analysis to encompass types of conceptual apparatus that are not strictly economic (or not traditionally economic), thus giving this approach a thoroughly interdisciplinary flavour. Two dimensions overlooked in traditional methodologies, space and social relationships, are thus involved in economic analysis.[7]

2.3
The geographical space

Hugon speaks of "spatialized" pipelines, assuming the existence of a relationship between pipeline features (organizational levels, techniques used, etc.) and their specific dimensions (local, regional and national). This hypothesis has also been applied to cities with the urban environment being seen as the site where pipelines or their segments intersect. Interlacing with one another, their activities are affected by phenomena and processes characteristic of urbanization (agglomeration, concentration and hierarchization of pipeline functions).[8]

Lançon has criticized the use of neoclassical concepts to measure market efficiency and proposes what amounts to an application of the spatial approach to pipelines:

> *"An understanding of the organization of trade must therefore be based on an analytical framework that allows us to understand market formation ... [in which] a view of economic space as one-dimensional is abandoned, in favour of an approach that accommodates both the dynamics of relationships between spaces and also the notion of asymmetric relationships between hierarchically ordered spaces. Thus ... the development of the food market is seen ... as a twofold process of differentiation between hierarchically ordered spaces and their relation to one another through an integration process in which traders are the main actors"* (Lançon, 1994).

There is a clear attempt to move beyond data from the economy (the market and its situation) and explain its dynamics by using concepts specific to pipelines, i.e. actors' strategies. In this approach the actors give the space in which they operate a structure and an economic significance through their strategies. Space is then simply an expression of physical potential without other qualification.

2.4

Social relationships

Research into links between the economic and social spheres springs from the need expressed by some researchers to take into consideration factors outside actors' economic activities that determine their behaviour (i.e. the social context). Leplaideur describes analysis of social relationships and their influence on economic activity as a process comprising three stages which partly mirror the pipeline method: calculation of pipeline costs and margins; a spatialized view of functions and actors; and, analysis of social relationships concerned in the appropriation and use of the means of production and trade in order to locate the junctions of capital power and labour power, or how actors organize themselves around rules and institutions in order to share goods among themselves and to manage conflicts and alliances. The last stage means moving from the notion of function to that of actor (according to the pipeline approach), and then from individuals to the social group in order to obtain answers to socio-economic questions. This shift introduces a change of perspective in the analysis: "*When we argue activity-actor, we analyse men-things relationships; when we have to interpret the process of the social distribution of production resources, we argue in terms of men-men relationships in connection with things"* (Leplaideur, 1994).

At the operational level, expanding the field of inquiry to include the social sphere entails the use of both qualitative and quantitative data (the latter being processed by such well-established statistical techniques as factorial analysis). This additional information, obtained through surveys or interviews concerning the types of actors in the pipeline, is particularly valuable evidence of social change, in other words the dynamics through which actors change, expand or reduce their roles and their power in the pipeline. The researcher chooses the interpretative procedures to be used in structuring the data. For example, Leplaideur uses Marxist economic theory. According to this theory the motivating force of social change lies in conflicts between those whom the economic process either reduces to poverty (causing their disappearance from the pipeline) or maintains (allowing them to reproduce the function and means of production or to accumulate either means of production or functions in the pipeline). Analysis based on this view involves grouping data in accordance with the variables that reveal this dynamic process.[9]

2.5 Summary

The identified strengths of this approach include enabling researchers to:

- take a holistic view of the phenomena (flow of commodities and finance, economic performance, structure and hierarchization of activities or segments) in their sequence from one end to the other of the production/consumption chain for a given product;

- articulate the interplay of functions and actors; and

- identify mutually influencing relationships (actors' strategies) and their power of control.

This approach has the added advantages of:

- the possibility of sub-dividing the analysis (sub-pipeline, segment, etc.); and

- the flexibility of the interpretative model, which allows economic factors to be combined with others from an interdisciplinary perspective.

Despite these strengths, the pipeline approach has been criticized because:

- although sub-division of the analysis provides this tool with considerable flexibility, it also limits its explanatory capacity (which is based on the widest consideration of the pipeline and not on its restriction);

- the critical process of identifying the shape of the pipeline is an imprecise element in this approach, because there are no clear-cut methods of doing this; and

- the choice of product and pipeline assume a strategic value which leads to the potential risk of reaching conclusions that do not reflect the phenomena being observed. This is because the product retains a central role in the phenomena structuring the pipeline and is a key determinant of the functions of actors involved. This becomes particularly problematic when trying to extend results obtained for one product to the whole socio-economic system.

In Leplaideur's words:

> *"It is true that focusing on a dominant product will allow a better understanding of the forms of production-trading social relationships than an overall analysis of all producers and traders. However, having made such an analysis, we cannot extrapolate from the observed process to the entire economic system. This can be attempted only when the product being analysed has been shown to be the centre of social interchanges in the period being analysed at the spatial level being studied"* (Leplaideur, 1994).

Economic analysis undertaken gives a measurement of the efficiency of the pipeline and its strengths and weaknesses, through calculation of costs, margins, etc., at different stages and for different functions and actors. Unlike the traditional neoclassical approach, it is not a question of efficiency as measured against a rigid model, but of a judgement based on comparison. The aim is not the concept of an optimum, but rather the degree of efficiency in comparison with other situations.

The analysis of actors' strategies entails a very detailed description of the economic and social relationships concerned with the product that goes beyond the simplifications found in other methods. The problem with this lies in the need to isolate trends and conclusions capable of synthesizing a considerable amount of very varied data. To the extent that the pipeline is integrated into its social, political and geographical context, a large number of variables have to be taken into account. The interpretative models, thus, become more complex and synthesis more difficult. It is in finding solutions to these problems that it is possible to gain an insight into the forces that provide the sector with its real dynamics and also where and how (and through whom) they act and affect its degree of efficiency.

3
The evolutionary approach

FSDSs must be able to adjust to change in order to fulfil their role. These systems, however, are in a state of crisis precisely because the factors determining them are not fixed but extremely dynamic. Although a state of equilibrium is postulated theoretically, especially in economics, it is never attained except perhaps when the system is being considered in general and abstract terms. Quite often agents involved in FSDSs have to cope with an environment that presents problems of adaptation for them.

In discussing change and innovation, it should be noted that because economic theory focuses particularly on the industrial sector, these terms tend to imply changes primarily in production techniques (technical progress) and, in more general terms, to organizations. Various theories have been developed to locate innovation within economic systems and in the environment of which they are a part. With regard to FSDSs, at least two points need to be settled in order to appreciate the value of examining the subject of innovation. First, the level at which one can speak of innovation within FSDSs; and, second, how the subject is to be addressed in conceptual terms. While the latter point is relatively simple, since it is a question of reconstructing, albeit very briefly, the development of economic thought in this area, the former concerns a vast area in which research has only recently begun.

This complex subject will be addressed in this chapter in an effort to define an evolutionary innovative approach to examining how innovations can be realized within FSDSs.

3.1
Theoretical perspective on innovation: the historical background

The basic essentials of the concept and role of innovation in economics can be understood by taking a brief look at the development of economic thought. This entails consideration of four main positions: classical political economics, Schumpeter's approach, the macroeconomics of technical progress, and the evolutionary approach (Le Bas, 1995).

The classical economists Smith and Ricardo provide concepts to handle the theoretical disposition of innovation. Smith considers chiefly the technical aspect, concentrating particularly on the division of labour from the start of any innovation, since this allows and facilitates the introduction of machinery into the production chain. On the one hand, technical innovation is a phenomenon that evolves at the factory floor from the know-how of craftsmen and experts. On the other, the profit motive urges entrepreneurs to favour progress. Other authors follow Smith's lead, using the same conceptual tools, but with a broader and more complex view of reality. Through the work of Babbage and Young,[10] the influence of Smith's legacy is found in Kaldor's cumulative causation model and Myrdal's development analysis.

Ricardo is associated with a systematization of types of technological progress and speculation on its main features: its effect on value (use value/product value) and on the breakdown of earnings (salary, profit, income). The latter point is then developed in terms of the technological unemployment issue and the neutrality of inventions.

Schumpeter reserves a special place for analysis of innovation, placing it at the heart of his interpretation of the economic system and of development phenomena. According to him, innovation constitutes a defining feature of the firm and the entrepreneur and has the function of bringing new combinations into action (Le Bas, 1995). He further distinguishes between the roles of the entrepreneur and inventor with regard to innovation and emphasizes that the process of innovation depends on proximity to earlier innovations and a synergy between the entrepreneur/inventor and the social and cultural environment. Schumpeter also stresses the importance of the conditions of competition, which are no longer explained in terms of price but in those of product innovation, and the profit motive, explained not in terms of risk but of innovation itself.[11]

From a macroeconomic point of view, innovation occurs in the framework of the system's equilibrium. The views of various schools of economic thought differ widely on the dynamics and role of innovation in this process. In early neoclassical models, technical progress is seen simply as a distortion of the steady-yield production function. The Keynesian school, on the other hand, accepts the changing yields associated with technical change. This difference inevitably affects the methodologies used to measure innovation.

3.2
Innovation and the process of innovation

Unlike those mentioned above, the evolutionary school focuses on factors that result largely from changes in the object being observed. Whereas the other more "traditional" approaches focus on the study of technical progress, the evolutionary approach is more concerned with the actual process of innovation. As shown below, this difference in perspective has interesting and innovative implications: the usual problems of economic analysis are bypassed or short-circuited while others arise that affect methodology. A summary of what is involved here is provided with a view to helping our understanding of FSDSs.

In neoclassical economics the firm:

> *"... may be considered as having two complementary features: it appears as an agent without depth or dimension (a "point-firm"), and as a passive agent (an "automaton-firm" ...). Like any individual agent in the neoclassical world, this actor behaves in a perfectly rational manner, as seen in its objective function of profit maximization, without the constraints of its technological capacities"* (Coriat and Weinstein, 1995).

