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Family and commercial farming in the Niayes area of Senegal

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making decentralisation work

About the authors

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Abbreviations

CNA	*Centre national d'aviculture* National centre for poultry farming
CNCAS	*Caisse nationale du crédit agricole* National Agricultural Credit Bank
CNIH	*Comité national interprofessionnel de l'horticulture* National committee for commercial horticulture
CNCR	*Comité national de coordination et de concertation des ruraux* National co-ordinating committee for farmers
ENDA	*Environnement et Développement du Tiers-Monde*
IIED	International Institute for Environment and Development
LOA	*Loi d'orientation agricole* Framework Agricultural Law
LOASP	*Loi d'orientation agro-sylvo-pastorale* Framework law on agro-sylvo-pastoralism
MAE	*Ministère de l'agriculture et de l'élevage* Ministry of Agriculture and Livestock
PAEP	*Projet d'appui à l'entreprenariat paysan* Rural enterprise support project
PASDUNE	*Programme d'actions pour la sauvegarde et le développement des Niayes* Programme for the protection and development of the Niayes
PPEA	*Projet de promotion des exportations agricoles* Project for the promotion of agricultural exports
PPMEH	*Projet de promotion des petites et moyennes entreprises horticoles* Project for the promotion of small and medium-sized horticultural enterprises
UEMOA	*Union économique et monétaire ouest africaine* Economic and Monetary Union of West Africa
SDE	*Société de distribution des eaux* Water corporation
SENELEC	*Société nationale d'électricité* National electricity board
SONEES	*Société nationale des eaux du Sénégal* National water board

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1. Introduction

1.1 The problem

Having opted to diversify agricultural production, the government in Senegal that came to power following the political changeover in 2000 launched a series of ambitious maize, cassava and rice production programmes in 2003 and 2004. The vision of agricultural development promoted by the President of the Republic centred around i) putting in place a national water network, ii) developing water retention basins, and iii) promoting commercial farming, largely by setting up young graduates in modern farms. This vision would be achieved through a dual approach focusing on increased farm productivity on the one hand, and government interventions in the agricultural sector on the other, providing credit and distributing seeds and agricultural supplies to farmers via public institutions, and mobilising public funds to support special programmes to revitalise certain agricultural outlets.

The State decided to support the *Sénégal agricole* programme, an initiative that aims to provide concrete, practical support for commercial farming by setting up 33 large-scale farms across the country. By promoting high-yield, sustainable systems of production, the aim is to increase the availability of fresh or processed produce with high added value (vegetables, fruit, flowers, meat) destined for the more profitable external market. This produce will come from "*modern farms run by trained professional farmers – young people, women or men from both rural and urban settings*" (ENDA/Syspro, 2001).[1]

However, the ideas and options for agricultural development conceived by the authorities are not entirely shared by officials from farmer organisations. They have another vision for the future of rural economies, and are convinced that agricultural policy-making must also take account of small-scale family farms, which have to contend with significant climatic hazards and essentially rely on the exploitation of increasingly degraded natural resources. In the view of these organisations, the main challenges to this type of farming are security of tenure, natural resource manage-

1. The authorities have yet to translate their commitment to support this programme to turn it into concrete action.

ment, the food security of increasingly impoverished rural producers, high demographic growth and rapid urbanisation. Therefore, they reason, concerted and profound thought should be given to future policy orientations and to the process of transforming small-scale family farming.

The argument put forward by farmer organisations is based on the idea that family holdings and small-scale farming constitute the economic, social and cultural foundation of our rural societies; while the authorities' argument is based on the assumption that agricultural growth can only be achieved by promoting new structures of production that will act as a lever for the transformation of agriculture. Although there are no reference studies supporting this view, the agricultural programme in Senegal seems to have been conceived on the basis that commercial farming is a superior model to that of family farming.

To understand better the arguments used to promote each type of farming, it would be useful consider how they are defined. According to Bélières *et al*. (2002)[2] and Faye (2004), family farming is characterised by the family mode of organising production and consumption. The aim of these systems is not to make a profit; instead, they are geared towards meeting the immediate and future needs of the family to ensure the continuation of the domestic group. As a general rule, they take a wide variety of forms, in terms of production and modes of combining activities that are determined both by the farming situation (soil and climatic characteristics, proximity to markets) and by the availability of factors of production (land, agricultural supplies and labour).

In Senegal, the combined effects of abandoning a policy in support of agriculture and introducing competition over access to grain and fertilisers has favoured the emergence of agricultural entrepreneurs[3] who

2."Family farming corresponds to a form of production that is characterised by the particular structural link between economic activities and family structure. This relationship influences the decision-making process, i.e., the choice of activities, organisation of family work, management of the means of production and transference of inheritance. (…) With regard to this definition, the notion of the "rural producer" refers to a much more heterogeneous reality that includes other forms of production. A producer is characterised by the implementation of a function of production – implicitly for the market – without prejudging how this production is organised. One could, in effect, be a producer by owning the means of production and produce without being directly involved in the production process itself, or even living in the country, and without the family unit being involved in farming activities" (Bélières, 2002).

3. For the most part, agricultural entrepreneurs come from an urban background (civil servants, shopkeepers, political officials, etc.) and benefit from particular conditions that favour an initial process of accelerated accumulation (support from economic and political networks providing an entry point to land tenure, privileged access to strategic information and credit, close relations with support agencies and accumulation of significant sums of money in the non-farming sector).

concentrate on national urban markets (poultry farming, milk production, horticulture) or external markets (fruit and market garden produce). These commercial farms are not based on mobilising the family workforce, and do not link the factors of production with consumption. Their goal is to maximise the profit on capital invested.

The development of these commercial farms is an important issue for the future of agriculture, insofar as it reinforces social differentiation and leads to a dual agricultural system. On the one hand, there are competitive modern farming systems exclusively geared towards the market, and on the other is the family farming undertaken by the vast majority of rural people. Thus, current developments not only highlight questions about the orientation of public investments allocated to the agricultural sector, but also about the forms of agriculture that should be promoted.

The implications of each of these options need to be analysed against the current context of market liberalisation and globalisation. In the interests of economic efficiency and social equity – the basic parameters of any process of policy formulation – the weight of each mode of production needs to be taken into account, as well as that of their different constituent systems of production. Consideration should also be given to the development potential of each mode of production, its contribution to the national economy and its impact on the living conditions of different social groups.

Farmer organisations coming together under the CNCR believe that commercial farming can only be a complement to family farming, and that the latter should be given a high priority. Nevertheless, commercial farms can contribute to increased production and the growth of exports, thanks to the capital and technologies available to them. Experience in the Niayes area has shown that agri-business can provide opportunities for family farms, when commercial farms specialising in fruit and vegetable exports to Europe purchase produce from small-scale producers.

However, the relationship between family farming and agri-business is founded more on competition than on complementarity. Insofar as there are no remaining land reserves, commercial farms can only develop by taking lands currently held by family farms. And access to land aside, competition between the two types of farming also has a bearing on the use of water resources, labour and access to public resources. For

example, in the last twenty years irrigated agriculture has attracted over 60% of public investment allocated to the sector. Most of these resources have been directed to the delta area of the River Senegal, which supports less than 10% of all farmers in the country (Faye, 2004).

With the exception of the sugar, horticultural and poultry sectors, family farming still predominates. Commercial farming is no substitute for this model; indeed, the experience of large-scale farms in the River Senegal delta raises questions about the long-term viability of this type of agriculture. Most commercial farms of over 50 hectares experienced real economic difficulties following the devaluation of the franc CFA in 1994 (Bélières *et al*., 1999).

In the Niayes area, family farms seem better able to deal with difficulties than the commercial farms. By increasing farm size and introducing mechanisms facilitating access to credit and inputs, modernisation of these farms will not only allow them to contribute more to the growth of national agricultural production, but also increase revenue for farmers.

1.2 Study objectives

The development of commercial agriculture involves a growing number of groups of actors at different levels of the production chain. Their social and economic conditions and levels of training and information vary greatly; each has their own divergent and sometimes even contradictory interests, and each develops their own specific strategies. So what impact does the promotion of agri-business have on individuals and groups, particularly those who do not benefit from the opportunities offered by the market and the development of land transactions?

It is difficult to answer this question, insofar as the conditions for developing commercial agriculture in the Niayes area are not fully in place. What are the circumstances and motivation for the creation of these commercial farms? What is the profile of the actors concerned? How do these operators gain access to land? What types of investment are made? What is the nature of the relations between commercial farmers and the surrounding communities? What effect does the institutional and policy environment have on agri-business? How sustainable is this type of undertaking under current conditions in the Niayes area? How does this type of farming tend to develop? What changes should family farms be encour-

aged to make in order to adapt to current developments? How do family-run farms and commercial agriculture interact?

In order to answer these questions, field surveys were conducted in several localities in the Niayes area between March and May 2004, better to determine the changes taking place, particularly those affecting agricultural activities in this region. This work was done in the context of the IIED programme, "*Transformations in West African agriculture and the role of family farms*". The results of the study will feed into reflection on the future of agriculture and the importance that different modes of production should be accorded when agricultural development policies are formulated.

The Niayes area was selected for this study on the conditions for the development of commercial farming, because this peri-urban zone has the biophysical and socio-economic potential that agri-business requires (urban market, concentration of consumers, export opportunities). The paradox is that, having favoured the emergence and consolidation of a market for agricultural produce, urban development is now adversely affecting natural resources and has become a source of conflict over the control and use of land by different actors in the area.

1.3 Methodology

Factors determining the choice of survey sites included the nature and diversity of the problems affecting the development of peri-urban agriculture, and the major trends emerging in different sectors in the Dakar and Thiès regions of the Niayes, where most of these agricultural activities are focused.

The fieldwork was designed to allow researchers to gather information on how farms function, choice of marketing outlets, modes of access to land, economic performance and prospects for development. To understand the current realities and internal dynamics of the farms, it was essential to take account of their diversity and the factors at work in the process of agricultural differentiation.

Previous research on the Niayes area did not yield any precise information on the typology of farms specialising in vegetable gardening and fruit production. Before conducting the surveys, we enlisted the help of offi-

cials from the local federation of vegetable gardeners to outline a typology of the farms, and used their criteria to identify four main types of farm (see Box 1 below).

