

1. Context

It is commonly accepted among international donors and researchers that the challenge of feeding the world requires enhancing quantity and quality of agricultural commodities (FAO, 2009; World Bank, 2007; Godfray et al. 2010; Horlings & Marsden 2011; Smil, 2001). This statement is often related to the urgent need to get smallholders in developing countries out of the cycle of subsistence. Proposed actions include 1) increasing yields in order to generate marketable surpluses by giving access to innovative agricultural technologies and productive assets; 2) improving access to markets by strengthening the linkages between farm-level production and processing and marketing activities; and 3) developing commercial agriculture.

For such purpose, the major part of donors and scholars stress the key role of the private sector and foreign investments in the process to closing the yield gap and revitalizing agricultural production through agribusiness-led development (Konig et al. 2013, FAO/UNIDO, 2010; Byerlee et al. 2013; Rulli and D’Odorico, 2014). Trends for agricultural development are set along this path with regional policies such as Comprehensive Africa Agriculture Development Programme (CAADP), emphasizing on the importance of strengthening stakeholders’ engagement, encouraging and supporting private sector to invest in agriculture (Brüntrup & Zimmerman, 2009). CAADP is one of the seven pillars of the New Partnership for Africa’s Development (NEPAD), a framework for addressing the challenge of improving agricultural productivity in Sub-Saharan Africa (NEPAD, 2003). Others argue that the answer to food insecurity is to be found towards smallholder farmers to meet future food demands of a growing and increasingly rich and urbanized population. In fact, national development policy strategies within the region (including most national CAADP strategies and investment plans) officially regard the smallholder farming sector as the main vehicle for achieving agricultural growth, food security, and poverty reduction objectives. Between the archetypes of smallholders and agribusiness, lie a diverse set of households with varying characteristics. For instance, recent evidence suggests that land acquisition by “emergent” medium-scale investors in sub-Saharan Africa is massively important, despite being very under-recognized (Jayne et al 2014). Described by Jayne et al. (2014), the meteoric rise of emergent farmers warrants their inclusion in efforts to understand the changing nature of farm structure and food value chains in Africa. For example, in Ghana, Kenya and Zambia emergent farmers already control more land than do large scale investors and, in Zambia and possibly also Ghana, now control more land than the other smallholders farmers combined (ibid). The impacts of the rise of medium and large scale farms on national development objectives remain poorly understood. Medium/large-scale farm investment may inject important sources of capital and expertise into underperforming farming systems. Evidence in support of the inverse farm size / productivity relationship has generally been based on a range of farm scale that do not include medium/large scale farms and there is reason to believe that such farms may in fact be more (land and labor) productive than smallholdings (Muyanga and Jayne, date). It is important to pay attention to structural changes in region’s farm sectors, as well as to try to understand the factors enabling emergent farmer growth and the impacts of this growth on the overall development of the rural economy and rural household welfare.

2. The Senegal case study

Agriculture in Senegal (including forestry, livestock, and fisheries) accounts for only 17.5% of GDP while about 70% of the working population is involved in farming. Most Senegalese farms are small family farms (1.5–2.4 hectares/3.7–5.9 acres), and about 60% are located in the so-called “Peanut Basin”, east of Dakar. Senegal mainly relies on irregularly rain-fed agriculture, which occupies about

75% of its agricultural workforce. Water availability is thus one of the country's biggest agricultural challenges.

Peanuts are the engine of the rural economy with 40 % of all cultivated land, which accounts for 2 million hectares, while cotton accounts for about 3% of total exports and is the third source of export earnings for Senegal (some USD 28 million over the period 1995-2000). However these cash crops are declining while horticultural products and grain crops are on the increase.

As a matter of fact, Senegal does not meet its self-sufficiency goals. Production of food crops does not meet Senegal's needs, covering barely 30% of consumption needs. In addition, agriculture remains extremely vulnerable to climatic variations and to fluctuations in the international markets of major export of agricultural products. Economic, climatic and sanitary constraints lead to the decline of yields and cultivated surfaces, as well as the increasing number of degrading soils. In general, local farmers lack resources for the development of irrigation, the purchase of fertilizers, pesticides, along with mechanical and conditioning equipment.

