



**STRUCTURAL DIMENSIONS  
OF LIBERALIZATION ON AGRICULTURE  
AND RURAL DEVELOPMENT**

*A Cross-Regional Analysis on Rural Change*

**SYNTHESIS REPORT  
OF THE RURALSTRUC PROGRAM**

*FINAL DRAFT*

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# EXECUTIVE SUMMARY

The last 40 years of world history has been characterized by a trend of rapid urbanization within the context of a rapidly growing population. There are now, for the first time, more people living in cities than in rural areas. This process will continue and even accelerate, posing huge challenges for societies in terms of sustainability. According to Cities Alliance, if we refer to the fastest growing regions of the world, the population of sub-Saharan African cities will increase by 340 million people in the next 20 years, more than the population of the United States today.

Nevertheless rural populations remain massive, and these populations are primarily engaged in agriculture. Therefore, the evolution of agricultural and rural development policy in the coming two decades will be critical both for the future well-being of rural people and for the shaping of rural-urban dynamics.

The World Development Report 2008 on *"Agriculture for Development"* identifies three "worlds of agriculture," which are related to different stages in the process of structural transformation. The first of these "worlds" consists of the agricultural based countries, which correspond to most of sub-Saharan Africa, and are characterized by a high contribution of agriculture to growth and employment. The second world refers to "transforming" countries, which include most of South and East Asia where rapidly rising rural urban disparities and persistent extreme rural poverty are major sources of social and political tensions. The third refers to urbanized countries, including most of Latin America, where agriculture can still help reduce the remaining rural poverty through a better integration into modern food markets and the development of environmental services.

Due to its specific positioning with regard to the three worlds of agriculture, the case of sub-Saharan Africa is of course very unique and deserves specific attention. It is the last region of the world to face its demographic transition, and with a population mainly engaged in agriculture, rural policy will effectively determine how this transition occurs. There are huge incentives to get it right.

Between now and 2030 sub-Saharan Africa will grow by 450 million people, and at the same time its rural population is forecasted to move from 63% of total population to just 52%. The share of population in rural areas could even shrink by more, meaning an increased burden on booming cities which are already characterized by a lack of industrialization, reflecting a lack of economic transition. This has more often than not led to the development of a sponge-like informal sector with low productivity and low returns, creating a high level of poverty and the rapid expansion of slums.



Sub-Saharan Africa must face the dual challenges of its demographic and economic transitions at the same time, and will be the first region to do so in the context of a global open economy and under the constraints of climate change. This is a tremendous challenge. Today in sub-Saharan Africa, 65% of the labor force is still engaged in agriculture. In certain countries, this number is over 80%. Even if the global economy offers many opportunities to engage in new activities, participation in it also means confronting growing asymmetries in terms of productivity and competitiveness. Comparative advantages are built with time and even though sub-Saharan Africa has major assets (natural resources, a growing labor force with competitive costs, and a proclivity for entrepreneurship), it also faces several constraints. These include a lack of skills and capital, a weak economic and institutional environment and a poor business climate. Though these constraints are beginning to relax, they are still strong enough that it will be a long time before industrialization will be able to absorb the growing labor force. This strongly supports the decision of the international community to reengage in agriculture.

These observations formed part of the background discussions which led to the design of the RuralStruc program on the *“Structural Dimensions of Liberalization on Agriculture and Rural Development.”* Initiated in 2005 at a time when the international debate was over-focused on trade liberalization, the program aimed at providing a new perspective on agriculture and rural development, taking into account the structural dimensions of the processes of change.

Three inter-related hypotheses were advanced to structure the program. The first hypothesis was that the global restructuring of agrifood markets, and the increasing asymmetry of international competition, led to both the development of increasing differentiation among farm, marketing, transformation and distribution structures. The second hypothesis was that the income and activity structures of rural households changed to include more off-farm activities in response to these more competitive and challenging global markets. The third hypothesis stated that possible marginalization processes in agriculture and difficulties of adaptation of rural households to this new context, especially in situations characterized by the absence of effective alternatives, could possibly lead to transition impasses within the process of structural transformation. This third hypothesis was particularly relevant for the first “world of agriculture,” the agricultural based countries.

To address these hypotheses the program employed a comparative approach. It selected for study seven countries at different stages of structural transformation and economic integration –Mali, Senegal, Kenya, Madagascar, Morocco, Nicaragua, and Mexico- in an effort to draw lessons from different modalities of adaptation to this context of change. The program implemented its activities through a deep collaborative process involving national teams in all seven countries at every stage of program development: preparation, implementation and analysis.

The first phase of the program was dedicated to the production of a broad overview of what was known in every country about the processes of rural change. At this

stage, the work was confronted with a severe weakness of the knowledge base regarding the characteristics of rural economies, particularly concerning activities and income structures of households. The only information available came in various case studies, each with a different objective and different methodology, which prevented them from being used systematically.

Based on this first result the program decided to engage in deep field surveys which were not initially planned. Around 8,000 rural households in 26 regions of the seven participating countries were interviewed.

This data provided a unique, single-shot representation of rural income structures that was comparable across the surveyed regions. However, the main limitation was of course the lack of panel data. This prevented any dynamic analysis within surveyed regions. However, the fact that the surveys used the same methodology at the same time in regions at different stages of economic development and integration allowed a dynamic interpretation of results at the cross-regional level.

The main results of this work are the following:

- Heterogeneity of regional situations: both between regions and within regions. This applies to the level and distribution of income, the degree of integration to markets, the income structure in terms of activities (on-farm and off-farm), and the patterns of diversification or specialization. This heterogeneity is confirmed by econometric analysis, which focuses on the determinants of farm income.
- The very low level of income in the surveyed regions, with a clear distinction between sub-Saharan Africa regions, where poverty is overwhelming, and non-SSA regions, where it still affects a significant portion of households. A major issue is the level of income in the first quintiles, which remains dire. The bottom quintile in every RuralStruc regions outside of Mexico suffers from \$1/day poverty. In three of the four regions in Mali, only the fifth quintile escapes it. At the other end, average incomes in the top quintile of most regions are pulled up by a handful of better-off households, who benefit from very specific social and economic conditions.
- The conversion of income into kilocalories per adult equivalent confirms that the poorest households are in a situation of food insecurity, and thus of high vulnerability. Although the situation is the most critical in the poorest sub-Saharan Africa regions (Tominian, Casamance, Antsirabe 2, Nyando), it is worth noting that it is also the case for two regions in Nicaragua (Muy Muy and Terrabona). Only the Mexican zones and Nakuru North (Kenya) fully escape this critical situation

- Households in the RuralStruc survey are broadly involved in the Rural Non-Farm Economy (RNFE). However, this rural diversification is far from the buoyant economy described in the literature.
  - Agricultural wage employment, one of the most frequently recorded off-farm activities, is a first option for the poor to complement their on-farm income, but only when the demand for labor exists. Agricultural work can be an exit option in non-SSA countries due to the relatively high levels of remuneration. In sub-Saharan Africa, agricultural wages are too low for workers to escape poverty.
  - Non-agricultural wage employment also remains a limited option, mostly linked to unique regional endowments of wealth, infrastructure and services. Its development is uneven in the studied regions (mainly found in non-SSA countries, appearing only sporadically in SSA). In most cases, non-agricultural wage labor is an exit path available only to the already well-off, whose better-endowment of financial, human and social capital allows them to capitalize on opportunities.
  - Self-employment is widely available in most of the surveyed areas. These activities are almost always carried out by small businesses at the micro level and are based on odd jobs, which provide low returns. A handful of richer households are able to generate higher incomes, while the poorest develop coping “survival” strategies. For the majority, self-employment must be considered underemployment.
  - Private transfers related to migration are difficult to capture. This was particularly the case in the two Latin American countries. However, one of the results of the surveys is that migration opportunities often depend upon historical and geographic patterns. In only one region do they make up a significant share of income (40% in Diéma, Mali). In the other regions where remittances are observed, they generally make up between five and fifteen percent of income (Morocco, Senegal, and Nicaragua). Households in poor quintiles often engage in short-term migration with the goal of reducing the number of mouths to feed during the dry season. In the case of public transfers, they only exist in Mexico (where they weigh heavily).
- Households in the RuralStruc survey participate in rural economies that have not been as radically reshaped by vertical integration and the supermarket revolution as one may have thought. High levels of self-consumption, a reliance on staples, and heterogeneous patterns of on-farm diversification that develop in response to region-specific opportunities are commonly observed characteristics. Self consumption levels are driven both by a “supply effect”, whereby households employ risk-management strategies to

retain control over their food supply, and a “demand effect”, whereby households face a weak demand for their products due to poor access to and integration with markets.

- Market integration in the surveyed regions remains mostly “traditional.” Most private collecting agents rely on informal strategies based on trust to obtain output from small farmers, while agribusinesses generally make greater use of contracts. However, at a general level, contractualization remains low in the RuralStruc sample and rarely occurs at the producer level: it is often downstream, between the wholesaler, or the collection unit, and the processing firm or the procurement service.
- Incomes of farm households in RuralStruc regions depend largely on traditional determinants rather than on more modern factors. Plot size, number of livestock, and number of family members are still the largest drivers of household per capita income. Market integration and the use of modern farm inputs (seeds and fertilizer) do not seem to matter as much as more traditional factors.

Despite these sobering rural realities presented by the survey, there are also more hopeful results. There is a strong positive relationship between income and the process of change towards a more diversified rural economy. At the lowest levels of income (where households focus on survival strategies), diversification of income sources does not frequently occur. As households become slightly richer, they remain at risk (especially from adverse shocks) but develop more room for maneuver to build a safety net. At this level of income households begin to diversify their activities. This process of diversification continues until a point where households develop enough of a wealth and asset base that they can earn enough returns through specialization to meet their basic needs and manage their risks. At this point, households begin to specialize into different activities (some on-farm, some off-farm), which results in a diversified economy on the whole. This process is clearly underway, and represents regions engaged in their structural transformation

These results together lead to the emergence of four major policy guidelines.

- The first is to take seriously into account the importance of the strong heterogeneity of every regional situation. Heterogeneous situations require heterogeneous policies, based on a proper diagnostic, the identification of main binding constraints, and the consideration of policies in the context of a long term vision based on a dynamic view of population, factor endowments, and other economic and political variables. This is a strong argument for reinvestment in development strategies, and therefore developing the capacity of policy makers to engage in this type of strategy work, both at the regional and national level.

- Second, policy makers should strongly consider focusing on increasing the productivity of staple agriculture. While it is true that staples often offer a low return, and therefore cannot be the only solution to poverty alleviation, they can clearly serve as a catalyst. Increasing staple production can significantly reduce a household's food-risk, unlock their economic potential and allow them to begin to engage in diversification. This refers to a relaxation the "supply effect" of risk on self-consumption. Further reasons to focus on staples are its inclusiveness (the large majority of households are engaged in staple production), and potential for value added at the local level through transformation. All of this will be possible because there is a rising demand for food from a growing population.
- Third, the employment challenge presented by the rapid increase in population provides additional justification for promotion small-farm agriculture. While large farms have many advantages (particularly for specific products), small farms should also be supported. They offer significant productivity and competitiveness advantages (largely due to their reliance on family labor), and are inclusive. Further, imperfect labor markets in sub-Saharan Africa, and the fact that agricultural wages were found to be too low to provide an exit option from poverty, also suggest encouraging the development of small farms.
- Fourth, the development of strong linkages between small cities and their surroundings rural areas appears to be a necessary focus of attention. Rural-urban linkages on a small scale and in small cities provide unique advantages. They allow simple goods to be produced near the place of consumption, provide job opportunities, foster the development of services and thereby lead to a growing RNFE. The additional provision of public goods at the small city level can help this process and strengthen the transformation of regional economies. Simultaneously, it can help manage the increasing costs of mega-cities by promoting a more sustainable urban development.



## **CHAPTER 1. SETTING THE SCENE AND SELECTING THE TOOLS**

Initiated in 2005, in the context of intense international debates and negotiations on the liberalization of agricultural markets and their consequences on farming in the developing countries, the RuralStruc Program's main objective was to provide a renewed perspective on agriculture and its role for development and, more particularly, to reconnect the issues related to trade liberalization with the more global discussion on structural change.

Over the last four years, and during the in-depth fieldwork implemented by RuralStruc, the scope and issues of the international debate have dramatically changed. However, the "knowledge challenge" remains a striking issue. A lot is said but little is known, and when one wants to find keys to understanding the processes underway in the rural economy of developing countries and their participation and active contribution to the processes of economic and social change, a lack of information is often the rule.

Increasing farmers' connection to markets, integration and contractualization with global value chains, development of the rural non-farm economy, migration and remittances, evolving rural household activities and incomes, all these themes are common for any scholar engaged in development studies and are often referred to by the international community of donors, governments, and local stakeholders. Nevertheless, on all these issues, information mainly relies on scattered case studies from which it is difficult to draw general conclusions or perspectives. However, the weakness of the knowledge-base and the importance of information gaps regarding agriculture and rural development – and more precisely the processes of structural transformation of rural economies – remain a real concern because they are the reality on and with which development strategies and action plans have to be designed.

These fundamental views have shaped the RuralStruc Program and its global framework, which is based on a broad comparative approach involving seven countries at different stages of their structural transformation and economic integration: Mexico, Nicaragua, Morocco, Senegal, Mali, Kenya, and Madagascar. They also underpinned the collaborative design, which translated in every country in a strong partnership with national teams directly involved in the process of data collection and analysis, with the objective of strengthening local evidence-based approaches.

# 1 A Quickly Evolving and Disconcerting Global Context

When the RuralStruc Program was launched, the international landscape and the international debate were significantly different than they are at present. They have since evolved quickly, showing the volatility of the global issues; it is important to keep track of these changes because they are the ever-changing context of the development processes and also the immediate reality to which policy makers refer.

## 1.1 The “Starting Point”

At the time of RuralStruc’s preparation in 2005-06, two main frameworks structured the international debate about development: the United Nations’ Millennium Development Goals (MDGs), and the World Trade Organization’s (WTO) “Development cycle” or Doha Development Agenda (DDA), set at the Doha ministerial conference (2001). Agriculture was clearly part of these two main agendas, sometimes occupying a key position (as in the case of the DDA), but it was never the core issue.

The MDGs provided a global framework based on poverty alleviation. The first goal –*“to halve poverty and hunger before 2015”* – is clearly agriculture-related: 70% of the world’s poor (45% of the world’s population) live in rural areas and rural people rely mainly on agriculture as a livelihood; and improved food supply and availability is central for hunger alleviation. The decisive role of agriculture in “pro-poor growth” was also reaffirmed by broad cross-country analyses performed by the World Bank (2005a). However, poverty remained the central issue, while agricultural development was only one of the means cited to fight poverty among many other thematic and non-sectoral issues.

The WTO negotiations logically focused on trade liberalization, where agriculture is one sector, among others, to be liberalized. However, agriculture progressively became the main stumbling block in the negotiation process, used by developing countries as a core argument to engage with developed countries on the broader issue of the liberalization of industrial products and services. It led to the failure of the Cancún ministerial (2003), initiating a large debate on the costs and benefits of trade liberalization for agriculture. This overwhelming focus on agriculture and trade and its domination over the international debate was one of the main justifications of the RuralStruc initiative.

Since 2005, the MDGs remain a distant reminder of the international community’s commitment to poverty alleviation and global development. They have gained renewed attention with the upcoming UN Summit in September 2010, which will assess the progress achieved so far. However, it has gradually been recognized that every goal will not be achieved.

The WTO debate has faded for several overlapping and interlinked reasons. The first reason is, of course, the emergence of new issues that have overtaken the forefront



(see below). Another probable reason is the profusion and new depths of research on these topics, which have provided additional and mixed estimations of the expected gains of trade liberalization. These new estimations also pointed out the specific situations of many developing countries, particularly in Africa, which could possibly incur net losses rather than gains,<sup>1</sup> adding some doubts – if not confusion – to the discussion. In this context, negotiations have become more acute on OECD countries' subsidies and market access. This contributed to strengthening the opposition and came out of continuous impasses, particularly regarding agriculture: the unsuccessful Hong-Kong ministerial (2005) led to the suspension of negotiations (July 2006) followed by failed attempts to reach an agreement on agriculture and non-agriculture market access (Geneva meetings in July 2008). This “negotiation fatigue” is most likely a third reason for the fading of the WTO debate, which also explains why increasing attention was dedicated to bilateral or regional Free Trade Agreements (FTA), and why major stakeholders decided to carry on bilaterally what was impossible to achieve at the global level.

## 1.2 The “New Events”

Over the last three years, several major changes have occurred. They are related to the growing concern about the consequences of the global climate change and to the eruption of two crises: the food price and the financial crises.

Global climate change is an “old issue” that has been firmly on the international agenda at least since Rio's Earth Summit (1992) and the Kyoto Conference (1997). However, it became a growing concern over the last years due to two successive broad research works: the *Stern Review on the Economics of Climate Change* (2006) and the Fourth Assessment of the Intergovernmental Panel on Climate Change (IPCC, 2007). These in-depth analyses have heightened the international community's awareness and have refocused the on-going negotiations, which led to the Copenhagen Summit of December 2009. They emphasize the impact of climate change on natural resources – including agriculture – by showing that climate change is expected to have various adverse effects, such as increased rainfall variability, long-term drying trends, a reduction in cultivable land and a reduction in the length of the growing season. Out of all the regions, sub-Saharan Africa is expected to suffer the most: the IPCC projects annual agricultural losses of between 2 and 7% of GDP in the region by 2100. The World Development Report 2010, focused on *Development and Climate Change* (World Bank, 2009), has provided a comprehensive update on the challenges faced by developing countries, which will bear most of the costs (75 to 80%) of the damages related to global warming. Their reliance on ecosystem services and natural capital for production (mainly agriculture), the concentration of their population in physically exposed locations,

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1 Among others, see for instance Bouët et al. 2005, Boussard et al. 2005, Polaski 2006, or more recently Pérez et al. 2008 on Latin America or Zepeda et al. 2009 on Kenya, and of course the work coordinated by K. Anderson on “Krueger/Schiff/Valdés Revisited” (Anderson 2010).

and their limited financial and institutional capacities for adaptation are among the main explanations. Special mitigating measures will be necessary to prevent an additional 120 million people from suffering from hunger, and agriculture will occupy a central role in resource management and carbon sequestration.

Aside from this long-standing but growing issue, the first new concern was the emergence of the food price crisis (2007-2008), which modified the global picture and contributed to renewed interest in food and agriculture issues. Prices had been increasing progressively since 2006 and rose sharply at the beginning of 2008, leading to international mobilization. Though they then slowed down and remain below the 2008 peak, according to all forecasts relatively high prices in the medium-term and a greater instability are expected.

Different factors led to these high food prices and there was a fervent debate on the role each of these factors played. On the supply-side, weather-related production shortfalls combined with a trend towards lower stock levels and increasing fuel costs are the main explanations. On the demand-side, the major reasons are the long-term changing structure of demand related to quickly evolving diets in emerging countries, the emergence of bio-fuels as a response to growing oil costs, and more occasional operations on financial markets. Nevertheless, and whatever the contribution of each factor, one main conclusion is that there is no global food shortage in the medium-term: the core issue is the *cost* of food and not the global *lack* of food (even if food shortage can occur locally and increase prices); thus, the main concern is the functioning of food markets and the access to food for low-income consumers. The challenge is to avoid an excessive focus on short-term issues and to focus simultaneously on helping farmers to reap the benefits of the current better prices, mitigate their impacts on the poorest consumers, increase food production to counter-act increasing prices, and improve producers' incomes through increased bargaining power and higher yields.

The second major event was the unexpected and sudden onset of the global financial crisis, which has dramatically affected the world economy since September 2008. The recovery has been a slow process and remains fragile. The rapid transmission of the downturn in the US housing sector to the global financial system deeply affected both rich and poor countries, with a contraction and recession in several developed economies and a sharp slow-down of developing countries' growth rates. The consequences for the latter, particularly the weakest with fewer resources to assist them rebound, is a risk of lagging economic growth (which is incompatible with their demographic trends), and of drastically reduced revenues (foreign direct investments, fiscal revenue, foreign aid, and remittances).

When going back to the "starting point" of the RuralStruc Program, it appears clearly that the founding reference to trade liberalization – even if the core objective of the Program was to go beyond – has been overshadowed by these new events.

These two crises generated different sets of disconnected discussions on remedies. However, both crises have triggered, to a certain extent, temporary protectionist reactions (perceived as the risk of a “protectionist tide”), strongly contradicting the long-lasting international negotiations on trade liberalization. The food price crisis led to a search for new production options based on quick investments or re-investments in inputs (sometimes with subsidies), infrastructure, irrigation and even large scale capital-intensive agricultural schemes, launching anew an old – and artificial – debate between smallholder and commercial agriculture (similar here to large-scale farming). Concurrently with the financial crisis, it also sparked tariffs increases and new non-tariff barriers and the provisional return of quotas.

### **1.3 Which Role for Agriculture?**

Fortunately, however, during these three years, the specific debate on agriculture has been boosted within the international community by the choice made by the World Bank to select agriculture for the World Development Report (WDR) – its yearly flagship report on development – in 2008. Prepared in 2006 and 2007 and launched at the end of 2007, the WDR08 provided the necessary momentum for a new focus and a new perspective on agriculture. Named “*Agriculture for Development*”, the WDR08 strongly reaffirms the roles of agriculture as a main sector of economic activity in most developing countries (as a source of labor, growth and of comparative advantage), an important social sector due to the large share of the population involved, and an important user of natural resources.

The WDR08 also provides an insightful review of what is known about the mechanisms of agricultural development and how agriculture can leverage the development process. The latter is based on a regionalized vision of the world’s agriculture, which depicts the specific roles and challenges of agriculture in the development process depending on its weight in the regional economy (**Box 1**).

This targeted approach has strongly contributed to the success of the report and has fostered its discussion at regional level. Its broad dissemination process has facilitated agriculture’s comeback in the international debate on development. Nevertheless, its momentum was somewhat impeded by the hectic international agenda, knowing that only a few months later different messages were disseminated. For instance, the last UNIDO’s Industrial Development Report (2009) highlights the role of industry as the main driver of change, particularly for the “Bottom Billion” countries.<sup>2</sup> And, with a different – though not necessarily contradictory – perspective, the World Development Report 2009 (WDR09) on “*Reshaping Economic Geography*”, stresses the need for higher demographic

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<sup>2</sup> The “Bottom Billion” refers to Paul Collier’s book (2007) which focuses on the group of fifty failing states stuck in poverty, 70% being in SSA. Collier is one of the two authors of UNIDO’s report.

densities, shorter economic distances and fewer political divisions, all of which can be reached through increasing agglomeration and integration processes.<sup>3</sup>

**Box 1: The WDR08 and its “Three Worlds”**

The WDR08 proposes a regionalized approach to agriculture for development and identifies three distinct worlds of agriculture depending on its contribution to growth and on the rural share of global poverty: an agriculture-based, a transforming, and an urbanized world. In each world, the agriculture-for-development agenda differs in pursuit of sustainable growth and poverty reduction.

In the agriculture-based countries, which include most of sub-Saharan Africa, agriculture and its associated industries are essential to growth and to reducing mass poverty and food insecurity. They provide jobs, activities, incomes, and food self-sufficiency. In transforming countries, which include most of South and East Asia and the Middle East and North Africa, rapidly rising rural-urban income disparities and persistent extreme rural poverty are major sources of social and political tensions; rural diversification and agricultural income growth are answers to these challenges. In urbanized countries, including most of Latin America, much of Europe and Central Asia, agriculture can help reduce the remaining rural poverty if smallholders become direct suppliers in modern food markets, good jobs are created in agriculture and agro-industry, and if markets for environmental services are introduced.

	<b>Agriculture-based countries</b>	<b>Transforming countries</b>	<b>Urbanized countries</b>
Rural population (millions), 2005	417	2,220	255
Share of population rural (%), 2005	68	63	26
GDP per capita (2000 US\$), 2005	379	1,068	3,489
Share of agriculture in GDP (%), 2005	29	13	6
Annual agricultural GDP growth, 1993-2005, (%)	4.0	2.9	2.2
Annual nonagricultural GDP growth, 1993-2005 (%)	3.5	7.0	2.7
Rural poverty rate, 2002 (%)	51	28	13

Source: World Bank 2007, p. 31-32

Note: The poverty line is \$1.08 a day in 1993 PPP.

The WDR08 suggests three pathways out of rural poverty in order to explain how agricultural growth can reduce rural poverty: (i) agricultural entrepreneurship, (ii) the rural labor market, and (iii) the rural non-farm economy and migration to towns, cities or other countries. Several pathways often operate simultaneously and the complementary effects of farm and non-farm activities can be strong. Although rural households engage in farming, labor and migration, one of these activities usually dominates as a source of income.

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3 Two departments of the World Bank, the Poverty Reduction and Equity Group, and the Finance, Economics and Urban Department, have launched a joint work program on “*Poverty Reduction during the Rural-urban Transformation in Developing Countries*”, with the objective of continuing and combining the two WDRs perspectives. This work will be achieved in 2010.

However, despite this very unstable environment, agriculture is now back on the development agenda and its contribution to growth, trade, and poverty alleviation is no longer in question: donors and governments are reengaging; the United Nations Secretary-General's High Level Task Force on the Global Food Security Crisis, launched in April 2008, contributes to coordinating the international efforts; in July 2009 (L'Aquila Summit) the Group of Eight (G8) industrialized countries made the pledge to mobilize \$20 billion over five years to boost food security (confirmed at the G20 Summit in Pittsburg, September 2009); and in April 2010 the Global Agriculture and Food Security Program (GAFSP) was officially launched with a first contribution close to \$1 billion.

Although food security is a narrower scope, this context provides an opportunity to broaden the debate and to propose a global perspective where agriculture is also the core activity for rural livelihoods, and a central driver for structural change.

## **2 Main Objectives and Hypotheses of the Program: Reconnecting the Dots**

When launched, the Program had three specific purposes: (i) contribute to the analytical knowledge-base about the structural dimensions of liberalization and economic integration on agriculture and rural development in developing countries, (ii) feed and improve the international and national debates by promoting these issues, and (iii) provide guidelines for policy making.

For these purposes, the Program adopted a broad approach, which was not limited to liberalization, and also included a wide range of economic, social and political issues to facilitate a better understanding of the trajectories of structural change and to identify factors of convergence and divergence between countries through comparative analyses.

### **Box 2: "RuralStruc" – What's in a Name?**

The selection of the acronym used to name this Program, officially titled "Structural Dimensions of Liberalization in Agriculture and Rural Development", clearly relates to the choice of bringing structural issues into a debate that mainly focused on trade issues and that had directly affected its designation.

RuralStruc refers both to rural structures and to the implications of global structural change on agriculture and rural economies. Using the iceberg image, structural transformation refers to what is under the waterline, while trade liberalization is only the tip. The Program's logo draws on this image.

The seven countries involved in the Program were selected to illustrate different phases on a gradient representing the process of liberalization, economic integration and structural change:

- Mexico, on one side, was chosen as an example of "old" economic transition and supposedly deep integration and liberalization processes, providing a

background picture with the experience of the North American Free Trade Agreement (NAFTA);

- Sub-Saharan Africa (SSA), on the other hand, with Senegal, Mali, Kenya and Madagascar, provided an illustration of the initial stage of economic transition with partial integration and liberalization processes, initiated through state and market reforms, and an important remaining role for agriculture and other primary activities;
- Morocco and Nicaragua, illustrating a more advanced stage of structural transformation, represented additional case studies characterized by supposedly rapid integration processes due to their proximity to powerful economic zones with which free trade agreements had been recently implemented (the European Union and the USA in the case of Morocco, and the USA in the case of Nicaragua).

The discussion on the consequences of global changes on economic and social structures and on the agricultural and rural dynamics of developing countries directly shaped the rationale of the RuralStruc Program and its hypotheses. While the trade liberalization debate focused on the expected gains of the liberalization process and its consequences for poverty, and also (though more rarely) engaged in its potential employment dimensions (Winters et al. 2004, Hoekman & Winters 2005), the Program's objective was to investigate more particularly the characteristics of economic transition within globalization (Box 3). It was also to elaborate on possible structural difficulties rather than just on "transitional problems", which has been the long-standing common view of the international debate. Consequently, it aimed at addressing some recurring blind spots like the growing asymmetries between countries, the lagging economic diversification and the demographic challenges of several developing regions, and their consequences for each country's unique process of structural transformation.

Three embedded hypotheses were advanced to structure the research process. The first hypothesis refers to the global restructuring of the agrifood markets and the increasing asymmetry within international competition. It states that these processes lead to both the development of increasing differentiation among farm structures, and also marketing, transformation and distribution structures. This hypothesis raises several questions: What is the balance between the potential integration of farmers in the new value chains and their possible exclusion? What are the amplitude, rapidity, and characteristics of these processes? Do they induce a segmentation dynamic with concentration, marginalization and, sometimes, exclusion within and from the farm sector, leading to the emergence or consolidation of multiple-track agriculture?

The second hypothesis relates to the existing processes of adaptation among rural households as a response to the many changing factors in agriculture and their impact on farms' viability. Rural households engage in new configurations of

activities and income characterized by a changing role of agriculture and a growing importance of off-farm activities and transfers (private transfers related to migration and, possibly, public transfers linked to specific support systems). Questions relevant to this hypothesis include: What are the characteristics of these new configurations? How do they differ between countries? Are they new dynamics or do they follow the historical paths of structural transformation? Are they effective answers for rural livelihoods sustainability?

Consequently, the differentiation dynamics within agriculture and the possible difficulties of rural households' adaptation, in absence of effective alternatives in terms of activities and incomes, could constitute risks of transition impasses within the process of structural transformation. This is the third hypothesis, which refers firstly to the characteristics of what the WDR08 named the "agriculture based" countries. In these countries, the weight of agriculture in the employment and activity structures, the strong urbanization process without significant industrialization, the limited economic diversification in a context of growing international competition, and the heavy demographic pressure, all create a unique challenge for development. Will some countries face impasses in escaping poverty due to a lack of alternatives (Kydd 2002), and what are the potential social, economic, and political consequences of such dead-ends in the economic transition?

### **Box 3: Liberalization or Globalization?**

In the early definition of the RuralStruc Program, liberalization was understood in a broad sense as the global process of change engaged in the early 1980s that included trade and domestic reform, state withdrawal from economic activities, privatization, and, in many developing countries, the reform of the state through decentralization and the development of democracy.

The aim of the RS Program was to focus on all of the structural dimensions of this new context, which explains the initial choice for the denomination of the Program. However, although the Program adopted this broad definition of liberalization, this "official positioning" of the Program's name quickly appeared inadequate: firstly, because the understanding of the objectives was often restricted to the policy package dimension of the reform process associated with liberalization and, consequently, was only perceived as a critical approach of the reforms – which was obviously not the purpose; and, secondly, because this misinterpretation implicitly limited the scope of the processes at stake.

After engaging in debates with both the donor community and the national partners, it appears that "globalization" would have been more relevant than "liberalization" in the denomination of the Program. Such a positioning could appear to be an excessive scope. Nevertheless, what the Program clearly addresses is the new international regime engaged in the early 1980s and its consequence for agriculture and rural economies. This new regime is characterized by new roles for the state and private actors, as well as by a broad and deep movement towards integration of the world economy.

Some RuralStruc national teams have adopted this broader positioning and sets of policy briefs prepared to support the dissemination process refer to the RuralStruc Program as "*Globalization and Structural Change in Rural Economies*". This designation has been selected for the final edited version of the Second Phase national reports posted on the program's web page.

### **3 General Design of the Program: Country Case Studies, Regional Surveys, and Collaborative Processes**

To assess the relevance of the hypotheses and to answer their related questions, the comparative approach selected by the RS Program aimed at identifying the main similarities and differences in countries' processes of adaptation to the new context, taking into account their own trajectories of structural change. This overall design was supported by the implementation of a collaborative framework engaging local teams in an internal process of analysis with the dual objective of a "better understanding for a better policy making" (this statement was the sub-title of the Program).

#### **3.1 A Comparative Approach**

Comparative approaches are a powerful tool for analytical work because they help to stress convergences and differences and to identify key explanatory factors. However, they are also risky and can lead to deep methodological errors. For the RS Program, the comparative perspective was, of course, not used to make comparisons between countries (for instance Mexico and Madagascar), as this would have made little sense and would have induced classical selection bias.<sup>4</sup>

Simultaneously, facing the classical challenge of ex-post analysis, the goal was not to evaluate "impacts" – the term was carefully avoided in the title of the program and "dimensions" was preferred – because it would have led to information difficulties (particularly the lack of years of reference for evaluation) and to a risky discussion on causalities of change.

On the contrary, the objective of the comparative approach was to illustrate processes of change in agriculture and the rural economy related to liberalization, economic integration and globalization, so as to identify patterns and differences, the understanding of which can be useful for policy making. In its implementation, it endeavored to adopt a global multi-disciplinary and historical perspective of the dynamics of change, by giving attention to the national trajectories and their "critical junctures",<sup>5</sup> which can modify the nature of relationships between agriculture, the rural sector and the overall economy.

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<sup>4</sup> Due to the selection process and the self-selection of the country cases, any conclusion from direct comparison to explain variables would suffer from systematic error (Collier & Mahoney 1996).

<sup>5</sup> The concept of critical juncture is part of path dependence approaches and refers to the identification of "key choice points" when a particular option is selected by governments, coalitions, or social forces among other alternatives and leads to the creation of recurring institutional patterns (see Mahoney 2001, Pierson 2000).



### 3.1.1 *Country Selection*

To engage in the comparative approach, it was decided to select, as previously stated, a sample of countries corresponding to a spectrum of situations within the process of economic integration, including, on the one side, countries that are far ahead in this process and, on the other side, countries where the pace of integration into the world economy has been slow and / or unequal.

The process of selection of case studies for a comparative goal is always the result of a trade-off between objective criteria related to research purposes and operational issues, which refer to local partnerships, conditions for implementation (budget, human resources, allocated time), and contributing partners' overall themes of interest. Thus, the country selection resulted from discussions between the contributing donors. It was decided that a specific focus on sub-Saharan Africa was justified by the critical structural situation of the continent and the many commitments of both the international community and African governments to revitalize the agricultural sector. On the donors' side, at the end of 2005, the UN Millennium Project's Task Force on Hunger, the Commission for Africa Report, the Africa-EU Partnership and the World Bank Africa Action Plan (AAP) were the main references. As seen previously, this commitment has increased over the last four years as a consequence of the food price crisis and a general recognition of the role of agriculture for development. On the African governments' side, NEPAD's Comprehensive Africa Agriculture Development Program (CAADP) was the indisputable framework. It has since become the African and international reference for action and reached the stage of its operationalization.

Further to the above-mentioned criteria of gradual and differentiated integration, the selection of countries was based on two specific macro-economic criteria: the GDP per capita and the agricultural economically active population (AgEAP), which are indicators of the country's stage within the economic transition. As a consequence (with the exception of Mexico), the selected countries are low-income or lower-middle-income countries, with significant but different levels of their economically active population involved in agriculture (see Chapter 2): between 70 and 80% for the SSA countries, 35% in Morocco, around 30% in Nicaragua and 20% in Mexico.

The demographic size was also part of the selection process in order to avoid extremes – particularly the most populated countries, which offer broader options regarding the process of structural transformation. This view is disputable, of course, because there is no direct correlation between economic transition and demographic size, and significant counter-examples exist on both sides. However, in the context of increasing competition linked to globalization, economies of scale related to large domestic markets offer additional room for maneuver. This is particularly the case for industrialization, as well as for research and / or capacity

building, and regional economic integration is, of course, the main option for “small” countries.<sup>6</sup> Again, the selected countries have a small to medium demographic size, between 5 and 35 million inhabitants (except, again, for Mexico). These criteria precluded the selection of any Asian countries, as many countries of the continent deal with bigger dimensions.<sup>7</sup>

The choice among the SSA countries reflects the diversity of situations among low-income countries (Madagascar, Mali, and Senegal being in the Least Developed Countries group (LDCs)). It refers to their geographical situation (Southern, East and West Africa, including a land-locked country, Mali), their colonial history, their activity structure including the role of migrations, and the state of the national debate around agriculture and privatization.

The specific cases of Nicaragua<sup>8</sup> and Morocco, two lower-middle-income countries, are direct and powerful examples of countries facing rapid transformation processes. Agriculture – characterized by dualistic structures – is still a major political issue and international migrations play a big role in the political economy. They have both to deal with challenging new free trade agreements.

Despite being an exception to several selection criteria, including Mexico (an upper-middle-income country, OECD member and emerging economy) was justified by its anteriority in the integration process through the implementation of the NAFTA in 1993.<sup>9</sup> Indeed, Mexico provides a useful picture of the supposed impacts of deep liberalization and integration processes with strong consequences for agriculture and the rural economy on the whole, though these impacts have been mitigated by significant public support targeting both the farm level and the rural poor. It is also a reference case for international migration, which plays a decisive role in the processes of adaptation to deeper integration.

With reference to the WDR08, the selected countries represent the three worlds of agriculture: “agriculture-based” (Kenya, Madagascar, Mali), “transforming” (Senegal,

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6 “Small” and “medium” are indeed relative values. Nevertheless, one must keep in mind that among the 192 members of the United Nations, only 25 countries count more than 50 million people, 50 count more than 20 million, but 80 have less than 5 million inhabitants.

7 This is, of course, the case of China and India which are “global exceptions”. But it is also the case of most of the Asian countries (e.g. Thailand, Vietnam, Indonesia, Philippines). If we exclude the former USSR Republics and the conflict and post-conflict countries (Cambodia, Sri Lanka), the alternatives were limited. Within this range of demographic size, Malaysia could have been an interesting case, even if already deeply engaged in its structural transformation.

8 To illustrate the CAFTA countries, Guatemala and Honduras were discussed alternative options. However, Nicaragua was selected for operational reasons.

9 It is worth to mention here that Mexico holds also a specific status among developing countries due to its long-standing agricultural policy, initially based on a revolutionary-founded agrarian reform which ran from the 1920s to the 1970s. In spite of liberalization of the land market in 1992, this specific trajectory has deeply shaped the structure of the Mexican agriculture.

Nicaragua and Morocco), “urbanized” (Mexico).<sup>10</sup> There is no perfect sample, and this one could have probably benefited from a case illustrating powerful plantation-based agricultural economies that have been long engaged in tropical commodity exports (coffee, cocoa, palm oil), like some countries of the Gulf of Guinea in West Africa.<sup>11</sup> However, even if polarized on annual crops agriculture and mainly cereals, the RuralStruc countries present a range of situations, which fits with the Program’s hypotheses and that cast light on the respective roles of value chains and their market orientation (domestic or international, staple or high-value), the degree of economic diversification, migrations, and the type of public policies.

### 3.1.2 *Operationalizing the Comparative Work*

The RuralStruc Program was conceived with two main phases:

- The main objective of the First Phase was to generate broad country overviews based on desktop studies and gathering all the available information on “what was known” on the role of agriculture in the economy, on market structures and their evolution, on development and differentiation of farm structures, and on risks of impasses and possibilities for adaptation. Simultaneously, this First Phase was an opportunity to identify the missing information related to the processes of structural change within agriculture and to share views on the general approach of the Program with the national partners.
- The Second Phase was originally designed to produce specific information through more detailed case studies, both at the regional and value chain levels, based on qualitative fieldwork including interviews of smallholders, middlemen, and other economic agents, and targeting the relevant issues brought out by the First Phase.

However, due to the weakness of the knowledge-base and the extent of significant information gaps regarding the processes of structural transformation of rural economies revealed by the First Phase, notably on household activities and incomes and integration to markets, it was decided (First Advisory Committee meeting of March 2007) to engage more directly in data collection at the household level. The

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10 Having Senegal, a country with 71% of its EAP in agriculture (2008), in the “transforming world” illustrates the ambiguity of using only “rural” (and rural poverty) as a category for the analysis. The definition of rural varies between countries (see below) and has a restrictive definition in Senegal. Nicaragua is not referred to in the WDR’s “three worlds” analysis, which excludes countries below the 5 million inhabitants limit (even though Nicaragua passed this limit in 2000). However, using the same criteria, Nicaragua would be part of the “transforming countries” group.

11 Kenya provides an example of deep involvement in tropical commodities. Nevertheless, for many operational reasons, the core tea and coffee regions were not selected for the field work. However the surveyed district of Bungoma, in the Western Province, is a coffee-growing region. Among the country cases, the other example of tropical perennial crop is found in Nicaragua (also coffee), and perennials are also strongly represented in Morocco (mainly citrus).

objective of these household surveys was to provide new evidence on the processes underway in agriculture and the rural economy by generating new and updated information, as well as to improve the conceptualization of the new roles of agriculture within the households' activity nexus (types of income generation, combination of systems of income and activities, multi-purpose strategies, etc.).<sup>12</sup>

## 3.2 Regional Fieldwork

### 3.2.1 *Design and Limitations*

The main operational choice of the RuralStruc fieldwork was to implement rural household income surveys.<sup>13</sup> The preference for *rural* and not only *farm* households was justified by the objective of identifying more precisely agriculture's role with respect to other rural activities and sources of income. This option was not neutral, as it refers to analytical categories whose definition are more complicated than one may believe *a priori*, like the definition of what "rural" is, its characterization varying between countries (see Box 4). Targeting household incomes led the Program to focus on the core issue of income estimates, which, in rural areas, means dealing with farm incomes and all the difficulties of their approximation.

However, the overall duration of the Program, as well as its funding, did not allow more than implementing a "one shot" survey, a key inconvenience with regard to the Program's hypotheses developed in dynamic terms, and a source of bias due to the yearly variation of farm incomes (e.g. impact of bad weather conditions on yields).

A way to mitigate this severe restriction would have been to benchmark the surveys based on existing panels, but this option quickly appeared to be a dead-end. The first reason is that it would have been unrealistic to deal with several baselines and survey frameworks and methodologies in the different countries, which would have deeply affected the content and results of the fieldwork and the objectives of the Program. The second reason was the unavailability of such panels with a specific focus on rural incomes. In developing countries, panel data, when they exist, have mainly been developed for poverty estimation purposes and, consequently, they most often deal with household expenditures and not with incomes.<sup>14</sup> Though many case studies exist, little has been done and is available on rural incomes: this is frequently a consequence of the depletion of the national statistical systems and, also, the result of statistical frameworks that do not target the rural economy but

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12 The First Phase was realized between April 2006 and March 2007. The Second Phase was supposed to be implemented between June 2007 and June 2008. The new choices obviously led to a new schedule and the activities were launched in September 2007 and lasted till June 2009, with extensions for Kenya and Mexico until January 2010.

13 See annex 1 which presents the detailed methodology used for the fieldwork and the data analysis.

14 This is broadly the case of Living Standards Measurement Studies (LSMS).

principally agriculture. A rare exception is the RIGA Program (Rural Incomes Generating Activities) developed by the FAO in collaboration with the World Bank, which offers a coherent framework to compare national sources on rural incomes (see Box 6 in Chapter 4).<sup>15</sup>

**Box 4: Rural versus Urban: What Definition for Each Country?**

**Kenya:** The Kenya National Bureau of Statistics defines “rural” as a locality with human population of less than 2,000 dwellers.

**Madagascar:** Rural areas correspond to districts where the proportion of agricultural economically active population exceeds 50% (as defined for the Agricultural Census) (*RSII Madagascar*, p.26).<sup>16</sup>

**Mali:** “Rural households” include all households living in “rural areas”, which are defined as the opposite to towns. At least through one of the members, rural households are involved in agricultural activities (broadly defined) (*RSII Mali*, p.20).

**Mexico:** Although there is a common reference to the 5,000 inhabitants limit, a “rural locality” is defined as a place with less than 2,500 dwellers (*RSII Mexico*, p.13).

**Morocco:** “Rural areas” are defined by default: rural is considered any area that is not included in the scope of an urban area. Urban areas change their boundaries over time due to the expansion of cities and the reclassification of rural localities to urban. There is no statistical definition of the rural population (MCP 1995; *RSII Morocco*, p.6).

**Nicaragua:** The official definition of “rural areas” corresponds to districts with less than 1,000 dwellers (INEC 2007; *RSII Nicaragua*, p.11).

**Senegal:** The “rural” is defined in opposition to the “urban”, which has an administrative definition: all “communes” are classified as urban, even if they have all the attributes of rural areas, particularly the importance of farming (*RSII Senegal*, p.39).

This drawback of the survey design was balanced by the overall conception of both the fieldwork and the Program, the household surveys being complemented by additional and specific fieldwork and desk reviews on selected value chains and on the characteristics of the surveyed regions. These articulated activities provided the overall background which allowed for a fine-tuned analysis of the household surveys’ results putting them in perspective with an analysis of the processes of change underway.

*In fine*, around 8,000 rural households surveys counting 57,000 people were implemented in 26 regions of the seven countries (see detailed table in Annex 1) between November 2007 and May 2008, based on the same positioning and questioning and using the same survey instrument framework. This is a unique tool

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15 In the coming years, the new LSMS-ISA (LSMS Integrated Surveys on Agriculture) launched in 2009 by the World Bank and the Bill and Melinda Gates Foundation in seven sub-Saharan African countries will provide panel data focusing on agriculture and linkages between farm and non-farm activities.

16 The national reports are referenced in the document using the following: *RSI Country*, for the First Phase reports; *RSII Country*, for the Second Phase reports. The list of reports is provided at the beginning of the bibliography.

for simultaneously putting into perspective the reality of the rural economies of the selected countries.

### 3.2.2 *Selection of the Surveyed Regions and Value Chain Reviews*

Due to the general objectives of the Program and its resources, the purpose of the household surveys was obviously not to reach representativeness, but rather to provide a comprehensive picture of the rural realities. Consequently, the Program decided to focus on a selection of regions illustrative of different underlying trends that had been previously identified. Regions were chosen based on the First Phase results and the expertise of the local teams, who used different criteria depending on the local context, but all related to market access, the presence of integrated commodity chains, the level of public investments and public goods, and the situation of natural resources.

Three types of regions were qualified:

- “*winning regions*”, where the existing dynamics of integration to markets, related to specific value chains, the proximity of urban centers or good infrastructure provide opportunities and are strong drivers of change;
- “*losing regions*”, which are characterized by trends toward marginalization due to local constraints (low factors endowment, lack of public goods), poor connection to markets, high poverty rates, and where household sustainability appears to be increasingly difficult;
- “*intermediary regions*”, where the trends appear to be more imprecise and will broadly depend on the evolution of the global economic and institutional contexts, which will either provide new opportunities and reduce the existing constraints, or not.

Based on this general typology, a minimum of three different regions (one per type), but sometimes more, was selected for the fieldwork in the seven study countries (see Table 1 below). Surveyed localities were chosen by the national teams in order to illustrate the regional dynamics, and households were randomly designated at the locality level.

During the analysis, fine-tuning based on the survey results led to the identification of sub-regions in order to provide a more accurate view of the regional characteristics. This choice was grounded on the high income variations between localities, which revealed a statistically significant heterogeneity. This was the case in Senegal and Madagascar, where two regions were split into separate zones.<sup>17</sup> For

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17 In Senegal: Lower Delta (Bas Delta) and Upper Delta (Haut Delta) for the Senegal River Delta region, Mekhé 1 and 2 for the Groundnut Basin North. In Madagascar: Antsirabe 1 and 2, and Alaotra 1 and 2.

obvious geographical differences, the Sotavento region in the Veracruz state (Mexico) was also divided in two sub-regions – the low lands (Tierras Bajas) and the mountains (Sierra de Santa Marta) – in order to take into account different households’ asset endowments and agrarian structures, reflected in income patterns.<sup>18</sup> The main characteristics of the regions as well as maps of the surveyed zones are provided in Annex 3.

**Table 1: Selected Surveyed Regions in the RS Countries**

	Ex-Ante classification		
	"Winning"	Intermediary	"Losing"
<b>Mali</b>	Koutiala Macina	Diéma	Tominian
<b>Senegal</b>	Senegal Delta	Groundnut Basin: North (Mekhé) and South (Nioro)	Casamance
<b>Madagascar</b>	Antsirabe	Alaotra Itasy	Morondava
<b>Kenya</b>	Nakuru North	Bungoma	Nyando
<b>Morocco</b>	Souss	Saïss	Chaouia
<b>Nicaragua</b>	El Viejo El Cuá	Muy Muy	Terrabona La Libertad
<b>Mexico</b>	Tequisquiapan (Quéretaro)	Sotavento (Veracruz)	Ixmiquilpan (Hidalgo)

Sources: RuralStruc Phase II reports

Thus, due to the general configuration of the sampling method, the Program’s surveys are statistically representative at the locality level only (village or community). They are indicative at the regional level and provide a good overview of the regional characteristics, as confirmed by the Second Phase national reports. They are illustrative at the national level and shed light on the diversity of the rural situations.

In parallel to the selection of study regions, relevant value chains were also chosen in order to contextualize the survey results and to provide a broader historical perspective, in particular with respect to the restructuring of agricultural markets. They were selected with reference to their economic role in the surveyed regions. The chain selection per country, which included both staples and commodities, is presented below in Table 2.

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18 Unfortunately, it was decided to drop the results of Ixmiquilpan, in the Otomi region of the Hidalgo state, which had been selected as a losing region. The inconsistencies in the survey results were insurmountable. The Sotavento sub-region of Sierra de Santa Marta, characterized by difficult access, low provision of public goods and a population mainly indigenous, somewhat offers characteristics of a “losing” region.

**Table 2: Main Value Chains analyzed in the RS Countries**

Country	Value Chains
Kenya	Maize, milk, sugar cane
Madagascar	Rice, maize, potato, dairy, green bean
Mali	Meat and dairy, dry cereals, rice, onion, cotton
Morocco	Cereals, red meat, olive oil, tomato, citrus
Mexico	Maize, dairy, fruit and vegetables
Nicaragua	Basic Grains, vegetables, dairy, coffee, sesame
Senegal	Groundnut, cassava, rice, dairy, maize, tomato

Sources: RuralStruc Phase II reports

### 3.3 The Partnership at Work

One of the original characteristics of the RS Program was the core methodological choice of developing activities through local partnerships – relying on national teams – in order to facilitate and improve data collection and analysis (an additional safeguard in terms of consistency of the collected information and general understanding of the processes underway) and to foster both local ownership and the public policy debate. Between the launching workshop of the Program in April 2006 and June 2009, the national teams and the coordination team engaged in continuous exchanges, which intensified during the launching and ending stages of each phase, joint field missions, and several collective events (see Annex 2).

The same terms of reference, adjusted collaboratively, were used for each phase and, above all, a deep consultation process on the survey instrument design was engaged. The same framework was used in the seven countries, with the necessary local adaptations. A methodology for the data breakdown and definition of the core variables for the analysis was shared; difficulties about the data analyses were discussed during a specific workshop, as was the outline of the Second Phase report. A common effort was also engaged in order to build an aggregated mini-database focusing on some core variables. Last, but not least, the country results were thoroughly discussed, based on the data analysis and the national reports, as a way to consolidate the final outcomes of the program.

Dissemination of the results was engaged in every country after the First Phase and has been launched in some of the participating countries for the presentation of the overall results of the Program after the Second Phase. The format and pace of these events, which should continue after the formal end of the Program, has depended and will continue to depend on the local political agenda, and the willingness of the local partners and the contributing donors. In the two countries where a formal dissemination occurred (Mali, April 2010) or is planned (Senegal, June 2010), it consisted of the preparation of a set of policy briefs by the national teams that presented the overall results of the program and recommendations, which were discussed during a workshop involving farmers’ organizations and civil society representatives, administration, local governments, private sector, and donors.



International dissemination will occur throughout 2010 and early 2011 and will involve the country teams. A first step was undertaken in August 2009 when the Program organized a pre-conference workshop during the XXVII International Conference of Agricultural Economists (IAAE 2009) in Beijing. This workshop was implemented with several national team representatives and offered a good opportunity to share and confront results within international academia.<sup>19</sup>

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19 The workshop's title was "*Rural restructuring and the difficult ways of specialization or diversification: Lessons from a cross-country approach*". See: <http://www.iaae2009.org/workshop.html>

## **CHAPTER 2. THE CHALLENGES OF STRUCTURAL TRANSFORMATION**

As previously presented, the overall objective of the Program is to reconnect the processes of global change and their main consequences with the reality of rural economies. . The Program made the methodological choice not to rely on micro-macro modeling, which – though a potentially powerful way to address these issues – would not take into consideration significant data problems. Rather, it chose to analyze the characteristics of rural households in the surveyed regions and to examine them in the context of existing macro-level challenges. The main objective of this chapter is to provide both the background of the processes underway and to address specific challenges faced by the RS countries and regions, notably sub-Saharan Africa.

### **1 Structural Transformation in an Open Global Economy**

#### **1.1 The Process of Structural Transformation: a Refresher**

The structural transformation of economies and societies is a core issue in development studies. Historical records and statistical evidence (Timmer 2009) show a progressive switch from agriculture (the original “primary” activity of every sedentary population), to industry (the “secondary” activities) and then to services (the “tertiary” activities). The well-known underlying dynamic of this structural change – or “economic transition” from one configuration to the next – is productivity gains in agriculture, based on innovation that fosters technical change and allows labor and capital transfers towards other economic activities. This process is accompanied by progressive spatial restructuring, from scattered activities (typically agriculture) to more concentrated ones (typically industry), with migration of labor and people from rural areas to cities.

Alongside this process of growing urbanization, global economic transformation induces increasing incomes and wealth, which translates into improved living conditions. This, in turn, initiates the demographic transition (the progressive reduction of mortality and birth rates, the difference between which explains different population growth dynamics – see *infra*). Evidence of this process of global structural change can be found in various regions across the world, albeit at different paces and along different paths, starting with the closely related agricultural and industrial revolutions of Western Europe at the end of the 18<sup>th</sup> century, followed by the USA, other regions of Europe, the majority of Latin America and various regions of Asia.

One of the main challenges at present is the acceleration of the pace of change and subsequently the growing asymmetries between regions of the world, characterized

by their different stages in this process of economic transition. This situation is unique in world history. The current globalization process is too often trivialized as a “second globalization”, with reference to a first period between the 1860s and the First World War when increasing flows of goods, labor and capital connected Europe with its immediate periphery (Russia, Ottoman Empire) and, most of all, with the “New Worlds” – mainly the USA (Berger 2002). However, this globalization of the early 20<sup>th</sup> century was, first of all, a process of convergence in the North Atlantic economy driven by migration flows (O’Rourke & Williamson 1999), with a significantly different geopolitical order (mainly European colonial empires and the American influence zone in Latin America).

In comparison, today’s globalization involves increasing integration of the “global world.” It is facilitated by continuous technical progress in the transportation of goods, capital and, particularly, information – and is characterized with a greater concentration of assets among global firms and institutional investors, and the development of intra-industry trade. The emerging result of this integration is a deeper interconnection of markets and of human societies that is impacting the structures of both.

## **1.2 The New Demographic Pattern and its Challenges**

Economic and demographic transitions are closely intertwined. World population growth is currently rapid, and characterized by differential growth rates across societies that will lead to an increasing share of the world’s population coming from developing countries. This trend will simultaneously challenge economic growth, exacerbate the existing asymmetries between regions, and finally bear upon every region’s economic structures.

According to the most recent United Nations estimates,<sup>20</sup> the world population will reach 9.1 billion people in 2050 – nearly 2.5 billion more people than today (see Table 3). Although these statistics are widely acknowledged, the distribution of this population increase across regions receives less attention. Whilst Europe shows characteristics of the final stage of transition, with an ageing and declining population, sub-Saharan Africa and South-Central Asia are still booming, demonstrating different phases within the transition. However, SSA and South-Central Asia are growing at different rates: SSA’s population should double by 2050, reaching 1.7 billion people, while South-Central Asia should “only” grow by 40%. Thus, sub-Saharan Africa should become the second most populous region of the world (after South Asia). Simultaneously, East Asia’s population growth (mainly China) should come to a halt as a consequence of the radical birth policies in place

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<sup>20</sup> The United Nations World Population Prospects are a major reference. The projections are based on a set of assumptions – notably the fertility rate – which are revised every two years. The medium variant results have been selected.

since the 1970s, and East Asia should progressively face the same problems presently seen in Europe (i.e. the burden of an ageing population).

The unequal distribution, described above, is a direct consequence of different stages in the process of demographic transition experienced regionally. The main result of this differentiated evolution will be a new mapping of the world, which will inevitably influence the current balance of power. As Guengant (2007) reminds us, SSA should regain its former share of the world population – around 20% – and should overtake China in 2050 (interestingly, the two had a very close population around the 16<sup>th</sup> century). Europe and North America combined should represent fewer than 15% of the world’s total population (Table 3).

The main economic concern with the demographic transition relates to the evolution of the population’s activity structure, which in turn reflects its age structure (Bloom et al. 2001). This evolution is reflected in different dependency or activity ratios,<sup>21</sup> which summarize the respective portions of active and inactive people in the economy. In the first phase of demographic transition, the population is young with a high share inactive youths; during the second stage, these cohorts become active and offer a potential bonus to the economy, named the “demographic dividend”, if the conditions for growth exist (good economic, institutional, and political environment). Finally, the third stage corresponds to the ageing of these cohorts, thus increasing the dependency ratio (or decreasing the activity ratio).

**Table 3: World Population Increase in Selected Regions: 1960-2050 (millions)**

Year	1960		1990		2010		2050		2010-2050 Increase	
Eastern Asia	779,337	26%	1,336,700	25%	1,563,951	23%	1,600,005	17%	36,054	2%
South-Central Asia	626,984	21%	1,250,453	24%	1,780,473	26%	2,493,681	27%	713,208	40%
Sub-Saharan Africa	229,222	8%	518,053	10%	863,314	12%	1,753,272	19%	889,958	103%
Latin America and the Caribbean	219,651	7%	442,310	8%	588,649	9%	729,184	8%	140,535	24%
Northern America	204,318	7%	282,688	5%	351,659	5%	448,464	5%	96,805	28%
Europe	604,464	20%	720,989	14%	732,759	11%	691,048	8%	-41,711	-6%
<b>World</b>	<b>3,023,358</b>	<b>100%</b>	<b>5,290,452</b>	<b>100%</b>	<b>6,908,688</b>	<b>100%</b>	<b>9,149,984</b>	<b>100%</b>	<b>2,241,296</b>	<b>32%</b>

Source: United Nations, *World Population Prospects, 2008 Revision*

Note: for the definition of regions see: <http://esa.un.org/unpp/index.asp?panel=5>

21 The ratio commonly used is the dependency ratio, i.e. the inactive population: the active population; however, because the Program examines activity and employment, it uses the activity ratio (active:inactive) which is more illustrative for the Program’s purposes.