An entrepreneur with full information on the facts of the problem has complete mastery of technology and its technical and economic parameters (production function). His choices are governed by a substantive rationality, which economists derive from the content of these choices.

The evolutionists reject this concept, preferring a rationality that is derived from the way choices are made and not the choices themselves:

> "*This gives rise to a proposal for an alternative approach to rationality, defined depending on the situation as 'procedural' or 'bounded' rationality, and leading to in-depth study of the decision-making processes of the firm and in the firm, in a complex situation .... It highlights the process of learning, problem resolution ... and rule development .... In the context of the theory of the firm, this can be seen as the basis for a 'behaviourist' view, as opposed to the 'situational determinism' of neoclassical theory"* (Coriat and Weinstein, 1995).

The process of learning and its various features are thus analysed[12] and aspects of innovation ignored by traditional theories are brought to light. The process of innovation is seen as having a social dimension (an innovation is always effected and disseminated through a network rooted in social relationships, with the firm at its centre playing an economic mediating role). It is also an interactive process, either within the firm or in relation to the network to which it belongs (whether this is official, institutionalized or informal). It establishes itself along specific paths in relation to its surrounding environment and is marked by technological discontinuities and proximities, accumulated skills and economic uncertainties.

With regards to the origin of research and the reasons governing the choice of innovation, Montaigne stresses that the evolutionary approach:

> *"... is opposed to the neoclassical view that technology is exogenous to the*

economic world and that an invention appears by chance, no matter where, with entrepreneurs then deciding to adopt it, depending on their calculation of a reduction in costs. Technology is thus thought of as a 'great book' containing all the techniques on which the entrepreneur would draw, depending on the relationship between input and product prices. Calculation and the line of reasoning remain fixed around the production function and linear planning.

The technological paradigm … to the body of technological knowledge shared by firms and the community of engineers, technicians and development agents with respect to the current or intrinsic limits of a particular technology. It encompasses the opinions and paths of research in order to find the best way of improving things. It is associated with shared ideas on the developed product whose performance has to be improved and production costs reduced" (Montaigne, 1996).

This approach incorporates the concept of "technological trajectory", denoting the pathway an innovation must follow in order to establish itself within a complex environment. In methodological terms, it is interesting to note that this approach is compatible with the pipeline concept. Here we have an "innovation pipeline" made up of all the firms and private or public organizations that take part in the process of developing a technology (Montaigne, 1993).

3.3 Innovation and urban FSDSs

In this section an attempt is made to bring the two conceptual fields of innovation and FSDSs together, to see how and at what level the evolutionary approach can be applied to these systems in the African situation. The evolutionary approach is relatively recent although it is the outcome of earlier concepts borrowed from history and science (see Box 1). It is a product of the economic analysis of industrialized countries and has only recently been applied to agriculture, with its use in research on agricultural and food systems in developing countries being at the pioneering stage. In view of its origins, the evolutionary approach has been applied primarily to technical innovations (industrial or small-scale), following a well-trodden path with the help of scientific and methodological approaches refined in a developed environment. Doubts about the applicability of this "imported" approach have been put succinctly by Treillon.

> *"From 1970, however, doubts began to be raised as to the applicability of imported scientific models, and the need for a re-thinking gradually grew clearer. Several arguments played a role in this revision. Firstly, there was the need to take account of the structural facts of underdeveloped economies. ... Secondly, criticism of development models as a result of both the failure of industrial projects, and especially of the continued existence of the causes of underdevelopment, led to a change in the issues at stake in innovation, overturning the whole question of 'why'. Lastly, analysis of the 'consequences' showed that very frequently the spread of innovations had a deeply unequal effect, aggravating the uneven sharing of power and wealth"* (Treillon, 1992).

Studies carried out from the innovative perspective concentrated particularly on food processing – a specific feature of FSDSs that is growing in importance as a result of urbanization (population concentration, expansion of urban markets, changes in life-styles and food habits). A sample of these studies, with some relevant methodological comments, was surveyed by Treillon (1992) and Muchnik (1993). The question that arises is whether the evolutionary approach can be extended to other specific activities of FSDSs concerned with marketing and associated problems. In other words, can the evolutionary approach be applied to the study of FSDSs as systems? Since there are no known evolutionary studies of FSDSs as systems, following are some issues pertinent to this question:

- Innovation is defined to include both technical and organizational factors.

- Organizations should be studied not only in relation to the firm or a unit in its economic activities but also as systems of firms/units and their relationships.

- It has to be recognized that many elements in FSDSs are subject to very powerful internal or external forces (for example, structural adjustment, devaluation and privitization) to which actors have to adapt by changing their attitudes.

- Change is seen as essential for preserving the system at all levels. Producers, traders and consumers learn new types of conduct in order to cope with constraints that arise from time to time (here we have innovations within a process of innovation).

- Finally, there is need to explore areas or units of study (apart from processing) in which the evolutionary approach can throw light on the dynamics of change. For instance, how do the agents involved (institutions, individuals, etc.) acquire the know-how necessary to handle privatization? How does the idea of a new way of organizing marketing spread through the population?

3.4 Summary

By comparison with traditional economic approaches, the evolutionary approach to the study of innovation is itself innovative, being focused not on innovation *per se* but as a process. This change of perspective entails a conceptual procedure leading to the consideration of:

- the process of studying the innovation;

- actors following a procedural type of reasoning, instead of a substantive one (unlike the neoclassical approach); and

- the network of social, economic and institutional relationships in which the innovation is embedded, moving beyond simple calculation of the economic margin in order to interpret adoption of the innovation.

This procedure is enriched by other conceptual tools – the "technological paradigm" and the "technological trajectory" of innovation. From the operational point of view the evolutionary approach can also be subjected to a pipeline approach (the innovation pipeline) and a systemic conception. Using these tools, this approach seeks to explain the purpose, process and factors that promote innovation and how it spreads in an environment with its peculiar economic, social and technical features.

Apart from the application to the study of technical innovation in agrofood processing, it will be interesting to consider whether the evolutionary approach can also be adopted in studying other segments of FSDSs (perceived as systems in either continuous or sporadic evolution, requiring adaptation of actors and structures and open to innovation within a complex context of economic, social and institutional relationships).

Box 1

Biological origin of the evolutionary theory

The roots of the evolutionary theory in economics can be traced to nineteenth century biologists, especially Darwin with his famous work *On the Origin of Species by Means of Natural Selection* (1859). Although he was not the first to develop these ideas – Lamark before him and his contemporary Wallace having proposed similar theses – his fundamental contribution was recognized by the scientific community (Bosquet, 1968).

These ideas were themselves inspired by the work of economists, because it was after reading T.R. Malthus's *Essay on the Principle of Population* that he realized the solution to the problem of natural selection. A century later the wheel turned full circle, with the establishment of a school of economic thought around a theory conceived by analogy with biological concepts and the theory of evolution (in contrast with neoclassical economics which has more in common with physical and mechanical laws).

Based on the observation of the existence of a struggle for survival between individuals of the same or different species, Darwin defined natural selection as responsible for the formation of species and the constant process of adaptation. However, he did not know of J. Mendel's work on heredity. In the 1930s, a number of researchers were finally able to build on this theory of the acquisition of genetic characteristics. Furthermore, they presented natural selection as a statistical process. "Natural selection ensures the statistically preferred transmission of the best adapted genotypes." The theory also profited from the work of systematicians and ecologists.

However, it seems that the economists stopped borrowing from evolutionary theory much sooner, confining themselves to the three basic laws or principles: the principle of variety among the elements of a population; the principle of heredity (which reveals the form of the continuity of species within time) and the principle of selection, according to which certain species are poorly adapted to their environment and must evolve or disappear (Chanaron and Metcalfe, in Montaigne, 1996).

4
The historical approach

Alternatives to the strictly economic approach include the regional social history approach (Guyer, 1987), referred to simply as the historical approach. This approach seeks to shift the interpretation of food-supply related phenomena away from a disciplinary particularism to a more general perspective in which the performance of a distribution system is analysed in terms of its development in a physical, economic, social and political territory. It therefore adopts historical tools in addressing its subject, while not forgetting the geographical aspect, which finds its functional dimension in "the region".

At least two points can help to comprehend exactly how this approach differs from those described earlier. First, the role of cities in the analytical methodology used and, second, the need to set the economics of food distribution within the surrounding system of social, institutional and political relationships and factors. It will be recalled that the latter aspect was considered in examples with respect to the traditional approach (Lutz, 1994; Goossens, 1994) as well as the pipeline approach (Hugon, 1985; Lançon, 1994; Leplaideur, 1994) and implicitly in the evolutionary approach. In the historical approach, the need for comprehensive interpretative coverage is met by the preference given to a truly complex methodology which is closely linked to the choice of cities as the focus of analysis. In nearly all food distribution studies, the urban context is considered one of the key locations because the problems involved in the African food crisis and the influence of various factors (economic, social, institutional and political) can most clearly be seen in the context of the cities. In other words, this systemic approach can best be adopted at the urban and regional levels.

4.1
Recomposing the social field

Guyer (1987) identifies three variants of this approach that have been used in research into the problems of urban food supply. These differ as much in the aspects they consider as in the methodologies adopted. The "American approach", first developed at the Stanford Food Research Institute in the 1960s, was initially prompted by studies on the efficiency of marketing networks and ways of improving it. This model focused on conditions of competition as the determining factors for efficiency. It marginalized linkages between economic

factors and the social, political and institutional context.[13] The model developed by the "French school"[14] partly bridged this conceptual and methodological gap by shifting attention from markets and prices (as effective vectors of information through supply networks) to the social organization of the distribution of goods. The starting point is thus quite different because the hypotheses of this model take distribution institutions, rather than market principles, as primary subjects of research. The model, however, fails to answer fundamental questions, particularly on how African farmers, traders and consumers have been able to influence policies and prices. Finally, the "English approach" gives greater importance to factors governing living standards. It therefore pays attention to relations between salaries/income and consumption, with the explicit or implicit aim of reaching a better understanding of relations between economic well-being and political stability.