These issues have been identified for a long time. The successive Senegalese governments, as well as international donors, have stressed the urgent need for the modernization of agriculture through intensified practices. Following international donors' recommendations, the Senegalese government, hoping to boost the agricultural sector, has gradually liberalized its market since the late 1990's. This policy has been implemented through several legislations and programs, opening the primary sector to foreign investors: this includes the Senegal involvement in the NEPAD (New Partnership for Africa's development, 2002), the vote of the Agro-sylvo-pastoral Act (LOASP) in 2004, the Accelerated Growth Strategy launched in 2005, and more recently the Emerging Senegal Plan (2012), all promoted by FAO, the World Bank and several other international institutions (*DPEE, 2013; OCDE, 2008; Rulli et al. 2013*). Successive programs have emphasized the need for the development of intensive agriculture and export-oriented farms in Senegal, in order to "respond to international demand" (LOASP, 2004). The economic opening of Senegal's market has taken place in conjunction with the global rise of agricultural commodities' prices, which stimulated the interest of financial institutions, agribusiness industries and sovereign wealth funds. The first ones considered it as an economic opportunity and the latter as a means to secure food supplies for governments they depended on. This interest culminated in 2008 with the peak prices of several food products triggering many "food riots" (Cotula et al. 2013; Deininger & Byerlee, 2010).

Senegal market opening to foreign investors and growing interest into developing countries' agricultural lands have therefore led to the development of agribusiness industries in Senegal (Sy et al. 2013), these foreign investments being intended to meet three priority goals, such as the development of food self-sufficiency, the development of food exports and income generation for the farmers, as well as the improvement of basic infrastructures in rural remote and less productive areas helping them to catch-up. The agricultural section of the Emerging Senegal Plan drafted in 2013 explicitly targets the synergies between agro-industries and family-farms as the main lever towards rural development and the emergence of middle-scale farms. This win-win partnership is expected to provide self-sufficiency returns for rice, maize, onion, peanut and other horticulture productions.

A large number of farmers' organizations, rural stakeholders, NGOs, as well as politicians has disapproved the liberal path followed by Senegal in terms of agriculture and more precisely worrying about the possible land-grabbing over local farmers without land certification, the environmental impact of intensive and unregulated agriculture, the threat to food security due to the development of export agriculture over subsistence crops, and the unwanted and disturbing social changes in the rural

communities affected by the development of agri-business industries (Sy et al. 2013; Kanoute et al. 2011; Deininger & Byerlee, 2010; Burnod & Tonneau. 2013).

3. Objectives

To date, the rise of emerging farmers described in other African countries has not been assessed nor documented in Senegal. This study intends to analyze the growth of emergent farmers in different agro-ecological zones in the country and to contribute to the current debate opposing smallholder farmers and agricultural firms. More specifically, this study includes several related research objectives, namely: (1) to understand the rate of land expansion of medium- and large-scale farms in Senegal and to consider the policy implications of consequent changes in farm structure and the concentration of food production and marketed output; (2) to consider the implications of the rise of medium/large scale farms on Senegal's agricultural development path and the consequent downstream employment impacts; (3) to understand the relationship between farm size and efficiency in Senegal, including the range of factors that might condition this relationship; and (4) to specifically examine the impacts of large commercial agricultural operations on the welfare of rural communities around them.

4. Methods

To this end, a farm-level field survey of emergent farmers has been conducted in several areas of the country. The survey framework has been designed in such a way that this research will be aligned with the medium scale household survey conducted in Zambia, Malawi, Mozambique, Kenya, and Ghana. This will enable us to pool our observations on key variables with those from the earlier surveys, thus enabling comparative analyses and broader generalizations. In Senegal, the study has been conducted by the Department of Macro-Economic Analyses at the Senegalese Agricultural Research Institute (Bureau d'Analyses Macro-Economiques (BAME), Institut Sénégalais de Recherches Agricoles (ISRA)) with the support of

We summarize below the probabilistic sampling plan that has been implemented to draw sample units used for the study of emerging farmers.

a. Identification of target population and survey strategy

The survey consists of two phases:

- The exploratory phase, which consists of a census of all the farms in the sample villages.
- The MSF survey phase, which will concern only households corresponding to MSFs.

The first census phase, which is a rapid appraisal, has two objectives: first, to measure the MSF rate at the national level, which could not have been done by investigating only the MSFs; Then to ensure a more accurate and representative sample distribution for the second phase.

We have 2 sampling units in this study: Villages as primary units and Households as secondary units.

b. Survey frame

Once the scope of the survey and the sampling units are determined, it is necessary to identify all the units that are part of it: the sampling frame. Through this procedure, we try to give each unit the probability of being included in the sample. In other words, any farm in the field has a non-zero probability of belonging to the sample.

We do not have a sampling frame for the MSF in our field of study. However, the list of all villages in the study areas is available. So we have the sampling frame for our primary units, which should give us a sampling frame for MSF after the census phase.

c. Sampling method

We are conducting a two-stage survey. Initially, villages are fired and then MSFs are fired from the selected villages.

Drawing of primary units: To draw villages, we proceed to a proportional stratification by considering the different agro-ecological zones. The more an agro-ecological zone is populated, the more villages will be selected. Overall, 140 villages were surveyed, which represents 8922 households (Figure 1).