The first step in developing a typology of farms is to distinguish between small family-run farms that combine diverse farming and non-farming activities, and commercial farms with capital and waged labour. However, while this distinction is essential to avoid any confusion, it is also important to realise there is no barrier between these two modes of production. Family farming can change and develop into a more business-oriented venture, and each of the two main types of production includes several systems.

The fieldwork took place in two successive stages. The first was devoted to exploratory surveys of a sample of 40 farms, which included 11 family-run and 29 commercial farms. They were carefully selected so that the survey

Box 1. Rough typology of farms in the Niayes area

There are two types of production in the zone:
- Horticulture in the broad sense (including tree cultivation);
- Livestock rearing (essentially, poultry farming and intensive cattle and sheep rearing).

Officials from the federation of vegetable gardeners believe that the changes affecting farms in the area are due to two closely linked criteria: the irrigation system and the amount of land farmed. These two criteria can be used to distinguish four main types of farm:

i) smallholdings not exceeding 0.5 ha, irrigated with water from sinks or traditional wells;
ii) small farmsteads of 1 to 2 ha, equipped with improved wells;
ii) farms covering 3 to 10 ha, which obtain their water from the Société des Eaux (SDE) and improved wells;
iv) large-scale farms covering several tens or even hundreds of hectares, which have boreholes.

There is usually a correlation between the level of investments made, farm size and choice of irrigation system.

There are three main types of poultry farm:

i) small poultry farms with a maximum production capacity of 500 hens;
ii) medium-size farms capable of producing between 500 and 5,000 hens;
iii) large industrial complexes with a capacity exceeding 5,000 hens.

This typology is not entirely satisfactory because it is based solely on farm production capacity, and does not take account of another important parameter, type of produce (meat, laying, reproduction, etc.).

could cover the different categories identified, with officials from the federation of vegetable gardeners helping compile an initial list to be used as the basis for the fieldwork. The composition of this sample had to be modified during the survey phase because some of the target sample were unavailable or unwilling to provide information on the farms they managed.

The results of the exploratory survey were used to select 20 farms for more detailed study. These five family farms and 15 commercial enterprises were chosen by combining five important criteria regarding i) their status; ii) the amount of land farmed; iii) type of water supply, iv) volume of investments, v) economic performance.

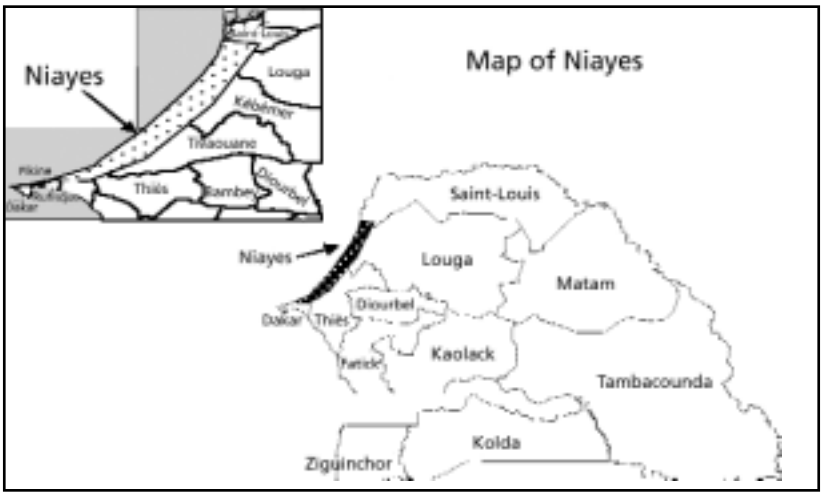
In order to determine the specific constraints related to poultry farming and the prospects for its development, the study covered three commercial farms from the sample group that combined horticultural activities with poultry farming. In addition to these farms, the survey targeted four other specialist poultry farms, thus covering a total of 24 farms for the two types of produce (horticulture and poultry).[4]

Once the survey was under way, it soon became clear that while family farmers had no particular problems with the questionnaires, some of the managers of commercial farms were less keen to divulge information about their activities. This was partly because the interviewees were often employees rather than the owners of these enterprises, and some felt that they didn't have enough background information on the farms where they worked. In such cases the researchers were referred back to the owners, who were often difficult to get hold of as most lived outside the Niayes area.

One of the major limitations of these surveys is the fact that the information was gathered retrospectively and not supported by farm-level observation. As a result, their findings had to be interpreted with great care. Furthermore, the data collected did not shed any light on the dynamics of the farms, because the surveys did not cover their past history and development in enough detail to determine the causes of the change they are undergoing, or identify future possible trends.

4. The rearing of ruminants for milk and meat production plays an important role in the economy of the Niayes region. This predominantly intensive or semi-intensive form of livestock rearing has been the subject of several recent pieces of research, looking at production systems, profile of the actors concerned, input flows and interactions between horticulture and livestock rearing, the potential within the area and main constraints preventing the development of this type of production (Fall, S. *et al*, 2001). It is for this reason that the survey did not cover milk and meat production.

2. The study area: the Niayes



2.1 Local and physical characteristics

The Niayes is a natural region in north-west Senegal stretching from Dakar to Saint-Louis, covering a coastal fringe and hinterland some 180 km long and 5km to 30km wide (Fall *et al*., 2001). Cutting diagonally across the four administrative regions of Dakar, Thiès, Louga and Saint-Louis, this swathe of land is characterised by depressions and dunes lying over a shallow water table, with a network of water courses once rich in lakes and water points. Its coastal location and particular ecological conditions have proved highly attractive since the installation of the first colonial trading posts on the Grand Côte, and its continued economic importance and demographic growth have made the Niayes one of the main centres of human and economic activity in Senegal today.

2.2 Climatic conditions

The climate in this area is Sahelian, characterised by a long dry season from October to June and a short, three-month rainy season. Average annual precipitation is low, tailing off from 500mm/pa in Dakar in the south to 300mm/pa in Saint-Louis in the north. Between December and

February polar air from temperate regions brings in some light and irregular rain (Seck, 1965), which is beneficial for the blossom on fruit trees and helps regenerate vegetation over the dry season (Trochain, 1940).

The major characteristic of this area is the microclimate created by the maritime trade winds. As a result of this steady, cool damp wind, the area enjoys moderate temperatures, high humidity and frequent night-time dew.

Average annual temperatures vary between 23.7°C and 25°C. The highest average monthly temperatures occur in the rainy season, oscillating between 27.5°C and 28.1°C. From November to February, the lowest and highest temperatures are 18°C and 28°C respectively. In May and June, at the beginning of the rainy season, the harmattan raises the temperature to a maximum of 31°C. Relative air humidity remains elevated, reaching up to 90% near the coast, and dropping to a low of 15% in the interior of the Niayes.

2.3 Soils and farmland

The study area is characterised by dune formations separated by corridors and interspersed with basins and depressions containing groundwater. Soils are more or less clayey.

There are three main ranges of dunes in the Niayes. Along the shore stretch the white coastal dunes with their characteristic conchiferous beaches. Over the last three decades these shifting dunes have been planted with beefwood (*Casuarina equisetifolia*) to help stabilise them and prevent wind erosion.[5] Behind the coastal dunes, yellow or semi-stable dunes are developing, interspersed with dried-up lakes and valleys and scattered with numerous temporary pools that hold water for no more than one to three months after the rainy season. The interior of the area is taken up by red mainland dunes.

The nature and characteristics of the soils within the zone vary according to the type of dune and position in the toposequence. The shifting dunes are characterised by very sandy soils containing virtually no organic matter. To the north, depressions in the white and yellow dunes support

5. Trees have been planted along the coast between Dakar and Saint-Louis to act as windbreaks.

small family holdings, where vegetable gardens are tended in the shade of the beefwoods with the help of small, shallow pools of standing water and large quantities of organic matter. The red dunes are covered with the unleached tropical ferruginous soils found in over two thirds of the Niayes area, which are low in organic matter. Until the end of the 1960s they were used to grow rain-fed cereals and groundnuts, as well as providing grazing for livestock that alternated between pastures on the dunes and in the basins.

As rainfall diminished and the demand generated by demographic growth and the developing urban markets increased, this production system progressively shifted towards more productive agriculture based on associated vegetable gardening/tree cultivation and sedentary livestock rearing, with a parallel development of fishing in coastal villages. Nowadays, this part of the Niayes is characterised by the presence of medium- and large-scale horticultural enterprises, which often include a poultry or dairy farm.

The *niayes*, or depressions between the dunes from which the region takes its name, are characterised by shallow basins, patches of groundwater, soils rich in humus and often peaty sediments. These rich soils are favourable for a wide variety of horticultural produce. Depending on the proximity and abundance of the water table, the lowest parts of these basins are used for irrigated and seasonally flooded farming, sometimes with additional watering. Because of their rarity and the richness of their soils, the basins of the Niayes are densely occupied.

The numerous dry lakes and valleys in the regions of Dakar and Thiès bear witness to the earlier existence of a significant network of waterways, which has been progressively degraded by successive years of drought, incursions of seawater, man-made embankments and in-filling by wind erosion.

2.4 Water resources

There is no permanent surface water in the Niayes, and most water in the area is drawn from underground sources. The main reserve is a good quality shallow aquifer that extends across the entire zone between Dakar and Saint-Louis, which is of paramount importance in supplying water for all the area's needs. In addition to the considerable human pres-

sure on it, particularly towards the south, this reserve is also threatened by serious risk from incursions of seawater (Panaudit, 1996).

2.5 Demographics

The area is characterised by high population density and marked intra-regional disparities. In 1998 the population of the four regions of Dakar, Thiès, Louga and Saint-Louis was 3.6million, rising to 5.5 million in 2001, or 52.5% of the population of the entire country. Average density is 193 hab/km^2. Population density in the zone is the result of natural growth combined with inter-regional migration from the north to the south, and from the Sahelian hinterland towards the coast. These migratory flows have increased since the mid-1970s, resulting in rapid urbanisation.

The natural resources of the Niayes are under high and constant pressure as rural areas are increasingly engulfed by densely populated urban sprawl, and the opportunities offered by urban markets encourage more intensive forms of agriculture. This has led to the emergence of progressively inter-related urban and industrial development.

