



**Rural Transformation  
and Late Developing Countries  
in a Globalizing World**

*A Comparative Analysis of Rural Change*

Economic and Sector Work  
P095096

**Agricultural and Rural Development Unit (AFTAR)  
Africa Region**

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The RuralStruc Program on the '**Structural Dimensions of Liberalization in Agriculture and Rural Development**' is a joint initiative of the World Bank, the French Cooperation (French Development Agency, Ministry of Agriculture and Fisheries, Ministry of Foreign and European Affairs, Agricultural Research Centre for International Development—CIRAD) and the International Fund for Agricultural Development. It is managed by the World Bank.

With a duration of five years (2006-2010), its objective is to analyze the processes of liberalization and economic integration and their impacts on agriculture and the rural sector of developing countries. It also aims to illustrate the situation of rural economies in terms of income, diversification, and overall transformation. The results obtained make it possible to improve the dialogue between national and international partners and to provide orientations for the agricultural and rural policy debates.

The Program adopts a comparative approach across seven countries—Mexico, Nicaragua, Morocco, Senegal, Mali, Kenya and Madagascar—which correspond to different stages of the processes of economic and demographic transition. The Program's work is conducted with teams of national experts and researchers. Two phases were implemented: a first phase providing an overview of each country's dynamics (2006-2007), and a second phase comprising sectoral and regional case studies, supported by rural household surveys (2007-2010).

<http://www.worldbank.org/afr/ruralstruc>



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and Late Developing Countries  
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*A Comparative Analysis of Rural Change*

**Synthesis of the RuralStruc Program  
on the Structural Dimensions of Liberalization  
on Agriculture and Rural Development**

**Final Report  
*Revised Version*  
2011**

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Losch B., Fréguin-Gresh S. and E. White, 2011, *Rural Transformation and Late Developing Countries in a Globalizing World. A Comparative Analysis of Rural Change*. Final Report of the RuralStruc Program, Revised Version. Washington, DC: World Bank

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# ACKNOWLEDGMENTS AND AUTHORS

*This synthesis report of the RuralStruc Program is dedicated to the memory of Jacques Faye (1946-2010), rural sociologist and founding member of IPAR (Initiative Prospective Agricole et Rurale, Sénégal)*

This synthesis report is one of the many outputs of the RuralStruc Program on the *Structural Dimensions of Liberalization on Agriculture and Rural Development*. During the four years of its two phases, and a fifth year dedicated to creating a general synthesis and conducting a first dissemination, the Program developed a close collaboration with numerous experts and researchers in its seven participating countries.

The activities were implemented under the guidance of Bruno Losch (TTL, World Bank and Cirad) and the field work was developed with the support of a coordination team including Bruno Losch, Sandrine Fréguin-Gresh and Thierry Giordano (French Ministry of Foreign and European Affairs), respectively based at the University of Pretoria (*Post-graduate School of Agriculture and Rural Development*) and the Development Bank of Southern Africa.

The launching of the Program benefited from the full support of John McIntire, Sector Director (ESSD Africa), and then from the guidance of Karen Brooks, Sector Manager (AFTAR), and of Stephen Mink, Senior Adviser (AFTSN), who was involved in every step of the process. The initial peer-reviewers of the Program's objectives and design were: Louise Cord and Robert Schneider (World Bank), and Camilla Toulmin (*IIED*).

This final report was prepared by Bruno Losch, Sandrine Fréguin-Gresh and Eric White (World Bank), with contributions of Thierry Giordano and Jean-François Bélières (*Cirad*). It was peer-reviewed by Derek Byerlee, Don Larson (World Bank), and André Pouilles-Duplaix (*AFD*).

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Jean Coussy (*Ceri-Sciences Po*) and Jean-Jacques Gabas (*Université Paris X- Orsay* and *Cirad*) participated in the preparation and in the launching workshop of the Program in Senegal (April 2006). Jean-Jacques Gabas also led two *Sciences Po Paris* student workshops (2006 and 2007), and was involved in the preparation of several of the Program's Policy Briefs. Eric Léonard (*IRD*) provided specific support on Mexico. Additional contributions were received from Emmanuelle Benicourt (consultant), and Véronique Meuriot (*Cirad*). Erin O'Brien took charge of the editing of the national reports as well as previous draft versions of the final report.

The World Bank staff who contributed to the overall RuralStruc Program included Bruno Losch (TTL), Patrick Labaste and Michael Morris (successive TTLs of the RuralStruc multi-donor Trustfund), Eric White, Malick Antoine, Angela Lisulo, Benjamin Billard, James Keough, Beatriz Prieto-Oramas, and Ingrid Mollard. Hawanty Page and Germaine Mafougong-Ethy were in charge of the Program's administrative support. Jeff Lecksell and Bruno Bonansea prepared the maps based on information provided by the RuralStruc national teams.

The Program benefited from the guidance of its Advisory Committee, chaired by C. Peter Timmer (*Cabot Professor of Development Studies, emeritus, Harvard University, USA*), and including: Kirsten Albrechtsen de Appendini (*Colegio de México, Mexico*), Pierre-Marie Bosc (*Cirad, France*), Peter Gibbon (*Danish Institute for International Studies, Denmark*), Catherine Laurent (*Institut National de la Recherche Agronomique, France*), Jean-Luc Maurer (*Institut des Hautes études internationales et du développement, Switzerland*), Sandra Polaski (*Carnegie Endowment for International Peace, USA*), Marc Raffinot (*Université Paris – Dauphine, France*), and Sibiri Jean Zoundi (*Sahel and West Africa Club, OECD, Paris*).

The Program also benefited from the careful follow-up of the Steering Committee of its contributing donors (*Agence Française de Développement, French Ministries of Foreign and European Affairs, and of Agriculture and Fisheries, Centre de Coopération Internationale en Recherche Agronomique pour le Développement, International Fund for Agricultural Development, and World Bank*), chaired successively by Florence Lasbennes (*Ministry of Foreign and European Affairs*) and Marie-Cécile Thirion (*Agence Française de Développement*).



# EXECUTIVE SUMMARY

## OVERALL POSITIONING: A VISION OF UPCOMING CHALLENGES

The last 40 years of world history have witnessed dramatic changes. The population of the planet has grown by 3.2 billion people—a near doubling—and there are now, for the first time, more people living in cities than in rural areas. The emergence of a global open economy, boosted by technological progress and the new international political landscape, has deeply modified the world’s development prospects.

Over the next 40 years, the world’s population will grow by an additional 2.3 billion people, and urbanization will come to affect 70% of humanity. The abrupt nature of this change in demography, occurring over less than a century, raises a question of sustainability. The existing growth trajectory of the world is simultaneously challenged by the depletion of natural resources, the consequences of climate change, and the high risks associated with asymmetric economic development among the world’s regions.

A continuous international debate is now raging about the multiple challenges of a 9-billion person world—not least of which is how to feed it. However, focusing on these overall figures tends to divert attention from other major facts related to the dynamics of population growth and its distribution that are just as important. A major shift is the continued marginalization, in terms of world population share, of the “developed world” (or the world of the “first developers”). In 2050, North America and Europe combined will account for only 15% of the population. While Asia will remain the world’s most populous region, the relative weights of the populations of sub-Saharan Africa (SSA) and Europe in world totals will be reversed compared to where they stood in 1960 (10% for SSA and 20% for Europe in 1960, and the reverse in 2050). This major realignment of the world’s population will exacerbate existing inequalities in access to resources.

In the meanwhile, despite continued urbanization, 2.8 billion people will continue to live in rural areas in 2050. Rural populations will therefore remain massive, and these populations will still be primarily engaged in earning their living from agriculture. Additionally, regional differences in urban dynamics will strongly affect the distribution of rural populations. They will be increasingly concentrated in South Asia and sub-Saharan Africa (together accounting for nearly 2/3 of the world’s rural population), and in SSA the number of rural people will continue to grow (a unique situation).

These trends are of major importance because they challenge the prospects for development in much of the world. Agriculture is more than just the production of food. Because agriculture is the core activity and main source of livelihood of

billions of rural people, its evolution will shape the process of economic, social, and environmental change. The situation is especially challenging in SSA where the lack of economic diversification, reflected most notably in the region's anemic rate of industrialization, limits possible options for employment outside of agriculture and the informal sector. Over the next 15 years, as a consequence of demographic dynamics, 330 million youth (who have already been born) will enter the labor market—a figure equivalent to the current population of the USA. Of these, 195 million will live in rural areas, and rural activities will have to provide them with needed jobs. Otherwise they will migrate to cities or to neighboring countries, where they will contribute to the growing economic, social and political difficulties that result from mega-urbanization and mass migration.

Economies characterized by large rural population and slow industrialization will need to focus on creating rural employment, although economic diversification and management of urban growth remain critical objectives. As such, the evolution of agricultural and rural development policy in the coming two decades will be decisive: for the continued fight against poverty, for economic development, and for political stability.

### **BACKGROUND: FROM THE WTO DEBATE TO THE FOOD PRICE CRISIS - THE NEED TO REFOCUS ON STRUCTURAL TRANSFORMATION**

Initiated in 2005 in the context of an intense international debate on the liberalization of agricultural markets and the resulting consequences for farming in developing countries, the RuralStruc Program's main goal was to provide a renewed perspective on agriculture and its role for development. More particularly, the Program aimed to reconnect the issues related to trade liberalization with the broader discussion of rural transformation and the evolution of rural economies within a rapidly globalizing world.

The RuralStruc Program was carried out over a period of five years (2006-2010), during which time the scope and issues of the international debate changed dramatically. Three major issues affected the global debate about agriculture. They are related to growing concerns about the consequences of global climate change—which culminated with the 2009 Copenhagen Summit—and the eruption of the world food price crisis and the world financial crisis, which remain high on the agenda (as evidenced by the implementation of an Agricultural G20).

Amidst this evolving international debate, the World Development Report 2008 on *Agriculture for Development* (WDR08) offered a strong and well argued reminder of the central role of agriculture in the development process and of its importance as a contributor to poverty alleviation. Even though the report's full incorporation into the policy agenda was somewhat delayed by the emergence of the world food price crisis and the subsequent need to focus on more pressing short-term issues, its contribution to the debate remains invaluable.

The originality of the WDR08 was in adopting a regional approach based on different stages in the process of structural transformation. It introduced the idea of the three “worlds of agriculture,” which correspond to the different roles played by agriculture at different stages of a country’s development. The first of these worlds consists of “agriculture-based” countries whose economies rely heavily on agriculture for growth and employment. This world includes most of sub-Saharan Africa. The second world of agriculture corresponds to “transforming” countries, found mainly in South Asia and East Asia, where rapidly rising rural-urban disparities and the persistence of extreme rural poverty are major sources of social and political tensions. The third world refers to “urbanized countries,” including most of Latin America, where agriculture can still help reduce the remaining rural poverty through better integration into modern food markets and the development of environmental services.

While the enumeration of these three worlds facilitated the design of policy recommendations, some of the aforementioned challenges that countries face remained largely overlooked. These included demographic issues, notably population growth and its consequences for employment, as well as asymmetries in competitiveness that result from globalization.

The consideration of these issues calls into question the viability of the historical pathway of structural transformation, which involves the well-known progressive shift from agriculture to industry, and then to services. The underlying dynamic of this “economic transition” (a key component of structural transformation) is increased productivity in agriculture, which fosters technical change and allows labor and capital to flow to other economic activities. Simultaneously, economies experience a broad geographic restructuring as labor moves from scattered activities (agriculture) to more concentrated ones (industry), and urbanization processes accelerate. This process of change translates into higher incomes, greater wealth and improved living conditions, which along with medical progress initiate the “demographic transition” (the progressive, though staggered, reduction of mortality and birth rates). The result is a population that grows rapidly at first but then stabilizes.

This evolutionist vision, based on statistical evidence from past transitions, is challenged by today’s world, which suggests that it is important to adopt a more contextual historical perspective to understand 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.

Specifically, three main characteristics from previous transitions have to be kept in mind. First, the Western European and North American transitions that occurred over the 19th and the better part of the 20th centuries cannot be disconnected from European and American political hegemony, which reduced or eliminated competition and created captive markets that were very lucrative. Access to these markets strongly facilitated economic specialization and industrialization. Second,

the European transition was boosted by a unique outflow of international migrants that smoothed the adjustment of European economies and improved their ability to deal with labor surpluses. Between 1850 and 1930, nearly 60 million Europeans migrated to the “New Worlds” (35 million to the USA alone). Third, the Latin American and Asian transitions started during a very specific period of self-centered national development that characterized the international regime between the 1929 crisis and the current era of globalization, starting at the end of the 1970s. This “developmental regime” was characterized by import-substitution, protection and strong state intervention, all of which contributed to economic modernization. In Latin America the economic transition started between the two World Wars, and in Asia it started in the 1950s. Both regions benefited from massive assistance programs that resulted from the Cold War.

Today, the situation of the developing countries that remain at the early stages of structural transformation is drastically different. This is mostly the case of sub-Saharan Africa—the last region of the world to embark on the structural transformation process—which faces the challenges of an incipient economic transition and an unachieved demographic transition in the context of a global open economy and under the constraints of climate change.

“Late developers,” including most countries in sub-Saharan Africa, enjoy certain advantages that their predecessors lacked. They can reap the benefits of technological progress and past experience, and they can also take advantage of new opportunities to access global markets. At the same time, they face new constraints, such as huge asymmetries in productivity, increased international competition (notably from the big emerging countries), and environmental degradation. These contextual challenges, as well as the instability of the international environment, drastically reduce their room for maneuver in managing structural change, particularly when it comes to improving the livelihood prospects of fast-growing populations.

## **PRESENTING THE RESEARCH PROGRAM**

This challenging contextual background shaped the design of the RuralStruc Program, which had three specific objectives: (i) contribute to the analytical knowledge base about structural change and its impacts on agriculture and the rural economy in developing countries, (ii) feed and improve international and national debates by promoting and reconnecting these issues, and (iii) provide perspectives for policy making. Accordingly the Program’s motto was “*better understanding for better policy making.*”

The design of the RuralStruc Program was based on three inter-related hypotheses. The first hypothesis is that the global restructuring of agrifood markets and the increasing asymmetry of international competition are leading to growing differentiation among farm, marketing, processing and distribution structures. The second hypothesis is that the income sources and activity patterns of rural



households change to include more off-farm activities in response to these more competitive and challenging global markets. The third hypothesis is that marginalization processes in agriculture and difficulties faced by rural households in adapting to this new context (especially in situations characterized by the absence of effective alternatives to farming) sometimes lead to impasses within the process of structural transformation. This third hypothesis is particularly relevant for the first of the “three worlds of agriculture,” namely, the agriculture-based countries.

To address these hypotheses, the RuralStruc Program used a comparative approach. In order to draw lessons from the different ways that rural economies adapt to the new global context of change, seven countries at different stages of structural transformation and economic integration were selected for study. Mali, Senegal, Kenya, and Madagascar are at an early stage of the economic transition, and they are part of the first of the “three worlds of agriculture.” Morocco and Nicaragua are at an intermediate stage in their transformation process, and although agriculture remains critical in the economies of both countries, its role is declining. Mexico, an upper-middle income economy, is much further ahead in its transformation process, has become deeply integrated with its northern neighbors through NAFTA, and forms part of the WDR08’s “urbanized world.”

The activities of the Program were implemented through a collaborative process involving national teams in all seven countries that were deeply involved at every stage of Program development: preparation, implementation, analysis, dissemination and discussion of results. The first phase was dedicated to the production of a series of broad overview documents summarizing what was known in every country about processes of rural change. This exercise exposed the weakness of the empirical knowledge base regarding the characteristics of rural economies, particularly concerning the livelihood structures and income-generating activities of households. The only information available came in the form of case studies, undertaken for different objectives and using different methodologies, which prevented them from being used systematically.

Based on this first result, the decision was taken to engage in primary data collection through field surveys. Around 8,000 rural households in 26 regions of the seven participating countries were interviewed in early 2008 (note that the survey was implemented before the full development of the food price crisis). The interviews focused on the activities and incomes of the participating households. The resulting data set provided a unique, single-shot representation of rural income structures that was comparable across the surveyed regions due to a common methodology. However, since the surveys were carried out at a single point in time, it was not possible to conduct any dynamic analysis within the surveyed regions. Nevertheless, the fact that the surveys used the same methodology at the same point in time, yet were carried out in different regions at different stages of economic development and featuring different levels of integration into the global economy, allowed for a dynamic interpretation of results at the cross-regional and cross-

country levels. This interpretation allowed the Program to investigate the drivers of rural transformation and to feed the debate on economic transition and structural change.

## **THE PERSISTING ROLE OF AGRICULTURE AND THE EXTENT OF RURAL POVERTY**

The analysis conducted under the RuralStruc Program revealed a diverse array of rural situations that nevertheless had a number of important characteristics in common. First among them was the continued dominance of agriculture as an economic activity in all of the surveyed regions. Ninety-five percent of surveyed households were engaged in on-farm activities, meaning producing crops, growing livestock or processing products on the farm. Some regions were significantly more diversified, however, notably Tequisquiapan (Queretaro state) in Mexico—where only 30% of households rely on on-farm activities—and also to a lesser extent Souss in Morocco, where no more than 75% of households are “farm households.”

In addition to having high levels of involvement in agriculture, the surveyed regions were characterized by widespread poverty, particularly in sub-Saharan Africa. Median incomes—which offer a better overview of the rural reality than regional averages—were estimated between 0.5 and 2 dollars PPP per person per day in the SSA regions (except Nakuru North in Kenya, where it is \$3), while the non-SSA regions displayed higher levels (between \$1.5 and \$5.5). Dealing with averages, 70% of SSA surveyed households earn less than \$2 PPP/person/day, and 40% suffer from \$1/day poverty. In some regions, notably in Mali, this figure can reach as high as 80%.

Examining the poorest 20% of households in a given surveyed region, rather than looking at the region as a whole, expresses the reality of poverty even more drastically. This bottom quintile suffers from \$1/day poverty in every region in the survey outside of Mexico, even in regions that were, due to their good connections to markets and strong asset endowments, a priori classified as “winning”. Further, average incomes in the top quintiles are usually pulled up by a very small number of households that are significantly better off than the others, and that benefit from very specific social and economic conditions.

A consequence of high poverty levels is that households face very high levels of risk, which limit their investment capacity and their ability to innovate. This dire situation is complicated for households that also face food insecurity. When earnings are converted from dollars PPP into kilocalories, based on local prices, it appears that a substantial share of households in all surveyed regions had difficulty meeting their minimum daily caloric requirements: in 11 out of the 19 surveyed zones in SSA, the bottom quintile was, on average, unable to provide 2450 kCal/person/day. Two regions in Nicaragua exhibited the same situation.

These results concerning the importance of on-farm income and the widespread prevalence of poverty, even within otherwise heterogeneous rural economies, colored the investigation of each of the Program's three hypotheses. In the case of SSA countries, the data suggested that, whatever farm differentiation processes have been initiated or strengthened by globalization and the subsequent increasing integration of world food markets, none have been deep or profound enough to make a macro-level impact on rural economies in the surveyed regions. They also suggested that no matter what other activities households may have diversified into as a rural non-farm economy developed, few have been able to leave agriculture altogether, and few of the households that stayed in rural areas became non-poor. At the other end of the transition gradient, the case of Mexico showed that even when differentiation processes are extensive, and many households leave agriculture, rural poverty can remain quite substantial. In these economies, many households in the lowest quintiles are still poor, below the \$2 per day line and sometimes below \$1 per day.

Similarly, the differences in income levels and patterns of income distribution observed between rural areas of the seven countries say something about structural transformation. In SSA, the overwhelming majority of rural households are poor, but inequality among them is limited (Gini indices built on the sample range between 0.35 and 0.45). In Morocco and Nicaragua, which are moving more quickly in the transition, average rural incomes are notably higher, but inequality is quite severe (Gini indices fall between 0.6 and 0.7). In Mexico, which was found to have the highest median rural incomes of the sample, Gini indices are quite low (0.4). There the question of inequality within the rural space has been displaced by one of rural-urban inequality. The concern in Mexico is the increasing marginalization of rural areas (Mexican regions display the largest gap in the RuralStruc sample between surveyed household incomes and national GDP per capita—four to seven times).

## **FARM-PRODUCTION, MARKETS, AND DIFFERENTIATION PROCESSES**

Over the last decade, the agricultural economics literature has been brimming with accounts of how farmers in developing countries have been integrating into the market economy. Case study examples abound that describe how producers have forged new connections to high value markets, achieved vertical integration through contracts, and have been able to reap the benefits of the so-called "supermarket revolution." Though these processes are underway in several regions of the developing world, there is a risk of overstating their impact, especially when it comes to the proportion of farmers involved in this new world of agriculture. New opportunities do exist, but they are often strongly localized in specific regions and, above all, concern a relatively limited number of producers. In any given country, while thousands or even tens of thousands of farm households may have benefited from the development of new integrated value chains, hundreds of thousands or even millions of other households remain embedded in more traditional types of agriculture—a situation exemplified by the well-known Kenyan horticulture success story.

## **The Importance of Staples and Self-consumption**

Among surveyed households, a commonly observed characteristic of production is the importance of staples, usually a cereal: rice in Madagascar, Mali and Senegal, complemented by millet and sorghum in the last two countries; wheat in Morocco; and maize in Kenya, Mexico and Nicaragua. Ninety-eight percent of the surveyed households in SSA and 76% in non-SSA regions are engaged in staple production. On aggregate in the RuralStruc sample, staples represent on average 62% of farm output in SSA and can often reach up to 80%. In non-SSA countries, where on-farm diversification is greater (i.e., more products are grown), the situation is more varied. The numbers for production of staples stand at around 45% in Nicaragua and should be similar in Morocco (in fact they were lower in Morocco during the survey year, because drought affected the relative share of wheat). Specialization in maize in the surveyed regions in Mexico is more specific and related to very particular sets of incentives.