There is an implicit criticism of the traditional or economic approaches in the historical approach. Guyer notes, for instance, that research efforts on the multiple aspects of food distribution tend be highly specialized and often totally isolated:

> *"While the academic disciplines have made analytical progress by separating the domains of social life—politics, economics, culture and material life—there are junctures at which particular dynamics cannot be studied without a recomposition of the social field .... Food distribution systems are not only market chains which ensure the conveyance of goods and the communication of price information, nor merely a link between the classic dyads of analysis, the producer and the consumer, the peasant and the state. They are also organizations rooted in an articulated social and economic structure. Throughout the continent, they form a bridge between the conditions of production in an African society and ecology and the conditions of exchange and power in a national and international political economy"* (Guyer, 1987).

Since food distribution is not simply a technical matter but also a major political and social issue, the routes followed by the different disciplines have to be reorganized into a structured conceptual framework capable of joining the technical and economic aspects of distribution with the dynamics of the social and political environment in which they operate. In other words, the question to be answered is that of how food supply has worked in different historical periods and what its relationship with different political contexts has been. The

historical approach facilitates this process of providing a full interpretation of the complex relationships involved in food distribution.

> *"First of all, regional social history allows us to explore the domains of social and economic life as related to one another in a system, and thereby to recontextualize dimensions of food supply which have been analytically separated"* (Guyer, 1987).

4.2 Basic features of the historical approach

Describing the methodology used in the historical approach involves both operational and conceptual questions, some of which are critical for any assessment of its practical effectiveness. As stated earlier the choice of the city and region as the focus of analysis is based not on the convenience of restricting the geographical area under study but on recognition of the fact that the city is the site of systemic relationships. National and local powers, which are capable of influencing the functioning of supply and distribution systems, are often found together in a large city, whose history is also the history of the groups and organizations that participate in decision-making processes, and of institutions and how they have changed. As a unit of analysis, the city also provides a limited territory in which social dynamics (the formation of social classes and their economic and political dynamics) take on a greater significance. With respect to case studies, it should be emphasized that in this approach the conclusions to be drawn from them cannot be seen as universally valid laws; they are not starting points for a process of induction. On the contrary, in the systemic approach most of the available analytical information is used to restore the unique quality of the case under study, in a kind of "reverse movement" from plurality of information to case specificity as argued by Guyer.

> *"Instead, therefore, of lifting the results of local studies out of context in order to illustrate a general conclusion, we are pursuing the reverse strategy of drawing on as broad an array as possible to recompose geographically and historically specific dynamics"* (Guyer, 1987).

The use of the social history of cities in the process of recontextualization entails both a division into periods, i.e. identification of socio-institutionally uniform periods, and the identification of key moments marking the shift from one period to the next or from one socio-institutional system to another. Attention is

focused in the latter case on crises of adaptation to major changes in the political and economic context of the city or region (changes in the political and institutional regime, social class dynamics, etc.) or in the world situation (for example the effects of the Second World War). This procedure allows us first to highlight relationships between the social sphere (political power, institutions, group and social class dynamics) and the features of FSDSs, and to relate changes in the latter to movements in the former. It also facilitates an understanding of how FSDSs work, who gains and who loses with what type and level of state control, and with what long-term results (Guyer, 1987). Focusing on crisis periods also brings out points of continuity or discontinuity in the development of distribution systems and the relationships between features of these systems and the social and political factors in each individual period.

The approach is based on the hypothesis that the interests of social and political groups – and also the ways they are established – are more clearly seen during periods of crisis than in normal times. Guyer works with a division of the history of African cities into four periods: the pre-colonial period; 1880-1940 (which saw the development of the administrative and salaried classes); 1945-1970 (which witnessed urban growth and the rise of the informal sector); and the post-1970 period of market interventions. Supply and distribution systems are examined for each period from a number of perspectives according to the criteria briefly outlined above.

Case studies (city studies) furnish comparative conclusions, inasmuch as they observe solutions and strategies for change instituted by different urban societies in comparable historical periods. General trends going beyond the individual features of case studies can thus be identified while avoiding the temptation of making simplistic generalizations. At a superficial level this methodology is concerned with the relationship between the operational methodology of case studies and the possibility of generalizing on processes of change. It touches, however, on a much more fundamental problem: the concept of growth and whether it should be viewed as a succession of predictable stages or the outcome of unique, critical situations that provide system dynamics with a structure and specific features. This highlights a confrontation between two major schools of historical thought:

> *"Growth, however, is an ambiguous organic metaphor, implying as it does both incremental development and metamorphosis. The two major intellectual traditions in African studies, neo-classical and neo-Marxist*

paradigms, place different emphases on these two different qualities. As exemplified in the work of W.O. Jones, the former approach implies that the growth of the market is a fundamentally cumulative process involving the increase in demand and supply. As exemplified in many of the neo-Marxist critiques, the growth of the market is more fundamentally a process of commoditization, which characteristically develops through qualitatively different stages, crossing identifiable structural watersheds" (Guyer, 1987).

The lack of precision in the neoclassical and neo-Marxist approaches is perhaps a result of the idea that there is an inherent direction in events, which also implies that too much reliance is placed on case studies as illustrating a universal order. By contrast, the historical approach takes the course of change itself as the object of analysis.[15]

4.3 Summary

Adoption of this method and some of its results may produce more questions than certainties, reflecting methodological weaknesses at the operational level. A number of authors note the lack of data and the imprecision and incomplete character of historical studies over long periods. They also warn against the temptation of drawing simplistic conclusions from the available data:

"The thinness of the data base on urban food supply ... is one problem in the reconstruction of a social history .... Entire periods, sectors of the market and even crucial organizations and events may leave only a hint in the record or, beside oral testimony, no trace at all .... The greatest difficulty is in placing and interpreting the sources. The most obvious fact is that records are generally official and that the documentation therefore reflects the responsibility assumed by the state, itself one of the objects of study" (Guyer, 1987).

Apart from the lack of statistical data, the use of the historical approach tends to be problematic because of the quantity and complexity of elements to be taken into account in order to achieve useful results as well as its attendant risks of subjectivity. Nevertheless, the approach seeks to meet a strongly felt need (providing a systemic view) and its use therefore needs to be encouraged.

Its results are situated at a fairly general level – as is to be expected with a

"systemic" approach – and it allows variables upstream of the particular object of study (the urban FSDS), either in time or in terms of strategic relationships, to be integrated into an overall picture. It produces results in terms of: broad trends in food supply; the interests of social and political groups; adaptation and perpetuation strategies in crisis periods and the means of implementing these strategies. At a more specific level, efforts are made to explore the connections between the three aspects of regional supply systems: the income/price relationship for producers and consumers; forms of organization in production and trade; and the broader social dynamics resulting from interaction between social organizations and colonial and post-colonial policies (Guyer, 1987). This leads to some interesting results, which may in fact overturn previously accepted points of view.[16]

Critical analysis of the initial motivations and final aims of supply systems provides the historical approach with very important data on the everyday context in which these systems play their vital role. This is of fundamental importance to any policy intervention that considers the food supply problem not in isolation but as part of a system of relationships. The method of comparing isolated cases or different times may prove the best way of checking the efficiency of traditional economic interpretations, which are often deductive, but it does have some major weaknesses. The lack of data – see studies on the economic history of food (Guyer, 1987) – is perhaps less important than the absence of a reference model for analysis of systemic relationships because of difficulties in operationalizing its underlying concepts. This implies that the method cannot be standardized, with the risk that the results of analysis will be imprecise or subjective.

5
The nutritional approach

There is a clear relationship between nutrition and FSDSs since food consumption, which is an essential determinant of the nutritional status of a population, is the main goal of the FSDSs. No policy concerned with food – whether agriculture, food security or distribution – can therefore disregard consumption models and their relevance to the nutritional needs of a population. When speaking of FSDSs, however, it is necessary to clearly distinguish between the spheres covered by the two aspects of supply/marketing and desirable nutritional status. Attempts to combine these two spheres require, as a first step, a description of the scientific and methodological aspects of the

nutritional approach and how it is related to the goals served by FSDSs.[17]

Since most food consumed in urban areas is purchased, a more efficient FSDS and better information for consumers can help to improve the nutritional status and quality of life of the city inhabitants. The nutritional approach therefore analyses FSDSs not only in terms of their economic performance but also on the basis of the extent to which the services provided ensure the supply of a variety of wholesome foodstuffs at affordable prices to everyone at all times. This definition extends to non-commercial food distribution systems as well.

Although different branches of nutritional science can contribute to the analysis of FSDSs, the study of nutritional issues is only developing, with the exception of quality control. Nevertheless, nutritionists have been and are often involved in various consumer aid programmes including food rationing during wartime, food coupon programmes for disadvantaged social groups and subsidies for certain staples.

Unlike the traditional economic approach, there are no significant differences in the methodology used in analysing the food and nutritional situation in the study of FSDSs. The analysis tends to concentrate on:

- the evaluation of nutritional status, for example, in connection with mother and child protection programmes or day nurseries;

- consumption and food habits, especially as concerns young children; and

- food quality issues.

5.1
Current state of theories and methodologies

Nutritional studies tend to focus on *ex post* analysis of the impact of FSDSs, i.e. on the effect of food and nourishment on the population. These studies, which are as much concerned with medical sciences as with social sciences (sociology and economics), take account of a wide range of issues including food demand and formal or informal marketing networks as well as all the processes involved in preparing food for consumption, including cooking.

5.2

Analysis of nutritional status

Nutritionists focus mainly on collecting data on the nutritional status of the population (in this case the urban population). Established yardsticks such as the Body Mass Index (BMI) are used as indicators of vulnerability among the urban population and provide indirect information on FSDS performance, inasmuch as urban consumers depend primarily on distribution systems for their food supply. The prevalence of clinical signs of malnutrition, especially deficiencies in micronutrients (diagnosed during nutritional studies or more commonly by health centres), often justifies studies on the diet of the groups concerned and of their knowledge, attitudes and practices with regard to food. Such studies facilitate the identification of foods that are lacking, so that their consumption and therefore availability at affordable prices is encouraged. Data on the nutritional status of a population can therefore provide vital information on FSDSs and also help in subsequent monitoring and evaluation of any programme to improve these systems.