3. Survey findings

3.1 Characteristics of different farm types

The agriculture developing in the Niayes region is highly diversified, ranging from small individual holdings operating under land rental contracts or sharecropping arrangements to large-scale commercial enterprises whose production is primarily destined for the external market. Between these two extremes lies a wide range of family-run farms that perform at varying levels and are involved in markets to varying degrees.[6]

There is a growing gap between smallholdings managed by individuals rather than families and commercial farms covering tens if not hundreds of hectares. In addition to their greater surface area and equipment, these commercial farms share a common goal - production for the external market and/or local urban markets. The commercial farmers operating in the regions of Dakar and Thiès focus on developing profitable crops for export, particularly French beans and cherry tomatoes.

With regard to family-run farms, it is important to underline the fact that they differ, sometimes greatly, in terms of the amount of land available, their water supply system, level of equipment and investment, and amount of non-farm income. Some of them have only very limited technical means at their disposal, while others have recourse to modern irrigation techniques. The general trend is to diversify production in order to improve risk management.

3.2 Land tenure and access to farmland

3.2.1. Land legislation and its effect in the Niayes area

In 1964 Senegal adopted a national land law (Law 64-46 of 16 June 1964). This legislation removed the customary land rights of lineage groups and families in rural areas, stipulating that "*all lands not classified as public property, which are not registered and whose ownership has not been recorded in the Mortgage Registry, are by rights national lands*".

6. In the regions of Dakar and Thiès there are now farms specialising in citrus fruit and mango production, which generally cover more than 5 hectares. Over the last few years, orchards have been expanding and mango exports have boomed.

However, occupants of public lands who had "*made continuous productive use*" of the land at the time that the law came into force were allowed to apply for it to be registered. This productive use had to be certified by an administrative decision, which the interested party had to apply for within six months of the publication of the enforcement order for the law. The rules for certification of productive use were designed more as a function of irrigated farming or conditions in Ivorian plantations than the realities of Senegalese farming, which is largely based on rain-fed cultivation and, to a lesser extent, seasonally flooded crops. Nevertheless, these conditions could be achieved in several parts of the country, especially areas near to centres of colonial settlement and zones with particular ecological conditions.

This is particularly true of the Niayes, peripheral areas around certain urban centres (Saint-Louis, Thiès, Ziguinchor) and former stopping off points along the River Senegal. Demand from their elite indigenous population and expatriate employees led to the progressive development around these urban centres of vegetable gardens, orchards and 'country houses' belonging to the well-to-do. Often well-educated and close to the centres of decision-making, these actors were able to understand the implications of the new legislation and make the necessary arrangements to get their land rights transcribed.

Apart from government land and private lands owned by the State and individuals, farmland in the Niayes area falls into two categories: land from village lands, and farmland located within urban areas.

Over 80% of the agricultural lands in the Niayes area are village lands located within *communautés rurales.*[7] These lands are managed by rural councils, which allocate them to members of the *communauté rurale.* Allocation gives the beneficiary non-transferable use rights, and is determined according to the applicant's capacity to ensure that the land is put to productive use, either individually or with help from the family. The legislation also states that "*persons occupying and cultivating land on public lands at the time when the law comes into force may continue to occupy and farm them under the terms and conditions of an allocation*."[8]

7. Administrative grouping of the population: rural community.
8. National Land Law, Article 15.

The rural council can only withdraw land if beneficiaries cease to use the plot themselves, or if the productive use is deemed to be insufficient. Land may also be withdrawn for reasons of general interest.

Alongside the land allocated to individuals and groups, some lands remain unallocated. Most commonly found in *communautés rurales* north of the department of Rufisque, these lands were to be used collectively and are now managed by the rural council, which can allocate plots to applicants wishing to put them to productive use. These include uncleared lands, areas used for grazing, wild harvesting and woodcutting, pools and areas unsuitable for cultivation. In practice, farmers have free access to the resources found on these lands.

Farmlands located in urban areas are managed by mayors and municipal councillors, often in conjunction with the town planning department. Over the last decade, municipal authorities in towns whose territory includes these lands have given housing and job creation a higher priority than urban agriculture, pursuing an independent policy of parcelling and selling off public lands to urban developers (*lotissement*) and allocating land to property developers and industrialists. Market gardening basins have been filled in, local farmers driven out, and numerous conflicts have arisen as local people opposed to these decisions and operations claim customary rights over the land.

Over the last two years the government has been trying to reverse a trend that has seen farmsteads and green spaces disappear from urban and peri-urban areas of the Dakar region, by initiating a programme of actions to safeguard and develop the Niayes and green areas (PASDUNE). This programme aims to protect the remaining horticultural enterprises in the area and preserve the green belt provided by these spaces.

3.2.2 Land tenure situation for family-run farms

The size of the family farms surveyed varies between 1 and 6 hectares, averaging out at 2.7 hectares.

Table 1. Distribution of family farms according to size

Surface area (ha)	1-1.5	1.6-3	3.1-5	> 5
% of farms	23. 7	45.4	18.1	9.1

Virtually all these farms (91%) are located within or on the slopes of depressions in the Niayes, where soils are rich and the water table very close to the surface. Their location on good horticultural land is an indication of how long they have been established in the zone, dating back to a time when there was less pressure on land. The quality of the soils and proximity of the water table is some compensation for the relatively small size of these holdings, as they can be intensively cultivated using family labour and low levels of investment.

The great majority of family farmers inherited or were given their land (81.8% of farms, and 90.1% of land). The survey did not reveal any cases of conflict related to inherited land, and analysis of the cases where land was given showed that families tend to adopt practices that help prevent or limit the risks of conflict. All the gifts of land recorded in the survey were made during the donor's lifetime, apart from one case where land was given by a village chief.

Other forms of access to land include loans and purchases. Loans are less common now because some beneficiaries have assumed rights over the plots loaned to them and applied to the rural council asking for the land be allocated to them, on the grounds that they have put it to productive use. Several interviewees thought that nowadays people only lend land to someone they trust, such as friends and blood or marriage relatives. Whatever the reason, beneficiaries are not permitted to plant trees or invest in land by sinking wells, developing irrigation systems, constructing buildings on it, etc.

Purchasing is a common means of gaining access to land in the Niayes at the moment. However, it is hard to evaluate the real incidence of sales because the arrangements under land legislation forbid the sale of untitled land, making such transactions illegal and hence clandestine. Some interviewees reported that they had bought land adjoining their plots in order to expand their holdings, but were unwilling to give any detailed information about these transactions.

None of the farmers from the survey sample hold any real rights over the land they cultivate (title deeds or lease). The tenure rights of family-run farms in the area fall into two main types: customary rights held by owners who are socially recognised as such, and rights of use arising from allocation by the rural council. Many farmers enjoy traditional rights over land inherited or received from their relatives (54%).

Table 2. Modes of access to land and types of land rights held by family farms							
Modes of access to land and types of land rights	Customary rights		Rights of use			Other	Total
	Inheritance	Gift	Inheritance legalised by the rural council	Gift legalised by the rural council	Purchase legalised by the rural council	Loan	
% of farms	27.3	27.3	18.1	9.1	9.1	9.1	100
% of surface area	30.5	19.9	23.2	16.5	6.6	3.3	100

A little over one quarter of farmers have legalised their customary land rights by applying for an allocation from the rural council, which amounts to legal recognition of their use rights. People buying land from customary owners usually follow this procedure as well.[9]

3.2.3 Access to land and land transactions among commercial farms

The commercial farms covered by the survey range from 1.3 hectares to 200 hectares. Two thirds of them manage holdings of between 1.5 hectares and 5 hectares.

Table 3. Distribution of commercial farms according to size							
Surface area (ha)	0-1.5	1.6-3	3.1-5	5.1-10	10.1-25	> 25	Total
% of farms	17.2	31.0	31.0	3.5	13.8	3.5	100
% of surface area	1.7	7.0	10.8	2.0	21.6	56.9	100

9. Obtaining a decision to allocate from the rural council guarantees these purchasers compensation for their investments if the land is withdrawn.

Because the basins of the Niayes are densely occupied by indigenous farms established before the relatively recent arrival of commercial operators, the great majority of commercial farms are located on the sandy and sandy-clay lands of the dunes and inter-dunal corridors (79% of farms and 94% of the land).

These farms use several means of access to land and enjoy a variety of land rights. The most common modes of access are purchases and allocation of plots by the rural council. Over 55% of entrepreneurs bought the land they farm from local people. The average size of plot purchased is about three hectares. Rights over these lands may be:

- genuine rights, acquired by accession to titled land ;
- use rights recognised by the rural council (after purchasing a plot, the entrepreneur applies for an allocation from the rural council, thereby legalising their occupation of the land);
- insecure rights, if the council has made no decision regarding allocation of the land purchased.[10]

Table 4. Modes of access to land by commercial farms

Modes of access to land and type of land rights	Customary rights	Rights of use		Genuine rights		Other			Total
	Inheritance	Allocation by rural council	Purchase legalised by allocation	Inheritance with title	Purchase with title	Purchase	Rental	Loan	
% of farms	3.4	13.8	31.0	6.9	10.4	20.7	6.9	6.9	100
% of surface area	0.9	2.6	68.3	6.3	6.5	10.9	1.8	2.7	100

The allocation of land to incomers causes resentment among villagers, who often find it extremely difficult to obtain land through the rural councils. Elected local officials claim that indigenous people do not always have sufficient means to put land to productive use, but this argument is not based on proven facts as the rural council does little to verify the ability of applicants to make productive use of the land. For their part, villagers

10. This may put the whole enterprise at risk, and is also a frequent source of conflict if a family member sold the land without informing other members of the family.

believe that the reason commercial farmers find it easy to get land allocated to them is because they make deals with elected local officials.

3.3 Technical and economic results achieved by commercial farms

3.3.1 Levels of investment and equipment

In the context of a free market agricultural economy, funding for agriculture is more dependent on resources mobilised by the producers themselves than on public money. In reducing its intervention, the State should create the conditions that will encourage producers to invest in increasing their production and productivity and make the investments agreed more profitable.

The abolition of credit and subsidised inputs has led to a reduction in the use of fertiliser and renewal of agricultural equipment. In the Niayes, it is family farms that have suffered most from the withdrawal of support for agriculture, because they have been deprived of the opportunities to access supplies of inputs offered by the agricultural programme. Commercial farms have not been adversely affected by state withdrawal from the sector insofar as their investments and activities are not dependent on public funding.