The pervasive importance of staples reflects the fact that risk levels, and sometimes food insecurity, have led a large proportion of sub-Saharan African households to remain at least partly and significantly engaged in subsistence farming. These households do not simply produce staple crops, but they also consume a large portion of their own output. Self-consumption, depending on the region, accounts for around 50% of production. Extremes are found at one end of the spectrum in Mali (75% in Diéma or Tominian) and at the other end of the spectrum in Mekhé, in Senegal (less than 20%). Outside of sub-Saharan Africa, the share of farm output that is self-consumed is lower (20 to 30%), but in Nicaragua, poorer quintiles rely heavily on subsistence farming (up to 60%). The extreme low level of self-consumption in the Mexican surveyed regions is the consequence of a deep restructuring of the maize industry in the country which followed the implementation of NAFTA.

Generally, the share of self-consumption decreases with rising wealth, both at the regional level and at the household level. Surveyed households in sub-Saharan Africa are less advanced in this process, because they are poorer. More precisely, the prominence of self-consumption in the survey results from two complementary effects that limit smallholder farmers' participation in markets. First, the supply effect refers to risk management strategies that households employ to retain control over their food supply—a direct response to incomplete and imperfect markets. Second, households face various demand effects, including weak demand for their products that results from poor access to and integration with markets, or the fact that production surpluses are too low to attract buyers.

## **Marketing by Traditional Means**

These observations express a dual reality. They indicate that rural areas—notably in sub-Saharan Africa—continue to engage in subsistence farming, but at the same time improved connectivity to markets is a generalized fact. Situations where

households do not sell any products are unusual, and a large majority of them also purchase food products produced by others.

In the surveyed regions in SSA, “traditional” marketing patterns persist. Most private collecting agents rely on informal strategies based on trust to obtain output from farmers, and contractualization remains low, even for those farms which are firmly integrated into markets through ongoing relationships with wholesalers or agro-industries (this is notably the case of monopsonistic situations like cotton in Mali). However, some local agribusinesses do make use of contracts (tomato in the Haut Delta, Senegal, milk in Antsirabe and green beans in Itasy, Madagascar, sugar cane in Kenya), and modern marketing systems are more prevalent in non-SSA countries. It is worth noticing that contractualization rarely occurs at the producer level and most often occurs downstream, between the wholesaler, the collection unit, or the producers’ organization, and the processing firm or the procurement service (e.g., dairy industry in Nicaragua).

Where on-farm diversification has occurred, it has done so seemingly without any discernable pattern. Rather, the surveys revealed heterogeneous examples of on-farm diversification that have developed in response to region-specific opportunities. These can include a legacy of a colonial cash crop (cotton in Mali, groundnut in Senegal, coffee in Kenya), a specific investment by a foreign firm (the case of green beans produced by *Lecofruit* in Madagascar), or local entrepreneurship enabled by public investment in infrastructure (the booming shallot production in the *Office du Niger* irrigation scheme in Mali).

With reference to the Program’s first hypothesis, the conclusion is that households in the RuralStruc surveys participate in rural economies that have not been radically reshaped by vertical integration and the supermarket revolution—which is not really a surprise. (the very specific situation of the Mexican Sotavento region is an exception). Consequently, new agricultural production systems featuring non-traditional connections to markets are rare. This suggests that farm differentiation, where it occurs, reflects primarily differences in levels of existing household assets rather than new types of connections to markets, and more likely simply illustrates the characteristics of local agrarian systems.

### **The Continuous Importance of Household Assets**

Additional evidence for this conclusion is provided by econometric work aimed at investigating the determinants of farm income in surveyed households. A strong finding of this regression work is that household earnings from farming depend largely on traditional determinants of income, rather than on more modern factors. A particularly striking result is the widespread importance of land as a top determinant of farm incomes (significant in 22 of 30 surveyed zones, making it the most commonly significant variable in the survey). This suggests that expanding acreage under cultivation is generally more worthwhile than using fertilizer or improved seed varieties.

Along with plot size, a large herd and a small number of family members were found to be the other largest contributors to per capita household income, while market integration and the use of modern farm inputs (seeds and fertilizer) did not seem to matter as much. Though the survey did not provide detailed information on the practices of farmers and did not allow for a fine-tuned understanding of farming systems, a noteworthy finding was that market integration does not necessarily imply improved incomes. Whether or not the two are linked is context specific. The income effects of contractualization, for example, are highly differentiated, and depend on where the contracts are concentrated on the income spectrum (poor households can be in a situation of heavy dependence, tightly bonded to the processor) and on the regional context (notably the existence of competition).

## **OFF-FARM DIVERSIFICATION AND THE RESHAPING OF THE RURAL ECONOMY**

Given the degree of poverty observed in the survey, the risk levels of households (including all types of risks related to climate, pests, prices or market access) are a major issue and a major determinant of their livelihood strategies. Households facing high levels of risk in their agricultural activities often seek income opportunities outside the farm, and consequently a large majority of surveyed households engage in off-farm activities (75% on average). The figures are higher in SSA (ranging from 80 to 95%) and lower in non-SSA regions, where more on-farm specialization is observed.

Despite these general tendencies, the degree of development of the rural non-farm economy remains uneven, and the rural off-farm sector is often characterized by high levels of self-employment, provision of petty services, and few formal opportunities to earn a wage. The picture that emerges from the survey data is quite far removed from the buoyant rural economy frequently described in the literature.

### **Uneven Opportunities for Diversification**

***Agricultural wage labor:*** Agricultural wage employment is a common off-farm activity (reported by one quarter of the sample) and can be an option available to the poor to complement their on-farm income between cropping seasons. Agricultural wage however are generally not very remunerative. Quoted wages—which most of the time are listed in reference to “peak season” when labor demand is high—are \$2 to \$4 PPP per day in the surveyed regions in SSA and \$10 to \$15 outside SSA. Yet, agricultural jobs are almost always seasonal and, above all, provide a very limited return when aggregated over the year. Though many rural households engage in this work, it remains a limited complement to their own farming activities. The only way that agricultural wage labor can make a real difference (i.e., allow households to escape from poverty) is for a household member to secure a permanent job, which might pay \$7 PPP per day in Senegal and as much as \$9 PPP per day in Mexico. But these opportunities are definitely too scarce to provide a sustainable solution for many.

***Non-agricultural wage labor:*** Non-agricultural wage employment remains a limited option, mostly found in regions with unique regional endowments of resources, infrastructure, and services. Only 15% of the surveyed households engage in this type of activity, and this percentage varied considerably across the studied regions. Non-agricultural wage labor employment opportunities are found mainly in non-SSA countries; they appear only sporadically in SSA. A good example is the maquiladoras (labor-intensive industrial units), found in Tequisquiapan (Mexico), as well as in Terrabona (Nicaragua), where an apparel industry has developed in rural localities. In SSA, this type of manufacturing work is scarce—particularly in rural areas—and non-agricultural wage labor mostly consists of jobs in the service industries. They are generally poorly paid and in the informal sector, although some formal sector jobs can be found (e.g. civil service or tourism). The most lucrative opportunities usually are available to those who are already well off, having ample human and social capital.

***Self-employment:*** In contrast, self-employment is prevalent everywhere. It represents the most common source of off-farm income in most of the surveyed regions, and it is the main diversification option for the poorest households. In SSA, as well as in the Sotavento (Mexico), 40 to 80% of the surveyed households were found to be engaged in self-employment. In Morocco, Nicaragua and Tequisquiapan, where there are more economic options (waged jobs), the incidence of self-employment is dramatically lower (5 to 15%). Self-employment activities are almost always carried out at the micro level and are often based on the performance of odd jobs. Two main self-employment patterns can be distinguished: “positive diversification,” where self-employment contributes significantly to household income (generally a full-time activity), and “neutral diversification,” where the poorest and most marginalized households develop coping or “survival” strategies by engaging in minor self-employment activities with very low returns. Positive diversification is accessible mostly to better-off households, with more or better assets and/or the ability to make an initial investment (e.g., a grinder, a sewing machine, or welding equipment). Other types of self-employment, specifically those related to coping strategies, could rightly be thought of as a form of underemployment, and they do not represent a good option for poverty alleviation (e.g. petty trade).

***Transfers:*** Transfers contribute significantly to the income of rural households. Although public transfers related to farm subsidies and safety nets were observed only in Mexico, there they weighed quite heavily in household incomes (contributing between 12 and 20% in the Sotavento region). Private transfers related to migration (remittances) are more common, even if difficult to quantify. They were reported by 24% of the households in the sample, most of them living in regions with strong historical patterns of migration. The importance of remittances depends on the type of migration (long-term or short-term) and on the destination (national, or international, to high-income countries or to neighboring countries). Nevertheless, in only one region do remittances make up a significant share of income (40% in Diéma, Mali). In the other regions where they occur, they generally

account for between five and fifteen percent of total household income (Morocco, Senegal, and Nicaragua), except for in Kenya and Madagascar, where they are insignificant. Strikingly, 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 such cases, remittances are often very limited or even non-existent, and the living conditions of the migrant can be dire.

### **Rural Adaptation Mirroring Overall Structural Change**

In addition to the direct income benefit of migration in the form of remittances, there is also a network effect that can provide indirect returns. Improvements in transport and communication infrastructure allow for new types of household organization in which family members contribute to household income from different locations, where they are engaged in different economic activities. These “archipelago systems” facilitate greater diversification and risk management, improve the economic prospects of households, and offer new perspectives for rural change. This pattern was observed several times in the RuralStruc sample.

With reference to the Program’s second hypothesis, these overall characteristics of off-farm diversification illustrate heterogeneous processes of adaptation and rural transformation. They somewhat mirror the economic transition as a whole: diversification which generates very low returns at the early stages of structural transformation, and a more mature diversification which consolidates the process of change at later stages. Accordingly, they serve as a reminder that proximity to cities or an area of high population density is not enough to stimulate economic growth. The characteristics of urbanization count, especially the infrastructure, public goods, and services which are critical for the intensification of rural-urban linkages.

### **THE DIVERSIFICATION – INCOME RELATIONSHIP AND RURAL TRANSFORMATION**

Many of the RuralStruc survey results presented up until this point are quite sobering. Most of the surveyed households in SSA, as well as significant shares of the sample in the three non-SSA countries, are very poor and continue to engage extensively in subsistence farming. For households in the lowest income quintiles, food security continues to represent a major challenge. Opportunities to engage in off-farm activities offer very weak returns or are accessible only to the already well off, and vertical integration and contractualization processes are not well developed.

Yet in spite of these findings, the surveys also turned up some more hopeful results. Levels of income vary between regions and between countries, and outside of SSA there is considerable evidence that average incomes are rising. Some regions in SSA also show improving situations (Bas Delta in Senegal, Nakuru North in Kenya). In Morocco and Nicaragua, falling levels of risks and improving market opportunities have allowed some households to engage in more on-farm diversification. In these two countries, and also in Mexico, the increasing number of economic options has



facilitated higher returns from off-farm activities. This trend is most obviously exemplified by Tequisquiapan in Mexico, where 70% of rural households are no longer directly engaged in agriculture. Though this trend can result in a critical form of marginalization for those households that cannot access wage employment, the average household is better off. Among the households with farms (30% of the sample), those that have one member working in a wage-earning activity display the highest per capita income levels in the entire seven-country sample.

To explore more fully the extent of these processes of change, the phenomena of diversification and specialization were studied more closely, as was their relation to income levels. Two indicators (the Herfindahl-Hirshman index and the share of income earned from off-farm sources) were used to illustrate the degree to which rural households and regions have moved away from on-farm activities as a source of livelihood. Several trends were identified. First, households in surveyed zones in richer countries, specifically non-SSA countries, tend to exhibit, on average, lower levels of off-farm diversification. This result was somewhat surprising, given that structural change is generally considered to be associated with increases in income, and that change involves moving away from a reliance on farming.

Second, at the sub-national level, no clear trend was noticed. In some countries, richer surveyed regions were on average more diversified, and in others they were less diversified. Within surveyed regions, the effect was equally muddled, but regardless of the direction of the diversification-income relationship, the difference in diversification levels between income quintiles was quite pronounced, indicating a strong interaction between them.

### **The “Inverted U”: A Perspective on Processes of Rural Change**

To explain these observations, it was hypothesized that the diversification-income relationship is characterized by an “inverted U” shape. At very low income levels (where households focus on survival strategies), diversification of income sources is uncommon: households are fully engaged in farming. As income levels start to rise and households become slightly richer, they remain at risk (especially from adverse shocks), but they develop more room for maneuver to build safety nets. As incomes continue to grow, households begin to diversify their activities in order to cope with risk and find additional revenues. During this stage, the region remains highly specialized in agriculture, as diversification takes place at the household level only (within-household diversification). This process of diversification continues until a point where households develop enough of a wealth and asset base that they can earn sufficient 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, others off-farm—and the result is a more diversified regional economy on the whole (between-household diversification),

An indicator was developed, called the “diversification gap,” that served as a proxy for a region’s progress along this continuum. The observed very strong correlation

between the diversification gap and household income suggested that regions within the RuralStruc survey tend to move along the inverted U path as they develop. More interestingly, the diversification-income relationship appears to include an exponential component. Specifically, once regions are able to “turn the corner” and households begin to specialize economically, income growth at the aggregate regional level, previously quite slow, seems to take off rapidly and lead regions on a pathway out of poverty.

### **Poverty Traps and the Elusive RNFE**

A significant finding of the RuralStruc analysis is that most of the surveyed regions in sub-Saharan Africa are lagging behind in their progression along the inverted U. In fact, many African households seem to hit an invisible wall in the transition process, where they cannot earn enough money through income diversification to become secure in their livelihoods (a result of low returns to available off-farm income-generating activities). Consequently they never “turn the corner” and begin to specialize. They seem to be trapped in structural poverty, an observation that confirms the difficulty of rural transformation as well as the Program’s third hypothesis: that risks of transition impasses were to be observed in the globalization process.

Finally, a more general result of the survey is worth highlighting. In the sample, the process of specialization at the final stage of the inverted U path mainly occurs in agriculture, while specialization in other economic activities is observed less frequently. This striking outcome can be explained by a methodological bias related to the fact that the survey was implemented only in “rural” areas and, consequently, tends to inform mainly about re-specialization processes in the farming sector. Households that specialize in non-farm activities often do so in urban areas, meaning that they frequently migrate. In addition, and perhaps more fundamentally, this result highlights the somewhat ephemeral nature of the rural non-farm economy, which tends to simultaneously grow and to dissolve itself as a result of the urbanization process. Not only do off-farm specializers migrate to urban areas, but urban areas expand as rural boroughs grow to become small cities. This phenomenon of “cities moving to the country” is a consequence of increasing demographic densities and of the territorial expansion of cities related to the urban growth process itself.

### **MAIN POLICY OUTCOMES**

The RuralStruc survey results tell a story about rural transformation and provide a framework for understanding the evolving trends of diversification and specialization over time. Furthermore, they highlight the importance of national characteristics—e.g., country assets, market functionality, business climate, institutional arrangements, overall governance, and political stability—which determine the room for maneuver available to households as they struggle to escape from poverty. The RuralStruc survey results provide particularly important insights

into the specific situation of the late developers, exemplified by the surveyed regions in SSA, where the fact that countries are still at a very early stage of the economic transition limits households' opportunities for income diversification and access to high-return activities.

It is important to note that the inverted U pattern is not deterministic. Rather, it provides a conceptual framework that helps us to understand where regions stand in the diversification-specialization process. This framework helps us to think systematically about changes that occurred in the past and to enumerate the possible causes of observed transition impasses. It does not predict future developmental paths, as these will depend on the idiosyncrasies of every local context and the nature of its interactions with the outside world.

For the many rural regions in sub-Saharan Africa that are caught in a poverty trap, solutions will have to come from contextualized policy interventions at the country level, as well as from initiatives capable of bringing about stronger regional integration. The best way to attack SSA's lagging transition is to introduce policies that can promote rural growth by simultaneously fostering and meeting rural demand. An important lesson from past transitions is that increasing farm incomes fosters rural demand. To ensure that this rural demand is met with an adequate supply of goods and services, governments must support local investments through an adequate provision of public goods.

If this rural development strategy is critical for SSA countries, it is also sensible for other developing countries. The Program's surveys outside of SSA also exhibit situations of marginalized rural population, but combine them with high urban-rural inequality—a situation which is not politically sustainable.

### **From General Guidelines to Building Blocks**

There is no easy way to deal with the huge challenges of poverty alleviation, rural growth and economic transition. In the absence of a silver bullet, a long "shopping list" of potentially helpful policy measures has emerged from the last two decades of rural development practice. The main components of this list are the improvement of imperfect markets (by lowering transaction costs), the development of missing markets (for credit, technical support, insurance), the provision of public goods (infrastructure, research, information, and capacity building), and the introduction of risk mitigation mechanisms.

Procuring all the ingredients for an effective policy regime may be challenging, but finding the exact recipe for success is even more difficult. Policies must be tailored to local circumstances, so the most difficult task is to devise the right combination of policy measures that will be effective in a particular context. Critically, this process includes making choices in terms of prioritization and targeting. Indeed, in most countries (not only the developing ones), an important issue for policy makers is the

pressing need to address a multitude of problems at the same time, which is usually not possible due to financial and human resource constraints.

Based on the Program results, which exhibit a very strong heterogeneity of situations (between countries, between regions, and between households), it is possible to advance two major recommendations for policy making: (i) reengaging in development strategies, at both the national and sub-national level, and (ii) implementing regional diagnoses.

***Reengaging in development strategies:*** There has been a long-term neglect of overall strategy design over the last decades which has resulted from state withdrawal, an excessive segmentation in sectoral policy making (leading to “stove-piping”), and the deterioration of public information and statistical systems—a major handicap for the policy makers.

In this context, reinvesting in knowledge creation is an urgent priority. As illustrated by the country reviews that were carried out during the first phase of the RuralStruc Program, socio-economic information is deficient in general, and the data needed to understand the dynamics of evolving rural economies are especially scarce. Public data collection and reporting systems (statistical systems) must be reinvigorated and redefined, and capacity in public agencies to collect and report data must be complemented by capacity to analyze the data and formulate relevant policy conclusions. If this does not happen, policy makers will be unable to design measures needed to deal with evolving rural economies, the increasing mobility of people, and the resulting new organizational patterns of households (such as the “archipelago” system). Reengaging in development strategies at both the national and sub-national levels also implies reinvesting in processes. In order to secure ownership—the determining factor of shared vision and commitment—consultation is a critical step. It takes time, adequate planning, and a significant effort in capacity building to manage information systems, to analyze results, and to monitor processes.

***Implementing regional diagnoses:*** Regional diagnoses are indispensable for the prioritization of objectives, targeting of interventions, and sequencing of actions. A useful approach is to identify the binding constraints to agricultural growth—the necessary first step for increasing rural demand and fostering rural diversification—and then to design policies to address them. These policies must necessarily make choices, identify targets, plan, and then monitor the implementation of interventions. An important caveat here is the need to avoid being trapped in mono-sectoral policy making—for example, focusing exclusively on agricultural problems—and to embrace broader approaches that reconnect agriculture to rural development, and in turn rural development to a comprehensive framework of integrated multi-sectoral and regional development (an approach sometimes referred to as territorial development).

These two recommendations relate to the methodology of policy-making, and they do not prescribe any particular set of interventions. Specific policy measures formulated on the basis of these recommendations will need to reflect country-specific circumstances and processes. As such, specific assets or strong natural advantages (e.g., in mining or tourism) can offer additional room for maneuver for supporting new activities and rural transformation.

Still, for large majority of rural situations (where households are deeply engaged in farming), it is possible to suggest some major policy orientations or “building blocks.” Policy makers should keep these in mind when devising targeted development strategies aimed at overcoming poverty traps and facilitating the overall process of rural transformation. Three building blocks are presented to help governments avoid “shopping lists” of urgent policy needs. They are relevant to the specific circumstances of the late developers (particularly SSA), and are based on the main findings of the Program. They focus on the following critical areas:

1. Supporting family farms
2. Promoting staple crops
3. Strengthening rural-urban linkages for territorial development

### **Supporting Family Farms**

The RuralStruc Program results offer arguments for supporting family farms, and they contribute to the controversial debate about optimal farm size, which has been reignited by the food price crisis of 2008 and the related rise of land grabbing, notably in Africa.

A false dualism lies at the heart of this debate. It sets smallholder and subsistence agriculture on one side against large-scale and commercial agriculture on the other, when the reality corresponds to a continuum of situations in which family farming is nearly always the dominant mode of production. Family agriculture, as opposed to managerial or capitalist agriculture (which is often large scale) already feeds most of the world. Family farms can be subsistence oriented, commercially oriented, or a combination of the two. A large body of empirical evidence shows that family farms can be productive and also competitive in terms of production costs when compared to large-scale managerial farms. In sub-Saharan Africa, family farms are often competitive in the domestic market, but they are often disadvantaged in global markets due to factors unrelated to their size (e.g., economic and institutional environment).

The current focus on food security has tended to overshadow the multifunctionality of agriculture (specifically its ecological, economic, social, and cultural roles), for which family farms, because they are embedded in the local context, are the major stakeholders. The concern for food security has also led many policy makers to overlook the role of agriculture as a source of employment and a driver of structural transformation over the medium term. Family farms, because they rely heavily on

labor-intensive production methods, have the largest capacity to absorb the rapidly growing labor force (195 million rural youth in the next 15 years in SSA). In contrast, managerial agriculture, which is much more likely to be capital-intensive, offer fewer prospects for generating important new labor opportunities.

Investments in large-scale commercial agriculture (including investments coming from foreign sources) can offer important opportunities for growth, diversification of markets, and development of sparsely populated areas, but they should be evaluated as well in terms of the employment they are likely to generate. In addition, investments in large-scale commercial agriculture should be focused on segments of the value chain where capital is missing (input supply, marketing, transformation), with the goal of unleashing the huge potential of family farms to increase production.

“Supporting family farms” can mean many different things, and, again, it is necessary to avoid presenting a long list of recommendations. Still, experience suggests that three types of actions are often needed to address the most critical problems: (i) securing land rights, (ii) providing public goods, and (iii) supporting farmers’ organizations.