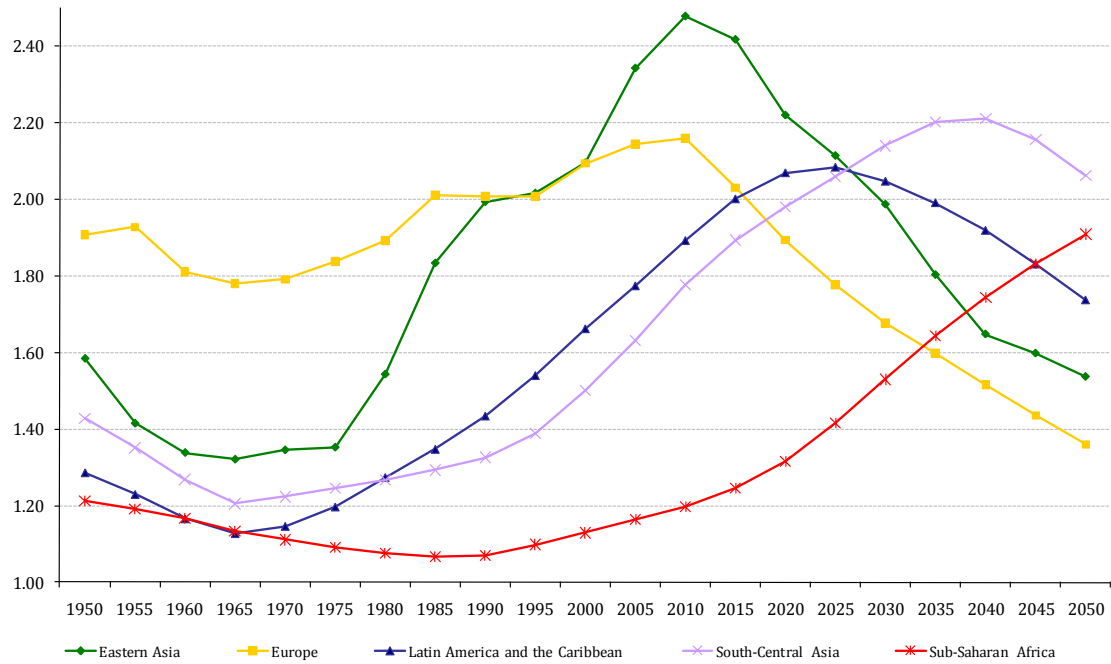
Figure 1 illustrates the consequences of staggered and differentiated demographic transitions. Due to its high population growth rate since the 1960s (higher than 2.5% per year over 40 years, with a peak at 3% in the 1980s), sub-Saharan Africa faced the weakest activity ratio ever recorded in the 1980s and 1990s, with approximately only one active person per inactive person (and less than one active in some sub-Saharan Africa countries). This heavy burden must be put into perspective with these two decades of economic crisis and structural adjustment, thus shedding new light on SSA's context. During the same period, East Asia benefited from an outstanding demographic dividend with 2.5 active persons for each inactive person, which certainly fuelled the economic growth of the region (Bloom et al. 2001). South Asia, which has a 30-year delayed transition, should only get this demographic windfall around 2035; SSA will have to wait after 2050 to potentially reap the benefits of a more favorable demographic structure.

When we translate these different demographic trends not only into global population increase, but also into yearly cohorts of people – particularly into yearly cohorts of new entrants in the labor market – we have a clear indicator of what the labor supply (and number of people looking for jobs) should be in the coming decades.<sup>22</sup> Figure 2 shows the same delayed trends between the main growing regions (Asia and SSA) and provides an estimate of the needs for absorption by the different regional economies. Presently, sub-Saharan Africa's yearly cohort of new EAP is around 17 million people and should reach 25 million in 15 years. The peak will occur after 2050. For a median-sized SSA country (i.e. 15 million people) the yearly cohort was 250,000 in the 2000s and is expected to reach 400,000 in 2020s. These projections are underestimated (Guengant & May 2009)

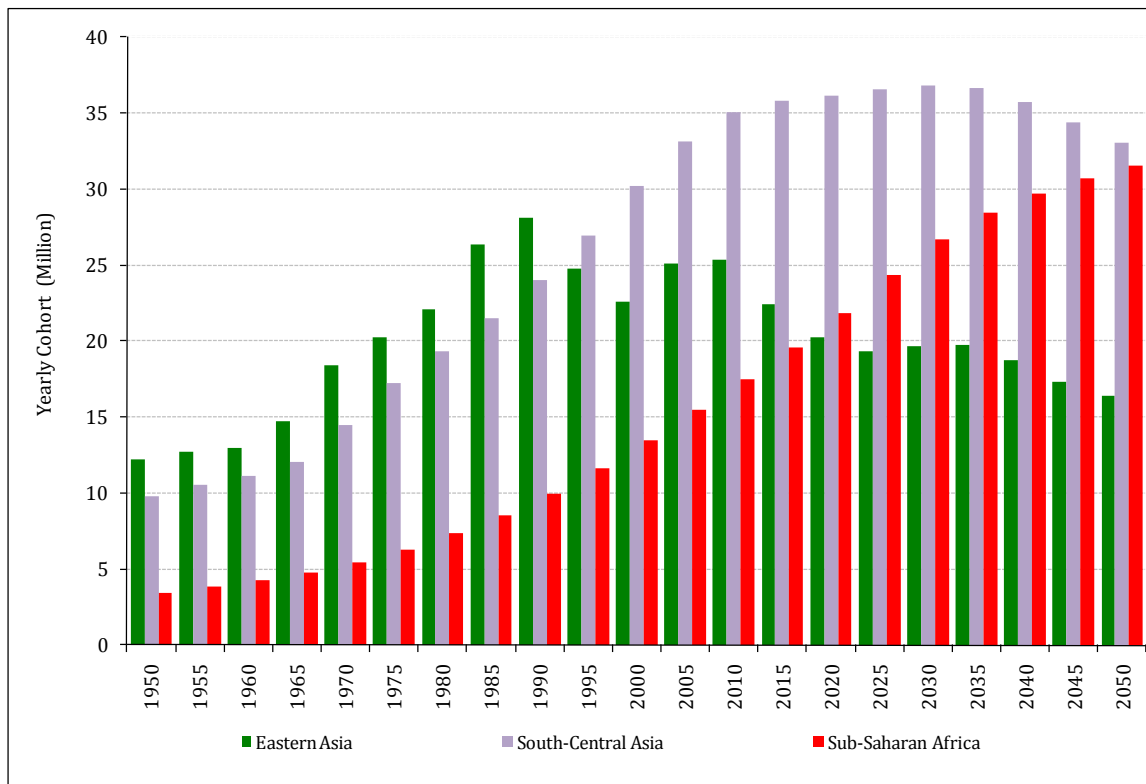
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<sup>22</sup> Cohorts are calculated taking 1/10 of the 15-24 age group.

**Figure 1: Activity Ratio by Region, 1950-2050**



**Figure 2: Yearly Cohorts Entering the Labor Market by Region: 1955-2050**



Source: World Population Prospects, 2008 revision - <http://esa.un.org/unpp/>

### 1.3 Is the Historical Sequence of Structural Change still viable today?

Despite their different stages within the economic and demographic transitions, and therefore within the structural transformation process, all countries face the same open world economy. As a result of their specific development trajectories and diverse modalities and sequences of integration in the international economy, they each have different comparative advantages. The “late comers” can benefit from the “first developers.” Technological progress and past experiences can be passed down and opportunities to access growing global markets can be seized. However, these “late coming” countries must also deal with huge asymmetries in terms of productivity and competitiveness, while also being confronted with the constraints of increased international competition (particularly from the “big emerging” countries) and with the instability of the global economic environment. These are dramatic challenges for their own structural change.

The overall productivity gap faced by SSA, the region with the most delayed transitions, is about one to five with other developing countries, and one to 100 when compared to OECD countries.<sup>23</sup> Such a gap is a major and enduring obstacle to global competitiveness – even if competitive advantages can exist for specific factors (e.g. the cost of labor). Nevertheless, one must bear in mind that the three pillars of competitiveness are, of course, production costs, as well as responsiveness to markets’ quality requirements, and the volume of supply. It is the volume of supply that, at the end of the day, determines the market share: the core indicator of competitiveness. This observation is valid for all sectors of activity, including agriculture, which is the sector that engages the largest portion of the world’s labor force (45% or approximately 1.3 billion people).

In the current context of increasing food demand and high prices, the most productive farming systems are those able to take advantage of new market opportunities, as they are able to provide additional supply quickly. This basic fact has to be put in perspective with many investment projects in large-scale agriculture. For less productive and competitive types of agriculture, it means a potential risk of marginalization due to decreasing market shares. Similarly, as developed in the following chapters, the global agrifood system is changing and has been characterized by an increasing integration in demand-driven markets, where quality requirements are the rule. The scale and scope of these changes are uncertain, but one can expect that they will provide new opportunities for growth and for the integration of local producers into global chains; however this will simultaneously require adaptations, implying capital and technical skills where asymmetries are fully at play (cf. the first hypothesis of the Program).

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23 Overall productivity is calculated by applying value-added to the total working population. The average constant values per worker-based on 2000 to 2005 series are around \$500 for SSA, \$2,500 for the other developing countries and \$50,000 for OECD countries (UNCTAD, 2006).

One of the main questions is to explore whether or not, or to what degree, the historical sequence of structural change is viable for today's late-comers. Will they follow the same path demonstrated throughout history, or will they be confronted with difficulties related to the simultaneous challenges of globalization and demographic transition? Today's conventional wisdom accepts this path as an obvious stylized fact of history, and sees no cause to dispute the approach. Timmer and Akkus (2008) argue that if countries are lagging in the process of structural change it is mainly related to economic growth difficulties and does not imply failure of the historical transformation process.<sup>24</sup> However, it seems important to highlight the need for a historical perspective, which must be kept in mind to discuss the on-going process of structural change. The "moment in time" matters because opportunities, constraints and the balance of power evolve continuously throughout world history. Thus, the period when the transition occurs – or becomes possible – is closely related to the available economic, social and political room to maneuver of every country or region (Gore 2003).

The occurrence of past economic transitions strongly illustrates the importance of the "moment in time" when discussing structural change. The characteristics of the Western European and North American transitions over the 19<sup>th</sup> and the better part of the 20<sup>th</sup> centuries cannot be disconnected from European and American political hegemony, which was expressed openly through colonization and unequal treaties, and indirectly, through influence zones. This hegemony reduced or eliminated competition and allowed for very attractive situations of both supply and demand with captive markets, which facilitated specialization and industrialization, and increased accumulation through profitability of businesses. The European transition and "New World's" development, which are entirely intertwined, were also boosted by a unique flow of international migration (Hatton & Williamson 2005) made possible by Europe's hegemonic position. Between 1850 and 1930, nearly 60 million Europeans migrated to the Americas (35 million to the USA alone), Australia, New Zealand, and Africa. These migrations facilitated the adjustment of European economies and the management of the surpluses of labor resulting from rural depopulation and the insufficient pace of job creation in other sectors, despite a strong process of industrialization (Losch 2008a).

The cases of Latin American and Asian emerging economies, which are frequently called into the debate to confirm the infallibility of this pattern of structural change, must also be discussed in the historical context of when their structural change occurred (Gabas & Losch 2008). For all these countries, the transition occurred during a very specific period of national self-centered development, which characterized the international regime between the 1929 crisis and the current new globalization era, starting at the end of the 1970s (see Giraud 1996). Throughout the

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<sup>24</sup> Timmer and Akkus have tested the evolution of the structural pattern in 86 countries. The results confirm the robustness of this historical process. The authors included the seven RS Program countries in the sample, which do not exhibit strong divergence from the general pattern.



world, nation-states implemented their own “development projects” (McMichael 1996) characterized by import-substitution, protection and strong state intervention. The role of public policies was determinant for both industrialization (Evans 1995) and agriculture modernization (Djurfeldt et al. 2005), and initiated the so-called “developmental state”. The independent Latin American countries engaged in this process between the two World Wars; they were followed by many Asian countries that were decolonized in the early 1950s; and, in both cases, Cold War-period funding played its role. Although the results of this state-led development were uneven, they always deeply shaped the economic and institutional environments and in preparation for further changes.

Today, the situation of the developing countries that remain at the early stages of the economic transition, particularly in sub-Saharan Africa, is more constrained by the characteristics of globalization than were either Europe, Latin America or Asia. Indeed, if we examine how Europe made use of the three pathways out of rural poverty (WDR08), we note the third pathway, migration to cities or abroad, was critical. This option is clearly more difficult today.

Firstly, although international migration is a growing issue in development studies with reference to the effective impact of remittances, the main migration flows remain concentrated in the “contact” regions, peripheral to the EU and the USA. In the future, the options for migration will likely depend on the demographic evolution of the industrialized countries and their reliance on foreign labor. Nevertheless, within the current geopolitical order, one cannot imagine the repetition of the same process of mass-migration that occurred at the end of the 19<sup>th</sup> century, which probably could only occur if borders were open (Pritchett 2006). Furthermore the migration patterns of the “contact” regions are also not replicable. Countries like Mexico or Morocco, part of the RS Program, have approximately 10% of their nationals living abroad, and this share of migrants plays a big role in the political economy of the two countries: the same ratio applied to sub-Saharan Africa today would mean the migration of 85 million people, mainly to Europe.

Secondly, a major characteristic of the growth of many cities in the developing is a process of urbanization without industrialization, illustrated by the dramatic expansion of the informal sector. This informal sector acts as a buffer in dealing with the difference between economic and demographic growth rates; however, it is also a low productivity sector<sup>25</sup>, with under-employment, a lack of job security and low returns – factors that culminate in the development of urban slums, which are proliferating around cities in the developing world (UN-Habitat 2003; Davis 2006). This phenomenon is, of course, exacerbated in Africa, where the impact of the lack of

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25 Ranis and Stewart (1999) distinguish between two informal subsectors: a traditional subsector of the so-called “sponge type”, stemming from the surplus of agricultural labor, with incomes sometimes lower than rural incomes; and an informal subsector now undergoing modernization that revolves around the formal urban sector.

urban employment on the structuring of the economy, referred to as “under employment traps”, was detected by Todaro (1971) forty years ago.

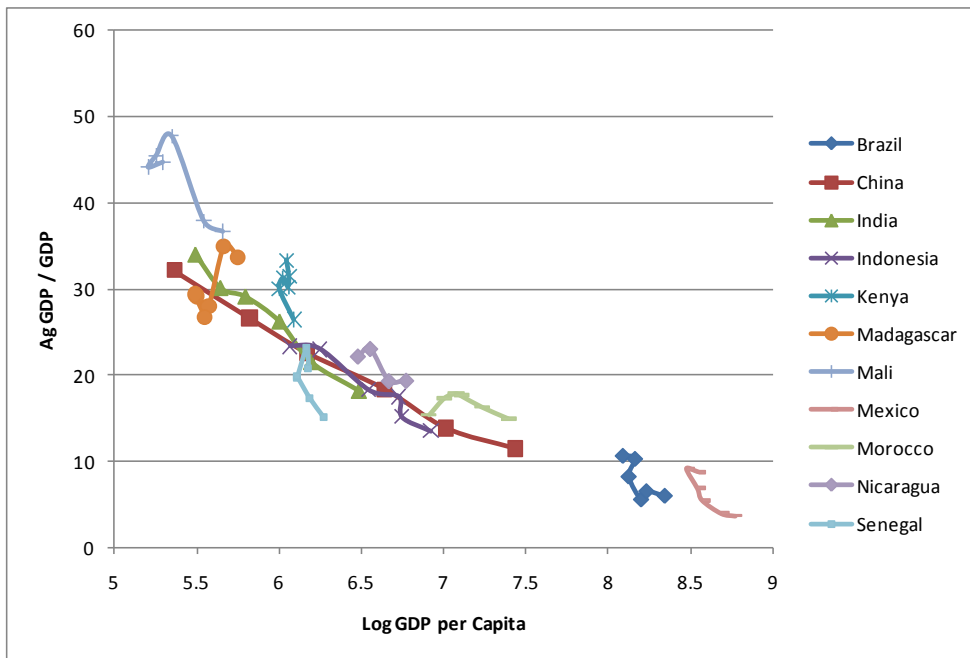
Obviously, these observations do not mean that opportunities for industrialization do not exist, or that an economic diversification will not occur in both manufacturing and services. Nor do they imply that public policies do not have to invest in the promotion of a more attractive business environment and in the development of skills. But these facts do shed light on what the trend has been and on the reality of present day economic structures. They also stress the importance of the debate on economic transition today, which remains open and insufficiently addressed, and highlight the risks of transition impasses to which the Program refers. They also demonstrate the importance of investing more deeply in improving the existing room for maneuver of the two other options, those related to agriculture and rural diversification.

## **2 The Different Positioning of the RuralStruc Countries**

### **2.1 General Overview**

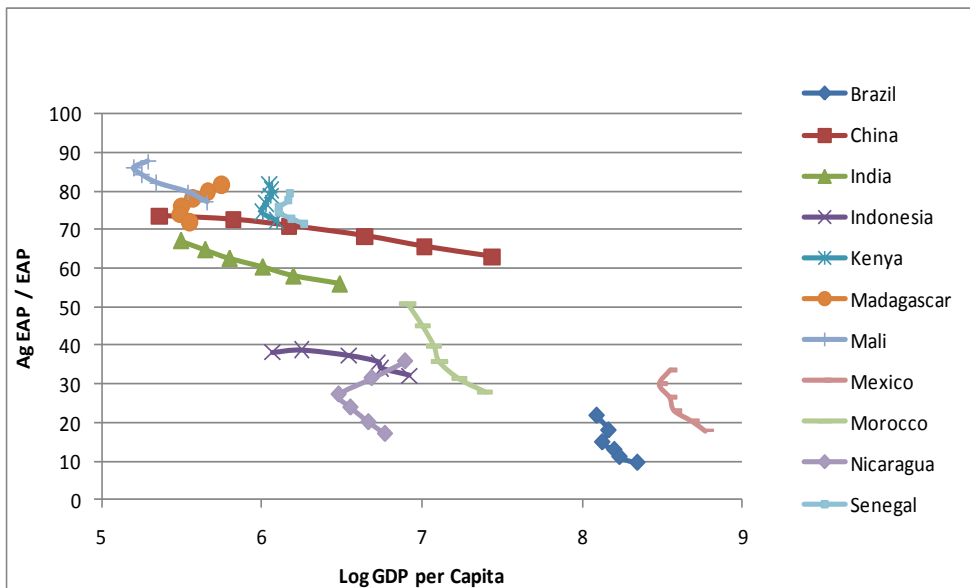
The seven RS countries obviously demonstrate different stages of the structural transformation process. This fact provided one of the justifications for their selection for the RuralStruc Program. Though a deep macro-economic data-based comparison could be presented, two very simple and comprehensive figures will allow for a clear positioning of the seven countries within the process of structural change. Figure 3 and Figure 4 display the stage of every country with reference to their GDP per capita and the share of agriculture in GDP and in employment, respectively. This comparison, based on the 1960-2005 period, exemplifies economic transition. The share of agriculture in GDP decreases everywhere, over time. On the contrary, the share of agriculture in the labor force evolves differently. It either declines at a slower pace or remains relatively constant. This creates a gap between the two indicators, which exhibits the inequality of incomes between agriculture and the other sectors of the economy, and is a well known characteristic of the structural transformation. This rural-urban income gap widens during the early stages of economic development, later reducing with the convergence of the two sectors.

**Figure 3: Share of Agriculture in GDP and GDP per capita overtime (1980 - 2008, 5-year averages)**



Sources: WDI

**Figure 4: Share of Agriculture in EAP and GDP per capita overtime (1980 - 2008, 5-year averages)**



Sources: WDI and FAO

Mexico is well into its structural transformation and offers an example of a diversified economy where agriculture no longer plays a significant role; however, this does not resolve the difficulties of the adjustment of its rural economy (25 million people live in the rural areas and between 15 and 20% of the labor force remains in agriculture). The cases of Morocco and Nicaragua are more sensitive: agriculture still plays a heavy role in overall value-added, and the successfully deepening their economic transition will clearly rely on the capacity to skillfully manage their regional integration. As such, agricultural policies could play a significant role in limiting the exclusion processes. This issue is clearly addressed by the Moroccan Government which, in 2008, launched a new rural development strategy – “*Le Plan Maroc Vert*” – based on two pillars: the development of the commercial and agro-industrial sectors, and the promotion of family agriculture.

The situation of sub-Saharan Africa is clearly the most critical. The sub-continent is characterized by its long-lasting structural stagnation. As previously stated, while urbanization has increased tenfold since the time of independence, the overall economy remains clearly outside of the industrialization process; growth has been very volatile over the last decades; agriculture still counts for 60 to 80% of the EAP; and the absorption capacity of the economy relies on the informal sector, both rural (including agriculture) and urban, leading to a very low productivity.

This difficult picture takes a dramatic focus, as demonstrated in Table 4 which demonstrates the dramatic differences between RuralStruc’s SSA and non-SSA countries when the demographic perspective is taken into account. As seen in the previous section, SSA is the last region in the world to engage in its demographic transition. The population prospects targets an increase of 1 billion people between 2010 and 2050, which means a doubling in forty years.

**Table 4: Evolution and Projections of the RS Countries’ Population, 1950-2050 (in millions)**

	1960	1990	2010	2050	Variation 2010-50	Variation 2010-2050
SSA	229.2	518	863.3	1,753.2	889.9	103%
Kenya	8.1	23.4	40.8	85.4	44.5	109%
Madagascar	5.1	11.2	20.1	42.7	22.5	112%
Mali	5	8.6	13.3	28.3	14.9	112%
Mexico	37.9	83.4	110.6	128.9	18.3	17%
Morocco	11.6	24.8	32.3	42.6	10.2	32%
Nicaragua	1.8	4.1	5.8	8.1	2.3	40%
Senegal	3	7.5	12.8	26.1	13.2	103%

Sources: World Population Prospects, 2008 revision <http://esa.un.org/unpp/>

In terms of employment, the annual additional labor supply to be absorbed by the economy is presently 17 million people in SSA and will reach approximately 25 million in 2030. Table 5 shows what this trend means for the RS SSA countries. Their forecasted peak-time of labor supply is after 2050. It also shows that for the

non-SSA countries the peak-time has passed or is nearly to be passed, confirming their later stage within the demographic transition.

**Table 5: Maximum Annual Labor Supply in the RS Countries**

Country	Additional Labor Supply in 2010 (Thousands)	Peak of Annual Additional Labor Supply (Thousands)	Peak Time
Kenya	847	1,545	> 2050
Madagascar	405	736	> 2050
Mali	278	524	> 2050
Mexico	1,984	2,008	2015
Morocco	638	644	2005
Nicaragua	125	129	2015
Senegal	269	452	> 2050

Source: World Population Prospects, 2008 revision <http://esa.un.org/unpp/>

These figures serve as a reminder of the drastic situation faced by SSA countries. Sub-Saharan Africa is currently confronted with the unique challenge of dealing simultaneously with the early phases of its economic transition and an unachieved demographic transition, under the very specific conditions of the present period: a global open economy, which offers huge opportunities as well as some dramatic challenges in terms of competitiveness. When the growing constraints related to climate change are added, the sub-Saharan African situation deserves critical attention.<sup>26</sup>

## 2.2 The Specific Role of Agriculture in SSA's Economic Transition

Agriculture's fundamental roles as a means of both food production in a context of rising demand – internationally and for the African continent –, and of poverty alleviation are fully recognized and are indisputable. Yet, many views contest agriculture's ability to be a real booster for African development and, consequently, for its structural transformation. These views posit that productivity is too low, the challenges are too great, and, consequently, that it would be more realistic to come up with other options<sup>27</sup>.

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26 These very specific African challenges have been presented and discussed in a parallel session of the ABCDE 2009 Conference in Seoul, Korea. The title of this parallel session, co-organized by the Program's team, was: "*The Growth-Employment Challenge: A Comparative Approach between Asian Economic Transitions and Africa Today*". The contribution in the panel was: Arbache J., Giordano T., and Losch B., "*Africa's Traps and Challenges: What Can We Learn from East Asia?*"

27 The many positions developed by authors like Paul Collier are a good illustration of this trend. See for example Collier 2008

One can easily recognize that there is no single answer to the very unique challenges faced by SSA. To deal with the surge in the active population and the weakness of the overall productivity of the economy, industrialization certainly cannot be ignored, nor can the need for development of more formal activities in the service sector be overlooked. However, one must recognize that industrialization did not take place over the last four decades, despite a huge process of urbanization which has offered, and continues to offer, all the economic advantages of density (cf. WDR09). Many reasons, related to both the history of the international insertion of the African continent in the world economy and to inappropriate economic choices and public policies, can be raised for its limited progresses in terms of industrialization. However, even with massive investments in infrastructure, capacity building and in the improvement of the business climate, industrialization will take time and there is no silver bullet to hasten the process.

Meanwhile, the on-going demographic transition of the continent will translate into huge pressure in terms of the activities required to sustain the livelihoods of a growing population. The figures presented in the previous section cannot be ignored, and agriculture must be part of the solution: with the existing share of the active population engaged in farming activities, its growth and development will be central in the on-going economic transition. Furthermore, the sector will at least continue to play its historical strategic buffer role in the coming years, parallel to the informal urban sector.

The lessons learned from the last economic transitions that occurred in the emerging economies of East and South-East Asia, remind us that agriculture has been a strategic component of the development process. Governments dealt very seriously with the issue, and agriculture was not only considered as a sector for growth, but also as the core driver of the structural transformation. Profitability of farming activities is a central issue here: the increase of farm incomes is a necessary element to engage in the poverty alleviation process, but also in rural diversification. Increasing farm income means increasing rural demand, which is the driver for development of new activities and economic change. These are lessons clearly substantiated in the literature that should not be ignored.

Similarly, more attention has to be paid to supporting micro-level regional rural-urban dynamics: the linking of small cities with their immediate surroundings. These smaller cities and their surrounding areas are places where linkages between agriculture production, transformation of products and related services can occur and this level of development can provide an adequate connection between agriculture, rural non-farm economy and secondary towns. New evidence has been provided by recent research work on the importance of this “missing middle” (Christiansen & Todo, 2009), which has powerful effects in terms of poverty reduction, which is not the case with large scale urbanization in mega-cities.

Now, what are the prospects for the absorption capacity of agriculture in SSA today? This question is notably sensitive and contains several traps because in many developing countries, and particularly in Africa, information on endowment and availability of factors of production is often scarce, partial, and based on estimations at the national level. Furthermore, the possible answers to this sensitive question are clearly context-related and cannot be generalized. Indeed, existing information systems do not provide data about the accessibility, the quality and / or the possible combination of each factor, which depend on their intrinsic local characteristics and also of the global economic and institutional environment. Global numbers also mask the distribution effects among stakeholders and regions, as well as and their evolution.

The case of land is particularly illustrative of these difficulties. Information about the evolution of the quantity of agricultural land and its size by AgEAP is insufficient to understand the existing challenges. Further information is needed on: the soil's quality and fertility; land access and the concentration of land, which refer to property rights and the structure of ownership, as all of these elements are part of the characterization of the agrarian system. Each situation has its own constraints and opportunities, which directly affects the options for development. Similarly, if there is an absolute stock of agricultural land – defined by national borders or landscape – the available land is relative to the level of technology, the existing infrastructure, and the provision of public goods (water access and irrigation, roads, eradication of endemic diseases, etc.).

It is clear that population–natural resources linkages will be increasingly at play in the coming decades and the choices to be made in terms of agricultural development will be crucial. The large scale–small scale debate has reemerged with the food price crisis and the frenzy of land acquisitions in several countries of sub-Saharan Africa. In this exacerbated context, a long term perspective must be adopted and policy choices will need to be carefully made. What is at stake is the capacity of agriculture to provide ways for growing rural populations to sustain their livelihoods, and smallholder agriculture can be a powerful engine to do so. Its potential for, and its past successes in, simultaneously providing food security, poverty reduction and employment are clearly demonstrated in the literature (World Bank 2009b, Wiggins 2009).

## CHAPTER 3. RURAL REALITIES: AGRICULTURE AND POVERTY IN THE SURVEYED REGIONS

The RS countries belong to the “three worlds” of agriculture and the surveyed regions are supposed to correspond, based on their *a priori* classification, to different trends in terms of integration into markets, regional dynamism and economic returns, translated into income levels.

The expectation was to record very differentiated situations presenting diverse opportunities in terms of processes of change and exit pathways out of rural poverty. However, the results are surprisingly more nuanced. Indeed, differences obviously exist, and a clear gap between the SSA countries and the non-SSA countries translates the disparity of wealth and different development levels. Similarly, uneven agro-ecological conditions and demographic densities, diverse agrarian history and institutional patterns, varied level and duration of integration into domestic and global markets shape comparative advantages between regions. But the consistent importance of agriculture in the activities of rural dwellers and the magnitude of poverty in absolute or relative terms is staggering.

This chapter provides an overall picture of the rural realities in the surveyed regions. As a preliminary approach, it focuses first agriculture’s role in activities and incomes. Then it proposes a comparison of the estimated rural incomes to international and domestic poverty lines and their distribution. It then fine-tunes the income estimates and addresses the situation of the lowest income households, in particular by assessing their food vulnerability. Finally, it relies upon the WDR08 typologies to identify the main categories of households based on their income structure, which can indicate trends in terms rural diversification and possible pathways out of rural poverty.

### 1 The Remaining Central Role of Agriculture

As previously mentioned, the RS surveyed regions<sup>28</sup> are firstly agricultural regions, without any specific extracting industries. They are mostly engaged into an annual crop type of agriculture centered on staple productions, mainly cereals – maize in Mexico, Nicaragua and Kenya, rice in Madagascar, rice, millets and sorghum in Senegal and Mali, durum and wheat in Morocco – combined with roots, plantains and beans in most of the regions. The production of cereals is mainly rain fed but, in some cases, farmers have also developed irrigated rice (Madagascar, Senegal, and Mali) and maize (Mexico), notably through irrigation schemes. Traditional annual export crops or production for local agro-industries are present: cotton in Mali,

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28 Annex 3 presents maps of the regions and tables with a brief overview of their main characteristics.



cotton and groundnut in Senegal, sugar cane in Kenya and Nicaragua. Perennial crops are less developed and mostly concern coffee in Kenya and Nicaragua, citrus and olives in Morocco. Fruits and vegetables are grown in all regions and are less important in relative terms, but some regional specialization exists in all the seven countries. Livestock is present in every region and, in some cases, dairy production is regionally well developed (Madagascar, Kenya and Nicaragua).

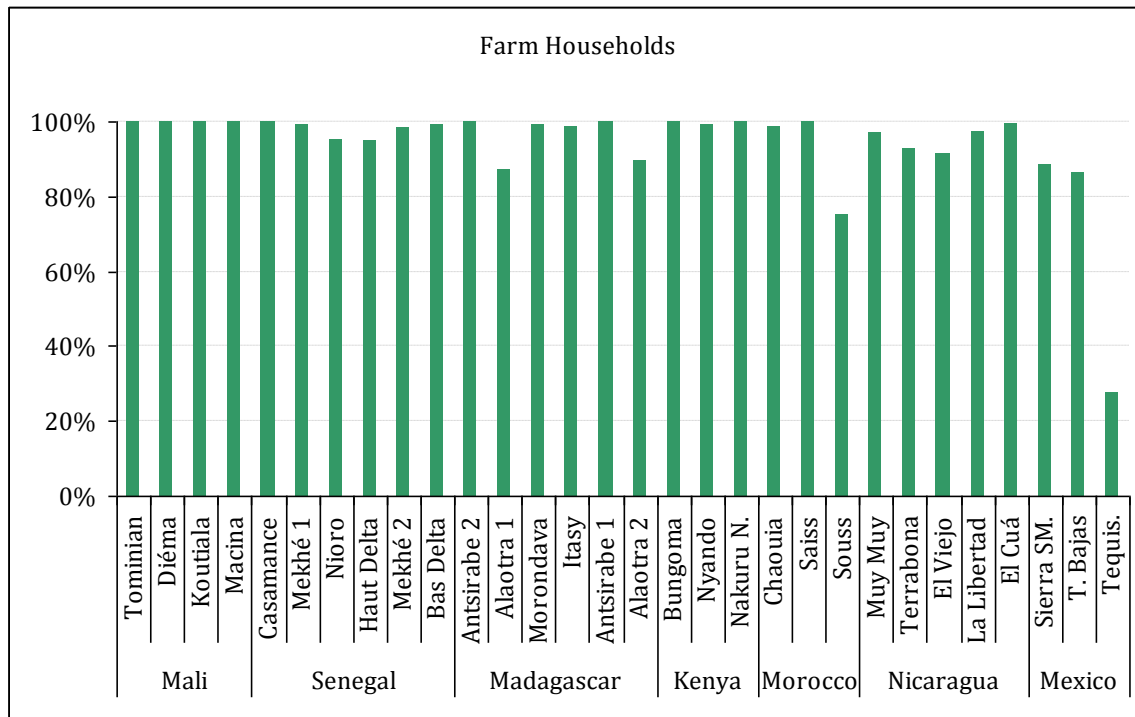
Consequently, it was not a surprise to find a deep involvement of the surveyed households in agriculture *sensu largo* (i.e. crops, livestock, hunting, fishing and gathering of natural resources, and transformation of the related products). But what was more surprising was the observed share of rural households engaged in on-farm activities, meaning having their own farm. One could have expected to find more rural dwellers fully participating in others activities but 95 to, more often, 100% of the households are farm households (Figure 5). If we exclude the specific case of the landless families of Alaotra in Madagascar, the main rice basket of the country, where some households mainly rely on agricultural waged labor, the two major exceptions are the Souss region in Morocco and the Tequisquiapan region in Mexico, both characterized by strong articulation to cities and a more diversified local economy, which is consistent with the development of the country.

In Souss, 25% of the households are engaged only in off-farm activities, which results from both the proximity of Agadir, one of Morocco's main cities (7<sup>th</sup> town of the country with around 600,000 persons), and also the development of agricultural waged labor in the commercial citrus plantations of the coastal plain. Although the Sotavento region in Mexico shows a slightly higher share of non-farm households than in the other surveyed regions (15%), it is Tequisquiapan that offers the most dramatic exception with only 30% of farm households. The surveyed region of Tequisquiapan corresponds to six localities selected in the valley located north of San Juan del Rio (around 210,000 inhabitants), 150 km South of the city of Querétaro (which metro area counts around one million dwellers). With a strong urban network,<sup>29</sup> the region has been a fast growing zone over the last two decades with the development of both agribusinesses (vegetables, poultry) and manufacturing (*maquiladoras* as well as high-tech industries like aeronautics), which led to the development of a strong labor market and explains the exit of many rural dwellers from agriculture.

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29 The valley of San Juan counts four cities in a range of 35,000 to 55,000 inhabitants, including Tequisquiapan (55,000).

**Figure 5: Share of Rural Households with Farms**



Sources: RuralStruc Surveys

The other main fact showing the strong role of agriculture in the surveyed regions is the average regional share of on-farm and off-farm household incomes,<sup>30</sup> the off-farm corresponding to the other rural generating activities and transfers.<sup>31</sup> In 23 out of 30 regions, on-farm incomes are higher than the 50% threshold, and in 15 regions this share is higher or equal to 70% (Figure 6). This significant role of agriculture is highlighted by another interesting pattern: the share of on-farm incomes grows with regional wealth in five out of the seven countries, the two exceptions being Kenya and Mexico.<sup>32</sup>

Surveyed regions in Mali, Madagascar, Morocco and Nicaragua reveal the largest involvement in farm activities, including Souss in Morocco, while unsurprisingly Mexico shows a very different profile, though the sub-region of Sotavento (Tierras Bajas) illustrates also agricultural specialization. Senegal and Kenya reveal different

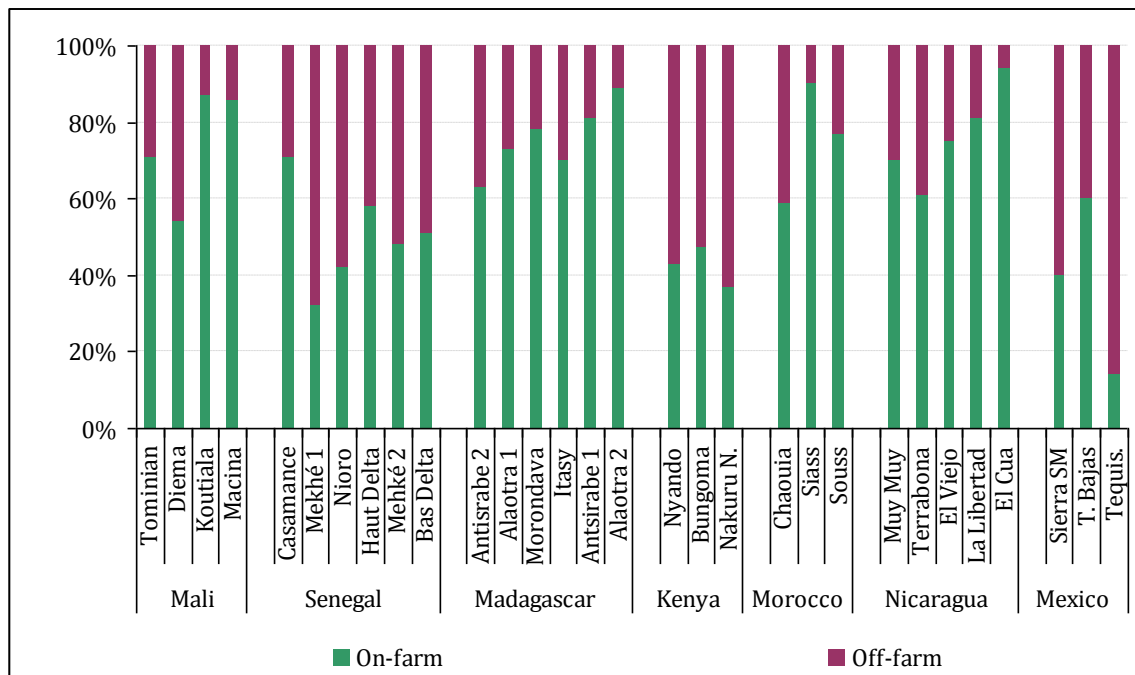
30 This calculation is made on the full regional sample including all the households (with farms and without farms) and is based on the share of the regional means, which gives an estimate of the regional structure.

31 Off-farm activities are detailed in Chapter 4 (see Figure 15) and correspond to agricultural wage and non-agricultural wage employment, self-employment, public and private transfers, and rents.

32 Knowing that in every country regions have been sorted from left to right, from the poorest to the richest in relative terms, this pattern appears clearly in Figure 6.

patterns with a stronger share of off-farm income on average. With the exception of the Casamance region, very similar to Mali, all the Senegalese regions, even the richest, are characterized by a strong level of off-farm income. In Kenya, off-farm income is around 60%, particularly in Nyando and Nakuru North, the two regions being polarized by the third and fourth cities of the country (Kisumu and Nakuru, with respectively 450,000 and 350,000 inhabitants). However, off-farm activities do not obviously mean a disconnection from agriculture, as many of the off-farm incomes are related to agriculture, notably trade and waged labor in agro-industries, which is the case of Nyando.

**Figure 6: Average share of on-farm and off-farm incomes per region**



Sources: RuralStruc Surveys

## 2 A Widespread Rural Poverty

If agriculture's role remains so important in the surveyed regions, what are their characteristics in terms of income level and income distribution? In response to this question, this section compares the household results aggregated at the regional level with the objective of providing a general positioning of the sample with reference to existing baselines, and to discuss differences within countries and between countries.<sup>33</sup> Due to the methodology adopted, the comparison is of course only indicative and not representative.

### 2.1 Average Incomes and Poverty Levels

#### 2.1.1 Overall Presentation

The first striking observation is the very low level of income in the surveyed regions, with a clear distinction between SSA regions, where poverty is overwhelming, and non-SSA regions (see Figure 7 and Table 6).<sup>34</sup> Not surprisingly, due to the strong and well-known rural-urban divide in terms of welfare, the average income is clearly below the national GDP per capita: only the sub-region of Alaotra 2 (Madagascar) and El Cuá (Nicaragua) exceed this threshold.

The largest gap is recorded in Mexico – the regional averages are four to seven times below the GDP per capita (\$12,780 PPP) – which is worth taking into consideration for three different reasons. First, this situation is the result of high level of income inequality within the country and an uneven spatial distribution of poverty, which is highly concentrated in rural areas, as confirmed by the Gini indexes. It reveals a difficult convergence between rural and urban incomes: one of the most sensitive structural problems of the country. This income gap is also a consequence of the selection of the surveyed regions, the Southern part of the country being more broadly affected by rural poverty and characterized by smaller farm structures. Lastly, it also reveals a rural pattern exacerbated by the survey methodology: focused on localities defined as rural (i.e. below 5,000 dwellers), the survey has consequently excluded many of the better-off households (including some farm households), who prefer to live in large rural boroughs or small towns where they access better services (*RSII Mexico*, p 49.). For these reasons, the characteristics of

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33 To allow for comparison, household incomes per capita aggregated at the regional level were converted from local currency units (LCU) into international dollars at purchasing power parity (PPP) for the year 2007, which is the year of reference of the collected information (see Annex 1). The same conversion into international dollars was applied to GDP per capita and domestic poverty lines initially expressed in LCU.

34 The estimated global income per household is an aggregate of monetary incomes and incomes in kind (self-consumption) valued at the market price (see Annex 1). The estimated cash income is consequently lower, depending on the share of self-consumption (see Chapter 5).

the Mexican rural areas are particularly interesting because they highlight a possible trend that complicates the capture of an evolving rural reality.

**Table 6: Global Annual Income in the Surveyed Regions**

		Global Annual income per capita in \$ PPP								
		Ex Ante classification	#HH	Mean	Median	Min	Max	Perc 05	Perc 95	GINI
Mali	Tominian	losing	155	196	155	29	2 229	50	405	0,37
	Diéma	intermediary	148	303	205	33	5 568	60	727	0,47
	Koutiala	winning	153	301	265	13	995	82	613	0,3
	Macina	winning	154	422	350	31	1 595	64	942	0,37
Senegal	Casamance	losing	239	360	263	0	3 059	33	1 022	0,47
	Mekhé 1	intermediary	111	436	323	23	2 442	55	1 166	0,44
	Nioro	intermediary	252	376	305	16	2 828	78	988	0,41
	Haut Delta	winning	61	443	268	26	2 238	78	1 106	0,47
	Mekhé 2	intermediary	113	641	511	38	2 996	125	1 578	0,39
	Bas Delta	winning	121	1 014	757	64	6 696	182	2 675	0,56
Madagascar	Antsirabe 2	winning	303	340	247	56	2 640	102	822	0,4
	Alaotra 1	intermediary	385	429	315	41	2 679	133	1 078	0,38
	Morondava	losing	506	493	384	39	2 440	132	1 255	0,38
	Itasy	intermediary	503	520	404	95	3 678	176	1 221	0,36
	Antsirabe 1	winning	206	626	440	65	6 272	130	1 456	0,43
	Alaotra 2	intermediary	115	1 181	788	125	7 521	180	3 309	0,53
Kenya	Bungoma	intermediary	299	527	341	5	4 484	30	1 629	0,48
	Nyando	losing	285	568	259	6	11 224	29	1 924	0,56
	Nakuru North	winning	289	1 973	1 077	14	22 222	197	6 375	0,51
Morocco	Chaouia	losing	228	1 960	882	11	25 833	77	9 832	0,63
	Saïss	intermediary	261	2 941	1 242	9	73 849	81	10 144	0,67
	Souss	winning	240	3 583	1 493	20	54 054	106	12 497	0,66
Nicaragua	Muy Muy	intermediary	299	1 140	543	24	38 466	64	3 783	0,63
	Terrabona	losing	281	1 136	560	4	20 616	71	3 663	0,6
	La Libertad	losing	288	2 038	895	12	106 712	75	3 179	0,6
	El Viejo	winning	290	1 908	1 006	7	50 864	132	5 919	0,68
	El Cuà	winning	300	2 835	1 166	27	32 946	179	11 246	0,65
Mexico	Sierra SM.	intermediary	175	1 571	1 162	264	15 922	391	4 049	0,41
	Tierras Bajas	intermediary	145	2 728	2 024	216	16 907	548	8 225	0,41
	Tequisquiapan	winning	364	2 486	1 888	50	21 808	470	6 575	

Source: RuralStruc Surveys

When considering the absolute and relative poverty lines of \$1 and \$2 PPP, the difference between SSA and non-SSA countries is staggering.<sup>35</sup> In SSA, nearly all the surveyed regions are near the \$1 line, the poorest region of Mali being clearly below. Only the richest regions of Senegal, Madagascar and Kenya are above \$2 a day. While Nyando and Bungoma in Kenya are as badly off as the other SSA regions, Nakuru is a notable exception and has an estimated average income comparable with the other non-SSA countries.

35 Annex 4 shows the domestic poverty lines for each country. However, the national definition of poverty, often influenced by political considerations, and the large variety of threshold types do not facilitate the overall discussion. It is worth noting that 11 out of 19 SSA's surveyed regions and sub-regions are below domestic poverty lines (the exceptions are Kenya and Madagascar, where the poverty thresholds are very low).

When focusing on the income differences between regions, the gap of income *per capita* between the poorest and the richest zones is an indicator of regional differentiation. The smallest gap is found in Morocco with a ratio of only 1.8 times, and the highest is in Madagascar and Kenya (3.5).

The figure recorded in Morocco is striking, because the relative homogeneity among zones is in stark contrast with the huge heterogeneity within zones, the highest of the seven countries, as expressed by the Gini index.<sup>36</sup> More broadly, Gini indices tend to be higher in the richest surveyed zones in every country, as expected, with the exception of Mali where the richest region is internally equal.<sup>37</sup>

These inequalities, also revealed by the very high average income of the richest 5% households, are a clear reminder of the ambivalence of average values. When using the median income *per capita*, the pattern of the surveyed regions is clearly modified. If the “hierarchy” between regions remains unchanged, profiles are more compact, particularly in Morocco and Nicaragua (Figure 8).

### 2.1.2 *Characterization of the Surveyed Regions*

What do these results mean with regard to the *ex ante* classification of “winning”, “losing” and “intermediary” regions, which was adopted by the national teams for the selection of the regional country cases? If we consider the average household incomes aggregated at the regional level to be a good proxy of the regional characteristics in term of rural wealth, and thus of their dynamism, the survey results globally reflect well the *ex ante* estimate (see Table 6). However, there are some slight differences in terms of ranking (clearly reduced if medians are used) and a couple of more challenging results.

In Mali, Koutiala, at the center of the cotton zone, was chosen as a winning region illustrating the success of the “white revolution” in the Savannah zone. The disappointing income results reveal a crisis in the sector, which affects all aspects of the regional dynamism: the long-standing unfavorable international prices and uncertainties due to a delayed reform have translated in a progressive reduction of the cotton area and led to a decrease of farm incomes. Large family size and internal migrations (initially motivated by the high returns on cotton) explain growing tensions on resources (land, fertility). The situation of Koutiala illustrates the “Paradox of Sikasso”, named after the other major cotton growing area, which expresses the contradiction between the “success story” of the sector and the relatively low level of income per person (see Box 5).

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36 In Morocco, the presence of some high-income households, mainly coming from rents (housing), which obviously impact sample’s means, explain this pattern (*RSII Morocco*, p.142).

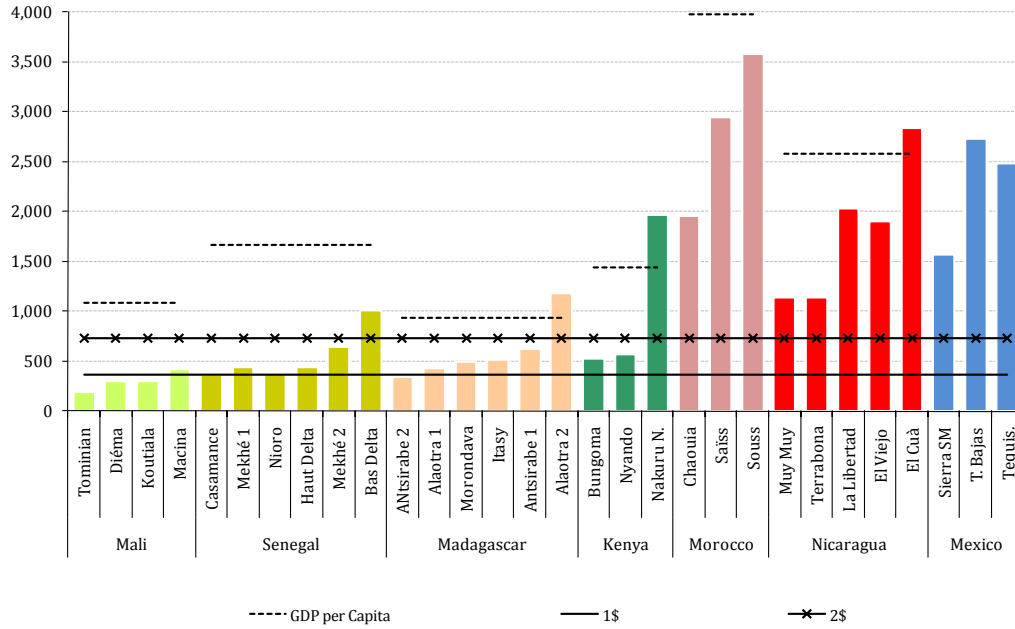
37 The low Gini in Macina reflects the homogeneity of land assets and production techniques in the irrigation scheme of *Office du Niger* where surveys were conducted.

Even if the results are not radically different, it is worth mentioning the situation of the Senegalese regions revealed by their fine-tuning: Nioro, in the South of the *Bassin arachidier*, is not really better-off than Casamance, the “losing” region, and confirms the deep crisis of the groundnut sector; Mekhé 2, in the North of the *Bassin arachidier*, was somewhat able to make a difference through crop diversification (cassava) and off-farm activities (handicraft); the Haut Delta, dedicated to tomato production for the tomato paste industry, has very low returns from its specialization.

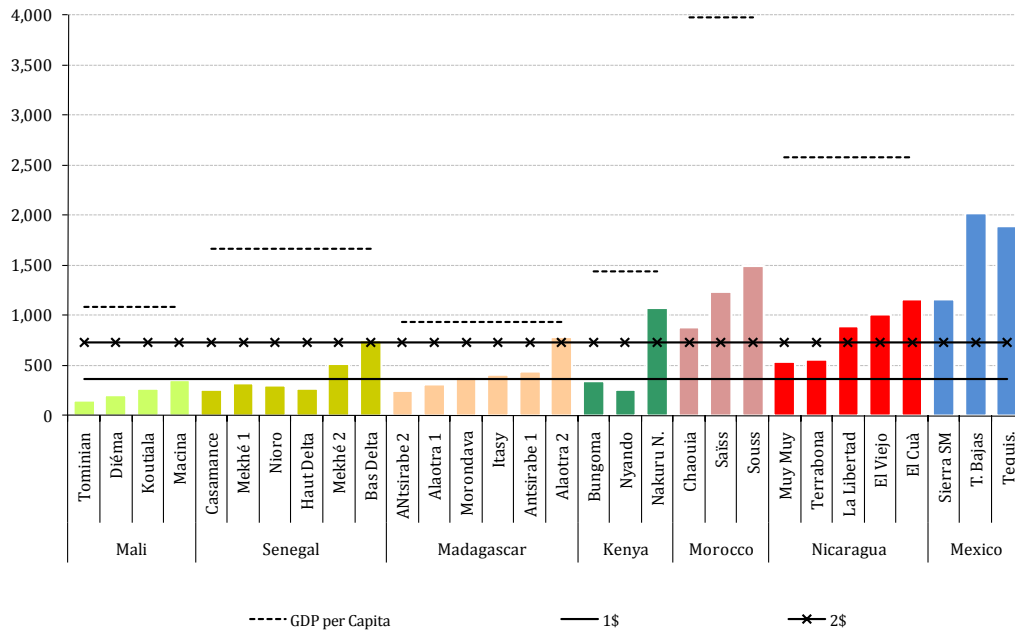
The Antsirabe region in Madagascar, a highly diversified agricultural region (rice and temperate cereals, horticulture, dairy), and that is well connected to markets with good infrastructure (Antsirabe, the third city of the country, around 200,000, is only 150 km from the capital, Antananarivo, connected with paved road in good condition) had originally been selected – without doubt – to illustrate a winning region. However, severe natural constraints, both climatic (bad weather conditions) and phyto-sanitary (potato disease), strongly affected yields and, consequently, farm incomes.

In Kenya, Nyando and Bungoma were supposed to illustrate differentiated situations, with Bungoma, the intermediate region, engaged in more diversified agricultural activities, particularly coffee production. But the estimated incomes are similarly sobering and do not differ significantly: high involvement in sugar cane production characterized by bad returns, importance of self-consumption and low productivity. On the contrary, Nakuru, where incomes are 3.5 times higher, confirms its status as a winning region and somewhat exemplifies the Kenyan success story. Located in the Rift Valley, with good natural conditions and a dense urban network of small towns around the city of Nakuru, the region is engaged in maize as well as high value products, notably dairy industry and horticulture. There are also many off-farm opportunities. Another specificity of Nakuru is its low dependency ratio (half of the two other regions), which reveals higher productive capacities per household and consequently higher possibilities of earning (see next section).

**Figure 7: Average Annual Income Per Capita (\$ PPP, 2007)<sup>38</sup>**



**Figure 8: Median Annual Income Per Capita (\$ PPP, 2007)**



38 Sources are: RuralStruc Surveys for the household incomes, WDI database for GDP data. The Mexican GDP per capita amounts to \$12,780 PPP and is not plotted on the figure.



### **Box 5: “The Paradox of Sikasso”**

In Mali, cotton is a strategic sector and is often considered as the driver of development of the south of the country. The cotton sector directly involves 275,000 producers and nearly 3 million people. Cotton fiber has been the first export of Mali for several decades. Considered as "the white gold of Mali", cotton has continuously grown since the 1960s, especially after the devaluation of the CFA Franc in 1994, with few exceptions related to crises in the value chain management (the most dramatic case is the “cotton hold-up” of 2001, when cotton production shrank by half as a consequence of a sowing strike by farmers dissatisfied with the new prices).

A public monopsony, the CMDT (*Compagnie Malienne de Développement des Textiles*), has been in charge of the development of the cotton sector (providing inputs, extension, collecting, ginning and marketing), but also of the broader rural development in the cotton area: roads, capacity building of producer organizations, rural credit, technical support, training and literacy programs, etc. The development of cotton allowed farmers to invest in equipment and livestock and to increase their assets, contributing to cotton’s reputation as a powerful driver for poverty alleviation and regional development. However, the Malian Poverty Assessment (EMEP) survey (DNSI, 2004) and other related studies showed that cotton production areas, such as Sikasso, were regions where poverty was widely spread with one of the highest child malnutrition rates in the country. Without providing an exhaustive explanation, the main characteristics of this paradox, according to Wodon et al. (2005) and Mesplé-Somps et al. (2008), are the following:

(i) Poverty in the cotton-growing regions is globally less severe than in other regions; (ii) Differences at household consumption level are quite sensitive to cotton prices and volumes produced, and to other conditions affecting local agriculture, notably rainfall. As a result, the fact that the EMEP survey was implemented in 2001 – the year of a major strike by cotton producers – directly impacted the survey’s results; (iii) The Malian cotton producers are clearly better equipped in durable goods (bicycles, motorcycles, radio, television) than farmers in other regions. This equipment translates the benefits of cotton production over the long-term, regardless of the specific circumstances of a particular year. It also refers to the preferential access to credit provided within the cotton sector; (iv) The education level is generally better in cotton-growing areas, for both primary school frequentation and level of adult literacy; (v) Due to cotton’s reputation in terms of monetary returns, Sikasso is the only region after the capital, Bamako, with a positive net migration flow. However, this evolution has impacted the income per capita, making the region, in some ways, a victim of its success; (vi) As a consequence, it is possible to derive a slightly positive balance in favor of cotton areas from this analysis. This benefit, however, is far from overwhelming, is highly dependent on prices, and is somewhat fragile in the long-run (degradation of natural resources).

The RuralStruc Program’s Second Phase results reinforce these findings. The dependency ratio in Koutiala is the highest of the four study regions, reducing the positive effects of cotton production in terms of average income. While the price of cotton was low during the reference period of the survey (crop season 2006/07), the level of income in the cotton-growing region of Koutiala is comparable to the Diéma region, a remote rain-fed area, which is characterized by a high level of international emigration. However, the cotton producers of Koutiala are better off than those of the Tominian zone, the poorest of the surveyed area. These disappointing income results, however, mask an important issue: in the cotton areas, farmers are, on average, less vulnerable because they are better equipped and more capitalized, particularly in livestock which plays a clear buffer role.

*Source: RS II Mali and communication with the RuralStruc Mali Team, 2009.*

In Nicaragua, the surprise comes from the two areas mainly dedicated to livestock production – Muy Muy and La Libertad – which were supposed to show very contrasted results. While Muy Muy, a region located in the “milky way” (the so-called dairy belt), was originally chosen as an intermediary region because of the development of integrated dairy value chains, the income estimates revealed a harsher reality mainly due to the fact that farmers do not benefit from higher milk

prices that are captured downstream. On the contrary, La Libertad, selected as a losing region because of several constraints (remote mountain area with insufficient transport infrastructure and lack of public investments), appeared better-off partly due to larger land holdings and specific market outputs based on farm-processed cheese.