There is a significant gap between the levels of investment and equipment found on family farms and commercial farms. Overall, irrigation on family farms is reliant on wells, some of which may be quite shallow. Only about one third of these farms have a proper irrigation system, as opposed to 80% of the commercial farms surveyed. To secure their water supply, 40% of these farms are connected to the SDE, and 25% have boreholes. Most family farms have very little equipment, apart from the few diesel pumps found on one third of them. Any modern equipment will be found on the commercial farms, although only a small proportion of these have such equipment: 7% are connected to an electricity supply, 7% have tractors and 10% have utility vehicles.

All the commercial farmers interviewed said that their irrigation network was crucial to their operations. Consequently, they prioritise this basic investment no matter what the size of their holding, selecting their irrigation system according to the amount of land farmed.

3.3.2 How commercial farms function

In rural areas of Senegal production is organised according to closely interconnected functions of production, consumption and accumulation, and adherence to a system of inheritance that helps keep assets within the family. This predominance of the domestic group in the organisation of agricultural activities is accompanied by systems of production that are geared towards extended private consumption involving some production for the market.

These characteristic traits of family farming are not found in commercial farming, which is essentially based on the mobilisation of waged labour and capital, recourse to technologies and involvement with the market. In this type of agriculture, the direct involvement of producers and their family members in the production process is not essential.

The most important parameters in the functioning of family farms in the Niayes are the ways in which land and labour are managed. As a general rule, active members of the family group participate in work on the farm, with women joining the men for certain tasks such as weeding and harvesting, etc. Farms with a relatively small workforce mobilise all their potential labour – men and women, children and the elderly. The rules observed in collective food consumption are based on co-operative working practices that enable the family group to produce or procure the goods needed for its maintenance and reproduction.

Most of the work in the fields is done by women and young men. Only a very few of these farms use seasonal labour recruited during the dry season. These workers are either paid on a monthly basis or remunerated at the end of the growing season.[11] As forms of reciprocal help between families and neighbours are dying out, the use of daily labourers is becoming more common in this area.

Waged labour is systematically used to carry out production tasks on commercial horticultural and poultry farms in the Niayes. The results of the survey indicate that most commercial farms employ permanent staff of farm labourers and technicians who are responsible for running and monitoring operations. Some farms use both family labour and paid staff

11. Through a system of sharing the benefits between the owner of the plot and the seasonal labourers.

(permanent, seasonal or daily), in which case family members or other relations help by taking charge of certain specific tasks (supervising activities, marketing, etc.), thereby enabling the owner to employ fewer people. The number of full-time employees on the farms surveyed ranges from one to seven, depending on the volume of activities. In most cases, full-time employees are paid between 20,000 francs CFA and 55,000 francs CFA per month. These low wages are sometimes compensated for in kind (housing, food, etc.).

Most farms specialising in horticulture and fruit production employ daily labourers, mainly for weeding, hoeing and harvesting. At harvest time, some commercial farms employ several hundred women and young men from the surrounding villages. These workers are paid by task or by weight, without regard to the collective wage agreement.

3.3.3 Type of crop, levels of technology, production and yield

The climatic and soil conditions of the Niayes area are favourable for a broad range of vegetable garden produce.[12] The production period is virtually the same for all farms, lasting from October/November to May/June, and corresponding to the cold dry season (November to February) and the hot dry season (March to June). Producers avoid cultivation during the rainy season even though they know that the price of vegetables increases during this period because of its scarcity. This is partly due to high levels of parasites and associated cost of prevention and/or treatment, and partly to the difficulties of conserving produce in the hot, humid conditions of the rainy season.

Although they grow their produce at the same time as each other, family farms and commercial farms use different strategies to select their crops. Family farms mainly grow aubergine, cabbage and tomatoes – vegetables destined for the local market, to be used in everyday cooking. Commercial farms, on the other hand, tend to produce vegetables for export (beans), those used in European-style cooking (beans, potatoes) or which are hard to come by at certain times of year (groundnut, cabbage). They are also interested in some of the dry-season crops that are highly profitable, but which require greater investment and technical expertise.

12. Asparagus growing has been piloted in the Niayes, which is used as a laboratory for agricultural research.

The relative importance of different crops varies from one year to the next for both types of farm. Producers usually reduce the amount of land under a particular crop if they found it hard to export or dispose of on the local market the previous year, while increasing diversification into other crops to reduce the risks associated with the vagaries of the market.

Crop selection is not determined solely by the farmer's objectives. It also takes account of the soil characteristics of the production sites, particularly topography and soil types. Within the small basins of shifting sand scattered across the dune belt, production is focused on beans, onions, cabbage and tomatoes, and, to a lesser extent, aubergine, chilli and watermelon. In the inter-dunal depressions of the interior, kitchen gardens are cultivated in association with fruit trees (papaya, banana, coconut, palm wine, etc.). Two types of vegetable gardening are found here, determined by the water table below: seasonally flooded crops (tomato, sweet potato, onion) and the irrigated crops usually found in the driest parts of these depressions. Production can continue throughout the year in these sectors if the farmer has mastered the appropriate crop technologies and has the means to buy the products needed to protect them during the rainy season.

Horticulture in this area is largely dependent on use of water resources from the water table and inputs such as selected seed, fertilisers, plant protectants, etc. Growing techniques are not standardised, but vary according to the farmer's technological skills and drainage and irrigation methods.

Overall, the productivity of growing systems varies greatly from one farm to the next. This variability is linked to several factors, particularly the system of irrigation, technical expertise and consumption of inputs. Family farms dig in "groundnut powder", fish waste and green manure to fertilise their plots, or use manure and droppings. Commercial farms, which have more substantial means and greater technical expertise at their disposal, focus more on technical norms for basic manuring and maintenance. The survey highlighted the need to pay greater attention to the internal dynamic of both family-run and commercial farms, in order to understand the factors determining inter-annual variations in performance. While the results of the survey show that levels of production fluctuate, it is hard to explain why they do so because there is no data from more detailed surveys on the changes at work within different farms.

3.3.4 Economic results

Economic performance of poultry farms

The survey on the economic performance of poultry farms covered two categories of producer: those whose only economic activity was rearing poultry, and those who raised poultry in association with horticulture (vegetable and/or fruit production). The data gathered revealed that, in addition to flock size (poultry raised at the same time), another important criterion differentiating these farms was their production strategy. It was observed that producers combining horticulture with poultry farming are more likely to raise poultry for both meat and eggs, rather than one or other end product. Rearing chickens for meat is often a sporadic activity used to cash in on the market opportunities arising around the time of religious festivals.

The producers that focus exclusively on poultry farming usually prefer to concentrate their efforts on egg production, rearing several flocks each year. The expansion of these enterprises has been favoured by "*the facility, through frequent direct air links, to acquire day-old chicks of hybrid European stock, food supplements and veterinary products, availability of varied raw materials for the production of high quality provender and the opportunities to dispose of poultry products on large markets at profitable prices*" (Steyaert *et al*., 1988). The proportion of poultry farms that import chicks has diminished considerably over the last few years.

All the poultry farms surveyed that produce eggs do so on a regular basis, supplying the nearby urban markets in Dakar and Thiès, as well as some weekly sub-regional markets. Most of these producers are civil servants, private sector employees and economic operators, who use their own savings to invest in their farms. The CNA evaluated national production of commercially-farmed poultry meat at 5,982 tonnes in 2003, representing sales of around 9 billion francs CFA; while some 337 million eggs for eating raised a sum of around 21.5 billion francs CFA (CNA, 2004).

Previous research has shown that the productivity of poultry can be negatively affected by the conditions in which they are reared. The longstanding deficiencies in habitat observed by certain researchers continue to limit the economic performance of poultry farms, particularly those with insufficiently ventilated henhouses and poor standards of hygiene.

The poultry farmers surveyed complained about the uneven growth of chickens reared for meat, and a similar pattern was observed with those reared for egg production, whose productivity fluctuated significantly. This erratic performance is partly linked to local climatic conditions, which are periodically unfavourable to poultry farming (egg production drops off during the very hot season).

The change in the exchange rate in 1994 triggered a significant increase in the price of food inputs.[13] For example, a 50kg sack of laying feed that cost 3,800 francs CFA before devaluation now retails at 10,100 francs CFA. Because they lack the equipment or necessary expertise to produce feed, poultry farmers reported that they buy supplies from businesses that specialise in producing chicken feed, or stockists that have set up in the Niayes area. In 2003, feed production increased to 72,126 tonnes, bringing in over 13 billion francs CFA (CNA, 2004). Maize is the main source of energy in chicken feed, accounting for over 60% of the raw materials used in its production, and its high price on the national market is a constraint to the expansion of poultry production.

All those surveyed agreed that poultry farming is economically worthwhile, despite the high health risks inherent in the often makeshift rearing conditions. Egg production is seen as more profitable than meat production, as the meat is not always easy to dispose of on the market. This means that producers are obliged to prolong the production cycle and continue to feed hens that have achieved their optimal growth threshold, thereby increasing production costs and reducing their profit margins.

The producers' views on the economic profitability of poultry farming seems to be confirmed by the current state of these farms, as shown by the business accounts presented by some of those surveyed (see Tables 5 and 6 below). Although the survey sample was too limited to be truly representative, these figures are interesting because the elements relating to economic results enable us to better understand the situation of the poultry farms concerned.

13. The franc CFA was devalued by 50% in 1994.

Table 5. Elements of poultry farm accounts provided by producers in the

Farm No.	Depreciation charges		Number of clutches	Number of hens	Production	Loss
	Infrastructure	Equipment				
01	1,380,000	39,620	5	6,300	61,320 egg trays	Not assessed
02	1,920,000	1,320,000	4	5,500	No figures available	Not assessed
04	1,800,000	775,800	1	4,250	29,700	3%

a. We do not have any information on hens lost before they start laying (through death or other causes), or on the number of eggs unfit for sale (due to malformation, broken shells, etc.).
b. Expenses include maintenance/repair costs for infrastructure and equipment.
c. This farm has made several phased investments since it was set up in 1979, some of which were written off several years ago.
d. This equipment includes feeding and drinking trays and a second-hand vehicle used to transport feed and eggs.