***Securing land rights:*** Farm households face high levels of risk. The first steps towards achieving a more secure environment are to facilitate access to farmland and to secure land rights, two necessary conditions for investment and innovation. This includes the need to facilitate land access to youth, and to ease the transmittal of farm assets to young family workers.

***Providing public goods:*** Most family farms are severely constrained by their very low capacity for investment, a consequence of their long-lasting poverty. Selective targeting of direct support can help to overcome this constraint, but an even more effective measure is to increase the provision of public goods, notably information, training and capacity building for farmers, and rural infrastructure (small-scale irrigation, roads, power generation and transmission structure). Infrastructure can also, when possible and appropriate, facilitate access to sparsely populated areas and encourage internal migration.

***Supporting farmers’ organizations:*** Due to their small size and limited production capacity, many family farms are unable to capture economies of scale in sourcing inputs, marketing outputs, and transforming products. This constraint can often be overcome through collective action and suggests providing support to farmers’ organizations, which can at the same time improve integration into value chains, facilitate contracting with downstream agents and strengthen the bargaining power of producers.

### **Promoting Staple Crops**

In countries with agriculture-based economies, four major evidence-based arguments can be advanced for giving priority to staple crops. The first argument

stems from the ubiquity of staple crop production. In most developing countries, the overwhelming majority of farm households are involved in staple crop production (90% on average in the RuralStruc survey), so targeted policies that promote the production and marketing of staple crops can have important effects on the overall rural economy in terms of labor, income, and growth. The ratio between the number of producers involved in staple crop production versus the number of producers engaged in production of other crops is easily 10 : 1, and often much higher.

The second argument in favor of giving priority to staples is related to the critical role played by staple crops in risk management. Because food markets in rural areas often do not work well, many rural households remain vulnerable to periods of food shortage, and consequently often retain a significant share of their output for self-consumption. Any increase in staple crop production therefore can serve as a catalyst. By helping to reduce risk, increased production of staples can help to unlock the potential for technical innovation, speed on-farm diversification, and encourage participation in modern value chains.

The third argument in favor of a pro-staple policy is related to the huge growth potential of the staple food sector. For the foreseeable future, demand for food will grow steadily, fueled by population growth and urbanization. Even if rising incomes will lead to shifts in consumption patterns, staples—most notably cereals—will continue to account for the majority of food demand for years to come. Additionally, rising food prices are creating progressively better returns and preventing competition from low-priced imports.

The fourth and final argument for promoting staple crop production is that it can generate more value-addition at the local level, due to the huge potential for local processing of products. This could strongly contribute to strengthening rural-urban linkages and rural diversification.

Policy measures for increasing the productivity of staple crops and improving staple markets are diverse and varied. In the particular case of sub-Saharan Africa, however, two entry points can be highlighted: (i) reducing post-harvest losses, and (ii) unlocking regional trade.

***Reducing post-harvest losses:*** Post-harvest losses are a recurrent problem against which very little progress has been achieved. The economic cost of post-harvest losses is high (10 to 20% in cereals, and probably more in roots, tubers, and plantains), and the burden is born mainly by farmers. Technical solutions are available, but efforts are needed to adapt institutional and financial arrangements to facilitate the cost-effective use of storage systems (for example, warehouse receipts).

***Unlocking regional trade:*** Sub-Saharan Africa represents a huge potential market, but access to this market is currently constrained by the political fragmentation of the continent and multiple recurring barriers to trade. Even though some progress

has been made in fostering better regional integration, regional trade continues to lag as a consequence of non-tariff barriers, a lack of enforcement of regional trade agreements, and the high transactions costs associated with overland transportation. The most promising interventions for jump-starting regional trade relate to the continuing improvement of infrastructure networks and above all to strengthening the political will of the membership of regional economic communities.

A caveat to the recommendation of supporting staple crops is that it is not a catch-all strategy. Due to their relative low value when compared to other commodities, for example horticulture crops or livestock and livestock products, it is clear that productivity increases in staple crops cannot be the only solution for poverty alleviation. Other opportunities, when they exist, must be seized.

### **Strengthening Rural-Urban Linkages for Territorial Development**

The development of strong linkages between small cities and their surrounding rural areas is particularly critical for development and as such is a necessary focus of attention. Historically, the forging of rural-urban linkages was fed by growth in rural demand for goods and services, which generated new productive activities that naturally concentrated in rural boroughs and small towns so as to benefit from economies of scale. In recent decades this has changed; urbanization around the world has increasingly been characterized by rapid “metropolization” in and around large cities, which concentrates economic activity even more and offers superior job prospects. Metropolization is a consequence of better transportation and information networks, and it has given rise to large-scale migration directly from rural areas to metropolitan areas. In many cases migrants completely bypass smaller towns in which dense rural-urban and on-farm/off-farm linkages could have been formed. But even when they stay in small and mid-size cities, they create an informal urbanization that takes place without the adequate public goods and services. This constraints sustainable urban development and prevents strong urban-rural linkages from forming.

Strengthening the intermediate level of territorial development by promoting the economic vitality of towns and small cities—the so-called “missing middle”—appears to be an important step for fostering rural transformation in the context of globalization (which tends to favor long-distance over short-distance networks). Interventions in this area can offer win-win solutions which, on the one hand, create better local market opportunities, facilitate access to services, strengthen communities, and more broadly contribute to the weaving together of a region’s economic and social fabric and, on the other hand, reduce the burdens of mega-urbanization. This type of regional rural-urban dynamic 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. This perspective acknowledges the multifunctionality of agriculture and the fact that it can be a



driving force for rural and regional development. In order to strengthen rural-urban dynamics, two types of actions are proposed: (i) improving urban services, and (ii) empowering local institutions.

***Improving urban services in small cities:*** In order to better link towns and small cities with their immediate surroundings and strengthen their economic functions, transportation infrastructure is key. However, as revealed by the RuralStruc surveys carried out in the well-connected rural areas of Western Kenya and Senegal's Bassin arachidier, road infrastructure alone is not sufficient to foster growth and territorial development. The adequate provision of a range of other public goods and services is critical, and as such should be a major objective for policy makers. Provision of health and education services, as well as assured supplies of water, electricity and telecommunications are paramount. While most of these goods and services cannot easily be provided by the private sector during the early stages of development, fiscal incentives can be introduced aimed at encouraging private service providers and entrepreneurs to participate more actively in some of these areas. Moreover, this improvement in services as well as specific supports (especially in terms of capacity building and credit access) can help to strengthen non-farm activities—notably the small scale enterprises which are important complements to a growing farm sector and are the main ingredient of a buoyant territorial development.

***Empowering local institutions:*** Parallel to the improvement of public goods and services, it is important to strengthen local institutions and local governance systems, as well as to facilitate the decentralization process (which in many countries has been more *de jure* than *de facto*). Building strong capacity in the government agencies and the civil society organizations that are active at that level is a major first step needed to foster an effective integrated local development strategy. Decentralized decision-making power embedded in well-functioning local institutions offers the most promising opportunities to identify local assets and resources that can be employed in the pursuit of balanced and sustainable territorial development.



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

Initiated in 2005 in the context of an intense international debate on the liberalization of agricultural markets and the resulting consequences on farming in developing countries, the RuralStruc Program's main objective was to provide a new perspective on agriculture and its role for development. More particularly, the Program aimed at reconnecting the issues related to trade liberalization with the broader discussion of rural transformation and the evolution of rural economies within globalization.

This positioning was motivated by the lack of systematic information on the processes underway in the rural economies of developing countries, and by the question of what these processes mean for structural change and economic development. Of course, themes such as farmers' integration into global value chains, migration and remittances, the development of a rural non-farm economy, and possible futures for agriculture are commonly investigated and discussed by scholars engaged in development and agrarian studies. Further, they are often referred to by the international community of donors and governments, and by local stakeholders. The many comprehensive works published in these areas provide a wide range of information on the dynamics of rural change. Nevertheless, this information often relies on scattered local case studies (making it difficult to draw general conclusions or perspectives), and, moreover, analyses are rarely connected to structural change. This situation poses a real "knowledge challenge" because a comprehensive understanding of rural dynamics is the foundation on which development strategies and agricultural policies have to be designed.

These initial observations shaped the RuralStruc Program and its general framework: a broad comparative approach involving seven countries at different stages of their structural transformation and economic integration into the global economy (from west to east: Mexico, Nicaragua, Senegal, Morocco, Mali, Kenya, and Madagascar). They also underpinned the Program's collaborative design—a key feature of its implementation. RuralStruc formed strong partnerships with local research teams in each country, with the objective of strengthening local evidence-based approaches and fostering the local debate.<sup>1</sup>

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<sup>1</sup> National reports were produced for each phase of the Program. They are referenced in the document using the following: *RS I Country*, for the First Phase reports; *RS II Country*, for the Second Phase reports. The list of reports is provided at the beginning of the bibliography.

**Box 1: “RuralStruc” – What’s in a Name?**

The selection of the acronym used to name the Program, officially titled “Structural Dimensions of Liberalization on Agriculture and Rural Development”, clearly relates to the choice of bringing structural issues back into a debate that mainly focused on trade.

RuralStruc refers both to rural structures and to the implications of overall structural change on agriculture and rural economies. The Program’s logo draws on the iceberg image where structural transformation is the large portion under the waterline, trade liberalization being only the visible tip.

## **1. A Disconcerting and Quickly Evolving Global Context**

Over the last five years, and during the in-depth fieldwork implemented by the Program, the international landscape as well as the scope and issues of the international debate have dramatically changed. It is important to keep track of this permanent shift of policy agendas because these changes are the immediate reality to which policy makers refer.

### **1.1 The Starting Point**

At the time that the RuralStruc Program was being operationally planned (2005-06) two major 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, and though it sometimes occupied a key position (as in the case of the DDA) 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. Firstly, 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. Secondly, hunger alleviation depends on improved food availability and access. Agriculture’s decisive role 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, along with many other thematic and non-sectoral options.

The WTO negotiations logically focused on trade liberalization, where agriculture was one sector, among others, to be liberalized. Agriculture progressively became however the main stumbling block in the negotiation process. It was 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, and consequently 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 global perspective on development has dramatically shifted. The MDGs have waned, and they remain a somewhat distant reminder of the international community's commitment to poverty alleviation and global development. They briefly gained renewed attention with the UN Summit of September 2010, which assessed the progress achieved so far and concluded that not every goal will be achieved (United Nations 2010).

In parallel, the WTO debate has faded for several overlapping and interlinked reasons. The first reason is, of course, the emergence of new issues at the forefront of the international agenda, including a new debate over agriculture (see below). Another explanation is the profusion of new research that has provided new (and mixed) estimates of the expected gains from liberalizing trade. This body of work highlighted the unique situations of many developing countries, particularly in Africa, where trade liberalization could result in net losses rather than gains, adding some doubt—if not confusion—to the discussion.<sup>2</sup> These findings helped to shift negotiations to a narrower focus on OECD countries' agricultural subsidies and on developing countries' access to OECD markets. They contributed to strengthening the opposition to the Doha Round and resulted in 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) and, since then, recurring postponements of the conclusion of the Doha Round. In the end, "negotiation fatigue" is an additional motivation for the fading of the WTO debate, which also explains why increasing attention was dedicated to bilateral or regional Free Trade Agreements (FTAs), and why major stakeholders decided to carry on bilaterally what was impossible to achieve at the global level.

## 1.2 The "New Issues"

Over the last five years, three major issues have affected the global debate about agriculture. They are related to growing concerns about the consequences of global climate change and the eruption of the food price and financial crises.

Global climate change is an "old" international concern that has been firmly on the global agenda at least since Rio's Earth Summit (1992) and the Kyoto Conference (1997). It became however a growing worry over the last years due to two broad

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<sup>2</sup> Among the recent and often contradictory research work, see for instance Bouët *et al.* (2005), Boussard *et al.* (2005, 2006), Polaski (2006) or, more recently, Pérez *et al.* (2008) on Latin America, Zepeda *et al.* (2009) on Kenya, and the work coordinated by Anderson on "Krueger/Schiff/Valdés Revisited" (Anderson 2010).

research works: the *Stern Review on the Economics of Climate Change* (2007) and the *Climate Change 2007 IPCC Report* (Pachauri and Reisinger 2007). These in-depth analyses heightened the international community's awareness and refocused the on-going negotiations, which led to the Copenhagen Summit of December 2009. They emphasized the impact of climate change on natural resources—and on agriculture—by showing that climate change is expected to have various adverse effects, such as extreme weather events (droughts, floods, heat waves), as well as changes in temperature, rainfall and sea-levels. All of these consequences are likely to compound the challenges faced by farmers and agricultural workers in finding sustainable livelihoods. Out of all the world's regions, sub-Saharan Africa is expected to suffer the most from climate change: 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 climate change. Their reliance on ecosystem services and natural capital for production (mainly agriculture), the concentration of their population in physically exposed locations, 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.

The second issue is related to the rapid emergence of the food price crisis (2007-2008), which contributed to renewed interest in food and agriculture issues and resulted in increased questioning on the international stage about the future state of a 9-billion people world expected in 2050. Prices had been increasing progressively since 2006 and rose sharply at the beginning of 2008, leading to the international mobilization of assistance. Though prices then declined, according to all forecasts greater volatility and relatively high prices in the medium-term are expected, as shown by their new rebound at the end of 2010. Different factors led to these high food prices and there was a fervent debate about the role played by each of them. On the supply-side, weather-related production shortfalls combined with increasing fuel costs and a trend towards lower stock levels are the main explanations. On the demand-side, the major factors are the long-term changing structure of food demand related to quickly evolving diets in emerging countries, the development of bio-fuels as a response to growing oil costs, and speculation on financial markets (even if limited). 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 a global *lack* of food. Thus, the main concern is the functioning of food markets and access to food for low-income consumers. The challenge is to avoid an excessive focus on short-term issues and to concentrate simultaneously on helping farmers to reap the benefits of the current high prices, mitigate price impacts on the poorest consumers, increase local food production to counter-act increasing local prices, and improve producers' incomes through increased bargaining power and higher yields.

Last but not least, the consequences of the unexpected and sudden onset of the global financial crisis in September 2008 dramatically affected the world economy. The recovery has been a slow process which remains fragile and shaky. The rapid transmission of the downturn in the United States housing sector to the global financial system deeply impacted both rich and poor countries, with a contraction and recession in several developed economies and a sharp slow-down of many developing countries' growth rates. This slow-down has been particularly challenging for countries with limited financial resources, and those facing drastically reduced revenues (through reduced foreign direct investments, fiscal revenue, foreign aid, and remittances).

The food price and financial crises generated different (and disconnected) sets of discussions on remedies. However, both crises have to a certain extent triggered temporary protectionist reactions, such as tariff increases, new non-tariff barriers, and the provisional return of quotas and export bans. The possible risk of what has been named a "protectionist tide" is a sharp move away from the arguments about trade liberalization that had previously characterized the international debate. The food price crisis, and the new resource forecasts it engendered, also led to new strategies targeted at food security. They mainly focused—and are focusing—on new production options based on quick investments or re-investments in inputs (sometimes with subsidies), infrastructure, irrigation and large scale agricultural schemes. Land grabbing by foreign investors, particularly in sub-Saharan Africa, has been an increasing matter of concern (ILC 2009, World Bank 2010b), leading to conflicting situations among local stakeholders in several countries, and launching anew the old debate about the merits of small-scale versus large-scale farming (wrongly considered as respectively smallholder and commercial agriculture).

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

Fortunately, during these five years, two major contributions to the specific debate on agriculture have boosted its profile within the international community. The first is the *International Assessment of Agricultural Knowledge, Science and Technology for Development*, a broad international effort to review the existing stock of knowledge about agriculture, and to assess its adequacy in light of current global challenges to sustainable development. Based on a broad international cooperation involving 110 countries, the results were reviewed and ratified in the Johannesburg International Plenary Meeting (2008), and then extensively published (IAASTD 2009).

The second contribution is the publication of the World Development Report 2008 (WDR08) on *Agriculture for Development*. Prepared in 2006-2007 and launched at the end of 2007, the WDR08 provided the necessary momentum for a new focus and a new perspective on agriculture. It 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. Breaking with nearly thirty years of marginalization of agriculture in development

economics—a consequence of the Washington consensus reforms (de Janvry 2009)—the WDR08 also provides an insightful review of what is known about the mechanisms of agricultural development and how agriculture can serve as a catalyst for development. This demonstration 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 2).

Though the scope of the report is somewhat limited with regard to linkages between agriculture and other sectors<sup>3</sup>, this regionalized and targeted approach has strongly contributed to the WDR’s success; and the broad dissemination of the document has facilitated agriculture’s comeback in the international debate on development. Nevertheless its momentum, as well as that of the IAASTD report, was somewhat impeded by the hectic international agenda and the short term issues that arose from the food price crisis. Additionally, only a few months after the publication of the WDR08, different and to some extent contradictory messages were disseminated by other (or the same) international bodies. For instance, the UNIDO Industrial Development Report 2009 (UNIDO 2008) highlighted the role of industry as the main driver of change, particularly for the “Bottom Billion” countries.<sup>4</sup> And, adopting a different perspective, the following World Development Report (WDR09) on *Reshaping Economic Geography*, stressed the need for higher demographic densities, shorter economic distances, and fewer political divisions (see Box 7 in Chapter 3). It demonstrated that these objectives can be achieved through increasing agglomeration and integration processes, highlighting the role of urbanization.<sup>5</sup>

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<sup>3</sup> More specifically, the limitation is in regard to the scope of inter-sectoral linkages within the context of globalization. This discussion will be developed in Chapter 2. On critics of the WDR08’s framework see, among others, Akram-Lodhi (2008) and Oya (2009).

<sup>4</sup> The “Bottom Billion” refers to Paul Collier’s book (2007) which focuses on the group of fifty so-called “failing states” stuck in poverty, 70% being in SSA. Collier, who is one of the two authors of UNIDO’s report, fed the controversy about the role of agriculture, pointing the fact that it will not be able to alleviate poverty and that the only option is a broad migration to cities (Collier 2008, 2009). See more development on this debate in Chapter 6.

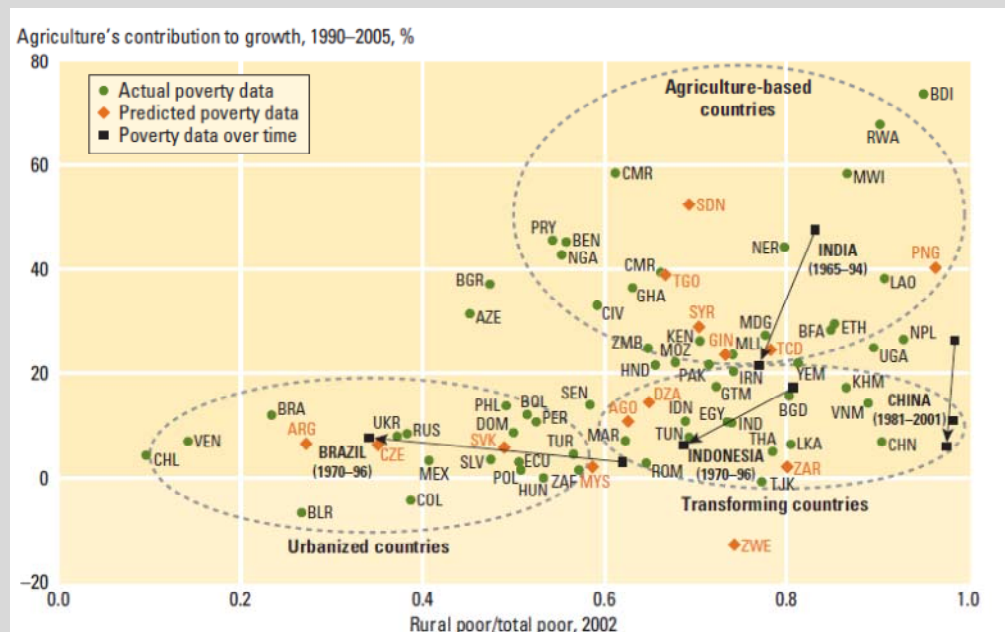
<sup>5</sup> Two departments of the World Bank, the Poverty Reduction and Equity Group, and the Finance, Economics and Urban Department have launched a joint work program on “*Poverty Reduction during the Rural-urban Transformation in Developing Countries*”, with the objective of continuing and combining the two WDRs perspectives. See Simler & Dudwick (2010). This work will be achieved in 2011.



## Box 2: The WDR08 and its “Three Worlds”

The WDR08 proposes a tiered approach to agriculture for development and identifies three distinct worlds of agriculture. These “worlds” depend on agriculture’s contribution to growth and on the rural share of total poverty. The three worlds are titled “agriculture-based”, “transforming” and “urbanized.” 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, and incomes. 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.



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 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.

	Ag. based	Transforming	Urbanized
Rural population (millions), 2005	417	2,220	255
Rural population (%), 2005	68	63	26
GDP per capita (2000 US\$), 2005	379	1,068	3,489
Agriculture in GDP (%), 2005	29	13	6
Annual Ag.GDP growth (%), 1993-2005	4.0	2.9	2.2
Annual Non Ag.GDP growth (%), 1993-2005	3.5	7.0	2.7
Rural poverty rate (%), 2002	51	28	13

Source: World Bank 2007, p. 31-33  
Note: The poverty line is \$1.08 a day in 1993 PPP

In the end, despite this very unstable and somewhat confusing environment, agriculture is firmly back on the agenda and 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 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 Pittsburgh, September 2009). Then, in April 2010, the Global Agriculture and Food Security Program (GAFSP) was officially launched with a first contribution of close to \$1 billion. Finally, at the Seoul G20 Summit in November 2010 it was decided to launch an "Agricultural G20" in order to foster international cooperation, especially in combating food price volatility.

Although food security is clearly narrower in scope than agricultural and rural development as a whole, this context does provide an opportunity to broaden the debate and to propose a perspective that does not restrict agriculture to food supply but embraces its other functions as well (environmental, economic, social, cultural). As stated by the IAASTD, this multifunctionality<sup>6</sup> is a unique feature of agriculture, given that the sector serves simultaneously as the core activity for rural livelihoods and rural poverty alleviation, the basis for rural diversification and the development of rural-urban linkages, and is central to the provision of environmental services. Further, its role as a driver of structural change must be reaffirmed, and questions about the viability of possible pathways out of rural poverty in the globalization era must be asked.<sup>7</sup> This critical issue has to be pushed to the front of the policy debate and should justify reengaging in the development of policy frameworks that adopt the necessary long-term focus.