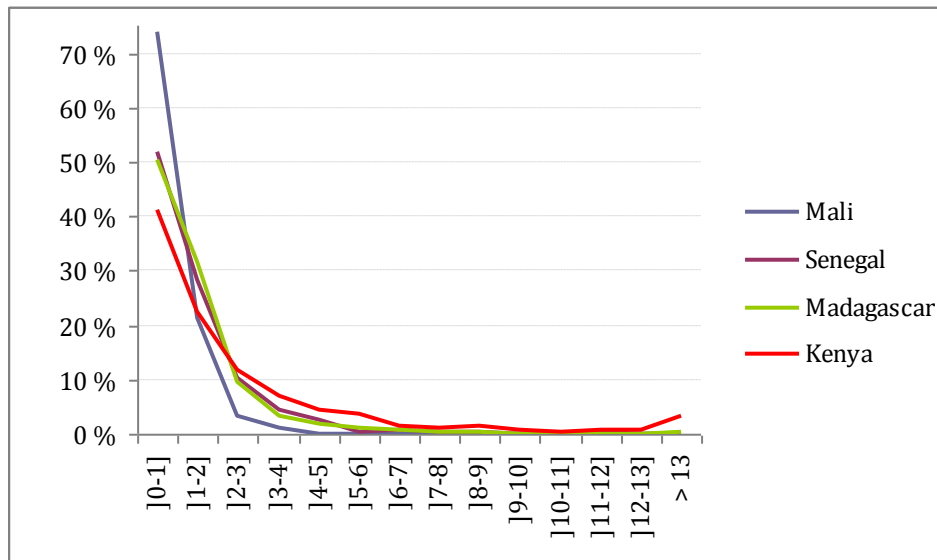
In Mexico, the aggregated results for the Sotavento region are, as expected, lower than for Tequisquipan. Nevertheless, and surprisingly, the average income for the Tierras Bajas sub-region are higher and prove that the returns from intensive maize production can be significant and higher than off-farm incomes (see below).

### 2.1.3 *Distribution of Rural Incomes*

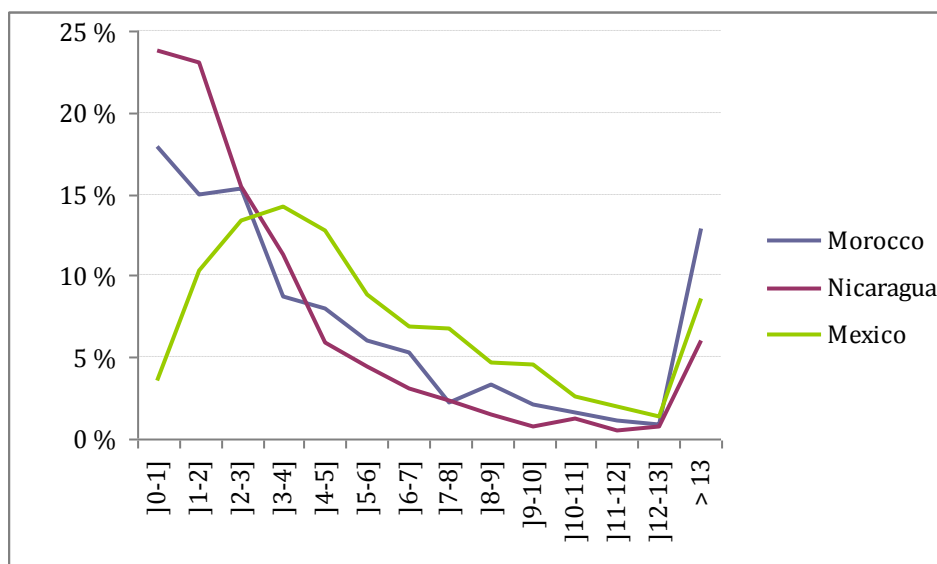
The distribution of incomes confirms the strong difference between SSA and non-SSA countries and the importance of intra-regional inequalities. When aggregating the survey results at the national level in order to compare the distribution profiles, and when using income classes with \$1PPP intervals, the difference of the shape of the curve is striking (Figure 9 and Figure 10).

In the sample, absolute poverty at \$1 ranges from 3% in the Mexican surveyed zones to 74% in the Malian zones, and there is a clear opposition between the SSA surveyed regions, where 90 to 95% of the households are captured within the first three classes (Kenya being slightly better-off and Mali clearly worse-off), and the non-SSA regions. In Mexico, Nicaragua and Morocco, the distribution is smoother, and the Mexican sample shows a markedly different pattern, peaking at the \$3-4 income class. In the three countries, incomes per capita and per day higher than \$13 must be noted (between 5 and 15% of the sample).

**Figure 9: Distribution of Households by Income Classes in SSA Surveyed Countries (\$ PPP 2007, per person, per day)**



**Figure 10: Distribution of Households by Income Classes in non-SSA Surveyed Countries (\$ PPP 2007, per person, per day)**

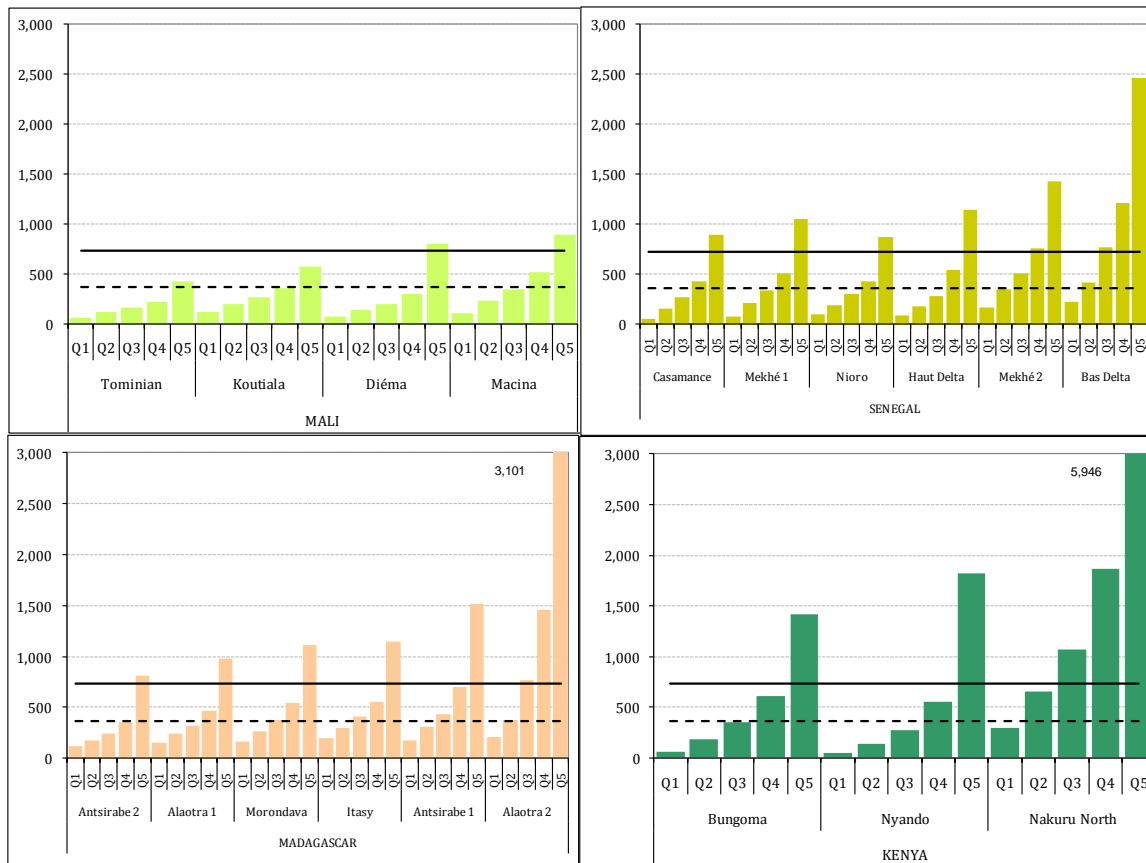


Source: RuralStruc Surveys

So as to better characterize the regions and their income structures, the results have been split into household quintiles, each consisting of 20% of the household sample (see Figure 11 and Figure 12). This breakdown sheds a new light on the rural reality of the surveyed regions.

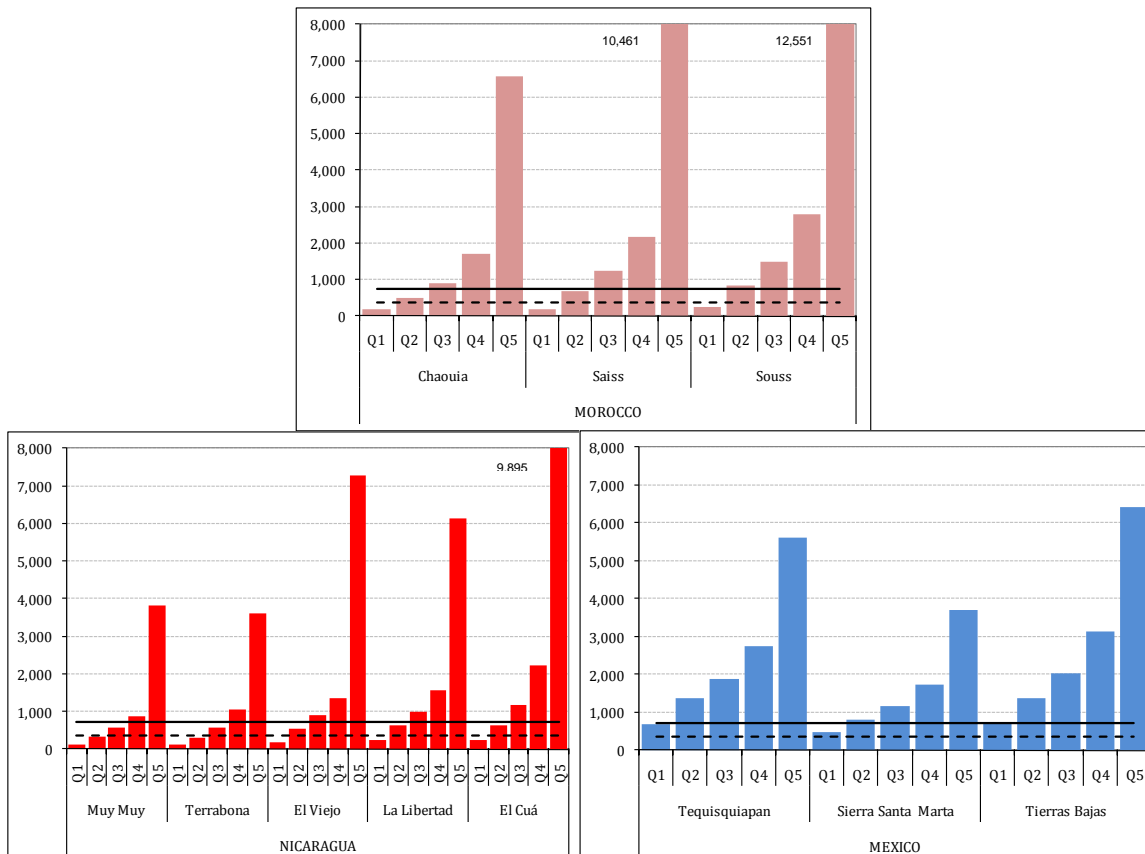
A major issue is the level of income in the first quintiles, which remains dire. The worst incomes per capita are recorded in the poorest regions of Mali, Senegal and Kenya, with a yearly average of \$64 PPP (Tominian), \$54 PPP (Casamance), \$51 and \$61 in Nyando and Bungoma respectively, i.e. only 15% of the value of the \$1 a day absolute poverty line. The first quintiles in Madagascar are somewhat “better”, around \$150. But the surprise comes from the poorest regions of Morocco (Chaouia) and even more Nicaragua (Muy Muy and Terrabona), which fall in the same range as the Malagasy regions. With the exception of Mexico, the first quintile always accounts for less than \$1 a day.

**Figure 11: Quintiles of Households by Zone in SSA Countries (\$ PPP 2007, per person)**



Sources: RuralStruc Surveys

**Figure 12: Quintiles of Households by Zone in non-SSA Countries (\$ PPP 2007, per person)**



Source: RuralStruc Surveys. The lines are respectively the \$1 PPP poverty line (dotted) and the \$2 PPP poverty line.

More globally, two common features can be noted:

- The increase of the average global income per person from quintile 1 to 4 is relatively linear (the income of quintile  $n$  being from 1.3 to 2 times the income of quintile  $n-1$ ), while a sharper jump is recorded for quintile 5 (the income of Q5 ranging from 2.7 to 5.4 times the income of Q4, in Diéma, Mali, and El Viejo, Nicaragua, respectively).
- The profile of the fifth quintile increases differs from region to region, yet the descriptive statistics of the richest quintile clearly indicate the same kind of phenomenon: the average of the fifth quintile is pulled up by a handful of better-off households.

This feature is illustrated by the following (see Table in Annex 4):

In Diéma, Mali, a few households recording high incomes per person (one has slightly above \$5,500 PPP) bolster quintile 5: because Diéma is an emigration zone,

remittances are commonly received but on a very irregular basis, and a once-off transfer in the year translates into income jumps.

In Alaotra 2, the richest surveyed zone of Madagascar, few large rice producers differentiate themselves from the other households. They pull the average income of the fifth quintile up to \$3,100 PPP, while the median income stands well below at \$2,390 PPP. Still in Madagascar, the fifth quintile of Antsirabe 1 shows a high variation related to the small number of households that have moved away from rice to specialize in potatoes and dairy products, which are sold rather than self-consumed. These results are confirmed by the value of the percentile 95, which is always much lower than the maximum.

In Senegal, the biggest gaps between average and median of the richest quintiles are recorded in the Bas Delta where some households cultivate large irrigated areas, which give them a significant rice production capacity. A few households in Mekhé 2 generate high incomes from cassava production and trade and, in Nioro, some households are responsible for these differences owing to their trading activities across the Gambian border, sometimes related to smuggling.

In Morocco, because of the previously mentioned high intra-regional heterogeneity, the gaps are very important in the three zones, the highest being in Saïss and Souss where differences are high between the plain and mountain localities.

In Nicaragua, gaps are marked in all the surveyed regions, particularly in the Pacific region of El Viejo, and illustrate the dualism of farm structures (a few large managerial farms mixing with a majority of poor small-scale family farms), while the Mexican regions appear less heterogeneous.

Therefore, in all the RS countries, most of the fifth quintiles of the richest regions are characterized by a handful of better-off households, benefiting from very specific social and economic conditions (a one-off high amount of received remittances, rents related to housing rentals, unusually good endowment in land and capital, etc.).

## **2.2 Fine-Tuning the Income Groups**

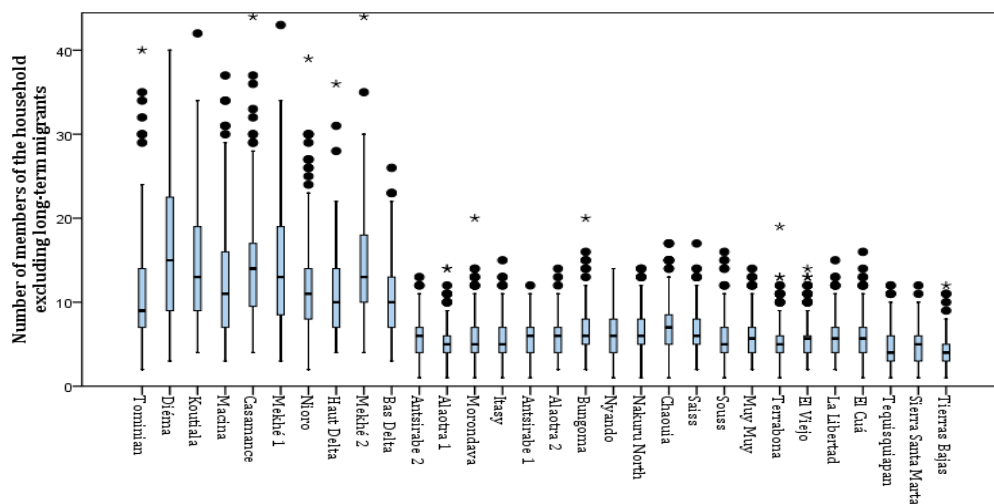
### *2.2.1 Improving the Comparability by using Adult Equivalent Ratios*

While per capita ratios were used in the previous sections to compare the survey results with poverty lines or GDP per person, it appears more accurate to use an Equivalent Adult approach (EqA) in order to take into account the very significant differences that can exist between households, regions and countries in terms of household structures. Adult Equivalents will be used from now on in the following sections and chapters.

Substantial amounts of literature exist on equivalence scales and the program adopted a conversion based on nutritional needs per age and sex, as presented in Annex 1. This equivalence scale over-emphasizes the role of food consumption and is consequently less adequate for the higher incomes. Nevertheless, it corresponds to the structural reality of the main part of the surveyed household for which food expenditures and self-consumption are essential.

Differences in household structures depend, of course, on the demographic dynamics and are exacerbated by social structures and cultural patterns in a given country. Thus, as shown in Figure 13, there are major differences mainly between West African countries, characterized by large households, and the other countries where more classic “nuclear” families exist. The large traditional family structures of Mali and Senegal, which aggregate several nuclear households under the authority of an elder – most often the head of lineage and landlord – still play a central economic role.<sup>39</sup>

**Figure 13: Size of Households (Number of Person Present)**<sup>40</sup>



Source: RuralStruc Surveys

These variations in size and structure translate into different dependency ratios, which directly impact both the production capacity (number of economically active household members), the consumption pattern and, *in fine*, the available income in EqA. As seen in Table 7, the higher dependency ratios found in the SSA countries

39 Households with more than 20 members represent 19% and 12% of the sample in the two countries, but they respectively account for 39% and 24% of the surveyed population.

40 Figure 13 displays box plots that depict the distribution of the regional samples. The bottom of the box gives the first quartile, the top of the box the third quartile, and the horizontal line within the box is the median. Extreme values are excluded from the present figure.

confirm the weight of young people and illustrate the unachieved demographic transition of the continent (see Chapter 2).

**Table 7: Household Structure and Income per Equivalent Adult**

		Household size		Dependency ratio	Global income \$PPP		Difference %
		# person	# EqA		per capita	per EqA	
Mali	Tominian	11.1	9.3	1.09	196	234	19
	Diéma	18.8	15.3	1.19	303	368	21
	Koutiala	14.8	12.1	1.25	301	368	22
	Macina	12.9	10.5	1.15	422	516	22
Senegal	Casamance	14.3	11.8	1.15	360	439	22
	Mekhé 1	14.7	12.2	0.99	436	527	21
	Nioro	11.8	9.5	1.15	376	484	29
	Haut Delta	12.1	10.1	0.85	443	524	18
	Mekhé 2	15.0	12.4	1.04	641	769	20
	Bas Delta	10.7	9.0	1.00	1,014	1,205	19
Madagascar	Antsirabe 2	5.8	4.8	1.19	340	409	20
	Alaoatra 1	5.2	4.4	1.01	429	506	18
	Morondava	5.5	4.5	1.23	493	597	21
	Itasy	5.5	4.5	1.21	520	622	20
	Antsirabe 1	5.7	4.8	1.21	626	744	19
	Alaoatra 2	6.0	5.1	0.90	1,181	1,346	14
Kenya	Bungoma	6.7	5.6	1.30	527	641	22
	Nyando	6.3	5.4	1.35	568	660	16
	Nakuru N.	6.5	5.7	0.61	1,973	2,258	14
Morocco	Chaouia	7.1	6.1	0.68	1,960	2,280	16
	Saïss	6.6	5.8	0.59	2,941	3,419	16
	Souss	5.8	5.1	0.57	3,583	4,131	15
Nicaragua	Muy Muy	5.8	4.7	1.02	1,140	1,417	24
	Terrabona	5.5	4.5	0.84	1,136	1,458	28
	El Viejo	5.6	4.5	0.94	2,038	2,575	26
	La Libertad	5.8	4.8	0.89	1,908	2,329	22
	El Cuá	6.0	4.9	1.00	2,835	3,610	27
Mexico	Sierra SM.	4.6	4.0	0.85	1,571	1,824	16
	Tierras Bajas	4.3	3.7	0.63	2,728	3,144	15
	Tequis.	4.6	3.9	0.61	2,486	2,879	16

Source: RuralStruc Surveys

On average, for the surveyed households, the ratio is around 1.1-1.2 in Mali and Madagascar, 1.0 to 1.1 in Senegal, but reaches 1.3 in Kenya, with the exception of Nakuru, which shows a very atypical situation.<sup>41</sup> The non-SSA countries are far ahead in the transition process and should reveal lower ratios: this is the case in Morocco and two Mexican regions, but Nicaragua as well as Sotavento's sierra

<sup>41</sup> The mean dependency ratio observed in Nakuru is consistent with other panel data, which show ratios of 0.60 (*RSII Kenya*, p.79), and acknowledged by national statistics. Among the possible explanations, one can note the demographic characteristics of Nakuru, which is exceptionally youthful with about 55% of the population less than 20 years and 75% less than 30 years (Republic of Kenya, 2005). This phenomenon is probably related to the very low level of children in the Nakuru North district households (only 55% have children) and could be explained by permanent migration of young people to host families in the city.



region appear specific.<sup>42</sup> These differences are important in terms of present productive capacity, but are also indicative of the looming challenges related to an increasing labor force. This conversion in Equivalent Adult allows a better comparability between average incomes and improves the regional levels in a range of 14 to 28%.

### 2.2.2 *Are Farm Households Better-Off or Worse-Off?*

As previously discussed, surveyed households are mostly farm households. However, what is their situation in terms of estimated wealth when compared with non-farm households? When put side by side as in Table 8, the results are surprising. Being a poor farmer is a common status in DCs' rural areas and one could have expected a noteworthy advantage in terms of income for the households entirely engaged in rural non-farm activities; however, this is not the case. In the six regions where we find more than 10% of the surveyed households without a farm, farm households' average income is twofold.

The situation is easily understandable in Madagascar where, as previously mentioned, the families without land access in Alaotra are the worse-off and mainly rely on low-paying agricultural wages. Besides, there is no difference in the average income between the two Alaotra sub-regions, while Alaotra 2 is the richest by threefold. The case of the sierra sub-region of the Mexican Sotavento is comparable: non-farm households have very few opportunities to sustain their livelihoods. But the cases of the Souss, Morocco and Mexican regions other than Sotavento are more paradoxical: returns from non-farm activities are clearly lower than what can be earned from agriculture. This unexpected result from the survey tempers the common view about vibrant rural non-farm activities (see Chapter 4).

Although the share of households without a farm is less important, the results in Nicaragua reveal a rather specific situation: the median income of the non-farm group is higher than those "with farm", which indicates an average income for farm households pulled out by a small number of bigger farms.

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42 Population growth rates have clearly fallen in Nicaragua since the mid-nineties. However, rural areas show a quite specific pattern related to the consequences of the civil war (fewer male adults) and to long-term migration (long-term migrants are not counted in the household number of persons present on which the ratio is calculated). The later is applicable to the Sierra de Santa Marta, which also reveals higher birth rates characteristic of indigenous populations.

**Table 8: Household Global Incomes With and Without a Farm**

		Households With Farm				Households Without Farm			
		Observations		\$PPP per EqA		Observations		\$PPP per EqA	
		n	%	Mean	Median	n	%	Mean	Median
Mali	Tominian	155	100	234	187	0	0	-	-
	Diéma	148	100	368	252	0	0	-	-
	Koutiala	153	100	368	318	0	0	-	-
	Macina	154	100	516	418	0	0	-	-
Senegal	Casamance	239	100	439	316	0	0	-	-
	Mekhe 1	110	99	531	394	1	1	120	120
	Nioro	240	95	460	358	12	5	972	585
	Haut Delta	58	95	525	307	3	5	489	527
	Mekhe 2	111	98	775	609	2	2	448	448
	Bas Delta	120	99	1,212	889	1	1	421	421
Madagascar	Antsirabe 2	303	100	409	296	0	0	-	-
	Alaotra 1	336	87	526	388	49	13	373	321
	Morondava	501	99	597	469	5	1	591	676
	Itasy	497	99	625	490	6	1	373	250
	Antsirabe 1	206	100	744	525	0	0	-	-
	Alaotra 2	103	90	1,455	1,052	12	10	405	369
Kenya	Bungoma	299	100	641	429	0	0	-	-
	Nyando	283	99	661	306	2	1	495	495
	Nakuru N.	289	100	2,258	1,213	0	0	-	-
Morocco	Chaouia	225	99	2,280	1,002	3	1	2,309	1,890
	Saïss	261	100	3,419	1,503	0	0	-	-
	Souss	181	75	4,758	2,122	59	25	2,208	1,157
Nicaragua	Muy Muy	290	97	1,436	670	9	3	803	734
	Terrabona	260	93	1,457	690	21	7	1,470	1,081
	El Viejo	264	92	2,678	1,176	24	8	1,440	1,279
	La Libertad	283	98	2,353	1,251	7	2	1,350	1,269
	El Cuá	299	100	3,619	1,428	1	0	995	995
Mexico	Sierra SM.	155	89	1,937	1,444	20	11	947	645
	Tierras Bajas	125	86	3,383	2,506	20	14	1,651	1,158
	Tequis.	101	28	3,697	2,873	263	72	2,565	2,055

Source: RuralStruc Surveys

### 2.2.3 The Wealth Status of Female-headed Households

In terms of gender, with the exception of the two West African countries and Morocco, the share of female-headed households is around 10% of the sample. Significantly higher shares exist in Alaotra 1, El Viejo (20%) and Nyando (30%).

These differences have multiple explanations related to the many life incidents (death, divorce), which are not handled similarly in every cultural context (the case of Muslim countries is striking), and also reveal diverse migration patterns: in nuclear families of Nicaragua and Mexico (and in a lower extend in Madagascar and Kenya), it is often the husband who leaves for long term migration, while in West

Africa it is mainly young dependents. The Nicaraguan civil war also left its footprint on these figures.<sup>43</sup>

**Table 9: Share, Size and Annual Income of Female Headed Households**

		Female HH	HH size in EqA		\$PPP per EqA	
		%	male	female	male	female
Mali	Tominian	0.0	9.3	-	235	-
	Diéma	0.0	15.3	-	368	-
	Koutiala	0.7	12.1	4.4	367	495
	Macina	1.3	10.6	6.2	520	203
Senegal	Casamance	2.9	11.9	9.2	441	365
	Mekhé 1	2.7	12.4	6.3	519	799
	Nioro	5.2	9.6	7.7	473	698
	Haut Delta	8.2	10.5	5.8	499	794
	Mekhé 2	0.9	12.5	4.4	772	399
	Bas Delta	5.0	9.1	7.0	1,207	1,163
Madagascar	Antsirabe 2	8.3	4.9	3.6	409	406
	Alaotra 1	21.3	4.6	3.6	516	471
	Morondava	16.2	4.8	3.2	601	574
	Itasy	10.7	4.7	3.1	616	670
	Antsirabe 1	6.8	4.9	2.3	736	852
	Alaotra 2	9.6	5.3	3.6	1,362	1,188
Kenya	Bungoma	11.0	5.7	4.7	628	745
	Nyando	30.5	5.8	4.6	818	300
	Nakuru N.	16.6	5.9	4.4	2,255	2,272
Morocco	Chaouia	4.8	6.2	4.1	2,299	1,922
	Saïss	0.4	5.8	3.0	3,426	1,587
	Souss	1.7	5.1	3.8	4,175	1,521
Nicaragua	Muy Muy	11.7	4.8	4.3	1,472	1,000
	Terrabona	14.6	4.5	4.3	1,467	1,406
	El Viejo	22.6	4.4	4.9	2,891	1,491
	La Libertad	10.3	4.8	4.7	2,342	2,216
	El Cuá	14.0	4.9	4.7	3,670	3,241
Mexico	Sierra SM.	13.7	4.1	2.8	1,776	2,621
	T. Bajas	9.0	3.8	2.7	3,187	2,712
	Tequis.	13.7	4.1	2.8	2,820	3,247

Source: RuralStruc Surveys

When a female heads a household, household sizes are logically smaller in nuclear family contexts, but the variation of the average income is less important than one might have expected: in a range of 10% lower, with a few exceptions (El Viejo and Nyando again). On the contrary, it is worth noting the specific case of Tequisquipan and Sierra de Santa Marta in Mexico, where average incomes of female-headed households are notably higher. Even if the survey faced difficulties in capturing the

43 The case of Nyando appears exceptional. It is confirmed by panel data from the Tegemeo Institute showing a rapid increase of female-headed families with 80% of widows, AIDS being one of the most probable explanations.

reality of migrations (cf. Annex 1), the results speak for themselves: while incomes reflect the role of remittances, household sizes are smaller and illustrate the consequences of long term migrations (these households are in the early stages of their family cycle and migrants are mainly young adults, below 40 years of age).

#### 2.2.4 *Viability of the Low Income Level Households and Food Insecurity*

The breakdown of results per household quintiles has previously shown the unbearable situation of the first quintiles in all the surveyed regions but Mexico. Their situation improves slightly when using EqA but remains calamitous. How do the poorest households actually manage to live – or better survive – and how are they able to sustain their livelihoods with such low income levels?

To shed some light on this dire reality, it was decided to use kilocalories (Kcal) as a unit for income measurement in order to appreciate whether households were able, or not, to sustain their minimum food requirements with their existing incomes. This approach is, of course, a proxy because households' needs cannot be reduced to food needs only. However, it provides an estimate and helps to refine the comparison among surveyed zones, in particular for the poorest households.

To do so, household incomes in EqA were transformed into kilocalories by using the price of households' main food staple and then compared with the average individual's daily energetic needs, estimated by the World Health Organization (WHO) at 2,450 Kcal per adult person per day.<sup>44</sup> The price of the kilocalorie varies strongly from one country to the next, and among zones within the same country (Table 10): from \$0.10 PPP for 1,000 Kcal of corn in Mexico, to \$0.25 PPP for rice in Itasy, Madagascar. It depends, of course, on the type of cereal cultivated. Mali's dry cereals (millet, sorghum, maize), mostly consumed in rain-fed areas, are notably less expensive than rice (\$0.11 or 0.12 PPP for 1,000 Kcal). However, in Senegal, the price of rice kilocalorie is less expensive than in the other countries (\$0.15 to 0.16 PPP) with little regional variation, which can be explained by strong market competition between the imported broken rice and local rice. Mexico's least expensive kilocalorie results from government support to production through credit mechanisms and technical assistance for the acquisition and use of technical packages; a relatively good productivity at the national level; and a strong competition with imported corn.

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<sup>44</sup> The adopted methodology and conversion table are presented in Annex 1.

**Table 10: Average Global Income per EqA and per Day (in \$ PPP and Kcal)**

		Global Income in EqA				Price of 1000 Kcal
		in \$PPP per year		in KiloCalories per day		in \$PPP
		Mean	Tominian Index = 100	Mean	Tominian Index = 100	
Mali	Tominian	234	100	5 225	100	0.12
	Diéma	368	157	8 762	168	0.12
	Koutiala	368	157	9 530	182	0.11
	Macina	516	220	7 374	141	0.19
Senegal	Casamance	439	187	7 844	150	0.15
	Mekhé 1	527	225	9 011	172	0.16
	Nioro	484	207	8 733	167	0.15
	Haut Delta	524	224	8 954	171	0.16
	Mekhé 2	769	328	14 125	270	0.15
	Bas Delta	1 205	515	22 138	424	0.15
Madagascar	Antsirabe 2	409	175	4 781	92	0.23
	Alaotra 1	506	216	6 564	126	0.21
	Morondava	597	255	8 373	160	0.20
	Itasy	622	266	6 935	133	0.25
	Antsirabe 1	744	318	8 694	166	0.23
	Alaotra 2	1 346	575	17 444	334	0.21
Kenya	Bungoma	641	274	14 121	270	0.44
	Nyando	660	282	13 120	251	0.49
	Nakuru N.	2 258	964	65 736	1 258	0.34
Morocco	Chaouia	2 280	974	34 070	652	0.18
	Saiss	3 419	1 460	56 881	1 089	0.16
	Souss	4 131	1 765	54 005	1 034	0.21
Nicaragua	Muy Muy	1 417	605	21 532	412	0.18
	Terrabona	1 458	623	20 273	388	0.20
	El Viejo	2 575	1 100	35 802	685	0.20
	La Libertad	2 329	995	33 089	633	0.19
	El Cuá	3 610	1 542	56 168	1 075	0.18
Mexico	Sierra SM.	1 824	779	51 952	994	0.10
	T. Bajas	3 144	1 343	89 540	1 714	0.10
	Tequis.	2 879	1 230	81 984	1 569	0.10

Source: RuralStruc Surveys

Using Tominian, the poorest region of the RS sample, as a baseline, it is possible to calculate the income gaps between Tominian and all the other regions, and then to record the influence of the conversion in Kcal on the differences between the surveyed regions (Table 10): the gaps between the average income of the richest and poorest regions decrease from 10 to 1<sup>45</sup> instead of 18 to 1. Thus, the situation of the Malian regions appears to be comparable with most of the zones of Madagascar or Senegal. On the contrary, the situation in Madagascar is less favorable due to the relatively expensive rice kilocalorie and significant differences between zones.

These results help to better understand how poor rural households can deal with such low global income levels in \$PPP. The conversion of income into kilocalories per adult equivalent translates into a relative improvement of the situation of the poorest households, particularly in SSA

45 When excluding the Mexican zones because of the very low cost of kilocalories from corn related to the average income.

These observations confirm that the poorest households are in situation of food insecurity and thus of high vulnerability. Although the situation is the most critical in the poorest SSA regions (Tominian, Casamance, Antsirabe 2, Nyando), it is worth noting that it is also the case for two regions in Nicaragua (Muy Muy and Terrabona). Only the Mexican zones and Nakuru North (Kenya) fully escape this critical situation (Table 11). In Koutiala, as previously seen when discussing the “paradox” of Mali’s cotton-growing (see Box 5), few households experience food insecurity (only 5%), despite a low average income, notably because of a low income inequality and the low cost of cereal calories. But the situation of the other surveyed regions is clearly more difficult.

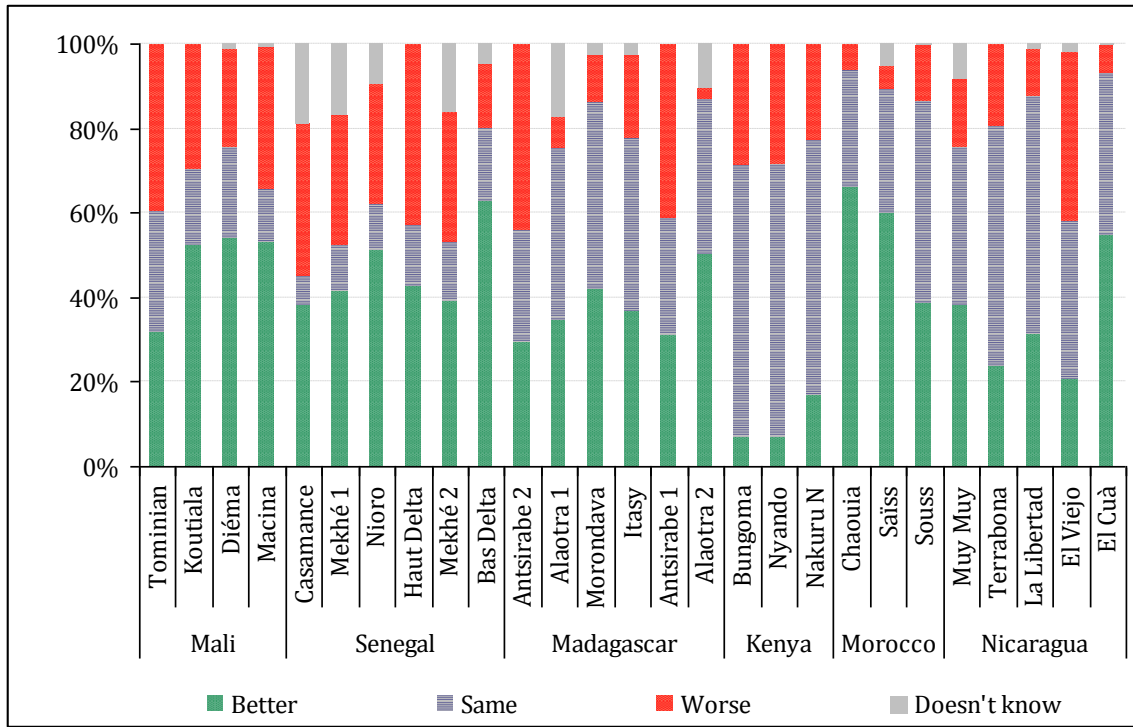
In conclusion, the kilocalorie approach usefully complements the comparison on a monetary basis and somewhat tempers the apparent non-viability of low-income households. However, food insecurity persists and is a major fact in several regions. This result can be put into perspective, in dynamic terms, with the perception of the heads of households: 23 to 40% of them in Mali, 15 to 43% in Senegal, over 40% in some regions in Madagascar (Antsirabe) and Nicaragua (El Viejo) consider that their food security has deteriorated over the last five years, in terms of quantity as well as in quality (Figure 14). This perception may have been exacerbated by the food price crisis during the surveyed year (end of 2007, early 2008) but nevertheless corroborates the harsh reality of many rural households.

**Table 11: Household Distribution According to Levels of Income Expressed in Kilocalories (%)**

		Level of Annual Global Income in Kcal per EqA per day		
		<= 2450 Kcal	2451 - 4900 KCal	>= 4900 KCal
Mali	Tominian	19%	41%	40%
	Diéma	5%	10%	86%
	Koutiala	12%	24%	64%
	Macina	14%	25%	60%
Senegal	Casamance	22%	22%	56%
	Mekhé 1	17%	15%	68%
	Nioro	12%	25%	63%
	Haut Delta	13%	31%	56%
	Mekhé 2	4%	9%	87%
	Bas Delta	4%	4%	92%
Madagascar	Antsirabe 2	29%	41%	31%
	Alaotra 1	11%	38%	51%
	Morondava	6%	28%	65%
	Itasy	6%	38%	56%
	Antsirabe 1	8%	27%	65%
	Alaotra 2	3%	19%	77%
Kenya	Bungoma	15%	14%	71%
	Nyando	22%	21%	57%
	Nakuru N	1%	1%	97%
Morocco	Chaouia	7%	7%	86%
	Saiss	8%	4%	87%
	Souss	8%	5%	87%
Nicaragua	Muy Muy	12%	13%	75%
	Terrabona	13%	13%	74%
	El Viejo	8%	6%	85%
	La Libertad	5%	8%	88%
	El Cuá	3%	8%	89%
Mexico	Sierra SM	1%	1%	98%
	T Bajas	0%	0%	100%
	Tequis	0%	0%	100%

Source: RuralStruc Surveys

**Figure 14: Perceived Evolution of Food Security in the Surveyed Zones (% of households)**



Source: RuralStruc Surveys



### 3 Existing Livelihood Strategies

Facing such difficult situations in many of the surveyed regions, a burning question is: How do rural households engage in livelihood strategies likely to help them to face their needs and build a future, particularly for their children?

The WDR08, with its main reference to “exit pathways out of rural poverty”, provides a helpful framework for discussion of the Program’s results. Based on the approach developed by the RIGA project,<sup>46</sup> the WDR08 distinguishes four types of livelihood strategies among rural households (World Bank 2007, p.75): (i) *farm-oriented* households deriving most of their income from farming activities;<sup>47</sup> (ii) *labor-oriented* households, which sustain their livelihoods from wage labor in agriculture, in the rural non-farm economy, or from non-agricultural self-employment; (iii) *migration-oriented* households choosing to leave the rural sector entirely, or depending on transfers from members who have migrated or on public transfers; and (iv) *diversified* households, which combine income from the previous options (farming, off-farm activities and migration).

#### 3.1 Following the WDR08’s Typology

Using the same definitions,<sup>48</sup> Table 12 displays the survey results based on the WDR08 categories and gives an overview of how rural households are distributed among the four livelihood strategies groups. The first observation is that the share of the farm-oriented category logically confirms the role of agriculture and of on-farm incomes in the surveyed regions. In 18 out of 30 regions, on-farm income represents the major source of livelihood; among these regions 12 count for more than 50% of the interviewed households. This share reaches 80% in four regions: Koutiala and Macina in Mali, Saïss in Morocco, and El Cuá in Nicaragua. In Kenya and Senegal farm orientation does not appear as a generalized pattern, and Mexico is confirmed as a specific case.

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46 The Rural Income Generating Activities (RIGA) project is led by the FAO and supported by the World Bank (see Box 6 in Chapter 4).

47 In fact, the WDR08 refers to five strategies, the *farm-oriented* category being split in two: subsistence farming and market-oriented farming. This discussion on the farm-oriented group is engaged further in Chapter 5 with the presentation of the Program’s results on market insertion.

48 The threshold for each group is 75% of the total income: farm-oriented households rely on farm production (all types); labor-oriented households are based on wages (all types) and non-farm self-employment; migration-oriented households earn their income from transfers (public and private) and other non-labor sources (rents, etc.); diversified households have neither farming, labor, nor transfer income sources contributing to more than 75% of total income.

**Table 12: Livelihood Strategies in the Surveyed Regions (WDR08's Typology)<sup>49</sup>**

		N	Farm-oriented HH	Labor-oriented HH	Migration-oriented HH	Diversified HH
Mali	Tominian	155	55,5	0,6	1,3	42,6
	Diéma	148	44,6	1,4	8,1	45,9
	Koutiala	153	85,6	0,0	0,7	13,7
	Macina	153	81,2	1,9	0,6	16,2
Senegal	Casamance	238	51,5	9,2	0,0	39,3
	Mehké 1	108	15,3	35,1	0,0	49,5
	Nioro	242	21,0	22,6	2,0	54,4
	Haut Delta	57	41,0	18,0	1,6	39,3
	Mehké 2	110	17,7	16,8	1,8	63,7
	Bas Delta	119	21,5	19,8	0,8	57,9
Madagascar	Antsirabe 2	303	29,7	3,3	0,3	66,7
	Alaotra 1	385	41,8	19,5	0,5	38,2
	Morondava	506	63,2	3,2	0,6	33,0
	Itasy	502	40,2	5,0	0,4	54,5
	Antsirabe 1	206	65,0	2,9	0,0	32,0
	Alaotra 2	113	60,9	11,3	0,0	27,8
Kenya	Bungoma	290	44,5	19,1	0,0	36,5
	Nyando	260	24,6	31,2	1,1	43,2
	Nakuru N.	280	17,6	26,6	0,0	55,7
Morocco	Chaouia	190	44,3	20,6	7,0	28,1
	Saïss	253	80,5	2,7	3,8	13,0
	Souss	222	44,6	24,6	8,8	22,1
Nicaragua	Muy Muy	278	51,2	22,7	7,0	19,1
	Terrabona	269	57,3	16,7	6,8	19,2
	El Viejo	287	43,1	31,9	4,9	20,1
	La Libertad	251	57,2	18,6	0,3	23,8
	El Cuá	298	85,3	2,7	0,0	12,0
Mexico	Sierra SM.	175	8,0	12,6	1,1	78,3
	T. Bajas	145	20,0	16,6	2,8	60,7
	Tequis.	364	4,1	81,3	4,1	10,4
		7060				
Madagascar	1993 (*)	2653	59,4	9,5	1,4	29,6
Nicaragua	2001 (*)	1839	18,9	48,2	0,9	32,0

Source: RuralStruc Surveys, adapted from WDR08, p.76 (World Bank 2007); (\*) RIGA results in Davis et al. 2007, p. 162. The main strategy is shaded.

Secondly, only one region is off-farm oriented: Tequisquiapan, massively engaged in labor activities (80%), which corroborates the low number of households still engaged in on-farm activities. In the other regions, the off-farm barely weights more than 30%, the exceptions being Mekhé 1 in Senegal, Nyando in Kenya and El Viejo in Nicaragua, where one third of the households are similarly labor-oriented. Migrations never appear as a strong pattern, even in countries like Morocco, Nicaragua and Mexico, where many households are “traditionally” engaged in

49 Negative on-farm incomes concern 2.9% of the survey sample and these households were not included in the breakdown. The negative on-farm incomes are mainly due to low harvests related to bad weather conditions and to the methodology used to estimate livestock incomes.

migrations.<sup>50</sup> Few households are migration-oriented: only Diema in Mali, Chaouiã and Souss in Morocco, and Muy Muy and Terrabona in Nicaragua reach 7-8%.

Thirdly, and consequently, household specialization mainly occurs for farming. On the other extreme, the diversification category is well represented in all the surveyed zones and leads in 12 regions, with a maximum of 78% in Sotavento's Sierra (Mexico). Nevertheless, this importance of diversification can be misleading and is, of course, highly sensitive to the selected threshold of 75% of income, which tends to over-polarize the survey results. Besides, Davis et al. (2007) consider this threshold as a specialization level rather than an "orientation". To test and confirm the sensitivity of the threshold, the sample was broken down based on the 60% limit. This 15% change strongly modifies the global pattern: the share of the diversified group is halved everywhere, except in the Sotavento, attesting to the resilience of its diversified orientation; in some regions the category is divided by nearly three (Muy Muy, Antsirabe 1, Alaotra 2); the diversification category only leads in the two Sotavento zones; and the transfer of households mainly benefits the farm-oriented group (see Annex 4).

If the Program's results are compared with those of the RIGA project for Nicaragua and Madagascar – the only two common case studies but with different years of reference (respectively 2001 and 1993) – significant differences emerge, notably in Nicaragua (see Table 12), where the share of labor-oriented households according to RIGA is 48%, instead of a maximum of 32% found in the RS study. On the contrary, the share of farm-oriented households is much lower (RIGA shows 19%, whereas the RuralStruc surveys find from 43 to 85%). The results are not so markedly different in the case of Madagascar, even though the years of reference span over more time: 15 years). One probable explanation for these differences is that RIGA's findings are based on aggregated national results, whereas RuralStruc data illustrate regional situations.

Although the survey methodologies, level of analysis and years of reference differ, these gaps illustrate the difficulty of establishing comparable measurements of income across countries, which was clearly indicated by the WDR08 (World Bank 2007, cf. box 3.2, p.76).

### **3.2 Moving Forward**

This typology of livelihood strategies helps to better identify the configuration of the studied regional economies. So far, it confirms the domination of farm-oriented strategies and the limited role of alternative strategies based on off-farm activities, knowing that the threshold selected for the classification accentuates this picture. It also serves as a reminder that the alternative options to farming are quite restricted

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<sup>50</sup> See the methodology regarding the difficulties of capturing remittances.

and illustrates the few existing local opportunities as well as the elusive windfalls of migrations.

What is more difficult to ascertain is the effectiveness of these livelihood strategies as exit options out of poverty. The lack of dynamic data is a major limitation of the Program; additional limitations include the high heterogeneity between the households of the sample, and the small number of households per category of strategy at regional level.<sup>51</sup> These obstacles prevent any discussion on income levels per livelihood strategy knowing that the variability of situations is a main recurrent difficulty, as it was well stated by the WDR08, which asserts the same issue:

A household's income structure does not tell whether it is engaged in a successful income strategy. Each of the strategies can become a pathway out of poverty, but many households do not manage to improve their situation over time, reflecting the marked heterogeneity in each of the activities and the fact that income varies widely for each of the strategies (World Bank 2007, p.77).

The utilization of the WDR typology applied to the wide range of situations illustrated by the RuralStruc Program mainly gives us two large groupings of households: one is strongly specialized in on-farm activities and the other is strongly diversified. But, in fact, we know little about the characteristics of these activities. What comprises the "on-farm" and the "off-farm" in the surveyed regions? Defining these characteristics is the objective of the two next chapters.

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51 See in Annex 4 the statistical breakdown of the global income per region and type of strategy.

## **CHAPTER 4. EXPLORING THE RURAL NON-FARM ECONOMY**

The configuration of rural economies has significantly changed worldwide over the last decades. As a consequence of the increased mobility of people, goods, and ideas – directly linked to technical progresses in transport and communication – the old urban-rural divide is fading and there is a need to rethink the vision of rural economies’ defining characteristics.

Despite the fervent debate that has emerged between the academic and the donor communities on this topic, little is known about the facts. The recurring issue is the lack of data about these processes of rural transformation, which are not captured by existing information and statistical systems. The majority of the existing analytical work relies on empirical case studies, most often based on small samples, and with few global approaches.

Thus, contributing to fill this information gap was one of the objectives of the RuralStruc Program. The results obtained provide a rather nuanced picture of changes currently underway and illustrate that agriculture still plays a leading role in most of the surveyed regions.

This chapter aims to shed some light on the rural non-farm economy (RNFE) of the Program’s regional studies. A first section briefly reviews the existing literature on the question of diversification. A second section presents the major findings of the surveys and will draw a picture of the existing off-farm activities and incomes.

### **1 The Existing Question of Diversification**

#### **1.1 The Rural Non-farm Economy: A Brief Overview of the On-going Debate**

An important recent research trend has shown that rural households in developing countries derive their incomes from a variety of sources, including a heavy share from non-agricultural activities, and that new patterns of livelihood diversification have progressively emerged over the last 30 years (Reardon 1997; Reardon et al. 1998; Ellis 1998 and 2000; and Haggblade et al. 2005 and 2010; among others). Many authors point out that the contribution of non-farm activities to household income in the developing world in general, and in sub-Saharan Africa in particular, is substantial. Thus, Reardon et al. (1998) and Reardon (1999) estimate this share at 42% for SSA, 32% for Asia and 40% for Latin America. Ellis (2000) reports higher figures from case studies in SSA, up to 50%. More recently, Haggblade et al. (2010) observe that off-farm activities account for about 30% of full-time rural employment in Asia and Latin America, 20% in West Asia and North Africa, and 10 % in Africa.

Whatever their conclusions about the exact share of off-farm activities, these contrasted results on the situation of rural economies across developing countries provide a new light and progressively replace the “old” vision where agriculture was the core livelihood of rural households.

These processes of change have accelerated since the 1980s, when liberalization policies and globalization resulted in a plethora of changes for rural households to face. Because of the importance of market imperfections and market failures, these changes often increased uncertainty. In many regions, particularly those less connected to markets, vulnerability increased due to difficulties in marketing and supply, price instability, the removal of subsidies (particularly for inputs), or the withdrawal of technical support. Meanwhile, cutbacks in public budgets as well as consumer price inflation have led to an increased need for accessible cash. As a consequence, an increasing number of rural households have engaged in “coping strategies”<sup>52</sup> that seek additional incomes out of agriculture. Technical progress in transportation and communication (particularly cell phones and cash transfer systems) facilitates this diversification.

As such, for many households, the literature confirms that farming is now one of several activities and income sources. Increasing emphasis is put on livelihood diversification, i.e. the multiple income-generating activities undertaken by rural households. Two main perspectives on diversification have been investigated.<sup>53</sup> The first refers to the diversification of income through rural non-farm activities and the related implication on poverty alleviation; whereas the second deals with diversification of income through migration, and the related impact of remittances on livelihoods. This second diversification strategy includes migration to a wide array of locations (to cities, other regions, or outside the home country) and relies on members of the household working in these different places. These new composite systems contribute to the emergence of “archipelago models”<sup>54</sup> that clearly redefine the country-to-city linkages.

According to Barrett and Reardon, “diversification is the norm. Very few people collect all their income from any one source, hold all their wealth in the form of any single asset, or use their assets in just one activity”. They remind that,

*...there are several reasons for this: risk reduction, realization of economies of scope, diminishing returns to factor use in any given application, response to crisis, liquidity constraints, etc. At the more aggregate level of households or communities or regions, scarcity of productive resources and specialization according to comparative*

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52 See Ellis (1998) for discussion on the different meanings of “coping strategies”.

53 For additional sources and discussion see, among others: for a general approach Ellis (2000; 2004), Wiggins and Davis (2003), and Haggblade et al. (2005); for regional issues on Latin America Reardon et al. (2001), and Barrett et al. (2001, 2005) and Bryceson (1999,2002) on Africa.

54 On these new configurations see, among others: Gastellu and Marchal (1997); Léonard et al. (2004).

*advantage accorded by superior technologies or skills or by greater endowments leads to considerable inter-individual diversity in activities and incomes. So no matter the unit of analysis, diversification is ubiquitous. This is especially true in rural areas of low-income countries, where high transactions costs induce many residents to self-provision in several goods and services, where increasing population pressures often result in landholdings too small to absorb all of a household's labor supply, and where limited risk-bearing capacity and weak financial institutions create strong incentives to select a portfolio of activities in order to stabilize income flows so as to stabilize consumption and minimize the risk of entitlements failure (2000, p. 1-2).*

## **1.2 How to Classify Rural Non-farm Activities and Incomes**

The discussion on diversification of livelihoods is sometimes difficult because there are no single broadly-accepted activities and incomes categories defined in the literature, and because few referenced sources explicitly establish a classification of the RNFE. Thus, it remains useful to clarify the picture.

Following Davis et al. (2007), rural activities can be divided into six categories: (i) crop production, (ii) livestock production, (iii) agricultural wage employment, (iv) non-agricultural wage employment, (v) non-agricultural self-employment, and (vi) transfers (private and public). The first three categories (crop, livestock and agricultural wage) make up “agricultural activities”, while the last three (non-agricultural wage, non-agriculture self employment and transfers) represent “non-agricultural activities”. The first two categories (crop and livestock production) are “on-farm activities”, and categories four and five (non-agricultural wage and self employment) are “non-farm activities”. Agricultural wage employment and transfers are separate categories. The concept of “off-farm activities” includes “agricultural wage labor” plus all other “non-agricultural activities” (Barrett & Reardon 2000; Winters et al. 2001; Davis et al. 2007).

As with every classification, this grouping is disputable and it is possible to continue feeding the debate on definitions and categories. For instance, one could argue that: (i) transfers are not an activity but an income source and can foster activities or increase consumption or investment; (ii) private transfers can also result from agricultural and non-agricultural activities or wages; (iii) agricultural activities cannot be restricted to crop and livestock production but must also include on-farm processing of raw products (added-value at the farm level);<sup>55</sup> (iv) occasional hunting, fishing and gathering are not agricultural activities but, as common rural

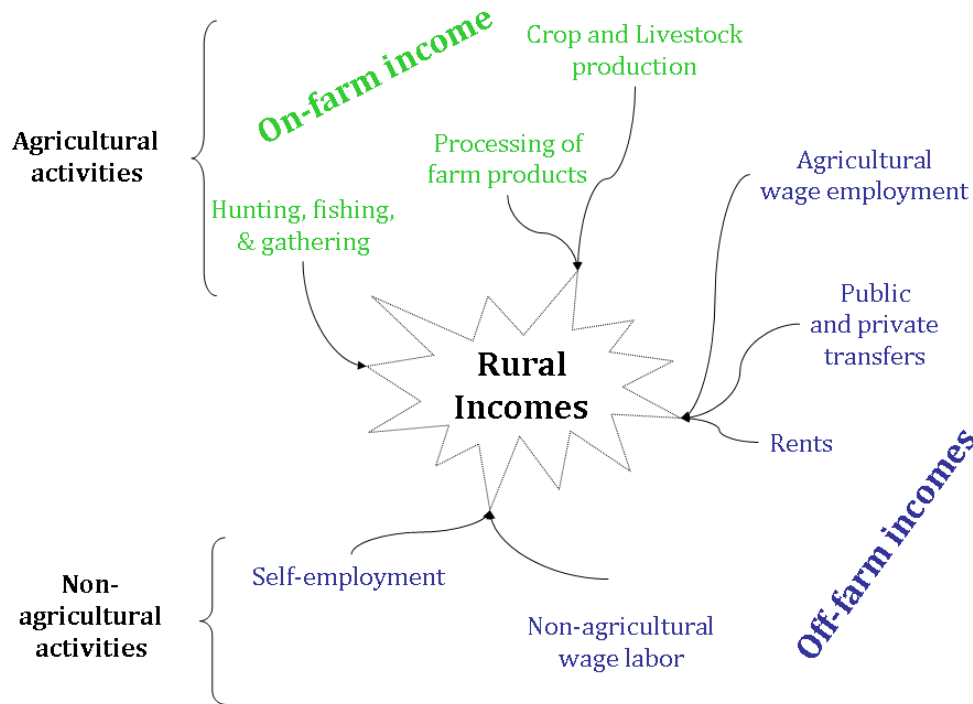
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<sup>55</sup> Many authors include on-farm processing of raw products in rural non-farm activities and define it as a key component of the rural non farm economy (see Habbglade et al 2010). This is very debatable, and we consider that this type of activity should be included in on-farm activities as in most cases they directly contribute to adding value to farm outputs. This is particularly true in SSA, where processing often concerns the products of the family farm itself. When products are processed by agro-industries or small-scale independent enterprises, labor earnings are obviously off-farm and considered as non-agricultural wage employment.

practices based on the utilization of natural resources, they can be included in the on-farm income; or (v) distinguishing self-employment from non-agricultural wage employment raises questions about certain types of jobs, which although nominally waged, are mostly carried out in small workshops or small businesses at the micro level –for instance taxi driving or apprenticeship – and are therefore difficult to analyze when included in the same group as formal office work (e.g. public service).

Considering the above, the RS Program made choices in terms of income structure. These choices, depicted in Figure 15, are adapted from Davis et al. (2007) and use the perspective of the household rather than that of the activity, because the Program’s purpose and objectives are to facilitate the identification of patterns that express the complex livelihood strategies adopted by rural households.

**Figure 15: Diversification of Activities and Incomes in Developing Countries**



Source: Authors, adapted from Davis et al. 2007

Over the past years, the need to understand the processes of change and the development of rural diversification, has led to an effort to systematize the available information with the objective of providing a new vision of rural realities. These efforts were manifested in few initiatives such as the RIGA project (Rural Income Generating Activities), a joint initiative of the World Bank and the FAO that aims at helping the development community to build empirically-based generalizations about the RNFE. RIGA also aims to identify policy instruments that could be used to promote RNF activities alongside agriculture to facilitate poverty alleviation in rural areas.



Even though the RIGA results are based on largely heterogeneous data (particularly the years of reference of the collected data), the RIGA project remains one of the very rare existing sources of international comparison. Its results were used extensively by the WDR08, most notably to discuss the role of rural activity and income source diversification as a way out of poverty as follows,

Many rural households move out of poverty through agricultural entrepreneurship; others through the rural labor market and the rural non-farm economy; and others by migrating to towns, cities, or other countries. The three pathways are complementary: non-farm incomes can enhance the potential of farming as a pathway out of poverty, and agriculture can facilitate the labor and migration pathways (World Bank 2007).