Drawing of secondary units (MSFs): After proceeding a census in selected villages, we dispose of a database of all households, be they MSFs or not. In all agro-ecological zones, we proceeded to an exhaustive observation of MSF, except for the Peanut Basin where sampled half of MSFs. In total, 1800 households were included in this second phase (Figure 1).

In summary, the sampling plan is as follows:

- Stratification by agro-ecological zone
- Drawing villages through a systematic survey with unequal probabilities
- Census of households in sample villages
- Establishment of the MSF frame
- Observing all MSFs in villages of all agro-ecological zones, except for the Peanut Basin where half of MSFs were selected.

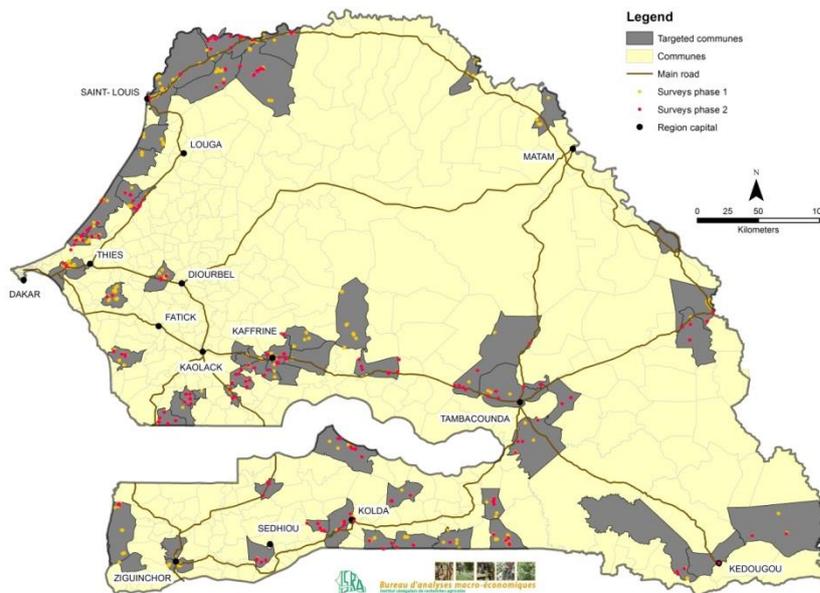


Figure 1. Location of surveys conducted by ISRA BAME for Middle Scale Farmers's project

5. Results for the national survey

Census results show that farmers in Senegal possess between 0.04 and 800 hectares, with 5.3 hectares on average. We observe an important standard deviation (of 16.9 hectares), explained by an important heterogeneity in farmers profiles and situations across the country. Similarly, the map in figure 2 displays land under cultivation on average for each department. We observe a trend with smaller areas in areas near the urban corridor Dakar-Thiès, in the Senegal River Valley due to a strong land pressure, in the south-east part of the country due to the presence of large national parks, and in the western tip of Casamance. On the other hand, larger areas can be found in the peanut basin, extended towards the region of Kolda and Tambacounda. The middle section of the Niayes area also seems to

harbor larger areas of cultivated lands. It can be explained by its distance from urbanized areas (Dakar-Thiès in the South and Saint-Louis, North).