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<sup>6</sup> There has been a long and tense international debate about recognizing multifunctionality as a feature unique to agriculture, and it has been heavily intertwined with ongoing policy discussions. Many European states adopted policies promoting multifunctionality in the 1990s and in doing so faced strong opposition at the WTO from countries (principally Cairns Group countries and the United States) that denounced their actions as market distortions. On these debates and on the multifunctionality of agriculture in general, see Barthélémy *et al.* (2003), Losch (2004), Caron & Le Cotty (2006), Groupe Polanyi (2008). Specific reference must also be made to the *Roles of Agriculture Project* implemented by FAO between 2000 and 2006 which developed a broad set of case studies and analyses on the roles of agriculture at the different phases of development (FAO 2007).

<sup>7</sup> A long tradition of stimulating research in agrarian studies questions the consequences of on-going processes of change. See notably the *Journal of Agrarian Change* and, for a recent review of the current debates and their evolution, Akram-Lodhi & Kay (2010a and b).

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

When launched, the RuralStruc Program had three specific objectives: (i) to contribute to the analytical knowledge-base about structural changes related to liberalization and economic integration, and the consequences of these changes on developing countries' agriculture and their rural economies (Box 3), (ii) to feed and improve the international and national debates by promoting and reconnecting these issues, and (iii) to provide perspectives for policy making.

Though the third goal relied directly on the Program's design and the operationalization of its research results, the first and second were more subjective. They implied a clear positioning and the Program chose to put the discussion on agriculture and rural change within the overall perspective of the structural transformation framework—a way to reconnect the development debate with global issues and to avoid discussions trapped in sectoral approaches.

The structural transformation of economies and societies is a core issue in development studies. Historical records and statistical evidence<sup>8</sup> show a progressive shift 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 transformation—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, overall economic transformation induces increasing incomes and wealth, which translates into improved living conditions. This, in turn, along with medical progress, initiates the demographic transition (the progressive reduction of mortality and birth rates, the difference between which explains different population growth dynamics).

Evidence of this process of global structural transformation can be found in various regions across the world, though it occurs at different paces and along different paths. It started with the closely related agricultural and industrial revolutions of Western Europe at the end of the 18<sup>th</sup> century, and continued in European offshoots (mainly the USA), other European regions, the majority of Latin America and various regions of Asia.

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<sup>8</sup> See for example, Johnson & Kilby (1975), Chenery & Syrquin (1975), Timmer (1988, 2009).

Reference to this process has forged the classical development paradigm that founded development economics.<sup>9</sup> One of the main challenges at present is the acceleration of the pace of change related to globalization and, subsequently, the growing asymmetries between regions of the world characterized by their different stages in this process of structural transformation.

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

Since the early definition of the RuralStruc Program, liberalization was understood in a broad sense as a global process of change, begun 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.

The aim of the RuralStruc Program was to focus on all of the structural dimensions of this new context, which explains the initial choice for the title of the Program. However, although the Program adopted this broad definition of liberalization, the “official positioning” of the Program’s name quickly appeared inadequate. Firstly, because the understanding of its objectives was often restricted to the policy package dimension of the reform process associated with liberalization (consequently the Program was often perceived as a critique of the reforms, the evaluation of which was not its purpose). Secondly, this misinterpretation implicitly limited the understanding of the scope of the processes at play.

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 title of the Program. Though such a positioning could appear to be an excessive scope, the context to which the Program refers clearly corresponds to the new international regime that emerged in the early 1980s and its consequences for agriculture, rural economies, and the process of economic transition as a whole. 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.

This is why the Program has progressively adopted this broader positioning for the presentation of its results. “*Globalization and Structural Change in Rural Economies*” has been used as a title for the second phase national reports and policy briefs, and the title of this synthesis report clearly refers to globalization.

This conceptual positioning strongly shaped the rationale of the RuralStruc Program and its hypotheses. While the trade liberalization debate focused on the expected gains from the liberalization process and their consequences for growth and poverty,<sup>10</sup> the Program’s objective was to reengage in the debate on economic transition within globalization and to elaborate on possible structural difficulties

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<sup>9</sup> Development economics emerged at the end of World War II with the idea of catching-up the growth process of industrializing countries, with reference to the takeoff of 19<sup>th</sup>-century West-European countries. It founded a debated evolutionist vision of development where countries have to go through “necessary stages”. See Chapter 2 which discusses further economic and demographic transitions.

<sup>10</sup> Economic research work rarely addresses other consequences of liberalization. On its potential employment dimensions see for instance Hoekman & Winters (2005). On its environmental dimensions see Cook *et al.* (2010).

rather than just on “transitional problems”.<sup>11</sup> Consequently, it aimed at reconnecting the discussion on agriculture with some challenging issues like increasing overall productivity gaps between countries, lagging economic diversification, and the demographic challenges faced by several regions. These are recurring blind spots in the international debate, but at the same time they are critical for the structural transformation of developing countries.

With reference to the existing debates on agriculture, food markets and rural diversification, three embedded hypotheses were advanced to structure the research process (Box 4). The first hypothesis (H1) refers to the global restructuring of 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 among marketing, processing, and retailing structures. This hypothesis raises several questions: What is the balance between the potential integration of farmers in modern emerging value chains and their possible exclusion? What are the scope, speeds, 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 (H2) 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 systems characterized by a changing role of agriculture and a growing importance of off-farm activities and transfers (private transfers related to migrations 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 these dynamics new or do they follow the historical paths of structural transformation? How do they reshape the characteristics of rural areas and of rural – urban linkages? Are they effective answers for the sustainability of rural livelihoods?

Consequently, the differentiation dynamics within agriculture and the possible difficulties of rural households’ adaptation (in the absence of effective alternatives in terms of activities and incomes) could create risks of transition impasses within the process of structural transformation. This is the third hypothesis (H3), which refers primarily to the characteristics of what the WDR08 named the “agriculture based” countries. In these countries, as discussed in the next chapter, the weight of agriculture in employment and activity structures, the strong urbanization process without significant industrialization and job creation, the limited economic

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<sup>11</sup> In the economic literature, difficulties related to liberalization are generally perceived as temporary. This is the case for unemployment which is supposed to reflect the time needed for adaptation to the new context and for reaching a new equilibrium (Winters *et al.* 2004).

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 limited migration opportunities, and what are the potential social, economic, and political consequences of such dead-ends in the economic transition?

#### Box 4: The three Program's Hypotheses

*H1: The global restructuring of agrifood markets reinforces a process of differentiation and segmentation within agricultural economies*



*H2: Farm households are adapting to the new context by adopting composite strategies of activities and income that are reshaping rural economies*

*H3: Marginalization trends introduced by these processes lead to risks of transition dead-ends linked to the relative scarcity of alternative activities and sources of employment*

### **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 RuralStruc Program aimed at identifying the main similarities and differences in countries' processes of adaptation to the new context, taking into account the characteristics of their rural transformation and 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 motto of the Program).

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

Comparative approaches are a powerful tool for analytical work because they help to stress convergences and divergences and to identify key explanatory factors. However, they are also risky and can lead to deep methodological errors. For the RuralStruc Program, the comparative perspective was not used to make comparisons between countries (for instance Mexico and Madagascar), as this would have made, of course, little sense and would have induced classical selection bias.<sup>12</sup> Simultaneously, facing the classical challenge of ex-post analysis, the goal was not to evaluate "impacts"—the term was carefully avoided in the official 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 the direction of causality.

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, the Program endeavored to adopt a global multi-disciplinary and historical perspective on the dynamics of change, by giving attention to national trajectories and their "critical junctures"<sup>13</sup> (which can modify the nature of relationships between agriculture, the rural sector and the overall economy).

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<sup>12</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>13</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*

The process of selecting country case studies for comparative purposes is always the result of a trade-off between objective criteria related to research goals and operational issues, which refer to local partnerships, conditions for implementation (particularly allocated time, financial and human resources), and also to contributing partners' buy-in as well as their own overall themes of interest.

The selection of countries for RuralStruc resulted from preliminary discussions between the Program's contributing donors where 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 already undertaken to revitalize its agricultural sector. Concurrent to this progressive reengagement of the donor community into agriculture, African governments remained notably dedicated to the implementation of NEPAD's Comprehensive Africa Agriculture Development Program (CAADP).<sup>14</sup> This program has become the African, and indeed international, reference for action in agriculture and is currently being operationalized.

To engage in the comparative approach, it was decided to select a small sample of countries. These of course were not intended to be representative of the large diversity of possible development trajectories, but they did correspond to a spectrum of situations within the process of structural transformation. This included, on the one side, countries that were far ahead in this process and, on the other side, countries where economic transition and the pace of integration into the world economy had been slow and/or unequal.

Among the Program's seven country case studies, Mexico was chosen as an example of "advanced" economic transition, with a high urbanization level and a limited role for agriculture in the economy. We anticipated the Mexican rural economy to show evidence of being broadly affected by deep integration and liberalization processes, accelerated 15 years ago with the implementation of the North American Free Trade Agreement (NAFTA), as well as huge migration flows to the USA.

Sub-Saharan Africa (SSA), on the other hand, represented by 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 enduring role for agriculture and other primary activities.

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<sup>14</sup> CAADP is one of the flagship programs of the New Partnership for Africa's Development (NEPAD). Launched in 2003, it aims at increasing agricultural investment to 10% of national budgets (Maputo Declaration) and at facilitating the preparation of investment plans. CAADP focuses on four pillars to improve productivity and growth: land and water management, market access, food supply and hunger, and agricultural research. See: <http://www.nepad-caadp.net/>



Morocco and Nicaragua, illustrating a more advanced or somewhat intermediate stage of structural transformation, corresponded to additional country case studies characterized by supposedly more rapid integration processes due to their proximity to powerful economic zones with which free trade agreements had been recently implemented.<sup>15</sup> In these countries, agriculture—characterized by dualistic structures—remains a major political issue and international migrations play a big role in their political economy.

Further to the aforementioned criteria of gradual and differentiated integration, the selection of countries was also based on three specific macro-economic criteria (see

Table 1)<sup>16</sup>: GDP per capita, the share of agriculture in GDP (AgGDP), and the share of the economically active population engaged in agriculture (AgEAP), all of which are basic 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. They display a wide range of situations in terms of poverty, human development, governance, and business climate, with stark contrast between SSA and non-SSA countries and also clear gradual indicators' results between countries.

Using the WDR08 typology, the selected countries represent the three worlds of agriculture: “agriculture-based” (Kenya, Madagascar, Mali), “transforming” (Senegal, Nicaragua and Morocco), and “urbanized” (Mexico).<sup>17</sup> In the selected countries agriculture contributes less and less to economic growth, but maintains a significant role in national employment: between 70 and 80% of the labor force for the SSA countries, and under 30% in Morocco, Nicaragua<sup>18</sup> and Mexico. The seven countries

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<sup>15</sup> The European Union and the USA in the case of Morocco, and the USA in the case of Nicaragua (with the Central American – Dominican Republic Free Trade Agreement—CAFTA-DR).

<sup>16</sup> In Table 1 (as well as in the document as a whole) country data have been sorted from left to right, first by region (SSA, North Africa, and Latin America), and then by income level based on the survey results (see Chapter 3).

<sup>17</sup> Having Senegal, a country with 72% of its EAP in agriculture, in the “transforming world” illustrates the ambiguity of using “rural” (and rural poverty) instead of AgEAP as a criteria for the analysis. The definition of rural varies between countries (see below Box 5) 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.

<sup>18</sup> AgEAP shares are computed from FAO based on ILO data. In the case of Nicaragua, the effective share of the active population engaged in agriculture seems to be strongly underestimated. According to the Central Bank of Nicaragua, 29% of the labor force was employed in the sector (*RS I Nicaragua*, p.28).

also correspond to the different urbanization stages of the WDR09: “incipient”, “intermediate”, and “advanced”.<sup>19</sup>

Population size also played a role in the selection process. This was done in order to avoid extreme situations, and consequently both the most populous countries (like China, India, Indonesia, or Brazil) and the very smallest were left aside.<sup>20</sup> This choice is disputable, of course, because there is no direct correlation between economic transition and demographic size. The WDR09 reminds us however that “size matters,” and it can be a strong asset facilitating structural transformation. Large domestic markets offer economies of scale and accessible demand, which provide substantial room for maneuver to domestic firms in the context of increasing competition linked to globalization. This is particularly the case for industrialization, as well as for research and/or capacity building.<sup>21</sup> Again, the selected countries have a small to medium demographic size, between 5 and 35 million inhabitants (except, once more, for Mexico). These criteria precluded the selection of any countries in Asia, where many countries deal with larger dimensions.<sup>22</sup>

The selected SSA countries reflect the diversity of situations among low-income countries (Madagascar, Mali, and Senegal are all included in the Least Developed Countries group (LDCs)). They display a diversity of geography (Southern, East and West Africa, including a land-locked country—Mali), of colonial history (former

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<sup>19</sup> Country groupings are always debatable. However, qualifying Kenya as a country facing an incipient urbanization is somewhat surprising given the huge urban growth observed in the country. See Box 8 in Chapter 3 and Harre *et al.* (2010).

<sup>20</sup> “Small” and “large” sizes are indeed very relative values. Nevertheless, one must keep in mind that among the 192 member states of the United Nations, only 11 countries have more than 100 million inhabitants, 25 countries have more than 50 million people, and 50 countries count more than 20 million—but 80 countries have less than 5 million inhabitants. The median country population is 7 million.

<sup>21</sup> If the case against the most populous countries in the selection is easily understandable, the case against the smallest is trickier: they can also face high difficulties in their economic transition in today’s world, but the population numbers at stake are globally less illustrative of the transition challenges and the risks of dead-ends.

<sup>22</sup> If China and India are “global exceptions”, most of the Asian countries have large population (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, Nepal or Malaysia could have been interesting cases, the latter being already deeply engaged in its structural transformation. The selection of Nicaragua is somewhat disputable with regard to the above: this is a post-conflict country, affected by a civil war between 1978 and 1989, and its population size is limited. To illustrate the CAFTA-DR countries, Guatemala and Honduras were discussed alternative options. Nicaragua was however selected for operational reasons.

French or British colonies), of activity structure—including the role of migrations—and of the state of the national debate around agriculture and privatization.<sup>23</sup>

**Table 1: Selected Indicators for the RuralStruc Countries**

#	Country	Mali	Senegal	Madagascar	Kenya	Morocco	Nicaragua	Mexico
1	ISO code	MLI	SEN	MDG	KEN	MAR	NIC	MEX
2	Income Group 2009	Low	Low	Low	Low	Lower middle	Lower middle	Upper middle
3	GDP per capita 2007 (US\$)	552	952	395	718	2,373	1,023	9,715
4	GDP per capita 2007 (\$ PPP)	1,084	1,666	935	1,437	3,980	2,578	12,780
5	\$2 / day (PPP) 2005 (% of pop.)	77.1	60.4	89.6	39.9	14.0	31.9	4.8
6	National Gini index 2005	39.0	39.2	47.2	47.7	40.9	52.3	48.1
7	% AgGDP 2007	37	14	26	25	14	20	4
8	Transition stage (WDR08)	Ag.based	Transforming	Ag.based	Ag.based	Transforming	Transforming	Urbanized
9	Population 2005 (Thds)	11,833	11,281	17,614	35,817	30,495	5,455	105,330
10	Urbanization stage (WDR09)	Intermed.	Intermed.	Intermed.	Incipient	Intermed.	Intermed.	Advanced
11	% rural 2005	69.5	58.4	71.5	79.3	45.0	44.1	23.7
12	% AgEAP 2005	78	72	72	73	29	18	19
13	Human Development (index 2010)	0.37	0.45	0.49	0.50	0.62	0.63	0.79
	Human Development (rank 2010)	128	121	110	106	98	96	46
14	Rule of law (Gov. Indicator 2008)	-0.35	-0.31	-0.46	-0.98	-0.11	-0.86	-0.64
	Political stability (Gov. Indicator 2008)	-0.21	-0.16	-0.42	-1.25	-0.47	-0.39	-0.62
15	Doing Business (rank 2010)	155	151	138	94	114	119	41

Notes: for #5 and 6, Mali and Mexico values are for 2006, Morocco for 2007; for #13, 0 (low) to 100 (high) and ranking out of 135 countries; for #14, -2.5 (low) to +2.5 (high); for #15, ranking out of 183 countries

Sources and detailed definitions: see annex 4

By its demographic and economic characteristics, the choice of Mexico violated many selection criteria (this is an upper-middle-income country, an OECD member and an emerging economy). The aim in selecting Mexico was however to provide a useful background picture about the restructuring of a rural economy in a context of strong liberalization and economic integration.<sup>24</sup>

There is no perfect sample. The RuralStruc country cases present however a wide range of situations which fit with the Program's objectives and help to draw a differentiated picture about the processes of change underway. They shed light on the structural characteristics of economies with different degrees of economic diversification and urbanization, various migration patterns, different types of public policies and, of course, diverse agricultural sectors. Agricultures are characterized by the goods they produce, the size of their main value chains and their market orientation (domestic or international, staple or high-value); all of which are related to natural and historical conditions which have shaped local agrarian systems and markets. As such, the agricultural sectors of the selected

<sup>23</sup> Due to its insular situation, Madagascar is somewhat a quite specific country case study within Southern Africa. Mozambique and Zambia were other possible study cases but, again, availability of local partnership prevailed.

<sup>24</sup> 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 (*RS I Mexico*).

country cases are generally focused on annual crops (mainly cereals), including irrigated crops, but also include traditional commodities such as sugar cane, cotton, groundnut, or coffee. The sample could have probably benefited from including a strong plantation-based agricultural economy, where perennial crops (coffee, cocoa, palm oil) have long shaped the agrarian systems (such as some countries of the Gulf of Guinea in West Africa.)<sup>25</sup>

### 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 on the role of agriculture in the economy. These studies specifically examined market structures and their evolution, the development and differentiation of farm structures, and the risks of transition impasses and possibilities for adaptation. Simultaneously, this First Phase was an opportunity to identify 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 at the regional and value chain levels, based on qualitative interviews with farmers, middlemen, and other economic agents, and targeting the relevant issues brought out by the First Phase. However, the First Phase results highlighted the weakness of the knowledge base, and identified significant information gaps regarding the process of rural transformation (particularly on rural household activities, income, and integration into markets). Consequently, the Program decided to engage more directly in primary data collection at the household level.<sup>26</sup>

The objective of the household surveys in each country was to provide evidence about the processes underway in agriculture and the rural economy by generating original information (both qualitative and quantitative). It further aimed to facilitate improved understanding of the roles of agriculture in local economies and rural livelihoods (types of rural income generation, combination of activities and income sources, multi-faceted livelihoods).<sup>27</sup>

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<sup>25</sup> The selection includes, however, regions engaged in tropical perennial crops. Among the country cases, examples are found in Kenya and Nicaragua (coffee). Perennials are also strongly represented in Morocco (mainly citrus and olive trees).

<sup>26</sup> Decision of the First Advisory Committee meeting, March 2007. The program benefited from a governance structure including a 10-member Advisory Committee from the academia and a Steering Committee of the contributing donors.

<sup>27</sup> 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 related to the implementation of household surveys obviously led to a new schedule. The activities of this Second Phase were launched in September 2007 and lasted till June 2009, with extensions for Kenya, Morocco and Mexico until January – March 2010.

## 3.2 Regional Fieldwork

### 3.2.1 *Design and Limitations*

The decision to implement rural household surveys focusing on activities and incomes deeply shaped the operationalization of the Program and its outputs. The preference for *rural* and not only *farm* households was justified by the need to identify more precisely agriculture's role with respect to other rural activities and sources of income. This choice made it necessary to deal with analytical categories whose definition are more complicated than one may believe *a priori*, like the official definition of "rural", which varies between countries (see Box 5).

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. The Program dealt with these difficulties by employing a heavy survey framework with extensive questionnaires.<sup>28</sup>

While the survey work suffered from a few specific localized difficulties (such as delays and missing information resulting from Kenya's post-election violence in early 2008), the main constraint of the fieldwork was its limitation to a "one shot" survey, a consequence of the overall duration of the Program, as well as its funding. This represents a key inconvenience given that the Program's hypotheses were developed in dynamic terms. It is also a source of bias due to the inter-annual 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 difficult within the allocated timeframe to deal with several existing baselines, survey frameworks and methodologies.

The second reason was the unavailability of such panels with a specific focus on rural incomes. In developing countries, household panel data, when it exists, has mainly been developed for poverty estimation purposes (notably within the context of structural adjustment programs started in the 1980s-90s). Consequently, it most often deals with household expenditures and frequently target urban households, which often correspond to the main share of the country samples.<sup>29</sup>

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<sup>28</sup> See annex 1 which presents the detailed methodology used for the fieldwork (units of analysis, sampling procedures, dates of collection), its difficulties, as well as the technical solutions which were adopted to deal with them.

<sup>29</sup> This is broadly the case of the Living Standards Measurement Studies (LSMS), initiated by the World Bank in the 1980s, which include 32 countries. In Africa, most of the poverty household surveys were implemented on a national basis, using a quite similar approach.

### **Box 5: Rural versus Urban: What Definition for Each Country?**

Though the definition of “rural” varies from country to country, there does seem to be a commonality: there is rarely *positive* definition. Most of the time “rural” is the residual population after subtracting urban population from total population (FAO definition). There is of course no uniform definition for “urban.” It is most often based on the size of settlements, but also on population density or administrative boundaries, and sometimes on the provision of services. In the RuralStruc countries, definitions of “rural” are the following:

**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 (as defined for the Agricultural Census) exceeds 50% (*RS II Madagascar*, p.26).

**Mali:** “Rural households” include all households living in “rural areas”, which are defined as the opposite of towns. Through at least one of the members, rural households are involved in agricultural activities—broadly defined (*RS II Mali*, p.20).