5.3
Study of urban food consumption

Food demand is often estimated by studying consumption. In addition to examining overall consumption trends, nutritionists tend to be concerned with consumption by different groups in the population and seasonal variations as well as the factors governing these. The methodology they adopt in this process is often akin to what other disciplines such as economics use.

The consumption patterns and diet of the urban population are usually analysed using a combination of budget-consumption surveys combined with food composition tables. These studies usually involve multidisciplinary teams (economists, nutritionists and statisticians) and tend to be costly in time and financial terms (staff to collect, process and analyse data as well as equipment). Though such studies constitute a major source of information from which nutritionists can analyse FSDSs, the cost implications raise fundamental questions about whether or not it is reasonable to undertake them.

Studies on the knowledge, attitudes and practices of urban consumers regarding food and nutrition also provide important information on the factors governing their food choices and hence purchasing behaviour. It has to be stressed, however, that results from such studies need to be triangulated with studies of

the population using social and cultural criteria (for example region of origin).

The study of the behaviour of disadvantaged consumers (identified on the basis of such criteria as an insufficient BMI) with respect to food supply is especially important. Issues examined include analysis of modes of consumption, how food is selected and acquired and the obstacles consumers face in purchasing, storing, preparing and cooking food and distributing it within the family. The emphasis in these studies is increasingly being placed on participatory thematic analysis methods. These combine a variety of techniques (including semi-structured interviews with target groups, group exercises based on visualization techniques, etc.) and involve multidisciplinary teams that include those involved at the local level. These methods tend to provide a basis for subsequent quantitative studies on issues identified as particularly relevant.

5.4 Quality control of foodstuffs

Studies on quality control of foodstuffs usually aim at identifying the various causes of contamination or adulteration of agricultural produce entering the FSDS. Food contamination monitoring programmes developed at national or, in certain cases, regional levels provide essential mechanisms for assessing the quality of foodstuffs, including those handled by FSDSs. They identify not only the type of food, contaminant or adulterant, but also its source within the food chain (production, storage, transport, distribution, marketing, etc.).

These programmes are usually carried out by food quality control services within the framework of a more general national quality policy. They require central administrative structure as well as institutional structures for inspection, sampling and analysis and qualified personnel, particularly inspectors, microbiologists and chemists. The main factor that discourages the inclusion of contamination surveys in the study of FSDSs is the associated high cost. Existing data, however, may provide a good indication of quality trends in FSDSs in a country, while specific quality studies can be applied to a particular pipeline or foodstuff where necessary. For instance, regular inspection reports from control services as well as reports on special inspections carried out following a food contamination incident or a disaster resulting in contamination of food supplies, or complaints from consumers and those working in the pipeline under consideration, can provide very useful information. Analysis of survey reports on food-transmittable diseases (including diseases associated with contaminants,

the foods involved and seasonal occurrence) can also facilitate analysis of the quality of foodstuffs handled by FSDSs.

5.5 Relationship between this discipline and others

The description of the relationship between the nutritional and other approaches discussed above is rather limited mainly because of definitional difficulties arising from the fact that FSDSs, as systems, depend on human resources and the institutional context in any city being studied. It must be noted, however, that nutritionists need to work with all the other disciplines in order to ensure that nutritional considerations are taken into account in analysing FSDSs. They have to work closely with economists (in analysing trends in food demand), sociologists (in studying purchasing behaviour and factors governing it), town planners (on decisions affecting the location of points of sale), legislators (analysis of quality issues) and food technologists.

5.6 Summary

The work of nutritionists begins with establishing the nutritional status of the population being studied. Information provided by this analysis facilitates a general assessment of the food needs of the population as well as the identification of any nutritional shortfalls or lack of particular nutrients. This provides a basis for related analyses on food habits and how consumption needs are satisfied. The nutritional approach tends to rely on survey methods used in economic research on consumption (particularly food demand analysis) as sources of additional information in examining FSDS issues. Budgetary and time constraints have often limited the extent to which nutritional issues are analysed in depth in FSDS studies. A case in point is the study of quality control issues, which tends to be problematic mainly because of the high direct cost involved and the need for specialized technical skills and organizational structures. As such most studies on the dietary efficiency of FSDSs rely on indirect sources of information and indicators in examining quality control and nutritional issues.

The relationship between the efficiency of FSDSs and the nutritional status of the target population can be reduced to two main issues:

- the gap between what is eaten at a given time and what should be eaten in

order to best meet nutritional needs; and

- the conditions of supply and distribution which under normal conditions ensure the availability of nutritionally essential foods.

The first is more general and is mainly concerned with rules for proper nutrition. The second leads to consideration of food security in relation to particular social strata or phenomena seen as structural (poverty, demographic profile, decline in purchasing power, etc.). In both cases, the question is how FSDSs can convey nutritional messages through structures specific to their own particular mode of operation when they are also faced with problems of economic efficiency.

In terms of action aimed at improvement, this focuses attention on the possibility of identifying synergies between the development of FSDSs and improvement in nutritional status. Two different situations that need to be addressed emerge depending on whether nutritional analysis is concerned more with nutritional status or quality control. Focusing on the former affects FSDSs indirectly through demand and more directly as an indication of structural inefficiency. The latter objective can also indicate inefficiencies in pipelines (problems with storage, preservation, processing, hygiene, etc.) and the structural relationship of these with FSDSs must be analysed with a view to examining the possibility of intervention.

These considerations suggest that nutritional issues constitute an important dimension of FSDS efficiency.

Box 2

Development of the methodology used in food quality analysis

The development of analytical approaches to quality problems with street food is a good illustration of how thinking in this area has been moving in recent years. Studies aimed basically at identifying concrete measures to improve the quality of street food in order to protect the health of consumers.

In the earliest studies it was decided to take a broad sample to analyse possible microbiological contamination as well as any possible contamination by chemical agents, especially heavy metals, food additives and aflatoxins. This allowed identification of the most common contaminants and the foodstuffs most susceptible to contamination or adulteration. The limitations of this approach were mainly budgetary, restricting the size of samples, so that some of the studies were not truly representative.

The second approach consisted of refining the earlier results by restricting contamination studies to foods identified as the most susceptible to contamination, and the most widespread contaminants, especially micro-organisms. Working with similar budgets, more representative information on the contamination of individual types of food was thus obtained. These studies, however, did not allow identification of the origin of such contamination.

The third approach therefore focused on one type of food, studying all the stages of the pipeline (purchase of raw materials, processing, cooking, storage, preservation, transport and sale). This made it possible to identify stages at risk – points where contaminants could be introduced or could not be eliminated by the preparation process. It thus made it easier to define good preparation practices, easily adopted technological innovations, and food hygiene practices for the street food sector. The approach, however, turned out to have limited impact inasmuch as operators lacked incentive to adopt methods capable of improving quality and therefore on the whole ignored them, while consumers tended not to grasp their purpose.

The fourth approach incorporated participatory methods, working with sector operators, and carried out consumer surveys in order to identify constraints affecting preparers/vendors, and also to reach a better understanding of consumer attitudes and expectations.

These various approaches have helped to develop concepts of quality for the street food sector, one of the major sectors of African FSDSs. Studies initially concentrated on purely scientific and technical research on contaminants and food preparation, but now cover cultural, legal, land tenure, regulatory, socio-economic and town-planning aspects. Here again, the need for a multidisciplinary approach has clearly proved essential.

6

The geographical approach

Geography holds a major place alongside the other disciplines in the analysis of issues related to food supply and distribution. Franqueville noted that:

> *"In geographical theory, urban provisioning (food supply) is one of the components of the functional organization of space that has concerned geographers since their discipline became an autonomous science in the nineteenth century"* (Franqueville, 1996).

As was the case with the traditional economic approach, discussion of the geographical approach involves defining the sphere and levels at which it can provide an explanation of phenomena concerning the urban FSDS. It also includes identifying the conceptual tools used and showing how this approach can work with other disciplines to provide a more precise explanation of concrete cases in urban food supply and distribution.

Space is usually seen as the main dimension of reality with which geography is concerned. The concept of space, however, extends beyond the simple physical dimension and has a scientific and analytical significance in geography when it is differentiated and takes the form of a complex of structures, forms, functions and relationships anchored in a physical space. Geographers therefore focus on the differentiation of space as well as the process of differentiation and its consequences. Given this background, this study seeks to decipher the riches of the geographical language and its special insights in the sphere of food supply and distribution in cities.The geographical approach is perceived as being concerned with relationships between urban space and the supply of food to the urban population. It seeks to demonstrate schematically, the interplay between urban growth and the metropolitan dimension of cities, and how food production and distribution systems operate in urban areas.

All FSDS operations face situations and constraints that are as much geographical as economic. One cannot speak of economic relations therefore without taking account of their spatial dimension. On the one hand, a distinction can be made between production, exchange and communication spaces and also how these spaces are established, change and relate to each other. On the other, one can distinguish between rural and urban spaces, their functions as well as the complementarities and conflicts concerning ways these spaces may be used. Space is a scarce and limited resource and geographers tend to be concerned

with explaining how it is organized, its specific internal dynamics and how to make the best use of it in view of people's varied needs.

As cities grow their various functions increase, becoming more distinct and more complex at every level as a result of the demographic, economic and social dynamics of urban areas. The political role of cities may also change, leading to questions concerning the influence of cities over a growing and increasingly varied territory; their role in the region, the state and in relations with other countries; and the exercise of administrative and political control over the cities. Spaces that have traditionally or intentionally been dedicated to specific functions change under the pressure of this growth, a pressure exerted by a wide range of forces.