**Box 6: The Rural Income Generating Activities (RIGA) Project**

The RIGA project analyzes sources of rural household income in 15 countries from 23 household surveys: Ghana 1992 & 1998; Madagascar 1993-94; Malawi 2004-05; Nigeria 2004; Bangladesh 2000; Indonesia 1992 & 2000; Nepal 1995-96; Pakistan 1991 & 2001; Vietnam 1992-93 & 1997-98; Albania 2002 & 2005; Bulgaria 1995 & 2001; Ecuador 1995 & 1998; Guatemala 2000; Nicaragua 2001; Panama 1997 & 2003. RIGA uses a database constructed from a pool of Living Standards Measurement Study (LSMS) and other multi-purpose household surveys made available by the World Bank and the FAO. From this pool of existing data, a panel of countries is selected with the objective of ensuring geographic coverage, as well as adequate quality and sufficient comparability in codification and nomenclatures. The specific objective of this work is (i) to conduct a systematic analysis of income-generating activities in rural areas of the selected countries; (ii) to identify the relative importance of different activities; and (iii) to analyze the determinants of participation and intensity of involvement in different activities.

To this end, basic analysis is conducted to (i) evaluate the participation in and income received from RIGAs, (ii) analyze the role of household assets in participation in each activity, (iii) analyze the role of household assets in the income received from each activity, and (iv) disaggregate rural non-farm activities by industry. Indeed, a major component of the RIGA project is to construct comparable income measures. The aim of the exercise is to provide annualized benchmark aggregates spanning four continents, which, despite pervasive differences in the quality and level of information available in each survey, is suitable for cross-country analysis. Although consumption-based money metric measures are more commonly used in welfare analysis because they are considered to be more accurate and easier to measure in a typical household survey, the RIGA study uses income-based measures and their components, whose definitions closely follow those given by the International Labor Organization (ILO).

Some of the results of the RIGA project are that schooling is an important determinant for participation in many activities, but that its magnitude varies with respect to rural non-farm wage employment, agricultural wage and RNF self-employment. As a consequence, the RIGA project puts forward that schooling leads to a shift to RNF wage employment and, thus, higher income. This work also underlines that services are the most important RNF wage employment activity followed by manufacturing, construction and commerce, the latter being the most important RNF self-employment activity.

*Source: Carletto et al. 2007*

As previously stated, diversification of rural activities and incomes does not mean the complete abandonment of crop and livestock activities. On the contrary, the evolution of the agricultural sector has led many rural households to develop new strategies based on different income generating activities that allow for adaptation

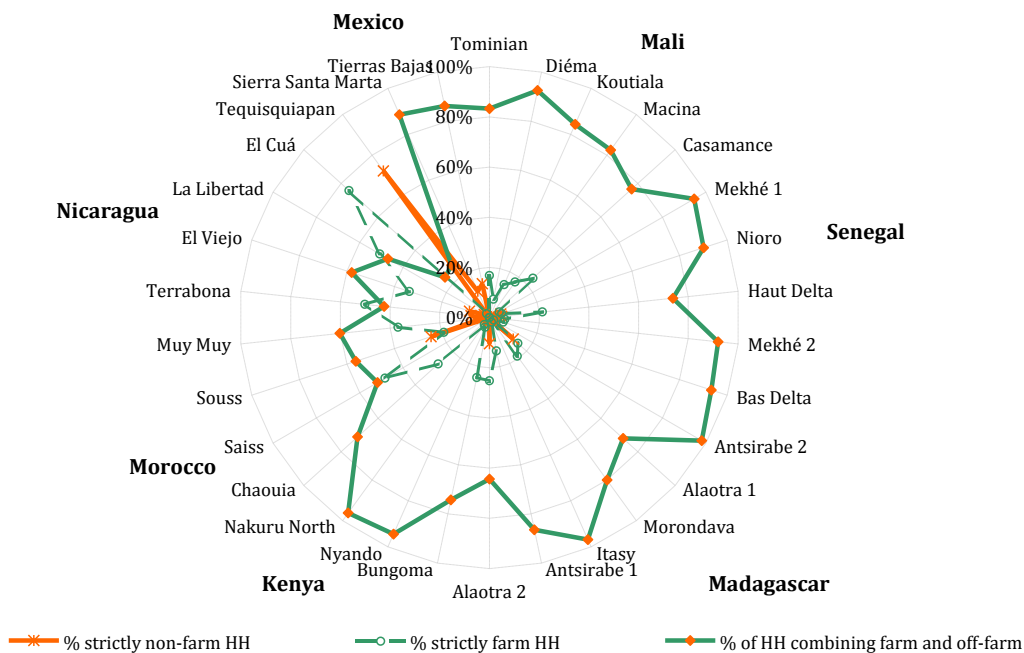
and risk management in an uncertain and changing environment. Consequently, labor and capital can be reallocated to other activities – when alternatives exist. Thus, the core issue remains that of existing diversification options and the potential of each to provide a pathway out of rural poverty.

## 2 The Reality of the Rural Non-farm Economy in the Surveyed Regions

### 2.1 Importance of Off-farm Activities and Incomes

While agriculture remains the backbone of rural livelihoods in most of the surveyed regions (as shown in Chapter 3), rural off-farm activities exist everywhere and provide a substantial complement to on-farm income or – in some cases – progressively replace it. Figure 16 displays the participation rates of surveyed rural households in off-farm activities.

**Figure 16: Participation in Off-farm Activities (% of Households)**



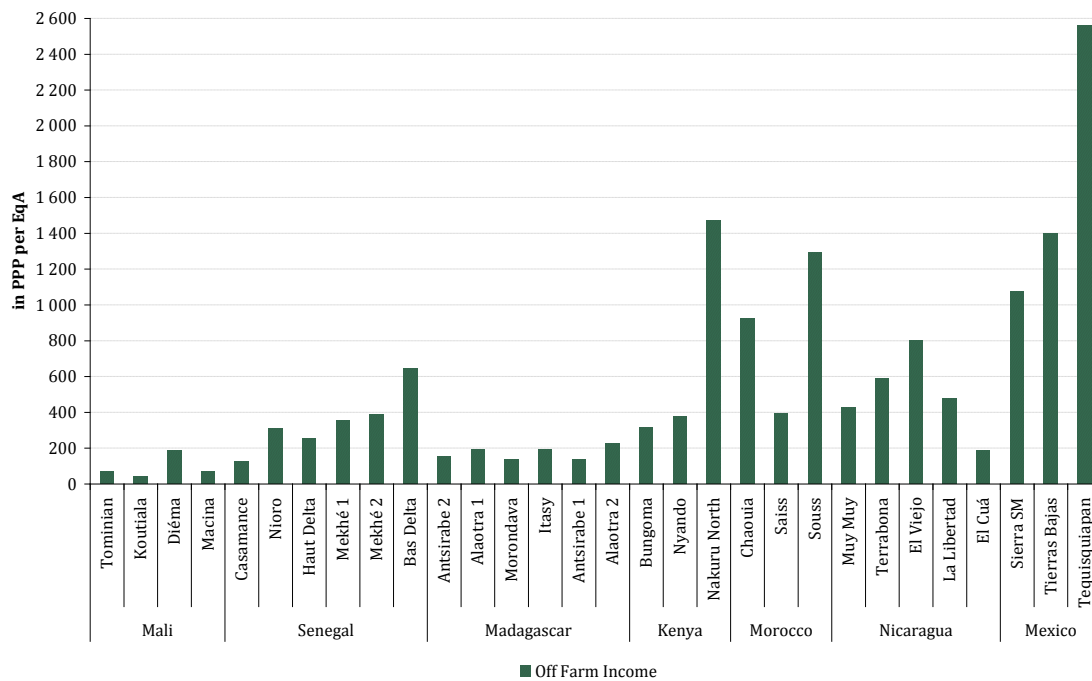
Source: RuralStruc Surveys

The level of participation of rural households in off-farm activities in the SSA regions is extremely high, and even higher than what occurs in the non-SSA regions, contrary to what one may have thought. It is particularly true when SSA regions are compared to specialized agricultural zones in the non-SSA countries like Saïss (Morocco) or El Cuá (Nicaragua), where a significant share of households exclusively rely on farming activities. The three Mexican regions are clearly different

from the other non-SSA countries, in that almost all the households are engaged in off-farm activities. In the case of Tequisquiapan, this is also explained by the high share of rural households that no longer engage in farming at all.

When translated into earnings, off-farm activities' contribution to overall household incomes strongly varies by region, as shown in Figure 17. At the cross-national level, off-farm activities generate low incomes in SSA regions where they provide the average household with less than 400 \$PPP per EqA per year (in Mali, Casamance and Madagascar that number becomes 200 \$PPP). The exceptions to this pattern are the Bas Delta (Senegal) and Nakuru North (Kenya), where the value of off-farm incomes is higher. In non-SSA regions, with the exception of the agricultural-based regions, the value of off-farm incomes is higher (600 up to 1600 \$PPP per EqA). Tequisquiapan (2600 \$PPP), with 70% of households without farm activities, is confirmed as a specific case illustrating the situation of wealthier regions where the role of agriculture has significantly diminished, but where the welfare situation of rural households is not necessarily better than in agriculture-focused regions (see Chapter 3).

**Figure 17: Average Regional Value of the Off-farm Income in the Surveyed Regions**



Sources: RuralStruc Surveys

## **2.2 Nature and Combination of Off-farm Activities and Incomes**

Much dissimilarity exists between the surveyed regions when the structure of the off-farm income is broken down into different sources. The breakdown reveals diverse situations and strategies, and stresses the importance of local configurations.

Table 13 displays the distribution of the surveyed households according to their main off-farm activities and the contribution of these activities to off-farm income. At the regional level, different trends can be identified both in terms of types and combinations of off-farm activities. In all the Western African regions (except two in Senegal) and in Morocco, a combination of self-employment and migration dominate the off-farm strategies, the importance of each activity varying according to local configurations. In Kenya and in the two other Senegalese regions (Delta and Mekhé 2), a combination of non-agricultural waged labor and self-employment dominates. In Madagascar, where migration is not as developed as in the other SSA countries, the main trend of diversification is agricultural wage labor and self-employment. In the non-SAA countries, the trends are unclear, as rural households rely on different types of off-farm activities, each activity contributing to a lower share of off-farm income. In Nicaragua, where most of the selected regions are agriculture-based, wage labor in agriculture is the most common option, combined with migration (during which households can be engaged in seasonal agricultural work), non-agricultural wage labor or self-employment. The Mexican zones are more specific due to the significant share of non-farm households, as previously mentioned, as well as the existence of public transfers.

**Table 13: Main Off-farm Activities of Rural Households in terms of Contribution to Off-farm Income (% of off-farm income in brackets)**

		Top Off Farm Activity	2nd Off Farm	3rd Off Farm	Oth Off-Farm activities (%)
MALI	Tominián	Remit (48%)	Self Emp (37%)	Non Ag Wage (7%)	8
	Koutiala	Self Emp (63%)	Remit (20%)	Non Ag Wage (7%)	10
	Diéma	Remit (86%)	Self Emp (11%)	Ag Wage (3%)	1
	Macina	Self Emp (43%)	Remit (22%)	Ag Wage (17%)	19
SENEGAL	Casamance	Self Emp (69%)	Remit (20%)	Non Ag Wage (10%)	2
	Mekhé 1	Self Emp (69%)	Remit (19%)	Non Ag Wage (12%)	1
	Nioro	Self Emp (77%)	Remit (13%)	Non Ag Wage (8%)	2
	Haut Delta	Self Emp (76%)	Non Ag Wage (15%)	Remit (9%)	0
	Mekhé 2	Self Emp (68%)	Non Ag Wage (19%)	Remit (13%)	1
	Bas Delta	Self Emp (58%)	Non Ag Wage (22%)	Rents (13%)	7
MADAGASCAR	Antsirabe 2	Self Emp (67%)	Ag Wage (21%)	Remit (7%)	6
	Alaoatra 1	Self Emp (52%)	Rent (19%)	Ag Wage (18%)	12
	Morondava	Self Emp (50%)	Ag Wage (24%)	Non Ag Wage (16%)	10
	Itasy	Self Emp (53%)	Ag Wage (25%)	Non Ag Wage (12%)	10
	Antsirabe 1	Self Emp (62%)	Ag Wage (26%)	Non Ag Wage (6%)	6
	Alaoatra 2	Self Emp (57%)	Rent (23%)	Ag Wage (16%)	4
KENYA	Bungoma	Non Ag Wage (54%)	Self Emp (38%)	Ag Wage (5%)	3
	Nyando	Non Ag Wage (56%)	Self Emp (31%)	Ag Wage (8%)	5
	Nakuru N	Self Emp (72%)	Non Ag Wage (24%)	Rents (2%)	2
MOROCCO	Chaouia	Rents (30%)	Remit (23%)	Self Emp (22%)	24
	Saiss	Rents (47%)	Remit (15%)	Self Emp (15%)	22
	Souss	Rents (40%)	Self Emp (24%)	Non Ag Wage (14%)	22
NICARAGUA	Muy Muy	Ag Wage (37%)	Remit (30%)	Non Age Wage (17%)	16
	Terrabona	Remit (32%)	Non Ag Wage (31%)	Self Emp (27%)	11
	El Viejo	Ag Wage (58%)	Remit (19%)	Non Ag Wage (17%)	6
	La Libertad	Ag Wage (67%)	Self Emp (20%)	Non Ag Wage (7%)	6
	El Cuá	Non Ag Wage (28%)	Ag Wage (26%)	Self Emp (23%)	23
MEXICO	Sierra SM	Self Emp (38%)	Pub Transf (32%)	Ag Wage (15%)	15
	T Baja	Pub Transf (32%)	Self Emp (30%)	Ag Wage (15%)	23
	Tequis.	Non Ag Wage (47%)	Ag Wage (24%)	Self Emp (21%)	7

Source: RuralStruc Surveys

## 2.2.1 Off-farm Activities: Widespread, but Generating Uneven Incomes

### a Agricultural Wage Employment: a Common Option

Agricultural wage labor is a common feature in developing countries and a well-developed option for rural households seeking additional income. In the RS studied regions, in particular in SSA, but also in the selected regions of Morocco, Nicaragua and Mexico, family farms dominate. The Program defines family-based farming as, *a form of production characterized by a particular kind of link between economic activity and family structure, this relationship influencing the choice of activities, organization of family labor, management of the factors of production and transfer of property* (Bélières et al. 2002). This definition makes it clear that within these family-based structures, most agricultural labor is provided by the unpaid members of the household. However, one can note that family farms also use external workforce, which can consist of both locally-formed mutual-aid groups (relatives and other members of the localities who work without any monetary exchanges)

and paid-workers, who can be either casual earners or permanent agricultural employees.<sup>56</sup>

Even if wage employment in agriculture is present in all the regions studied by RuralStruc, its availability varies sharply according to local labor demand. This demand clearly depends on the degree of farm differentiation: a prerequisite is the existence of larger farms that are unable to meet all of their agricultural labor needs inside the family, or managerial farms relying only on external workforce. This type of farm differentiation is generally lower in SSA countries, where small-scale family farms with limited assets dominate,<sup>57</sup> and higher in non-SSA countries where farm sizes can be bigger. Non-SSA regions are much more likely to be characterized by the presence of large commercial farms, managerial farms and agribusinesses employing numerous external workers. In all countries, households, whose assets (particularly land assets) are not sufficient to provide a basic food basket and a minimum income to sustain their families' needs, are pressured to seek gainful employment off the family farm. In turn, those farms with better asset endowments can put this extra labor to work for a set wage.

Paid work in agriculture is found mostly in activities where labor demand varies strongly by season (harvest time being the peak season). Therefore, the agricultural workforce tends to be mobile, and include seasonal migrants as well as local labor. These kinds of seasonal activities characterize specific crops, such as those in:

- the rice-growing regions in Madagascar (Alaotra, Itasy, Morondava), Mali (Macina) and Senegal (Delta), where rice cropping is manual and requires intensive labor for transplanting or harvest;
- the horticulture regions: Itasy and Antsirabe (Madagascar), Souss and Saïss (Morocco), mainly for manual harvesting;
- other regions engaged in specific value-chains: managerial pineapple production in Sotavento (Tierras Bajas), cotton in Koutiala (Mali), livestock shepherding and coffee harvesting in La Libertad and El Cuá, and sugar cane harvesting in El Viejo (Nicaragua) and Kenya.

As expected, wage work in agriculture mainly engages the poorest households and its frequency significantly decreases as incomes rise. In the SSA countries, the

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56 We include payments in kind, such as meals, housing on the farm, and share-cropping, to identify agricultural wage workers. However, it is worth mentioning that many agricultural workers are casual wage earners, which makes it complicated to estimate annual values of agricultural wages.

57 The Pearson correlations between the total size of the farm (land used) and the level of agricultural wages is negatively significant in Madagascar (-0,114\*\*), in Kenya (-0,096\*\*), in Morocco (-0,112\*\*), in Nicaragua (-0,059\*) and in Mexico (-0,059\*). One can note that in Latin America, most agricultural paid workers are landless, which explains the weakest correlations.

\*Correlation is significant at the 0.05 level and \*\*Correlation is significant at the 0.01 level.

households involved in agricultural wage labor are usually also small-scale farmers themselves, but enter the labor market seeking a complement to their on-farm income during time periods where there is little work required on their own plots. This occurs mostly during the dry season, a difficult period of the year in terms of under-employment and food shortage. Because of this mechanism, the supply of agricultural labor by smallholders is greatest in rain-fed agricultural zones. Moreover, the importance of wages also results from the generally limited land assets of these family-based farms; however, it does not imply that family farms do not rely on external labor (wage labor and mutual aid groups) for the most labor-intensive tasks. For these farm households, agricultural wages account from five to 20% of their global income. Where land access is particularly difficult (Latin America, Morocco) or where agriculture is only rain-fed (Kenya and the *Bassin arachidier* in particular), the contribution of agricultural work for smallholders is higher, ranging from 25-30% up to 67% in El Viejo, Nicaragua.

Agricultural wage work also provides a major source of income -and sometime the only source of income- for landless and near-landless households. This occurs most notably in Latin America (Nicaragua<sup>58</sup> and Mexico), but also in Morocco (Souss and Chaouia) and Madagascar (Alaotra and Itasy) where land access is a pressing issue (as shown by the many existing land conflicts). For these landless households, agricultural wages account for about 50% of their overall income (in SSA) and are likely to make up between 90 and 100% of their income (in Latin America.)

In some extreme cases, the poorest households rent their land to larger and better-off farmers, employing themselves as agricultural workers as they lack the necessary means to develop their own plots. This situation has been observed particularly in Souss in Morocco (*RS II Morocco*, p.13 and p.124). In a few cases, the well-off households can also engage in agricultural wage labor, as part of the social cohesion and “redistribution” process in the villages (in Madagascar), but showing also the precariousness of the supposedly richer families.

When translated into earnings, agricultural wages are globally low. Figure 18 displays the average daily agricultural wages by region in \$PPP. This figure illustrates the differences between SSA and non-SSA regions, ranging from an average of less than 2 \$PPP/day/ worker in Madagascar, to up to 18 \$PPP/day in Tequisquiapan. These differences can be explained by several factors: i) the level of involvement of household members in agricultural work (casual, seasonal or permanent labor); ii) the economic level of development and wealth of the region (gradient of wages from the poorest to the richest, following the GDP per capita, as shown in Table 14); iii) the difference in labor markets, i.e. the level of demand for

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58 In the region of El Cuá – which is a relatively rich region specialized in coffee production – many paid workers in agriculture are casual seasonal earners who often do not live in the area but temporally migrate during the peak season for the harvest to support the insufficient labor force of local households.



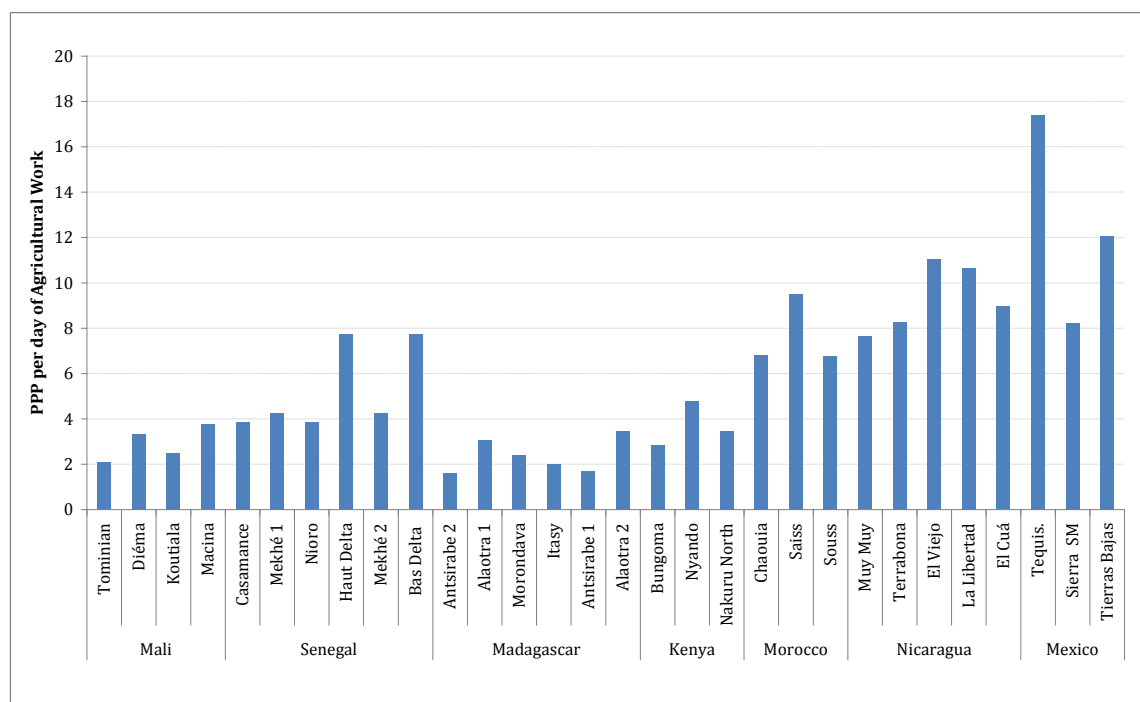
labor and competition between activities which create a tension on labor prices (like in the Senegalese Delta) and raise the agricultural wages (like in Tequisquiapan, Mexico). Lastly, this figure also shows that in non-SSA regions, the wage levels can make a difference and potentially create an opportunity to escape poverty. In SSA, the remuneration of agriculture wage labor is too low to be reasonably considered as a viable escape route from poverty. Even at these low levels, it is clear that in Mali and Senegal the minimum wage is not enforced, as shown when comparing Figure 18 and Table 14).

**Table 14: Minimum urban and rural wages in the RS Countries**

	MALI	SEN	MAD	KEN	MOR	NIC	MEX
Minimum wage	83 PPP/month						7,4 - 7,9 PPP/day
Urban minimum wage		184 PPP/month (0,8 PPP/h)	92 PPP/month	153 PPP/month	387 PPP/month	310 PPP/month	
Agricultural minimum wage		0,69 PPP/h	66 PPP/month	140 PPP/month	219 PPP/month (10 PPP/day)	170 PPP/month	

Sources: Communication RuralStruc teams, Législation marocaine du travail, Réglementation du travail au Sénégal, Code du travail de Madagascar, Servicio de Administración Tributaria, México.

**Figure 18: Daily Agricultural Wages in the RS Regions (in \$PPP per Day and Worker)**



Sources: RuralStruc Surveys

## b Non-agricultural Wage Employment: A Limited Option

In many developing countries, non-agricultural wage labor has become available to rural households. Non-agricultural wage employment clearly depends on the regional economic characteristics, and its development is uneven in the studied regions. Non-agricultural wage employment mostly concerns extractive activities (mining, quarrying, etc.), public services (e.g. education, health, information, roads, etc.), private services (e.g. taxi driving, security guarding, cleaning, cooking and child-care), agribusiness processing and packaging (dairy, sugar cane, industrial tomato plants, coffee, citrus, cleaning, grading and packaging stations, etc.), and manufacturing (intermediate or consumer goods) for domestic and export markets (e.g. apparel industry). They refer to both skilled and unskilled jobs.

Consequently (and as expected), opportunities for non-agricultural wage employment are most developed in the non-SSA surveyed regions. These opportunities include jobs related to the agricultural sector (agri-businesses such as sugar cane factories, dairy processors or coffee cooperatives in Nicaragua), but also other sectors such as manufacturing (*maquiladoras*). Manufacturing is especially seen in Tequisquiapan (Mexico) or in rural Free Trade Zones like Terrabona (Nicaragua) (see Box 7).

### **Box 7: The Development of Free Trade Zones and Non-agricultural Wage Labor in Nicaragua**

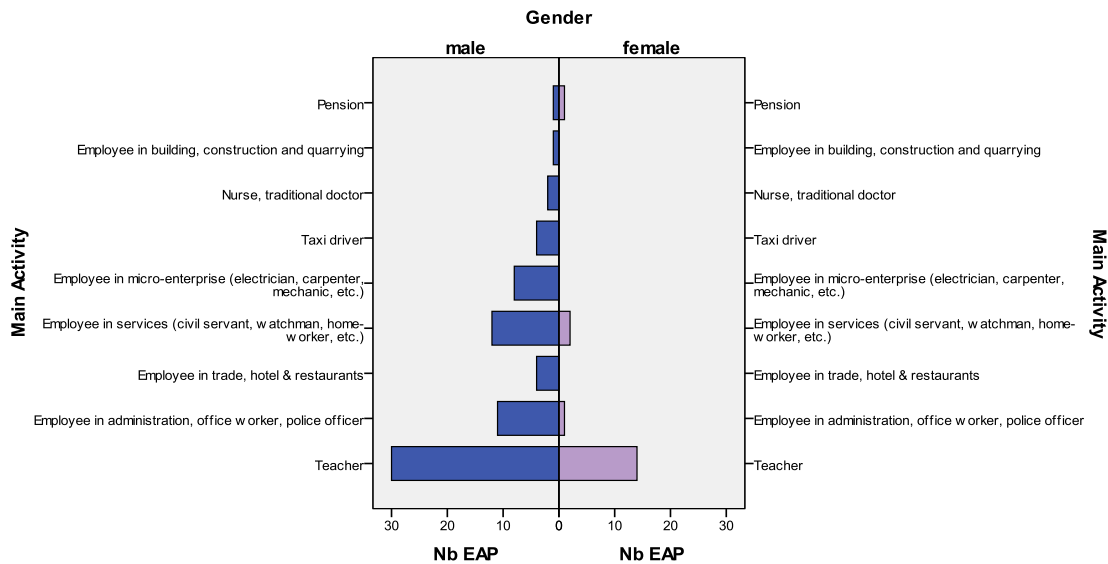
In Nicaragua, factories operating under the Free Trade Zone (FTZs) have increased considerably since the 1990s. In 1976, the first industrial park, "Las Mercedes," opened in Nicaragua with 11 factories. Today, the FTZ system consists of a dozen industrial parks with about 50 firms, mainly from Taiwan and the US and with the vast majority engaged in the production of clothes for export (to the US mostly). The sector has been very dynamic in terms of job creation: the number of jobs increased from 1003 in 1992 to 38,792 in 2001 and it is estimated that by 2013 the number of jobs in the sector will increase by 15,000, reaching a total of 85,000. Currently, there are around 70,000 people working in free zone companies all over the country. It is estimated that 55% of the workers are young women with a low education levels.

In the RS surveys, the annual salaries generated by jobs in FTZs are estimated from 2500 to 4500 \$PPP per capita. This estimation is in line with estimates made by other studies, which place monthly salaries at a maximum of 500 USD/month in 2009. In January 2010, the Government of Nicaragua, labor unions and the private sector signed an agreement which will set salary adjustments in the FTZ for the next three years. The objective is to protect jobs as well as to offer predictability so investors can effectively develop financial plans for their firms. This agreement, known as the "*Social-Labor Consensus Agreement by the Free Zone's Tripartite Labor Commission*", establishes minimum wage increases over the next three years of eight, nine and ten percent, respectively.

Sources: RuralStruc Surveys and <http://www.capitalforcommunities.org/articles/ftz.html>

Non-agricultural wage labor opportunities also exist in the SSA regions, but to a lesser extent. They concern jobs linked to local agribusinesses such as sugarcane (Nyando and Bungoma) or industrial tomato processors (Delta, Nakuru), and small-scale businesses in services employing permanent or casual workers and apprentices. Figure 19 displays examples of the non-agricultural jobs found in Kenya.

**Figure 19: Non-agricultural Wage Activities depending on the Gender in Kenya (number of EAP)**



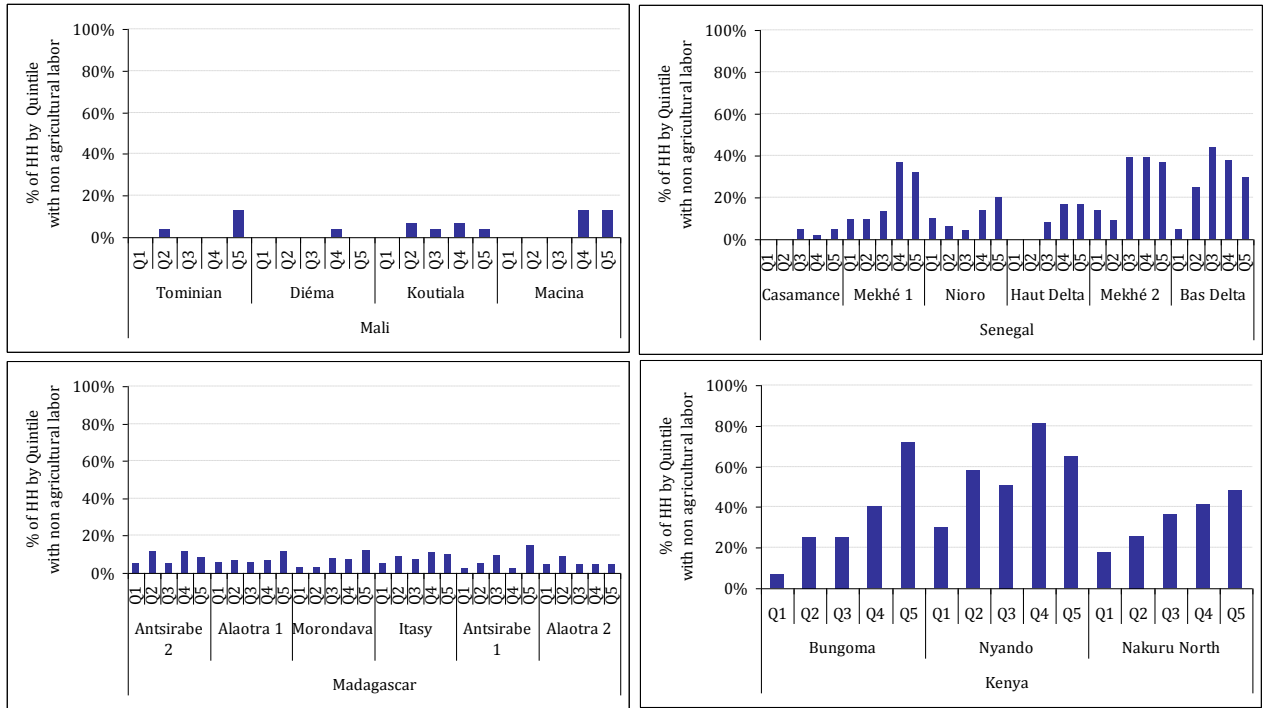
Sources: RuralStruc Surveys

In all the studied regions, the development of non-agricultural employment and the level of income generated by these activities are clearly linked to the skills and the level of education within the household.<sup>59</sup> It also clearly appears that the households engaged in non-agricultural labor are also richer on average than other households (see Figure 20 and Figure 21), but the causality is very difficult to establish.

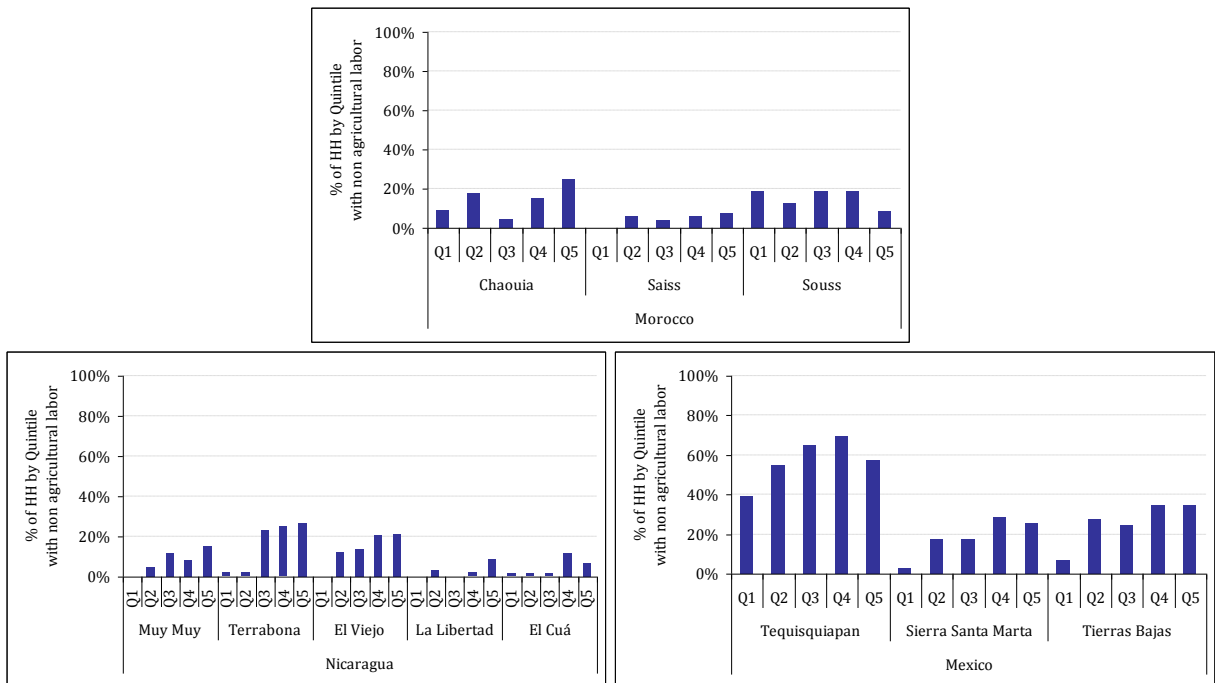
59 The Pearson correlations between the level of education of the most educated member within each household and the level of non-agricultural wages is positively significant in Mali (0,286\*\*), Senegal (0,225\*\*), Madagascar (0,220\*\*), Kenya (0,286\*\*), Morocco (0,083\*), Nicaragua (0,194\*\*) and in Mexico (0,194\*\*)

\*Correlation is significant at the 0.05 level and \*\*Correlation is significant at the 0.01 level.

**Figure 20: Share of HHs Involved in Non-agricultural Wage Employment in the SSA Regions**



**Figure 21: Share of HHs Involved in Non-agricultural Wage Employment in the Non-SSA Regions**



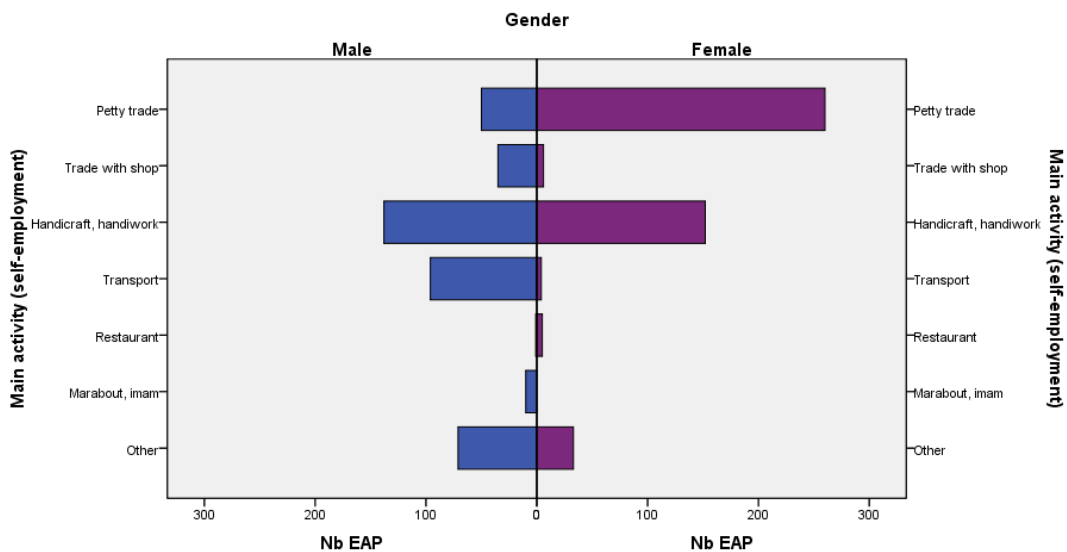
Sources: RuralStruc Surveys

### c Self-Employment: a Prevalent “Catch-all” Strategy

A strong result of RuralStruc’s Second Phase is that self-employment represents the core off-farm incomes in most of the RS surveyed zones. Indeed, it contributes up to 77% of off-farm incomes at the regional level in Nioro (Senegal). It is the top income-generating off-farm activity in 16 out of 30 studied regions. Self-employment is particularly widespread in the SSA regions surveyed, in particular in Nakuru North (Kenya) and in the *Bassin arachidier* region (Senegal), where it has become the backbone of livelihoods. It is also a major source of off-farm income in some non-SSA regions (in particular in La Libertad, Souss and Tierras Bajas).

Self-employment mostly relies on trading and transport of both agricultural raw products and manufactured goods for the local rural market (small-scale trading of foods, farm products, livestock and wood; running small shops), handicraft (pottery, basket making, etc.), manufacture and repair of consumer goods for local rural market (repairing farm equipment, vehicles, some domestic items, tailoring, shoe-making, etc.) or provision of services for local rural market (hair-dressing, carpentry, painting, restaurants, etc.). These activities are almost always carried out by small businesses at micro level and are based on odd jobs, which provide low returns. In few cases these activities are related to specific skills and to specific infrastructure (healing, artisan workshops, restaurants and hotels). However, self-employment is mostly developed where no permanent activities outside of agriculture are feasible. Self-employment activities also involve many women, depending on types of activities in which the households’ members are engaged. In addition, employment in different activities can be highly differentiated according to gender like in Senegal (see Figure 22).

**Figure 22: Self-employment Activities Depending on Gender in Senegal**



Sources: RuralStruc Surveys

In all the studied countries, except Nicaragua, self-employment usually makes up a larger share of off-farm income in richer quintiles.<sup>60</sup> It is particularly the case in Nakuru North (Kenya), where self-employment in the service sector provides higher incomes<sup>61</sup> and has considerably pulled up the fifth quintile's income.

Consequently, the general picture shows that a handful of better-off households are able to engage in self-employment activities generating enough incomes to allow them to sustain their livelihoods mostly from these activities. These households tend to have more / better assets and / or a significant initial investment (financial, social and / or human capital). On the other side, the poorest and most marginalized households develop coping or "survival" strategies by mostly accessing minor activities with very low returns. These jobs complement their on-farm incomes, but pay far too little to serve as a viable poverty exit option. It is important to note that the direction of causality to establish whether the better-off are richest because of higher self-employment returns or whether self-employment returns have made them richer, is difficult to establish without a longer term perspective.

### 2.2.2 *Other Off-farm Incomes: A Substantial Complement*

As previously mentioned, RNFE also refers to other sources of off-farm incomes (social support, grants, private transfers in which remittances, rents). However, even if these incomes can foster activities or increase consumption and investment, we decided to analyze them separately as they do not directly concern activities undertaken by the household members in the locality or the effective use of working time. For the same reasons, the Program did not specifically focus on income from renting land, equipment and housing. This category can be locally significant (about 10% of overall income in Morocco), but is so heterogeneous (leasing of agricultural land by smallholders having no means to cultivate, urban rentals, etc.), rare, and spatially disparate that although it plays into local income, it can mask broader dynamics that deserve more attention.

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60 The Pearson correlations between the level of self-employment income and the level of global income is positively significant in Mali (0,378\*\*), Senegal (0,500\*\*), Madagascar (0,362\*\*), Kenya (0,834\*\*), Morocco (0,179\*\*), and in Mexico (0,518\*\*)

\*\*Correlation is significant at the 0.01 level.

61 In that region, but more broadly in Kenya, employment in the non-agricultural sectors has been tremendous with the services sector surpassing agriculture as from 2001 (see *RS II Kenya*, p.34)

## a Migrations: Different Strategies According to the Regions

Migration in search of higher incomes is common in developing countries and a potential exit for many households in the studied regions. Domestic or international migrations over the long-and / or short-term<sup>62</sup> concern between 15 and 40% of the surveyed households, with exceptions in Alaotra in Madagascar, La Libertad and El Cuà in Nicaragua, and the Mexican regions.<sup>63</sup> Remittances are the top off-farm income in three out of 30 surveyed regions (Tominian and Diéma in Mali, Terrabona in Nicaragua), while they are ranked as the second off-farm income in nine other regions in Senegal, Morocco and Nicaragua.

Migration patterns and strategies differ from one country and one region to another (see Box 8). Where long-term migration – international as well urban – is developed, short-term migration, usually domestic or to surrounding countries, can also be well established.

### **Box 8: Different Patterns of Migration in the RS Countries**

International migration is a core issue in RS countries, and its patterns depend both on geography and on national trajectories. Mexico, Morocco and Nicaragua have taken advantage of their geographic position, and have, on average, 10% of their total population living abroad (see Table 4). This option is less possible in sub-Saharan Africa, except in Mali where about 11% of the Malian population lives abroad, but where migration flows are oriented toward other West African countries.

These patterns highlight the difficulty of long distance migration, often implying high costs – particularly when migration is illegal. Therefore, it seems that the only places where a significant contribution of remittances to GDP is recorded are in those countries with both a large share of their migrants living in OECD countries and a large amount of migrants relative to the size of their overall population (Morocco, Nicaragua). One must stress that these data do not take into account the geographic distribution of emigrants within a country, leading to high emigrant concentration in some regions (e.g. Kayes region in Western Mali). Differential concentrations of emigrants by region could influence the potential impact of both emigration and remittances in these regions.

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62 During the survey, long-term migrants were identified as persons who are geographically distant from the household for at least 12 months and sending (or not) remittances, whatever the amount.

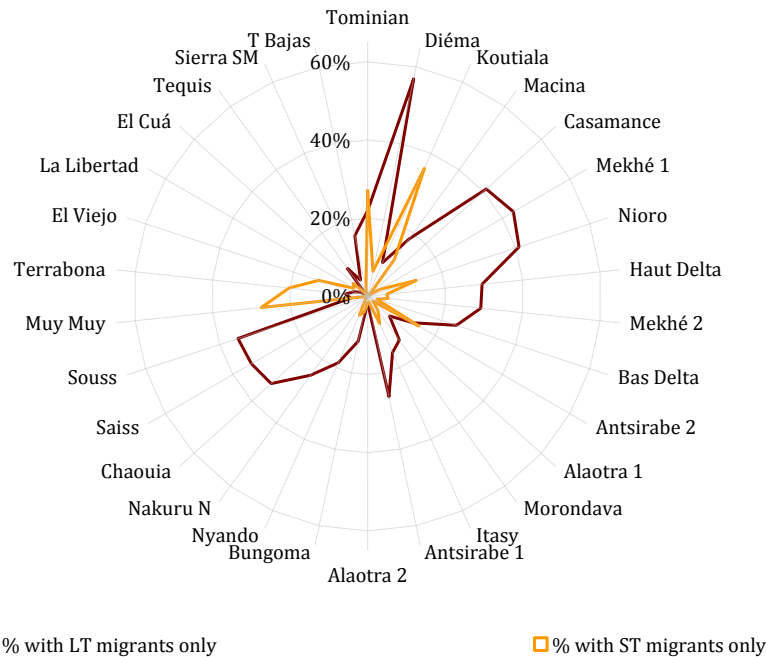
63 As explained in the methodology, the implementation of the survey in Mexico has probably led to an underestimation of the migration flow, particularly for the short-term migrations, even if the Sotavento region is not a long-standing emigration zone.

Table 15: Main Destinations of Emigrants from the RS Countries (2005)

		Migrant's country of origin						
		KEN	MAD	Mali	MEX	MOR	NIC	SEN
To developed countries	Canada	5%	1%	1%		1%	1%	
	France		54%	4%		29%		20%
	Israel					8%		
	Italy		1%			11%	1%	15%
	Netherlands					6%		
	Réunion		17%					
	Spain			1%		25%	1%	5%
	United Kingdom	34%	1%			1%		
	United States	11%	1%		90%	2%	36%	3%
	Others	7%	3%	1%	2%	9%	1%	3%
Sub total	57%	78%	7%	92%	91%	40%	46%	
To developing countries	Burkina Faso			25%				
	Comoros		14%					
	Costa Rica						49%	
	Gambia			1%				27%
	Côte d'Ivoire			41%				
	Mauritania			1%				9%
	Nigeria			9%				1%
	Tanzania	26%						
	Uganda	8%						
	Others	9%	8%	16%	8%	9%	11%	18%
Sub total	43%	22%	93%	8%	9%	60%	54%	
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	

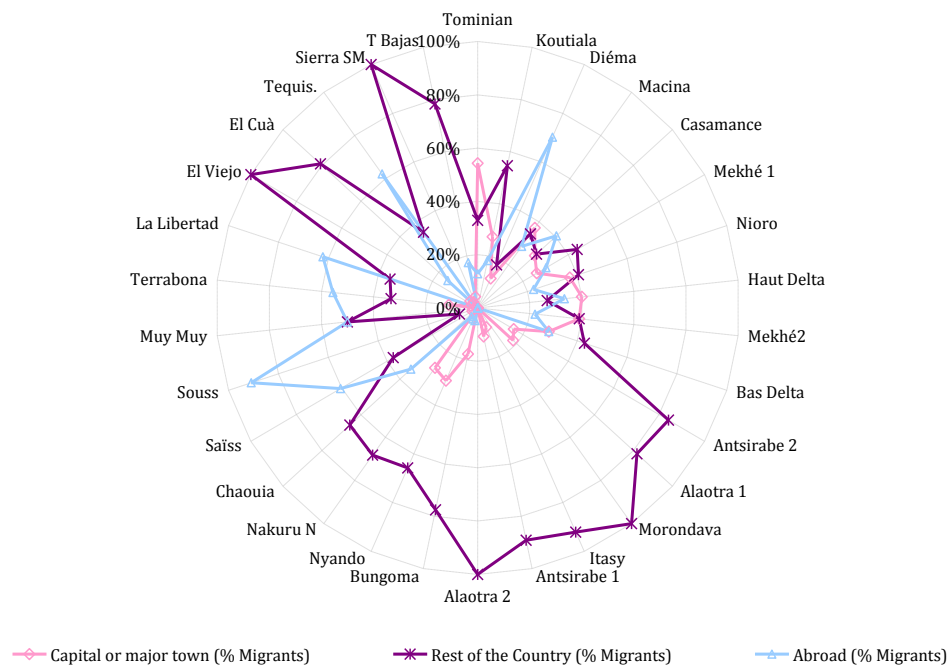
Source: Ratha and Shaw 2007, authors' calculations.

Figure 23: Households Engaged in Migration (by duration in %)





**Figure 24: Destinations of the Migrants by Surveyed Region (% of migrants)**



Sources: RuralStruc Surveys

From the overall picture of the destination and duration of migration, as developed in Figure 23 and Figure 24, two major patterns of migration can be distinguished:

- **Regions where households are more likely to engage in “structural” long-term migration.** In this case, two sub-types can be identified. First, regions having more than 50% of their migrants abroad (Muy Muy, Terrabona and La Libertad, Diéma, Saïss and Souss, Tequisquiapan). In Western Africa, a significant share of migrants is abroad, but the majority remains within the region (with the long-standing exception of Diéma where migrations to Europe are the rule). In Tequisquiapan, households are more likely to engage in long-term migration, mostly toward the US and other Mexican major cities. Second, regions having 50% or more of long-term migrants in urban areas, like in Chaouia, Tominian or in the sub-regions of the *Bassin arachidier* where the nearest cities or the national capital offer job opportunities in the urban informal sector.
- **Regions where households are more likely to engage in “circular” short-term migrations.** This is the case in Nicaragua where households engage in short-term migration to nearby neighboring countries (Costa Rica and El Salvador) for agricultural work or non-agricultural labor in the service sector because the salaries in these neighboring countries are higher (see Box 8). Circular migration is also evident where most of the migrants (50% or more)

go to other rural areas (all the Malagasy and Kenyan regions, Koutiala and the two sub-regions of the Sotavento) and where no clear patterns can be discerned in migrants' destination choices (Senegal and Macina). In the former case, migrants leave for short periods, searching for new agricultural land (Madagascar) or for seasonal agricultural activities (Sotavento).

One can form the hypothesis that households engaged in "structural migrations" are likely richer, and can afford to invest in the costs related to supporting the travel of a migrant in the long-run, expecting returns that can contribute to the general improvement of the economic situation of the members who stayed. However, the value of remittances received depends on many criteria, such as the destination choices and the jobs found by the migrant, among others.

We can also form the hypothesis that, in the case of "circular" migration, strategies aim not only at generating income but have the added goal of decreasing the number of mouths to feed during the season when on-farm family labor is not needed.<sup>64</sup> This can lead to the situation, as observed in the surveys, where the poorest households with migrants also receive the lowest value of remittances, or even no transfers at all. This is indeed the case in the SSA regions where migrations are mostly short-term and domestic (Tominian, Koutiala, Haut Delta, Nyando, all the regions in Madagascar), but also in the regions where high demand for seasonal agricultural work exists (El Cuá, El Viejo).

**Box 9: What are the Returns of Migration?**

One may suppose that a region with a higher share of its migrants moving to international destinations should receive higher levels of remittances per migrant. This assumption, however, does not hold, as Madagascar records very low levels of remittances per migrant despite the majority of its international migrants going to France. Nor does this assumption prove to be linear. Kenya has a larger proportion of migrants going to developed countries than Senegal but has a somewhat equal level of remittances per migrant. However, Mali records the lowest flow of remittances by migrants while more than 10% of its population lives abroad. This is explained by the fact that many Malian migrants are seasonal workers in the neighboring countries, so rather than sending remittances home, they bring them with them upon returning (Shaw 2007). These gaps show that a deeper knowledge of migration patterns is necessary to understand remittance flows to developing countries.

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64 The Pearson correlations between the number of members of the households present and the total number of migrants is positively significant in Mali (0,390\*\*), Senegal (0,144\*\*), Madagascar (0,168\*\*), and in Nicaragua (0,193\*\*)

\*\*Correlation is significant at the 0.01 level.

**Table 16: Migrants and Remittances in RS Countries**

	KEN	MAD	Mali	MEX	MOR	NIC	SEN
Stocks of emigrants in 2005 (Millions)	0.4	0.2	1.2	11.5	2.7	0.7	0.5
Population in 2005 (Millions)	33.4	17.0	11.4	104.3	29.9	5.6	11.7
Emigrants / Population	1.3%	0.9%	10.6%	11.0%	9.1%	12.2%	4.0%
Remittances in 2005 (Millions \$US)	494	16	175	21,802	4,724	600	511
Remittances (% GDP)	3.4%	0.4%	3.9%	3.5%	9.4%	13.3%	6.7%
Remittances (\$US / migrants)	1,156	106	144	1,895	1,738	878	1,103

Source: Ratha and Shaw 2007, WDI

### b Public Transfers: Specific to Mexico

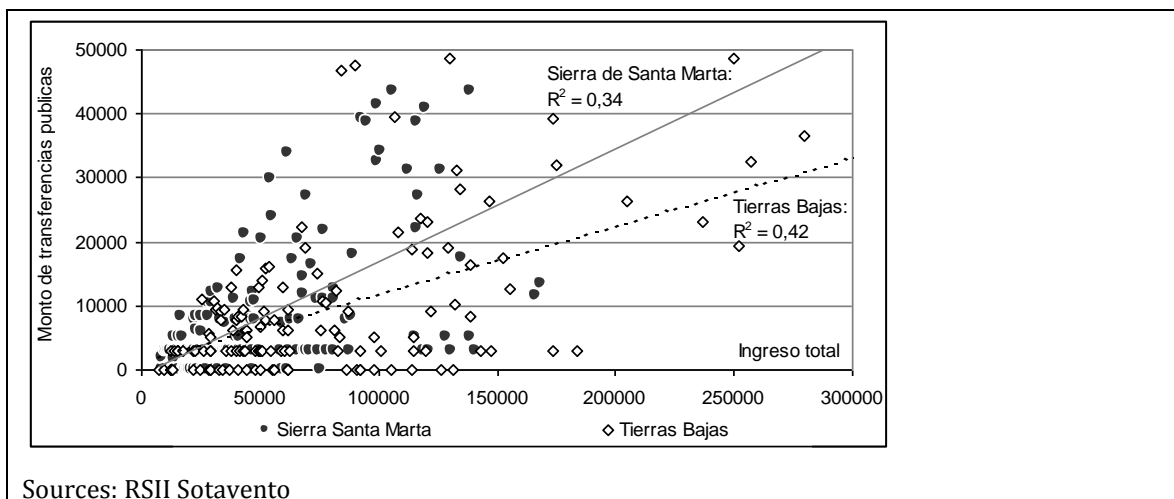
In the RS surveys, public transfers are only found in Mexico. They play a major role in the country, representing between 15 and 20% of household income in all quintiles. Among the surveyed rural households 86% benefit from at least one public program.<sup>65</sup> These public payments are significant in Sotavento, but not in Tequisquiapan where few households are engaged in agriculture and do not benefit from agricultural subsidy programs, which represent a substantial share of the transfers received.

#### Box 10: Inequality of Access to Public Transfers in Mexico's Sotavento Region

In the Sotavento region, public transfers are third highest source of income of the surveyed households, after agricultural sales and agricultural wage employment, and contribute on average about 15% of global income. These public transfers are a key factor in allowing the "transition" of households towards a specialization in agriculture (for the bigger farms) and towards the rural non-farm economy to the others. Beyond the monetary support to those most vulnerable households, evidence shows that they have multiplier effects on incomes (Sadoulet et al., 2001). There are a number of programs available to rural households, with most funds distributed as social grants and support to agricultural activities.

One of the most striking survey results in Sotavento is the inequality of the distribution of public subsidies, both in regards to social groups and geographic areas. The richest households benefit from a level of public transfers seven times higher than what is received by the poorest households, and 50% higher than the sum of the subsidies received by the households of the three lowest quintiles. This inequality has also a strong spatial dimension: in the Lowlands (Tierras Bajas), where three-quarters of the richest households surveyed in the Sotavento are located, the average level of public transfers is regionally higher than in the Mountain area (Sierra de Santa Marta). Yet, the latter is considered a zone of high marginalization, and therefore an *a priori* priority both for social grants and agricultural production subsidies.

65 In Mexico, more than fifteen public programs were recorded. For instance, in the Sotavento region, 79% of the households receive subsidies from *Oportunidades* (poverty alleviation program) and 24.5% from *Procampo* (agricultural support based on the size of the cultivated area). The only other case of public transfer is in Mali (Tominan) where a government backed NGO provides assistance to rural dwellers.



### 2.3 Summary of Off-Farm Income Analysis: Far from the Buoyant Rural Economy

Households in the RuralStruc Survey confirm their deep implication in the RNFE. However, the main findings of the Program do not allow presenting the observed rural diversification as a buoyant and optimistic reality, as described in the literature. Agricultural wage employment, one of the most frequently recorded off-farm activities, is a first option for the poor to complement their on-farm income but only when the demand for labor exists. Agricultural work can be considered as an exit option in non-SSA countries, thanks to the levels of remuneration, which – on the contrary – are too low in SSA to reasonably consider agricultural labor as a viable escape route from poverty. Non-agricultural wage employment remains a limited option, mostly linked to regional economic wealth, infrastructure and services. Consequently, non-agricultural labor is mainly found in the non-SSA countries, appearing only sporadically in SSA. In most cases, this exit remains available to the already well-off, who are also the better-endowed in terms of financial, human and social capital. Consequently, self-employment offers widespread alternatives in most of rural surveyed areas. However, once again, a handful of richer households are able generate higher incomes which allow them to sustain their livelihoods mostly from these activities, while the poorest develop coping “survival” strategies thanks to low-returns gathered during the intercropping periods. Thus, for the majority, self-employment must firstly be considered as underemployment, i.e. as a way to fill the lack of jobs and activities in rural areas and hardly complement on-farm incomes during the off-periods. Other off-farm incomes can be a substantial complement. However, migration is a costly exit option with uneven returns that are often only available for the richest; however; it can also alleviate the demographic pressure, acting as a temporary relief valve for the poorest, particularly through short term migrations. Finally, public transfers are only present in Mexico; however, while they are supposed to be efficient safety nets for the poorest, they also appear to be substantial subsidies for the already-better-off farm households.

# CHAPTER 5. SEARCHING FOR NEW PATTERNS OF AGRICULTURAL SPECIALIZATION

## 1 General Background: The Big Restructuring

### 1.1 The Main Processes of Change Underway

#### 1.1.1 *Market Liberalization*

##### a Context Prior to Liberalization

In all of the RuralStruc countries, as in many developing countries, the agricultural markets prior to liberalization were similarly characterized by a dual system with asymmetric levels of state intervention. On the one hand, most domestic staple markets and commodity exports were controlled and highly regulated via marketing boards, state-run industries, administrative commodity pricing, and, often, fixed wholesale and retail prices for many basic food products. Most of the time, these public bodies were monopsonies, especially for major export products and sometimes for staples (with some cases of associated monopolies). These structures were initially created to i) promote sector growth, with agriculture being perceived as the first sector of accumulation; ii) stabilize producer prices (and incomes) within a single season and reduce variability between seasons, with the objective of reducing risks; iii) increase prices and improve incentives by reducing the number of intermediaries along the commodity chains; and iv) facilitate the insertion of exports into international markets through management of the national supply.

On the other hand, a few traditional non-staple markets (fresh products, such as fruit and vegetables, dairy, etc.) were almost free, with little or no state intervention or price regulation. Spot transactions with many small, non-specialized and unorganized buyers and sellers characterized these markets, where few – if any – grades or standards existed, poor market information systems prevailed, and mostly informal contracts, largely enforced through social networks, were the norm (Fafchamps 2004).