**Mexico:** A “rural locality” is defined by the national statistical system (INEGI) as a place with less than 2,500 dwellers. However, this threshold is debated and there is a common reference to the limit of 5,000 inhabitants, which was selected by the country team (*RS II Mexico*, p.6).

**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 (*RS II Morocco*, p.6).

**Nicaragua:** The official definition of “rural areas” corresponds to districts with less than 1,000 dwellers (*RS II 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 (*RS II Senegal*, p.39).

Though many local case studies exist, little has been done and is available on rural incomes. This is often a consequence of the depletion of national statistical systems, but it also frequently results from statistical frameworks that do not target the rural economy, just agriculture. This creates a real difficulty in conceptualizing the processes of rural change underway. In this context, a rare exception is the RIGA Project, developed by the FAO in collaboration with the World Bank, which offers a coherent framework for a cross-national comparison of rural income sources (Box 6).<sup>30</sup>

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<sup>30</sup> In the coming years, the new LSMS-ISA Program (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.

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

The RIGA project intended to fill some of the major gaps in the understanding of the rural non-farm economy (RNFE) by using 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. It analyzed sources of rural household income in 18 countries from 32 household surveys: Ghana 1992 & 1998; Kenya 2004-05; Madagascar 1993-94 & 2001; Malawi 2004; Nigeria 2004; Bangladesh 2000; Indonesia 1992 & 2000; Nepal 1995-96 & 2003-04; Pakistan 1991 & 2001; Vietnam 1992-93, 1997-98 & 2002; Albania 2002 & 2005; Bulgaria 1995 & 2001; Tajikistan 2003; Bolivia 2005; Ecuador 1995 & 1998; Guatemala 2000 & 2006; Nicaragua 1998, 2001 & 2005; Panama 1997 & 2003.

The RIGA database is composed of a series of constructed variables about rural incomes created from the original data sources. The sample of countries and the indicators built offer geographic coverage, as well as adequate quality and sufficient comparability to allow for cross-country analysis, despite pervasive differences in the quality and level of information available in each survey.

Analyses based on the RIGA project have been extensively published. They allow 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.

Source: Carletto et al. 2007, <http://www.fao.org/economic/riga/en/>

The RIGA 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.<sup>31</sup> They were however not directly usable for the RuralStruc analysis due to different years of reference and missing country cases.

Since the Program lacked easy options for benchmarking the household surveys, a way to mitigate the drawbacks related to the “one shot” data collection was to complement the surveys with specific fieldwork and desk reviews on selected value chains and the characteristics of the surveyed regions. These activities, allowed for contextualization: a fine-tuned analysis of the household surveys’ results that bears in mind the historical background of the processes of change underway, notably regarding the restructuring of agricultural markets. The value chains were selected by the national research teams with reference to their importance in the economy at both national and regional level. Each value chain analysis presented characteristics of supply and demand, their evolution in the context of liberalization, and the existing integration and differentiation processes resulting from the global restructuring of agrifood markets.

The selected value chains, which included both staples and commodities, are presented by country in Table 2.

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<sup>31</sup> RIGA results are also a main reference of IFAD’s Rural Poverty Report 2010 which makes use of the RuralStruc survey results as well (IFAD 2010).

**Table 2: Main Value Chains Analyzed in the RuralStruc Country Studies**

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

Sources: RuralStruc Phase II reports

### 3.2.2 Selection of the Surveyed Regions

Due to the general objectives of the Program and its resources, the purpose of the household surveys was obviously not to obtain a statistically representative sample, but rather to provide a comprehensive picture of rural realities. Consequently, within each country, the Program decided to focus on a selection of regions illustrative of different underlying trends that had been previously identified.

Regions were chosen by the national teams, based on the First Phase results and their own expertise. Their goal in selecting regions was to illustrate the regional dynamics relevant for understanding the processes of change currently underway in the country. Different criteria were used depending on the country, but all related to market access (infrastructures and proximity to cities), the presence of integrated value chains, the level of public investments and public goods, and the situation regarding natural resources.

Three types of regions were specified, with reference to their existing trends:

- “*winning regions*”, where the on-going dynamics of integration to markets (whether related to specific value chains, the proximity of urban centers or good infrastructure) provide opportunities and are strong drivers of change;
- “*losing regions*”, on the other end, 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 local economic and institutional context, 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 data collection in the seven study countries (see Table 3 below). Surveyed localities were chosen by the national teams in every



region based on their local knowledge, with the objective of illustrating the regional dynamics. Within each locality the selection of households to survey was randomized.

For certain surveyed regions, fine-tuning based on the first survey results led to the identification of significant differences between different areas of the same region. Consequently, a few of the original surveyed regions were split in two in order to provide a more accurate representation of regional characteristics (the idea being to avoid misleading effects coming from averaging opposite extremes). This choice was usually made based on statistically significant differences in household incomes between surveyed localities in the same region, and sometimes based on particular local conditions (remoteness, natural characteristics). This was the case in Senegal, Madagascar and Mexico, where several original regions were split in two.<sup>32</sup> These choices helped to take into account different households' asset endowments and agrarian structures, reflected in income patterns. The main characteristics of the regions as well as maps of the surveyed zones are provided in Annex 3.<sup>33</sup>

Thus, due to the characteristics of the sampling method, the Program's surveys are statistically representative at the locality level (village or community) only. However, because the Program relied on national teams of experts to select the surveyed regions, with reference to their factor endowments and connection to markets, the results provide an accurate estimate of the country's existing regional trends in terms of agricultural development, rural incomes and rural diversification. They shed light on the diversity of the rural situations at the national level, a situation confirmed by the second phase's national reports (see Chapter 3).

In the end, around 8,000 rural household surveys encompassing 57,000 people were implemented in 26 regions<sup>34</sup> of the seven selected countries between November 2007 and May 2008—before the full development of the food price crisis. As such, the data collected refer mainly to the 2007 crop season. Forty percent of the surveyed households are in the three non-SSA countries.

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<sup>32</sup> In Senegal: Lower Delta (Bas Delta) and Upper Delta (Haut Delta) for the Senegal River Delta region; Mekhé 1 and 2 for the North of the Groundnut Basin (*Bassin arachidier*). In Madagascar: Antsirabe 1 and 2, and Alaotra 1 and 2. In Mexico: the Sotavento (Veracruz state) was divided in the lowlands (Tierras Bajas) and the mountains (Sierra de Santa Marta).

<sup>33</sup> In Mexico, 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 the characteristics of a "losing" region and mitigates the dropping of Ixmiquilpan.

<sup>34</sup> Due to the regional fine-tuning explained above, the results are displayed between 30 regions and sub-regions (among the 26 surveyed regions, 5 regions being divided in two sub-regions, minus the dropped Mexican region of Ixmiquilpan). See detailed table in Annex 1.

**Table 3: Selected Surveyed Regions in the RuralStruc Countries**

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

Sources: RuralStruc Phase II reports

Surveys in each region were based on the same positioning and questioning and used the same survey instrument framework. In spite of data limitations, this design offers a set of comparable statistics referring to the same period of time (a key difference from RIGA) that documents both overarching patterns of development and the great diversity within rural societies.<sup>35</sup>

### 3.3 The Partnership at Work

One of the original characteristics and strength of the RuralStruc Program was the core methodological choice of developing activities through local partnerships, relying on national teams. This choice facilitated of course the implementation of the Program, notably the process of data collection, but it also strongly improved the quality of both the data and the analysis, by providing an additional safeguard in terms of accuracy and consistency of the collected information and of the general understanding of the processes underway. In the end, it fostered both local ownership and the public policy debate.

<sup>35</sup> The contributing donors of the Program agreed to provide public access to the RuralStruc databases (country databases and core merged database). This dissemination, including the adequate documentation using the international standards (metadata and variable description), will be progressively implemented in 2011 with support from the Accelerated Data Program coordinated by the World Bank and the PARIS21 Secretariat. Data are already available through the World Bank's Micro Data Library: <http://microdata.worldbank.org/index.php/catalog/670>

Between the launching workshop of the Program in April 2006 and the publication of the first draft of this synthesis in June 2009, the national and the coordination teams engaged in continuous exchanges, which intensified during the launching and ending stages of each phase, during joint field missions, and at several collective events (see Annex 2).

The same terms of reference, adjusted collaboratively, were used for each phase and, above all, a deep consultative process was adopted for the design of the survey instrument. The same methodological framework was used in each of the seven countries, including common definitions and selection of core transversal variables to-be used for the analysis, with the necessary local adaptations. The major difficulties related to variable definitions and data analyses were reviewed 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 merged database focusing on a core set of variables that each national team extracted and/or calculated from the national data sets. Last, but not least, the country results were thoroughly discussed, based on the cross-country data analysis and the national reports, as a way to consolidate the final outcomes of the Program.

The team engaged in a program of disseminating results in each of the surveyed countries after the First Phase, and post-Second phase dissemination has occurred in some of the participating countries. The format and pace of these dissemination 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 contributing donors to participate in them.

In the two countries where a formal dissemination event for phase II occurred (Mali in April 2010 and Senegal in June 2010), it consisted of the preparation of a set of policy briefs by the national teams that presented results and policy recommendations. These were discussed during a workshop involving farmers' organizations and civil society representatives, administration, local governments, private sector, and donors.

International dissemination will continue in 2011 and 2012 and will involve the country teams. Beyond several presentations of the Program and its first results in various forums since its launching in 2006 (see Annex 2), a first step was undertaken in August 2009 when the Program organized a pre-conference workshop during the XXVII<sup>th</sup> International Conference of Agricultural Economists (IAAE 2009) in Beijing.

## 4. Synopsis of the Report

This final report of the RuralStruc Program proposes a comparative analysis of rural change articulated with the existing debate on agriculture, rural development and structural transformation. It relies on the extensive fieldwork and analyses developed by the country teams, based on desk reviews and rural household surveys, which are presented in 14 country reports.<sup>36</sup> This country-based material has been complemented by a literature review which provides the necessary background for interpreting the Program's results and highlighting its contribution to thematic research and the policy debate.

The report consists of six chapters, and Figure 1 proposes an overview of how they fit together, serving as a guide to facilitate the navigation of the report. The way the chapters are drafted allows the reader to follow the progression of the document or to go directly to the chapters of her/his interest. The report is completed by annexes which provide additional information on the methodology, the local partnerships, the description and the location of the surveyed regions, as well as data results which could not fit into the core document.

The first chapter on *Setting the Scene and Selecting the Tools* has explained the motivation of the Program with reference to the past and on-going international debates, as well as the methodology used. Specifically, it showed how the Program employed a two-stage process that involved both qualitative and quantitative research, and it presented the Program's three hypotheses related to: the extent of integration processes in agriculture and their consequences on farm households and the agricultural sector (hypothesis one); the development of the rural non-farm economy (RNFE) and the way it reshapes rural realities (hypothesis two); the risks of transitional dead-ends with possibly some households and regions left behind within the process of structural transformation (hypothesis three).

Chapter 2 on *The Challenges of Structural Transformation* acts as a reminder about the overall processes of structural change and particularly the characteristics of the economic and demographic transitions. It provides a frame of reference for the discussion for the rest of the report, addressing more particularly the question of the viability of the historical sequence of structural transformation in a globalizing world. It points the specific situation of the least developed countries—mainly in sub-Saharan Africa—which remain at the early stages of their transition processes. The chapter also presents the characteristics of the RuralStruc countries with regard to their demographic and economic structures, highlights their main challenges and the different role played by agriculture.

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<sup>36</sup> The 14 RuralStruc country reports are posted on the World Bank's RuralStruc webpage: <http://www.worldbank.org/afr/ruralstruc>

Chapter 3 begins the work of examining the *Rural Realities* in the surveyed regions by focusing more particularly on the place of agriculture in households' activities and incomes and the extent of poverty. After a general positioning underlining the central role of agriculture across very different regional settings, the chapter uses micro level survey data to present the income characteristics of the households. Two themes dominate this review: the strength and persistence of absolute poverty, and the extent to which households are still engaged in agriculture, especially in sub-Saharan Africa. The chapter shows that this poverty holds when calculated a number of different ways: per head, per adult-equivalent, and even in kilocalories. The last section discusses the types of observed livelihood strategies calling on the WDR08's typology which refers to its three pathways out of rural poverty (farm specialization, rural labor, and migration). It leads to the definition of two large groupings of households, strongly specialized in on-farm activities or more diversified without any significant off-farm specialization. The understanding of the characteristics of households' activities and incomes is the objective of the next two chapters.

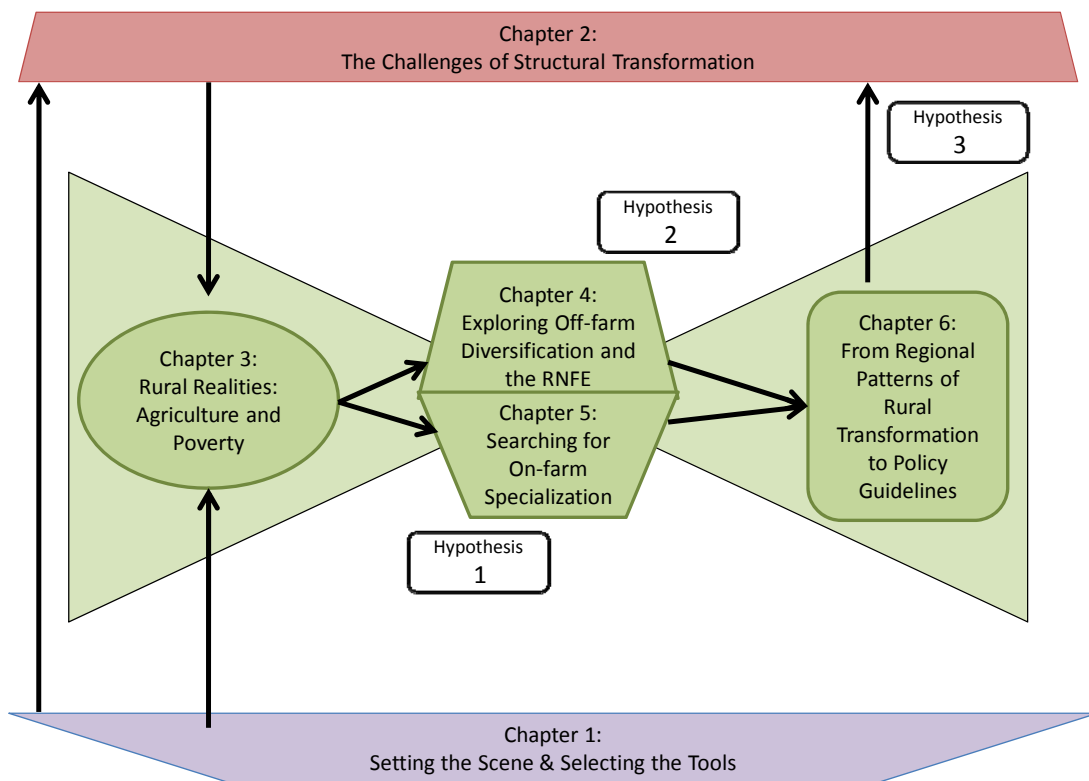
Chapter 4 is *Exploring Off-farm Diversification and the Rural Non-farm Economy*. After a review of the existing debate and a necessary clarification about the definition of respectively the RNFE and the "off-farm"—the latter including the agricultural wage labor and being the lens used by the Program—the chapter explores the extent of diversification in the surveyed regions. It investigates the different types of off-farm activities and incomes (agricultural wage labor, non-agricultural wage labor, self-employment, public and private transfers and rents), and seeks to identify the characteristics of the households that are involved in these activities. As such, the chapter specifically focuses on the second hypothesis of the Program and discusses how the patterns of off-farm diversification contribute to the process of change and the reshaping of the rural economies. It differentiates coping-type strategies at the initial stage of diversification, and a more mature and positive diversification at a later stage.

Chapter 5 focuses on agriculture. After reviewing the patterns of the "big restructuring" related to market liberalization and the new agrifood markets, it investigates the characteristics of on-farm activities in the surveyed regions. *Searching for On-farm Specialization*, the chapter explores the first hypothesis of the Program about the consequences of changes underway in the sector. In general, what is observed is far from the "new agriculture" suggested in the literature. Instead, it highlights the persistence of old agricultural patterns, with the importance of self-consumption and staple production—in relation with risk-management strategies and weak market environment—and the limited role of contractualization. The connection of farm households to markets is however significant everywhere with very few exceptions.

Building on the discussion of existing off-farm and on-farm characteristics developed in the two previous chapters, the sixth and final chapter covers *From Regional Patterns of Rural Transformation to Policy Guidelines*. After a discussion of

the determinants of the regional levels of income, it elaborates on the core diversification–specialization relationship which is central in the process of structural transformation. Based on statistical analyses, it identifies an inverted U pattern that may go a long way towards facilitating the understanding of the process of rural transformation. It highlights the specific situation of sub-Saharan Africa where most of the regions appear to be trapped in poverty due to obstacles to their progression along the transformation path, echoing the risk of transition impasse of the Program’s third hypothesis. The second section of the chapter draws on the accrued evidence to propose possible policy guidelines. It suggests methodological orientations and three main building blocks, specifically targeted to SSA’s early-transitioning regions, which could help them to overcome risks of persistent traps.

**Figure 1: A Tool to Navigate the Report**



## CHAPTER 2. THE CHALLENGES OF STRUCTURAL TRANSFORMATION

The previous chapter underscored several new issues that have emerged as growing international concerns in the policy debate in recent years, and that have changed the policy landscape. Among them, the financial crisis has probably, and unexpectedly, contributed to the very recent and discernible resurrection of a theme which had long been ignored in the policy agenda: structural transformation. Though this topic had remained fully relevant in academic circles, it was broadly absent from the discussions of policy makers; and reconnecting structural issues with the policy debate was a core motivation for the RuralStruc Program.

The political comeback of structural transformation still remains very limited. Short term issues and rescue plans require the majority of governments' and donors' attention, and consequently restrict their ability to strongly reengage in long-term structural policies. However, two major recent contributions are worth citing: the 2010 UNRISD report on *Combating Poverty and Inequality*, the subtitle of which is *Structural Change, Social Policy and Politics*; and the newly released "Economic Report on Africa 2011," published by the African Union and the Economic Commission for Africa and titled *Governing development in Africa – the role of the state in economic transformation*. New interest on the donors' side can also be identified, as the World Bank's Chief economist recently called for a *New structural economics as a framework for rethinking development* (Lin 2009).

Two factors can be put forward to explain this progressive new focus on structural issues. First, the financial crisis has raised questions about the sustainability of the existing growth model. As such, new structural solutions are being sought to allow a more sustainable and inclusive future development regime, a process exemplified by the many attempts to improve world governance and the growing role of the G20. Second, the dramatic actions of rich country governments in dealing with the consequences of the crisis through bailouts serves as a clear reminder of the limits of market-only approaches and suggests that states still have a role to play, particularly in dealing with regulatory and structural issues.

With this evolving context in mind, the main objectives of this chapter are to provide background on the processes of structural change currently underway and to address specific challenges faced by the RuralStruc countries and regions with respect to their economic and demographic transitions. The chapter will address the situation of sub-Saharan Africa in particular, as it was the last region in the world to begin its structural transformation.

# 1. Regional Differences and Positioning of the RuralStruc Countries

## 1.1 Uneven Economic Transitions

The seven RuralStruc countries were selected because they each demonstrate different stages within the structural transformation process. Though a deep analysis based on macro-economic data could have been presented on each of them<sup>37</sup>, the Program decided to restrict the discussion in this synthesis report to very simple and comprehensive figures and the most important stylized facts. This allows for a clear presentation of the seven countries' positioning within the process of structural change.

Figure 2 serves as a reminder of the strong differences in income levels between world regions and, above all, of the dramatic differences in their growth over time. It compares SSA as a whole<sup>38</sup> with the three non-SSA RuralStruc countries and other comparators, and underscores the long stagnation of sub-Saharan Africa when compared with other regions (with the notable exception of Nicaragua, whose growth trajectory reflects the consequences of its civil war).

Figure 3 and Figure 4 present the economic transition of each of the RuralStruc countries (and some comparators) from 1965 to 2005 using three basic indicators: GDP per capita, the share of agriculture in GDP and its share in employment—an efficient way to measure the structural evolution of an economy away from one that is entirely centered on agriculture. The differences between countries and the addition of comparators show very significant differences in the extent and pace of structural change.

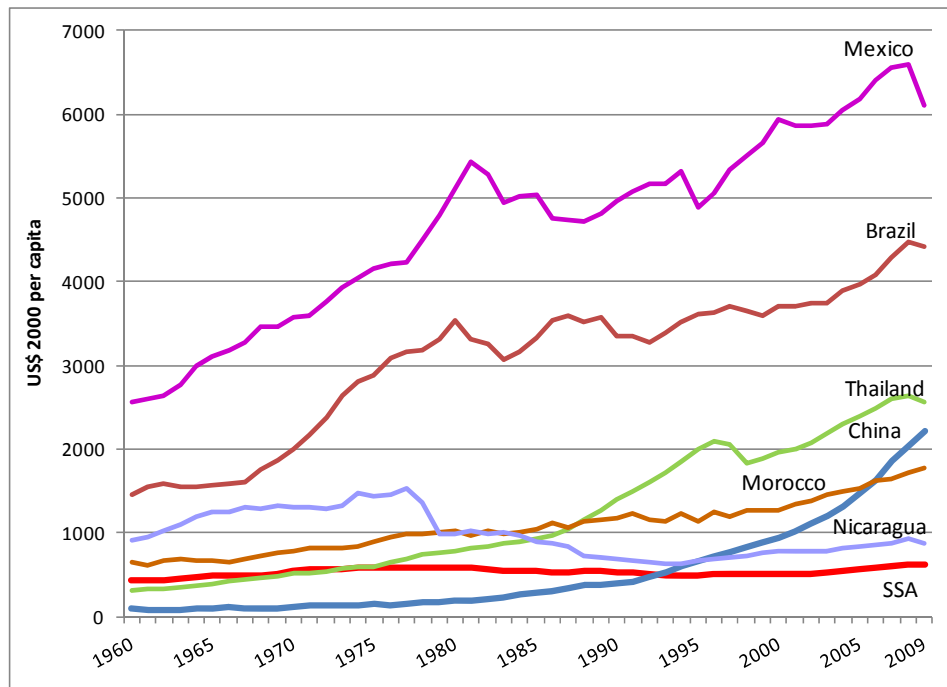
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<sup>37</sup> This work was undertaken during the first phase of the Program. It relied on international sources in order to facilitate the overall positioning of the Program and the background of the country studies developed by the national teams.