Food supply and distribution and related ancillary services need specific, distinct spaces because of their size, quantity and required installations. Urban growth therefore means that such spaces have to be reallocated to meet new requirements in order to avoid serious inefficiencies with significant negative consequences for the population. This sets the background from which one seeks to gain an understanding of how cities work and of space/function relationships (a vast, rich sphere even when dealing with the single issue of meeting food needs).

6.1
Urban growth: city and metropolis

The geographical concept of the city is both multifaceted and changing. It is perceived in one sense as a collection, series or stratification of manufactured products with a range of purposes (housing, production, trade, transport, administration, leisure, etc.) which give rise to relationships between individuals, groups, institutions and authorities. Cities are not random phenomena, but arise and change over time according to criteria that geographers have sought to rationalize with such classical principles of economic and spatial organization synthesized by Prezioso (1996) as including:

- agglomeration (or the scale of expansion and the level of cohesion of the urban aggregate);

- accessibility (the minimum economic distance paradigm as formulated by Von Thunen);

- interaction (the phenomenon of economic gravitation within the city);

- hierarchy (which depends on the position, importance and role of the city in a given space, for example the region, as opposed to other urban centres); and

- competitiveness (connected to the basic productive activities that enable the city to reach outside markets).

In discussing the principles that shape cities and give rise to typical urban structures, use is usually made of urban development models (centre-periphery, multipolar and reticular models) that differ depending on how physical and functional spaces are distributed and related to one another. They convey a descriptive and interpretative idea of space and reflect the specific conceptual and theoretical contributions of geographers.

According to Prezioso (1996), for geographers, a model is a tool for interpreting reality after the fact, and unlike other sciences has no prognostic function.[18] Its role in geography differs from that of economics where it is an *a priori* element, a form and method of knowledge in itself, which is superimposed or sometimes imposed on actual reality. Franqueville describes the model as follows:

> *"An attempt to formalize and interpret varied concrete situations in order to establish common points .... It never corresponds perfectly to any reality, as each geographical space is a particular case. Nor is it in any way static, inasmuch as it describes a kind of equilibrium reached at a given moment, while always remaining open and ready for change"* (Franqueville, 1996).

A model in town-planning terms has a normative function. Attempts to apply such models in many African cities and the consequent need to take account of totally different environments have influenced thinking in this area, leading to changes in models used as well as in the demographic and economic indicators used in studying factors that shape the city.

Attempts to explain the shift from "city" to "metropolis" have influenced the urban development models used by geographers. In the 1950s the models used to explain this phenomenon in Africa were based on parameters derived from western experience with some modification to account for peculiar local

conditions[19]. There was also the additional influence of the concept of conurbation (seeing urban areas as a spatial continuity of structures for housing, production, services, trade, etc., without the inclusion of any agricultural land). In the 1960s this definition was replaced by one based on the idea of a continuum between the urban and adjacent zones, with the latter being affected by the spread of the former, in a hierarchical or gravitational relationship. Between 1960 and 1970 these concepts of metropolitan space were superseded by geometrical models in which the use of space is based on the rent or income formation mechanism (a model that can also be applied to economic optimization of space in terms of town planning).

More recently, Prezioso defines a metropolis in Africa as:

> *"A complex aggregation being the expression of: an endowment of high-level services (universities, hospitals, trade and administrative centres); a system of productive interdependence with the adjacent zone; 'scarce' or 'high-level' functions (organization of international relations) which affect a much wider region than the adjacent areas (because of the presence of international holding companies); an arrival point for flows of migrants from its zone of influence"* (Prezioso, 1996).

In theoretical terms, metropolitan models rely on economic concepts such as transport times and costs, installation costs and the availability of infrastructure. These models and concepts are commonly used to produce town plans that make the best use of the functions of the metropolitan centre.[20]

6.2
Urban malaise

Urban growth and the possible development from an urban centre to a metropolis constitute a critical process in the development of cities (the main indicator of this process being demography). This phenomenon has special features and dynamic characteristics in African cities when compared with cities in industrialized countries where it occurs through physiological demands and is the result of the interplay and synergy of all the economic sectors. In economically less-advanced countries, however, it tends to take place independently of the development of productive activities (leading to the formation of informal sectors), so that the pattern of the city bears the marks of this pathological condition. Furthermore, while in economically advanced

countries the model of urban expansion is adapted functionally to new demands, in less-developed countries old organizational systems, the legacy of former political regimes, remain unchanged (and are also shaped by more recent uncontrolled and uncontrollable dynamics). Thus, in the latter case, people rightly speak of an "urban malaise". It is impossible to identify and interpret what is actually happening without the help of other typically geographical concepts.

Given the special character of African urban growth, applicable urban development models and their theoretical foundations need to incorporate analytical methods and indicators that reveal the complexity of the process and the factors involved. Analysis of "significant phenomena" can provide insight on the metropolitan urban structure. Prezioso sums up the outline of this approach as:

> *"A methodological innovation to allow an understanding of the metropolitan type of urban structure in French-speaking Africa entails identification of the significant phenomena that must be taken into account when choosing indicators to be used in evaluation. The starting point is identification of situations of urban malaise: alienation, delocalization and saturation. While the first covers phenomena associated with distinction between functional zones (monofunctionality), the second covers the effects of the loss of physical dimension for the city. The concept of proximity is no longer physical, but a balance is lacking in the use of all the means of communication that could transform functional proximity into real proximity, avoiding situations of malaise. In Africa, this would seem to be caused by the globalization of international markets, which threatens to set the city at the service of outside subjects. However, it is the third condition, saturation, that causes the phenomena with most impact on the physical environment and the capacity of the entire system"* (Prezioso, 1996).

Indicators that describe urban structural transformations are applied to the natural system, the socio-economic system, the structural system for production activities, and the city's relational system (which in turn includes feeding functions). This approach is not concerned simply with the distribution of space and how it is used, but also examines the main events and relationships that arise within it. It is therefore close to the concept of systems analysis, with a geographical slant. The history of cities, has an important role in this regard and can in fact be used to explain how and why functions sometimes attributed to cities are transformed into urban projects. It also provides insight on how the

population has adapted and reacted to these projects and how and why new urban situations have arisen.[21] An integrated analysis of economic relationships, social factors, forms of government and administration and both urban and rural planning interventions, can help to describe and explain the role of geography in urban food relationships in all its complexity.

6.3
The city and food

In this section the effects of urban structure on food supply and distribution in cities are discussed. The discussion is, however, confined to a few examples that show the cause/effect process in this sphere. With respect to the process of segregation it has, for example, been observed that:

> *"The first characteristic of the urban supply space in Africa is the way it is set up in disjointed areas which often have totally autonomous relations with the market. It is not so much a question of a supply space or area as of islands, or sometimes of relatively extensive but unconnected zones from which a portion of agricultural produce is channelled to meet the needs of urban consumption"* (Franqueville, 1996).

African cities often have constituent townships that are relatively isolated from one another – so that they can in fact be described as separate towns (Prezioso, 1996, *op. cit.*). This can be attributed to the impact of migration on urban growth, with implications in spatial terms and significant consequences for food supplies. Migration often results in the very visible phenomenon of shantytowns within cities. Shantytowns are in no way temporary, but become a form of permanent settlement, demonstrating a typical process in urban segregation and the behaviour of migrants when confronted with urban ways of life. Food habits change in proportion to the variety and extent of the migrant recruitment basin (Franqueville, 1996). A greater variety in food habits also leads to changes in the products requested and in the places and ways they are bought. In other words it affects markets (as viewed by geography as spaces dedicated to trade) and their number, size, specialization (in terms of both products and clientele) and location (city centre, intermediate zone, suburbs, main roads), etc.

Urban and peri-urban agriculture is another phenomenon typical of African cities. It can be found right in the centre of a city or in its surroundings (sometimes very distant) and may in extreme cases result in an *intra muros* production

(Franqueville, 1996). Its main functional role is to supply the city with green produce (horticultural crops) at a reasonable price. This practice has created a unique urban landscape with allocation of space that is clearly of major importance to urban farmers and the average urban consumer. For urban farmers this activity provides both employment and income while for consumers it offers access to a relatively cheaper product that also represents a very important nutritional contribution to their diet. However, from the viewpoint of urban dynamics, the future of this practice is rather uncertain for the reasons outlined by Franqueville:

> *"In the course of time urban farms come up against two types of difficulty, one local and the other more general. As urbanization advances, the rising value of suburban land – and even more so of intra-urban land – ... (imposes limits) on agricultural activity whose comparative profitability will naturally decline .... The other more recent obstacle facing this kind of farming, which specializes in the production of relatively costly items, is the crisis following structural adjustment and the consequent fall in the purchasing power of most urban households"* (Franqueville, 1996).

This line of reasoning can be extended, for instance, to discussion of information systems in food distribution and also to issues related to the diet of urban households, which is supplemented significantly by the urban production network and is sensitive to changes in income and urban lifestyles. The production network retains a pivotal role in urban food supply but the problems associated with town planning indicate that any related interventions need to take account of space and the functions of this network. In this regard, complementarities (for example between housing and urban agriculture) as well as conflicts and their resolution are bound to affect the role of urban structures in feeding cities.

6.4 Summary

Geography has been closely concerned with urban food supplies for a long time. The geographical approach is based on the idea of space, seeking to interpret the way it is organized and differentiated in terms of the functions that take place in it. From the geographical viewpoint, the question of feeding cities is closely linked with the phenomenon of urban growth (often the source of supply and distribution problems).

Concepts such as agglomeration, accessibility, interaction, hierarchy and competitiveness have been developed to identify factors governing the way human activities (especially economic activities) are localized in cities and the associated relationships. The effects of these factors are analysed within the framework of urban development models, which give physical shape to scientific analysis by geographers.

The dimension of metropolis is reached by different routes. Demographic size determines a metropolis, together with a combination of many other factors and situations. This aspect of urban growth in African cities is very different from western parameters. Geographers have modified and enriched their interpretative approaches and the methodologies used to understand it.

The growth of African cities reveals various symptoms of malaise. The cause and dynamics of this development have been explained with analytical tools that take account of the natural, socio-economic, production-structure and relational systems. In this regard the historical approach to the study of cities seems to provide a rich source of information on their existing structure.