Due to the weakness of the private sector, states also intervened in processing, mainly through parastatals. This often occurred in key industries in the traditional export sector such as groundnut, palm oil, tea, coffee, cocoa, sugar, etc. Many industrial crops were produced by public, vertically integrated firms aiming at economies of scale (processing, transportation), and / or were justified by the need to process quickly, particularly because of perishability and quality requirements of the products (like palm oil or tea).

## b Withdrawal of the State and Fading Regulation

In the 1980s and 1990s, market-oriented agricultural policy reforms were a centerpiece of liberalization in developing countries. They were often implemented within the context of structural adjustment programs designed to restore fiscal and current account balances, to reduce or eliminate price distortions and to facilitate efficient price transmission, so as to stimulate investment and production (Akiyama et al. 2003; Barrett & Mutambatsere 2005). These reforms were justified by the fact that these state-run structures, such as marketing boards, development agencies and public enterprises, were no longer meeting their original objectives. They had become symbols of state inefficiency. Thus, the first steps in reforming agricultural markets were the dismantling and privatization of the state-run structures, and the reduction of tariffs and export taxes, consumer subsidies, and producer price controls.

The following tables present some examples of the dismantling of former public bodies in the RS countries. These restructuring processes all occurred over an extended period of time (from the end of the 1970s to the end of the 1990s). As discussed previously, depending on a country's historical trajectories, the starting point, the scope, and the pace of liberalization were all country-specific and explain large variations among countries.

**Table 17: Scope of Market Reforms in non Sub-Saharan RS Countries**

Marketing at producer level	BEFORE liberalization	AFTER liberalization
<b>Morocco</b>		
<b>ONICL</b>	<u>State marketing board</u> which fully controlled marketing of grains through fixed prices (especially wheat), and strictly controlled imports	1988 - 96: progressive liberalization of the grain market
Office National Interprofessionnel des Céréales et Légumineuses		Quotas subsist for the "national flour"
<b>OCE</b>	<u>State marketing board</u> which had the monopoly of exports such as citrus, horticultural products, canned foods etc.	1985: removal of the monopoly and liberalization of exports
Office de Commercialisation et d'Exportation		
<b>Nicaragua</b>		
<b>ENABAS</b>	<u>State marketing agency</u> which had the monopoly for the commercialization of staples and export crops such as peanuts, sesame and soy	1984: elimination of price differential for basic grains
Empresa Nacional de Alimentos Basicos		1990: full liberalization of staples commercialization
<b>Mexico</b>		
<b>CONASUPO Compania Nacional de Subsistencias Populares</b>	<u>State-run enterprise</u> that had the monopoly for imports, was supervising exports, and was supplying the domestic market in staples with controlled prices	1989: removal of the marketing monopoly of national products and imports and limitation of its intervention to maize and beans
Compania Nacional de Subsistencias Populares		
<b>INMECAFE</b>	<u>State marketing board</u> which supported farm production and handled processing and marketing of coffee	1993: dismantling of the board and liberalization
Instituto Mexicano del café		

Source: RuralStruc Country Reports, Phases 1 and 2

Table 18: Scope of Market Reforms in Sub-Saharan RS Countries

Marketing at producer level	BEFORE liberalization	AFTER liberalization
<b>Mali</b>		
<b>OPAM</b>	<u>State marketing board</u> which had the monopoly of the commercialization of <u>grains</u>	1986: removal of the monopoly
Office des Produits Agricoles du Mali		1989: liberalization of imports and commercialization of grains
<b>Office du Niger</b>	<u>Parastatal</u> which managed water, land and irrigation infrastructure, production, marketing, and processing of <u>rice</u>	1994: objectives restricted to land management, infrastructures maintenance, and extension
<b>CMDT</b>	<u>Semi public company</u> (40% of the capital belong to the French DAGRIS, now Geocoton) in charge of inputs supply, extension, marketing, and processing of <u>cotton</u> seed, supply of cotton fiber to the Malian public textile industry COMATEX and exports	On-going liberalization since 2004
Compagnie Malienne de Développement des Textiles		
<b>Senegal</b>		
<b>ONCAD</b>	<u>State marketing board</u> which had the monopoly of the commercialization of domestic agricultural products ( <u>groundnut, grains</u> ) and imports, and supervised the cooperatives of producers	1979: liquidation
Office national de commercialisation et d'assistance au développement		1991: liberalization of local market and imports of rice
<b>SONACOS</b>	State-run processor for groundnut oil	2006: privatization
Société nationale de commercialisation des oléagineux du Sénégal		
<b>Madagascar</b>		
<b>BCSR</b>	<u>State marketing board</u> which had the monopoly of collect and commercialization of rice	1986: total removal of the monopoly of the commercialization of rice in domestic market
Bureau de Commercialisation et de Stabilisation du Riz		1990: privatization of imports
		1991: removal of the buffer stock
		2005: removal of import taxes
<b>HASYMA</b>	<u>Semi public company</u> (36% of the capital belong to the French DAGRIS) which ensured collection and commercialization of cotton seed, and trade of cotton fiber to local textile industry and exports	2004: privatization (90% of the capital bought by DAGRIS, now Geocoton)
Hasy Malagasy		
<b>Kenya</b>		
<b>NCPB</b>	<u>State marketing board</u> that was charged with grain marketing controls in both internal and external level	1991-95: privatization and liberalization of trade in both internal and external markets
National Cereals and Produce Board		
<b>Kenya Cooperative Creameries</b>	<u>Dairy Board</u> which had the monopoly /monopsony power over the dairy industry	1992: liberalization of processing and commercialization of dairies
<b>The Coffee board of Kenya</b>	<u>State marketing board</u> in charge of collection, process and trade of coffee	2002: end of the coffee marketing board activities
<b>The Tea Board of Kenya</b>	<u>State marketing board</u> mandated to regulate the tea industry: growing, research, manufacture, trade and promotion on local and international markets	no change
<b>KTDA</b>	<u>Public development agency</u> responsible for the management of production through provision of inputs, extension, collection, processing and marketing of tea	2000: privatization
Kenya Tea Development Agency		

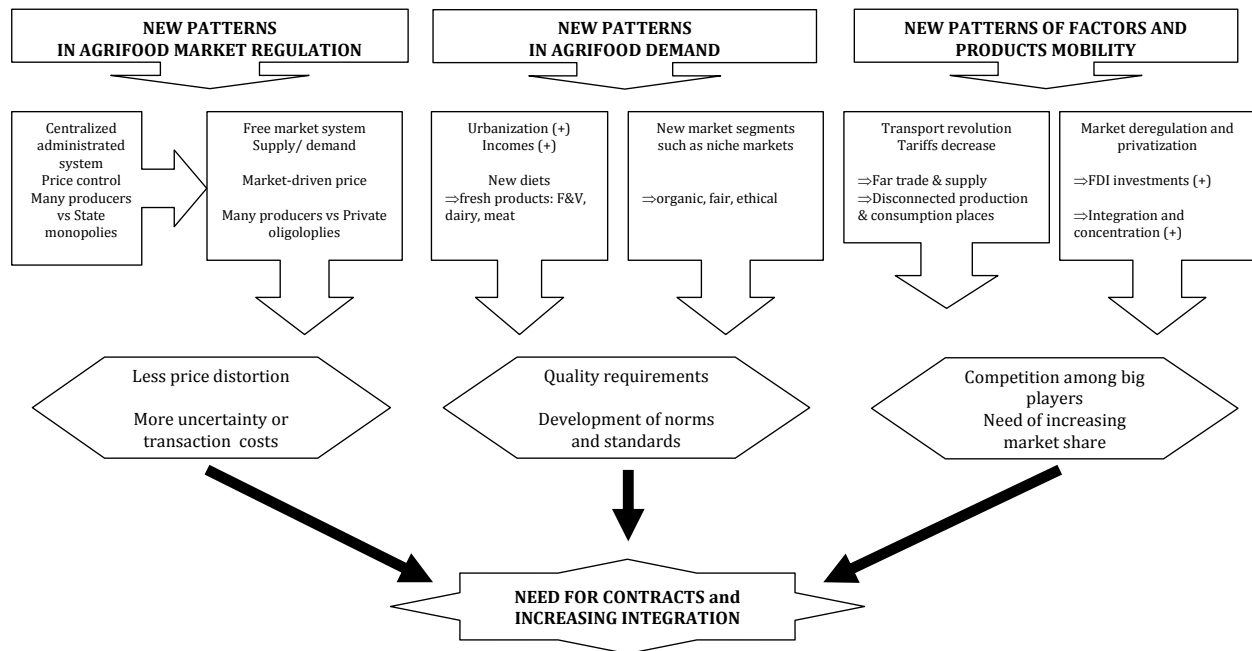
Source: RuralStruc Country Reports, Phases 1 and 2

State withdrawal from agricultural markets, and the dismantling of parastatals and regulation systems have generated a new economic and institutional environment at the national level. However, this change has to be put in perspective with other major restructuring processes within international agrifood markets.

### 1.1.2 The New Agrifood Markets

The new agrifood markets are the result of the liberalization process as well as more specific developments related to new patterns in food demand, which have been boosted by the increasing mobility of factors resulting from globalization (see Figure 25). The main consequence of this evolution, which started in the 1980s, is a trend towards increasing levels of integration, the main attributes of which are the development of standards and closer relationships between producers and buyers. These processes, of course, develop at very different paces in different countries. The aim of the following section is to provide a frame of reference to understand what changes are underway in order to better position the discussion of the RS countries.

**Figure 25: New Patterns and Trends in the Agrifood System Resulting from Liberalization and Globalization**



Source: Authors, diverse inspiration



#### a New Patterns in Agrifood Market Regulation

The dismantling of the public regulation structures and of the centralized supply management systems had several consequences that can be summarized by two main features. First, value chains rapidly became market-driven and dependent on supply and demand variations. Many new private actors emerged but were often eliminated later because of intense competition. In many situations, one of the conditions for survival was to increase alliances with foreign capital, a phenomenon that exacerbated an asymmetrical situation: whereas markets still incorporated many fragmented producers, larger but fewer marketing agents have progressively controlled the value chains.

Second, due to the removal of administrated regulation and price management, uncertainty and transaction costs increased for those emerging private actors engaged in the new competitive environment. Faced with this context, the main trend among trade and processing companies was to implement strategies to secure their supplies through the implementation of contract arrangements with producers. Some of these firms engaged in closer integration by buying local subsidiaries, organizing supply networks with specific support to producers, etc. At the same time, increasing competition over the international and national markets fostered processes of concentration, the result of which was the emergence of many “big players” that deeply transformed market dynamics.

#### b New Patterns in Agrifood Demand

In the meantime, the food system is evolving quickly, though the pace of change varies considerably from region to region. There are several major trends behind these changes: i) the world’s population is becoming increasingly urban; ii) growing incomes result in quickly evolving diets, with more proteins and high-value foods (meat and dairy, fruits and vegetables) instead of staples; iii) until the current period of growing food prices, structurally decreasing prices have stimulated agrifood market dynamics; and iv) an increasingly integrated world trade environment and improved transportation systems have spurred the convergence of dietary patterns and food preferences (FAO 2004).

As a consequence of these simultaneous changes, consumer-driven value chains (such as fruits, vegetables, meat, dairy products, fish and seafood products) have grown rapidly. Telecommunications allow long-range commerce, and changes in shipping and storage technologies in the mid-late 1980s allowed fresh produce (apples, strawberries and asparagus, for example) to be shipped from Southern Hemisphere producers to Northern Hemisphere consumers. This expanding demand for and trade in perishable products and high-value foods in turn brought about a need for more health and safety standards. This change is evident in the growing attention paid to the risks associated with microbial pathogens, residues from pesticides, veterinary medicines or other agricultural inputs. The implementation of stricter food safety and quality standards has had strong impacts on the evolution of supply chains. Exporters and retailers, in particular, employ new forms of production and marketing contracts, while technical and/or financial assistance is often provided to strengthen these new networks.

Further, the shift of markets from supply-driven to demand-driven in a context of increasing incomes (at the aggregate level) has also transformed relationships among commodity chain stakeholders. Today, consumers are increasingly looking for safety and for information on the way products are grown and traded, to ensure socially fair and sustainable agricultural practices. This growth in consumer awareness has progressively supported a range of new alternative initiatives in international, national, and local agrifood systems, and has fueled changes in retail patterns as fair trade, organic, and other “alternative foods” have entered mainstream venues. With the emergence of these niche markets, new types of standards and specific controls have been established parallel to the implementation of more generic certification structures. For instance, efforts are made to protect the integrity of organic standards to further differentiate organic foods and to promote different forms of short supply chains for local community development. To this end, the International Federation of Organic Agriculture Movements (IFOAM) has been created and bases its “organic” certification on issues such as health, ecology, fairness and the principle of precaution. As for fresh products, contractualization is growing between producers and exporters / retailers as the best means to guarantee standards and requirements.

Contracts, in their various forms and with varying degrees of obligations, usually reduce risks for the buyer and seller and have appeared in response to the removal of the formerly controlled marketing systems as a possible way to guarantee standards and requirements for the purchaser. For the producer, selling under contract arrangements is less risky when the requirements for the product are high and its characteristics are complex. Also, it is often the only way to access specific markets. For this reason, contracts have progressively spread to both emerging fresh product chains and niche markets, where product attributes are clearly defined in terms of norms and standards, and where the final value of production allows for the coverage of specific costs of contracts (selection, negotiation, monitoring, and enforcement).

### c New Patterns of Factor Mobility and Trade, and Rising New Actors

Since the 1980s, growing long-distance trade and increasing Foreign Direct Investments (FDI) have broadly modified the scope of agricultural production and marketing. They are the consequence of both a more open international economy resulting from economic liberalization and of progress in technology (the Internet for finance and information on the software side; shipping, storage, processing on the hardware side). These factors all greatly increase the efficiency of international trade and domestic marketing, and have paved the way for major investments by new players everywhere, particularly in processing and retailing since the 1990s (Barrett & Mutambatsere 2005). Consequently, a handful of vertically integrated transnational corporations have gained growing control over global trade, processing and retailing of food products (Vorley 2003). The tremendous development of these processes in the case of the distribution of products has resulted in the so-called “supermarket revolution” (Box 11).

The differences between countries can be explained by socio-economic factors related to consumers’ demand for supermarket services, product diversity and quality. Among these

factors one can cite as examples: income level and urbanization, correlated with the opportunity cost of time (in particular that of women), and reductions in transaction costs through improvements in roads and transport, and ownership of refrigerators. These demand-side factors are necessary, but not sufficient, to explain the very rapid spread of supermarkets in the 1990s and 2000s in developing countries, most of which had a very small supermarket sector before 1990. Supply-side factors, combined with the overall objective of governments throughout the developing world to modernize the retail sector, were also of extreme importance, especially the influx of retail foreign investment as countries liberalized FDI, and improvements in procurement systems arose.

**Box 11: The World Spread of the Supermarket Revolution**

The penetration of modern food retailing varies among developing countries. Reardon and Timmer (2007, p. 2840) write: “Experiencing supermarket-sector “takeoff” in developing countries in the early to mid 1990s, the first-wave include much of South America, East Asia outside China, and South Africa – a set of areas where the average share of supermarkets in food retail went from roughly only 10-20% circa 1990 to 50-60% on average by the early 2000s. The second-wave include parts of Southeast Asia, Central America and Mexico where the share went from circa 5-10% in 1990 to 30-50% by the early 2000s, with the take-off occurring in the mid to late 1990s. The third-wave includes countries where the supermarket revolution take-off started only in the late 1990s or early 2000s, reaching about 10-20% of national food retail by circa 2003; they include some of Africa and some countries in Central and South America (such as Nicaragua, Peru and Bolivia), Southeast Asia, and China and India and Russia. Sub-Saharan Africa presents a very diverse picture, with only South Africa firmly in the first wave of supermarket penetration, but the rest either in the early phase of the “third wave” take-off of diffusion - or in what may be a pending – but not yet started – take-off of supermarket diffusion”.

## **1.2 Expected Consequences of Restructuring for Farming**

All these changes in agrifood markets, predictably have upstream consequences at the producer level. However, questions remain about the strength, the amplitude and the pace of this global restructuring for farming.

In theory, global markets present an opportunity for the suppliers – new ‘valuable’ consumers and new products year round – as far as they are able to connect. Contractualization is often seen as a tool for fostering smallholder integration into these new markets, increasing and stabilizing their incomes. The WDR08 strengthens this view and argues that contractualization and development of agricultural entrepreneurship is one of the ways for smallholders in developing countries to escape from poverty (World Bank 2007, p.127). Indeed, smallholders are largely considered to have many efficiency advantages over large farms, specifically labor intensity and labor-related transaction costs. They are, however, constrained by capital and liquidity difficulties, as well as by a lack of access and / or capacity to adopt technological innovations. Contract farming with supermarkets or processors could help them overcome these constraints.

However, as previously mentioned and as reiterated by Reardon and Timmer (2007), among others, contractualization implies increasing requirements in terms of norms and standards, sometimes including specifications on how the product should be grown, harvested, transported, processed and stored. Consequently, contracts and the new markets they connect with are a real opportunity for the producers who are able to

respond to their requirements, but they also present a substantial risk of marginalization for those who are not. This evolution could be decisive for the development of many value chains and could have a clear impact on farm structures. The core issue here is to identify how developed these processes of differentiation are, so as to be able to anticipate their impacts, both positive and negative.

These questions have been dealt with by the recent *Regoverning Markets* research program (Box 12), which shows that a main trend is an initial growth in the participation of smallholders in new modern value chains, frequently followed by their progressive marginalization as larger producers enter the market and are able to provide more supply with the required quality (Huang & Reardon 2008). This progressive differentiation among producers is exacerbated by the practices of major retailers or by the supermarkets' procurement systems. Indeed, as they try to facilitate the adoption of their specifications and to reduce their transaction costs, supermarkets and major retailers often chose to work with a reduced number of suppliers that are able to provide high volumes and high quality in due course.

**Box 12: Regoverning Markets**

*Regoverning Markets* is a multi-partner collaborative research program (2005-2007) analyzing the growing concentration in the processing and retail sectors of national and regional agrifood systems and its impacts on rural livelihoods and communities in middle- and low-income countries. The aim of the Program was to provide strategic advice and guidance to the public sector, agrifood chain actors, civil society organizations and development agencies on approaches that can anticipate and manage the impacts of changes in local and regional markets.

*Regoverning Markets* focused on agrifood market restructuring in order to assess its upstream impacts on the various segments of the value chain: retail (particularly supermarkets), processing, whole sale and farming. To respond to this purpose, the Program compared country / product pairs, each at different stages of restructuring, using farm household surveys and commodity chain analyses. Household surveys were conducted with a focus on the selected products among high-value chains, mainly fresh products such as fresh fruit and vegetables and dairy.

Source: <http://www.regoverningmarkets.org/>

Nevertheless, it appears that these evolutions remain poorly informed. More is known about the characteristics and modalities of value chain integration and contractualization development, particularly thanks to the *Regoverning Markets* Program, but little is known about the extent of these processes. How far and how deep did they trickle down in the different developing countries for which we know that the pace of change has differed? What numbers are at stake? How many farmers are engaged in these new chains?

## 2 An Elusive New Agriculture

These processes of change underway in agrifood systems and their consequences in terms of increasing integration of agriculture obviously occur at different speeds, depending on local and national characteristics. The RS countries are no exception and the regions surveyed by the Program illustrate a large diversity of situations.

However, the striking results of the fieldwork are the continued high share of staple crops in the farm production of surveyed households, and the particularly important share of self-consumption. This result is not a surprise *per se*, as a large share of agricultural production in developing countries consists of self-consumed staple crops. Nevertheless, in the ex-ante “winning” regions of the survey one could have expected results showing deeper levels crop diversification and connection to markets. This is not the case and even in these most integrated regions of the sample agricultural production patterns remain relatively “domestic-oriented” and “traditional”.<sup>66</sup>

This section will first review the patterns of agricultural production and will then discuss the conditions of market integration.

### 2.1 Characteristics of On-Farm Income

#### 2.1.1 General Overview

On-farm incomes can be divided into four main types: crop income; livestock income; income from hunting, fishing and gathering; and income from on-farm transformation processes (such as the on-farm transformation of milk into cheese). We can see from Figure 26 that crop production generates the main share of on-farm income and dominates regional output everywhere, except in the traditional livestock regions of Muy Muy and La Libertad in Nicaragua, and in Morocco. In Chaouia the importance of livestock income is mainly due to decapitalization. The region witnessed a high volume of sales of live cattle and small ruminants due to a very bad crop season (drought), which deeply affected crop yields and obliged many farmers to sell off their productive assets (animals) in order to survive.

The figure also shows us that the surveyed farm households do not rely so much on natural resources for income generation.<sup>67</sup> The main activities in this category are: fishing in the Office du Niger zone in Mali (Macina), in Lake Victoria in Kenya (Nyando) and along the

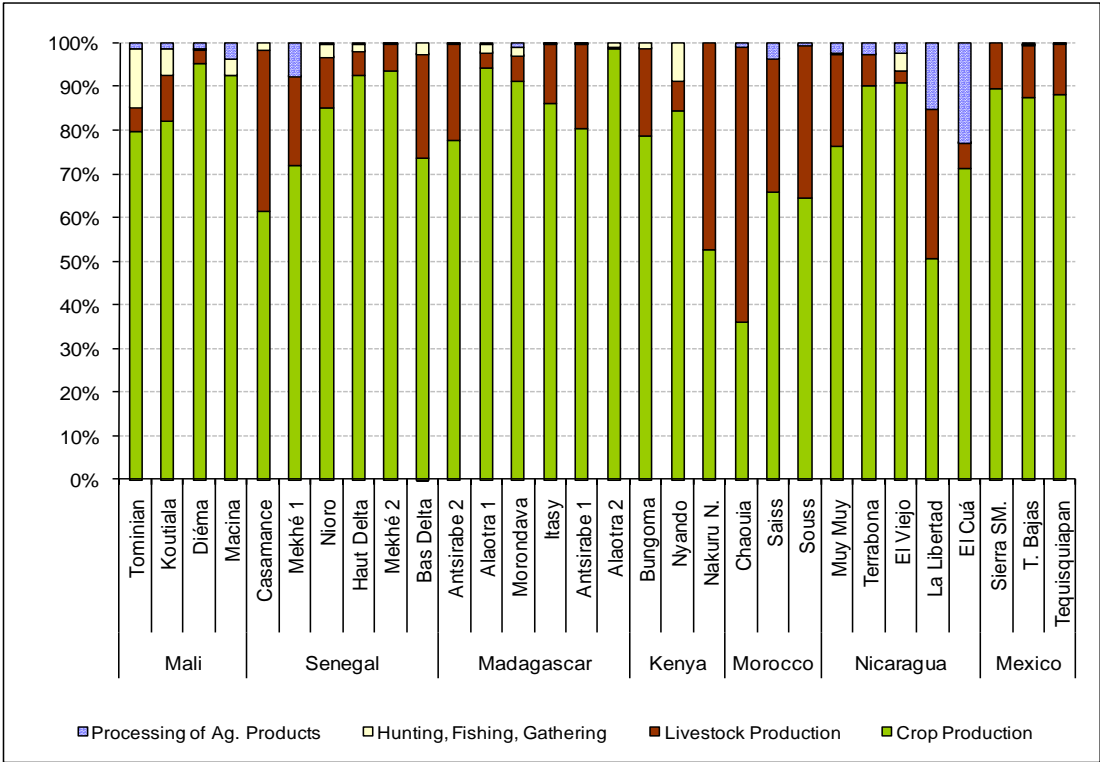
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<sup>66</sup> Of course, as mentioned in Chapter 1, the selection of countries and regions does not include major tropical export commodities areas, where a long-standing connection to markets has deeply affected the pattern of the rural economy over a long period of time. Nevertheless, several surveyed regions are engaged in these export commodities and some of high-value crops are found as well.

<sup>67</sup> The estimation of incomes generated by gathering activities is often difficult because they relate to small amounts of products that are gathered throughout the year, which are often self-consumed. However, wild fruits, animals and fish often play a core role in the food security of the rural households.

Pacific Coast in Nicaragua (El Viejo); and the gathering of fruits (agroforestry); and extraction of sand in Tominian. Processing of on-farm products remains surprisingly limited; where it does occur, processing concerns livestock products (mostly cheese production) and initial processing of coffee in Nicaragua; cheese and olive oil in Morocco (Saïss); and groundnut paste in Senegal.

**Figure 26: Overall Structure of the On-Farm Income (in % per surveyed region)**



Source: RuralStruc Surveys

In order to analyze agricultural production further, five main categories of products (presented in Table 19) were designed by summarizing more than 30 products identified during the field surveys. This type of grouping exercise is always complicated, particularly when it includes different regions and their different consumption patterns, as the utilization of products varies.<sup>68</sup>

68 This is the case of potato, a horticultural product that is also self-consumed and can be considered as a staple in Madagascar, the only place in the surveyed regions where it is significantly grown. This is also the case of groundnut, the traditional export of Senegal, which was considered as such even if groundnut is increasingly consumed locally, as a consequence of the adverse evolution of the value chain. Lastly, sugar cane is a traditional export commodity, but in Kenya the production is mainly sold on the domestic market and is insufficient to answer the local demand.

**Table 19: Categories of Products Used for Data Analysis**

Staples	Rice, maize, wheat and durum, other cereals (millet, sorghum, fonio, barley), cassava, potato, other staples (peas and beans - niebe, voandzou, chick peas, lentils, etc.), soy
Traditional Exports	Cotton, groundnut, sesame, coffee, sugar cane
Fruits and Vegetables	Olive, citrus, other fruits, green beans, tomato, onion, other vegetables
Livestock Products	Milk, other livestock products (butter, meat, etc.), live animals
Others	Forage, others (coconut, herbs and spices, etc.), other sub-products (sweet potatoe, cassava, groundnut leaves, etc.)

Source: RuralStruc Surveys

Figure 27 displays the overall structure of the households' gross farm product across the regions.<sup>69</sup> The striking result is obviously the large share of staple food crops. In all zones, except Morocco and four of the Senegalese regions (Casamance, Mekhé 1, Nioro, Haut Delta), staple production varies between 60 and 80% of the gross farm product. Generally, staple production concerns one main type of product, usually cereals: rice throughout Madagascar, in Macina (Mali), and in Senegal's Bas Delta; millet and sorghum in the three other regions of Mali; wheat in Morocco; maize in Mexico and Nicaragua, and beans in Nicaragua. In Antsirabe (Madagascar), potato accounts for an important share of the staple food production. Although, the potato value chain originally developed in response to urban demand, the product progressively transformed local consumption patterns and is now widely self-consumed as well as sold.

Livestock is present in all the surveyed regions and commercialization of live animals is the rule. This is particularly true in Mali, one of the main cattle providers for the costal countries of the Gulf of Guinea. However, some regional specialization in livestock products can also be noted, particularly in dairy. Nicaragua's "milky way" (Muy Muy) produces fresh dairy products for sale, and there is also a traditional on-farm processed cheese industry in La Libertad. Nakuru in Kenya, as well as Antsirabe in Madagascar, and the Saïss region in Morocco each have dairy belts which led to the development of agro-industries.<sup>70</sup> Casamance in Senegal also engages in some processing and trades these products locally. Marketing patterns of livestock products and the development of agro-industry can be explained by the quality of infrastructure available in each region. This determines what can be sold (e.g. milk vs. cheese in Nicaragua), and also the strength of local demand (proximity and access to cities). The significance of livestock in the cotton zone of Mali (Koutiala) represents a different set of circumstances. In Mali, livestock is often a patrimonial asset, which provides draft force, embodies financial savings and also supplies

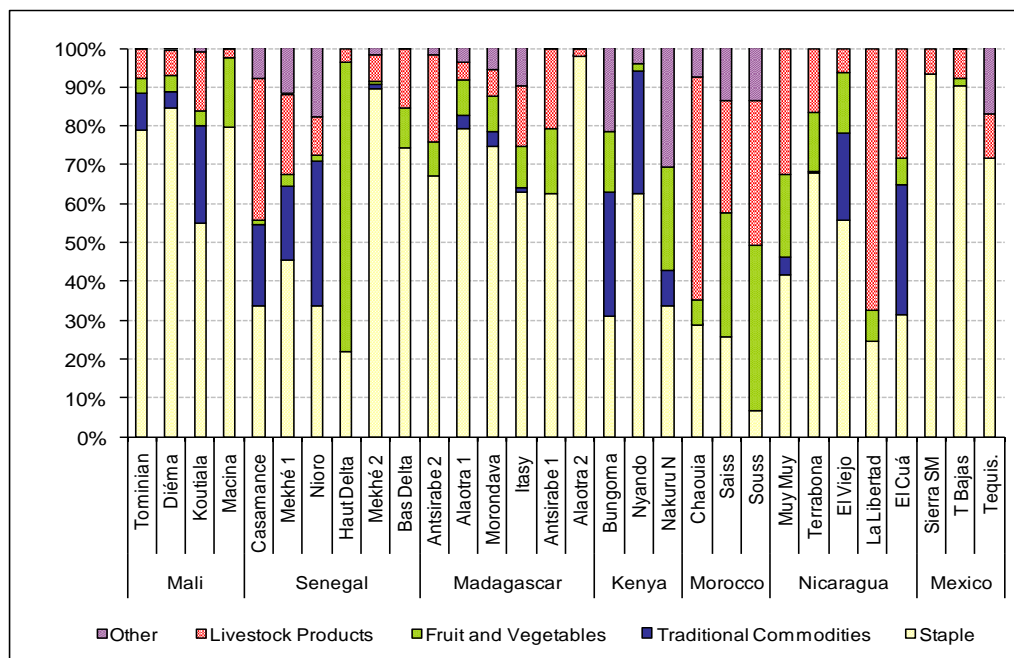
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<sup>69</sup> In this chapter, dedicated to on-farm production and commercialization, the survey results are displayed in absolute and relative gross farm product per household (total of sales and self-consumption of crops and livestock productions) instead of income. This choice reflects the methodological choices because the breakdown of costs by type of product was impossible within the survey framework (total costs were applied respectively to gross crop product and gross livestock product to calculate crop and livestock incomes and then the total farm income).

<sup>70</sup> *Tiko*, the major milk processor in Madagascar until the recent political events, has a dairy plant in Antsirabe with collection networks.

manure for crop productions. Due to the low price of cotton that affected the growers in 2007, many of the farmers decapitalized and sold their livestock to maintain their purchasing power. As noted previously, a similar phenomenon occurred in Chaouia (Morocco), as a consequence of a very bad crop season (drought). Conversely, the good crop season in Macina led to the opposite effect, with low sales of, and increased investment in, livestock.

**Figure 27: Main Farm Productions per Surveyed Region (in % of Gross Farm Product)**



Source: RuralStruc Surveys

Horticulture is also a common activity, as vegetables are grown everywhere for local consumption. In many surveyed regions, however, specialization in horticulture has occurred. This specialization is often encouraged by favorable natural conditions and stimulated by urban development, which led to specific private investments. This is particularly the case in Morocco, where exports of fruits and vegetables in Saïss and Souss (mainly citrus, tomato and olive) have become a major industry over the last two decades and where processing and / or exporting companies are fostering development through contractual arrangements. The same phenomenon occurs in Nakuru North. Even though the surveyed zone is not located in the region’s famous flower production area, surveyed households are involved in tomato production (and sell to a canning company). Fruits and other vegetables are also dynamic sectors. In the Senegal River valley (Haut Delta) tomato production has developed due to the presence of a processing plant that provides the local market with tomato paste. Fresh products targeting cities also developed in Antsirabe and Itasy (Madagascar), where temperate fruits and vegetables (peaches, apples, carrots, etc.)



can be grown.<sup>71</sup> Onion production has flourished in Office du Niger (Mali) and supplies the domestic, but also regional, market and contributes 20% of the region's gross farm product. Lastly, in Terrabona (Nicaragua), the richest households have engaged in irrigated horticulture production that is mainly sold domestically through traditional spot markets, but also through more integrated value chains (procurement systems of supermarkets, see Box 11).

Traditional commodities are seen mostly in Senegal (*Bassin Arachidier* and Casamance), Koutiala in Mali, El Viejo and El Cuá in Nicaragua, and in Kenya. The importance of traditional commodities in these locations is linked to region-specific circumstances. Their development is mainly related to regional history and results from both natural advantages and specific interventions by either the state or the private sector, most often during colonization. Where traditional commodities are produced, they shape the region's output structure: cotton in Koutiala and Casamance, coffee in El Cuá and Bungoma, sugar cane in Kenya. This occurs even if production is fully oriented toward the domestic market, as with the groundnut industry in Senegal. In surveyed regions that lack these specific historical circumstances traditional exports are very limited.

### 2.1.2 *Self-Consumption vs. Sales*

In spite of very different regional contexts in terms of agro-ecological, agrarian, historical and institutional conditions, the main characteristic of on-farm incomes in the RS sample is the importance of self-consumption,<sup>72</sup> which accounts for a large share of gross farm product and consequently reflects an unequal, and sometimes low, degree of connection to markets. It is important to note, however, that this does not necessarily imply total disconnection from markets, as households may have different patterns of market engagement when acting as consumers rather than producers. Taking the example of Mali in Table 20 below, one can note that even in the poorest regions a large percentage of households participate in markets as consumers.

**Table 20: Share of Malian households engaged in markets**

	Share of HHs with Purchases	Share of HHs with Sales
Tominian	60%	8%
Diéma	64%	53%
Koutiala	58%	77%
Macina	71%	89%

*Source: RuralStruc Surveys*

<sup>71</sup> A small – and now famous (because of frequent citation in literature) – green bean production for export markets has developed in Itasy, which is closely linked to the presence of an export-oriented processing firm: *Lecofruit* (see).

<sup>72</sup> Self-consumption includes gifts to family, and to social and religious networks (see Annex 1).

But the point remains that household engagement with markets can be limited, and self-consumption levels remain high. Figure 28 shows that there seem to be both regional and country effects at play in determining levels of self-consumption: richer countries and richer regions apparently self-consume a smaller share of their output. In addition to between-region and between-country effects, there are also within-region differences in self-consumption patterns due to income levels. These within-region effects (or “quintile effects”) seem to be strongest in Madagascar, Kenya and Nicaragua, though present almost everywhere (even in Mexico’s Sotavento, where shares of self-consumption are very low).

Both within and between regions and countries, self-consumption rates are driven by two main phenomena. The first depends mostly on distance to markets and / or possibilities for integration through specific value chains (e.g. self consumption is lower in Koutiala because a strong demand for cotton provides opportunities to move away from substance farming; the same occurs with tomato and cassava in Haut Delta and Mekhé 2, respectively). We can refer to these as “demand effects.” Households self-consume much of their own output because there is little demand for it by anyone outside of the household. When demand for these products increases, either through proximity to a large market or through the presence of a specific buyer, self-consumption decreases. Demand effects more often appear as regional and national effects than quintile effects, simply because market access does not vary strongly within a region, even if differences can of course occur at the sub-regional level (this is the case in remote areas of Chaouia or Souss in Morocco).

The second phenomenon is related to risk. Households with very weak incomes face food security challenges and adopt “risk-management” practices, whereby they prefer to retain control over their own food supply by producing it within the household. This can be termed a “supply effect.” Because of a heightened level of risk, households are unwilling to sell their output on the market, and consequently self-consume a large portion of it. Supply effects are more likely to show up between income quintiles in the same region, as a household’s level of food security risk is clearly related to its income (though this effect can come into play between richer and poorer regions and countries).

**Figure 28: Value and Share of Self-consumption (% in Gross Farm Product per Household Quintile)**



Source: RuralStruc Surveys

Nicaragua is the clearest RuralStruc example of a country where supply effects dominate the pattern of self-consumption. In low-income quintiles self-consumption rates often reach 60%, and a number of households (20-40%) are completely uninvolved with markets (i.e. their self-consumption share is 100%). Yet only one region is characterized by physical seclusion (La Libertad). In light of the strong quintile effects observed in the region, the main explanation for this disconnection from markets is the development of “risk-management” strategies, especially during the surveyed period when food prices were very high (early 2008). In some cases it also reflects the importance of alternative off-farm options, notably off-farm wage-labor, both in agriculture and in the *maquiladoras* (Terrabona). In this case, households prefer to maintain food crop productions for family consumption and search for off-farm activities to earn cash revenues. These opportunities allow a dual strategy, mixing self-consumption of farm products on one side, and insertion into labor markets (in order to meet specific monetary needs: schooling, health, consumption goods, etc.) on the other.<sup>73</sup> This pattern is also exacerbated by agro-climatic conditions<sup>74</sup> and by the increasing food prices in 2007-08, which reinforced the dual strategies. More attention will be devoted to the relative strengths of demand-side and supply-side determinants of self-consumption in the next chapter, with an eye towards prioritizing policy interventions.

Mexico, whose diversification pattern differs from the rest of the countries surveyed in RuralStruc, offers a very contrasted and differentiated picture. First, a very low share of farm output is self-consumed. But there are also a fair number of farm households that are completely disconnected from markets (i.e; they sell nothing). In the bottom quintiles of Sotavento, in both the sierra and the lowlands, this isolation describes 40% of households. This result is evidence of a wide disparity in the livelihood strategies followed by rural Mexican households in the wake of changes to the overall Mexican agricultural economy. Farms in the surveyed Mexican regions are strongly stratified into two distinct types: smaller and mainly for self-consumption, or larger and almost entirely for sales. In the two richer regions (Tierras Bajas and Tequisquiapan) over two thirds of households self-consume less than 5% of their output. Even in the more isolated sierra region, this low level of self-consumption is observed in nearly half of all farm households. Among all surveyed farm households in Mexico, the correlation between plot size and the share of output self-consumed is -0.13.

Mexican households with high levels of self-consumption usually operate a small family plot, a vestige of the traditional food system based on home-grown maize. These households are largely disconnected from agricultural markets, but only as producers. They often have very low asset endowments, and generally make their living from off-farm incomes, notably agricultural wages. However, they maintain the traditional maize plot (*la milpa*), where local varieties of maize and beans are grown for family consumption.

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73 When compared with SSA, the accessibility of markets for goods and services is notably higher in the Nicaraguan countryside.

74 There is only one crop season in the dry region of Terrabona, whereas in the more humid regions such as El Cuà or La Libertad, two to three crop seasons are possible.

Nevertheless, for some of the poorest farmers, this disconnection from markets is sometimes impossible when the need for cash to cover unavoidable costs requires commercialization during the crop period, often under poor price conditions, and even if the same food staple has to be bought shortly thereafter at a higher price.<sup>75</sup>

The story of how some Mexican households came to eliminate all self-consumption, on the other hand, illustrates how new techniques and new commercialization networks can radically change production-consumption patterns over a ten year period.<sup>76</sup> Indeed, the development of a new technical package (a selected maize variety, inputs and technical assistance), promoted by private firms under contracts that have the support of public credit (and possibility of price subsidies),<sup>77</sup> has fully reshaped the local practice.

Four major features explain this rapid evolution. First, to access public credit and the technical support, producers must sell all their production to private firms. Second, the opportunity to sell all of their products, rather than store it on their farms, is a welcome relief for farmers. Maize produced using the new hybrid seed variety is highly vulnerable to rodents after harvest, making storage difficult. Third, in the Sotavento lowlands, the maize harvest is completely mechanized through services provided by the firms; and fourth, women are increasingly engaged in off-farm activities and are no longer able to dedicate time to the preparation of *tortillas* from farm-grown maize. Consequently, farmers sell their hybrid corn and buy maize flour or prepared *tortillas* at the local markets. This Sotavento exception among the surveyed regions is significant, as it shows the potentially strong impact of new marketing channels when supported by a combination of drivers of change.

## 2.2 Regional Patterns of Crop Diversification

The previous section displayed the types of farm products and the importance of self-consumption in the surveyed regions, but what is the degree of specialization or of diversification of farm production?

In order to analyze on-farm production further, Figure 29 below displays the overall structure of households' gross farm product across regions. It focuses on the type of products on which households concentrate. It tells us the share of farm output self-consumed and the share of on-farm income that comes from selling the two most important sales crops. It also displays the name of the dominant sales crop of each region.

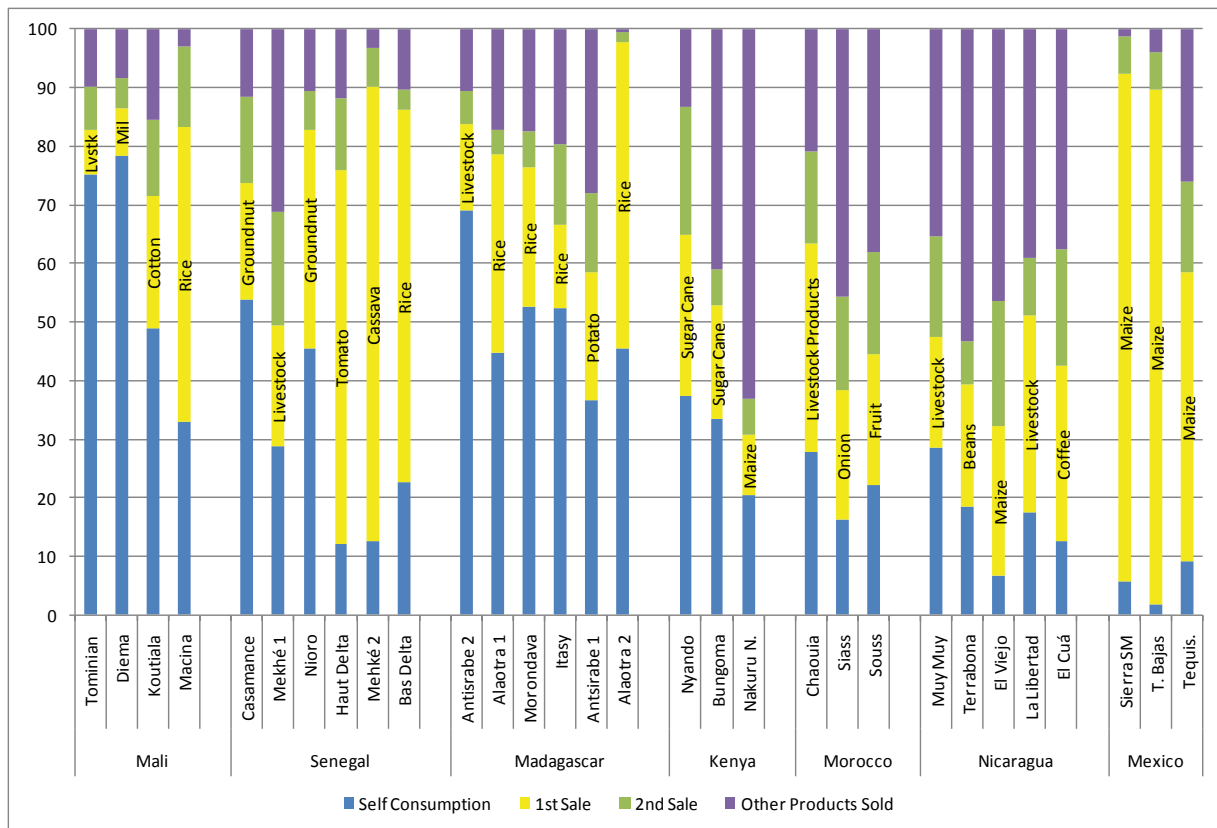
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75 This type of situation notably occurs in Madagascar, where the size of the household and the size of the farm are clear constraints and limit the storage possibilities.

76 The very poor households of the first quintiles who do not sell disappear when displaying the results in value.

77 For instance, through the Ministry of Agriculture "Target Price Program" (*Subprograma de Apoyos Directos al Ingreso Objetivo*), a price support mechanism has been provided since 2003 for when prices fall below a target price. The program has not operated over the last two years due to the market price increase.

**Figure 29: Farm output broken down into shares of self consumption and two dominant sales crops**



The high presence of self-consumption, especially in poorer regions, is clearly confirmed in the figure above; however it also highlights the patterns of on-farm diversification. In sub-Saharan Africa, households in 13 of 19 regions earn on average more than 70% of their on-farm income through either self-consumption or the sale of one type of crop. This is the case only in two of the 11 non-SSA regions: the two Sotavento zones where a process of deep specialization in maize production has developed. As wealth increases (moving from the poorest regions on the left to the richest regions on the right), the share of self-consumption falls and the share of “Other Products Sold” rises.

On-farm diversification is a trend not only between poorer and richer regions, but between poorer and richer households within regions. In 20 of the 30 surveyed regions, households in the fifth income quintile are more diversified than households in the bottom income quintile: sales of their top three products make up a smaller portion of their on-farm income (on average about eight percentage points less). These 20 regions are split equally between SSA and non-SSA regions, meaning that within region diversification is seen in 10 of 11 non-SSA regions, and only 10 of 19 SSA regions. This observation (that within-region on-farm income diversification is less likely in sub-Saharan Africa) is consistent with the Program’s previous observation that diversification is less widespread in SSA in general.

On-farm diversification within regions is often characterized by the addition of different sales crops, rather than the dropping of one type of production in favor of others. In fact, in 20 of the 30 regions surveyed, the top sales crop of households in the fifth quintile is the same as the top sales crop of households in the first quintile. It does not seem to be the case that the poor are restricted to selling staples while the rich are able to sell livestock or high-value horticultural products. Of the 20 regions mentioned where rich and poor households have the same top sales crop, that crop is a staple in 11 cases. Not only is it common to see richer households primarily selling staples, it is common to see households in the bottom quintile selling traditional commodities, livestock, or even high-value exports (coffee in El Cuá stands out).

The same pattern is observed between regions when looking at Figure 29. Contrary to expectations, one does not notice instances of the richest region in a country primarily selling a high-value product, while poorer regions primarily sell a low-value staple. The possible exceptions are Morocco and Nicaragua, where fruit and coffee, respectively, are sold by the richest regions. However, in each case, the poorest region is engaged in livestock or livestock products, which in some regions are signs of wealth.

Thus, it can be concluded that the types of crops grown result from the unique situations in each region in terms of natural resources, public and private investments in infrastructure, and the presence or absence of specific buyers. Where large shifts into sales of different products occur, they seem to encompass all households in the region. The differences between richer and poorer households tend to be in the diversification of their on-farm income sources. Richer households tend to have more on-farm income sources, with each source making up a smaller share of total income.

A defining characteristic of these diversification patterns is heterogeneity. Farmers each make use of their individual asset endowments to respond to opportunities arising from the natural and economic environment of their region. While the most profitable on-farm opportunities in each region generally appear to be available to all farmers, to a certain degree, richer households, with more assets, are able to take better advantage of these opportunities, resulting in generally higher levels of diversification among richer households.

A final observation of the Program's analysis of on-farm income sources is the strong persistence of staples. Staples are sold by households at all income levels, in all regions. Staples make up over 25% of farm output in every region except those in Morocco (where the importance of wheat is masked by a bad crop season and the following decapitalization of livestock assets). This is consistent with the conclusion that diversification patterns are driven by households with different asset endowments responding as much as they can to opportunities presented by their environment. This means, however, that staples are often one of the best options available to farm households, and reflects a generally low level of opportunity for specialization in higher value crops.

It is important to note that, even in areas of crop specialization (such as Mexico), the same mechanisms are at play. Richer households with better asset endowments are more able to

take advantage of the opportunities presented by their environment. It is simply that in their case, because of unique conditions, it makes more sense to specialize in maize than to diversify into other products. It is clear, however, that specialization in the RS surveyed regions is an exception. The reasons are that rich households are presented with an environment that generally prompts them to diversify rather than specialize is a subject for further research. However, Chapter 6 will explore in finer detail what makes them able to respond to these situations by examining the relationship between endowments of specific assets and income.

## 2.3 Regional Patterns of Market Integration

With the existing farm production patterns presented above, it is not surprising to find a high prevalence of “traditional” forms of commercialization and market integration in the surveyed regions. High-value exports, which are supposed to introduce new types of marketing arrangements through connection with foreign buyers located in highly competitive markets, are extremely limited. Although the RS countries find themselves at different stages in terms of the penetration of modern food retailing systems,<sup>78</sup> are very far from the “supermarket revolution”, Mexico as a whole being an exception. Yet, even when a significant degree of supermarket penetration has occurred (like in Mexico where supermarkets have reached 55% of modern food retail),<sup>79</sup> the effects on the “average” family farmer remain limited. *Regoverning Markets* reminds us of two important facts: first, there is a gap between the overall level of penetration of supermarkets and the level of penetration into high-value segments of the food chain (estimated at only 25% in Mexico). Secondly, supermarkets most often source the majority of their products from wholesale markets, and sometimes from large-scale companies under contract.

Outside of Mexico, the surveyed regions of the RS countries show a more classical picture shaped by long-standing trade systems, mainly based on informal arrangements. This occurs for all types of products and stakeholders. However, several value chains have specific market structures which lead to specific organization.

### 2.3.1 *Traditional Marketing Prevails*

‘Traditional marketing’ refers to the range of middlemen and rural intermediaries who connect the countryside with national and international markets (i.e. retail systems and exporters). They include wholesalers and the agents or brokers<sup>80</sup> working for them, as well as independent buyers

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78 According to the *Regoverning Markets* program (Reardon & Huang 2008), the RuralStruc countries can be classified into three types of development of the modern food industry: “advanced stage” with more than 40% of overall food sold in supermarkets (Mexico); “intermediate stage”, between 10% and 40% of supermarket share (Nicaragua, Kenya, and Morocco); and “initial stage” (less than 10%), which is the case of the three other SSA countries.

79 Knowing that spatial disparities and the urban-rural divide weight strongly in this national mean.

80 A wholesaler takes possession of the product; a broker does not.



This type of marketing presents farmers with two options, often with imprecise scopes. First, farmers can sell “spot”, either directly at the farm gate or in the village market to a broker or a wholesaler agent. Or they can sell on a routine basis to a wholesaler, knowing that this second option does not necessarily entail a formal arrangement, and consequently does not guarantee either a specific sales quantity or a better price than what could be earned on the spot market. This latter situation does correspond, however, to a type of formalization of the commercial transaction over time.

In the surveyed regions traditional marketing is dominant. Figure 30 classifies the existing methods of commercialization into four main categories: spot and wholesaler sales (the two types of traditional marketing), and sales to cooperatives and agribusinesses.<sup>81</sup> It shows that the two first categories account for a large majority of the total value of sales, with very few exceptions. Spot sales at the farm gate or at the village market account for 100% of sales in Tominian, Mali, and 95% in the *Bassin Arachidier* (Senegal) or in Chaouia (Morocco). However, commercialization with wholesalers is also significant, particularly in Madagascar for rice (Alaotra, where wholesalers are based) and horticulture products (Antsirabe 1, in the vicinity of the city), and in Nicaragua.

Surprisingly the share sold to cooperatives, an topic on which many previous agricultural policies focused, is non-existent in the large majority of the surveyed localities and is anecdotal in the others, aside from Mexico. In the specific case of Sotavento, new producers' organizations were created to support the development of maize production, but these organizations were assembled as a way to access public subsidies. In Tequisquipan, farmers sell maize to producers' organizations which are often under contractual arrangements with large cattle enterprises.

On the contrary, sales to agribusinesses are significant in many places, although their strength varies from one region to another. Logically, this variability is related to the presence or absence of a processor (and, of course, to the viability of crops that require processing). Thus, the highest shares of sales to agribusinesses are found in Koutiala, Mali, where all cotton is sold to the ginning company (CMDT). We also observe high levels of sales to agribusiness in the Haut Delta, Senegal, where tomatoes are processed by SOCAS (*Société de conserves alimentaires du Sénégal*), and Kenya, where sugar cane is sold to several factories.<sup>82</sup> In other regions, the importance of commercialization through agribusinesses is lower, and generally accounts for less than 20% of sales. These low levels of commercialization with agribusiness are found with tomatoes, citrus and olives in Saïss and Souss (Morocco), tomatoes and dairy products in Nakuru North (Kenya), coffee in El

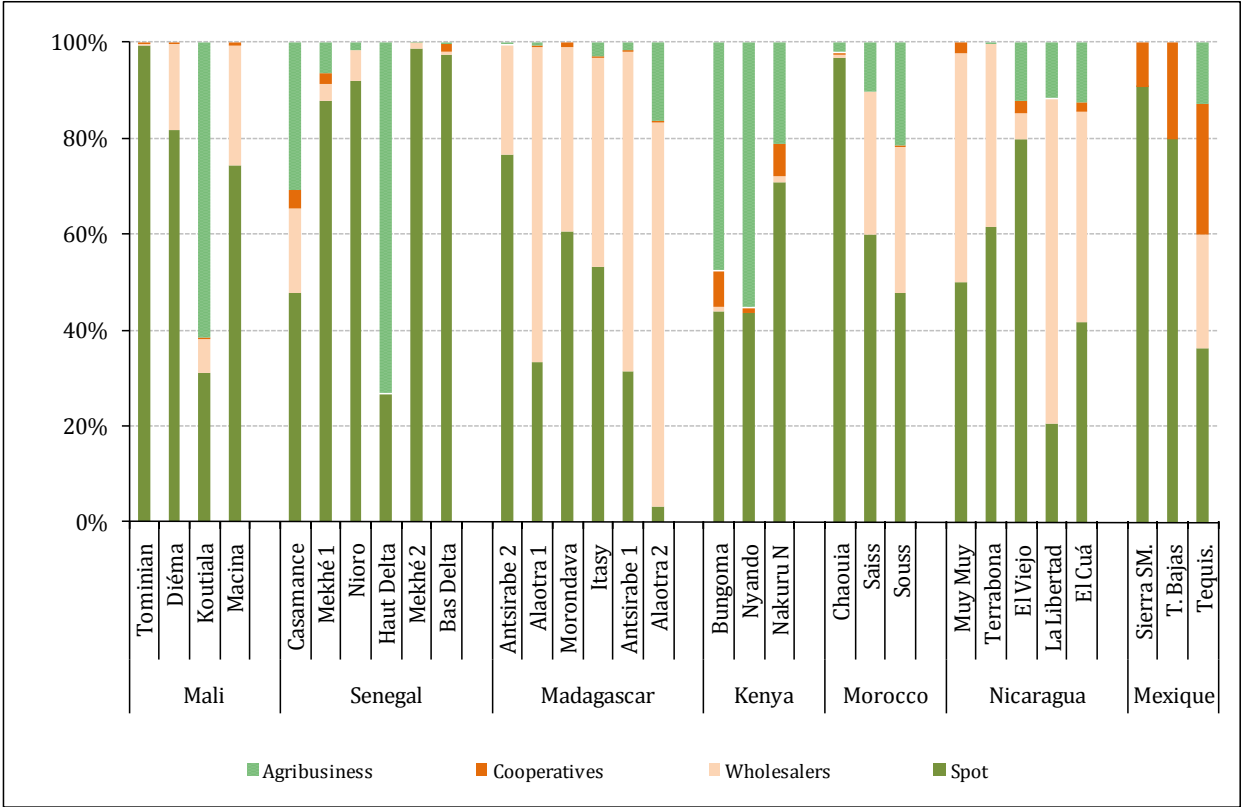
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81 This category refers to agro-industries in charge of transformation of raw agricultural products to semi-processed products (e.g. from cotton to cotton fiber) or processed products (e.g. from tomato to tomato paste or canned tomato). It also refers to businesses that clean, grade and package high-value products, like fruits and vegetables, for the domestic, but mainly export market.

82 It is worth notice that sales to agro-processors can sometimes occur through the channel of farmers' organizations or so-called cooperatives which are in fact creations of the agro-industry, which is also their sole buyer. This is the case for SOCAS and for cotton in Mali.

Cuá (Nicaragua), rice to rice mills in Alaotra 2 and green beans for export in Itasy (Madagascar).

**Figure 30: Methods of Commercialization in the Surveyed Zones (% of the value of sales)**



Source: RuralStruc Surveys

### 2.3.2 Underdeveloped Contractualization

The development of contracts is often seen as a good indicator of increasing integration between economic agents in a value chain; therefore, the identification of contractual arrangements was logically part of the survey framework implemented by the Program.

However, before presenting the survey results, three caveats are necessary. First, an objective the team had in mind when selecting regions and localities for the survey was to display different situations illustrative of different stages of integration. Consequently, no conclusions can be drawn from the observed differences in the number of contracts between regions and sub-regions. Second, as recalled in the methodology (Annex 1), the analysis of contractualization cannot afford imprecision. The definition of types of contracts is a core issue, and while formal contracts refer most of the time to written contracts, informal contracts can correspond to a wide range of situations where trust between buyer and seller is the main component. In each of these situations, understanding the existing arrangements requires a careful survey design. Third, to really make a statement about contractualization one must analyze the level of contracts along the entire

length of the value chain. An opportunity to do so was not provided in the methodology of the present fieldwork.

Even given these caveats, the main conclusion from the survey is that contractualization at the producer level is low almost everywhere in the selected regions. Table 21 makes this point clear: only 539 of the almost 8,000 households surveyed claimed to be engaged in at least one contractual arrangement. They did so even understanding our broad definition of contracts, which included informal contracts perceived by the producer as effective.

**Table 21: Importance of Formal and Informal Contractual Arrangements per Surveyed Region**

		HH with contract		type	Type of industry and contracting agents
		#	%		
Mali	Tomianian	1	0.6		
	Diéma	0	0.0		
	Koutiala	0	0.0		(*) cotton industry (CMDT)
	Macina	16	10.4		
Senegal	Casamance	11	4.6		
	Mekhé 1	26	23.4	I	Cassava wholesalers
	Nioro	1	0.4		
	Haut Delta	54	88.5	F	Tomato processor (SOCAS)
	Mekhé 2	33	29.2	I	Cassava wholesalers
	Bas Delta	12	9.9	I	Rice industry
Madagascar	Antsirabe 2	16	5.3	I	Vegetables collectors
	Alaoatra 1	2	0.5		
	Morondava	15	3.0		
	Itasy	50	9.9	F	Green beans processor (Lecofruit) and tobacco
	Antsirabe 1	46	22.3	F/I	Milk industry (Tiko)
	Alaoatra 2	8	7.0	I	Rice industry
Kenya	Bungoma	75	25.1	F	Sugar industry
	Nyando	7	2.5		
	Nakuru North	16	5.5	F/I	Milk industry and tomato processing
Morocco	Chaouia	1	0.4		
	Saïss	20	7.7	F	Milk Industry
	Souss	1	0.4		
Nicaragua	Muy Muy	9	3.0	I	Milk collection (Parmalat and Eskimo)
	Terrabona	4	1.4		
	El Viejo	13	4.5	F/I	Sesame and sorghum industry
	La Libertad	20	6.9	I	Milk collectors
	El Cua	47	15.7	I	Coffee Industry
Mexico	Sierra S. M.	0	0.0	I	(*) Producers'organizations
	Tierras Bajas	6	4.0	F/I	Maize Industry and (*) Producers'organizations
	Tequis.	29	8.0	F	Producers'organizations
		539	7.4		

*RuralStruc Surveys*

*F = formal; I = informal; (\*) refers to de facto contracts*

This lack of contractualization – particularly the lack of formal contracts – is significant, even despite the three caveats above. It reflects the low intensity of the integration

processes in the surveyed regions and the limited development of high value chains (where product requirements justify contracts). This is not totally surprising, even in light of the fact that several 'winning regions' had been selected for the presence of specific market dynamics related to products and / or agro-industries.