Table 6. Elements of poultry farm accounts provided by producers in the

Farm No.	Depreciation charges		Production	Number of clutches	Number of hens	Production	Loss
	Infrastructure	Equipment					
23	525,000	216,300	Eggs	1	2,000	11,550 egg trays	3%
23	-	-	For meat	1	300	290 hens	2%
04	1,800,000	775,800	Eggs	1	2,000	13,860 egg trays	2%
04	-	-	For meat	3	6,000	5,700 hens	

Niayes specialising in egg production (2002/2003)						
Expenses[b]					Sales receipts	GFP
Chicks	Feed	Veterinary	Staff	Misc.		
2,100,000	45,900,000	1,000,000	1,200,000	100,000	77,745,000	26,025,380
1,925,000	20,519,500	2,000,000	1,080,000	9,900	53,332,500	24,558,100
1,650,000	32,580,000	500,000	1,360,000	823,500	40,332,600	843,300

Niayes specialising in meat and egg production (2002/2003)						
Expenses					Sales receipts	GFP
Chicks	Feed	Veterinary	Staff	Misc.		
1,000,000	14,854,100	350,000	350,000	2,250,000	11,319,000	-7,876,400
1,925,000	268,800	80,000	80,000	–	580,000	118,000
1,650,000	12,015,000	500,000	500,000	1,836,000	15,523,200	-3,003,600
1,650,000	2,955,900	150,000	150,000	–	11,400,000	5,054,100

It is doubtful whether rearing chickens for meat is profitable in the current climate, given the considerable national macro-economic constraints and the growth in imports of chicken thighs from countries with very low production costs. In 1998, the CAF[14] cost per kilo of imported chicken thighs increased from 780 francs CFA to 1,114 francs CFA due to the addition of customs duty and a specific tax of 100 francs CFA levied for pastoral funds. At the time, local PAC chicken was being sold on the market for 1,300 francs CFA. The poultry sector was dealt a further blow by the harmonisation of customs rates within the Economic and Monetary Union of West Africa (UEMOA), as the new common external tariff (CET) imposed by international financial institutions cut customs duty by almost a factor of ten, thereby reducing the price of imported chicken.

This situation precipitated the collapse of a good many poultry farms. The federation of poultry producers claims that 70% of farms closed down over the last four years and that even the large ones are struggling to survive, mainly because of the competition from imported chicken thighs. Although poultry farming achieved some impressive results between 1985 and 1995, with a tenfold increase in turnover, it is facing a grave crisis today because the national market has been destabilised by the growth in imports from 189 tonnes in 1996 to 9,000 tonnes in 2002 (Pigeaud, 2003).

Economic performance of horticultural operations

Overall, the farms surveyed use relatively little land for vegetable gardening. Significant differences emerged between the rates of productive use[15] for family farms and commercial enterprises, as the data gathered show that on average, family farms cultivated 20% of the land they own over the last three years, compared with 50% cultivated by commercial farms.

The majority of commercial farms combine market gardening with fruit trees (primarily mango and citrus). In some cases, specific areas are reserved exclusively for market gardening, while in others the vegetables are grown between lines of trees. It was not possible to determine how much land was used for trees and how much for market gardening during the survey, so the rates of productive use mentioned above do not reflect real levels of productive use. However, they do show how little land is used for market gardening. On family farms this can be explained by cash

14. CAF: Coût/Assurance/Frêt: Insurance/Freight cost.
15. Percentage of surface area cultivated during the year in relation to overall farm size.

flow problems that prevent these farmers from buying inputs in bulk, and insufficient investment in the mobilisation and distribution of water.

Over the last three years about 15% of commercial farms regularly made productive use of up to or over 100% of their land.[16] However, 20% of them only farmed one out of every two years, or two out of every three years. Some producers chose to do so in order to concentrate on poultry farming, which is seen as more profitable than horticulture; while others had to interrupt their production activities because the SDE cut off their water supply due to non-payment of bills.

Table 7. Rates of productive use and main crops

Year	Farm No.	Surface area (ha)		Rate of productive use%	Beans	Cabbage	Onion	Tomato	Aubergine	Potato	Groundnut	Other[17]
		Total	Farmed									
01– 02	3	9	1.16	12.9	-	0.5	-		92			7.5
02 –03	4	10.2	2.45	24	4.6	40.8	-	10.6	41.2	-	-	2.8
03 –04	4	10.2	2.6	25.6	2.2	41.2	1.9	8.8	42.1			1.9
01 –02	5	29	14.7	50.7	40.8	15	-	-	3.4	20.4	20.4	-
02 –03	7	36	13.8	38.4	28.9	31.6	-	1.6	0.6	-	32.5	0.3
03 -04	7	39	23.4	59.9	32.0	5.4	5.6	2.6	4.3	34.2	10.7	0.9

16. In the cases observed, farms exceeding 100% had rented their land for renewable periods of three to five years.
17. Chilli, lettuce, cucumber, turnip, etc.

Table 8. Elements of production costs provided by four commercial farms

Growing season	Crop and surface area (ha)		Estimate per hectare (francs CFA)		
			Cost of inputs	Irrigation costs[a]	Cost of harvesting
Farm n° 5					
2003-04	Beans	6	265,050	518,750	83,350
	Groundnut	2	129,000	518,750	–
	Potato	8	46,375	518,750	–
2002-03	Beans	1	485,500	312,500	150,000
	Groundnuts	3	95,000	312,500	–
Farm n° 16					
2003-04	Cabbage	2	200,000	389,850	135,850
	Beans	2	337,500	389,850	108,700
	Onion	1.25	118,750	389,850	13,600
2002-03	Cabbage	2	157,500	408,300	58,330
	Beans	2	191,000	408,300	116,650
Farm n° 13					
2003-04	Beans	1	428,000	148,750	30,000
	Cabbage	1	375,000	148,750	30,000
	Onion	1.25	39,000	148,750	24,000
Farm n° 21					
2003-04	Cabbage	0.25	254,400	262,570	77,840
	Groundnut	0.5	111,500	262,570	11,120
2002-03	Cabbage	0.25	232,000	188,960	91,440
	Groundnut	1.5	77,300	188,960	8,580

Depreciation charges

With regard to farm n° 5, depreciation charges rose to 2,172, 600 francs CFA for equipment, irrigation, vehicles, etc. The charge was lower for other farms: 513,500 FCFA for farm n° 21; 40, 800 francs CFA for farm n° 13 and 23,750 francs CFA for farm n° 16, whose depreciation charges were written off in 1999.

in the Niayes area

Full-time and seasonal labour costs	Sales, transport and miscellaneous costs	Total expenses	Sales receipts	GFP
93,300	11,900	972,359	825,000	- 147,350
93,300	17,850	758,900	2,000,000	1,241,100
93,300	17,850	676,275	1,000,000	323,725
93,300	60,000	1,101,300	1,500,000	398,700
93,300	40,000	540,800	1,400,000	859,200
68,570	26,400	820,670	2,000,000	1,179,330
68,570	22,200	926,820	400,000	- 526,820
68,570	1,760	592,530	640,000	47,470
68,570	16,750	709,450	750,000	40,550
68,570	33,500	818,020	225,000	- 593,020
121,900	29,100	757,750	2,000,000	1,242,250
121,900	50,800	726,450	3,000,000	2,273,550
121,900	5,100	338,750	100,000	- 238,750
20,000 + (shared)[b]	–[c]	614,810	3,360,000	2,745,190
Idem	–	405,190	560,000	154,810
17,150 + (shared)	–	529,550	2,400,000	1,870,450
Idem		291,990	350,000	58,010

a. Cost of water (SDE bill) and maintenance of irrigation system.
b. This sum of 20,000 francs CFA represents daily labour costs per hectare (mainly for weeding). Farm labourers receive a share of the market garden produce, less production costs (inputs, harvesting) pre-financed by the farmer.
c. Direct cash or on account sales to informal traders.

It was not easy to gather economic data on farms in the Niayes because very few of them keep accounts recording their income and expenses (commercial farms included). Even when accounts were kept, some commercial farm managers proved unwilling to divulge this information, while others produced figures that did not make sense once the results of the survey had been scrutinised and crosschecked.

Nevertheless, we can gain some idea of the economic situation for all the farms in 2003 and 2004 by looking at the information gathered on four commercial farms (see Table 8 above). These data show that vegetable gardening is a fairly profitable activity. The raw results (excluding charging depreciation and management salaries) of annual figures for 2003 and 2004 (November to June growing season) are positive for three of the four farms analysed. Cabbage, groundnut and potato seem to be the most profitable crops, while beans produce very variable results, not only over time, but also from one farm to the next. Two farms recorded losses with beans in one year out of two due to their poor quality, and few farms in the Niayes grow onions because competition from onions produced in Gandiolais and the River Senegal valley makes them hard to sell on the market.

There are four main centres of production costs: irrigation, inputs, harvesting and labour. When they are broken down into their separate elements, significant disparities emerge with regard to seed and fertiliser dosage and use of plant care products, and hence production costs, both between farms and within the same farm from one year to the next. Irrigation (SDE bills, cost of pumping and maintaining equipment) is the most expensive budget line, accounting for an average of 49% of total expenses in the 2003 and 2004 growing seasons on all the farms surveyed. Inputs are the second most expensive budget line, accounting for 29% of all expenses.

The disparity in economic performances can be explained by the diversity of technical skills and variable quality of irrigation systems. Some farmers water from wells with motor or electric pumps during part of the growing season in order to reduce their water bills, although if they took account of the expenses involved in running the pumps (petrol, electricity) they might find that this does not actually save them any money.

Labour costs are variable, averaging out at 19% of production costs. On farms that employ few permanent staff or seasonal labourers, a significant proportion of these costs go on daily labourers, over 90% of whom are women.

The elements of the farm accounts gathered during the study show that inputs account for a large part of the expenses on family farms (55% to 85%), particularly seeds and fertiliser, while the cost of sales accounts for 15% to 30% of outgoings. Their spending on marketing is relatively high compared with commercial farms, because they do not usually have their own transport and therefore have to use private transporters with carts or vans, whose small carrying capacity reduces the possible economies of scale. Conversely, their harvesting costs are usually quite low because they do not farm large areas and use family labour during the harvest.

Looking at the relationship between declared receipts and expenses in both categories of farm, the ratios obtained provide a general idea of how they are faring (Tables 9 and 10 below). For the different crops grown in 2002/2003 and 2003/2004, the ratios are below 1 (showing a loss) in 23.5% of commercial enterprises, compared with 18% of family-run farms. Overall, sales for all farms are generally positive, because the losses recorded on one crop and made up for by the raw margin on other crops grown in the same year.