A network of multiple relationships characterizes cities and their food supply functions. The performance of FSDSs is affected by geographical constraints that lead to a dynamic reallocation of space and new processes of differentiation. Although geographers often use specific geographical concepts and methods to analyse spatial organization, there are significant overlaps with other disciplines. For instance, there are many examples of the application of economic concepts in urban development models. These include land rent in Von Thunen's model, showing the localization of productive activities and revealing a clear (and necessary) conceptual interface with economics. There is also reference to transport and establishment (whether production or housing) costs in Burgess's urban model and the concept of threshold and range.

History also provides a rich source of very useful information on the evolution of the existing structure of African cities and the forces that have combined to produce them. This is particularly clear when space is seen as generating actions that are caused by factors other than purely economic demands and can be explained in political terms (power management, administrative staff training, control of territory, and social dynamics as shown in note 21 on the effects of the colonial legacy on the urban structure in Africa).

The geographical approach places a lot of emphasis on the fact that, in methodological terms, cities and their influence must be analysed in terms of territory. Cities are spaces that are often hard to define, either because their limits are constantly changing or because they cannot be viewed in a purely physical manner (for example by considering simply the continuity of constructions). Hence, particularly from the viewpoint of supplies, the region is often adopted as the unit of analysis. This is based on several considerations closely linked with FSDSs including the role that cities play geographically with regard to the peripheral settlements in social, economic and demographic terms; relations between the city and countryside; and the effects of rural development schemes on living conditions in cities. These observations are aptly put by Franqueville and Prezioso :

> *"The definition of a peri-urban area is imprecise: it is the ¼ the area under the influence of the city. The distance this influence stretches may vary, mainly depending on the demographic size of the city and the activities carried on there. In small countries the supply zone for the capital may even be congruent with the national territory"* (Franqueville, 1996).

> *"We believe that the unique contributions of geography to the study of such complex phenomena as food supply can best be recognized at the regional level, because, despite the considerable size of African cities, in 1994 only 28 of them had a population of between one and five million"* (Prezioso, 1996).

Box 3

The main town-planning authors and theories

In geographical theory, urban food supply is one of the components of the functional organization of space that has occupied the attention of geographers since the establishment of their discipline as an autonomous science in the nineteenth century. Urban supplies had already been considered before then, but from the reverse point of view – that of the search for the best agricultural locations to satisfy consumer markets. Working from the existence of a central market, Von Thunen (1896) then proposed a model of concentric rings of unequal width whose extent was governed by two constraints: the maximum return per hectare in terms of market prices, and transport costs (two variables that allowed him to calculate a maximum transport distance for each product beyond which any profit would be cancelled out). This approach allowed a polygon of profit maximization to be built around each market, although it also suffered various distortions because of the existence of relatively expensive transport routes such as waterways. This polygon could then be seen as the ideal space for supplying the central market, in which farmers would find it profitable to market their produce and townspeople could obtain economically accessible food supplies.

Many writers since then have tried to refine this early model, especially by subtly changing it to take greater account of the complexities of actual situations, in particular the presence of several concurrent central markets. The best known is Christaller (1933) with his theory of central places, according to which the organization of space is regulated by the relationships between three groupings: distances, populations and functions, with the latter being the most important in constructing the system. The market principle, according to which every point in the theoretical territory must be equally accessible to its inhabitants, entails development of a triangular structure of space, with juxtaposition of triangles to constitute a network of interlocking hexagons hierarchically organized according to the importance of the functions of each centre.

This gives a kind of geometry of geographical space based on three principles, and directly concerning analysis of FSDSs:

- *The principle of centrality* (or of market): this idea is inherent in that of the trading market and requires that each point in the territory be accessible to all possible goods and services. Since all centres must be equidistant, the equilateral triangle is the basic figure of the system, and the complementary region of each central place must be hexagonal. Goods and services do not all have equal importance, so that a hierarchy of central places and of the corresponding areas of influence is established; however, no matter what their rank, the areas of influence retain a hexagonal shape. Central places at the top of the hierarchy are more spaced out and their sphere of influence is wider than those at the bottom; each central place has a number of lower places, k, equal to 3.

- *The principle of transport:* the most economic link between central places is along straight lines linking the greatest possible number of hierarchically high-level places that intersect the hexagonal network. This regrouping of central places takes place on the basis k = 4.

- *The principle of administrative hierarchy* marks jurisdictional limits, and results in a partitioning into cells. Christaller estimated that this regrouping takes place on the basis k = 7.

Losch (1943) expanded on this theory, while Berry and Garrison (1958) introduced two new concepts: the threshold and the range of a commodity. The threshold is a limit of population or production that allows a new function of the central place to appear; the range of a commodity is the size of its area of sale or influence.

Box 4

Urban networks

Geographical theory proposes at least three types of urban network:

- *Fixed-hierarchy networks:* formalized in Christaller's (1933) and Losch's (1954) models, which seek to represent closed installation systems in equilibrium in a region dominated by the highest-ranking central place (usually the metropolis). Relationships are asymmetrical in the central place, for they indicate relations of domination within a very rigid ranking scale. These models are based on the principles of threshold and range of produce offered to a demand that is spread uniformly over space; the resulting network is thus based on an area. Christaller's theory in particular sprang from the Daily Urban System (DUS) concept, which marks off individual systems on the basis of the daily flows into the city, and, if properly updated, can be used to describe temporary flows of migrants into urban outskirts.

- *Multipolar networks (Weber's agglomerations, Perroux's poles):* by virtue of the external features of agglomeration, urban productive activities are distributed among different nodes in a variety of combinations, which are not totally fortuitous, and which depict complementary relations between centre and periphery. Relationships within a region are asymmetrical, because of the economic force of the active sectors and the weight of infrastructure. The dimension of the network is not predetermined, as can be seen in Africa in cases where integrated rural development projects have been carried out.

- *Equipotential networks:* these refer to the fortuitous distribution of urban functions by assuming that dominant economic activities are not sensitive to establishment factors and/or in the case where these factors are uniformly distributed. Unlike the preceding models, there are no synergies here, a high mobility level is maintained and relationships are symmetrical (Prezioso, 1996).

7

The legal approach[22]

The activities of FSDSs take place within a framework of rules. Whether such rules are written or not, they affect FSDSs to a greater or lesser degree, inasmuch as they influence the incentive structure for actors and, hence, their efficiency. This chapter discusses the framework of rules that defines behaviour for the actors in FSDSs. From the legal viewpoint FSDSs are highly complex entities which elude any simple definition. Ferro notes, for instance, that:

> *"Supplying (food to) towns is a socio-economic rather than a legal issue. The legal frameworks concerned (with these activities) ... (includes a number of laws): administrative law, civil law, penal law, commercial law, company law, tax and public finance law, consumer law, transport law, environmental law, special laws of hygiene, public health and food, town-planning law, public freedoms, customs law, etc."* (Ferro, 1996).

This creates problems in the analysis of FSDSs from a legal perspective owing to difficulties in defining the scope of the analysis – a task made all the more difficult by the informal nature of most social and economic relationships in Africa (which tend to be governed by uncodified but nonetheless effective rules). From a methodological viewpoint, it is best to acknowledge this complexity and view FSDS law as an open composite that plays its role alongside the disciplines devoted to analysis of the social sphere, and as an operational tool for political decision-making. This does not mean that the area under observation is indeterminate but it suggests that more refined analytical tools are needed in studies pertaining to laws and the performance of FSDSs. An interdisciplinary approach needs to be adopted in such studies as was emphasized in discussions on other approaches in the preceding chapters.

7.1 The role and limitations of law in analysis of FSDSs

The key elements of the legal approach (laws and regulations) provide vital information on the environment in which FSDS activities take place. It covers the whole body of socially accepted rules recognized, positively or negatively, by the actors. Law, however, is also the technical tool that expresses the public wish to act and pursue objectives by modifying established rules.

In applying legal methodology to the study of FSDSs, it is essential to identify both the institutions from which the existing regulatory framework evolves or is contrived and the various sectoral laws affecting an FSDS. Attempts to identify the origin of laws and regulations affecting FSDSs and the general relationships between civil society and public authorities in Africa need to take account of:

- specific forms of organizations and institutions under colonialism which were inherited by African countries;

- Muslim law; and

- local traditions consisting of unwritten, informal rules of conduct which are generally accepted and applied.

The elements of this framework are not necessarily in harmony with one another. Conflict situations often arise, particularly between official and informal power centres (virtually on a daily basis) and require resolution to ensure that the system functions. This contradiction gives rise to certain relationships that are well-known phenomena in Africa. The FSDSs are embedded in this environment, which has a major influence on the structure of trading relationships. According to Ferro: "*FSDSs are placed within a social environment that only imperfectly obeys formal law. Consequently, the interaction between official law and informal practice follows a dialectical pattern*".

From the legal viewpoint, it can in fact be argued that the dominance of informal rules indicates the inefficiency of the formal.[23] Over-regulation also frequently occurs in this environment and is an additional source of inefficiency and cost (for example it encourages corruption).

The law reflects the society which contrives it, its specific aims and representative structures. It therefore provides a useful starting point from which to undertake social analysis. Although at the technical level it gives form to political decisions *erga omnes*, in terms of methodology the legal approach has no tools with which to study the society from which the regulatory framework is created and which it helps to shape. In the words of Ferro:

> *"Beyond the political objective that legal intervention is constrained to support, the law does not regulate lands hitherto devoid of any social or legal organization. It must adapt to situations if it hopes to play a part in society. While legal institutions may be privileged observers of social and economic interchange, the legal discipline per se does not have any valid methodological tools for observing and measuring what actually takes place in the sphere of law"* (Ferro, 1996).

If the law is to fulfil its goals, any study of society from a legal perspective has to rely on other disciplines such as legal sociology and anthropology. These disciplines have the analytical tools needed to analyse how societies – and individuals within them – operate: their basic rules, how and why these were

formed and established, how individuals and societies perceive new rules taken from other cultural and historical traditions[24] and the norms of behaviour that become established in relation to written law.