<sup>38</sup> The graph displays a line for “SSA aggregate” rather than one each for the four RuralStruc SSA countries for reasons of clutter. Further, at the scale presented, the differences between SSA countries in terms of evolution are slight.



**Figure 2: Evolution of GDP per Capita between Selected Countries and Regions (1960-2009)**

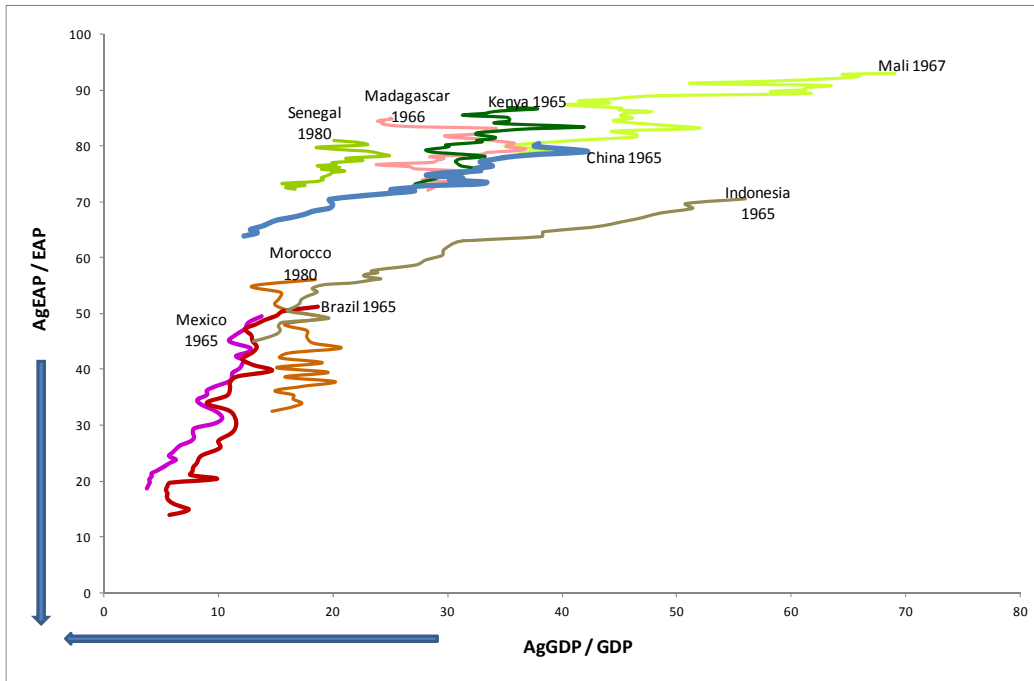


Sources: World Development Indicators

Figure 3 displays the share of agriculture in employment and in GDP over time, and the squiggly lines that result could well be termed the country's "signature," for not only their visual resemblance, but also because they summarize every individual country's unique development trajectory. The figure illustrates the different weight of agriculture over time, highlights the positioning of world regions through country examples, and shows how the share of agriculture in GDP decreases when moving from SSA to Asia and Latin America. It also stresses the decreasing share of agricultural employment in the labor force. This change occurs slowly at first, a situation exemplified by the stagnant employment structure observed in sub-Saharan Africa, and also by China where the decrease is similarly very slow.

The difference between agriculture's share in GDP and its share in employment is worth highlighting. This difference illustrates a well-known characteristic of structural transformation: the inequality of incomes between agriculture and the other sectors of the economy, which speaks to differences in factor productivity (Timmer & Akkus 2008). Figure 4 displays this structural gap (AgGDP-AgEAP), which clearly highlights rural-urban income differences. The structural gap widens during the early stages of economic development, a consequence of rapidly expanding economic activity in cities and of the resultant accumulation of wealth. It later reduces as the economy diversifies overall, and as urbanization continues, leading to the progressive convergence of rural and urban sectors into a fully integrated economy—i.e., with a gap equal or near to zero.

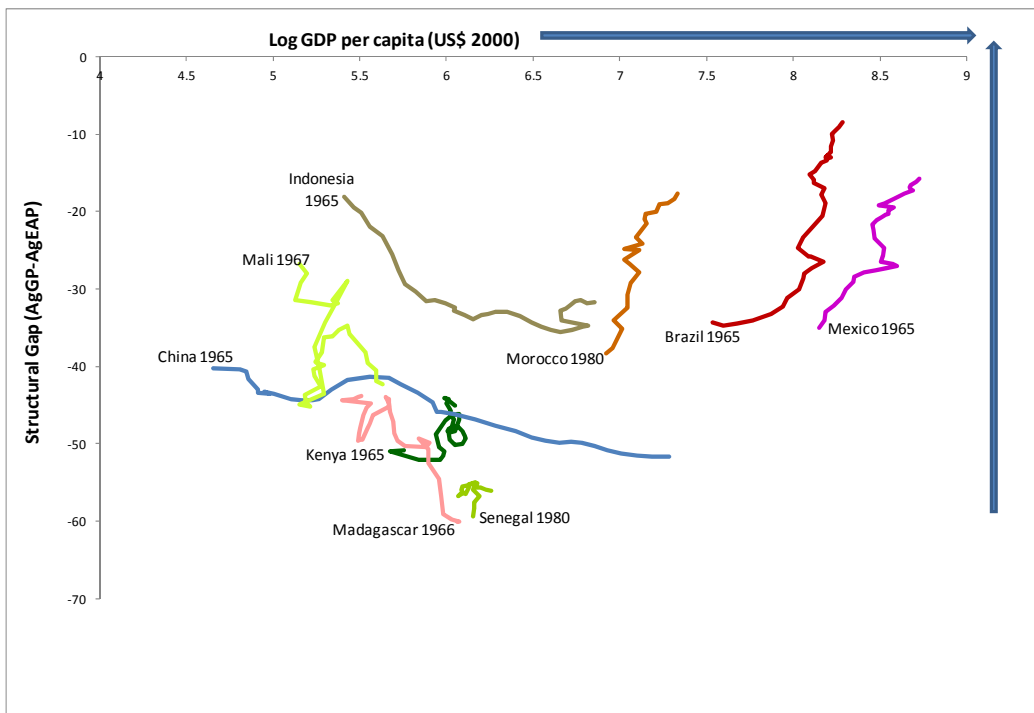
**Figure 3: Share of Agriculture in GDP and in EAP Overtime (1965 - 2005 in %)**



Sources: WDI and FAO

Note: Final year is 2005. Starting year is provided with the country name

**Figure 4: Structural Gap and GDP per Capita (1965 - 2005, 5-year averages)**



Sources: WDI and FAO, authors calculations

Note: Final year is 2005. Starting year is provided with the country name

Among the RuralStruc countries, the comparison of gap values confirms that Mexico is deeply engaged into its structural transformation. It is a diversified economy where agriculture no longer plays a major role (5% of the GDP). However, even after engaging in this transition, risks of growing marginalization in Mexico's rural economy continue to exist (25 million people still live in rural areas and between 15 and 20% of the labor force remains in agriculture). Mexico's difficulties in this convergence process are shown through a comparison with Brazil, whose gap value is decreasing much more rapidly.<sup>39</sup>

The cases of Morocco and Nicaragua<sup>40</sup> are more tenuous because agriculture still plays a significant role in overall value-added (respectively 15 and 20%). The convergence between the rural and urban sector is well underway, and this process has been especially quick in Morocco. However, the successful deepening of these two countries' economic transitions will clearly rely on their capacity to skillfully manage their internal economic integration in a way that avoids marginalizing remote areas (the mountain zones in Morocco and Autonomous Caribbean Regions in Nicaragua). Agricultural policies could play a significant role in limiting the exclusion processes. This issue is officially 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 agro-industrial sector (mainly based on nucleus of smallholders supplying export oriented processors, termed "aggregators"), and the promotion of family agriculture. The relative levels of attention afforded to the two pillars and how different approaches would affect the marginalization of rural households continue to be strongly debated (*RS I and RS II Morocco*).

In sub-Saharan Africa, the process of structural change has barely begun. Fifty years after their political independence, SSA countries continue to be characterized by the weight of the agricultural sector in GDP. On average it stands at about 20%, but in most countries, including Kenya, Mali and Madagascar, it is over 30%.<sup>41</sup> Sub-Saharan African countries are also notable for the weight of agriculture in their employment structures. It employs on average 65% of the sub-continent's economically active population, (excluding South Africa) and in many countries

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<sup>39</sup> The situation of China is worth noticing: while the country has experienced rapid growth, a strong increase of GDP per capita and a dramatic decrease of the economic weight of agriculture, the structural gap is still widening. This very specific situation is the result of booming cities, mainly along the coast, and lagging rural areas where a significant share of the population still live (760m people or 56% in 2008). This population is still principally engaged in agricultural activities (the AgEAP is around 500m people), and the gap between urban and rural incomes is a source of increasing social and political tension.

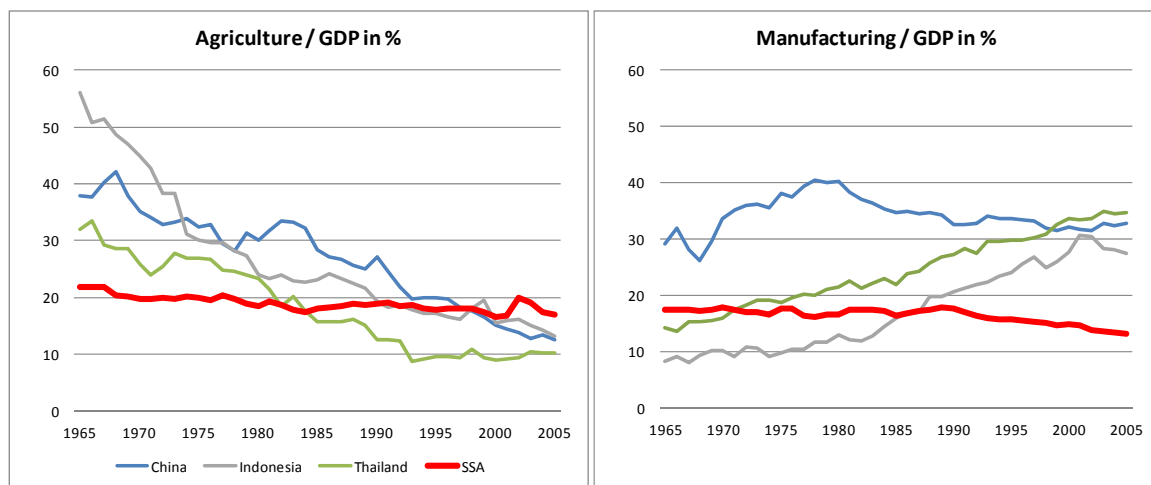
<sup>40</sup> Nicaragua is not displayed in Figure 3 and Figure 4 because its time series is too short.

<sup>41</sup> The weight of agriculture is also very significant in foreign trade. It is the primary foreign exchange earner for non-mining or non-oil countries.

(including the four SSA RuralStruc countries) between 70 to 85%. Agriculture therefore remains the principal source of economic activity and household income.

The most striking phenomenon lies in the great inertia of SSA's economic structures. SSA's trajectories in the transition are stagnant (see Figure 3 and Figure 4). Though, its populations show significant mobility, demonstrated most effectively by the speed of urbanization. With an urbanization ratio (percentage of the population living in urban areas) approaching 40%, the urban population has increased by a factor of 12 since 1960 (see Table 8). However, this urban dynamic has not been accompanied by any sort of significant industrialization. This urbanization-without-industrialization phenomenon so widely observed in sub-Saharan Africa is in contrast with patterns seen in other developing regions, notably Asia, where changes in the economic structure happened very quickly (see Figure 5). It has resulted in an overwhelmingly high share of services in SSA economies, mainly related to informal urban activities and to the marketing of agricultural products.<sup>42</sup>

**Figure 5: Evolution of GDP Structure: SSA vs. Asia (1965-2005)** <sup>43</sup>



Source: World Development Indicators, World Bank 2009

<sup>42</sup> The main other sectors are extractive industries and construction, which were respectively dropped from the primary and secondary sectors in order to highlight the specific trends of agriculture and manufacturing.

<sup>43</sup> Latin American countries are not included as comparators because their economic diversification mainly occurred before 1965.

The lack of a dynamic manufacturing sector in SSA has meant that increases in the economically active population have mainly concerned agriculture or the informal urban sector, which played the role of shock absorbers for Africa’s population. The informal urban sector represents about 30 to 45% of non-agricultural GDP and 70 to 90% of overall non-agricultural employment (Jütting & De Laiglesia 2009).

With a fragmented regional market consisting of 42 states (continental SSA only), with limited success in effective regional integration, and the deep levels of poverty which limit local capital accumulation, the growth of SSA’s economies remains highly dependent on external forces. It is prone to trade shocks related to price volatility and to foreign direct investments and public aid budgets that are often pro-cyclical. These characteristics, along with low labor productivity (a result of the sectoral distribution of labor discussed above), frequent political instability, and rapid population growth (see next section) explain SSA’s very weak economic growth and high volatility when compared to the rest of the world (Table 4). This chaotic growth pattern has greatly contributed to the short-term vision of many political leaders and private investors.

**Table 4: Compared Dynamics of GDP per capita Growth between Regions (1960-2007)**

	% per year	variation coef.
North Africa & Middle East	2.06	1.68
Sub-Saharan Africa	0.72	3.10
Latin America & Caribbean	1.73	1.38
East Asia & Pacific	5.44	0.76
South Asia	2.72	0.99

source: Arbache & Page (2007)

In the last two years, the literature on African economic development has been brimming with very optimistic titles reporting *Lions on the move* and an *Emerging Africa where Poverty is falling... much faster than (we) think!*<sup>44</sup> These victory statements must however be carefully discussed based on a more historical perspective.

Though the recent growth period and Africa’s apparent resilience to the financial crisis are good news, it is not clear that they are the result of structural solutions

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<sup>44</sup> These titles are respectively those of McKinsey (2010), Radelet (2010), and Sala-i-Martin & Pinkovskiy (2010). McKinsey’s African *lions* seem to have been shrewdly named to complete the “zoo of emergence” (Gabas & Losch 2008), along with the already well-know Asian *dragons* and *tigers*, and the Latin American *jaguars*. It is important to keep in mind that the “lions” counted by McKinsey include the whole African continent, the GDP of which is shared between North Africa (41%), South Africa (21%), and the rest of SSA (38%)—based on Africa’s GDP breakdown for 2008 in constant 2000 US\$ (source WDI).

that will sustain growth in the long term.<sup>45</sup> With some exceptions (situations of “catching up” and improvements in governance), growth has initially been brought about by a boom in raw materials. Growth was slower in SSA than in other developing countries (notably East Asia) and it was mainly concentrated in services and construction—the investment rate remained the lowest of any developing region (Ali & Dadush 2010). Recent progress has not so far changed the “structural anemia” of the sub-continent. Above all, gaps with the rest of the world have been continuing to widen.<sup>46</sup>

## 1.2 New Patterns in Demographic Transitions

Economic and demographic transitions are closely intertwined. World population growth is currently rapid and characterized by differential growth rates across societies. Consequently, countries are at different stages in demographic transition—a process characterized by a successive fall in both the mortality and birth rates.<sup>47</sup> As a result of these different stages in demographic transition an increasing share of the world’s population comes 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 United Nations estimates,<sup>48</sup> the world’s population should reach 9.2 billion people in 2050—more than two additional billion people than today (see Table 5). Although these statistics are widely discussed,<sup>49</sup> the distribution of this population increase across regions receives less attention. Whilst Europe shows characteristics of the final stage of demographic transition (with an ageing and declining population), sub-Saharan Africa and South-Central Asia are still booming,

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<sup>45</sup> GDP per capita has been growing on average around 3.5% per year between 2004 and 2008 and bounced back in 2010 to 2.3% after the 2009 drop.

<sup>46</sup> By computing the World Bank’s World Development Indicators, Arrighi & Zhang (*forthcoming*) compare SSA’s Gross National Product (GNP) per capita (including South Africa) to the GNP of what they name the First World (North America, Southern and Western Europe, including Scandinavia, Israel, Australia, New Zealand and Japan). They clearly show that the share of SSA (as a percentage of First World’s GNP per capita) dropped from 5.6% in 1960 to 2.3% in 2005 (Table 1, p.43).

<sup>47</sup> In the first stage of the transition, the drop in the mortality rate before any comparable decline in the birth rate leads to high population growth which then progressively diminishes when birth rates slow down. Progresses in healthcare and welfare have exacerbated the scale of the process and shorten its cycle.

<sup>48</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 of the 2008 revision have been selected.

<sup>49</sup> According to many specialists, the UN projections are underestimated (Guengant & May 2009). They are based on a “convergence paradigm” with a fertility rate target for 2050 which is contradicted by many national censuses. As an example, the 2009 Malian population census (INSTAT 2009) gives a 3.6% yearly increase of the Malian population between 1998 and 2009, a far higher rate than the 2.4% of the UN World Population Prospects.

demonstrating different phases within the transition. These latter two regions, however, 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%.<sup>50</sup> Thus, by 2050 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 huge growth in incomes (and also potentially due to the radical birth policies in place in China since the 1970s, the consequences of which is a debated issue). As a result, East Asia should progressively face the same problems presently seen in Europe (i.e., the burden of an ageing population) which will heavily weight on the region's growth rate. Japan is already confronted with this situation.

The main result of these differential population growth rates—which could of course change in the event of exceptional circumstances—will be a new mapping of the world. It will inevitably influence the current balance of power. As reminded by Guengant (2007), 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 5).

**Table 5: World Population by Region, Absolute and Share (1960-2050, in millions)**

Year	1960		1990		2010		2050		2010-2050	
Eastern Asia	779	26%	1,337	25%	1,564	23%	1,600	17%	36	2%
South-Central Asia	627	21%	1,250	24%	1,780	26%	2,494	27%	713	40%
Sub-Saharan Africa	229	8%	518	10%	863	12%	1,753	19%	890	103%
Latin America / Caribbean	220	7%	442	8%	589	9%	729	8%	141	24%
Northern America	204	7%	283	5%	352	5%	448	5%	97	28%
Europe	604	20%	721	14%	733	11%	691	8%	-42	-6%
Other regions	359	12%	739	14%	1,028	15%	1,434	16%	406	40%
<b>World</b>	<b>3,023</b>	<b>100%</b>	<b>5,290</b>	<b>100%</b>	<b>6,909</b>	<b>100%</b>	<b>9,150</b>	<b>100%</b>	<b>2,241</b>	<b>32%</b>

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

Note: for the definition of regions see: <http://esa.un.org/wpp/Excel-Data/definition-of-regions.htm>

<sup>50</sup> Beyond this overall picture of a booming sub-Saharan African population, there are of course significant differences between SSA countries. Firstly, the growth rate of many countries, mostly in Southern Africa, has been affected by the pandemic of HIV. Then, total fertility (number of children per woman) is unevenly declining. Most of the Sahelian and Central African countries, as well as the African Horn, still face very high fertility (6 to 7 children per woman), while some countries (e.g. Senegal, Nigeria, Kenya) have begun a gradual and halting slowdown (4 to 5 children per woman). These two groups correspond to 85% of SSA's population. The countries which are clearly engaged in their transition (3 to 4 children per woman) are Ghana, Côte d'Ivoire and Southern Africa (with the exception of Mozambique), South Africa being far ahead in the process (2.5 children per woman). See United Nations, *World Fertility data 2008*, Guengant (2007), and Gendreau (2010).

The different demographic prospects of the RuralStruc countries illustrate variations around these overall regional trends. Three SSA countries—Kenya, Madagascar and Mali—are above the regional average increase. Nicaragua’s growth is very similar to the Central American one (38%), while Mexico—part of the same UN sub-region—shows a clear slowdown consistent with the end of its demographic transition (Table 6).

**Table 6: Population of the RuralStruc Countries (1960-2050, in millions)**

Year	1960	1990	2010	2050	2010-2050	
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%
Senegal	3	7.5	12.8	26.1	13.2	103%
Morocco	11.6	24.8	32.3	42.6	10.2	32%
Nicaragua	1.8	4.1	5.8	8.1	2.3	40%
Mexico	37.9	83.4	110.6	128.9	18.3	17%

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

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 revealed by different dependency ratios, or activity ratios, which summarize the respective portions of active and inactive people in the economy.<sup>51</sup> In the first phase of demographic transition, the population is young with a high share of inactive youths; during the second stage, these cohorts become active and, if the conditions for growth exist (good economic, institutional, and political environment), offer a potential bonus to the economy, named the “demographic dividend.” Finally, the third stage corresponds to the ageing of these cohorts, thus increasing the dependency ratio (or decreasing the activity ratio).