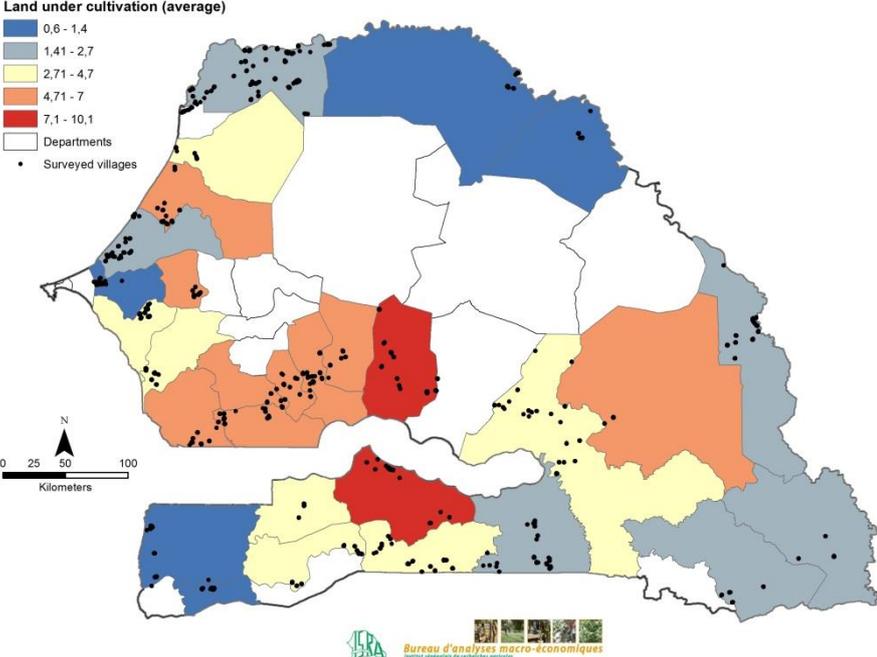


Figure 2. Land under cultivation on average for targeted departments

For each department, standard-deviation is very high. Figure 3 displays the relative standard deviation (RSD) and shows that certain areas with a high RSD index harbor high dispersion in cultivated areas. Certain hotspots can be highlighted such as the delta of the Senegal River Valley, the South of the Peanut Basin, and the region of Tambacounda.

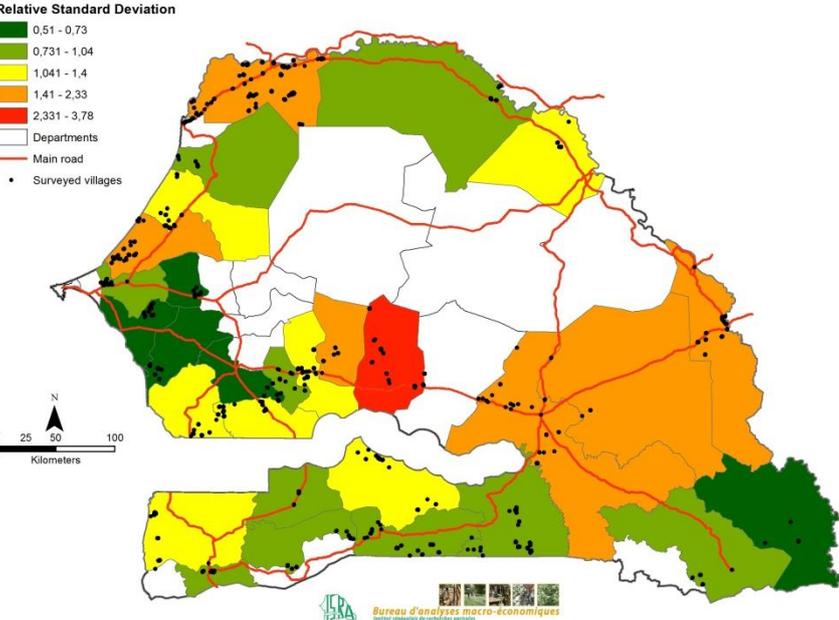


Figure 3. Relative Standard Deviation for land under cultivation for targeted departments
 In Senegal, livestock farming represents 28.8% of GDP (RGPHAE, 2014) and is of economic and social importance for income, jobs and social structure. From what can be drawn from the MSF study, 53.54% of the households interviewed are practicing free-roaming, whereas 68.55% are engaged in

stalling. Again at the national level we observe a large discrepancy in livestock farming practices. For instance, we observe on figure 4 that roaming is mainly used in the South of the peanut basin, the Western part of Casamance and in the department of Bakel at the border with Mali.

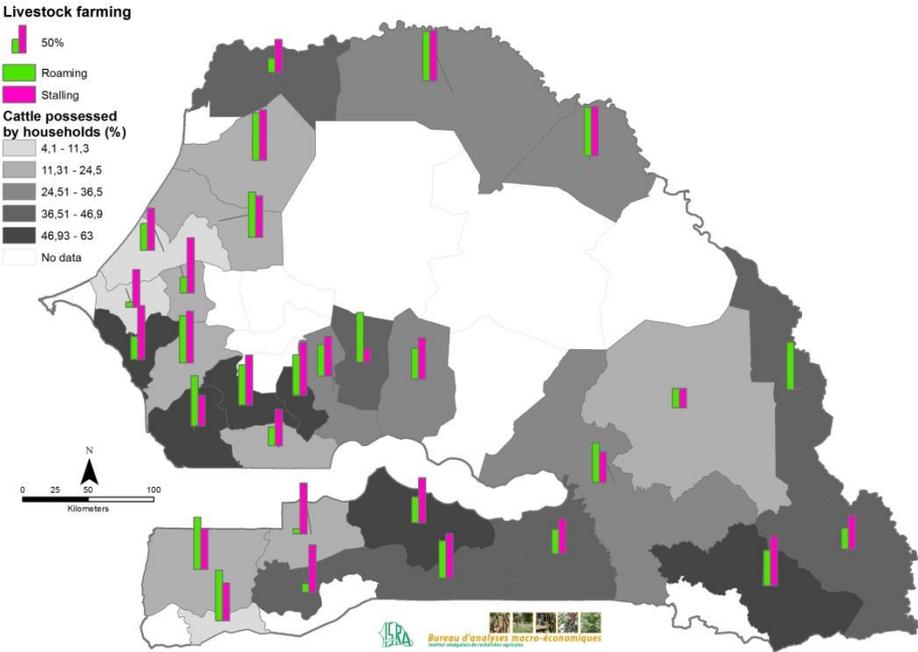


Figure 4. Percentage of households engaged in livestock farming and proportion of cattle possessed