In some of these regions, contracts with agribusinesses are almost non-existent. This is particularly true in two regions of Nicaragua (Terrabona and Muy Muy), where only a few farmers are directly connected to fruit and vegetable integrated value chains (domestic supermarkets such as Wal-Mart or La Colonia) and to dairy chains (supermarkets and processors such as Parmalat or Eskimo). However, these cases illustrate an important finding: in many situations, contractualization is not occurring at the producer level segment of the value chain, rather it is often downstream, between the wholesaler or the cooperative and the processing firm or the procurement service.

Three types of contractual arrangements and relationships between economic agents are generally identifiable: first is the informal contract that comes about through long-standing relationships, mainly with wholesalers; second is a supply contract with an agro-processor; and third is a more direct integration into high-value chains.

#### a Informal Contracts

Growing urban demand for fresh products has led to the development of value chains that are structured by wholesalers and are supplied by producers with informal agreements. This is particularly common when the competition between middlemen is high and when the product is perishable.

This is the case of the fruit and vegetable sectors in Antsirabe, which are integrated on the basis of informal agreements between individual producers or farmers' organizations and brokers who supply urban wholesalers. The producers who benefit from these agreements are generally the biggest producers with the best factor endowments (correlations are statistically significant) that allow them to reach surplus. In the same way, in the Groundnut Basin (mainly Mekhé 2, Senegal), cassava producers have also developed informal contractual agreements with middlemen based on transaction routine and reputation. These contracts guarantee the flow of supply to urban areas, whereas production is widely dispersed throughout the region.

Similarly, in Nicaragua, in response to growing urban demand and to the development of supermarkets, wholesalers have recently expanded their collection area. Thus, La Libertad is one of the regions where, in some villages, verbal agreements are used to satisfy this demand. These agreements provide many advantages for farmers; in particular, they enjoy the insurance of selling milk daily instead of selling on-farm processed cheese once a week. They also incur lower costs. Usually, the households that access these informal agreements are also the ones with more available land and bigger herds (hence, they are capable of producing more milk): they own 2.3 times more land and three times more cattle on average (correlations are statistically significant).

In the Sotavento region, informal contracts have also developed between farmers and producers' organizations for the purpose of accessing public transfers and for offering technical assistance and inputs in exchange of the commercialization of products. Although farmers did not claim to be engaged in contracts, their membership in producers' organizations often means *de facto* contracts.

#### b Supply Contracts with an Agro-Processor

These contracts are a very old practice, which initially developed to guarantee supply (and thus profitability) to industrial investments. Several examples exist in the surveyed regions, especially in the dairy industry. In Madagascar, privatization of the parastatal monopoly did not significantly change the configuration of the value chain, which is largely controlled by Tiko, a private firm that plays (or played, until recently) a central role in the Malagasy dairy industry. Tiko was collecting more than 90% of the milk marketed in the main production region (Antsirabe) and processing most of the dairy products in the country. With Tiko, contracted producers deliver milk to collection centers, where it is required to meet quality criteria stipulated in a formal contract. In return, the agro-industry provides inputs and sometimes cash advances. In this case, producers with larger herds are found to be more involved in these integration strategies. Similar patterns exist in Saïss, Morocco, and in Nakuru, Kenya.

Similar formal supply contracts also exist with sugar factories in Kenya (Bungoma) or with the tomato industry in both Haut Delta (Senegal) and Nakuru. This specific market configuration, with one agro-processor and many suppliers, can be seen to include situations of monopsony. In these cases there are no contracts, but there is a sort of tacit contractualization resulting from the knowledge that the producers do not have any options other than to sell to the monopsonist. A good example is the case of cotton: 75% of the family farms in the Koutiala region grow cotton and they have a *de facto* a contract with the CMDT, even if nothing is actually written.<sup>83</sup> The sector is vertically integrated, with the provision of inputs through producers' organizations; a system of credit secured by cotton sales; extension services and technical support; and fixed prices, which are negotiated to a certain extent.

#### c Contracts Related to High-value Exports

Contracts with high-value export companies are the typical contract cases cited in the literature. However, in the RS localities surveyed, only two examples of this type of arrangement were found. The first is the famous *Lecofruit* case in Ifanja, Itasy (Madagascar), where farmers grow green beans for export (see Box 13). The other case is in the coffee region of El Cuá, Nicaragua. In this region, organic coffee is mainly promoted by COMANUR-RL (*Cooperativa Multisectorial Alfonso Núñez Rodríguez*), which sells conventional and organic coffees. Farmers produce organic coffee under strict

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83 After years of negotiation privatization has finally been launched in 2010; however, it will not fundamentally change the market pattern and CMDT will be replaced by regional monopsonies.

specifications for the cooperative, at a determined price, and the cooperative provides technical assistance to its members including access to coffee management and planting material (new varieties of coffee), agricultural inputs (fertilizers and other agrochemicals), and to expensive equipment or infrastructure.

**Box 13: Lecofruit: Malagasy Smallholders Selling on European Markets**

The company " *Légumes Condiments et Fruits de Madagascar SA*" – also known as *Lecofruit* – was installed in Madagascar in 1989 when free zones were implemented and promoted by the Malagasy State (with tax exemptions and other fiscal advantages). Initially, *Lecofruit* processed pickles in small amounts in partnership with approximately 100 farmers. To develop its export markets, the firm associated with the French company *Segma Maille*, which guaranteed regular outlets for its products in Europe. Accordingly, *Lecofruit* began to diversify its production with green beans and snow peas, cucumbers, asparagus and baby vegetables for export to the European market. Currently, *Lecofruit* focuses on extra fine green beans production: the company exported 3,000 tons of products during the 2004/05 season, among which 70% were green beans. Approximately 90% of this tonnage were processed and canned in the company factory in Antananarivo and sent to Europe by sea. The remaining 10% was fresh green beans and snow peas shipped by air.

In 2007/08, the company branched out to involve 10,000 farmers under contract in the production of green beans. Producers are located in the highlands of Madagascar where a long tradition of fruit and vegetable production exists. The company now also targets the growing areas connected to major roads in order to optimize the costs of transporting products to the processing plant in Antananarivo.

Farmers cultivate their own land which helps to overcome the problems of land availability in the highlands. Production contracts are standardized and individual, though producers are obliged to belong to a producers' organization. A contract is limited to an area of approximately 1 are (1000m<sup>2</sup>) to ensure that producers will be able to comply with all stages of the production until harvest, as production is labor-intensive. Other commitments relate to specific technical recommendations (preparation of compost, plowing, seeding, etc.) and the need for daily harvest in order to meet the extra-fine size requirement of the product.

Cash advances are provided to producers under contract by the company; seeds are given for free and mineral fertilizer and pesticide costs are deducted from the final payment of the producer once green beans have been delivered. *Lecofruit* provides a "package" of seeds, mineral fertilizers and pesticides to ensure compliance with standards on maximum residue limits faced by agricultural products exported to the European Union. Some sanitary conditions that producers must meet are also stipulated in the contracts, such as washing of hands with non-perfumed soap before harvesting the beans, etc. Finally, producers are required to only deliver the production to *Lecofruit*. The payment is periodic. The price paid to farmers is set in advance by the company and remains unchanged during the season: 630 Ariary/kg for green beans in 2007/08.

Despite the balance of power that favors the processing firm in terms of prices, the number of farmers involved in contract farming with *Lecofruit* has never fallen, which means that farmers find the agreement as an interesting way to generate income and, above all, to provide cash to finance their other agricultural activities or to meet their needs.

Sources: RS II Madagascar, p. 84-85.

Due to the very limited information and the few cases gathered by the surveys, it is difficult to draw conclusions about the consequences of contractualization on households' incomes. There is also of, course, a reverse causality issue to contend with: in general, a household's low level of production is one of the biggest barriers to its participation in contractual agreements. It was noted previously that procurement systems or agro-industries prefer to work with large suppliers in order to lower their transaction costs. Thus, as previously mentioned, with the exception of Madagascar's green bean producers (who's plot area is

restricted by the contracting company), the households who engage in contracts tend to be those with the best factor endowments.<sup>84</sup>

However these results are obviously rough estimates, knowing that the fieldwork did not specifically target the measurement of the impacts of contractual arrangements. Many other factors interfere, and a precise analysis of farm income / contract linkages would imply specific research investments based on multiple years of observation. Nevertheless, based on the RuralStruc case studies, one can assume that the implications of contractualization for incomes remain limited, with a few exceptions. The survey shows that income differences between households with or without contracts are often minimal. It is worth noticing that the maximum average gross product earned from green bean production under contract in Itasy, Madagascar, is a very low 43 \$PPP per household per year. The main advantages of contractualization are certainly more related to access to technical packages, credit, and a secure marketing channel, as shown in many of the surveyed regions.

## **2.4 Summary of OnFarm Income Analysis**

Households in the RuralStruc Survey participate in rural economies that have not been as radically reshaped by liberalization and the supermarket revolution as one may have thought. High levels of self-consumption, a reliance on staples, and heterogenous patterns of on-farm diversification that develop in response to region-specific opportunities are commonly observed characteristics. Self consumption levels are driven both by a “supply effect”, whereby households employ risk-management strategies to retain control over their food supply, and a “demand effect”, whereby households are face a weak demand for their products due to poor access to and integration with markets.

Most private collecting agents operating in RuralStruc areas rely on informal relationship-based strategies to obtain output from small farmers, while agribusinesses generally employ traditional contract farming practices. The famous “high-value” export operations are few and far between, and employ a very small share of all farmers surveyed. Contractualization remains low, even for those firms who are firmly integrated into markets though ongoing relationships with wholesalers and other buyers. Furthermore, contractualization rarely occurs at the producer level: it is often downstream, between the wholesaler, or the collection unit, and the processing firm or the procurement service.

In short, our analysis reveals the persistence of old agricultural patterns in spite of the slew of changes that have occurred in many developing countries’ agricultural sectors in the last few decades. While a small minority of farmers have been able to escape poverty though increased integration into markets, the opportunities to make this escape depend on the existence of very unique circumstances.

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<sup>84</sup> This seems to be the case for land in particular. However, the small number of households with formal contracts does not allow any conclusion. In Antsirabe 1, where the number of contracts in the sample is sufficient, the T Test is significant.





## **CHAPTER 6. – REGIONAL PATTERNS OF DIVERSIFICATION OR SPECIALIZATION**

The previous three chapters provided details of the level of income and the characteristics of on-farm and off-farm activities in the surveyed regions, and in doing so posed questions as to why observed patterns exist.

Chapter 3 presented the breadth and depth of poverty among surveyed households, and illustrated significant differences in income levels between surveyed regions. Nearly all of the surveyed regions in sub-Saharan Africa remain in dire economic situations, with average incomes below \$1/day. In other regions the situation is clearly different: the poorest surveyed region in Mexico is eight times richer than the poorest surveyed region in Mali. The evidence presented in the chapter begs the question, “why are some regions richer than others?”

Chapter 3 concluded with an exercise classifying regions according to the WDR08’s typology of livelihood strategies (see Chapter 3, Table 12). That exercise showed that households tend to follow one of two main livelihood strategies. In twenty of the thirty surveyed regions households were mainly focused on farming activities, and in 12 of them more than half of households earned at least 75% of their income from on-farm sources. The remaining ten regions were characterized by diversification strategies without any clearly dominant activity (with the exception of Tequisquiapan, Mexico, where less than 30% of households have farms and therefore specialization in waged labor is the norm). Chapters 4 and 5 provided a more detailed analysis of the characteristics of on-farm and off-farm activities and incomes, helping to create a better understand the characteristics of the existing livelihood strategies. In doing so, it painted a very mixed picture of specialization and diversification patterns. These patterns are clearly region-specific and represent a significant heterogeneity of situations. The evidence presented in these chapters begs the question, “what explains patterns of diversification or specialization between regions?”

This sixth and final chapter will address successively these two questions, which are in fact clearly linked. They both relate to the broader questions of “what are the viable exit options out of rural poverty” (in terms of the WDR08) which depend themselves on the existence of alternatives, which relates directly to the economic structure of the country.

### **1 Understanding the Regional Level of Income**

One can assume that a household’s level of income per capita results from three things: the type of economic activities in which it is engaged, the returns to those economic activities, and the size of the household. Chapters 4 and 5 explored the types of activities in which households are engaged, and found no evidence of consistent patterns whereby richer households are engaged in one activity and poorer households in others. In terms of on-

farm activities, chapter five made it clear that it is not so much the type of crop grown or the method of marketing that is related to income differences, it is more the number of crops grown that counts. And the ability to grow more types of crops seems to be related in some way to a farmer's asset endowment and the environment of the region in which he lives. Regarding off farm activities, it is similarly the case that there is no silver bullet, whereby all rich households are engaged in a certain activity and not in another. It is not even the case, as we found with on farm-income sources, that richer households are more involved in a higher number of off-farm activities. How these patterns relate to income is a question worth exploring.

Returns to activities are influenced by the technology used and degree of integration to markets. Technology in this case refers to the type of assets owned by a farm and the human and social capital of the household.

Based on this analysis the Program decided to tailor its investigation into the determinants of income along four lines of inquiry: household characteristics and human capital, assets related to farm productivity, environment and market integration, and off-farm diversification. To pursue this investigation it engaged in a series of regression analyses. While a full explanation of the regression work and descriptions of the variables used can be found in appendix 5, a brief overview of the motivation and a summary of key results are presented below.

The regression work primarily takes place at the regional level (aggregating the households for each region), and was conducted in all thirty RuralStruc regions. The analysis only includes households with farms, as including households without farms would have reduced the explanatory power of our variables for farm assets. In each regression, the dependent variable is the log of household income per equivalent adult.<sup>85</sup>

We did, however, also engage in regression work at an aggregated level. For these specifications, all surveyed households in each country were used as observations in one catch-all regression, and regional affiliations were not considered. This "aggregated level" regression has the benefit of capturing the effects on wealth of assets or environmental conditions whose distribution varies significantly between regions but not within them. Examples include irrigated land in Mali (where Macina is very well endowed while other regions lack any irrigation at all) and transportation difficulty (where all households in a region likely face the same transportation hurdles, but households in other regions will face different problems). Table 22 and Table 23 give an overview of the results of the regression analysis and display the significant variables.

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<sup>85</sup> Every effort was made to run the same regression in all thirty surveyed regions. This was not always possible, as certain pieces of information were available in some regions and not others or some variables were locally irrelevant (e.g. irrigation), but in general the specification in each region is very similar.

**Table 22: Region Level Regression Results**

	Mali			Senegal				Madagascar				Kenya		Morocco			Nicaragua			Mexico			# of regions where variable is significant at 5% level	# of regions where variable is significant at 10% level								
	Tominian	Diena	Koutiala	Macina	Casamance	Mekhé 1	Nioko	Haut Delta	Mekhé 2	Bas Delta	Antsirabe 2	Alaoira 1	Morondava	Itasy	Antsirabe 1	Alaoira 2	Bungoma	Nyando	Nakum North	Charouia	Saïss	Souss			Muy Muy	Terrabona	El Yejo	La Libertade	El Cua	Tequisquapan	Sierra SM	Tierras Bajas
Demographics and Human Capital	Number of Persons in HH (Nb_PersonsPres_hh)																														17	1
	Dependency Ratio																														1	4
	Number of Long Term Migrants from HH																														4	0
	Number of Short Term Migrants from HH																														2	0
	HH head has at least Some Primary Education (binary)																														4	2
	HH head has at least Completed Primary Education (binary)																														5	3
HH Head has at least Some Secondary Education (binary)																														6	4	
HH Head has at least Completed Secondary Education (binary)																														2	0	
Household Assets related to Productivity	Hectares of Land Used by HH, per EqA (Land Owned in Nic.)																														19	3
	Hectares of Irrigated Land by HH, per EqA																														4	0
	HH uses Technical Package (improved seeds/fertilizer) (binary)																														5	3
	HH uses Manure (binary)																														1	0
	Number of Livestock Units (weighted avg) (# of Cattle in Mexico)																														19	1
	HH Uses Animal Draft (binary)																														4	1
	HH Uses Tiller for Draft (binary)																														2	1
	HH Uses Tractor for Draft (binary)																														4	3
Market Integration	Transportation is Easy only Part of the Year (Qualitative binary)																														7	1
	Transportation is Difficult (Qualitative binary)																														4	3
	Transportation Difficulty in Unknown (Qualitative binary)																														1	1
	c_50000 (c_ports in Kenya, Sub-Regions in Morocco)																														4	1
	Contract (binary)																														5	1
Diversification Index																														17	1	

**Table 23: Nationally Aggregated Regression Results**

	Mali	Senegal	Madagascar	Kenya	Morocco	Nicaragua	Mexico	# significant at 5% level	# significant at 10% level	Legend			
										Significant at the 5% level	Significant at the 10% level		
Demographics and Human Capital	Number of Persons in HH (Nb_PersonsPres_hh)										6	0	<div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: orange; margin-right: 5px;"></div> <span>Significant at the 5% level</span> </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: lightgreen; margin-right: 5px;"></div> <span>Significant at the 10% level</span> </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: gray; margin-right: 5px;"></div> <span>Not Included in the regression (see Appendix)</span> </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; border: 1px solid black; margin-right: 5px;"></div> <span>Included but not significant</span> </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: white; border: 1px solid black; margin-right: 5px; display: flex; align-items: center; justify-content: center;"> <span style="font-size: 8px;">N</span> </div> <span>The coefficient is negative</span> </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: white; border: 1px solid black; margin-right: 5px; display: flex; align-items: center; justify-content: center;"> <span style="font-size: 8px;">P</span> </div> <span>The coefficient is positive</span> </div>
	Dependency Ratio										4	0	
	Number of Long Term Migrants from HH										1	1	
	Number of Short Term Migrants from HH										2	0	
	HH head has at least Some Primary Education (binary)										2	0	
	HH head has at least Completed Primary Education (binary)										1	1	
HH Head has at least Some Secondary Education (binary)										2	1		
HH Head has at least Completed Secondary Education (binary)										2	1		
Household Assets related to Productivity	Hectares of Land Used by HH, per EqA (Land Owned in Nic.)										6	0	
	Hectares of Irrigated Land by HH, per EqA										4	0	
	HH uses Technical Package (improved seeds/fertilizer) (binary)										2	0	
	HH uses Manure (binary)										1	0	
	Number of Livestock Units (weighted avg) (# of Cattle in Mexico)										5	1	
	HH Uses Animal Draft (binary)										3	0	
	HH Uses Tiller for Draft (binary)										2	0	
	HH Uses Tractor for Draft (binary)										2	1	
Market Integration	Transportation is Easy only Part of the Year (Qualitative binary)										0	0	
	Transportation is Difficult (Qualitative binary)										4	2	
	Transportation Difficulty in Unknown (Qualitative binary)										1	0	
	c_50000 (c_ports in Kenya, Sub-Regions in Morocco)										2	0	
	Contract (binary)										4	0	
Diversification Index										6	1		

Table 22 is a complex table that offers many results with lots of possible interpretations. It is clear that the regressions have more explanatory power in certain regions, while in others they are not able to explain much of the variance in incomes. In general, the regression does better in regions with higher shares of on farm incomes (the importance of self employment in Senegal is likely why our regression, laden down with variables related to farming, does poorly there). We address below the main highlights by category of variable and provide comprehensive comments.

**Demographic and Human Capital Variables:** The total number of persons present in a household is significant in 18 of the 30 regions, and is therefore one of the most broadly significant variables in the regression. In almost every case it is significant with a negative coefficient. This implies that in most households, an additional household member costs on average more to maintain than they are able to provide. If we assume that the farm households in our sample mostly rely on family labor, the implication is that there are too many workers on the farm. For the average household then, an additional family member is less a work asset than a cost. This is the case everywhere except Koutiala in Mali, where the relationship between persons present and income is positive. This implies that families in Koutiala do not have enough labor. This conclusion makes sense in light of what we know about the labor requirements of cotton farming.

Given the prevalence of surplus labor in households, it is surprising to see that migrations are only significant determinants of income in five regions. This phenomenon has two possible causes. Firstly, as was shown in Chapter 4, many households send short-term migrants away without any expectation of remittance earning. The goal is often simply to decrease the number of mouths to feed. This practice is necessarily associated with poorer households. With long-term migrations, there are usually expectations of remittances, but these strategies are not always successful. Secondly, migrations are less common in the survey than one may have thought.<sup>86</sup> Long term migrants are present in only 21% of surveyed farm households. Short term migrants (which are often circular migrants) are even less common, only appearing in 11% of farm households. The regression work shows that migrations are clearly under-utilized as a livelihood strategy, which reflects the fact that strong barriers to migration currently make it a non-viable option for many households. These population dynamics revealed by the regression work are consistent with the demographic issues presented in chapter 2.

Conclusions from the education variables are less clear-cut. Education is less frequently associated with income in the countries of North and West Africa (Senegal, Mali, and Morocco) but also Mexico. There also seem to be important level effects, but not necessarily “certificate effects”. The most significant difference in

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<sup>86</sup> The difficult capture of migration incomes is of course an issue addressed in Chapter 4.

incomes is associated with the jump from having completed primary education to having some secondary education. This of course may have to do with a narrower availability of secondary schools rather than returns to schooling.

**Household Assets Related to Productivity:** There are three important findings related to household assets. The first is the continued supreme importance of land, specifically how much land is available to the farmer. This is significant in 22 of 30 regions, making it the most commonly significant variable in the survey. In 7 regions it has the largest coefficient of any variable in the regression. It is the second largest in 5 additional regions. The implication of this finding regarding the importance of land is that, despite all of the efforts of the development community over the last decades to focus on improving the output of a fixed sized plot, the best way for a farmer to improve his income is still to acquire more land. This helps to confirm a main finding of chapter 5, that the differentiation processes related to farming that were anticipated with increased economic integration have yet to be broadly realized. Further confirmation is provided in our second important finding, the comparatively broad insignificance of the technical package variable (the technical package represents access to fertilizer and improved seeds). It is only significant in 8 regions, and in two of those regions it enters negatively (farmers with the technical package are worse off than those without it). Perhaps more surprisingly, it is only significant between regions in two of the seven RuralStruc countries.<sup>87</sup> The third important finding is that the number of livestock owned is broadly and significantly associated with income. However, livestock can at the same time be an output, a productive asset, a method of savings, and a social attribute. These diverse roles complicate the interpretation of the livestock variable.

**Market Integration Variables:** Even with the caveat that market integration is a difficult thing to measure, a main finding of the regression work is that market integration does not necessarily imply improved incomes. Whether or not it does is context specific. The regression suggests this conclusion by examining market integration along two axes, distance to markets (including a qualitative assessment of transportation quality) and the number of households with contracts (what constitutes a contract having been more specifically discussed in Chapter 5).

Our distance to markets variables left little in the way of patterns to be discerned. Transportation quality is significant in the anticipated direction (poor quality associated with lower incomes) in only 6 regions, spread out relatively evenly across RuralStruc countries. However, there are almost as many regions (five) where a negative assessment of transportation quality is significantly associated with higher incomes: Bas Delta (Senegal) the two Antsirabe regions (Madagascar) El Cuá (Nicaragua) and Tequisquiapan (Mexico). While this could simply be due to a situation where it is only the relatively rich that ever try to leave an area (and

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<sup>87</sup> The survey did not address a detailed review of intensification practices. As a consequence, what is captured is only the presence or absence of a technical package.

therefore encounter transportation problems and complain about them), it is true that these are all regions where the richest farm households are significantly more involved with a specific crop: rice in Bas Delta, potato in Antsirabe, coffee in El Cuá, and maize in Tequisquiapan. It may well be that better farmland and larger plots are more readily available in areas where transportation access is poorer.

In terms of contracts, the regression clearly shows that they are significantly associated with income in Kenya and Nicaragua. It is interesting to note that this does not have to do with prevalence of contracts: some farmers in every country have them, and Kenya and Nicaragua are not particularly well endowed. The difference is where the contracts are concentrated on the income spectrum. In the Haut Delta, where over 90% of farmers are contracted to the tomato processor SOCAS, the few households without a contract are actually richer. Those with contracts are in a situation of heavy dependence, tightly bonded with the processor. Whether a contract allows a farmer to increase his income or prevents him from taking advantage of a more lucrative opportunity depends on the regional context.

The conclusions from the regression work so far can be summarized under two key topics. The first is the persistence of old patterns of wealth. Income still responds to population dynamics in the same way it did hundreds of years ago throughout the world: as population goes up income per head falls. The same old patterns persist in farming. Improvements in income from farming still rely more on increasing the amount of land under cultivation rather than making smarter and more productive use of that land.

The second topic however points out that changes are occurring, but sporadically and in a way that does not follow a set pattern. Households each individually are responding to their environments with their asset endowments in the best way they can to improve their own incomes. Since these environment and asset endowments change significantly from region to region, households' strategies vary accordingly. The effectiveness of specific strategies in terms of income generation will also change significantly between regions. This is clear in the regression results. Education is significantly associated with incomes in some areas and not in others, without seeming to follow any set pattern. So is the type of draft force used, or quality of transportation available.

A good illustration of this heterogeneity is provided in Table 24. It displays the three variables most strongly associated with income in each region. The top variable is the one with the largest coefficient (in absolute value) that is at least significant at the 5% level. If there are less than three variables significant at the five percent level, the variable with the largest coefficient and significant at the 10% level is used.

The result of this table is straightforward. "Land Used" is a top driver of income in a full half of the RS regions. The result is of course driven by the share of "poor regions" (the case of Madagascar is clear) but significance exists also in Morocco and

Mexico. After land there is no particular variable that is any more common than any of the others, and none that appear in the top three in more than six regions. Additional patterns of significance in the chart are indiscernible.

**Table 24: Variables most strongly associated with income by region**

	Mali			Senegal				Madagascar				Kenya		Morocco		Nicaragua			Mexico			# of 1st	# of 2nd	# of 3rd	total												
	Tominian	Diema	Koutiala	Macina	Casamance	BA Nord 1	BA sud	Haut Delta	BA Nord 2	Bas Delta	Antsirabe 2	Alaoira 1	Morondava	Itasy	Antsirabe 1	Alaoira 2	Bungoma	Nyando	Nakuru	Chaouia	Satss					Souss	Muy Muy	Terrabona	El Viejo	La Libertade	El Cua	Tequis	Sierra SM	Tierras			
Demographics and Human Capital	Nb_PersonsPres_hh		P	N		N																											0	4	2	6	
	Dependency Ratio																																	0	0	1	1
	Number of Long Term Migrants from HH																																	1	0	1	2
	Number of Short Term Migrants from HH		N																					N										0	0	2	2
	HH head has at least Some Primary Education																																	1	1	3	5
	HH head has at least Completed Primary Education																																	1	3	0	4
	HH Head has at least Some Secondary Education																																	4	1	1	6
	HH Head has at least Completed Secondary Education																																	1	1	0	2
Household Assets related to Productivity	Hectares of Land Used by HH, per EqA (Owned in Nic)																																	7	5	3	15
	Hectares of Irrigated Land by HH, per EqA																																	2	1	0	3
	Technical Package																																	2	1	1	4
	Manure																																	0	0	1	1
	Number of Livestock Units (weighted avg)																																	2	3	1	6
	HH Uses Animal Draft																																	1	0	2	3
	HH Uses Tiller for Draft																																	1	1	0	2
HH Uses Tractor for Draft																																	2	1	0	3	
Market Integration	Transportation is Easy only Part of the Year																																	0	3	3	6
	Transportation is Difficult																																	1	0	1	2
	Transportation Difficulty in Unknown																																0	1	0	1	
	Transportation Difficulty in Unknown c_50000 (c_ports in Kenya, Regions in Morocco)																																	2	1	0	3
	Contract																																	2	0	2	4
Diversification Index																																	0	1	5	6	

■ Most Strongly Associated Variable  
■ 2nd Most Strongly Associated Variable  
■ 3rd Most Strongly Associated Variable

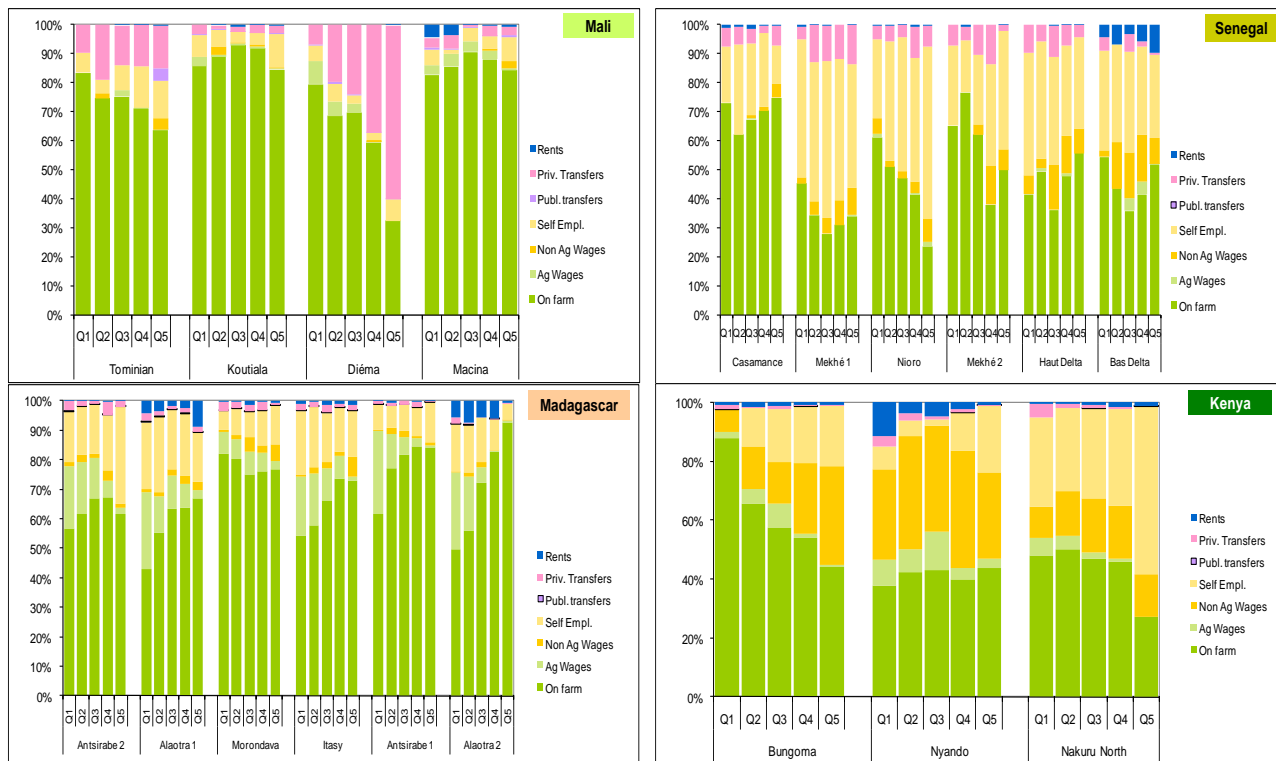


## 2 Fine-tuning the Regional Patterns

### 2.1 First overview

The final line of inquiry into determinants of income in the regression involved diversification. The question of how diversification patterns are related to income clearly is a part of the second question posed at the beginning of this chapter: “what explains patterns of diversification or specialization within regions?” But before we get to our analysis of the relationship between diversification and income it is useful to backtrack slightly and begin with an overall picture of household income sources by region and quintile. Not only does this exercise serve as a way to combine the analysis of chapters 4 and 5 into the overall picture, it is the first step on the way to understanding diversification patterns. Figure 31 displays the regional patterns per quintiles using the on-farm incomes as a group and the six off-farm incomes discussed in our review of the RNFE: agricultural wages, non agricultural wages, self-employment, public transfers, private transfers, and rents.

**Figure 31: Income Structure in the Surveyed Regions (in % of \$PPP / EqA)**





This overall picture confirms the important place of on-farm activities in regional income structures, but also illustrates important differences between regions. The share of on-farm income remains high in Mali, Madagascar, Nicaragua, Casamance in Senegal, and Saïss in Morocco; but off-farm incomes are very significant in Senegal, Kenya, Mexico, Chaouia and Souss in Morocco. Furthermore, the exact configuration of off-farm incomes in these seemingly more diversified regions varies. Self-employment is a key activity in Senegal, non agricultural wages and self-employment in Kenya, agricultural wages in Nicaragua, and higher diversification in Mexico.

Again, the above analysis clearly presents a diverse array of situations and illustrates the heterogeneous nature of regional diversification patterns. Even if it is possible to broadly suggest why some regions diversify and others do not (comparative advantages, urbanization, institutions, etc.), and why within each region some households diversify and others not (assets), the mechanisms contributing to the many combinations of income sources remain unclear.

## 2.2 Characterizing the Trends

To shed more light on this subject, the RS Program created an index of household diversification that is based on the well-known Herfindahl-Hirschman index (HHI).<sup>88</sup> The index is set between 0 and 1, and returns higher values as a region becomes more heavily

<sup>88</sup> Although constructed in a way that makes it more like 1-HHI. See the definition of the index in Annex 1.

involved in more types of activities. Therefore, higher values of the diversification index mean more diversification, while lower values mean more specialization.

Figure 32 tells us the average level of the diversification index by region and quintile. Looking at this figure, trends begin to emerge. We can analyze these trends on three levels: between countries, between regions of the same country (regional effects) and between income quintiles of the same regions (quintile effects).

### 2.2.1 “Country” and Regional Levels

First, at the country level, we notice a significant drop in the diversification index when moving from SSA into non-SSA regions. In Morocco, Nicaragua, and Tequisquiapan, the average value of the index hovers in the vicinity of 0.15 to 0.2. In most of the other survey regions (including 16 of 19 SSA regions), diversification indices are around 0.3. The exceptions are few and noteworthy. The lower level of diversification is observed in Sub-Saharan Africa in Koutiala and Macina (Mali) and in Morondava (Madagascar). These situations result from specific regional situations that will be discussed further. The higher level of diversification is observed outside of Sub-Saharan Africa in the two regions of the Mexican Sotovento (Tierras Bajas and the Sierra). This is largely a result of the way the index is constructed. As it is based on the seven types of incomes, the presence or absence of one of these types can have a large effect on a household’s overall score. One of the seven types of income measured by the index is public transfers, which exist in every quintile in every region in Mexico, and nowhere else in the survey. This significantly raises the diversification index in Mexico relative to other countries.<sup>89</sup> Even with the presence of these exceptions, it seems that between countries, diversification tends to fall as incomes increase.

Moving from the comparison between countries to the national level, we can also notice patterns between regions of the same country (or regional effects). It is clear, for example, that the two richer regions of Mali (Koutiala and Macina) are more specialized than its two poorer regions. This clearly reflects the long-standing Government attention given to the cotton industry and to the irrigation scheme of the Office du Niger. Taking another look at Mexico, we notice one region (Sierra de Santa Marta) that has a significantly higher diversification score than the others and one region (Tequisquiapan) that has a significantly lower diversification score. In the Sierra region, households are unable to specialize in maize to the same extent as their neighbors in Tierras Bajas. This stems partly from their isolation and subsequent lack of access to large buyers, but also from the smaller plot sizes available in mountains terrain. In Tequisquiapan, diversification occurs between households rather than within households, meaning that different households specialize in different things, creating a diversified economy (note how diversified it appears in **Error! Reference source not found.**). So while household’s diversification scores are all low, only 27% have farms at all. But between-regions patterns of diversification do not all tend

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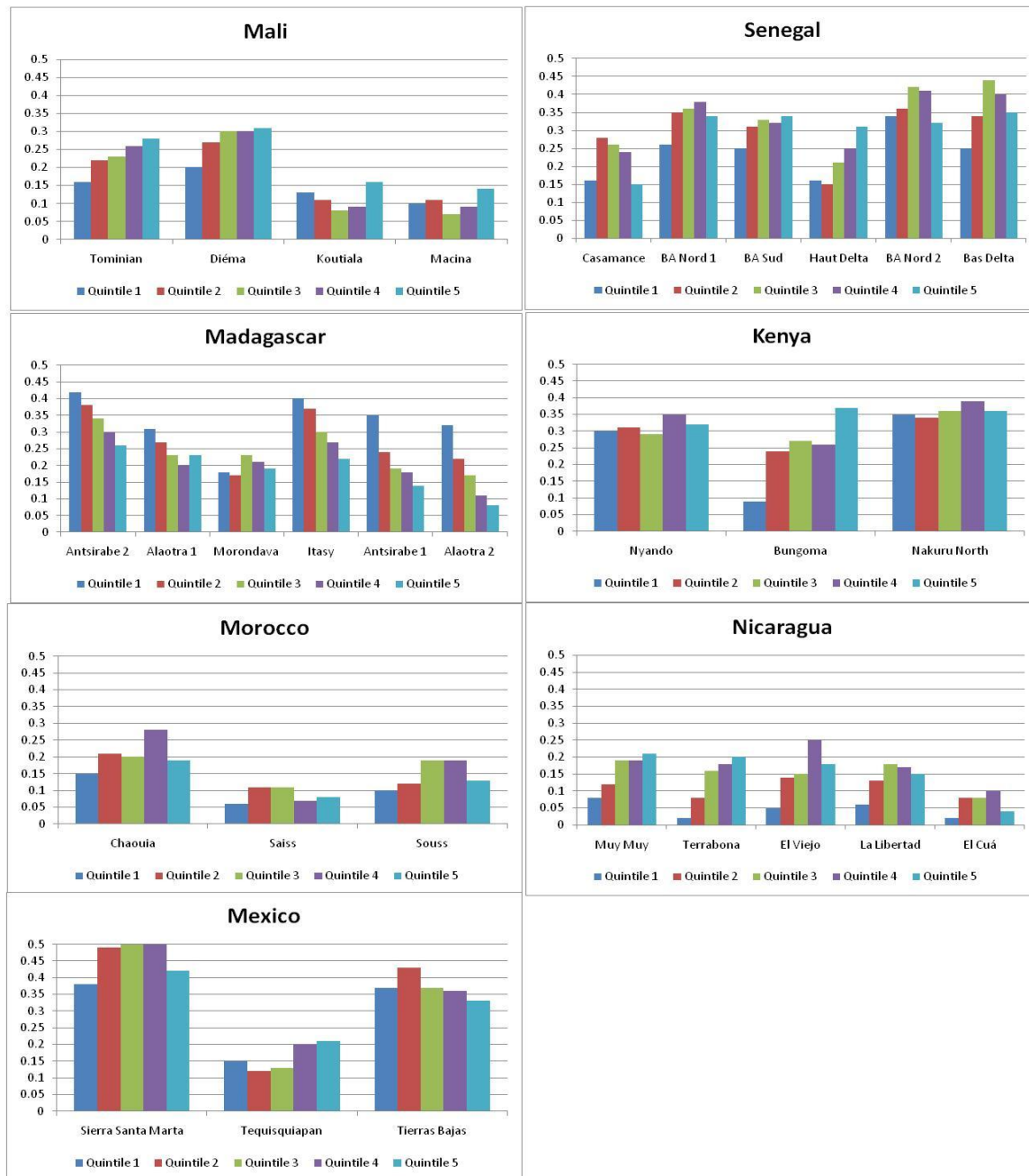
<sup>89</sup> Tequisquiapan’s index is not raised in this way because although public transfers are added, on-farm income is only present in 27% of households.

toward specialization with rising incomes. In Senegal, the Bas Delta is significantly more diversified than Casamance, and in Kenya Nakuru North is more diversified than Nyando.

### 2.2.2 *Household Level*

These regional effects, however, tend to be less pronounced than intra-region “quintile effects.” Although it appears clearly that in some regions richer quintiles are more diversified and in others they are more specialized, in most regions the change from quintile to quintile is important. Clearly there is a strong relationship between income and diversification. Also worth noting is that it appears that the direction of the quintile effect (whether richer households tend to be more specialized or more diversified) is the same between regions of the same country, with a few notable exceptions. For example, most regions in Madagascar show a sharp decrease in diversification as incomes rise, suggesting coping strategies outside of agriculture for the poorest households. The exception is Morondava, where isolation prevents residents from accessing diversification opportunities. The opposite can be noted in Senegal, where increasing incomes are associated with increased diversification in most regions. However, in Casamance richer households specialize. It is an isolated region with limited access to urban markets, and therefore limited access to self-employment opportunities and non agricultural wages. An interesting case to observe is Kenya, where the richest and poorest regions (Nakuru North and Nyando) seem to have a constant (and similar) level of diversification, while the intermediate region, Bungoma, seems to be in a state of change, with richer households becoming more diversified. This phenomenon is explained by looking at the income structure of households in Nyando and Nakuru. Households in Nakuru are heavily involved in two things: farming (maize but also higher value products like dairy and tomato) and self-employment activities supported by nearby Nakukru town. In Nyando, the majority of the population either grows sugar or works in the sugar processing plants. Although at the same level of overall diversification, households in Nakuru are involved in very different activities from those in Nyando, activities that bring these households higher returns. Bungoma, on the other hand, is a place where richer households have different opportunities than poorer households, specifically in non-agricultural wage labor.

**Figure 32: Diversification Index per Region and Quintile (1-HHi)**



An interesting trend to note between quintiles is the prevalence of situations where at lower income levels richer quintiles become more diversified, but above quintile 3 or 4 they begin to specialize again. This “inverted U” pattern is observed in three regions of Senegal (Mehké 1 and 2 and Bas Delta), Chaouia and Souss in Morocco, El Viejo, La Libertad, and El Cuá in Nicaragua, and Sierra Santa Marta in Mexico. This may say something about the preferences and capabilities of the relatively rich. If we look at the richest region in each of the seven countries, only in one of them are households in the fifth quintile the most diversified. That occurs in Mali, where the levels of income are the lowest of all the

sample, and where the richer tend to use all their assets to engage in additional activities. These two observations together may suggest that people would like to specialize, but are unable to do so until their livelihoods are secure.

While we can notice trends, these diversification patterns also pose a number of questions. Why is it that in Madagascar richer households specialize, while in most other countries they tend to diversify? Why is it that in richer non-SSA countries, households are more specialized, but within poorer countries richer households tend to diversify? By posing these questions the results strongly deny the existence of a simple relationship between diversification and wealth. It is not true that diversification offers an escape route from poverty in every case, nor is it true with specialization.

### 2.2.3 *The Diversification – Income Relationship*

What we can draw from these observations however, are suggestions about the existing relationship between income level and diversification. First, we can see clearly that the two are strongly related. It is clear, for example that, outside of Mali and Mexico surveyed regions, quintile effects are much more important than regional effects. Even when regional effects are important, the differences are often starkest between the poorest and richest region in a country. As previously observed, there is also clearly a difference in diversification levels between the poorer countries of Sub-Saharan Africa and the richer countries outside of it. Surely then, income matters for diversification.

But it is also clear that this relationship is context specific, and almost surely not linear. In fact, what is suggested is an inverse U pattern, whereby households diversify as they become richer up to a certain level of income, and beyond that, they begin to specialize.

The regression results, where we tested the relationship between income and diversification, help to address this hypothesis, even if it remains imperfect as a linear regression is unable to account for the shape we anticipate to observe.

The first result about diversification is that it is significantly associated with income between surveyed regions in every country. It is positively associated in five countries, and negatively associated in two (Madagascar and Mexico). We can also note that at the regional level, the significance of diversification tends to match that of the national level. This is an extension of the observation made from the charts, that there seems to be a diversification/specialization pattern that applies broadly to a country, and that each region individually tends to follow it. For instance, in Senegal, where diversification is significant between regions, it tends to be significant within regions. In Madagascar, where diversification is significant negatively between regions, it tends to not be significant in the regions (an insignificant coefficient on diversification can indicate coping strategies – poor households diversify and reduce income gaps, resulting in less income variation for more variation in the diversification index).

Earlier in this chapter we concluded that patterns of diversification and specialization are created by households taking best advantage of the opportunities provided to them by their environment. Since these conditions are difficult to measure, the best way of

deciphering if a country is more suited to diversification or specialization is to look at what households are doing.

It is therefore interesting to note the regions whose pattern of diversification/specialization differs from the pattern of their country on the whole. There are seven of these regions in the RuralStruc Survey: Diema, Mehké 2, Morondava, Nyando and Nakuru North, Souss, and Sierra Santa Marta. Two of these regions diversify while their country tends to specialize (Morondava and Sierra Santa Marta). The other five do not diversify while their country as a whole is strongly engaged in diversification.

The two regions of the first type are similar. Both Morondava and Sierra de Santa Marta are the poorest regions surveyed in their country, and both are the most isolated. It is clear that they are unable to specialize the way other regions in their respective countries do. The regions as a whole diversify as a coping strategy: they are “Forced Diversifiers”.

The five regions of the second type are very different from each other. Nakuru North, for example, does not follow Kenya’s pattern of richer households being more diversified simply because the households there are already diversified, and in general already the richest. They are the benchmark by which Kenya’s pattern of diversification was set. Nyando on the other hand represents stagnation in diversifying into new economic activities. All quintiles are involved in non-agricultural wage labor, but there is relatively little opportunity for the kind of self-employment that drives the much higher incomes in Nakuru North. It is as if Nakuru has finished a “transition”, and Nyando has not yet started. In both cases diversification levels across income quintiles are constant. Mehké 2 and Souss are examples of regions where a specific investment has created a unique opportunity to specialize in a country where most households diversify. In Mehké 2 this is in cassava production, in Souss it is mainly in fruits. These regions do not follow the national pattern because their environment provides them with a distinct opportunity. Diéma is unique in that at upper income levels it diversifies very strongly into migration. Its inclusion as a region where diversification is not significant likely represents a failing of the index. Though diversification away from farming and into migration is very strong at high income levels, at low income levels diversification is weaker but includes agricultural wage labor as well as migration. This additional category of income gives lower income quintiles higher diversification scores, even though a much larger share of their income comes from on farm sources.

To summarize this analysis from the regression, in countries where the surveyed households as a whole tend to specialize, the places that do not do so are often isolated and therefore cannot specialize. On the contrary, in countries where the main households’ trend is to diversify, places that do not sometimes lack opportunity (Nyando), but often simply choose not to (Souss and Mehké) because they are *given* an opportunity. Nowhere in the RuralStruc surveyed regions do we observe a region that chooses to diversify in a country where the regions at the aggregated level specialize. This finding is in line with our idea that households would choose to specialize if they could secure their livelihoods that way, and leads us back to postulating that the relationship between diversification and

income may look like an inverted U – as was observed numerous times between income quintiles in **Error! Reference source not found.**

### **3 Regional Specialization and Structural Transformation**

There is much literature that suggests household diversification, which leads to the development of the rural non farm economy, is a key first step in structural transformation. Indeed, diversification was a motivating hypothesis of this study. But little is said on how this relationship evolves as the transition occurs.

To start a thought experiment, imagine a country where no structural transformation has occurred. All citizens of this country are subsistence farmers, and no one is involved in any other type of activity. The first tentative steps of transition will necessarily involve some people doing things other than farming. But it would be a lot to expect these first diversifiers to risk it all and give up their plot as well. So in the first stages of a transition household level diversification will necessarily be observed. But as this country continues to transition, early diversifiers may get the point where they are well established in a non-farm business. As the economy grows during the transition and markets become more reliable sources of food, some of the households may begin to stop farming all together and specialize in off-farm. At that point, household level diversification may begin to fall on average across the country, even as diversification between households continues to grow. The end result is a country that is like an OECD-type country today, where many households earn income from only one type of activity.

If countries follow this pattern of structural transformation then a discussion of diversification is incomplete without a discussion of the relationship between within-household diversification and between-household diversification. At the beginning of the transition described above, within household diversification will be higher than between household diversification. But as incomes rise further between household diversification will rise and within household diversification will fall as households begin to specialize on off-farm activities. We can begin to look at evidence for this type of process in the RuralStruc survey data. Instead of using the average diversification index of a region, we will use the average share of household income from on-farm sources as a proxy for diversification. This is because it is a share, and therefore we can calculate it two ways: once as a “share of means” and once as a “mean of shares.”

To calculate the “share of means” (SoM) we average all households’ on farm income, then average all households’ total income, then divide the two. This indicator refers to between-household diversification or regional diversification. To calculate the “mean of shares” (MoS) we calculate each individual household’s share of on-farm income in total income, and then average that value for every household in the region. This indicator refers to within household diversification. The interesting statistic to note is the difference between these two values for each individual region. A positive value ( $MoS > SoM$ ) points to a situation where within-household diversification is greater than regional diversification, and corresponds to the stage of transition where households are individually testing out diversification without giving up their farming plots. A negative value ( $SoM > MoS$ ) points to



a situation where some households are beginning to specialize much more fully in off-farm income, and corresponds to a later stage of structural transition.

Because we are postulating that the gaps between regional and household diversification are related to the stage of the structural transformation, there should be a strong relationship between this gap variable and income. and confirm this relationship for the RuralStruc countries.

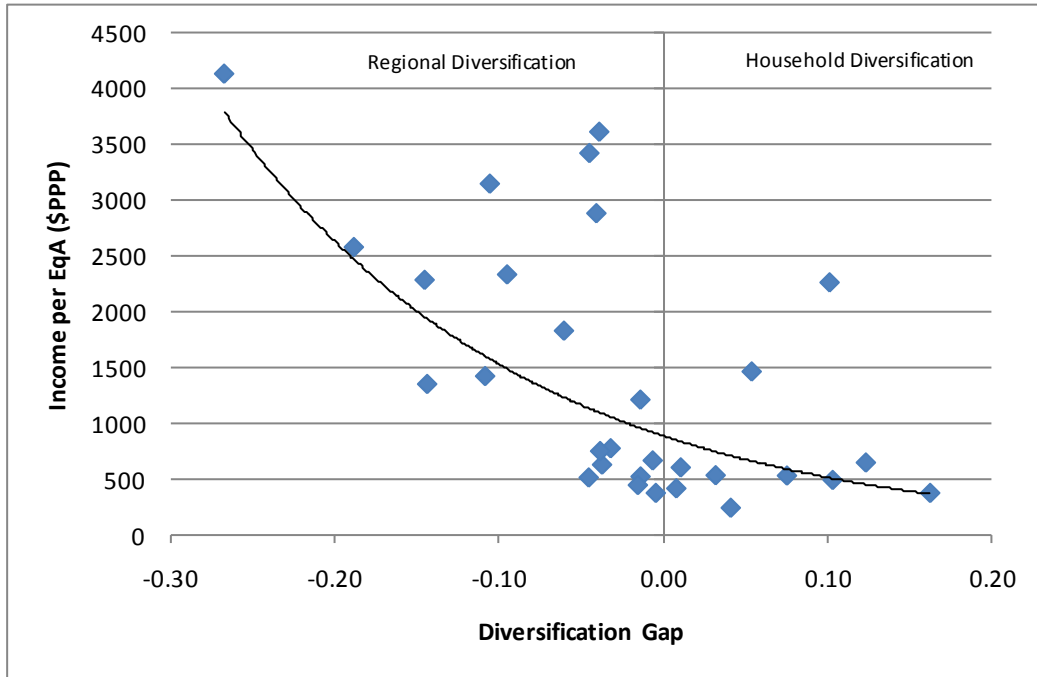
Table 25 displays the two indicators, as well as the difference between them. We refer to this difference as the “diversification gap.” The table also gives the average income per equivalent adult in each region. Figure 33 plots each region as a single data point on the income – diversification gap space, and a relationship clearly emerges.

The Pearson correlation between income and the diversification gap is relatively high (-0.58). However, the relationship seems to have an exponential component to it. At low levels of income, the gap can take any number of positive values. But it is generally not until the gap gets to be negative that we see incomes begin to grow substantially. The two outliers from this trend are Nakuru North and Terrabona.

**Table 25: Regional and Household Diversification (in terms of On-Farm Income Share) and Income**

		Regional Diversif. Share of Means All HHs	HH Diversification Mean of Shares All HHs	Gap	Average Income per EqA
Mali	Tominian	0.70	0.74	0.04	235
	Diéma	0.49	0.65	0.16	368
	Koutiala	0.88	0.88	0.00	368
	Macina	0.86	0.85	-0.01	516
Senegal	Casamance	0.72	0.7	-0.02	439
	Mehke 1	0.33	0.36	0.03	527
	Nioro	0.36	0.46	0.10	484
	Haut Delta	0.51	0.59	0.08	524
	Mehke 2	0.49	0.46	-0.03	769
	Bas Delta	0.46	0.45	-0.01	1,205
Madagascar	Antsirabe 2	0.63	0.64	0.01	409
	Alaotra 1	0.63	0.58	-0.05	506
	Morondava	0.77	0.78	0.01	597
	Itasy	0.69	0.65	-0.04	622
	Antsirabe 1	0.82	0.78	-0.04	744
	Alaotra 2	0.83	0.69	-0.14	1,346
Kenya	Bungoma	0.51	0.63	0.12	641
	Nyando	0.43	0.42	-0.01	660
	Nakuru North	0.35	0.45	0.10	2,258
Morocco	Chaouia	0.60	0.45	-0.15	2,280
	Saiss	0.89	0.84	-0.05	3,419
	Souss	0.69	0.42	-0.27	4,131
Nicaragua	Muy Muy	0.70	0.59	-0.11	1,417
	Terrabona	0.60	0.65	0.05	1,458
	El Viejo	0.69	0.5	-0.19	2,575
	La Libertad	0.80	0.7	-0.10	2,329
	El Cuá	0.95	0.91	-0.04	3,610
Mexico	Tequisquiapa	0.11	0.07	-0.04	2,879
	Sierra Santa	0.41	0.35	-0.06	1,824
	Tierras Baja	0.56	0.45	-0.11	3,144

**Figure 33: The relationship between Income and the Diversification Gap**



We can conclude our discussion of the relationship between income and diversification with a series of observations, but without proving a model. We can say with a fair degree of certainty that patterns are heterogeneous. We can also say that richer countries on the whole tend more towards specialization, and that there seem to be national characteristics that guide whether diversification or specialization is the best solution for households. Further, most regions in a country follow the same pattern. We also have suggestions that households prefer to specialize, but only once their basic economic needs are met. Lastly, we have shown that RuralStruc regions tend towards regional diversification rather than household diversification as they get richer.



## **CONCLUDING REMARKS**

The main objective of the RuralStruc program was to create a better understanding of rural realities in order to better inform policy making. Consequently, it first engaged in a review of structural transformation issues, which identified the very specific situation of sub-Saharan Africa. The region must face the dual challenges of its demographic and economic transitions at the same time, and will be the first region to do so in the context of a global open economy. This global economy offers many opportunities, but also presents challenges in terms of asymmetric competitive advantages. In this regard, sub-Saharan Africa clearly lags. The sub-continent will therefore have to deal with its growing population (an additional one billion people in the next forty years) in a context of low economic diversification. In the long term, this population growth will be an asset. The question is how to bridge the gap between the current situation, where the capacity of the economy to absorb the growing labor force is limited, and the future demographic dividend. Industrialization and opportunities in the new service economy will of course be part of the solution. However, the last forty years of African economic history has been characterized by urbanization without industrialization. One cannot expect industrialization therefore to solve Africa's demographic issues on its own in the short and medium terms. Agriculture, where the majority of sub-Saharan Africa's population remains active, will have to play a central role. This observation confirms the importance of updating the knowledge base on the situation of the rural economies today.

An early program result was the lack of information regarding the income and activity structures of rural households. This missing information was a main obstacle in addressing the program's first two hypotheses of increased agricultural integration and increased rural diversification. It justified the decision to engage in micro data collection, rather than relying only on qualitative case studies. This new household-level information allowed the RuralStruc team to reconnect micro and macro issues related to rural transformation, placing them in the global context of economic transition.

Several important lessons can be drawn from the RuralStruc comparative fieldwork. The first result is a strong heterogeneity of regional situations. Households in different regions are engaged in different activities, which are the result of households' asset endowments and of the unique combination of numerous factors present in each region. These factors can include previous government policies, regional asset endowments, and the unique historical trajectories of the regions themselves. While not surprising *per se*, it is an important result in that it reminds policy makers and development agencies of the need to tailor reforms.

The second set of results paints a picture of a rural reality marked by poverty and the persistence of traditional farming patterns. In almost every surveyed region of sub-Saharan Africa, at least 40% of households suffer from \$1/day poverty. In some places,

notably in Mali, this can be up to 80%. The situation in non sub-Saharan African countries is better, but extreme poverty persists in the bottom income quintiles, even in regions *a priori* classified as “winning.” This level of poverty translates into food insecurity: a substantial share of households in all surveyed countries (except Mexico) have difficulty meeting their minimum daily calorie requirements. In sub-Saharan Africa, a consequence of this food insecurity is that a large proportion of households are still deeply engaged in subsistence farming. High levels of self consumption and of staple production characterize most surveyed regions, and the new agricultural patterns of market integration, diversification, and the development of high-value products are not prevalent. Further, the development of the Rural Non Farm Economy remains limited, and is characterized by petty services and few opportunities to earn a wage. Outside of sub-Saharan Africa the picture is more nuanced. The share of farm output self consumed is clearly lower, and on-farm diversification is higher. Farm households are also more likely to be inserted into modern marketing systems. However, with the exception of the dense Querataro region in Mexico (Tequisquiapan), the Rural Non-Farm Economy is still weak, and the richest households specialize in on-farm activities. A final striking result is the widespread importance of land as a top determinant of farm incomes. Despite countless efforts by national governments and the development community over the last several decades to increase land productivity, land expansion still drives incomes, as it did centuries ago. Taken together, these results offer a sobering assessment of rural realities.