Two main issues need to be borne in mind in considering the law and FSDSs:

- the relation between the state and the individual and the individual's perception of the role of the state (which gives rise to forms of clientism and confusion between public and private interests); and

- contractual relationships (trading, etc.) which are strongly influenced by the social status of the actors and are seldom properly guaranteed by formal law.

Apart from written rules, these two factors give structure to commercial and social relationships in FSDSs and can be the cause of inefficiency and additional social or private costs.[25]

7.2 Sectoral laws affecting FSDSs

Most FSDS activities are subject to a number of regulations governing distinct normative spheres. According to Ferro (1996) they can be divided into three broad categories:

- management of urban space – trading structures and infrastructure rest on urban space as their physical support; its management also affects town planning and its relevance[26];

- management of commercial activity – encompasses many macroeconomic and microeconomic policies of general interest, from regulation of competition to company tax and product safety laws[27];

- control of urban activity – covers municipal regulations and measures affecting various aspects of the spatial and logistical organization of FSDSs.[28]

This list, which is far from exhaustive, can be examined in greater depth. For example sectoral policies, including agriculture, trade and monetary policies, directly or indirectly influence conditions in FSDSs and exert the force of rules over the actors.

7.3
FSDS laws in operation

From the perspective of its role as a dynamic element, the law can be described as: *"¼ a body of rules drawn up on the basis of a certain view of social reality and enacted in response to a political desire for social change"* (Ferro, 1996).

This brings us to the practical process of formalizing innovative rules within a given legal context for a specific system such as an FSDS. Generally speaking, three basic stages of analysis can be distinguished in this process:

- compatibility with the wider legal context;
- compatibility with actual conditions in the FSDS; and
- consistency with objectives.

In terms of methodology, studies involving the legal approach require identification of the structures, legal framework and actors operating within FSDSs. The laws and regulations that structure relationships at various levels (including those of organizations, individuals, associations, etc.) have to be studied in order to identify the framework of norms influencing actors in the system. Consideration must be given to activities and functions at various levels and should focus not only on the more general legal framework but also on the legal status of individuals and specific actors. This will mean in practice examining constitutional law, judicial systems and organizations, the framework of ministerial responsibilities and administrative authority, control and enforcement rules, the status of the actors and commodities involved in FSDSs and the tax and contractual systems. The role of legal experts in the process of incorporating innovative rules into the existing framework has been succinctly summed up as follows:

> *"Generally speaking, legal specialists have the task of justifying the body of decisions taken by the political arm. There is thus no one justifying legal framework but various legal frameworks capable of meeting the same objective. The legal experts do not decide on the specific legal formula but offer a range of solutions and it is then up to the decision-maker ... to select the formula best suited to his constraints and objectives*"

(Ferro, 1996).

7.4 Summary

The legal dimension of FSDS studies is important because the regulatory framework governing economic and social relationships reflects the society and its representative structures and also gives an idea of the direction in which it is moving. The law is seen as the means by which social will is expressed through public decisions.

The legal system in African societies is still fairly complex, with contradictions and conflicts arising from the coexistence of different cultural and institutional traditions. This peculiarity must be recognized because legal innovations have to take account of the complexity of the socio-economic/cultural environment and ensure that the innovations are compatible with the existing body of law, if the legal apparatus is to be effective. This can best be achieved if the process of legal reform is multidisciplinary, with inputs for example from sociology, anthropology and history.

The legal framework in most FSDSs is certainly multifaceted and can best be analysed in terms of the effectiveness of existing norms and their degree of consistency, either internally or in relation to the particular goals of FSDSs (for example efficiency). This necessitates, as earlier stated, a multidisciplinary approach to understanding seemingly perverse elements in the social and economic relations prevailing in FSDSs which undermine the efficiency of trade practices (informal activities, corruption, institutional inefficiency, etc.). In the particular case of Africa recent economic reforms call for re-examination of old political, judicial and legal structures and review of the aims and means of state interventions in FSDSs. Indeed the whole legal framework has to be re-examined in the light of liberal reforms that are being implemented.

8 Conclusions

In discussing the various approaches to the study of FSDSs, no attempt has been made to provide definitive answers to a number of questions that arise. The focus has been to simply outline a conceptual framework to facilitate further analytical work. In other words, an attempt has been made to set out basic issues

and concepts so as to generate further research on effective methodology for the study of FSDSs from an operational viewpoint. Given this, the conclusions outlined in this chapter are presented thematically with an effort to highlight the issues that cut across various disciplines.

8.1 The economic efficiency of markets

Economic efficiency constitutes the focus of analysis in the traditional economic approach discussed in Chapter 1. The traditional economic approach relies primarily on criteria derived from neoclassical economics in evaluating the performance of markets. The idealized market model used has been criticized for failing to reflect the reality of African conditions. Even though the rigid assumptions underlying the theoretical model are relaxed in some cases to enhance the applicability of this approach, there is usually a problem with defining the efficiency benchmark indicating whether a market is working well or not.

Pipeline analysis rejects any *a priori* model of the marketing system and definition of efficiency benchmarks. It restricts the unit of study to a sector that is seen as isolated, seeking to determine the underlying principles on which it operates and the objectives and strategies of various actors within it. Neoclassical efficiency becomes less important and is replaced by an emphasis on analysing strengths and weaknesses of agents' economic strategies.

These two approaches present different concepts of efficiency and it is difficult to choose between them in analysing problems in FSDSs. The strengths and weaknesses of each method have to be evaluated objectively (as set out in sections 1.4 and 2.5), keeping in mind the specific goals of any particular study.

8.2 Beyond economic efficiency

Even though efficiency is clearly central to any analysis of the performance of FSDSs, it is important to take account of other factors especially if they improve the understanding of the mechanisms governing the way FSDSs operate and offer an explanation of the efficiency of the systems. Economic analysis leaves little room for non-economic factors (social, institutional, historical or geographical), usually treating these as exogenous or even benign. These factors,

however, shed further light on the complexities of food supply and distribution and related trading and consumption activities and must be incorporated in any in-depth analysis of the determinants of efficiency in FSDSs. Although all the approaches discussed recognize this, the extent to which these factors are incorporated in the methodologies advocated differ as summarized below.

- The traditional economic approach is particularly weak in this area. Although the institutional context in which FSDSs operate is acknowledged, the link between it and the system (and the economy as a whole) is not analysed in depth.

- Pipeline analysis rejects the rigidity of abstract analytical models in favour of conceptual openness and is therefore more effective in achieving this goal. Indeed, although it remains a typical economic methodology, it incorporates a variety of conceptual tools including spatial integration, social relationships and the use of the pipeline in analysing innovation. Its view of the complexity of the whole is weakened by the limitation of analysis to the pipeline. Quite often generalizations concerning the economic system in general or the FSDS in particular are made on the basis of results from different sectors, but with a degree of approximation that may lead to methodological problems.

- The historical approach is perhaps more interesting in this context, but its effectiveness is limited by operational constraints. It has to be recognized, however, that the historical approach raises major questions relevant to analysis of FSDSs.

- The legal approach focuses analysis of FSDSs on the rules regulating the economic activities in food supply and distribution, both at the macro-legal level (the sphere of the politics of regulation) and at the micro-legal level (concerning the mundane daily trading activities). The way in which the regulatory framework is related to society in general provides another perspective on efficiency, introducing the concept of consistency (of official regulations with informal ones; legal innovation with cultural tradition; and of rules with one another) as well as compatibility of rules with the goals of society. When viewed from this perspective, the legal approach requires a methodological breadth that involves other disciplines such as sociology, history and anthropology. This multidisciplinary approach may be quite effective in facilitating analysis and elimination of the causes of serious inefficiency (even in economic terms) in FSDSs.[29]

8.3
Time and space

The geographical and historical approaches provide some interesting methodological analogies summarized below:

- In the historical approach geographical spaces (city, region) are taken as units of analysis (see sections 4.1 and 4.2) – as locations where elements of scattered knowledge from other disciplines can be rearranged in order to create a general or indeed systemic framework ("a patchwork of empirical records").

- In the geographical approach, on the other hand, relationships between the structure of the city and the food supply function cannot be understood without the help of a historical reconstruction of how cities have developed (see section 6.2). This allows the geographer to understand the reasons for urban planning (which occurs to varying degrees), the processes by which spaces are allocated and their effects.

- Finally, it should be emphasized that economics also allow a choice of the level of analysis and the problem of space is raised in studies based on the neoclassical model. Space is also incorporated directly and more effectively in pipeline analysis by assuming a relationship between the features of pipelines and the reference space (see section 2.3).[30]

8.4
A global approach

The key question now is how the various viewpoints discussed can be used to develop a practical and operational analytical framework that facilitates a holistic analysis of an FSDS and the formulation of interventions to improve its performance. It first has to be recognized that despite the significant differences identified, the approaches discussed are completely opposed to each other. Given the differences in underlying concepts, the value of each approach has to be seen in terms of its own aims, when it is applied and how it complements other approaches.

Quite clearly, the different approaches do complement each other. For example,

it may be difficult for the traditional economic analysis to produce a comprehensive view of FSDSs, but it can play an important role in terms of a general assessment of the performance of markets. Furthermore, even if the historical approach yields really interesting results, these would be much more valuable in the context of an overall political-economic analysis. This implies that overlaps between various academic disciplines need to be established in order to ensure effective use of the available research tools. It does not mean that any methodology can be used to examine a given problem but suggests that, given the variety of approaches and viewpoints, each methodology can help to refine and enrich the understanding of a problem. There is no denying that contradictions exist. What is being advocated is that effort be made to effectively synthesize these approaches in operational terms.