Similarly, figure 5 shows that livestock farming is not homogeneous amongst farmers. Classes of exploited land show that roaming practices are increasing with the augmentation of land. The last class is different with less livestock farming, especially due to the fact that farmers are highly specialized in agriculture at this point. Cattle, which at the national level only represents the second least possessed livestock (figure 6), is predominantly found in the Delta of the Senegal River Valley, the South of the Peanut Basin (extended in the Kolda area) and in the South-East of the country (cf. figure 4).

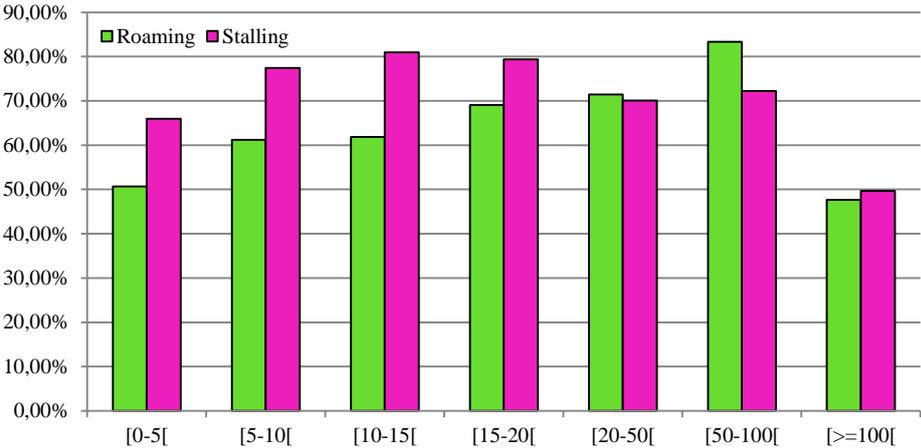


Figure 5. Types of livestock farming for different classes of farmers

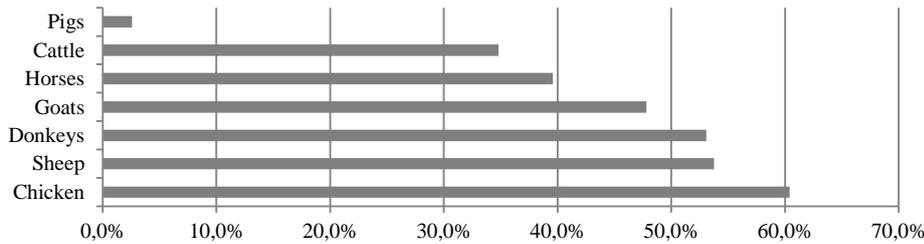


Figure 6. Types of livestock possessed by interviewed households

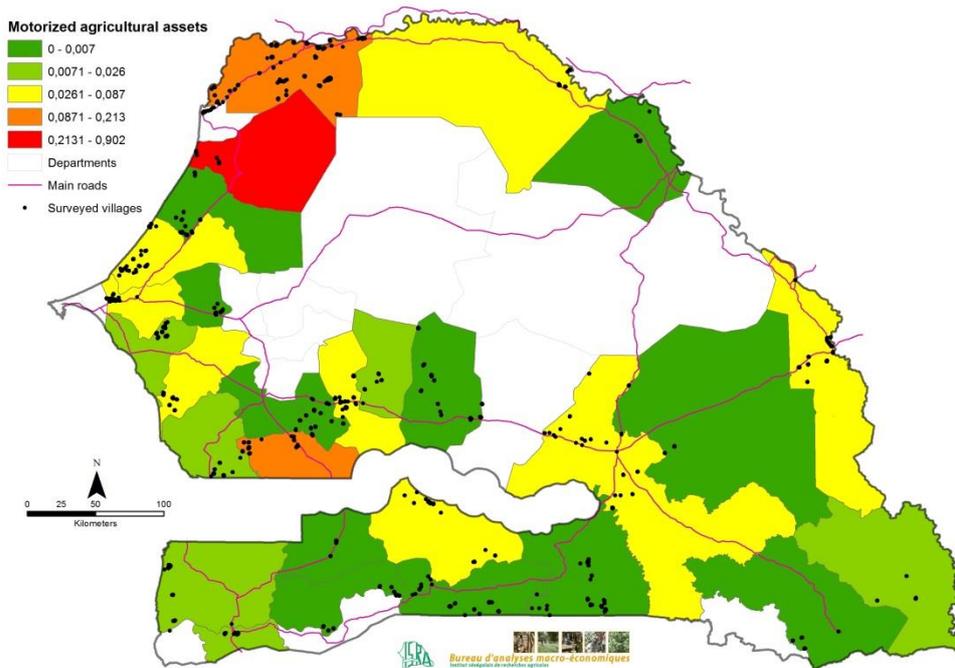


Figure 7. Number of motorized agricultural assets on average

As it can be seen on figure 7, motorized assets are rare and can mainly be found in the delta of the Senegal Rivers, the Niayes area in the vicinity of Tivaouane and Saint-Louis, and the area of Nioro. However, non-motorized agricultural assets are important with an average of 6.7 assets per household when considering the whole sample.

In terms of cultivated lands, 74% of interviewed households farm less than hectares which is higher than the national statistics from the last population census that goes back to 2013 where 69.8% of the households were in the 0-5 hectares category. The other classes are displayed in the Figure 8.

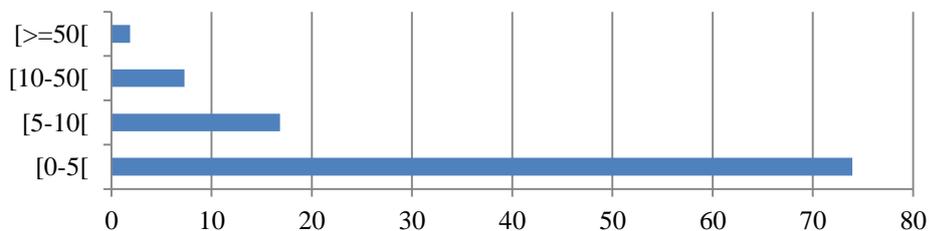


Figure 8. Distribution of exploited land from interviewed households (percentage)

Again, the distribution is not even across the country and certain areas harbor a large amount of farmers cultivating more than 5 ha of agricultural land. The main areas are the South of the peanut basin and its extension toward Kolda, then comes the central part of the Niayes area, as well as the

delta of the Senegal River valley (Figure 9). These areas also show the highest rates when it comes to labor hiring. The departments of Dagana, Foundiougne, and Tivaouane hire predominantly external labor force.