Comparative analysis shows that family farms are doing rather better than the commercial enterprises.[18] The ratios are over 2 in 54.5% of family farms, as opposed to only 32% of commercial farms. In two out of five cases, the income on family-run farms was four times greater than their expenses.

Overall, the family farms economically outperformed commercial farms on every crop. These data confirm observations made in other regions, showing that the small size of these farms can work to their economic advantage (greater involvement of labour and better monitoring of crops). The preferred crops on family farms in the Niayes (cabbage and aubergine, for example) generate comfortable margins and can find a commercial outlet on the local market.

18. Under current conditions, the modernisation of family farms in the Niayes area (through increased farm size, introduction of mechanisms facilitating farmer access to credit and inputs) should help substantially increase both their contribution to the growth of national agricultural production and their revenues.

Table 9. Commercial farms: income/expenses ratio for each crop																
Commercial farm n°5					Commercial farm n°16					Commercial farm n°13			Commercial farm n°21			
2003-04			2002-03		2003-04			2002-03		2003-04			2003-04		2002-03	
Bn	Grt	Pot	Bn	Grt	Cab	Bn	On	Cab	Bn	Bn	Cab	On	Cab	Grt	Cab	Grt
0.85	1.6	1.5	1.4	2.6	2.4	0.43	1.08	1.05	0.27	2.6	4.1	0.29	5.5	1.4	4.5	1.2

Table 10. Family-run farms: income/expenses ratio for each crop														
Family farm n°2							Family farm n°8							
2003-04				2002-03			2003-04				2002-03			
Bn	Cab	Chi	Aub	Bn	Cab	Aub	Cab	Aub	Tup	Cuc	Bn	Bet	Tup	
0.95	9.7	0.57	8.2	0.29	9.4	7.8	3.05	0.98	4.3	4.09	1.7	1.61	1.9	
Family farm n°9														
2003-04				2002-03										
Cab	Aub	Tom	Cou	Tom	Aub	Cou	Car							
4.13	1.52	1.04	1.45	2.90	16.5	3.5	19.8							

Aub = Aubergine; Bn = Bean; Bet = Beetroot; Cab = Cabage; Car = Carrot; Chi = Chilli; Cou = Courgette; Cuc = Cucumber; Grt = Groundnut; On = Onion; Pot = Potato; Tom = Tomato; Tup = Turnip.

Commercial farms do sometimes manage to generate substantial income due to their size and the considerable financial resources they commit to their operations. However, they also expose themselves to significant risks by producing for the export market (produce not conforming to standards, export clients defecting to other sources, uncertainties associated with air freight, etc.). Bean crops for export are a case in point, having shown a loss in three out of five cases in 2002/2003 and 2003/2004.

3.3.5 Problems with marketing and the market

While dry season horticultural activity was concentrated in the Niayes area in the 1990s, it is now flourishing in other regions of the country,

especially the River Senegal valley (tomato and onion) and the peanut basin (watermelon). At the national level, fruit and vegetable production increased by 3.8% between 1987 and 1998. Recorded performance has consolidated considerably since devaluation, thanks to the efforts of producer organisations, support structures and projects to diversify crops and improve the productivity of growing systems. In 2000, vegetable gardening production in Senegal was estimated at 69,000 tonnes of onions and 29,000 tonnes of watermelon, while fruit production (mango, citrus, banana and other fruits) amounted to 122,000 tonnes.

Urban markets are the main outlets for farmers producing vegetables, fruit, eggs and chicken meat. The biggest market for produce from the Niayes area is the region of Dakar, which is home to over 20% of the population of Senegal. This urban demand for food products will increase as the process of rapid urbanisation continues. In terms of developing and consolidating a market for agricultural produce, it seems, therefore, that urbanisation does have some positive consequences.

However, the potential of urban markets is limited by the fact that the vast majority of city dwellers have very little purchasing power. The negative effects of structural adjustment policies have been exacerbated by increased migration from rural areas towards Dakar, and the fact that the urban economy has not grown sufficiently to absorb the surplus labour coming in from rural areas. Thus, the process of impoverishment tends to be reinforced among the working classes, whose very low income and purchasing power reduces the overall solvency of urban demand. Despite the presence of the middle classes (all categories included), with their greater purchasing power, the city of Dakar does not provide an opportunity for optimal marketing of horticultural and poultry produce from the Niayes area.

In addition to this, other factors and constraints include the seasonal nature of production and the highly perishable types of goods produced. The infrastructure for conserving vegetables (refrigeration procedures) are generally inadequate and sometimes even non-existent. Furthermore, the development of a local market for horticultural produce is hampered by the lack of wholesale channels for fresh produce, and the complex channels for market distribution (multiplicity of middlemen, significant price fluctuations, lack of appropriate funding mechanisms). And finally, lack of information on production in the other regions means that

producers in the Niayes can never be sure how much produce will be present on the market.

The laws of supply and demand regulate sales of vegetables. Thus, the price of vegetables is usually low in periods when the markets are plentifully supplied (January to June), increasing on the market as production drops off during the rainy season.

Local vegetable produce has to compete with large quantities of imported onions, carrots and potatoes.[19] Senegal imports half of the total volume of these three imported products for the whole of West Africa. Increased local production would not only allow Senegal to stop these imports, but would also produce a surplus that could be exported to neighbouring countries.

An environment favourable to dry-season production for the European market is an advantage for farmers in the Niayes. In addition to the good climate, the geographic location of the area puts it in a very strong position to corner the market for out-of-season fruit and vegetable for European clients. These products could also find outlets in other regions of the world (particularly North America and the Middle East).

Despite the opportunities opened up by devaluation, exports of horticultural produce from Senegal to Europe have not really flourished. Over the last three decades these exports have dropped from 13,000 tonnes in 1977 to 12,000 tonnes in 1980 and less than 6,000 in 1997/1998, picking up again recently to 9,300 tonnes (a 50% increase), thanks mainly to interventions by support projects. A recent study (Anonymous, 2002) showed that in 2000, horticultural exports mainly consisted of French beans (5,900 tonnes destined for France and the Benelux countries, representing 63% of the total volume of exports). Cherry tomatoes were in second position, with exports amounting to 1,900 tonnes, and mango and melon exports came to 600 tonnes and 500 tonnes respectively. Exports of other, less competitive produce, such as watermelon, courgette, strawberries, chilli, papaya, asparagus, etc., were more sporadic.

Attempts to increase exports of fresh produce are also constrained by the European grading and quality standards, as few commercial farms are

19. Imports of onions rose to 45,000 tonnes in 2000 and 52,000 tonnes in 2001.

currently capable of meeting the quality conditions demanded by countries in the North. Small producers, who are the most numerous in the horticultural supply chain, are seeking to join the circle of importers through the intermediary of commercial farms. At the moment five enterprises produce about 80% of horticultural exports (30% of which is produced by a single outfit, FilFili).

A report drawn up by the Ministry for Agriculture (MAE, 2001) indicates that the growth of horticultural exports is hampered by three types of constraints, related to:

- Producers failing to meet the required quality standards;
- Inadequate basic infrastructures (refrigerated warehousing and transport infrastructures);
- Lack of credit systems suited to the needs of exporters.

Studies conducted by the Centre for International Commerce in 2001 highlight the possibilities for substantially increasing horticultural exports, which could reach 50,000 tonnes or more by 2006. In order to gain a foothold in new parts of the market, more effort must be made to improve the quality of produce and make it more competitive. Egypt and Kenya are Senegal's main rivals on the European market for horticultural produce, and according to certain projections, Egypt looks set to reinforce its position on this market.

The poultry sector has grown by around 8% since 1990. All the producers we interviewed reported that they have difficulties in disposing of eggs and chicken meat. Because of the lack of commercial outlets they are sometimes obliged to prolong the meat production cycle, which considerably reduces their profit margins. The growth in highly competitive dairy and poultry imports, particularly chicken thighs from Argentina, Germany, The Netherlands and the United States, is damaging local production. Although a 20% tax is theoretically levied on these products, they are sold at unbeatable prices and are threatening the survival of the poultry farms established in the Niayes.

Some local businesses export day-old chicks and poultry feed to neighbouring countries, such as Mauritania, the Gambia, etc. The managers of enterprises specialising in the production of poultry feed believe that their activity has been hampered by the introduction of 18% VAT on maize inputs in September 2001. This measure was felt all the more

deeply because Côte d'Ivoire, which is Senegal's main regional competitor in the poultry industry, made inputs exempt from VAT.

3.3.6 Main constraints to peri-urban agriculture

Water supply

Irrigation in the Niayes area draws on a shallow water table, which has lowered progressively after several successive dry years. This is not only due to reduced water inflow, but also to its over-use, as large amounts are drawn off to satisfy the high demand from Dakar. At the moment, the amount removed from the water tables exceeds their real capacity, and there is a significant risk that they will eventually dry up or become saline.

There is also a serious risk that the water table will be polluted by the chemical inputs and fertilisers liberally used by vegetable producers. Most of these producers do not fully understand the dangers presented by these substances, particularly long-lasting products such as organo-chlorinated compounds, which constitute a real threat to the quality of water resources.

Problems related to reduced water reserves in the Niayes region and pollution of all kinds to which they are subject are exacerbated by the high cost of water for irrigation. The sinking of deep boreholes for mechanical water extraction involves substantial investment of the kind mainly available to industrial operators, and only very rarely attainable by individual producers.

Not long ago, many producers in the Niayes operating in the sectors of Bayakh, Sangalkam, Ndoyenne and Sébikotane (329 market gardeners cultivating an area of 1,000 hectares) obtained their water from boreholes and the Beer Thialane reservoir, which were managed by SONEES. In 1996 these infrastructures were ceded back to a users' management committee, without any restoration works done prior to the handover. After they ceased functioning in 1999 following a dispute between the committee and SENELEC, several producers connected their gardens up to the SDE network. They are now complaining about the high tariffs applied to water used on their gardens and the upper limit placed on quotas, and are also very unhappy about the inappropriate system used by SDE to fix the monthly price scale. Not only does this new water policy create cash flow problems for farmers during the growing season, but the current credit system also takes no account of the need to finance

their water supplies. Producers are therefore obliged to water less often and less generously, thereby reducing the productivity of their crops.