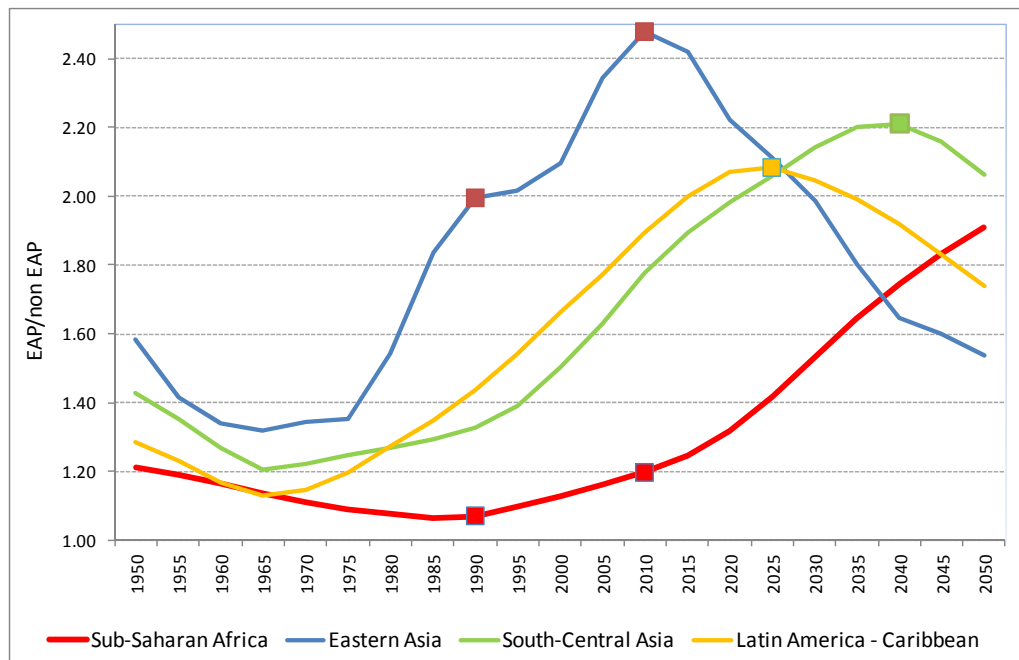
Figure 6 illustrates these staggered and differentiated demographic transitions. Due to its high population growth rate since the 1960s (higher than 2.5% per year over 40 years, with a peak at 3% in the 1980s), sub-Saharan Africa faced the weakest activity ratio ever recorded during the 1980s and 1990s, with only about one active

<sup>51</sup> The ratio commonly used is the dependency ratio, which relates economically active population (EAP, aged 15-64) to the economically inactive population (non-EAP, <15 and >64). The ratio is calculated by dividing the total number of non-EAP by EAP. However, the Program decided to use the activity ratio (EAP/non-EAP) which is more illustrative for the Program’s purposes. One must note that these ratios referring to the EAP overestimate the active population: the “working age” group includes many inactive and unemployed persons. As such, real dependency or activity ratios including the employment rate should be used. In many developing countries, and notably in SSA, this approach is made difficult by the size of the informal sector and poor information on the labor market. On this discussion, among others, see Oudin (2003).



person for every inactive person.<sup>52</sup> Understanding this heavy burden helps to create perspective on SSAs two decades of economic crisis and structural adjustment, as well as on its current situation. During the same period, East Asia benefited from an outstanding demographic dividend. Its activity ratio grew beyond 2 active people for every inactive and certainly fuelled the economic growth of the region (Bloom *et al.* 2001).<sup>53</sup> South Asia, whose transition lags behind East Asia's by about 30 years, should get this demographic windfall around 2035-2040. Yet SSA will have to wait after 2050 to potentially reap the benefits of a more favorable demographic structure.

**Figure 6: Activity Ratio by Selected Regions, 1950-2050**



Source: *World Population Prospects, 2008 revision*

When examined in terms of yearly cohorts of people—particularly yearly cohorts of young labor market entrants—these different demographic trends reveal a coming surge in the labor supply over the next decades in SSA and South Asia.

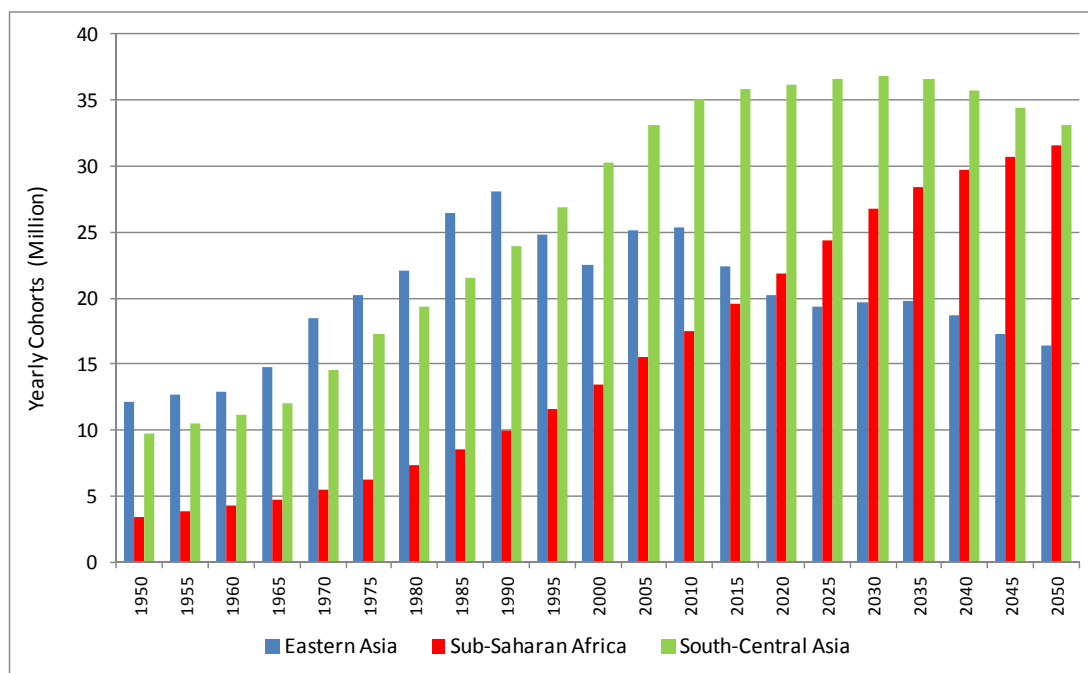
Figure 7 displays the size of the yearly cohort of labor market entrants, and illustrates the same trends between the world's most populous regions (Asia and

<sup>52</sup> The ratio was less than one in some countries. The real activity ratio, including the effective employment rate, would be worse.

<sup>53</sup> The activity structure's gap between SSA and East Asia is higher today: 1.2 versus 2.5 (see the dots in Figure 6).

SSA).<sup>54</sup> It provides an estimate of the labor absorption needs of 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 the 2020s. These figures mean that SSA will face a surge of around 330 million new markets entrants in the next 15 years—the equivalent to the current population of the USA.<sup>55</sup> It is important to keep in mind that this number is not a projection: these 330 million new labor market entrants have already been born and are currently children.

**Figure 7: Yearly Cohorts Entering the Labor Market by Selected Regions, 1955-2050**



Source: *World Population Prospects, 2008 revision*

<sup>54</sup> Cohorts are commonly calculated by taking 1/10 of the 15-24 age group, creating an estimate of the new entrants in the labor market, i.e. youth looking for a job or an activity that provides an income. This is different from the increase of the labor force, which can be estimated by using the net increase (n+1-n) of the EAP (15-64 age group). The second calculation based on EAPs gives a lower yearly cohort than the new labor market entrants (12m instead of 17m in 2010 for SSA). However, beyond the previous discussion about the imprecision of the EAP, it can be misleading also because most developing countries' labor markets include many people continuing to work after 65, notably retirees of the formal sector who try to augment their pension incomes. As such, the yearly cohort of labor market entrants gives a clearer estimate in terms of new labor supply.

<sup>55</sup> The figures for South and Central Asia are: a yearly cohort of 35m people in 2010, 37m in 2025, and an accrued amount of 575m new labor market entrants over the 15-year period.

Table 7 shows what these trends mean for the RuralStruc countries: in SSA the forecasted peak period for labor supply will be after 2050. It also shows the major difference between SSA and non-SSA countries (where the peak period has already passed or will do so soon, confirming their later stage within the demographic transition). During the next decades, achieving adequate economic growth to create demand for the coming labor surge will be a major concern for sub-Saharan Africa's societies and their governments (World Bank 2009c, UNRISD 2010).

**Table 7: Labor Market Entrants in the RuralStruc Countries (in Thousands)**

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

*Source: World Population Prospects, 2008 revision*

## 2. Structural Transformation in a Global Open Economy

The evolutionist view that underlies the “canonical model” of economic transition is insufficiently questioned today given the new configuration of the global economy. Indeed, the globalization process which began at the end of the 1970s is unique and too often mischaracterized as a “second globalization”, with reference to a “first globalization” occurring between the 1860s and the First World War. This period of time was certainly characterized by an increasing movement of goods, labor and capital between Europe, its immediate periphery (Russia, Ottoman Empire) and the “New Worlds”—mainly the USA (Berger 2002), but it was not an effective globalization affecting the whole world. Rather it primarily represented a process of convergence in the North Atlantic economy, driven by migration flows (O’Rourke & Williamson 1999), and governed by a significantly different geopolitical order (specifically by European colonial empires and the American sphere of influence in Latin America).

The processes at play today represent the growing integration of the world as a whole. This globalization is facilitated by continuous technological progress in the transportation of goods, capital, and information, strengthened by the liberalization policies begun in the early 1980’s, and result in a greater concentration of assets being held by global firms and institutional investors, as well as the development of intra-firm trade and the outsourcing of production. Additionally, globalization is also characterized by a convergence in thinking, related to common concerns about global change. This is particularly evident today in regards to the impact of human activities on natural resources and climate.

These characteristics foster a deep interconnection of markets and of human societies and, in the process, greatly impact the structures of both. They tend to simultaneously weaken local linkages in favor of more distant relations—notably in terms of production—and to widen the existing asymmetries between the different regions of the world.

### 2.1 Is the Historical Sequence of Structural Change Still Viable Today?

One of the main questions to explore is whether or not, or to what degree, the historical sequence of structural change is viable for today’s “late developers”. A caveat is necessary here because this debate includes many traps. Though it has many variants, the historical path of structural transformation is a stylized fact of history, confirmed by statistical evidence.<sup>56</sup> As such, it must be noted that this is a positive, not a normative statement. However, notions such as “development” or

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<sup>56</sup> Timmer & Akkus (2008) 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 RuralStruc Program countries in the sample, which do not exhibit strong divergence from the general pattern.

“emergence” are more ambiguous and carry certain overtones related to the European (or “Western”) view of world history.<sup>57</sup> In this perspective, the structural trajectory of today’s “developed” countries is used as the evolutionary measuring stick against which changes in economies and human societies are judged (Gabas & Losch 2008). Keeping in mind the limitations and biases inherent in this framework, this document nevertheless uses the terms “first” or “late” developers to describe a country’s position with regard to the observed historical transition processes.

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. While this is true in absolute terms, it surely understates the role of specific historical conditions in past transitions and the potential difficulty of replicating the structural transformation in the same way today.

### 2.1.1 *The Importance of the “Moment in Time”*

Prospects for change in every country or region depend not just on internal conditions in terms of population, education, natural resources, etc., but also on the relationship and room for maneuver that the country has with the outside world (Gore 2003). For example, limited competition for a country’s industrial exports could mean easier industrialization. And because opportunities, constraints and the balance of power evolve continuously throughout world history, the historical context matters. Consequently, it is important to highlight the need for a historical perspective in discussing the on-going processes of structural change.

Often today, the evolutionary frame of reference tends to omit three major characteristics of previous transition processes. The first omission refers to the existing power relations at the time 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. These early transitions from agrarian societies towards more diversified economies cannot be disconnected from European political and military hegemony, which developed starting in the 16<sup>th</sup> century and was expressed most overtly through colonization and unfair treaties.<sup>58</sup>

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<sup>57</sup> Rist (1996) refers to development as a “European belief” which is grounded in a unilateral vision of history—or in the “theft of history” if one follows Goody (2006). The term “new worlds” reflects the same European perspective, which gave little credence at that time to indigenous peoples.

<sup>58</sup> The conditions that led to European hegemony cannot be developed here, but the “discovery” and domination of the Americas appear to have been critical (Grataloup 2007). Further, Pomeranz (2000) notes that it was also related to the fortunate location of coal in Western Europe which deeply changed the continent’s relationship to natural resources when compared to that of China.

This hegemony, which is fully embedded in the history of world capitalism (Braudel 1979, Wallerstein 1989), reduced or eliminated competition<sup>59</sup> and allowed for very attractive situations of both supply and demand with captive markets. Together with the agricultural revolution of the 18<sup>th</sup> century (Mazoyer & Roudart 1997), it made specialization and industrialization possible (notably through consistent food supplies based on cheap imports), and facilitated high business profitability which resulted in increased capital accumulation and investment. When the United States went through its transition in the mid-late 19<sup>th</sup> century, it reproduced and deepened many of the features of the European transition.

The second omission is the huge outflows of migrants from Europe during the transition, an opportunity that was of course fully intertwined with European hegemony (Hatton & Williamson 2005). Between 1850 and 1930, nearly 60 million Europeans migrated to new worlds: the Americas, Australia, New Zealand, and Africa (mainly Algeria and Southern Africa).<sup>60</sup> These “white migrations” (Rygiel 2007) facilitated the adjustment of European economies and their management of labor surpluses resulting from their demographic transitions, from rural depopulation, and from the insufficient pace of job creation in urban sectors, despite a strong process of industrialization (Losch 2008).

The third omission is specific to the Latin American and Asian transitions, which are frequently called into the debate to confirm the infallibility of the pattern of structural change. Latin American and Asian countries began their transition processes during the very specific period of national self-centered development (Giraud 1996) that characterized the international regime between the 1929 crisis and the 1970s, i.e., the beginning of the globalization period. Throughout the world, nation-states implemented their own “development projects” (McMichael 1996) characterized by import-substitution, protection and strong state intervention (Chang 2002). Public policies were of paramount importance for both industrialization (Evans 1995, Amsden 2001) and agriculture modernization (Djurfeldt *et al.* 2005), and they initiated the so-called “developmental state”. The independent Latin American countries engaged in this process between the two World Wars and continued these policies during three decades after WWII.<sup>61</sup> They were followed by many of the newly independent Asian countries in the 1950s; and, in both cases, Cold War-period funding played its role. Although state-led

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<sup>59</sup> Bairoch (1997) points out that in 1750 India and China accounted for slightly over half of world manufacturing production.

<sup>60</sup> The estimates vary, depending on whether migrants who returned to their home countries are counted. European migrations to the Americas mainly concerned the USA—a country that took in up to 1.3 million immigrants a year at the turn of the 20<sup>th</sup> century (Daniels 2003), for a total of about 35 million migrants. Canada and the southern part of South America (Argentina, Southern Brazil, Chile) were other important destinations.

<sup>61</sup> See the huge work produced by the United Nations Economic Commission for Latin America (CEPAL).

development strategies produced mixed results and were eventually widely dropped for reasons of inefficiency, in most countries they contributed to the creation of a strong economic and institutional fabric (skills, processes, experiences). Once the scaffolding of strong state support was rolled back, this foundation helped facilitate their adaptation to globalization.

With regard to these previous transitions, the case of sub-Saharan Africa appears to be quite specific. The reasons for its lack of structural transformation over the last fifty years can be largely explained by the historical sequence that led to the continent's late insertion into the global economy, and the conditions under which this was finally accomplished. One can particularly mention the constraints of colonial rule (with captive markets and explicit obstacles to industrialization and education), which led to a deep specialization in primary sectors. Then, the political conditions under which African states were created, especially their inherited colonial borders and adoption of external administrative systems, resulted in young states lacking "institutional thickness" (Amin & Thrift 1993). This made attempts at national political integration very difficult and costly.

Finally, and perhaps above all, during the early 1980s African states found themselves simultaneously confronted by globalization and the restrictive policies of structural adjustment, while facing the heavy burden of their demography (notably their lowest ever activity ratios). At that time, most African states were only twenty years old. This strongly restricted their institutional capacity to effectively deal with these issues, and is an important fact that is too often forgotten. As such, they never had the necessary room for maneuver to engage in strong modernization policies and create and implement coherent development strategies (as was done in Asia and Latin America).

## 2.1.2 *The Difficulties of Replication*

### a. Growing Gaps and Shorter Distances

Though each country may be at a different stage of its own economic and demographic transitions, each one looks out upon the same world. As a result of their specific development trajectories and diverse modalities and sequences of integration into the global economy, they each have different comparative advantages. However, comparative advantages are not necessarily deterministic. The late developers can benefit from the technological progress and past experiences of the first developers to help build their own skill and asset bases. At the same time, they can seize new opportunities to access growing global markets.

However, these advantages to late developing countries are constrained by the fact that they must also deal with huge (and still growing) asymmetries in productivity and competitiveness, and not just on the international market but in their domestic market as well. They must compete on a "stormy open field" (Birdsall 2006), where their productivity is challenged by firms from abroad (particularly from the major

emerging countries), while dealing at the same time with the instability of the world economic environment and the growing consequences of global change. These are dramatic challenges for the structural transformation of the late developers.

The overall productivity gap faced by SSA is about one to five with other developing countries, and one to 100 when compared to OECD countries.<sup>62</sup> Such a gap is a major and enduring obstacle to global competitiveness: even if comparative advantages can exist for specific factors (e.g., the cost of labor), these are not enough. One must bear in mind that competitiveness is not based on production costs alone, but also includes an economy's responsiveness to markets' quality requirements and the volume of product it is capable of supplying. Though quality requirements are a main barrier to entry into the production of sophisticated products, the volume of supply determines market share, which at the end of the day is the core indicator of competitiveness.

This observation is valid for all sectors of activity, for manufacturing as well as for agriculture, and for all countries. As such, it is important to note that the current context of increasing food demand and high prices is equally favorable to producers around the world, but that it will require significant effort for late developing countries' producers to take advantage of these new opportunities. They will have to quickly provide additional supply and to upgrade the quality of their products. If not, the new demand will be met by others, and their market shares will suffer.

These asymmetries of productivity and competitiveness in the context of an open economy impact the local dimension of structural transformation as well. Trade across any distance was greatly facilitated by the liberalization process, and is now quicker than ever as a result of modern telecommunications and transportation. A major consequence of this trend is that the strong local linkages between agriculture, industry and urbanization, which powerfully contributed to the foundations of old economic transitions, are now increasingly weakened by the propensity to rely on imports (UNRISD 2010). However, while imports are often more cost efficient and timely—a significant advantage—they obviously do not strengthen the local dimension of development.

This has resulted in deep changes in patterns of urbanization in many developing countries, where cities (particularly large ones) often depend significantly on imports rather than on their own resources or the resources of their surrounding regions. This has contributed to the dramatic expansion of the informal sector, which acts as a buffer in dealing with the differential between labor supply and labor demand. This process of “informalization” is exacerbated in sub-Saharan

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<sup>62</sup> 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).



Africa where a long history of very slow economic growth did not affect the fast pace of urbanization (Fay & Opal 2000). Even without the promise of jobs, cities retained their allure (services, larger range of opportunities than in the countryside, way of life, etc.).

Despite a significant level of heterogeneity present in the informal sector,<sup>63</sup> it can in general be characterized as one of low productivity, marked by under-employment, a lack of job security and low returns.<sup>64</sup> These factors largely contribute to explaining the development of urban slums, which are proliferating around cities in the developing world (UN-Habitat 2003, Davis 2006).

#### b. Restricted Room for Maneuver

Beyond competitiveness gaps and the changing geography of trade, late developers' transition prospects are also hindered by two additional constraints that were not present during previous transitions: limits on the range of available policy interventions and on the availability of opportunities for international migration.

First, a number of the policy interventions that characterized the transitions of many Latin American and Asian countries are unavailable for late developers due to the current policy agenda. The existing global economic consensus is built upon market liberalization and the suppression of policies deemed to be distortive. This perspective prohibits many interventions, which in the past were used to promote modernization and increase productivity, both for agriculture and manufacturing, notably in Asia (Chang 2002). One may well ask if the policies under which Korea and Taiwan modernized in the second half of the 20<sup>th</sup> century would be possible under today's WTO regime (Birdsall *et al.* 2005).

More particularly, in the case of agriculture in sub-Saharan Africa, Bezemer & Headey (2008) show how these external restrictions were endogenously exacerbated by a persistent urban bias<sup>65</sup> in African domestic policy agendas. This was manifested in the extensive taxation of agricultural exports and limited

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<sup>63</sup> Ranis & 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.

<sup>64</sup> Under employment traps which were already detected by Todaro (1971) forty years ago.

<sup>65</sup> There has been an extensive literature on this "urban bias" and its effect on development since Lipton's initial work (1977) and Bates' contribution (1981), which somewhat overlooks many other factors related to the idiosyncrasies of every country. The major explanations advanced to explain this urban bias are: the legacy of colonial regimes and an adverse political context where rural African population had difficulties in expressing their "voice," while urban constituencies were more directly able to put pressure on governments. Among the cited obstacles to voice were: authoritarian political regimes, low threat of rural based Communist insurgency—when compared to Asia—low population density and communication obstacles.

protection from food imports (thus favoring cheaper food access for urban dwellers). These policies contributed to the heavy burdens faced by African farmers.<sup>66</sup>

Today, however, some of the policy restrictions related to the international consensus are softening (for example, with the so-called “smart subsidies”). Yet, even now with greater room for maneuver, the financial capacity of governments to engage in this sort of support (while also continuing to procure public goods) still presents a major issue. Budget constraints are severe in a global context marked by an instable economic environment and volatile levels of international assistance. As such, additional means will have to be found through fiscal reform.

The second constraint relates to international migrations. They are no longer a viable option for large amounts of people exiting agriculture and lacking other employment opportunities. International migrations have been a growing issue in development studies over the last years, but mostly with reference to the impact of remittances<sup>67</sup> (which on aggregate account for more international capital flows than does official overseas development assistance). However, the relative ease with which migrants can now remit their earnings masks the fact that migration overall is relatively restricted. Even though the total stock of international migrants (i.e., people living outside their home country) is estimated at 200-210 million persons, one cannot imagine the repetition of the same process of mass-migration that originated from Europe beginning in the mid-19<sup>th</sup> century within the current geopolitical order. If international borders were to be opened then, as Pritchett (2006) says, “their people would certainly come”. Migration remains a touchy political issue and borders remain broadly closed for people, although liberalization has been largely achieved for goods, capital, and many services.<sup>68</sup>

Today, the most active and remunerative migration routes are concentrated in regions peripheral to the EU and the USA,<sup>69</sup> and in the future the options for migration will likely depend on the demographic evolution of the high income countries (plus China) and their demand for foreign labor. This demand will likely

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<sup>66</sup> Anderson & Masters (2009) show a 40-year trend of “dis-protection” while other developing countries were protecting their agriculture—not to speak of the situation of OECD countries.