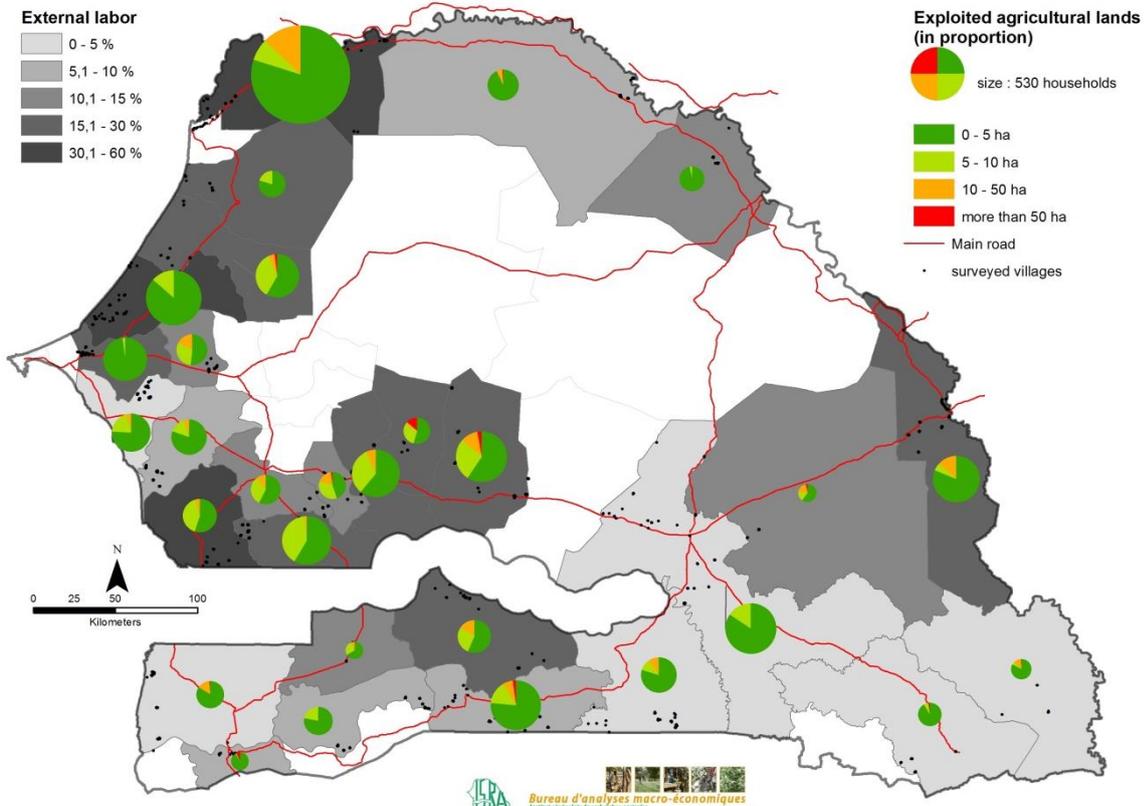


Figure 9. Relative proportion of land use classes for surveyed departments

At the national level, 63.11% of interviewed farmers are involved in peanut production. Top 10 crops are listed in figure 10.

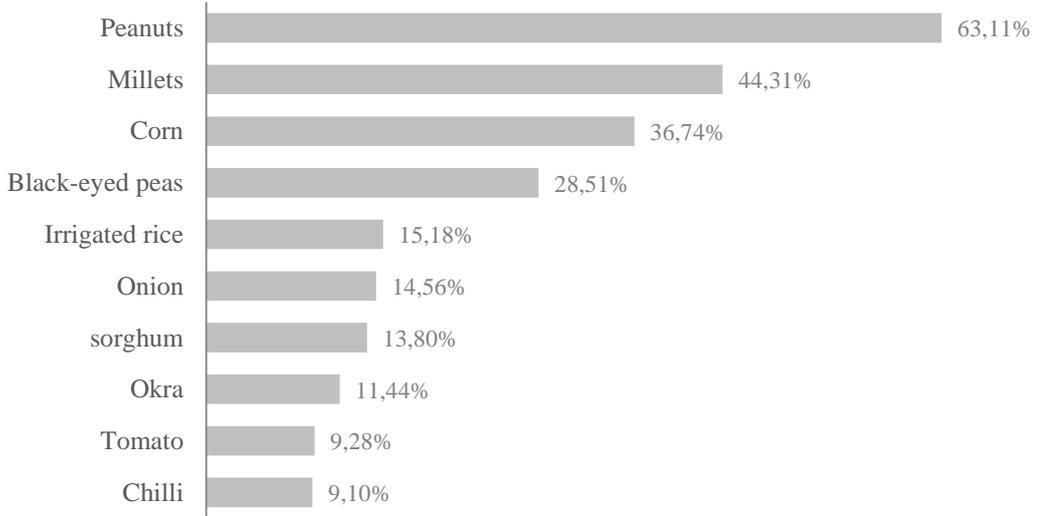


Figure 10. Farmers’ involvement in crop production

Farming lands above 5 hectares are mainly used for peanuts, millet, corn, sorghum and black-eyed peas production. This can be