It is difficult to define precisely how each approach can support and complement others but the possibility of such complementarity is evident when one adopts a more general perspective on FSDSs (in other words seeing them as systems, complex in themselves and in relation with other systems). In this connection, the city must be seen as the focus of analysis, the place where all the sectors meet and are re-engineered in response to consumer demands. The city is also the scene of dynamic change involving a number of factors that critically influence FSDSs. These factors, which include demographic, town-planning, social, political, economic and legal changes, cannot be explained by a single viewpoint. It is precisely the dynamic change that aggravates and generates research interest in food supply and distribution problems.

What is advocated in this paper is a systemic, multidisciplinary approach that has as its reference space, the city and the territory (both physical and relational) expected to meet its food needs. The economic, geographical and historical approaches provide us with the tools to delimit this space as well as the functions that are developed in it and also its structure relevant to the urban FSDS. This analytical approach should encourage further research into the underlying causes of inefficiency in FSDSs and its diagnosis so as to facilitate formulation of various interventions to improve their performance. It can be argued that such a systemic multidisciplinary approach to the FSDS issue would encourage the coordination of policies to improve efficiency in food supply to cities and provide us with the outlines of a global approach to such interventions.

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[1] A marketing channel is defined as a body of independent organizations operating in order to transfer goods from producers to consumers by means of formal or informal markets. These markets are integrated through a process of arbitrage in time and space; this process varies in effectiveness and is analyzed on the basis of price differentials. The theory of industrial organizations (the basis for the marketing channel approach) tries to understand the conduct of a

firm in the market, assuming a close connection between business behaviour, structural aspects of the market and its efficiency (or performance) in distribution. SCP analysis is also based on this theory. The theory of the firm departs from this perspective in favour of a more individualistic approach: the role of the industrial organization is taken over by the innovative activities of individual entrepreneurs who play a role of arbitrage, under pressure from the processes of competition. The pipeline approach also criticizes the organizational approach for its failure to highlight the integration of marketing channels with production and consumption. A very different insight into the forces governing markets is provided by the institutional economics approach, which highlights the importance of minimizing transaction costs and uncertainty in interpreting the behaviour of economic organizations. In this view, agents or institutions do not seek economic and social efficiency but the establishment of rules of conduct based on the interests and stability of economically powerful groups (Lutz, 1994).

[2] A researcher can take a conscious decision to restrict his study to the relationships found in one sector, for example, maize marketing. This restriction has the advantage of allowing the study to be focused on the arbitrage process, thus ensuring that the marketing aspects receive sufficient attention, which is difficult with macroeconomic studies or in the pipeline approach (Lutz, 1994).

[3] Neoclassical efficiency is based on efficiency conditions defined by Pareto: agents' rationality, divisibility and homogeneity of products, plurality of firms, free access and perfect knowledge. These conditions are never all met at the same time. The workable competition model relativizes the perfect competition concept by taking into account inevitable circumstances that prevent it from actually occurring. The contestable market concept refers, rather, to the problem of entry restrictions, and ultimately itself touches on the conditions of competition (Lutz, 1994; Goossens, 1994).

[4] Technical efficiency refers to the allocation of resources that are measurable in terms of inputs/outputs. Operational efficiency means the adequate supply of goods and services at the lowest possible price (satisfying the condition price = marginal cost). Economic efficiency refers to the way consumer demand is satisfied (supply stability, conformity, price); absence of market imperfections and relative extra costs; response of prices to demand incentives and supply conditions. Progressiveness refers to the extent and manner in which innovations in goods and services are applied and spread throughout the market. Equity concerns the way the benefits (profits) are distributed within the marketing system (Goossens, 1994).

[5] The pipeline approach is developed (in a summary) from an operational perspective by Terpend (1995).

[6] In practical terms, this means analysis of actors' strategies, i.e. the conduct actors develop in the face of the constraints and opportunities particular to each actor in acquiring operating resources (fixed and circulating capital, staff, information, know-how, market places, etc.) to achieve specific ends (income, savings, stability, etc.). Examples of such strategies are activity diversification, security in supply and disposal of products, and formation of associations.

[7] It should nevertheless be recalled that space and time are covered by the traditional approach through the concept of price integration, which is measured by using regional and seasonal differentials. The social aspect in general is not included in such analysis, apart from some references to the institutional approach (see section 3.3).

[8] See section 6.1 for further discussion. "Agrofood pipelines are defined on the basis of a space-time dyad. We can distinguish the pipeline space as defined by the location of operations and by the actors' horizons and urban spaces, the socio-economic system within which pipelines or pipeline segments intersect" (Hugon, 1985).

[9] Leplaideur provides a brief look at the application of this method in a work summarizing the results of wider ranging research on the rice pipeline in Conakry, Guinea (Leplaideur *et al.*, 1990). It starts by determining the economic space of the product (production sites, import structure and circulation routes for rice), "following the product through the people". It then analyses "the forms of socio-economic relationships of agents trading in rice: their economic origin; the role of rice in their activities; the history of their accumulation, their trading practices and their spatial network of operations; and, lastly, the technical, economic and political events that have impeded or accelerated their activities with rice". Thus it is "no longer a matter of following the product but of following the people involved with the product" (Leplaideur, 1994).

[10] Young revises Smith's point of view by applying the concept of specialization and division of labour to industrial systems in a macroeconomic rather than microeconomic context.

[11] We are indebted to Schumpeter for conceptual positions now classical in economics, for instance the image of creative destruction as the process underlying the capitalist system, which leads to a view of the economic system as marked more by instability than equilibrium. Schumpeter's ideas have also been adopted by the evolutionary approach.

[12] Learning develops cumulatively by creating a structure of experiences

and repeated errors, and thus enriching know-how. Knowledge is not always learned in a formal way but also by working things out together in the environment where it is applied. It is then eventually incorporated into the firm's normal routine (Montaigne, 1996).

[13] This refers to SCP-type approaches, which were discussed above.

[14] The socio-economic approach, considered in pipeline analysis, should be recalled here.

[15] The analogy between this position and the evolutionary approach to innovation is clear.

[16] For example, Guyer wonders whether the food crisis can be considered less as a consumption crisis than a supply crisis, and whether it has been given greater importance than its dimensions in fact warrant, while many studies criticize the rise in expenditure on other primary needs such as housing. The answer perhaps lies in the fact that decision-makers find it more feasible and politically advantageous to focus on the food crisis, whereas intervention in landholding systems would affect very wealthy – and basically untouchable – private interests.

[17] This section was written with the help of Florence Egal, Food and Nutrition Division, FAO, Rome.

[18] Models are "schematic representations, which sometimes have a purely descriptive value, although they always have an instrumental function ... a useful means of providing a section of observable reality with a logical arrangement, while not ruling out the possibility of seeing the same reality in a different way" (G. Dematteis, *Rivoluzione quantitativa e nuova geografia*, Turin 1970; cited in Prezioso, 1996).

[19] In 1950 the US Bureau of Census defined a standard metropolitan area (or SMA) as a central city with at least 50 000 inhabitants, or a pair of cities that are virtually contiguous and together have an equivalent population level. Counties and adjacent districts with a population density of over 150 000 inhabitants/mile^2 were subsequently added to this nucleus.

[20] Burgess proposes a model of the metropolis designed around five functional levels (business district, transitional zone, production zone, residential zone, suburban zones) which are based on two factors: distance from the business district and cost of transport from the business district. Losch bases his study of the metropolis on three types of aggregate: individual market areas; the network of market areas; and the system of market networks. This model allows a definition of the concept of "district" or "region system" which can be used to grasp the process of metropolitan concentration in Africa (Prezioso,

1996).

[21] African cities are affected by the heritage of the colonial period. They emerge either as completely new creations or from the superimposition of a colonial town over an original centre (for example the medinas). The latter case gives rise to cities with two distinct aspects, which stay so clearly separate that we can speak of the phenomenon of urban segregation. This phenomenon repeats itself over time, being applied to different situations, and sometimes results in substantial revisions of urban spaces and their functions. The city, whether pre- or post-colonial, in fact had a considerable food trade, which was carried on in the very heart of the city. Over subsequent years and right up to the present, urban centres have been turning into business districts, and this has pushed other urban functions (housing, the food trade) further out. In peripheral areas, other phenomena of segregation have arisen, with the creation of suburbs to receive the flows of migrants, market areas along the main roads, and areas used for agricultural production – all zones that remain on the whole separate, and do not come to form a real urban entity. These analytical tools can also help to discern a history of agricultural spaces, their structure and ownership (Prezioso, 1996).

[22] This chapter was prepared with the help of "Amélioration du droit des systèmes d'approvisionnement et de distribution des aliments en Afrique francophone", discussion notes drawn up by P. Ferro under the supervision of F. Feral, Centre d'Etude et de Recherche Juridique sur les Espaces Méditerranéens et Africains Francophones, Perpignan University, December 1996.

[23] This does not necessarily mean that FSDSs are inefficient. Without overgeneralizing, it can be argued that the informal is, on the one hand, an anarchic form of management, but on the other, a sign of the capacity to adapt to an inappropriate and inefficient official legal environment.

[24] For example from the colonial model.

[25] It should not be forgotten that this phenomenon also has positive features as it does help to overcome economic or administrative obstacles, for example, in the case of credit between members of a family, or between members of a religious or ethnic community.

[26] Cf. the geographical viewpoint (Chapter 6).

[27] Ferro has a list of these: (1) control of prices, competition, fraudulent trading practices; (2) product safety; (3) legal framework for traders; (4) legal framework for companies; (5) legal framework for trade; (6) trade taxation system.

[28] Control of roads, waste disposal, markets, traffic, urban transport, water supply, energy distribution and health.

[29] We would note in this connection that, far from being achieved simply through the elimination of past coercive or interventionist norms, the process of economic liberalization in many African countries requires a major and difficult reconstruction of the legal system.

[30] In this connection, we must at least mention the meso-analysis approach, one of the methodological features of which lies in the choice of the scale or level at which analysis is to be carried out in order to avoid overgeneralization of economic facts (Lauret and Perez, 1992). This choice has a bearing on intermediate levels, which can probably be seen in spatial terms, although their specific features are based on economic and relational criteria.