In this context, it is hardly surprising to find that "*a large proportion of urban farmers in Dakar use untreated, urban waste water, either as the sole source of water for their crops, or to make up for the shortfall in water from wells*" (Niang, 1999). This practice of applying raw waste-water directly onto vegetable gardens constitutes a serious health hazard for consumers. Analyses conducted by Niang (1999) on the parasitic contamination of vegetables likely to be eaten raw (salad, parsley, carrots) revealed that "*some vegetables are contaminated with parasites such as amoeba, which have no latency period and are infectious in small doses. This means that if these vegetables are consumed raw without being properly washed, they are capable of immediately making the consumer ill. Hookworm, ascarid and whipworm are intestinal nematodes that have a long latency period and no need of an intermediary host for transmission to humans. The presence of their eggs and larvae shows the degree to which these vegetables are contaminated*".

Access to credit

In order to revitalise the horticultural sector, the authorities have made an effort to adapt the credit system to suit the social circumstances of those involved, particularly small producers. Therefore, horticultural support projects have put in place an accompanying system of mutual societies, and a number of financial institutions have followed suit. However, mutualisation should not be seen as a panacea: in a sector where farms have to compete for their individual survival, collectivism should not be adopted as a standardised approach to be applied equally to all producers.

Moreover, mutuals and the micro-financing system offer short-term financial products with an upper credit limit. In its present form, this system does not permit the kind of investment needed to modernise and intensify horticultural concerns, and the sums loaned are too small to cover the financial demands of a growing season, especially for those hoping to improve the quality of their production or gain a foothold in the export market.

The policy adopted with regard to credit revolves around two distinct systems: the first based on micro-credit mechanisms, and the second struc-

tured around mechanisms supporting commercial farms to enable them to better integrate into market systems.

There is a significant gap between the positive assessment of the impact of the credit policy by officials from the *Comité national interprofessionel de l'horticulture* (CNIH), and the more critical views expressed by small producers from the Niayes. In a document published in 1999, the CNIH reported that it had, "*thanks to the intervention by CNACS, obtained credit of 500 million francs CFA for its member organisations. In the same year the State gave CNIH 800 tonnes of fertiliser to be supplied on credit to horticultural producers (…). In its negotiations with partners, CNIH also obtained a reduction in the rates of interest charged by banks*".

In an article on the production of French beans in the Niayes area, the review Syfia International (27 June 2004) reports that difficulties in gaining access to credit prevent most producers from exporting their horticultural produce. This sector of the export market is monopolised by a very few large concerns like Filfili.

Technical skills

One of the main factors behind the poor performance of production systems in the Niayes is lack of technical skills. Small producers are clearly failing to keep up with technical innovations in the use of mineral fertilisers and composting, and there is a real need for capacity building in the area.

On another level, it was observed that a number of bad practices are also having serious repercussions on production. Fertilisers are sometimes sprayed on crops just before or even the very day that they are harvested; continued use of the same product ends up creating resistant parasites; and certain pesticides that were originally intended for cotton, and which are not adapted for foodstuffs, are being circulated on the local markets. The lack of control over the pesticide market has negative effects on consumers' health, farm performance and exports of market garden produce.

In response to these problems, support structures and projects operating in the area have put in place mechanisms for support, advice and training. ENDA is foremost among them, providing support for various market gardens in promoting organic agriculture and composting. In collaboration with the Centre for Agriculture, the support project for rural businesses (PAEP) provides technical training for producers and conducts

studies on supply chains to identify marketing and export opportunities for certain market garden products. It has also put in place a programme of training and familiarisation with drip-fed irrigation techniques to improve farm performance while reducing pressure on water resources.

Further training is provided by the PPEA, a project promoting agricultural exports, to give producers a better grasp of farming techniques, procedures for exporting produce, techniques for packaging for export, and the quality requirements of international markets. It has also assisted commercial farms with the introduction of internal accounts management systems and helped producers participate in international fairs.

Support delivered by PPMEH, a project promoting small and medium sized horticultural enterprises, has enabled producers to learn about important innovations in growing techniques and methods of preventing plant illnesses. This project has also introduced new varieties and helped producers plan crops over the whole year.

The revitalisation of horticultural production has also been furthered by agricultural research, with the finalisation of technical options and varietal adaptations for the hot wet season. The Centre for the Development of Horticulture has developed growing techniques and introduced or selected over 3,000 varieties, as well as drawing up an inventory of crop pests, finalising appropriate methods for combating them and providing training for technicians and producers in the Niayes.

Despite these considerable efforts, much still remains to be done to improve the technical skills of producers and make horticultural output in the Niayes more competitive. It is particularly important that this matter be given urgent attention, since most of the support projects put in place last for too little time to reach significant numbers of producers and deliver the kind of support they really need.

Permanent adjustment to the export standards imposed by Northern countries not only requires investment in training and updating the technicians responsible for advice and support, but also the establishment of a sustainable mechanism for training, informing and supervising producers.[20]

20. Knowing the challenges presented by quality control of produce, the technical support and agricultural research services have advocated the creation of a quality control unit that will be authorised to deliver certificates testifying that produce conforms to the norms of the international market.

Land tenure

Rural lands in the Niayes have been eroded by rapid urban growth and peri-urban development in the area, and their status has changed radically as certain market towns and large villages have been elevated to the status of municipalities, partly as a result of demographic growth and partly as a result of political considerations. Thus, lands located within village territories have become urban lands. Municipal councils are prioritising the parcelling and selling off of agricultural lands to urban developers for habitation, market construction and property development. Although this is done in the name of general interest, these initiatives are more about generating money for the new municipalities than about supporting agricultural activities. The net result is that farmers are finding it more and more difficult to extend their operations as agricultural lands diminish and the price of land transfers soars.

The great majority of farmers only enjoy legal rights of use over their lands as a result of allocation by the rural council or through customary rights. With no land title, they have no security to offer financial institutions, even if they have already invested heavily in their farms. This situation, and the legal regime covering public lands, is hindering the development of investment in agriculture in an area where land has acquired real value.

3.4 Impacts of the introduction of commercial farms

3.4.1 Relations between commercial and indigenous farmers

The survey showed that most family farms in the Niayes see the presence of commercial farmers in the area in a negative light, viewing them as incomers with no links to the area beyond their immediate business interests. The farmers we spoke to claim that the advent of commercial farms has had a significant effect on local land dynamics. Some interviewees felt that marketing is the area where they have been hardest hit: "*These people have the means to produce large quantities of vegetables, so they flood the markets with them and this naturally drives down prices. It's the small producers who get hurt because they have to sell off their produce at very low prices*". Competition between family farms and commercial enterprises also extends to access to certain factors of production, such as water, labour and manure.

This view is contested by the commercial farmers, who deny that their operations in the area have a negative effect on the activities of indigenous family farms. They claim that there is no real competition between them on the market because they do not operate within the same production channels. In fact, some of them believe that their arrival has opened up opportunities for local development, by creating jobs for women and young people from the surrounding villages.[21]

Overall, commercial farmers feel that they have integrated well into the local milieu, and none of them reported any incidence of conflict with villagers. It seems that belonging to the same organisational framework tends to strengthen links between commercial operators and local farmers.

3.4.2 Impact of the emergence of commercial farming on land tenure

The advent of commercial farms has helped reinforce the new dynamics of land tenure triggered by the process of urbanisation in the Niayes area. The arrival of commercial operators wanting to buy land has greatly increased the value of agricultural land and created an active land market, particularly in central and southern parts of the area. There is no scale of charges, because these transactions involve public lands whose sale is forbidden by legislation. Prices are negotiated on a case-by-case basis, varying according to the availability of water, soil quality, accessibility of land and the vendor's financial needs.

Bare land that sold for between 300,000 francs CFA and 500,000 francs CFA per hectare ten years ago now fetches three or four times that price; while the cost of assignment has risen to 4 million francs CFA per hectare for land where trees have been planted, and 6 to 10 million francs CFA for titled plots.

In most cases, land is sold by families that no longer have the wherewithal to make their farms work, or who cannot make a decent living from their

21. The number of agricultural labourers hired varies according to the amount of land cultivated and the type of crops grown. Producers of French beans, groundnut and cabbage tend to hire the most labourers. Using the survey findings to calculate the number of days worked by hired labour, we arrived at a total figure of 19,580 days worked on 11 commercial farms in the survey sample, which cultivated an average of 103 hectares per year in 2003 and 2004. Taking into account the salary scale of these labourers, it seems that these farms distribute between 11.7 million francs CFA and 19.6 million francs CFA each year between the villages in the form of daily labour wages.

horticultural activities. Another important factor mentioned by some heads of family farms is their inability to withstand competition from the commercial operations whose products flood the markets during certain periods. Driven to the edge by their difficulties in the agricultural sector, some farmers have opted to sell their land and switch to other economic activities, or pay for a family member to emigrate.

In addition to its effect on the price of land, the development of commercial farming has increased the incidence and changed the nature of land transactions. The loan and rental of land that were once common are now becoming increasingly rare.[22]

3.5 Prospects for the development of commercial farming

3.5.1 Farmers' hopes

Very few of the family farms in the survey sample have received any technical training (2 out of 10). Support structures and projects working with horticultural producers in the Niayes tend to prioritise collaboration with commercial farmers because of their superior production factors, and this lack of interest in family-run farms is detrimental to their operations. The farmers interviewed reported that their main difficulties are related to water supply, crop pests, the high cost of inputs (seeds and fertiliser) and poor financial returns on their produce.

With regard to the sustainability of their operations, most farmers believe that their major asset is soil quality. However, they went on to say that the fertility of cultivated land is progressively dropping because of low levels of fertiliser use. Heads of family farms see the facilitation of access to credit, subsidised inputs and cheaper water from SDE as crucial to their operations. The authorities should also put in place broader mechanisms for technical training and reinforce conservation infrastructures in order to better regulate the market for horticultural produce.

Virtually all the commercial farms in the survey sample see the restricted water quotas and high cost of water from SDE as the main impediments to the development of their activities. Other problems mentioned include the cost of inputs and functioning of the market (low prices offered on

22. Rental costs are relatively high (between 50,000 francs CFA and 125,000 francs CFA per hectare per quarter), with renewable short-term contracts lasting 1 to 3 years.

the international market and limited export opportunities). To succeed, their horticultural activities need a regular, adequate and affordable water supply, as well as favourable conditions in terms of credit for subsidised inputs and a support mechanism for exports. Rather than soil quality, some interviewees saw the establishment of management systems within commercial farms as the resource most likely to enable them to overcome their difficulties. Others placed more emphasis on improving the level of technical expertise among farmers that had benefited from interventions by training structures.