seen on figure 11, which displays the relationship between crop types and classes of land sizes. Figure 12 shows that peanuts are the main crop for the peanut basin, Casamance and Eastern Senegal areas. The Senegal River Valley seems mainly dedicated to irrigated rice, while the Niayes area shows more heterogeneity in crop production.

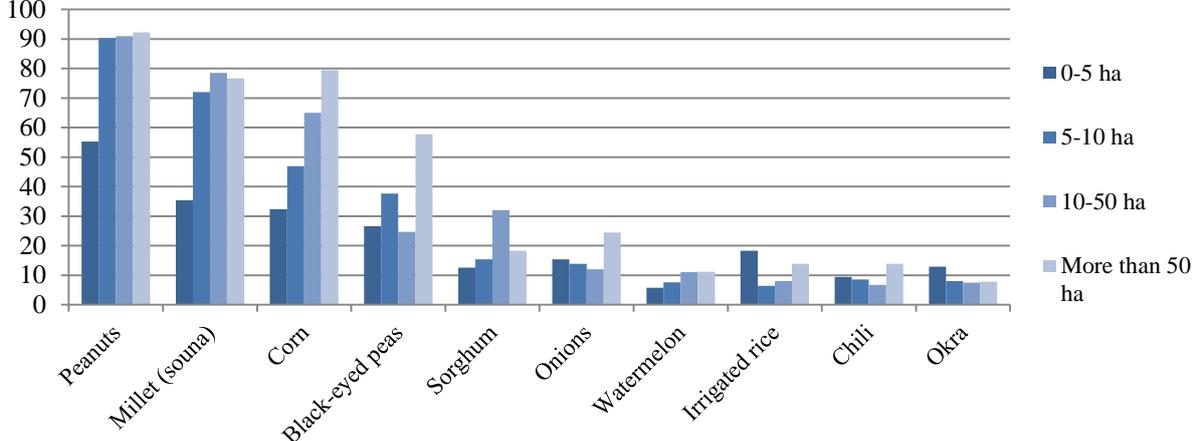


Figure 11. Relation between crop types and size of farming lands at national level