A third set of results is more hopeful. There is a strong positive relationship between income and the process of change towards a more diversified rural economy. This relationship can be observed between different countries, regions, and household income groups, and it follows an important pattern. At the lowest levels of income (where households focus on survival strategies), diversification of income sources does not frequently occur. As households become slightly richer, they remain at risk (especially from adverse shocks) but develop more room for maneuver to build a safety net. At this level of income households begin to diversify their activities. This process of diversification continues until a point where households develop enough of a wealth and asset base that they can earn enough returns through specialization to meet their basic needs and manage their risks. At this point, households begin to specialize into different activities (some on farm, some off-farm), which results in a diversified economy on the whole. The fact that we have enough differing observations to identify this process means that it is happening: regions are moving along this path. Many households do earn enough income so that they are secure enough to begin to diversify and manage risk. Some are even able to reach the stage where they can return to specialization, following the path described above.. Therefore, despite the sobering realities we observe, some households (and regions at an aggregated level) are following a path out of poverty.

These three sets of results allow us to begin to build towards a group of general policy guidelines. While our second set of results illustrates the broad presence of poverty, the third presents a pathway out. This path starts when households have found ways to manage the severe risks they face. Risk is therefore key, and food insecurity represents the main issue. This implies a focus on staples, which is the main production crop of the majority of the poorest households. At higher income quintiles, where diversification is

taking place, the issue at hand is that returns to diversification activities are too low for households to acquire adequate assets to protect themselves against adverse shocks. This implies a focus on increasing the returns to labor in the non-farm sector.

However, both the very poorest and the relatively well off can benefit from a policy that focuses on increasing rural demand. Historical evidence has shown that increasing rural demand comes from increasing farm incomes. A policy focused in this goal will de facto benefit the first group (the very poor). But the second group will also benefit directly, as a stronger market is created within which they can sell their goods and services. There are of course other ways to increase returns for this second group (e.g. by supporting industrialization), but these will take time. And in the meanwhile population pressure will continue to mount. A strategy of increasing rural demand, and hence farming incomes, will not avoid all the problems brought on by a growing population, but it will help to manage them, as it offers a way to provide additional options to the many new labor-market entrants.

The need to increase on-farm incomes is an old story and there are many policy options related to it. The consistent focus of the development community on productivity and market improvement have produced plenty of recommendations from which every policy-maker can create his own recipe.

Nevertheless, based on our results, four main sets of recommendations emerge for policy making. The first is to take seriously into account the importance of the strong heterogeneity of every regional situation. Heterogeneous situations require heterogeneous policies, based on a proper diagnostic, the identification of main binding constraints, and the consideration of policies in the context of a long term vision based on a dynamic view of population, factor endowments, and other economic and political variables. This is a strong argument for reinvestment in development strategies, and therefore developing the capacity of policy makers to engage in this type of strategy work, both at the regional and national level.

Second, policy makers should strongly consider focusing on increasing the productivity of staple agriculture. While it is true that staples often offer a low return, and therefore cannot be the only solution to poverty alleviation, they can clearly serve as a catalyst. We have shown that, for the poorest households (those engaged in subsistence agriculture), food security risk is a major issue preventing them from making any move towards off-farm diversification. These households are primarily involved in the production of staples, and increased productivity would give them room for maneuver to start to diversify, manage their risks, and escape from poverty. It would unlock a household's economic potential and allow them to make productive investments. Further, to develop staple agriculture is to invest in the improvement of an inclusive economic activity. Even at higher income levels, and even outside of sub-Saharan Africa, the vast majority of households are involved in staple production to some degree. Developing staples also makes sense in the face of growing food demand, which will necessarily follow from the increasing population dynamics discussed previously. Finally, it offers possibilities for adding value at the local level through the transformation of products. As a caveat, we offer



a focus on staples as a priority, not as a catch-all strategy. It is clearly also important for policy makers to pursue opportunities for households to become involved in high—value agriculture. Though this is less of a priority than staples, it is true that some of the richest households in the RuralStruc survey are in their current position because of these opportunities.

Third, the RuralStruc results offer further arguments for supporting small-farms. While large farms have many advantages (particularly for specific crops), small scale farming should also be encouraged. This is due primarily to the employment challenge presented by the rapid increase in population that will come in the next decades in sub-Saharan Africa. Small farms are inclusive and have the potential to employ many people. They also offer significant productivity and competitiveness advantages, due largely to their reliance on family labor. Further, imperfect labor markets in sub-Saharan Africa, and the fact that agricultural wages were found to be too low to provide an exit option from poverty, also recommend encouraging the development of small farms. The World Bank's *Awakening Africa's Sleeping Giant* study (Competitive Commercial Agriculture for Africa) offered supplementary evidence of their potential.

Fourth, the development of strong linkages between small cities and their surrounding rural areas appears to be a necessary focus of attention. As discussed, increasing farm incomes creates opportunities for the production of off-farm goods and services, and also creates opportunities related to the transformation of agricultural products. Rural-urban linkages on a small scale and in small cities provide unique advantages. They allow simple goods (which require few skills) to be produced near the place of consumption, reducing transportation costs and reducing the disadvantages of asymmetric competition. Another argument is that this type of urbanization is different. It is more flexible and does not create such a stark contrast between urban and rural conditions, leaving open the possibility of working on both sides on the rural-urban divide and creating a strong basis for a more sustainable rural non-farm economy. As a corollary, this small scale urbanization alternative can be a good response to the increasing management costs of mega-cities, where underemployment prevents any sharing of costs for the needed infrastructure and public services. Given these perspectives, the additional provision of public goods at the small city level appears to be a win-win solution fostering both the RNFE and a more sustainable urban development.



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# LIST OF ACRONYMS

AFD: Agence Française de Développement

AgEAP: Agricultural EAP

AGOA: African Growth and Opportunity Act

CAADP: Comprehensive Africa Agriculture Development Program

CAFTA: Central American Free Trade Agreement

CIRAD: Centre de Coopération Internationale en Recherche Agronomique pour le Développement

DCs: Developing countries

DDA: Doha Development Agenda

DDC: Direction du Développement et de la Coopération (Swiss Development Agency)

EAP: Economically active population

ECA: Economic Commission for Africa

EPAs: Economic Partnership Agreements

FAO: Food and Agriculture Organization

FDI: Foreign direct investment

FTA: Free Trade Agreement

GATT: General Agreement on Tariffs and Trade

GDP: Gross domestic product

IFAD: International Fund for Agricultural Development

ILO: International Labor Organization

IPCC: Intergovernmental Panel on Climate Change

LDCs: Least Developed Countries

LSMS: Living Standards Measurement Study

MDGs: Millennium Development Goals

NAFTA: North American Free Trade Agreement

NEPAD: New Partnership for Africa's Development

OECD: Organization of Economic Co-operation and Development

RIGA: Rural Income Generating Activities

RS: RuralStruc Program

SPS: Sanitary and Phytosanitary Measures

SSA: Sub-Saharan Africa

WDI: World Development Indicators

WDR08: World Development Report 2008 "Agriculture for Development"

WDR09: World Development Report 2009 "Reshaping Geography"

WTO: World Trade Organization







## **ANNEXES**

**ANNEX 1  
METHODOLOGY  
OF THE HOUSEHOLD SURVEYS  
AND DATA ANALYSIS**

## ORGANIZATION OF THE HOUSEHOLD SURVEYS

### The Survey Instrument

Based on a collective process, the survey instrument was organized in five modules presented in Fig. 1. Although the Program's design only allows for a static analysis, little qualitative dynamic information was collected in module 5 in order to appreciate households' perceptions of past and future evolution of assets endowment, food security, livelihoods, housing and living conditions, anticipated or desired activities and employment for their children, etc.

The general framework of the questionnaire was made up of five modules:

Module 1 aimed to characterize the "rural household" (Composition of household, Accommodation characteristics and quality of life; Description of economic activities of all the members of the household, including non-farm activities and related income sources; Identification and characterization of household members who migrated (long- and short-term migrations) and of related remittances to the remaining members of the household; Identification of public transfers received by the household; Characterization of the human and social capital of the head of household and his spouse).

The objective of Module 2 was to characterize a household's capital in terms of assets and factors endowment and identification of its development trend (Land (owned or rented); Material and equipment (owned or rented); Rentals (accommodation being reviewed in module 1); Other properties dedicated to economic activities: estimates of activities income (to be cross-checked with Module 1 data) and rental costs). At the end of those first two modules, the collected data allowed for an estimate of the level of diversification of economic activities, household earnings, assets evolution, and economic, human and social capital. The collected data also gave information about some of the indicators of economic and social vulnerability.

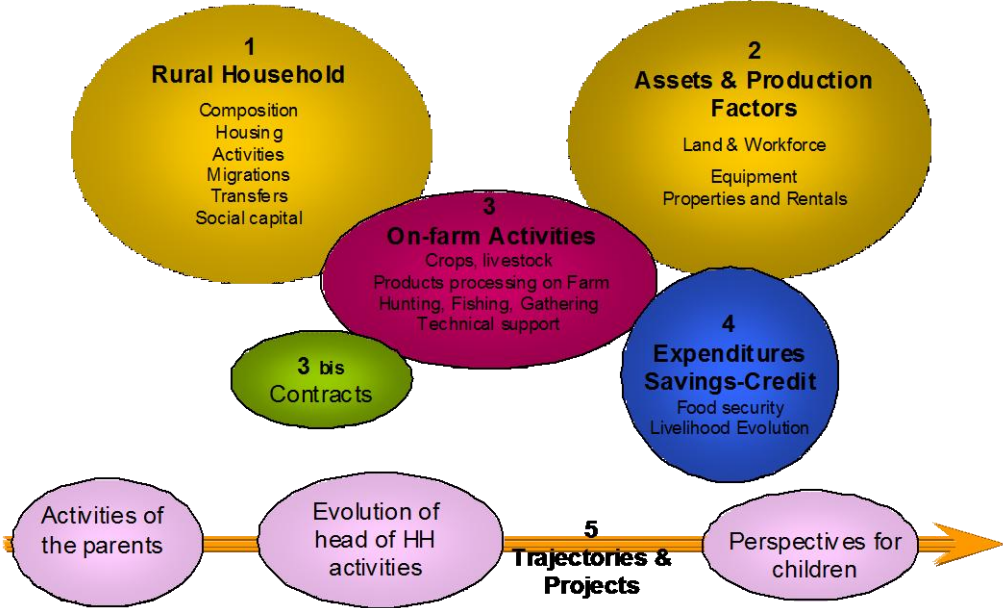
Module 3 aimed to describe in detail the on-farm activities (crops, livestock, fishing, hunting and gathering activities, processing on-farm of vegetal and animal products). A specific module (Module 3bis) was designed to take into account market integration and contractualization issues. Since those issues applied neither to *all* crops and livestock productions nor to *all* households, Module 3bis was used as an "if needed annex". The data collected by Module 3 allowed for the estimation of total on-farm income (in its broad sense). Of course, this estimate was only based on farmers' declarations on general productions and farming systems. Because of inter-annual variability of production, estimation of production costs (which are not exclusively monetary) is a big issue. More detailed information would have required more time than a one-shot survey. However, it was critical to estimate farm income to identify and describe the share of agriculture in the global range of rural households' activities and income. In order to make sure that the information collected on the outputs and costs were coherent and consistent, it was useful to collect for each region basic data on: yields and market prices (by crop / livestock), levels of intensification and unit costs of inputs. These basic references were collected when carrying out the regional characterization work prior to or during the survey itself.

Module 4 “Food and household expenditures” included questions related to costs of food and its origin (farm production, purchases, gifts, etc.). It also included questions related to food shortage management strategies and household perceptions of the evolution of their food security. Regarding expenditures, questions deal with current and occasional expenditures, investments in durable goods, credit, savings, as well as transfers that rural households might send to others. This module allowed for an examination of the use of rural household income, the breakdown of expenditures into different categories, access to services (health, transports, etc.), and allowed supplementing of information on indicators of vulnerability and sustainability.

Module 5 related to trajectories issues and rural households perspectives in terms of activities. It included open-ended and qualitative questions, which explored issues related to parents’ activities, development of non-farm activities, and perspectives for children in terms of activities and farm transferability, as well as perception of the evolution of livelihoods.

This common framework was completed at the national level by specific context-related questions, such as public support programs in Mexico, or more detailed questions about farming systems or livestock activities. In Mali, the household survey was implemented at the level of the head of the family farm but was completed by specific surveys targeting dependent households and women.

**Fig. 1: Framework of the Common Design for the Household Surveys**



Sources: Authors

In order to deal with the constraints of a “one shot” survey (only one interview preventing any double-checking), the impossibility of any type of measurement (only declarative data was obtained), and the absence of any benchmarking based on previous surveys, the Program designed a large survey instrument that allowed for the cross analysis of the declared information. The size of the instrument was increased by the needs of agricultural incomes estimation, which led to the review of the production factor endowment and economic results. As a consequence, the time needed to

administer the questionnaire was quite substantial (between 1 to 3 hours, depending on the size and the complexity of the household’s demographic, activity and income structures).

**Implementation of the Rural Household Surveys**

With the objective of 300 to 400 surveyed households per region (i.e. between 900 and 1,200 surveys per country), national teams engaged in the sampling process in two steps. The first step was the selection of the localities to be surveyed, with consideration of regions’ characteristics and national team expertise. The second step was the sampling itself, which was based on existing census lists or intentionally prepared locality household lists. Then, households were selected at random, targeting a sufficient number of households per locality allowing representativeness at local level.

Due to the general configuration of the surveys and the sampling method, the Program’s surveys are statistically representative at the locality (village or community) level only. They are indicative of the regional characteristics and illustrative of the diversity of the rural situations at the national level.

The different tasks of surveyor selection, training, and instrument testing were undertaken based on national teams’ own resources and survey capacity, or through existing partnerships. In Senegal, Mali, Kenya, Morocco and Nicaragua, surveyors were specifically hired and trained (some surveyors were selected from well-known surveyor pools). In Madagascar, the survey was implemented under an agreement with the ROR (*Réseaux des Observatoires Ruraux* – Rural Observatories Network), whereby the ROR surveyors administered the RuralStruc instrument during the annual ROR survey. In Mexico, the activity was externalized to a private consultancy specialized in surveys.

**Tab. 1: Implementation Schedule of the Rural Household Surveys**

	2007		2008					
	N	D	J	F	M	A	M	J
Kenya						■	■	■
Madagascar	■	■	■					
Mali				■	■	■	■	
Morocco					■	■	■	■
Mexico					■	■		
Nicaragua				■	■			
Senegal					■	■		

Sources: RuralStruc Surveys

In the seven RS countries, 8,061 rural households’ surveys were conducted in 26 regions and 167 localities (depending on the settlement structure). In Mali, the 634 household surveys (at the family farm level) were completed by 643 interviews with dependent households and 749 interviews with women.

**Tab. 2: Number of Households per Region and Sub-region in the RS Countries**

Country	Region and Sub-region	Nb of interviewed HH	Nb of selected HH	Nb of HH members
Mali	Tominian	172	155	1 962
	Koutiala	157	153	2 328
	Diéma	150	148	3 147
	Macina	155	154	2 056
	<b>Total</b>	<b>634</b>	<b>610</b>	<b>9 493</b>
Senegal	Casamance (Kolda)	249	239	3 608
	Mekhé (Groundnut Basin North)	255		
	- Mekhé 1		111	1 726
	- Mekhé 2		113	1 766
	Nioro (Groundnut Basin South)	285	252	3 182
	Senegal River Delta (Dagana)	250		
	- Haut Delta		61	770
- Bas Delta		121	1 347	
<b>Total</b>	<b>1 039</b>	<b>897</b>	<b>12 399</b>	
Madagascar	Antsirabe	509		
	- Antsirabe 2		303	1 889
	- Antsirabe 1		206	1 288
	Alaotra	500		
	- Alaotra 1		385	2 259
	- Alaotra 2		115	817
	Morondava	526	506	3 140
Itasy	503	503	3 001	
<b>Total</b>	<b>2 038</b>	<b>2 018</b>	<b>12 394</b>	
Kenya	Nakuru North	299	289	2 118
	Nyando	303	285	1 896
	Bungoma	300	299	2 138
	<b>Total</b>	<b>902</b>	<b>873</b>	<b>6 152</b>
Morocco	Chaouia	302	228	1 792
	Saïss	300	261	1 939
	Souss	298	240	1 539
	<b>Total</b>	<b>900</b>	<b>729</b>	<b>5 270</b>
Nicaragua	Muy Muy	311	299	1 757
	Terrabona	313	281	1 581
	El Viejo	317	288	1 645
	La Libertad	305	290	1 692
	El Cuá	312	300	1 801
	<b>Total</b>	<b>1 558</b>	<b>1 458</b>	<b>8 476</b>
Mexico	Tequisquiapan (Quéretaro)	364	364	1 708
	Ixmiquilpan (Hidalgo)	306		-
	Sotavento (Veracruz)	320		
	- Sierra Santa Marta		175	823
	- Tierras Bajas		145	654
<b>Total</b>	<b>990</b>	<b>684</b>	<b>3 185</b>	
<b>TOTAL</b>		<b>8 061</b>	<b>7 269</b>	<b>57 369</b>

Source: RuralStruc Surveys: National Databases and Mini-database

## DATA AND RESULTS MANAGEMENT

### Preparation of the Databases

Each national team was in charge of the arduous process of data capture and data cleaning prior to analysis. For quality reasons (questionnaires poorly informed, inconsistencies, etc.), some households were excluded from the databases.

In parallel, and in order to facilitate the cross-country analysis, a mini aggregated database was prepared based on a set of 235 core variables extracted from the national

databases.<sup>90</sup> This mini database was used for the preparation of the Synthesis Report and gave opportunities for additional consistency checks. *In fine*, 7,269 households (out of 8,061 surveys) were kept for the statistical analysis. The household numbers per regions are displayed in Tab. 2.

### **Conversion into International Dollars (\$ PPP)**

In order to allow for comparison between regions and countries, the monetary results were converted from local currency units (LCU) into international dollars (\$ PPP) (see Tab. 3).

Purchasing Power Parities (PPPs) are currency conversion rates that convert local currencies to a common currency: the international dollar or \$ PPP, in order to compare costs of living across countries. PPPs are needed because goods and services have widely varying prices across countries (notably for the non-commercialized items) when converted into a common currency, using market exchange rates.

However, PPP conversion rates present limitations. First, they are based on a selection of consumable items' prices for all countries in the comparison. Consequently, the PPP estimates for developing countries are unduly influenced by the consumption baskets and spending habits of their developed counterparts. Second, PPPs are derived using national average expenditure weights. Therefore, goods that are important to the poor and comprise a large part of their expenditure carry proportionally less weight.<sup>91</sup>

**Tab. 3: Average Conversion Rates between Local Currency Unit (LCU) and \$PPP (period of reference January 2007 - April 2008)**

	<b>LCU</b>	<b>\$ PPP</b>
Mali	CFA Franc	239,6
Senegal	CFA Franc	258,6
Madagascar	Ariary	758,7
Kenya	Kenyan Shilling	34
Morocco	Dirham	4,8
Nicaragua	Cordoba	6,7
Mexico	Mexican Peso	7,3

*Source: DDP (Development Data Platform), World Bank 2009*

### **Conversion into Adult Equivalent (EqA)**

Similarly, in order to deal with heterogeneous demographic household structures, adult equivalent values (EqA) were applied.

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<sup>90</sup> Data mining, analysis and interpretation was conducted using descriptive statistics and defined indices. Analysis was done using both the SPSS and STATA softwares.

<sup>91</sup> See World Development Indicators 2008, pp. 1-11.

A common approach used to compare households is to use per capita measures. However, this basic method does not deal with different household sizes or composition and, consequently, presents serious drawbacks because it ignores household members' differentiated needs and contributions.

A possible option is to convert the household demographic structure by age and sex into adult-equivalents. Many sophisticated methods exist based on expenditure structures and economies of scale (Deaton & Zaldi 2002). However, the RS program chose to use a simple approach based on nutritional needs as defined by the World Health organization (WHO)

**Tab. 4: Conversion in Adult Equivalents**

Age	Male Weight	Female Weight
0	0.33	0.33
1	0.46	0.46
2	0.54	0.54
3-4	0.62	0.62
5-6	0.74	0.70
7-9	0.84	0.72
10-11	0.88	0.78
12-13	0.96	0.84
14-15	1.06	0.86
16-17	1.14	0.86
18-29	1.04	0.80
30-59	1.00	0.82
60+	0.84	0.74

Source: World Health Organization. Cited in Dercon 1998

This choice is, of course, disputable: being based on nutrition criteria, the scale over-emphasizes the role of food consumption, and one could discuss the selected sex and age ratios. However, because food consumption is the main expenditure of poor households, this option is a good proxy to estimate, and then compare, the real household income balanced by the household structure.

### **Conversion into Kilocalories (KCal)**

In all the studied zones, diets rely primarily on cereals – at least in terms of energy. Thus, the basic cereal of each zone (or basket of cereals in the case of Mali) was used as a reference. The conversion rates between Kg of cereals and Kcal are those provided by the FAO's Food Balance Sheets (FAO 2001).

The prices of cereals are those used by the RuralStruc national teams to estimate the value of self-consumption. These prices correspond with the average producer sale prices (or the median in the case of Madagascar) for the surveyed year. One will note that, in general, the farm income for the poorest households largely consists of self-consumption of cereals, which are valued, therefore, at the producer sale price.

The average cereal prices and kilocalorie ratios permitted calculation of a price for units of 1000 Kcal in \$PPP and then to convert the estimated monetary incomes in incomes in kilocalories equivalent (see Tab. 5).



**Tab. 5: Estimation of the Average Calorie Price in the Surveyed Zones (main cereals consumed)**

Country	Region	Main Cereals	Average Price of Main Cereals		Conversion in Kcal/kg	Price of 1000 Kcal in \$PPP
			in LCU/kg	in \$PPP/kg		
Mali	Tominian	Millet, Sorghum	100	0,42	3400	0.12
	Diéma	Millet, Sorghum	94	0,39	3400	0.12
	Koutiala	Millet, Sorghum, Maize	88	0,37	3480	0.11
	Macina	Rice	129	0,54	2800	0.19
Senegal	Casamance	Rice	111	0,43	2800	0.15
	Mekhé 1		116	0,45		0.16
	Nioro		110	0,42		0.15
	Haut Delta		116	0,45		0.16
	Mekhé 2		108	0,42		0.15
	Bas Delta		108	0,42		0.15
Madagascar	Antsirabe 2	Rice	498	0,66	2800	0.23
	Alaotra 1		449	0,59		0.21
	Morondava		415	0,55		0.20
	Itasy		522	0,69		0.25
	Antsirabe 1		498	0,66		0.23
	Alaotra 2		449	0,59		0.21
Kenya	Bungoma	Maize	15.05	0,44	3560	0.44
	Nyando		16.67	0,49		0.49
	Nakuru N.		11.39	0,34		0.34
Morocco	Chaouia	Wheat	2.94	0,61	3340	0.18
	Saiss		2.64	0,55		0.16
	Souss		3.36	0,70		0.21
Nicaragua	Muy Muy	Maize	4.30	0,64	3560	0.18
	Terrabona		4.70	0,70		0.20
	El Viejo		4.70	0,70		0.20
	La Libertad		4.60	0,69		0.19
	El Cuá		4.20	0,63		0.18
Mexico	Sierra SM.	Maize	2.50	0,34	3560	0.10
	Tierras Bajas		2.50	0,34		0.10
	Tequis.		2.50	0,34		0.10

Sources: FAO, 2001, Food Balance Sheets, Annex, p.60 and RuralStruc Surveys.

### Conversion into Livestock Units (LU)

For the convenience of statistical analysis and comparisons between households, the different types of livestock were converted in livestock units, making it possible to estimate the live capital of the surveyed households.

**Tab. 6: Coefficient of conversion into LU (Livestock Unit)**

Cattle (all animals)	0,74
Adult cattle	1
Young cattle (2 to 4 years)	0,6
Veal (less than 2 years)	0,25
Horse	1
Donkey	0,5
Goat/Sheep	0,12
Pork	0,16
Poultry	0,004
Ostrich	0,14

Sources: The weight coefficients and methodology for creating this variable comes from the following report: Ziébé R., Thys E. and De Deken R. (2005) *Analysis Method of an Animal Production System in Cameroon*, in *Revue Élev. Méd. vét. Pays trop.*, 58 (3): 159-165.

## Diversification index

The diversification index (1-HHi) is defined as the opposite of the Herfindahl-Hirschman Index (HHi).

$$1 - IHH = 1 - \frac{\sqrt{\sum_{i=1}^n P_i^2} - \sqrt{\frac{1}{n}}}{1 - \sqrt{\frac{1}{n}}}$$

The definition of the index is the following: where  $i$  represents the different income sources (on-farm, agricultural wages, non-agricultural wages, self-employment, public transfers, private transfers, rents),  $n$  the number of income sources, and  $P$  the percentage of every income source.

Because the HHi squares the shares (i.e. the shares of income sources), it strengthens the main pattern of the household. It ranges from zero (entirely specialized) to one (highly diversified).

## DIFFICULTIES AND LIMITATIONS

### On-Farm Income

Estimating Farm Income is always a challenge because of the complexity of farming systems and the inter-annual variations of crop and livestock productions, among others. Due to time constraints, and in order to avoid an overly long and unmanageable questionnaire, the Program chose to approach the Farm Income through the estimate of crop and livestock production and global costs of the production.

Farm production was estimated for the last crop season prior to the survey. Unfortunately, the “one shot” survey does not allow for mitigation of adverse situations, which are frequent under rain-fed conditions. As a consequence of poor weather conditions in Chaouia (Morocco), the *Bassin arachidier* (Senegal) and Antsirabe (Madagascar), farm incomes presently reported are below the average for these regions.

In order to make the survey manageable, the Program decided to estimate the livestock production income based on a cash flow approach, i.e. considering sales and costs of rearing live animals and of producing livestock products, and the related costs (veterinary, food, shepherding, etc.) without including stock variations. This practical choice, which results from the survey conditions, has certainly induced an underestimation of the overall livestock results because it does not value the growing of the herd. However, one can note that in the surveyed regions very few households really invest in cattle (except some cases in Nicaragua).

The value given to the on-farm production was based on the sale prices indicated by the farmers. Self-consumption value was estimated at the producer's price level, except in Madagascar where the team used the median market price.

Finally, due to the constraints of the survey instrument, the production costs were estimated at the global farm level for crop production on one side, and livestock production on the other, instead of a more detailed approach, which would have required data collection at the field level. Consequently, costs were possibly underestimated.

### **Off-farm Incomes**

Even if the off-farm incomes were estimated based on the activities and incomes declared for every households' members, the survey instrument did not allow a detailed understanding of the time spent for each activity, knowing that in the case of the informal sector revenues are difficult to estimate. The off-farm incomes are thus approximate; therefore, both underestimation and overestimation may have occurred. The risks were mitigated during the data cleaning processes by running consistency checks that allowed questionnaire verification and possible adjustments.

Remittances are difficult to capture without a specific and dedicated survey, as there is a frequent bias of under-declaration. Their estimation is also complicated by their nature because they are sent from time to time to the head of household – in money or in kind – sometimes in small amounts. Conversely important amounts of money can also be sent in order to finance investments (construction), which leads to extreme values affecting the average results.

### **Contractualization**

Finally, contractualization and its pay-offs are difficult to identify and estimate without very specific surveys. Despite the use of a detailed instrument for the topic, the information gathered by the Program showed the difficulty of identifying different types of contractual arrangements and the need for very detailed data collection in order to assess their impact (exact quantities and prices at the plot level for both inputs and outputs).



**ANNEX 2**  
**COLLABORATIVE FRAMEWORK**  
**AND DISSEMINATION PROCESS**



## **A KNOWLEDGE SHARING PROCESS**

Although the RuralStruc Program is a donor initiative, it was obviously implemented after presentation to, discussion with and acceptance by the different countries' official counterparts. The World Bank officially introduced the Program's objectives and expected outputs in each country between November 2005 and March 2006 (through information missions and official correspondence).

The choice to implement the Program through local teams was justified by the objective of fostering ownership of the Program's core themes, the knowledge process (data collecting, mining, analysis, results sharing, and dissemination), and the policy making process. However, this was not the easiest way due to the high transaction costs of such an option. Despite the uneven results due to local context and team configuration, it is worth the results in the medium-term with reference to the policy debate.

### **Local Partnership Framework**

In each country of the Program, two types of partnership were identified, one at the institutional level and a second at the operational level.

The institutional counterparts are public bodies or policy dialogue platforms engaged in the policy debate, that are interested by the objectives of the RuralStruc Program and the dissemination of its results with the goal of feeding discussions about the future of agriculture and rural development.

The operational partners in charge of the implementation of the research work are locally based private consulting bodies, research institutions or universities, and sometimes, *ad hoc* teams specifically set up for the Program.

They were selected by sole sourcing based on the identification of existing and possible partnerships<sup>92</sup> or through a call for tender.

### **The Partnership at Work**

Between the launching workshop of the RuralStruc Program in April 2006 and June 2009, the national teams and the coordination team engaged in continuous exchanges intensified by the launching and ending stages of each phase and several collective events presented in Tab. 7. Three general workshops that assembled the seven national

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<sup>92</sup> To identify the possible country teams in Nicaragua, support was provided to the coordination team by RUTA (*Unidad regional de asistencia técnica*), platform for sustainable development in Central America.

teams were held, as well as specific country or regional workshops or meetings<sup>93</sup> for the preparation of the Second Phase.<sup>94</sup> These meetings were the opportunity to fine-tune the objectives, discuss difficulties and reach consensus on the methodology and the expected outputs.

The coordination team visited every country several times during the two phases, particularly during the implementation of the Second Phase’s fieldwork. In this time, the coordination team visited 16 out of the 26 surveyed regions between January and May 2008.

These workshops and missions were completed by regular information notes and by direct contacts with intensive back and forth through emails, phone calls and a few videoconferences. The preparation of the Second Phase is illustrative of this process. In November and December 2007, after the country and regional workshops, high email traffic between and with the teams allowed us to reach an agreement on the design of the household survey instrument (the adopted final version was the 15<sup>th</sup>). National teams adapted the standard instrument to take local specificities into account and the local questionnaire was then validated by the coordination team as well as the general survey design.

**Tab. 7: RuralStruc Workshops (2006-2008)**

	<b>Dates</b>	<b>Location</b>
<b>General Workshops</b>		
Program's launching	April 11-13, 2006	Senegal, M'Bour
End of phase 1	November 20-25, 2006	Morocco, Marrakech
End of phase 2 fieldwork	June 16-20, 2008	Senegal, Gorée
<b>Phase 2 Launching Country &amp; Regional Workshops</b>		
Madagascar	September 16-17, 2008	Antananarivo
Kenya	October 9-10, 2008	Njoro - Nakuru
Mali - Senegal	October 13-16, 2007	Gorée
Nicaragua - Mexico	October 30-31, 2007	Mexico City
Morocco	November 12-13, 2007	Rabat

<sup>93</sup> In Morocco, due to operational difficulties for the launching of the Second Phase, there was no specific workshop but instead several meetings in order to prepare Second Phase implementation.

<sup>94</sup> In perspective with the closing of the Program, a preconference workshop will be organized on August 16, 2009, at the 27<sup>th</sup> International Conference of Agricultural Economists (IAAE) in Beijing. Results will be shared and discussed with the participation of the national teams which have fully completed their contribution. The option of a final workshop joining all the country teams, the contributing donors, the Advisory Committee and academics specialized in the Program’s related themes is under discussion.



## Dissemination of Results

As decided during the Program's design, and due to its objective of contributing to the local policy debate, the national teams organized different events throughout and after completing the First Phase and the Second Phase. These presentation meetings or one-day workshops targeted different audiences depending on the local configuration and the situation of the local debate. Moreover, national teams and the coordination teams participated in several international events where some of the findings of the program were presented.

Box 14 below provides a summary of the dissemination process.

### **Box 14: Dissemination Process of the Results in the RS Countries**

#### Madagascar

*September 2006* - roundtable on the first results with ministries, donors, university and researchers

*16 May 2007* - presentation of the First Phase report to ministries, donors, university and researchers

#### Mali

*November 2006* - roundtable on the first results with ministries, chamber of agriculture (APCAM), rural producers' organizations (AOPP), and consumers' association

*December 2007* - Ministry in charge of agriculture, General Secretary - presentation of the First Phase report and of the objectives of the second phase

*November 2010* - Platform of the donors for rural development

*21-22 April 2010* - final workshop - discussion of the Second Phase results and the policy implications to institutionals counterparts, farmerrrs' organizations, donors, and researchers

#### Mexico

*June 2009* - presentation of the preliminary of the Second Phase results at the Latin American Study Association (LASA) annual conference

#### Morocco

*March 2007* - *Conseil Général du développement Agricole (CGDA)* - presentation of the First Phase report

*November 2008* - *Conseil Général du développement Agricole (CGDA)* - presentation of the Second Phase report in the Insitutional Seminar of the CGDA (Ifrane)

#### Nicaragua

*September 2007* - workshop organized by the Ministry in charge of agriculture (MAGFOR) with the Finnish Cooperation and the World Bank

#### Senegal

*March 2007* - *Initiative Prospective Agricole et Rurale (I-PAR)* - presentation of the First Phase report

*June 2007* - the seven rural producers' organizations platforms of Senegal

*July 2007* - *Mouvement social pour le Développement (MSD)* Platform

*July 2007* - debate at the University Cheikh Anta Diop of Dakar, co-organized with Editions *Clairafrique*

*January 2008* - Ministry in charge agriculture, DAPS - presentation of the First Phase results, of the dissemination process, and of the objectives of the second phase

*November 2010* - Platform of the donors for rural development

*21-22 June 2010* - final workshop -

The Kenyan and Mexican teams did not formally present their results. This situation is explained by different contexts. In Kenya this is, of course, related to the political situation (the period before the presidential election and the subsequent political events). In Mexico, this was a choice of both the national team and the World Bank. In this country, due to the number and standard of research institutions, universities, and NGOs, the local debate on agriculture and rural issues is fed by an abundant flow of surveys, studies, and research supported by year-round publications. As a consequence,

and because the First Phase was mainly an overview on the existing information, it appeared preferable to keep the dissemination for the presentation and discussion of the final results of the Program, which will provide new perspective based on specific field work. In Morocco, the presentation of the results was limited to the institutional partner.

In addition to the presentation meetings, debates and roundtables, some national teams also took specific initiatives. In Senegal, the two phases reports and the different presentations were posted on the I-PAR website to share information and also to open its results to discussion, see: <http://www.ipar.sn/> In Morocco, the team chose to publish the First Phase report to facilitate its dissemination.<sup>95</sup> In Madagascar and Kenya, the teams contributed to an academic article and a book chapter, in collaboration with other researchers.<sup>96</sup>

The dissemination of the final results will be supported by the preparation of policy briefs addressing the main outcomes of the Program.

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<sup>95</sup> Akasbi N., D. Benatya and N. El Aoufi (Dir.), 2008. *L'agriculture marocaine à l'épreuve de la libéralisation*, Economie Critique Editions, Rabat, 175p.

<sup>96</sup> Dabat M.H., B. Gastineau, O. Jenn-Treyer, J.-P. Roland, C. Martignac and A. Pierre-Bernard, 2008. "L'agriculture malgache peut-elle sortir de l'impasse démo-économique ?", *Autrepart*, No. 46, p. 189-202 ; and Anseeuw W., S. Fréguin-Gresh and P. Gamba, 2008. "Une nouvelle politique agricole au Kenya: nécessaire mais suffisante?", in Devèze J.-C. (Dir.), *Défis agricoles africains*, Karthala-AFD, Paris, p. 209-229.

**ANNEX 3**  
**MAIN CHARACTERISTICS**  
**OF THE SURVEYED REGIONS**



## MALI

Region	TOMINIAN	KOUTIALA	DIEMA	MACINA
<i>A priori</i> Classification	Losing	Winning	Intermediary	Winning
Population characteristics	32 inhabitants/km <sup>2</sup> . High dependency ratio (1.1). Seasonal emigrations to main cities of the country (Bamako, Ségou et Sikasso)	41 inhabitants/km <sup>2</sup> . Few migrations. High pressure on land due to the growing population	12 inhabitants/km <sup>2</sup> . Emigration to foreign countries (African countries, Europe, USA) is a common and established path	High density of population around the irrigation scheme (Office du Niger), but average of 18 inhabitants/km <sup>2</sup> at region level. Old immigration zone (agrarian colonization) from the rest of the country and other African countries.
Accessibility and proximity to major cities and markets	A tarmac road serves the town of Tominian and dirt roads serve the other localities, making accessibility difficult during the rainy season. Mainly rural area (no city exceeding 5,000)	Good accessibility with 4 national tarmac roads (main road Bamako-Burkina-Faso-Ivory Coast). Important network of dirt roads and good accessibility during the rainy season. Nearness of	Main crossroads of the roads Bamako-Kayes-Dakar and Bamako-Nioro-Mauritania. Near to only one city whose pop. exceeds 5,000.	Good accessibility in the irrigation scheme with a tarmac road (Macina-Ségou). Difficult accessibility with dirt roads for the rest of the area, particularly during the rainy season. Only one town bigger
Agro-ecological characteristics	Between a South-Sahelian and a North Sudano-Guinean climate (600-900 mm of rain concentrated in 4 months: June to September). Tropical ferruginous soils, which are fragile and easily erodible	Sudanese climate (750-1,000 mm of rain). Soils highly fragile and easily erodible with possibility of acidification and pollution, particularly in the cotton area	Sahelian climate (400-800 mm of rain concentrated from July to October). No permanent river but presence of ponds during the rainy season. Sandy soils in the north and between clay and silty soils in the South	Sahelian climate (450-650 mm of rain, concentrated from July to October). Fertile alluvial plains located in the Delta of the Niger River
Main agricultural productions	Staple (millet, maize, sorghum, <i>niébé</i> , <i>fonio</i> , etc.), groundnut, sesame	Cotton, dry cereals (millet, sorghum, maize), cattle (mainly for draft force and manure production)	Staples (millet, maize, sorghum, <i>niébé</i> , <i>fonio</i> , groundnut, roots such as potatoes and cassava, rice), horticulture (onion), cattle	Irrigated rice, horticulture, dry cereals, cattle, fisheries along the river
Existing agribusiness or integration processes	No agribusiness. Low level of commercialization of agricultural products	Vertical integration within the cotton industry (CMDT)	No agribusiness or integration process. Low level of commercialization	No agribusiness. Rice and onion are well commercialized in traditional value-chains
Existing job opportunities	Few opportunities out of the agricultural sector, but possibility of use of natural resources (gathering, wood, etc.)	Opportunities for seasonal or permanent employment in the main regional town (Koutiala), especially when cotton production is favorable	Few opportunities: agricultural seasonal workforce, trade and services activities are based in towns (Kayes or Bamako)	Opportunities for seasonal or permanent employment as agricultural laborer; some opportunities exist in the agricultural value chains (downstream and upstream segments) and in services



## SENEGAL

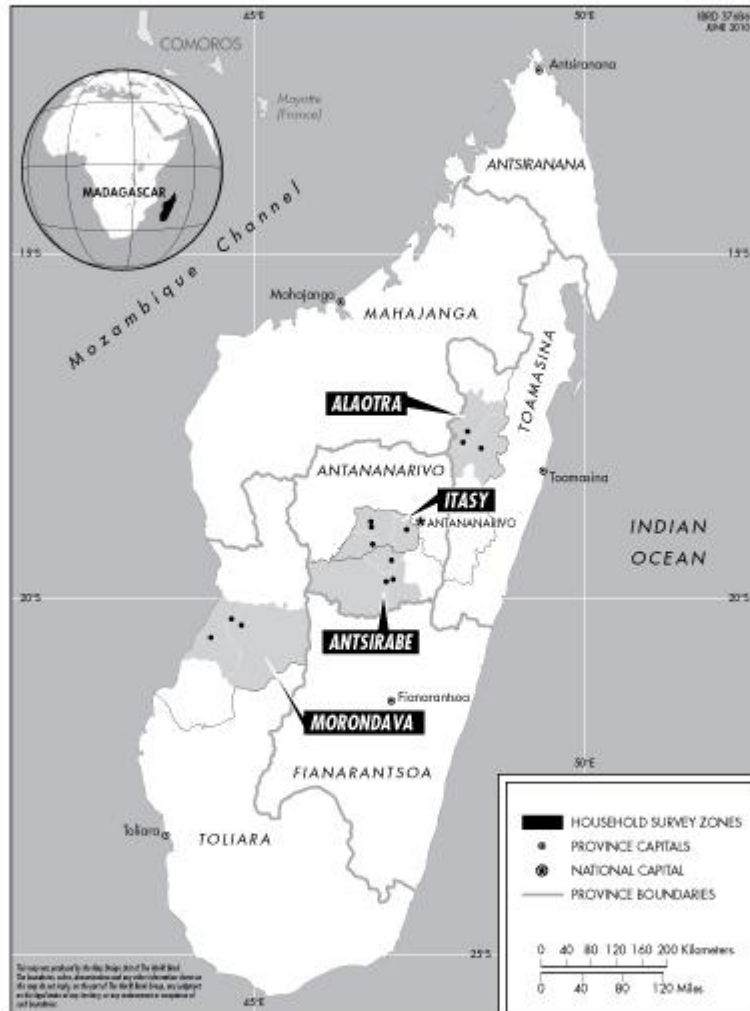
Region	DELTA	NIORO	MEKHE
<i>A priori</i> Classification	Winning	Intermediary	Intermediary
Population characteristics	11-40 inhabitants/km <sup>2</sup> . 37% of the population at regional level is urban	88 to 229 inhabitants/km <sup>2</sup> Importance of emigration and seasonal emigration to Kaolack, Dakar, Ziguinchor and to foreign countries (Gambia mostly, but also Europe), but also immigration from other regions	200 inhabitants/km <sup>2</sup> (Tivaouane). 56% of the population at regional level is urban (20% in Tivaouane). Emigration processes (to Dakar, Thiès, Touba, coastal regions for fisheries such as Kayar, Thiaroye, Mbour, and to foreign countries)
Accessibility and proximity to major cities and markets	Good accessibility. One major road linking Saint Louis to the other towns located along the Senegal River and to Mauritania. A network of dirt roads serves the irrigation scheme. Near the city of Saint Louis (pop. 700,000) and 2 medium towns (Dagana and Richard Toll)	Good to medium accessibility. Near Gambia and of the city of Kaolack (pop. 1 million).	Relatively good accessibility (tarmac and dirt roads). Near the city of Thiès (pop. 1 million).
Agro-ecological Characteristics	Semi arid climate (200 to 400 mm of rain, but irregularly dispersed). Alluvial humid and clay soils in depressions ( <i>walo</i> ), which are favorable to irrigated rice production, sandy soils ( <i>diéri</i> ) in rain fed areas. Possible presence of salty soils	North Sudanian climate (600-900 mm of rain, mostly concentrated from June to September and with high inter-annual variability) and poor and often degraded tropical ferruginous soils to clay soils	Semi-arid climate (300-500 mm of rain, concentrated from June to September). Poor and degraded <i>dior</i> soils (tropical ferruginous soils)
Main agricultural productions	Rice, horticulture (mainly industrial tomato, onion, etc.) in the irrigation scheme of the SAED, sugar cane (CSS), cattle (meat and draft force) and small ruminants, fisheries	Staples (millet, sorghum, maize), groundnut, cattle and small ruminants (also donkey and horse for draft force)	Staples (millet, <i>niébé</i> , cassava), groundnut, cattle and small ruminants
Existing agribusiness or integration processes	Agribusiness (tomato processor: SOCAS; sugar cane industry: CSS) and integration processes in the rice industry	Integration processes through groundnut industry	Integration processes through groundnut industry and with informal actors with cassava
Existing job opportunities	Many job opportunities in trade and services due to the proximity to the city of Saint Louis, but also jobs in the value chains, particularly in the sugar industry	The proximity to Gambia provides trade activities and opportunities in the informal sector	Basketry, leather handicrafts





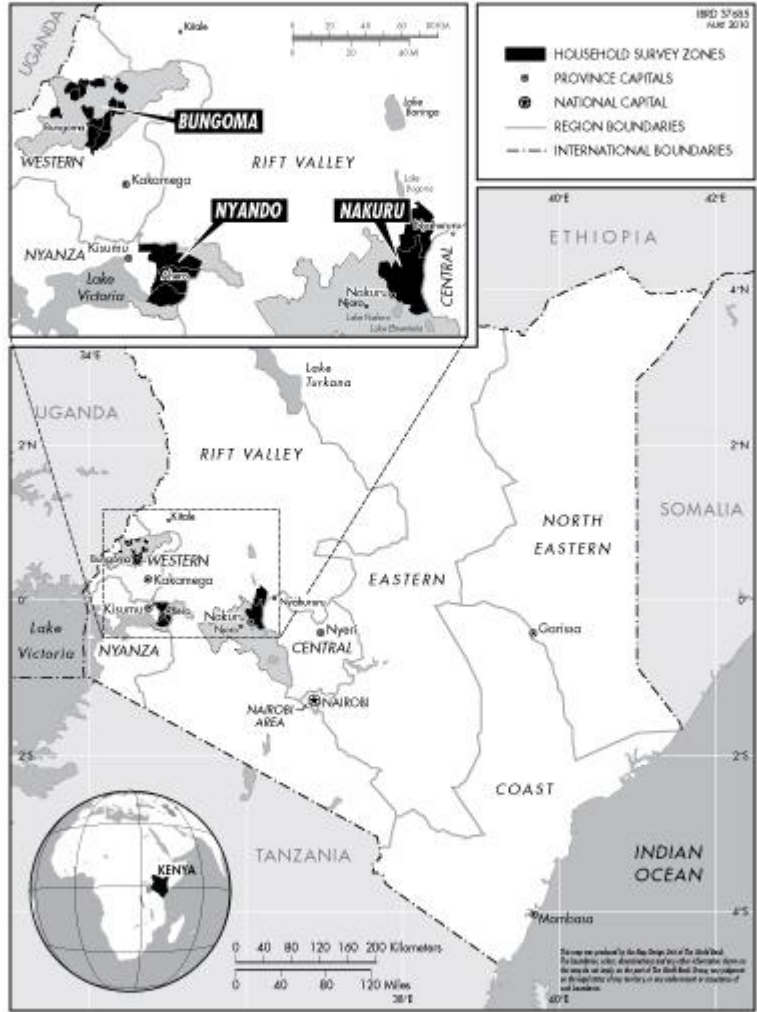
## MADAGASCAR

Region	ANTSIRABE	ITASY	ALAOTRA
<i>A priori</i> Classification	Winning	Intermediary	Intermediary
Population characteristics	90-125 inhabitants/km <sup>2</sup> - emigration out of the region because of lack of agricultural lands	105 inhabitants/km <sup>2</sup> . Immigration from the Highlands: people searching for available agricultural lands	55 inhabitants/km <sup>2</sup> . Seasonal immigration (for harvesting and agricultural works in general, but also for trade of paddy rice)
Accessibility and proximity to major cities and markets	2 sub-regions. One is served by a dirt road (medium accessibility), which can be used by collective transport, while the other is more difficult to access (stony dirt road). Near the third major city of the country: Antsirabe (pop. 183,000)	Region served by the national road (RN43) or a dirt road, but the accessibility can be very difficult. The region is known to offer many opportunities because of the proximity of the major town Antananarivo (pop. 1.7 million) and the network of roads serving the region	Dirt road or tarmac road (RN44) => good accessibility, but difficulties are possible during the rainy season
Agro-ecological characteristics	Located in the Central Highlands (altitude 1,500-1,900 m) characterized by red lateritic soils and tropical highland to temperate climate (mean of 13 to 18°C with morning frost in winter, 1,300 to 1,950 mm of rain)	Located between the Highlands and the Lowlands of the Middle-West of the country (1050-1450 m), characterized by volcanic formations (Lake Itasy itself is found in a volcanic crater) tropical highland climate (mean of 20°C, 1,350 to 1,700 mm of rain)	Located along the eastern escarpment (altitude 700 m) characterized by the presence of the Lac Alaotra, the largest body of water on the island which is in a large fault-controlled basin and is known for the islands most fertile and productive rice fields. The climate is semi-wet tropical (1,091 mm of rain, 17 to 24°C)
Main agricultural productions	Rice and other temperate cereals (wheat, barley), fruit and vegetables (potatoes, tomatoes, carrots, onions, temperate fruits such as apples, pears, peaches, etc.), cattle (dairy products and draft oxen), pork and poultry	Rice, fruit (tropical fruits such as papaya, avocados etc.) and vegetables, tobacco, roots, cattle (draft oxen), pork and poultry, fishery (Lake Itasy)	Rice, roots (cassava) cattle (draft oxen), pork and poultry, fishery (Lake Alaotra)
Existing agribusiness or integration processes	KOBAMA (wheat), MALTO (barley for brewery industry), TIKO and SOCOLAIT (dairy), FIFAMANOR and private actors (potatoes)	LECOFRUIT (green beans), OFMATA (tobacco)	Private rice buyers (ROGER, SILAC, FANAMBY, etc.)
Existing job opportunities	Trade and handicraft (embroidery)	Trade and handicrafts (embroidery, basketry)	Mostly, opportunities as an agricultural laborer in the rice industry



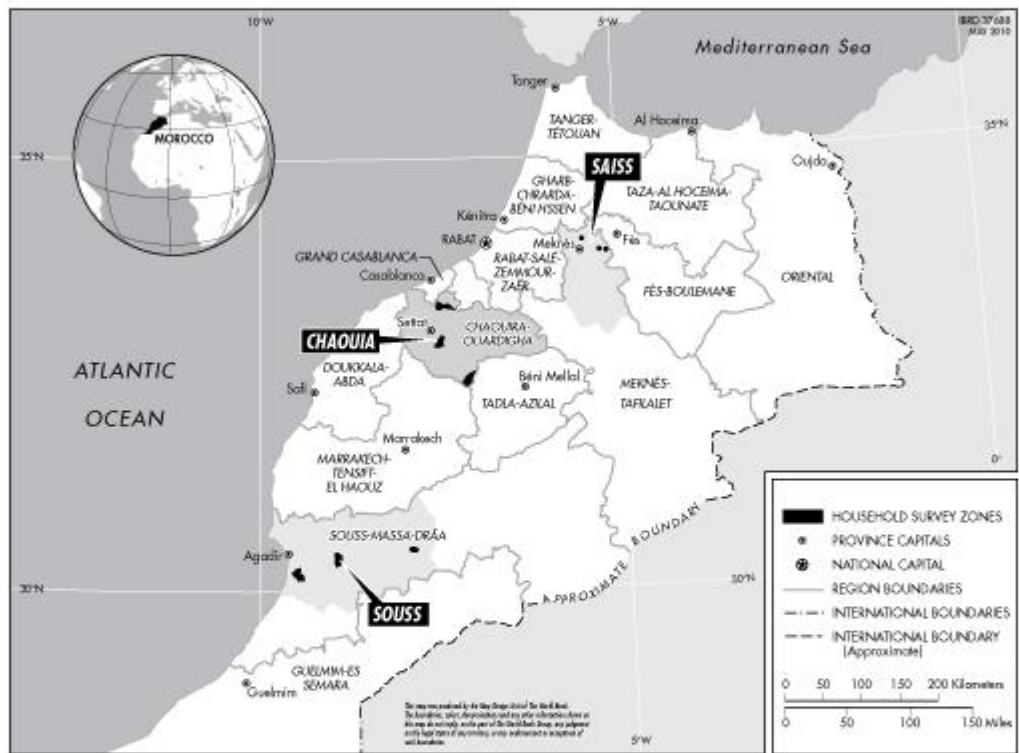
## KENYA

Region	Nakuru North	Bungoma
<i>A priori</i> Classification	Wining	Intermediary
Population characteristics	Provincial density of pop = 220 hab./km <sup>2</sup>	Provincial density of pop =424 hab./km <sup>2</sup>
Accessibility and proximity to of major cities and markets	Well served by good roads, electricity and water (many classified roads, half of them being tarmac roads). Road network offering good access to Nairobi (2,143,254 pers.) and Nakuru (219,366), Nyeri (98,908), Nyahururu and other surrounding large towns.	Major town: Bungoma (44,196 pers.). Shares borders with Uganda and has a road network (a third of them tarmacked), but some roads are impassable during rainy seasons (lack of river crossings and proper bridges). The region also has a rail line, which passes through to Malaba town
Agro-ecological characteristics	This zone occurs mainly at elevations between 900-1800 m, with an annual rainfall between 950 and 1500 mm. The region is home to Lake Nakuru, one of the Rift Valley soda lakes	Good soils and generally abundant, well-distributed rainfall make it an agriculturally productive area. The area experiences high rainfall throughout the year, and is home to several large rivers, which are used for small-scale irrigation
Main agricultural productions	Wheat, maize, millet, beans, pyrethrum, tea, coffee, potatoes and vegetables. Beef cattle ranching and bee in the lower elevation areas of the district.	Staples (maize, beans, potatoes, and sorghum), cash crops (sugarcane, tobacco and coffee), intensive production of horticultural crops (passion fruit, tomato, onion, citrus and capsicum), livestock production (meat and dairy), poultry (eggs.) + hides and skins. Fishing is also done in the existing dams, rivers and streams.
Existing agribusiness or integration processes	Kabazi Cannery and Subukia Tea and Coffee Ltd	Nzoia Sugar Company, Malakisi Ginnery, British American Tobacco and Mastermind Tobacco factories and Kitinda Dairies for milk processing
Existing job opportunities	Forest covers and mineral deposits (stone quarrying and diatomite for stone-walled houses construction). Urban businesses, industries and Jua Kali activities. Similarly, along the Nakuru-Nyahururu highway, several towns are emerging offering the locals an opportunity for commerce and employment. Industries (Kabazi Cannery and Subukia Tea and Coffee Ltd) utilize agricultural commodities produced in the area, and provide waged employment . The presence of the Rift also attracts tourists (wood-carving and other cultural artifacts and vending to the tourists.	Mining (ballast, brick making and quarrying). Fish trading. Trade general wholesale and retail in urban areas. Oil processing and pottery. Industries (Webuye Paper Mills, East Africa Heavy Commercials, Nzoia Sugar Company, Malakisi Ginnery, British American Tobacco and Mastermind Tobacco factories and Kitinda Dairies for milk processing).