3.5.2 Outlook for the development of commercial farming

When asked about their plans for the future, most family farmers focused on improving their irrigation system by equipping their wells with motor pumps and irrigation hoses. Their main motivation was to improve the productivity of their cropping systems and reduce the labour involved in raising and applying water by hand.

Most commercial farmers were primarily concerned with diversifying their production system by combining vegetable production with poultry farming or cattle fattening. Other favourite projects for the future included expanding operations, seeking financial partners and improving irrigation systems.

3.5.3 Possible implications of the framework law on agro-sylvo-pastoralism

In 2002 the Government of Senegal embarked on a process of formulating a framework agricultural law (*Loi d'orientation agricole*, LOA), in order to reform the legislation on land tenure and adapt it to the current need to develop the rural sector and make farming more secure. As soon as the bill had been drafted, the CNCR began to participate in dialogue on the law, organising decentralised reflection upon the report and a national workshop to synthesise the outcome of these discussions in September 2003.

By becoming involved in this dialogue, the CNCR drew the attention of the authorities to the fact that it was engaged in an ongoing process of formulating farmers' proposals for the reform of legislation on land tenure. The Government then decided to remove the chapter on land tenure regime from the bill, and define a new policy on land tenure within two years of the promulgation of the framework law.

When it had completed its consultations, the CNCR advised the political authorities that a law affecting the future of farmers and their families for the next 10 to 20 years would only be acceptable to them if it fulfilled three essential conditions: i) it must take account of the interests of farmers, who constitute one of the largest segments of society; ii) there must be broad consensus among the social and political forces of the country regarding the orientations of this law; iii) it must enjoy the support of the majority of Senegalese citizens.

Having examined the preamble to the draft bill and the 11 chapters of the LOA, the CNCR proposed various amendments that served as the basis for negotiations between the farmers' movement and experts from the Ministry of Agriculture. The CNCR believes that most of its concerns have been taken into account in the new version, known as the framework law on agro-sylvo-pastoralism (LOASP).[23] The bill was adopted by Cabinet in April 2004, and then sent before Parliament.

There is no question that the LOASP does take more account of the problems and prospects for modernising family farms. However, on closer inspection it becomes apparent that the law juxtaposes two different versions of the future for agriculture, without giving any indication of how they might interact, or which one will take precedence. The preamble defines a vision of the economic future of the world that emphasises both the revitalisation of family farm production in order to achieve food security, and the conquest of certain parts of the external market by commercial farms.

The option of promoting both types of agriculture simultaneously is reaffirmed in the follow-up to the preamble, but the CNCR's demand for family-run farms to be given a high priority is not explicitly addressed. "*The sector will be geared towards the creation of an attractive and rewarding environment in rural areas, aimed at transforming family farming by supporting the promotion of family farming through transition from extensive production systems to intensive, diversified, sustainable systems that respect natural resources. The aim is also to*

23. In a recent issue of the bulletin of the farmers' movement, the Secretary of the CNCR declared "The proposals made by the CNCR have, to a remarkable degree, been taken into account both with regard to the framework law on agro-sylvo-pastoralism and with regard to measures to revitalise agriculture. The CNCR is delighted that consensus has prevailed on what are recognised as key questions," (*Canal rural*, June 2004).

encourage the emergence of farming and rural enterprise. To do this, the strategy for agro-sylvo-pastoral development will be to diversify agricultural production and increase the productivity and competitiveness of farms on a sustainable basis, accompanied by a strategy of developing a non-agricultural economy in rural areas" (LOASP, 2004).

To help steer developments along the prescribed course, the LOASP has instituted a mechanism to finance agro-sylvo-pastoral activities, in the form of a national fund for agro-sylvo-pastoral development that will finance the activities of the agricultural council and support professional bodies in rural areas. Furthermore, the authorities have made a commitment to set up a fund to help modernise farms within three years of the promulgation of the LOASP. This will finance equipment for farms, help set up young farmers after agricultural training, and support sustainable natural resource management initiatives.

The modifications introduced by the framework law will benefit producers in the Niayes in at least two ways:

- Application of the new arrangements will help agricultural labourers gain recognised status, improve their work and pay conditions, and make jobs more secure;
- Implementation of the measures defined will help reinforce agricultural exports and thereby consolidate the position of commercial farms with some experience in this domain.

Nevertheless, some of the arrangements within the LOASP raise a number of questions when viewed in the context of the widespread degradation of natural resources in the Niayes. Through this law, the authorities recognise that "*the development of water networks in rural areas will secure agricultural production and help prolong agricultural activities throughout the year, thereby contributing to the well-being of the rural population*". The guidelines following this general comment are entirely centred around the exploitation of river basins and completion of major water works. No real account is taken of one of the main concerns of farmers in the Niayes: the exploitation of underground water sources to develop irrigation. The authorities and professional farmer organisations intervening in this region need to define measures to supplement the arrangements of the LOASP, in order to preserve water resources and safeguard farms and jobs in this part of the country.

4. Contribution to the debate on modernisation of the agricultural sector

The orientations of the LOASP raise a number of key issues that need to be addressed in order to define a coherent vision for the future of farming in Senegal. The debates generated by this document highlight the increasing differentiation between agricultural producers operating in a free market economy, as well as the widening gulf between those market outlets considered to have the greatest potential, which are the focus of most external finance (to turn them into levers that will help reinforce the competitiveness of the sector) and the food-crop sub-sector, which has been left to fend for itself.

The authorities see this sector as characterised by archaic and unproductive farming methods. According to the OMEGA plan formulated by President Wade in 2001, agrarian systems are essentially composed of "*small producers who are, on the whole, characterised by rudimentary modes of production and low productivity*", whose best efforts will never amount to more than subsistence farming. The OMEGA plan sees family farming as starved of capital, deprived of access to technological innovation and trapped in a spiral of low productivity and falling incomes.

This perception of family farming takes no account of the significant changes that these systems have undergone in many West African countries (Mortimore, 2003; Toulmin and Guèye, 2003). Although it receives no support from the authorities, the food crop sub-sector "*is progressively shrugging off its status of subsistence farming and feeding the regional market economy, spurred on by the high urban growth in the region. By catering to the needs of urban populations, food-crop farming is becoming profitable, embodying the predominant agricultural trends in the sub-region*" (Soulé, 2003).

However, this progress does not neutralise the risks presented by climatic factors, which are a major constraint to improved agricultural productivity. For the OMEGA plan (2001), "*the significant risk factor in agriculture does little to encourage a dynamic of intensive farming based on a substantial flow of private investments, hence the State's interest in hydro-agricultural works and certain developments that it would be diffi-*

cult for private operators to undertake. In parallel with these public works, it is also important to put in place support infrastructures such as roads, rural electrification, etc."

Reading between the lines, it seems that the OMEGA plan may be attempting to replace family farming based on extensive production systems with intensive farming based on capital and modern technologies. Yet this option takes no account of the lessons learned from attempts to promote commercial farming. In the specific case of the Niayes area, ongoing experiences highlight the multiple constraints to the success of this model of agricultural development (cost of production factors, access to land, marketing, export, credit, technical training, etc.). Because they have to contend with so many difficulties, commercial farms are unable to become more competitive and corner new parts of the external market, and this is putting many of them at risk. Current developments among poultry farms specialising in meat production provide a perfect illustration of this point.

It is also worth noting that the option to pursue more intensive systems of production will force a substantial number of farm workers out of agriculture, in a context where none of the other economic sectors are growing rapidly enough to absorb their labour. This is why agricultural development policy should not prioritise frantic intensification and the promotion of commercial farming. It should instead focus attention on the issue of transforming family farming. According to Faye (2003), this transformation is dictated by at least two requirements:

- The first is related to the fact that high demographic growth and rapid urbanisation have significantly increased the food needs of the population. Small, family-run farms with little equipment cannot satisfy this demand for agricultural produce. At the moment, these farms are too small to free up the money needed for agricultural investment. Furthermore, they are in the process of accelerated fragmentation as a result of the disappearance of land reserves and the destabilisation of the systems for transferring land tenure;
- The second is related to increased competition for deregulated markets, where the cost of production factors is constantly being revised upwards while payment for production diminishes.

What is needed to overcome the significant constraints to agriculture and make efficient use of its assets are procedures permitting the articulation

of strategies for modernising family farms with strategies for integrating agricultural and agro-industrial production channels, as well as polices for developing non-agricultural activities in rural areas.

Furthermore, the debate on modernisation of the agricultural sector must recognise the need for an in-depth review of the paradigms underlying the strategies adopted thus far. Senegal has no interest in continuing to intensify the drain on its natural resources, given the fluctuating price of agricultural exports and their tendency to fall in a context of fierce global competition.

Agricultural productivity will only improve if increases in output allow small-scale farmers to become more competitive and increase their earnings. A look at the history of international trade in raw materials clearly shows that a country that exports its raw materials has no chance of making a profit on increased agricultural productivity, since any this gains in this quarter will be wiped out by underlying currency reductions. Efforts to improve the productivity of cropping systems should be supplemented with initiatives to promote on-farm processing of agricultural produce, in order to supply national and external markets while increasing the added value of the sector and encouraging job creation.

We have already noted that improving agricultural productivity and increasing the size of family farms will free up agricultural labourers, who will be unable to find employment in towns because of the slow growth of the urban economy. "*The development of a rural economy based primarily on agricultural services and the processing of raw agricultural materials is essential to absorb the agricultural labour liberated by gains in agricultural productivity. Thus, the issue of non-agricultural economic activities becomes as important as that of transforming family farms. Unless we can formulate a response to this question, the impoverishment of rural populations will remain an insoluble problem. Unfortunately, many African countries treat the rural economy as a secondary question in the funding of rural development*" (Faye, 2003).

Another important issue is implementation of a policy of scientific and technological research involving strategies that promote technological innovation. Their main focus should be on the finalisation and dissemination of technologies adapted to the specific local context. We need to bear in mind that the acceptance and adoption of a technology does not

depend solely on how the proposed innovation performs. Producers' decisions are usually motivated by various considerations, which not only take account of the cost of acquiring the technology, but also of the fact that adopting the innovation is likely to entail changes in their way of life, and sometimes in their social relationships.

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