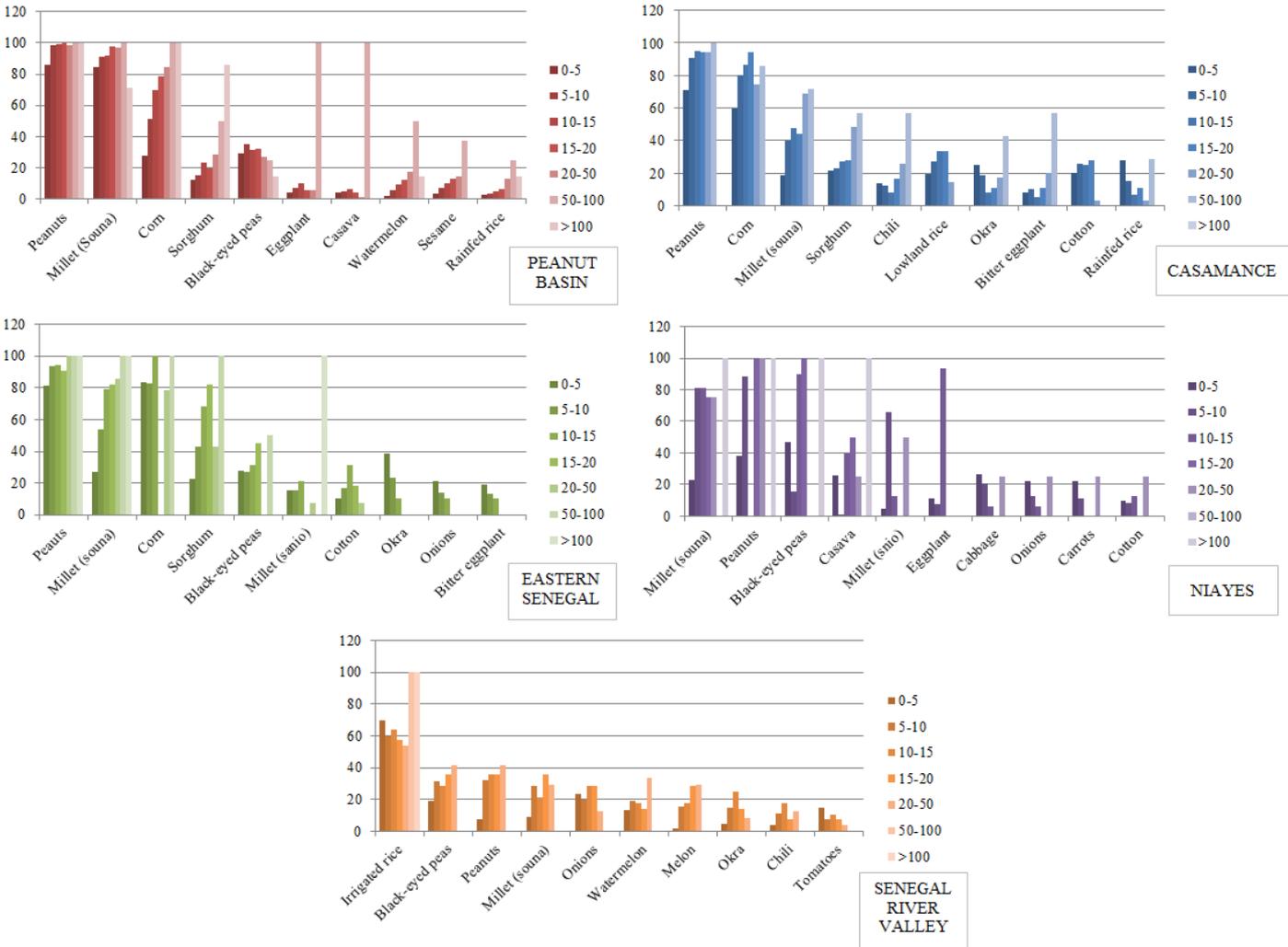


Figure 12. Relation between crop types and size of farming lands for different agro-ecological zones

In-depth work on the survey is still being conducted by the ISRA Bame research team to analyze the database on farmers with more than 5 hectares of agricultural lands.

The work has been divided in five parts to analyze the relationship between farm size and :

- Productivity
- Production and diversification
- Investments
- Market access
- Tenure

Results will be presented in the oral presentation at the Land&Poverty conference of March 2018.

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