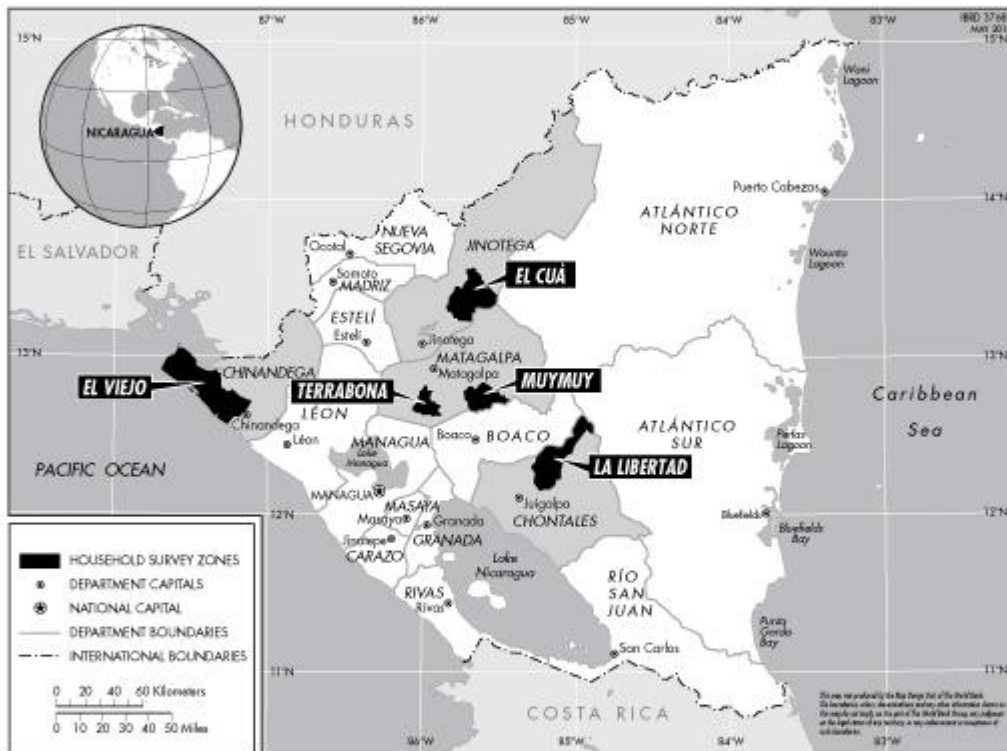
## MOROCCO

Region	CHAOUIA	SOUSS
<i>A priori</i> Classification	Losing	Winning
Population characteristics	236 inhabitants/km <sup>2</sup> . Immigration of people coming to work in the engineering and carpentry workshops of Berrechid. Old emigration to Casablanca and to Europe (from the 1960s)	40-50 inhabitants/km <sup>2</sup> (but very large region with people concentrated in urban localities). High level of emigration to Europe
Accessibility and proximity to major cities and markets	Important network of tarmac roads that link the region to the major towns. However, the dirt roads serving the localities can be in bad condition during the rainy season. Proximity to (pop. 3-4.5 million.) for one of the surveyed localities - Jaqma (30 Km)	Medium accessibility depending on the localities (unequal distribution of tarmac and dirt roads, especially in mountain areas). Near Agadir (pop. 68, 000.)
Agro-ecological characteristics	Semi arid climate (280-380 mm of very irregular rain, average temperature of 24°C - from 2 to 45°C) with high possibility of drought. Fertile clay soils in plains ( <i>Tirs</i> ), rocky and sandy poor soils in mountains ( <i>Hrach</i> , <i>Rmel</i> )	Arid climate (120-250 mm of rain) with the possibility of severe droughts
Main agricultural productions	Cereals (wheat, ), cattle, small ruminants	Horticulture (early vegetables, such as tomatoes), fruit trees (citrus, banana, almond, olive trees), cereals, legume crops, forage, saffron
Existing agribusiness or integration processes	Few agribusinesses (flour, oil, etc.)	Irrigation schemes. Integration processes for early vegetables and fruit trees (especially citrus)
Existing job opportunities	Many opportunities in urban areas due to the proximity to Casablanca	



## NICARAGUA

Region	EL VIEJO	EL CUA	MUY MUY	TERRABONA
<i>A priori</i> Classification	Winning	Winning	Intermediary	Losing
Population characteristics	30-6 inhabitants/km <sup>2</sup> . Relative proximity to the Salvadoran border	15-20 inhabitants/km <sup>2</sup>	35-40 inhabitants/km <sup>2</sup> .	20-30 inhabitants/km <sup>2</sup> . High level of emigration
Accessibility and proximity to major cities and markets	Good accessibility for most of the localities with tarmac roads or dirt roads. Nearness of towns such as Chinandega (pop. 134,000) and El Viejo (pop. 70,000)	Medium accessibility with tarmac and dirt roads. Near the city of Matagalpa (pop. 100,000.), which is important in terms of service provision and agribusiness related to coffee production	Junction between Boaco, Matiguas and Matagalpa with relatively good network of roads, but medium accessibility (very unequal quality of dirt roads in this area). Near medium towns such as Matagalpa (pop. 100,000)	Medium-to-poor accessibility with dirt roads, but relative proximity to a major tarmac road (Pan-American road)
Agro-ecological characteristics	Located in the Pacific plains. Mainly volcanic soils with high fertility and good potential for agriculture. Topical climate (1,100-1,650 mm of rain during 7 months in winter)	Located in the highlands (altitude 600-1000 m) with a semi-humid climate (1,500-2,500 mm of rain)	Located in the lower highlands (altitude 400-600 m). Tropical climate (1,100 to 1,500 mm of rain, 24-26°C allowing for 2 cropping seasons for maize and 3 for beans. Fertile ( <i>rendzine</i> ) to acid soils	Semi-arid to dry climate (800 to 1,000 mm of rain, but badly dispersed during the winter with possibility of drought) and poor, erodible soils
Main agricultural productions	Sesame, sugar cane, maize, beans, industrial sorghum, cattle	Coffee, maize, beans, cattle (meat)	Maize, beans, cattle (dairy and meat)	Maize, beans, vegetables, cattle (meat)
Existing agribusiness or integration processes	Main industries and agribusinesses are located in the Pacific Plains (cotton, sugar cane, sorghum, sesame, etc.)	Agribusiness related to coffee processing and export. Also irrigation related to basic grain commercialization	Integration processes in the dairy value chain (cheese for export to El Salvador and USA, procurement systems of agribusiness (Parmalat, Eskimo and Prolacsa))	Integration processes for horticulture (with supermarkets such as HortiFruiti, WalMart, etc.) for domestic market
Existing job opportunities	Agricultural labor (e.g. in the sugar cane industry for harvests) or in service and trade activities (oil, flour, groundnut and shrimp industry, sugar cane and liquor factories) in El Viejo and Chinandega	Agricultural labor (particularly for coffee harvesting) but also activities in the production of flour and the textile factory in Matagalpa	Mostly, agricultural labor (coffee, cattle) and processing of agricultural products	<i>Maquila</i> industry, services and trade activities





## MEXICO

Region	SOTAVENTO – TIERRAS BAJAS	Sotavento - Sierra de Santa Marta
<i>A priori</i> Classification	Intermediary	Losing
Population characteristics	Area of immigration throughout the 20th century (public land settlement policies, oil and industrial development). Recently, rural areas have suffered from combined processes of migration and dispersal of population.  Density of population = 50 inh/km <sup>2</sup>	Refuge area throughout the colonial period and most of the 19th Periodical uprisings favored isolation until the second half of the 20th century, and low commercial as well as communications infrastructures. The combination of such factors led to the persistence of a mainly indigenous population and high poverty levels.  Density of population = 55 inh/km <sup>2</sup>
Accessibility and proximity to of major cities and markets	Presence of small rural towns (Isla, Acayucan). Relative proximity of two major harbors (Veracruz and Coatzacoalcos). Relatively good infrastructure endowment	Isolated area, mostly inhabited by indigenous populations of origin Popoluca and Nahua who present high levels of socio-economic marginalization
Agro-ecological characteristics	This Lowland area offers high agricultural potential linked with the annual floods of the rivers, high temperatures (possibility of two cropping cycles) and the possibility of mechanization.	Mountain area, with consistent erosion risks, which presents a low potential for mechanization and intensive agriculture. The Sierra de Santa Marta also hosts a natural reserve (Reserva de la Biosfera Los Tuxtlas).
Main agricultural productions	Maize (mainly hybrids) in the <i>ejidal</i> area, sorghum in the private lands. Industrial pineapple production and cattle breeding in the surrounding uplands	The primary and highly dominant crop is hybrid corn. Associated crops like beans and tubercles have gradually been eliminated by the use of herbicides. In the higher lands coffee is the main commercial production and native corn varieties are mainly cultivated for self-consumption.
Existing agribusiness or integration processes	Industrial maize flour processors in Chinameca (MASECA) and in Jáltipan (MINSAA)	Industrial maize flour processors in Chinameca (MASECA) and in Jáltipan (MINSAA)
Existing job opportunities	Job opportunities are provided by pineapple producers in the surrounding highlands of Isla and Villa Azueta municipalities, or, in very low number in the cattle ranches. Industrial employment reduced considerably after the restructuring of public petrochemistry industry in Minatitlan and Coatzacoalcos. Most recently (2000 onward) illegal migration reached significant levels in some localized areas.	Traditionally, the construction and industrial sectors of neighboring cities like Coatzacoalcos and Minatitlan supported temporary migrations from Sierra de Santa Marta. After the restructuring of public petrochemistry factories at the beginning of the 1990s, recruitment agencies began to take low-cost workers from the Sierra to the fruits and vegetables production basins of northern-pacific coast (Sinaloa, Sonora and Baja California). Autonomous migration networks also connected with the <i>maquiladora</i> sector (Ciudad Juarez and Piedras Negras), and, in more localized processes, with the undocumented labor markets of the USA (from the 2000s onward).



## **ANNEX 4: TABLES**



		Q5 Global Annual Income <b>per capita</b> in \$PPP					
		Mean	Median	Minimum	Maximum	Percentile 05	Percentile 95
Mali	Tominian	428	350	248	2,229	267	646
	Diéma	802	497	374	5,568	375	2,186
	Koutiala	575	544	442	995	444	937
	Macina	888	785	658	1,595	660	1,446
Senegal	Casamance	897	821	555	3,059	557	1,547
	Mekhé 1	1,050	998	699	2,442	719	1,438
	Nioro	874	733	503	2,828	511	2,268
	Haut Delta	1,144	1,057	672	2,238	672	2,238
	Mekhé 2	1,433	1,253	973	2,996	984	2,260
	Bas Delta	2,467	1,962	1,511	6,696	1,516	4,148
Madagascar	Antsirabe 2	808	633	449	2,640	456	1,860
	Alaotra 1	977	826	580	2,679	589	2,136
	Morondava	1,113	936	667	2,440	684	2,022
	Itasy	1,147	923	676	3,678	692	2,684
	Antsirabe 1	1,518	1,159	912	6,272	916	3,185
	Alaotra 2	3,101	2,391	1,871	7,521	1,920	6,262
Kenya	Bungoma	1,421	1,224	761	4,484	779	2,872
	Nyando	1,826	1,412	827	11,224	867	4,767
	Nakuru North	5,946	4,613	2,649	22,222	2,746	18,430
Morocco	Chaouia	6,577	3,769	2,346	25,833	2,402	18,550
	Saïss	10,461	5,596	3,158	73,849	3,253	33,460
	Souss	12,551	9,245	4,229	54,054	4,250	36,126
Nicaragua	Muy Muy	3,833	2,175	1,159	38,466	1,210	9,002
	Terrabona	3,621	2,325	1,393	20,616	1,459	12,502
	La Libertad	7,269	2,397	1,679	106,712	1,757	61,433
	El Viejo	6,133	3,146	2,114	50,864	2,125	15,142
	El Cuà	9,895	7,922	3,325	32,946	3,638	25,109
Mexico	Sierra S. M.	3,703	2,790	2,159	15,922	2,188	8,130
	Tierras Bajas	6,404	5,886	3,868	16,907	4,083	8,759
	Tequis.	5,602	4,217	3,288	21,808	3,288	13,745

Table: Domestic Poverty Lines (in \$PPP)							
	<b>Mali</b>	<b>Senegal</b>	<b>Madagascar</b>	<b>Kenya</b>	<b>Morocco</b>	<b>Nicaragua</b>	<b>Mexico</b>
Poverty Threshold	688	763	490			1,201	
Absolute Poverty threshold						626	
Food Poverty Line	472			327			1,095
Capacity Poverty Line							1,295
Capital Poverty Line							1,987
Poverty Threshold in urban areas				935	813		
Poverty Threshold in rural areas				437	730		
Consumption expenses					1,630		
Source: RuralStruc national reports referring to national sources							
(various years were adjusted to 2007 when needed using annual national inflation rates - WDI database)							

**ANNEX 5  
RESULTS  
OF REGRESSION ANALYSIS**





## REGRESSION ANALYSIS APPLIED TO FARM HOUSEHOLDS

The RuralStruc team engaged in a quantitative analysis of the survey data using regression techniques to better identify effects of different assets and environmental conditions on the incomes of farm households. This annex explains in greater detail how this regression work was conceived and details important technical notes about how the analysis was conducted.

The first section of this annex will explain each of the variables selected for use in the regression analysis, along with a discussion of these variables were chosen. The second will detail our country cases, and the third will present regional typologies derived from the regression results, along with other conclusions.

### Section I - Selection and Explanation of Regression Variables

A Log-Linear specification of a standard Ordinary Least Squares (OLS) regression model using heteroskedastic standard errors was used.

Results are presented by survey region, and also aggregated at the “national level” to show within and between regions variation (to create aggregated national level regressions all HH in a given country were grouped together rather than separated by regions).

#### *The Dependent Variable*

**Log of Income per Adult Equivalent (*linc\_EqA*).** Since the goal of the regression work was to identify how a household’s assets and the environment it faces contribute to its earnings, income was an obvious choice for the dependent variable. Note here that income refers to revenues minus costs ( “Net Income”). The team elected to put the income variable into log terms in order to decrease the distortions caused by high-income outliers, which were present in nearly every country and region. We elected to use income per adult equivalent, rather than total income per household, to reduce certain reverse causality problems. Specifically, since we wanted to use demographic variables as regressors we were concerned that using income per HH would necessarily show a positive association between income and HH population. We would not be able to disentangle the productive effect of more workers on income from the effect of richer families having more children. We would also not learn anything about whether an additional person costs more to sustain than he or she adds to HH productivity. We also did not want to use income per head because there are vast differences in family size (and therefore in number of children) between regions and countries in the sample. A specific reduction in income per head in a HH with a higher share of children will have different consequences that it would for a HH with few children. We therefore settled on using income per Adult Equivalent, as it both avoids the reverse causality problem with demography and allows us to be more consistency across regions.

## *The Explanatory Variables*

### *Demography and Human Capital*

**Number of Persons Present in the HH (*Nb\_PersonPres\_hh*):** This variable represents the total number of people that regularly sleep at the residence. This includes short-term migrants, but does not include long-term migrants. The variable was included because it illustrates something about the productivity of labor in the HH. A positive relationship between *Nb\_PersonPres\_hh* and income per EqA would imply that the marginal product of labor is higher than its marginal cost. In this case there could even be a shortage of labor. If the relationship were negative we would see that the marginal product of labor is less than its marginal cost. In this case the HH could be overpopulated.

**The Dependency Ratio x 100 (*Ratio\_DepPresx100*):** The Dependency Ratio is defined as the number of dependents to standard working age people (15-64) within the HH, even if the latter is quite theoretical. The variable is included because we need to control for it in order to get an accurate interpretation of the Number of Persons Present variable. If we do not control for the dependency ratio, adding another person to the HH (a one unit increase in *Nb\_PersonPres\_hh*) would, statistically speaking, likely mean adding another child, as larger HHs have more children. Since children are often not used as labor they are more likely to consume more than they produce. If however we hold the dependency ratio constant, the one unit increase in *Nb\_PersonPres\_hh* will reflect the addition of a fictional person that is part dependent and part working age, in the proportion of the current dependency ratio. This fictional person would therefore represent the consumption/production ratio of the HH as a whole, and tell us something worthwhile about the economic returns to additional HH members. Before including the variable in the regression we multiplied it by 100. This is for ease of interpretation of the regression result. The coefficient on the Dependency Ratio can now be interpreted as follow: if it were -.023 for example, the interpretation would be “a one percentage point increase in the dependency ratio is associated with a 2.3% decrease in income per EqA, holding all else constant.” The effect of multiplying the dependency ratio by 100 is to make a “one unit increase” equivalent to a “one percentage point increase.” If we don’t multiply by 100 the interpretation is a “one hundred percentage point increase”, which is less useful.

**Number of Long Term Migrants per Household (*Nb\_MigrLT\_hh*):** A Long Term migrant is someone who has been geographically distant from the household for at least 12 months and is still sending remittances, no matter the amount. The presence of long term migrants can indicate both the possibility of private transfers and/or lower HH expenditure due to the exit of the HH member.

**Number of Short Term Migrants per Household (*Nb\_MigrST\_hh*):** A short term migrant is any other HH member that works geographically distant from the HH for some part or parts of the year, but maintain their permanent residence in the HH. Like long term migration this variable also indicates the possibility of private transfers and/or lower HH expenditure.

**Education Variables (educ\_2\_some\_prim, educ\_3\_prim, educ\_4\_some\_sec, educ\_5\_sec) (c\_Educ\_Head\_hh):** The education level of the head of HH is an asset that can have a positive effect on entrepreneurship, HH productivity, and social networking. The HH surveys included a qualitative variable, c\_Educ\_Head\_hh, that returns a value, 0-4, if the household head's education level is, respectively, no education, some primary education, complete primary education, some secondary education, or complete secondary education. The RuralStruc team created binary variables for each possible outcome, and included all except "no education" in the regression. Since education is cumulative the interpretation of each variable is made in terms of the previous education level. As an example, the interpretation of "educ\_3\_prim" is the "average difference in the log of income per equivalent adult between a household headed by someone that has completed primary education and one headed by someone that has completed some primary education."

#### *Variables Related to Farm Assets*

**Land Used (Ha/EqA) (Ha\_LandUsed\_EqA):** is the total land, in hectares per adult equivalent, used by the HH for crops and livestock raising, including fallow land. We use area per Equivalent Adult to avoid multicollinearity issues caused by the correlation between Number of Persons in the HH and total Land Used by the HH. Keep in mind that when interpreting the coefficient on this variable we are controlling for the total land area under irrigation. So an additional hectare of land used would in fact be an additional hectare of un-irrigated land used.

**Land Irrigated (Ha/EqA) (Ha\_IrrigLand\_EqA):** is the total land area of the HH, in Ha per Equivalent Adult, that is under irrigation. We use area per Equivalent Adult to avoid the same multicollinearity issues.

**Technical Package (c\_TechPackage\_hh):** is a binary variable that gives a one if the HH uses fully or partly a package of improved technical inputs, that includes selected seed varieties and fertilizer. It gives a 0 if the HH does not use these inputs.

**Manure (c\_Manure\_hh):** is a binary variable that gives a one if the HH uses manure to improve land fertility and a 0 if they do not.

**Number of Livestock Eq. (Nb\_UBT\_TOT):** The "Number of Livestock Equivalent" is a composite index that groups all of a HH's livestock together. It is a weighted sum of livestock animals owned by the HH, with weights assigned to specific types of animals. The weights are presented in Annex 1. The variable is included in the regression as a way of capturing all of a HH's livestock assets in one variable.

**Draft Force Variables (Animal Draft, Tiller Draft, and Tractor Draft) (c\_DraftForce\_hh):** The three draft force variables are binary variables created from the qualitative variable "c\_DraftForce\_hh" in the HH surveys. The c\_DraftForce\_hh variable tells us the "highest level" type of draft labor used: manual, animal, tiller, or tractor. To include this variable in the regression we have created a binary variable for each possible outcome of c\_DraftForce\_hh. For example: *Animal Draft* takes a value of 1 if the HHs highest-level draft is "Animal", and 0 if it is anything else (Manual, Tiller or Tractor). We included *Animal Draft*, *Tiller Draft*, and *Tractor Draft* in the regression, dropping the variable for *Manual Draft*. The interpretation of each binary variable is therefore "the

average percentage difference in income associated with having Animal/Tiller/Tractor Draft as opposed to Manual Draft.”

#### *Variables Related to Market Access*

**Transportation Variables (transp2\_easy\_parttime, transp3\_difficult, transp4\_dontknow) (c\_AccessTransp\_hh):** The RuralStruc household surveys included a question that asked respondents to rate the level of difficulty with which they can access transportation. Respondents were given the choice of “easy all year,” “easy only part of the year,” “difficult all the time,” or “I don’t know.” Working under the hypothesis that ease of transportation is a good proxy for ease of access to markets the team wanted to see how household incomes reacted to this variable. As with our other qualitative variables we created a series of binary variables for each possible outcome of *c\_AccessTransp\_hh*. We dropped the variable for “easy all year” from the regression, so all of our “transp” variables are interpreted as a comparison to those households with year-round easy access to transportation.

**Distance to nearest city (in minutes of travel time) (c\_50000 and c\_ports):** The RuralStruc surveys were each conducted in a small group of selected villages in each region, and in each case some villages were more physically remote than others. The team used different indicators to try to capture the effect of this physical remoteness in different countries. The most commonly used variable was referred to as “c\_50000” (used in Mali, Senegal and Madagascar). This variable gives the time, in minutes, required to travel from a HH’s village to the nearest city of at least 50,000 people. It takes account of transport infrastructure, topography, and physical distance when calculating these times. The data were provided by researchers in the World Bank’s Development Economics Research Group and affiliated with the University of Maryland’s Department of Agricultural and Resource Economics, led by Dr. Donald Larson. The methodology for calculating the variable comes from the “Global Map of Accessibility”, a model developed by Dr. Andrew Nelson for the European Commission’s Global Environment Monitoring program and used in the “density” calculations of the World Bank’s 2009 World Development Report. The map can be accessed at: <http://bioval.jrc.ec.europa.eu/products/gam/index.htm>.

In Kenya, the RuralStruc team decided to use a different but related variable, *c\_ports*. This variable gives the time in minutes to travel from the HH’s village to the nearest major port, rather than the nearest city of at least 50,000 people. It is calculated in the same way as the *c\_50000* variable. We first tried the Kenya regression with the *c\_50000* variable and found no significant correlations within or between regions. We hypothesized that since households in both the winning and losing regions in Kenya (Nakuru North and Nyando) are close to large cities (Nakuru and Kisumu respectively) that distance to a city is not really an income differentiator in Kenya. We thought, however, that there may be a difference in incomes resulting from differential access to Kenya’s main transport corridor, which runs from Mombassa to Nairobi and then through Nakuru and Eldoret all the way to Kampala in Uganda. The *c\_ports* variable gives us the time to Mombassa, through this main transport corridor. Since the winning region (Nakuru North) has shorter travel times to Mombassa than the other two regions we thought this regression specification was worth testing. We did not have access to the data from the “Global Map of Accessibility” outside of Sub-Saharan Africa. In Nicaragua and Mexico we decided not to use a variable for physical remoteness, as the

surveyed regions in most cases are as physically small as the sub-regions in Africa. In Morocco, however, we felt that we needed to include a variable for remoteness, so we included binary variables for sub-regions. Each region in our Morocco survey includes three sub-regions. In each regional regression we included binary variables for the two more remote sub-regions. The coefficients on these variables are interpreted in reference to the less remote sub-region, which was dropped.

**Contract (*c\_Contract\_hh*):** This is a binary variable that returns a value of 1 if the household has at least a contract to supply a portion of its farm output to either an agro-industry, a wholesaler, or a high-value exporter, and a 0 otherwise. The contract can be either explicit or implicit (as in the case of tobacco producers in Itasy, Madagascar).

#### *Variables Related to Income Diversification*

**Diversification Index (*1-HHI*):** This is a composite index, constructed by the RuralStruc study team and based on the Herfindahl-Hirshmann Index, that puts a quantitative measure on the degree of diversification of the household's income sources. See Annex 1. The index does not address on-farm diversification but rather treats "on-farm" as one type of income and measures diversification into other types of incomes (such as self-employment, remittances, wages).

## Section II – Country Results

The regression results for each of the seven RuralStruc countries will be presented in the same format. We will first present econometric issues specific to the country and explain why any variables are missing or were added. We will then offer conclusions and a discussion of results. Finally, we will present the actual regression output for each country.

### MALI

Specific econometric issues:

1. Due to their low number, HHs with a value of one for “Tiller” or “Tractor” were dropped from the regression. This is only 4 HHs.
2. Two of the education variables are dropped, either in whole or in part, because of a low number of observations: “educ3\_prim” and “educ5\_sec.” The former was dropped only in Tominin and Macina, while the later was dropped in all regions. Because the education variable is cumulative we were still able to include these households in the regressions, but for example those households whose head has completed primary school will be listed under “at least some primary education completed.” We therefore don’t make the distinction between completing primary school and only having some primary education. The data are not complete enough to allow us to do this.
3. The one HH with a contract in Tominian was dropped from the Tominian level regression, but not from the national level regression.
4. The one HH with irrigation in Tominian was dropped from the Tominian level regression, but not from the national level regression.
5. The technical package variable here was calculated as follows. If a HH reported spending money on fertilizer they received a code of 1 (has technical package). If they report no spending on fertilizer they receive a code of 0 (does not have technical package)

Conclusions and Discussions

1. There is potentially a labor shortage in Koutiala: Persons Present is positive and significant in this region, implying that an additional worker on average produces more than he consumes, and that the marginal product of labor is still above its marginal cost.
2. Tominian is the poorest region surveyed in Mali, but due to its history of Christian Jesuit academies it has the highest rate of household heads with at least some secondary education. These HHs are better off than those in Tominian that do not have an education, but remain poor relative to households in other regions. This is the cause of the negative sign in front of the national level

coefficient for educ3\_some\_sec. The fact that well educated HH heads in Tominian are still poorer than HH heads in other regions with little or no education points to the conclusion that education is unlikely to be the bidding constraint in the region..

3. Diversification is a significant determinant of income in every region except Diema. This is surprising, because both Koutiala and Macina are known for specializing in cotton and rice farming, respectively. It seems however that even in these regions of specialization, richer HHs diversify.

## MALI REGRESSION RESULTS

VARIABLES	Nationwide	Tominain	Diema	Koutiala	Macina
	Log of Rev per EqA	Log of Rev per EqA	Log of Rev per EqA	Log of Rev per EqA	Log of Rev per EqA
Nb_PersonPres_hh	-0.00381 (0.00346)	-0.0196** (0.00776)	-0.0120** (0.00536)	0.0180* (0.00950)	-0.00349 (0.00647)
Dependency Ratio (x100)	-0.00123*** (0.000435)	2.79e-05 (0.000626)	-0.00128 (0.000904)	-0.00107 (0.000891)	-0.00118 (0.000850)
Land Used (Ha/EqA)	0.318*** (0.0492)	0.308*** (0.0767)	0.240*** (0.0891)	0.670*** (0.103)	0.240* (0.135)
Land Irrigated (Ha/EqA)	1.385*** (0.197)				1.191*** (0.327)
Manure (binary)	0.228*** (0.0760)	-0.105 (0.148)	0.114 (0.136)	0.0396 (0.193)	0.311 (0.260)
Fertilizer (binary)	0.0215 (0.0676)	0.312*** (0.116)	-0.124 (0.307)	-0.0922 (0.0929)	0.492 (0.511)
Animal Draft (binary)	0.200*** (0.0689)	0.156 (0.138)	0.204 (0.137)	-0.0782 (0.141)	0.147 (0.143)
Number of Livestock Eq.	0.00648** (0.00302)	0.00953 (0.0106)	0.00493** (0.00240)	0.00518 (0.00618)	0.0198*** (0.00610)
educ1_some_prim	-0.0698 (0.0818)	0.0960 (0.0969)	0.257 (0.250)	-0.154 (0.134)	-0.0286 (0.187)
educ2_prim	0.418*** (0.146)		-0.0776 (0.336)	0.221 (0.188)	
educ3_some_sec	-0.312* (0.172)	0.457*** (0.151)			-0.324 (0.267)
transp2_easy_parttime	-0.0169 (0.0730)	-0.0340 (0.126)	-0.00256 (0.138)	0.148 (0.145)	0.146 (0.148)
transp3_difficult	-0.140** (0.0624)	-0.118 (0.0929)	-0.333** (0.139)	-0.152 (0.112)	-0.118 (0.174)
c_50000	-0.000132 (0.000230)	0.000904 (0.000683)	7.00e-05 (0.000484)	0.000174 (0.000266)	-0.00253* (0.00145)
HH has a Contract (binary)	-0.117 (0.152)				-0.125 (0.173)
Diversification Index	0.00338** (0.00170)	0.00921*** (0.00266)	0.00434 (0.00359)	0.00627* (0.00331)	0.0109*** (0.00393)
Nb_MigrLT_hh	0.0430* (0.0233)	0.0285 (0.0384)	0.138*** (0.0409)	-0.0640 (0.0699)	0.0377 (0.0493)
Nb_MigrST_hh	-0.0999** (0.0488)	-0.0387 (0.0529)	-0.172** (0.0785)	-0.144 (0.0874)	-0.137 (0.0927)
Constant	5.042*** (0.138)	4.618*** (0.183)	5.184*** (0.416)	5.039*** (0.287)	4.870*** (0.635)
Observations	554	136	128	144	144
R-squared	0.345	0.530	0.412	0.405	0.341

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1



## SENEGAL

Specific econometric issues:

1. There are data issues associated with the draft force variable in the Kenya regression. The team chose not to include it at all. Therefore the one HH with a tractor in Nioro is dropped from the regression.
2. The “Secondary School finished” variable was dropped from the regression because there were not enough observations. However, since the education variable we use is cumulative these HHs can still be included under “At least some secondary education” In Mekhé 1, because of the dearth of education, these HHs will be included in “at least some primary school complete” and all other education variables will be dropped. In Haut Delta they will be included under “At least Primary School Finished”. In Mekhé 2, because of lack of variance, the only education variable used will be “At least Primary School Started.”
3. Because every surveyed HH in Haut Delta has the technical package that variable will not be included in the regression for that region.
4. Due to lack of variance, the contract variable will not be included for Nioro or Haut Delta. The one HH with a contract in Nioro will be dropped from the regression, as will the four without a contract in Haut Delta.
5. Because only two HHs in Mekhé 2 responded “Don’t Know” to the transportation survey question they will be deleted from the regression and the variable will not be used.
6. In Mekhé 2 only 2 HHs have irrigation. This is not enough variance to detect a result, so the Ha\_IrrigLand\_EqA variable will be dropped. In Haut Delta, even though every HH has irrigation, the variable will be kept. Though every HH has irrigation, the amount will vary from HH to HH and may be significant.
7. The variable c\_50000 has no variance in Haut Delta, so it was not used.
8. In Casamance, the two HHs with Short Term Migrants will be dropped and the variable not included.

## Conclusions and Discussions

1. Note the low R-squared results everywhere except Casamance and the Delta Regions. Casamance and Haut delta have significantly higher shares of on-farm income than other regions in Senegal, and as such the higher R-squareds make sense here. Many of our independent variables have to do with farm assets. However, Bas Delta does not have a higher share of on-farm income. This is clearly capturing the effect of something that is not being controlled for. In Bas Delta something is missing from the regression, as is the case in Mekhé and Nioro.
2. Casamance seems to be different than the other regions in Senegal, and in fact looks more like regional patterns in Mali. It is the only region in Senegal where

land is a significant determinant of income, and is affected significantly by variation in access to productive farm inputs.

3. The significance of diversification in all regions aligns with our earlier conclusions that HHs in Senegal diversify into self employment (although our data, outside of the regression, shows that in Casamance the diversification seems to come from livestock farming).
4. In Bas Delta we see a strange pattern with transportation access and  $c_{5000}$ . Holding  $c_{5000}$  constant households with more difficult access to transportation have on average higher incomes than those with easy access to transportation. This shows the effect of being physically closer to the city. Even if travel time is the same, it's better to be located closer with more difficult transportation than it is to be located further away with better transportation. The fact the  $c_{5000}$  is significant and negative speaks to this fact as well. Clearly, households in Bas Delta are affected by their proximity to St. Louis.

## SENEGAL REGRESSION RESULTS

VARIABLES	Nationwide linc_EqA	Casamance linc_EqA	Mékhé 1 linc_EqA	Nioro linc_EqA	Haut Delta linc_EqA	Mékhé 2 linc_EqA	Bas Delta linc_EqA
Nb_PersonPres_hh	-0.0236*** (0.00525)	-0.0282** (0.0112)	-0.0170 (0.0168)	-0.0270*** (0.00900)	-0.0557** (0.0207)	-0.000584 (0.0145)	-0.0221 (0.0177)
Dependency Ratio (x100)	-0.000353 (0.000471)	0.000750 (0.001000)	-0.000289 (0.00150)	0.000391 (0.000697)	0.000345 (0.00292)	-0.00246* (0.00143)	0.000491 (0.00104)
Ha_LandUsed_EqA	0.123*** (0.0432)	0.257*** (0.0752)	0.0853 (0.129)	0.149 (0.116)	-0.0262 (0.498)	0.191 (0.153)	0.232 (0.159)
Ha_IrrigLand_EqA	0.479*** (0.0795)	0.390 (0.540)	-0.0880 (1.483)	0.512*** (0.192)	0.967 (0.623)		0.107 (0.173)
Manure (binary)	-0.0186 (0.0808)	0.172 (0.155)	-0.172 (0.208)	0.0177 (0.129)	-0.264 (0.453)	0.129 (0.230)	-0.0947 (0.368)
Technical Package (binary)	0.134 (0.0839)	0.363** (0.147)	-0.0729 (0.233)	-0.123 (0.130)		-0.00441 (0.202)	-0.396** (0.165)
Number of Livestock Units	0.0243*** (0.00209)	0.0250*** (0.00293)	0.0291 (0.0315)	0.0256*** (0.00669)	0.168** (0.0811)	0.0350** (0.0154)	0.0259*** (0.00424)
educ1_some_prim	0.0793 (0.0874)	0.000987 (0.199)	0.156 (0.296)	0.181 (0.166)	-0.195 (0.316)	0.252 (0.320)	-0.0160 (0.154)
educ2_prim	0.341* (0.181)	-0.126 (0.428)		0.553** (0.273)	0.0617 (0.409)		0.514** (0.258)
educ3_some_sec	-0.395 (0.411)	-0.820 (0.981)		-0.511* (0.298)			0.822** (0.323)
transp2_easy_parttime	-0.0576 (0.0910)	0.0105 (0.220)	0.197 (0.269)	-0.228 (0.182)	-0.0154 (0.353)	-0.0665 (0.187)	0.448** (0.216)
transp3_difficult	-0.240*** (0.0750)	0.0767 (0.228)	-0.0323 (0.219)	-0.289** (0.122)	-0.351 (0.298)	-0.0615 (0.369)	0.552** (0.266)
transp4_dontknow	-0.219** (0.110)	0.358 (0.232)	-0.549 (0.674)	-0.101 (0.375)	0.336 (0.476)		0.423* (0.248)
c_50000	1.55e-05 (0.000409)	0.000590 (0.000465)	-0.000778 (0.00197)	0.00244 (0.00240)		0.00405 (0.00859)	-0.00863** (0.00335)
HH has a Contract (binary)	0.254*** (0.0733)	0.212 (0.165)	0.536*** (0.201)			0.0311 (0.184)	-0.347 (0.275)
Diversification Index	0.0168*** (0.00185)	0.0128*** (0.00356)	0.0116** (0.00579)	0.0140*** (0.00303)	0.0129** (0.00585)	0.000879 (0.00468)	0.0180*** (0.00377)
Nb_MigrLT_hh	-0.0332 (0.0289)	0.0521 (0.0498)	-0.0276 (0.0919)	0.00790 (0.0441)	0.106 (0.148)	0.110 (0.0960)	-0.0490 (0.0775)
Nb_MigrST_hh	0.0310 (0.0611)		-0.205 (0.222)	0.0999 (0.0818)	-0.0530 (0.208)	-0.119 (0.130)	0.0823 (0.146)
Constant	5.430*** (0.152)	4.480*** (0.346)	5.728*** (0.476)	5.286*** (0.306)	5.879*** (0.530)	5.967*** (0.567)	6.718*** (0.437)
Observations	876	237	110	238	54	107	119
R-squared	0.272	0.443	0.185	0.191	0.495	0.141	0.472

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## MADAGASCAR

Specific econometric issues:

- 1) In Itasy and Antsirabe 1, there are not enough HHs with Tractors to include them in the regression. They are dropped from the region-level regressions. In Alaotra 2, no HHs have a Tiller, so that variable is dropped.
- 2) The variable for “Secondary School Finished or University” is only included for the national regression and for Morondava and Itasy. In other regions these HHs are included in the “At least some secondary education” category. In Alaotra 2 the 3 HHs whose highest level of education is completing primary school are included in the “At least some primary school” group.
- 3) The technical package variable is not included for the Alaotra 2 regression. There are only 2 HHs that have the technical package. They are dropped from the regression.
- 4) In Alaotra 1 there are only two HHs with a contract. Because of this, this variable (and the two HHs) are not included in the regression.
- 5) The “Transportation Access” variable gives a suspect result in Alaotra 2, and we therefore do not include it. “Easy only some months” is not included in Morondava and “Difficult” is not included in Antsirabe 1, for lack of observations.
- 6) Migration variables are not included in Alaotra 2 because so few HHs have them. Likewise Short Term migrants are not included in Antsirabe 1, because only 4 HHs have them. The HHs with the relevant type of migrant in these instances were dropped from the regression.
- 7) Manure is excluded from the Antsirabe 2 Regression because almost everyone has access to it. The one HH that does not is dropped.
- 8) The variable c\_50000 is included only for the regression of Madagascar amalgamated regression. The reason for this was that in each region the correlation with the transportation quality variable was very high. In two regions (Antsirabe 1 and 2) there was perfect colinearity. In Alaotra 1, Morondava and Itasy the correlations were also very high, sometimes over 0.9. This often had the effect of masking the transportation quality effect. In Alaotra 2, there is no variance of the c\_50000 variable.
- 9) The irrigation variable is not included because of very severe multicollinearity issues with Land Use, as a very high share of farmland used in Madagascar is irrigated.

## Conclusions and Discussions

- 1) Land Access is an important determinant of farm income everywhere in Madagascar.
- 2) The fact that diversification is not significant in any region in Madagascar confirms our previous finding that households in Madagascar diversify into Self-employment and Agricultural wage labor as a coping strategy.
- 3) In both Antsirabe sub-regions households with easy access to transportation are on average poorer than those that have some level of difficulty. Likewise, c\_5000 is significant and positive in Madagascar as a whole. It seems remoteness can be positively associated with income. This may have to do with specific natural conditions.

## MADAGASCAR REGRESSION RESULTS

VARIABLES	Aggregated Regions Log of Inc per EqA	Anstirabe 2 Log of Inc per EqA	Alaotra 1 Log of Inc per EqA	Morondava Log of Inc per EqA	Itasy Log of Inc per EqA	Antsirabe 1 Log of Inc per EqA	Alaotra 2 Log of Inc per EqA
Nb_PersonPres_hh	-0.0806*** (0.00643)	-0.0522*** (0.0131)	-0.109*** (0.0154)	-0.0593*** (0.0110)	-0.0538*** (0.00932)	-0.0828*** (0.0220)	-0.0280 (0.0343)
Ratio_DepPres_hh100	-0.000515*** (0.000142)	-0.000195 (0.000261)	-0.00111*** (0.000381)	-5.37e-05 (0.000181)	-0.000328 (0.000231)	0.000543 (0.000399)	-0.00148 (0.00125)
Nb_MigrLT_hh	0.0367 (0.0230)	0.00457 (0.0479)	-0.0709 (0.0461)	0.0127 (0.0402)	0.0135 (0.0318)	0.106** (0.0456)	
Nb_MigrST_hh	-0.0384** (0.0189)	0.0357 (0.0464)	0.0317 (0.0568)	-0.0226 (0.0259)	-0.0290 (0.0528)		
educ1_some_prim	0.0965*** (0.0339)	0.140** (0.0635)	0.0135 (0.0957)	-0.102** (0.0504)	0.0603 (0.0787)	0.250*** (0.0859)	0.169 (0.257)
educ2_prim	0.0672 (0.0476)	0.0227 (0.104)	-0.0884 (0.157)	0.0236 (0.0818)	0.103* (0.0552)	0.283* (0.148)	
educ3_some_sec	0.132** (0.0538)	0.109 (0.123)	0.221 (0.161)	0.182** (0.0891)	0.0549 (0.0756)	0.000318 (0.151)	0.251* (0.144)
educ4_sec	0.281*** (0.0987)			0.0641 (0.163)	0.219 (0.145)		
Ha_LandUsed_EqA	0.914*** (0.168)	4.259*** (0.631)	0.613*** (0.236)	1.223*** (0.0994)	2.626*** (0.295)	2.269*** (0.337)	0.574*** (0.127)
c_TechPackage_hh	0.107*** (0.0336)	0.0327 (0.0691)	0.163 (0.124)	0.0172 (0.0896)	0.0893* (0.0490)	0.0137 (0.115)	
c_Manure_hh	-0.0336 (0.0429)	-0.0682 (0.118)	-0.0915 (0.0589)	0.0581 (0.110)	-0.0192 (0.0703)		-0.212 (0.156)
Nb_UBT	0.0180*** (0.00573)	0.0246 (0.0206)	0.0254** (0.0121)	0.0146*** (0.00408)	0.0330*** (0.0102)	0.124*** (0.0222)	-0.0393 (0.0241)
AnimalDraft	0.164*** (0.0408)	0.111 (0.0953)	0.108 (0.0819)	0.199*** (0.0510)	0.0388 (0.0679)	0.0316 (0.148)	0.526** (0.202)
Tiller	0.286*** (0.0406)	0.133* (0.0707)	0.225 (0.148)	0.431*** (0.126)	0.0826 (0.0589)	0.0826 (0.133)	
Tractor	0.187* (0.110)	0.109 (0.115)	0.581*** (0.190)	0.270* (0.163)			0.661** (0.281)
transp2_easy_parttime	-0.0273 (0.0336)	0.136** (0.0689)	-0.124** (0.0603)		0.0623 (0.0596)	0.252*** (0.0760)	
transp3_difficult	-0.0178 (0.0273)	0.0757 (0.0672)	-0.110 (0.120)	-0.170*** (0.0482)	-0.0394 (0.0511)		
c_50000	0.000282*** (9.84e-05)						
c_Contract_hh	0.190*** (0.0436)	0.00423 (0.0752)		0.173 (0.109)	0.0277 (0.0572)	0.130* (0.0686)	-0.0447 (0.233)
OneMinusHHIx100	-0.00298*** (0.00108)	-0.00115 (0.00209)	-0.000367 (0.00205)	0.00423*** (0.00127)	-0.00197 (0.00153)	-0.00129 (0.00219)	-0.00363 (0.00451)
Constant	6.078*** (0.0997)	5.277*** (0.211)	6.504*** (0.184)	5.952*** (0.0942)	5.984*** (0.149)	5.389*** (0.173)	6.551*** (0.359)
Observations	1910	299	326	491	482	198	98
R-squared	0.485	0.611	0.453	0.583	0.595	0.719	0.631

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## KENYA

Specific econometric issues:

- 1) In Kenya almost every household head has at least some primary education. Because of the low amount of variance here, we could not include it as a reference in the regression. Consequently, the four households in Nakuru North with no education were dropped, and the variable “educ2\_some\_prim” was left out in order to be used as a reference.
- 2) Because of the low number of households in Nakuru North that use “Tiller Draft” this variable was dropped from the regional regression, as were the households that use tiller draft.
- 3) The variable c\_ports was used instead of c\_50000, as explained in section I of this annex.

Conclusions and Discussions

- 1) Market access and land productivity are important everywhere in Kenya. It seems that at poorer income levels land productivity is perhaps dominant, then at certain levels of productivity market access becomes more important than further productivity improvements. We see this in first looking at Nyando, then at Bungoma. Nyando’s most important factor is Land. When productivity is constrained, the only way to increase output is to have more land. We see large effects from the technical package. On the contrary, in terms of market access, we see no response from contracts or transportation access. Moving to Bungoma, these productivity issues are still important, but we see strong effects from contracts and transport – suggesting market access is important.
- 2) The result for manure in Nyando is surprising: farmers without access to manure are on average much richer than those with access to manure. This result is unexplained.
- 3) In Kenya between-region variance in income is greater than within-region variance. It is worth noting that certain constraints, such as access to transportation and c\_ports, are much more significant between-regions than within them. It seems that remoteness does have a negative effect on incomes in Kenya, just that our regions are too physically small to detect the effect at that level.

## KENYA REGRESSION RESULTS

VARIABLES	Nationwide	Bungoma	Nyando	Nakuru North
	Log of Income per EqA	Log of Income per EqA	Log of Income per EqA	Log of Income per EqA
Nb_PersonPres_hh	-0.0746*** (0.0154)	-0.0754*** (0.0268)	-0.0428 (0.0275)	-0.151*** (0.0288)
Dependency Ratio (x100)	-0.000951** (0.000386)	-0.000603 (0.000725)	-0.00122* (0.000666)	-0.000387 (0.000681)
Land Used (Ha/EqA)	0.279** (0.110)	0.283 (0.332)	0.354** (0.146)	0.163 (0.172)
Land Irrigated (Ha/EqA)	0.452 (0.414)	0.593 (0.846)	0.539 (0.631)	0.275 (0.503)
Manure (binary)	-0.0727 (0.0880)	0.206 (0.160)	-0.335** (0.161)	0.0286 (0.131)
Technical Package (binary)	0.568*** (0.0983)	0.111 (0.144)	0.551* (0.319)	0.593* (0.355)
Animal Draft (binary)	-0.102 (0.0966)	0.305** (0.154)	-0.0554 (0.182)	0.213 (0.338)
Tiller Draft (binary)	0.109 (0.228)	0.692** (0.316)	0.269 (0.358)	
Tractor Draft (binary)	0.476*** (0.103)	0.556* (0.303)	0.608* (0.319)	0.296** (0.116)
Number of Livestock Eq.	0.0597*** (0.0108)	0.0488 (0.0356)	0.0520*** (0.0145)	0.0973*** (0.0222)
educ2_prim	-0.143 (0.109)	0.162 (0.192)	-0.282 (0.217)	-0.324*** (0.122)
educ3_some_sec	0.211 (0.173)	-0.405* (0.243)	0.983** (0.416)	0.263 (0.254)
educ4_sec	0.673*** (0.182)	0.682** (0.293)	0.360 (0.535)	0.669** (0.271)
transp2_easy_parttime	0.0288 (0.0996)	0.0860 (0.161)	0.153 (0.201)	0.208 (0.178)
transp3_difficult	-0.355*** (0.115)	-0.318* (0.174)	-0.282 (0.212)	-0.114 (0.158)
c_ports	-0.00206*** (0.000435)	0.000802 (0.00126)	-0.00125 (0.000840)	0.000454 (0.000896)
HH has a contract (binary)	0.367*** (0.111)	0.399*** (0.128)	0.444 (0.498)	0.488** (0.233)
Diversification Index	0.0110*** (0.00208)	0.0217*** (0.00324)	0.000398 (0.00418)	0.00289 (0.00373)
Nb_MigrLT_hh	0.00312 (0.0272)	0.0231 (0.0353)	-0.157 (0.121)	-0.0471 (0.0327)
Nb_MigrST_hh	-0.160 (0.143)	-0.0476 (0.186)	-0.250 (0.230)	-0.266 (0.333)
Constant	7.800*** (0.412)	4.415*** (1.303)	7.140*** (0.831)	6.651*** (0.843)
Observations	835	284	272	272
R-squared	0.396	0.357	0.260	0.370

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## MOROCCO

### Specific econometric issues

- 1) Households in Saiss that reported “difficult” transportation access or those that answered “I don’t know” when asked about transportation access were dropped from the regression due to lack of variance.
- 2) The one household with a contract was deleted from Chaouia and from Souss, but not from the national level regression.
- 3) The Short Term Migrants variable was dropped because no households have short-term migrants.
- 4) The “manure” variable was not available for use in the Morocco regressions.

### Conclusions and Discussion

- 1) There are very large regional effects on income. In fact in Morocco the regional binary variables are the most significant determinant of income.
- 2) It is surprising that education is a significant determinant of income only in Chaouia, and between regions. What this means is that Saiss and Souss household heads are better educated than those in Chaouia, and have consequently gone farther towards eliminating further returns to schooling. This would make sense if the levels of schooling of Saiss and Souss were not low in an absolute sense. There is a surprisingly low lack of returns to education in the richer two regions in Morocco (Saiss and Souss).
- 3) The fact that “difficult transportation” enters the national-level regression positively likely reflects the fact that the poor region of Morocco we chose in the survey (Chaouia) includes a locality close to Casablanca.
- 4) The fact that irrigation enters negatively in Chaouia is unexplained. Looking simply at correlations, irrigation is positively associated with incomes. There may well be a multicollinearity problem here. The result did not become negative until we modified our calculations of Livestock Equivalent. The old livestock unit has a correlation of only .15 with the irrigation variable. The new livestock unit has a correlation of 0.3.



## MOROCCO REGRESSION RESULTS

VARIABLES	Nationwide	Chaouia	Saiss	Souss
	Log of Income per EqA	Log of Income per EqA	Log of Income per EqA	Log of Income per EqA
Nb_PersonPres_hh	-0.0731*** (0.0190)	0.0221 (0.0261)	-0.0718** (0.0295)	-0.0803 (0.0507)
Dependency Ratio (x100)	-0.000969 (0.000795)	-0.00148* (0.000871)	-0.00135 (0.00149)	6.07e-05 (0.00210)
Land Used (Ha/EqA)	0.0957*** (0.0287)	0.255*** (0.0508)	0.195** (0.0791)	0.257*** (0.0965)
Land Irrigated (Ha/EqA)	0.107** (0.0508)	-0.159** (0.0746)	-0.0752 (0.0973)	0.145 (0.139)
Technical Package (binary)	0.159 (0.133)	-0.281 (0.254)	0.274 (0.333)	0.424** (0.197)
Tractor Draft (binary)	0.511*** (0.176)	-0.127 (0.233)	0.705** (0.323)	0.00276 (0.296)
Number of Livestock Eq.	0.0371** (0.0185)	0.0256 (0.0196)	0.0553** (0.0247)	0.0582** (0.0243)
educ1_some_prim	0.387** (0.155)	0.308 (0.223)	-0.0774 (0.366)	0.0412 (0.211)
educ2_prim	0.0445 (0.171)	0.667** (0.292)	0.195 (0.372)	0.00403 (0.223)
educ3_some_sec	0.142 (0.177)	-0.0388 (0.479)	0.0691 (0.253)	0.134 (0.299)
educ4_sec	0.103 (0.284)		0.457 (0.350)	-0.0922 (0.440)
transp2_easy_parttime	-0.00387 (0.120)	-0.0900 (0.180)	-0.0366 (0.210)	-0.649*** (0.207)
transp3_difficult	0.330* (0.172)	-0.114 (0.198)		0.0932 (0.246)
transp4_dontknow	-0.0873 (0.207)	-0.236 (0.256)		-0.718** (0.296)
HH has a Contract (binary)	0.265 (0.247)		0.115 (0.250)	
Diversification Index	0.00848*** (0.00273)	0.0111** (0.00426)	0.0106** (0.00510)	-0.00254 (0.00561)
Nb_MigrLT_hh	-0.0616 (0.0435)	0.0492 (0.0511)	-0.0920 (0.0660)	0.00682 (0.120)
Sub Region = Laqraqra		-0.817*** (0.207)		
Sub Region = Oulad_Sghir		-0.314* (0.176)		
Sub Region = Laqsir			-0.448** (0.207)	
Sub Region = Mrhassiyine			-0.591** (0.230)	
Sub Region = Machraa				-0.270 (0.191)
Sub Region = Taliouine				-1.798*** (0.340)
Constant	6.918*** (0.177)	6.676*** (0.275)	7.202*** (0.411)	8.243*** (0.447)
Observations	663	224	252	179
R-squared	0.236	0.374	0.325	0.427

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## NICARAGUA

### Specific Econometric Issues

- 1) The Tiller variable was only included in the National Level Regression and the El Cua Regression. The 4 HHs with Tiller Draft in El Viejo were dropped from the regression.
- 2) The “secondary education complete” variable is included only in the national level regression. In Terrabona and El Cua, the “primary complete” variable is not included and all HHs with at least some primary and no secondary education are grouped together.
- 3) In Terrabona, HHs with contracts were dropped from the regression, as there was not enough variance.
- 4) There are only three HHs with Long Term Migrants in El Cua. Those HHs were dropped, and the variable was not included (kept in the national regression).
- 5) The “manure” variable was not available for use in the regressions.
- 6) Land Used has been replaced by Land Owned because land access is an issue in Nicaragua where there is an asymmetric and unequal land tenure and important difference between land used and land owned. Nicaragua is the only country of the program with this characteristic: traditional land tenure systems exist in Sub-Saharan Africa; Moroccan surveyed farmers are mainly landowners; and in México land is mainly in common property (*ejido* system).

### Conclusions and Discussion

- 1) Note the strong significance of contracts in many regions in Nicaragua. Income structures in every Nicaraguan region diversify as families become richer (less in El Cua): the country is a strong diversifier. However, households can be induced to specialize if they are given a contract. This specialization effect for contracting households occurs at all income levels (16 of 20 regional quintiles where contracts exist show farmers with contracts are on average less diversified than farmers without contracts). Contracts are more broadly available in richer quintiles in Muy Muy, La Libertad, and El Viejo, so the concentration effect can be seen clearly there. Households in these regions diversify their way out of poverty and then specialize in on-farm activities at higher income quintiles. We cannot say whether poorer HHs have fewer contract opportunities because they are less willing to specialize (risk) or specialize less because they have fewer contract opportunities (they tend to be smaller).
- 2) Like we saw in Kenya, Nicaraguan survey regions are physically small and therefore transportation is more likely to be an important determinant of incomes between rather than within regions. The place that this does not hold is in El Cua, the richest region, where households that report some difficulty with transportation are on average better off than those that report no transportation problems, holding all else constant. This is not very well explained.
- 3) It is fairly clear that irrigation is not a binding constraint on incomes in Nicaragua. Though irrigation access is limited to a select group of households in each region of Nicaragua, the variable is not significant in any of them.
- 4) Long-Term Migration is an important part of the income structure in Nicaragua.
- 5) Land Owned is a significant determinant of income everywhere except in La Libertad where farmers are mainly landlords specialized in cattle.

## NICARAGUA REGRESSION RESULTS

VARIABLES	National linc_EqA	Muy muy linc_EqA	Terrabona linc_EqA	El Viejo linc_EqA	La Libertade linc_EqA	El Cua linc_EqA
Nb_PersonPres_hh	-0.0720*** (0.0170)	-0.0455 (0.0361)	-0.0563 (0.0484)	-0.107** (0.0444)	-0.100*** (0.0362)	-0.0836*** (0.0272)
Ratio_DepPres_hh100	-0.00106 (0.00237)	-0.00223 (0.00456)	0.00962 (0.00581)	0.00163 (0.00523)	-0.00794 (0.00552)	-0.00179 (0.00420)
Land Owned (Ha/EqA)	0.0127*** (0.00338)	-0.0143* (0.00753)	0.00778** (0.00304)	0.0793*** (0.0199)	0.00832 (0.00688)	0.0544*** (0.0117)
Land Irrigated (Ha/EqA)	-0.0795 (0.0580)	0.184 (0.161)	0.00362 (0.0391)	-0.211 (0.180)	0 (0)	0.117 (0.133)
Technical Package (binary)	-0.102 (0.146)	-1.152*** (0.240)	-0.00720 (0.272)	-0.279 (0.314)	-0.378 (0.441)	0.483 (0.353)
Animal Draft (binary)	0.574*** (0.176)	0.827** (0.414)	-0.528 (0.394)	-0.142 (0.266)	0 (0)	0.522** (0.233)
Tiller Draft (binary)	0.701** (0.325)					0.164 (0.348)
Tractor Draft (binary)	0.163 (0.222)	-0.190 (0.339)		0.172 (0.244)		
Number of Livestock Eq	0.00904*** (0.00277)	0.0223*** (0.00494)	0.0497*** (0.0178)	0.0113 (0.0102)	0.0102*** (0.00380)	0.0274** (0.0129)
educ1_some_prim	0.375 (0.255)	0.456 (0.288)	0.103 (0.203)	2.636*** (0.911)	-0.0841 (0.546)	-0.218 (0.140)
educ2_prim	-0.241 (0.251)	-0.303 (0.274)		-2.024** (0.904)	0.188 (0.558)	
educ3_some_sec	0.512** (0.221)	1.470*** (0.270)	1.149** (0.562)	-0.119 (0.517)	-0.880 (0.618)	0.413 (0.299)
educ4_sec	-2.122* (1.181)					
transp2_easy_parttime	-0.151 (0.128)	-0.0150 (0.225)	-0.845*** (0.248)	-0.211 (0.264)	-0.338 (0.259)	0.420 (0.259)
transp3_difficult	-0.174* (0.0895)	-0.121 (0.185)	-0.395 (0.242)	0.0355 (0.233)	-0.0614 (0.187)	-0.178 (0.145)
HH has a Contract (binary)	0.818*** (0.153)	1.177* (0.643)		1.069** (0.496)	0.857*** (0.241)	0.458** (0.226)
Diversification Index	0.0115*** (0.00241)	0.0156*** (0.00456)	0.0236*** (0.00538)	0.0236*** (0.00589)	0.0163*** (0.00490)	0.0107*** (0.00367)
Nb_MigrLT_hh	0.459*** (0.167)	0.169 (0.231)	0.804*** (0.221)	0.615* (0.320)	0.786* (0.473)	
Nb_MigrST_hh	-0.0968 (0.0795)	-0.152** (0.0731)	0.0985 (0.128)	0.198 (0.242)	-0.321 (0.428)	0.0225 (0.307)
Constant	7.037*** (0.234)	7.353*** (0.423)	6.131*** (0.486)	6.446*** (0.606)	7.805*** (0.633)	7.080*** (0.433)
Observations	880	189	132	131	153	267
R-squared	0.210	0.394	0.420	0.469	0.338	0.366

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1

## **MEXICO**

### Specific Econometric Issues

- 1) There is no variance in Draft. So all draft variable for Mexico were dropped.
- 2) With Education, those that had completed “some secondary school” and those that had completed “Secondary School or some University” were grouped together due to lack of variation in the data. Consequently, educ4\_sec was dropped.
- 3) Because no HHs in SSM have a contract, the variable was not included in that regression.
- 4) The two HHs that have irrigation in SSM were dropped and the variable was not included.
- 5) All three HHs with ST Migrants were dropped from the regression and the variable was not included in any of the Mexico regressions.
- 6) The “manure” variable was not available for use in the regressions.
- 7) The Livestock Equivalent variable was not calculated in Mexico because only information on cattle was available. Number of cattle was used for the regression.

### Conclusions and Discussion

- 1) Note that diversification is only significant in a positive way in Sierra Santa Marta, the poorest region. Between regions, diversification is significant negatively. This tells us that rich farm households in Mexico specialize. This runs against RuralStruc hypothesis 2 and shows that it is possible for developing country farm households to escape poverty by specializing.
- 2) Irrigation is an extremely important determinant of income in Mexico, while in Nicaragua it is not.
- 3) The fact that education is not significant is surprising. Educational attainment in Mexico, though higher than in most SSA countries, is still low.

## MEXICO REGRESSION ANALYSIS

VARIABLES	Nationwide Log of Income per EqA	Tequis Log of Income per EqA	SSM Log of Income per EqA	Tierras Bajas Log of Income per EqA
Nb_PersonPres_hh	-0.0456** (0.0228)	-0.0384 (0.0570)	-0.00869 (0.0216)	-0.0717** (0.0333)
Dependency Ratio (x100)	-0.00131** (0.000601)	-0.000500 (0.00188)	-0.00107* (0.000549)	-0.000599 (0.000633)
Land Used (Ha/EqA)	0.136*** (0.0270)	0.263* (0.139)	0.253*** (0.0218)	0.118*** (0.0275)
Irrigated Land (Ha/EqA)	0.337*** (0.0787)	0.324** (0.135)		0.124 (0.0962)
Technical Package (binary)	-0.0852 (0.0998)	-0.290 (0.350)	0.0968 (0.0782)	0.0990 (0.158)
Total Number of Cattle	0.00704 (0.00654)	0.0547** (0.0259)	0.0295*** (0.00679)	0.00728 (0.00536)
educ1_some_prim	-0.0882 (0.0865)	-0.442* (0.251)	0.0296 (0.0805)	-0.0440 (0.113)
educ2_prim	-0.170 (0.111)	-0.161 (0.305)	-0.169 (0.123)	-0.285* (0.162)
educ3_some_sec	0.288 (0.259)	0.208 (0.276)	0.159 (0.151)	0.0506 (0.239)
educ4_sec	-0.205 (0.260)			
transp2_easy_parttime	-0.0157 (0.0829)	0.414* (0.244)	0.00490 (0.0727)	-0.0731 (0.122)
transp3_difficult	-0.295*** (0.107)	-0.365 (0.439)	-0.205* (0.112)	-0.186 (0.131)
HH has a Contract (binary)	0.312 (0.270)	0.303 (0.259)		-0.355 (0.468)
Diversification Index	-0.00443* (0.00241)	-0.00283 (0.00529)	0.00884*** (0.00270)	-0.00211 (0.00372)
Nb_MigrLT_hh	0.00519 (0.185)	-0.338 (0.238)	0.0330 (0.101)	0.255*** (0.0929)
Constant	7.988*** (0.169)	8.222*** (0.279)	6.437*** (0.187)	7.992*** (0.251)
Observations	341	92	137	110
R-squared	0.347	0.348	0.626	0.521

Robust standard errors in parentheses

\*\*\* p<0.01, \*\* p<0.05, \* p<0.1