<sup>67</sup> See among others Maimbo & Ratha (2005); Lucas (2005, 2008).

<sup>68</sup> Discussions on the liberalization of migration often refer only to the liberalization of trade in labor. The main reference here is mode 4 of WTO’s General Agreement on Trade in Services (GATS) on “*movement of natural persons*” (individuals travelling from their own country to supply services in another—i.e., migrant workers). On this trade perspective, see Winters *et al.* (2003).

<sup>69</sup> South–South migrations must not be underestimated. Half of developing countries’ migrants reside in other developing countries. However, as demonstrated by Ratha & Shaw (2007), 80% of these migrations take place between countries with contiguous borders and with relatively small differences in income. Consequently they only accounted for 10 to 30% of developing countries’ remittance earnings in 2005. These major differences in returns between destination countries are fully confirmed by the RuralStruc surveys (see Chapter 4).

continue to be met by countries on their periphery, and as such the replication of the migration patterns of the rich world's border countries is not possible for most late developers. Countries like Mexico or Morocco have approximately 10% of their nationals living abroad, and the opportunity for migration at this scale plays a big role in their political economies. First, it provides large scale cash transfers, but it also acts as a relief valve for internal tensions associated with structural transformation. As a way of illustrating the impracticality of this type of model for sub-Saharan Africa, one must note that if 10% of the region's population were to migrate it would mean an outflow of 85 million people, mainly to Europe. This is a politically unfathomable scenario.

## 2.2 Transition Options for Late Developers

All these facts limit the ability of the late developing regions to replicate the historical transition process, and there is a growing debate in the development community and in academia about the best options for transition under these circumstances. Discussions refer particularly to SSA and frequently compare the sub-continent with Asia. One of the most critical questions under debate is how to manage the labor supply that exits agriculture (Headey *et al.* 2010).

Yet before discussing options it is necessary to examine more closely the division of population between rural and urban areas, which will determinate the extent of the geographical and sectoral challenges related to a fast growing labor supply. Though its figures are debatable, the United Nations Urbanization Prospects presents useful estimates and permits this examination.

Table 8 shows the urbanization ratio for the principal regions of the world over time and into the future. It illustrates the very rapid process of urban growth underway in SSA, and shows that this process is quick even when compared to South Asia. An important fact is that the sub-continent should remain mainly primarily rural until sometime around 2030.

**Table 8: Urbanization Ratio by World Regions (1960-2050, in %)**

Year	1960	1990	2010	2025	2035	2050	Urban population multiplier
Eastern Asia	20.2	33.0	48.5	59.2	65.5	74.1	4.8
South-Central Asia	18.1	27.2	32.2	39.6	46.5	57.2	5.1
Sub-Saharan Africa	14.8	28.2	37.3	45.2	51.2	60.5	9.5
Latin America / Caribbean	48.9	70.6	79.4	83.5	85.7	88.7	4.4
Northern America	69.9	75.4	82.1	85.7	87.6	90.2	2.0
Europe	56.9	70.5	72.6	76.2	79.5	83.8	1.5
<b>World</b>	32.9	43.0	50.6	57.2	62.2	69.6	3.5

Source: United Nations, *World Urbanization Prospects, 2007 Revision*

Additionally, a particular feature of SSA's demography (highlighted by Table 9) is that it is the only region in which rural populations will still be growing in absolute terms in 2050. While other regions should register a significant decrease in rural populations between 2010 and 2050 (-50% in East Asia, -10% in South Asia, -45% in Europe), SSA's rural areas should add 150m people (nearly +30%).

**Table 9: Rural Population by World Regions (1960-2050, in millions)**

Year	1960		1990		2010		2050		2010-2050	
Eastern Asia	622	31%	896	30%	805	24%	414	15%	-391	-49%
South-Central Asia	513	25%	910	30%	1,207	35%	1,067	38%	-140	-12%
Sub-Saharan Africa	195	10%	372	12%	541	16%	693	25%	151	28%
Latin America / Caribbean	112	6%	130	4%	121	4%	82	3%	-39	-32%
Northern America	61	3%	70	2%	63	2%	44	2%	-19	-30%
Europe	261	13%	213	7%	201	6%	112	4%	-89	-44%
Other regions	264	13%	425	14%	474	14%	369	13%	-105	-22%
<b>World</b>	<b>2,029</b>	<b>100%</b>	<b>3,016</b>	<b>100%</b>	<b>3,413</b>	<b>100%</b>	<b>2,782</b>	<b>100%</b>	<b>-631</b>	<b>-18%</b>

Source: United Nations, *World Urbanization Prospects, 2007 Revision*, and *World Population Prospects, 2008 Revision*. Authors' calculations

As mentioned above, 330 million of today's children will, with certainty, enter SSA's labor market in the next 15 years. Based on the forecasted urbanization ratios (Figure 8), 195m of them should be in rural areas (59%) and 137m in cities (41%). These workers will present the region with both an opportunity in terms of growth and a serious challenge in terms of employment.<sup>70</sup>

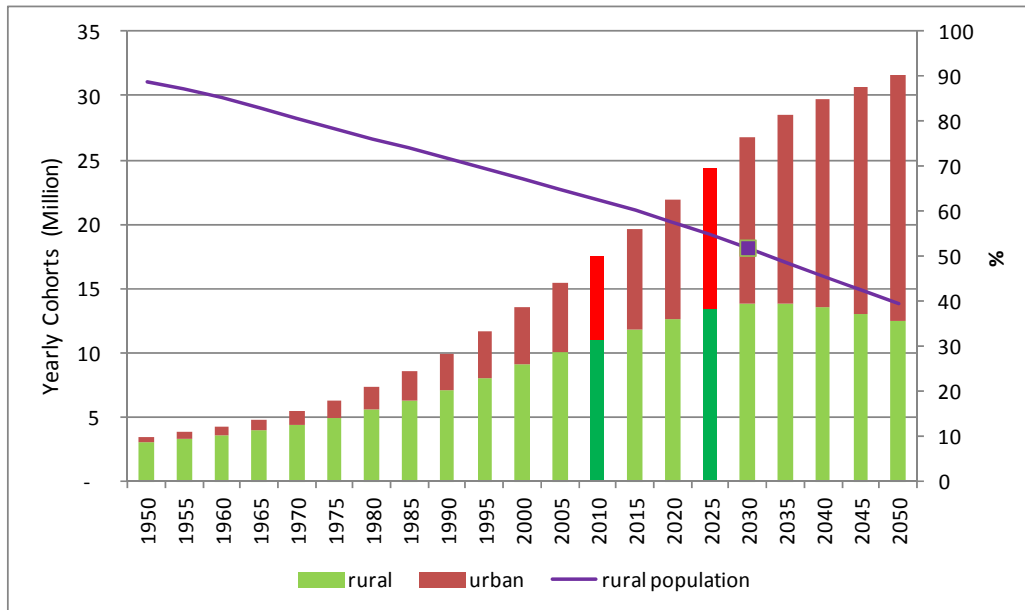
What are the options in terms of employment creation? More broadly, what should be the policy priorities to facilitate sustainable growth that will be able to foster economic transition on one side, and to both benefit from and support the demographic transition on the other?

In this debate, views are often strongly divided between industrialists and agriculturists, or "urbanists" and "ruralists." For the former, manufacturing can be the only real driver of African development and consequently of the sub-continent's structural transformation. Their views posit that agricultural productivity is too low, the challenges too great, and the expected progresses too slow; and consequently, that it would be more realistic to push hard on developing manufacturing and services. The latter group points out that poverty is above all a rural issue, and that the rural poor are deeply engaged in agriculture. As such agriculture can be a major tool for poverty alleviation, especially in light of rapidly rising demand for food. Additionally, agricultural development creates opportunities for diversification

<sup>70</sup> By comparison, the labor force surge in South-Central Asia (the other booming region) will result in 575m new workers over the same period of time. 64% of them (370m) should live in rural areas and 36% in cities (205m).

through the processing of products, and rising rural demand driven by increased agricultural incomes.

**Figure 8: Yearly Cohorts Entering Rural and Urban Labor Markets and Rural Population Share in sub-Saharan Africa, 1955-2050**



Source: United Nations, *World Urbanization Prospects, 2007 Revision*, and *World Population Prospects, 2008 Revision*. Authors' calculations

In order to help clarify this long-standing debate, it is useful to look more closely at both the economies of cities and of rural areas, and to review their respective capacities to absorb a growing labor force.

On the urban side, the decades of structural stagnation in sub-Saharan African economies are a strong reminder of the failure of traditional models of transition in the region.<sup>71</sup> As previously discussed, rural depopulation and the exiting of labor from agriculture mainly fed the informal urban sector. Manufacturing never really took off, and much of the industrialization that did occur later fell victim to its own failures or to the policies of the structural adjustment period.

Today, although manufacturing is a very narrow sector in SSA, many believe that current conditions present a new opportunity for industrialization. Among the main arguments put forward in support of this view are an improved business climate in

<sup>71</sup> The dualistic model proposed by Lewis (1954), suggesting labor transfers from a traditional agriculture-based sector (with low productivity and a surplus of labor) towards a modern-urban-industrializing sector, was a major contribution to development economics. See a recent utilization of Lewis' perspective about the role of agriculture in transition in Bertheliet & Lipchitz (2005).

many countries, the progressive growth of Asian industrial costs related to increasing wages (notably in China), and new opportunities for task-based production or light manufacturing (UNIDO 2009). This last argument refers to specialization in certain segments of a value-chain, rather than engaging in the manufacturing of end-products. This opportunity is a consequence of the development of outsourcing and intra-firm trade that characterizes globalization. It is appealing to late developers in that it requires less capital, fewer skills, and is possible in a weaker economic and institutional environment.

Reference is also made to new possibilities for the development of a service industry. The multiple possibilities offered by outsourcing, as well as options related to the development of “cloud computing” and ICT are frequently discussed. They are notably presented as a potential option for “leapfrogging” the historically-observed stage of industrialization. Opportunities surely exist, but whether or not they are large enough to allow a bypassing of industrialization is debatable, particularly in a context where services are becoming increasingly tradable. As such, competition will be fully at play and the challenges associated with winning an effective market share will be high (UNRISD 2010). One must not underestimate the requirements associated with such a strategy.

As previously mentioned, in sub-Saharan Africa, 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 vaunted by the WDR09. Upgrading from the current environment to a buoyant manufacturing sector will require more than just the exploitation of a country’s comparative advantage (e.g., labor costs): it will take heavy investment. The government should play a large role, procuring infrastructure and offering incentives to encourage private investment, though the specific types of incentives it should offer are highly debated (Lin & Chang 2009). Yet, given the challenges SSA will face over the short and medium term (the 15-year period to which this chapter frequently refers), it is difficult to anticipate the creation of hundreds of thousands jobs per year in manufacturing. As a consequence, first priority should be given to upgrading the existing productive base, which means providing adequate incentives and support the most promising parts of the informal sector, where there is potential for modernization.

On the rural side, with reference to Christiaensen and Demery’s 2007 book title, there is a need to get “down to earth” or, more precisely, to get down to basic arithmetic (Headey *et al.* 2010). The “big figures” presented in the RuralStruc report are unambiguous: around 65% of SSA’s population still live in rural areas, the same percentage of the labor force is engaged in agriculture, and 60% of the new workers entering the labor market between now and 2025 will be rural. These numbers offer a strong reminder that rural issues must be addressed in order to deal with poverty and manage the economic and demographic transitions. As such, rural activities will account for the “*major part of the equation of youth employment*” (World Bank

2009c), and failure in rural development would only accelerate depopulation of the countryside and create an additional burden for cities.

“Rural activities” refers to both agriculture and the rural-non farm economy (RNFE), which are strongly interrelated. As described by an abundant literature, it is increasing farm income that drives rural demand, which in turn fosters the development of new activities, rural transformation, and economic change.

Due to the growing demand for food that has resulted from booming populations and from rising urbanization, there is no doubt that agricultural growth will be steady for the decades to come. The critical question here, with reference to the transition challenges of the late developers, is about the growth model which will be encouraged. This will condition the labor absorption capacity of agriculture, as well as the overall sustainability of its development. Favoring family farms and labor-intensive practices will not have the same consequences on labor absorption as favoring large scale managerial enterprises and capital-intensive production techniques. Similarly, promoting the multifunctionality of agriculture with a specific focus on resources management will have a different impact on absorption and sustainability than promoting a strong intensification based on industrial inputs.

Limited natural resource endowments could also pose a major obstacle to sustainable labor absorption in agriculture, and to agricultural development in general (Alexandratos 2005). This is particularly the case for the stock of arable land (which is frequently unknown, due to a lack of reliable information systems). However, it must be noted that land availability is a relative concept. Its potential for output and employment depends on the way people use it, i.e., their level of technology, the infrastructure resources available, and the extent to which public goods are provided (water access and irrigation, roads, eradication of endemic diseases, etc.). Each situation has its own constraints and opportunities, which directly affect the options for development.

The above discussion highlights the need to understand the characteristics of rural situations. This is a prerequisite for assessing their constraints and their room for maneuver, and consequently for identifying their options for fostering their rural transformation. Though a better appreciation of factor resources and their availability is indispensable, it is not enough. The existing rural realities and the economic environment under which rural households sustain their livelihood and develop their activities need to be understood. This includes the nature and extent of each activity and source of income, and how these are possibly modified by ongoing dynamics related to globalization. Exploring this reality through the results of the field work implemented by the RuralStruc Program is the objective of the following chapters.





## CHAPTER 3. RURAL REALITIES: AGRICULTURE AND POVERTY

The RuralStruc countries belong to the “three worlds” of agriculture (see Box 2 in Chapter 1) and the surveyed regions were supposed to present different trends in terms of integration into markets, regional dynamism and economic returns, translated into income levels. The expectation was also to observe very different situations among regions along the lines of their *a priori* classification—“winning,” “losing” and “intermediate”—corresponding to different opportunities in terms of exit pathways out of rural poverty, and consequently different situations within the process of structural transformation.

However, the results proved surprisingly more nuanced. Differences among regions are indeed important; and the largest gap is between the surveyed regions in sub-Saharan Africa and those located elsewhere, reflecting very different levels of wealth and development. But despite this diversity two glaring similarities stood out: the consistent importance of agriculture in the activities of rural dwellers and the staggering magnitude of poverty, almost across the board, in both absolute and relative terms.

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

### 1. The Remaining Central Role of Agriculture across Different Regional Settings

As previously mentioned, the regions surveyed by RuralStruc are primarily agricultural regions, without any major extractive industries.<sup>72</sup> They are mostly engaged in an annual crop type of agriculture centered on the production of staples, mainly cereals. Thus, the specific crop is often maize in Mexico, Nicaragua (together with beans) and Kenya, rice in Madagascar, rice, millet and sorghum in Senegal and

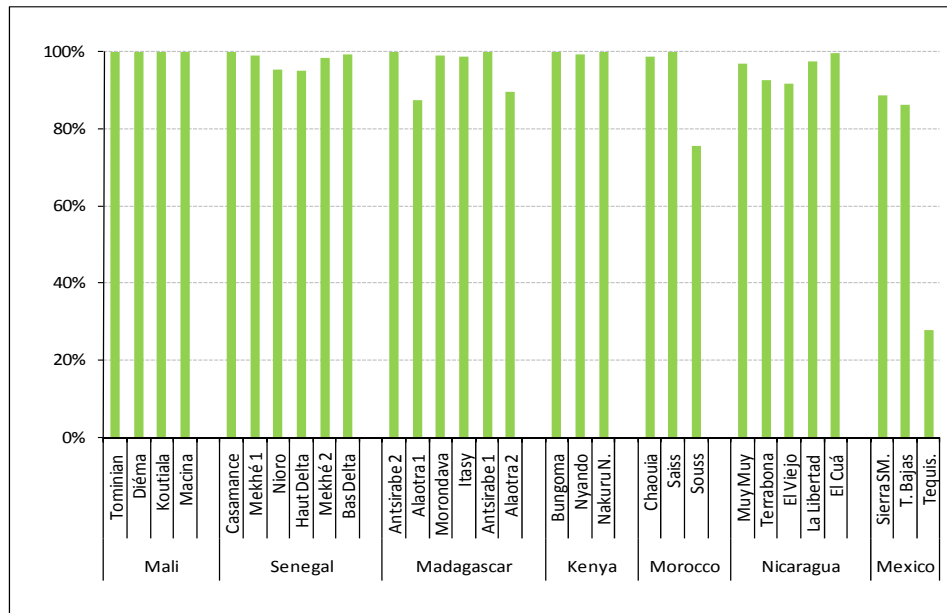
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<sup>72</sup> Annex 3 presents a brief overview of their main characteristics.

Mali, and durum and wheat in Morocco. Traditional commodities produced for export or local agro-industries are also present in every region, as well as fruits and vegetables and livestock with, in some cases, dairy production (see Chapter 5).

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 processing of the related products). But what was more surprising was the observed share of farm households, i.e., rural households engaged in on-farm activities.<sup>73</sup> One could have expected to find more rural dwellers fully participating in others activities, but in most regions 95 to (more often) 100% of surveyed households are farm households (Figure 9). If we exclude the specific case of the landless families of Alaotra in Madagascar, one of the main rice baskets 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.

**Figure 9: Share of Surveyed Rural Households with Farms**



Sources: RuralStruc Surveys

<sup>73</sup> The Program defines a farm household as an household directly engaged in agricultural activities (*sensu largo*) and earning incomes, in cash or in kind, from these activities, whatever the level of productive assets and their ownership (for example owned, rented, or lent land). See Chapter 4 for the definition of household activities.

In Souss, 25% of the households are fully engaged in off-farm activities. This diversification results from both the proximity of several surveyed zones to Agadir (Morocco's fifth largest city—nearly 800,000 persons) and its tourism industry, and above all from the development of agricultural waged labor in the coastal plain's commercial fruit and vegetable sector. Although the Sotavento region in Mexico also shows a slightly higher share of non-farm households than in the other surveyed regions (15%), it is Tequisquiapan that is the most dramatic outlier among the RuralStruc surveys. There, only 28% of households are farm households. The surveyed region of Tequisquiapan corresponds to six localities selected in a valley north of the city of San Juan del Rio (around 210,000 inhabitants), 150 km south of the city of Querétaro (whose metro area is home to around one million inhabitants). With a strong urban network,<sup>74</sup> the region has been a fast growing zone over the last two decades. It has seen the development of both agribusinesses (vegetables and poultry exported to the USA) and manufacturing (*maquiladoras* as well as high-tech industries like aeronautics), which led to the emergence of a strong labor market and the exit of many rural dwellers from agriculture (Rello & Morales 2002).

The examples of Souss and Tequisquiapan help to highlight the importance of regional contexts and show how they impact the characteristics of rural households' activities. Population densities and urbanization rates (which reflect different stages within the processes of demographic and economic transition), characteristics of the urban network (its concentration and its hierarchy), and the development of transport infrastructure (which determinates the fluidity of flows of people and goods), all shape different regional landscapes. These features contribute to the observed heterogeneity among rural economies in particular, and within and between countries in general—the core theme of the WDR09 on economic geography (see Box 7).

Access to markets and public goods (often provided in urban areas), and ease of networking due to the quality of communication infrastructure, strongly impact the scope of diversification of rural households. The maps presented on page 61 show the travel time in hours to the nearest city of 50,000 inhabitants. They reflect both the urban structure of the country as well as the efficiency of its transportation network; they display a remarkable heterogeneity among the RuralStruc SSA countries.<sup>75</sup>

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<sup>74</sup> The valley of San Juan has four cities of between 25,000 to 55,000 inhabitants, including Tequisquiapan (27,000).

<sup>75</sup> This threshold of 50,000 inhabitants comes from the WDR09's agglomeration index and was used as one of the variables for the regression work based on the survey results (see Annex 5). It was not possible to generate equivalent maps for the three non-SSA countries, but their degree of urbanization and their infrastructure networks would have in each case resulted in an orange-red color for most of the surveyed regions.

Nevertheless, and in spite of clear differences between regional contexts, the average regional share of household incomes earned from on-farm activities remains high in the RuralStruc sample and confirms the strong role of agriculture in the surveyed regions.<sup>76</sup> In 22 out of 30 regions, on-farm incomes make up more than 50% of overall income, and in 11 regions this share is greater than or equal to 70% (Figure 10). This significant role of agriculture is highlighted by another interesting pattern which will be discussed further: the share of household income coming from on-farm sources grows with regional wealth in five of the seven surveyed countries, the two exceptions being Kenya and Mexico.<sup>77</sup>

**Box 7: Density, Distance, and Division: the Three Major Geographic Features of Economic Development According to the WDR09**

The World Development Report 2009 titled *Reshaping Economic Geography* (World Bank 2008a) distinguishes three geographic dimensions of economic development that shape market forces: *density* (the economic output per km<sup>2</sup>), *distance* (between lagging and leading regions where activity is concentrated), and *division* (thickness of barriers related to borders, currencies, regulations, ethnicity, etc.).

The three Ds—density, distance, division—correspond to three scales: local, national, and international. They create disparities in welfare both regionally and among countries which can destabilize parts of a country, entire nations, and even some world regions (p.22). Consequently, governments have to worry but they have many instruments to reduce these disparities. The WDR09 distinguishes three types of instruments: *institutions* (i.e. land, labor and trade regulations), which are “spatially blind”; *infrastructure* (which facilitate movement of goods, people, services and ideas), which are “spatially connective”; and *interventions* (fiscal incentives, preferential trade access, etc.), which are “spatially targeted”.

The WDR09 proposes a rule of thumb for economic integration which is “*an I for a D*”, or: for a one-dimensional problem (density, distance, or division), spatially blind institutions; for a two-D challenge, institutions and infrastructure; and for a three-D predicament, the three instruments.

If, the report offers tools for analyzing existing asymmetries, its standardized and evolutionist approach (see Chapter 2) has raised many criticisms pointing its unilinear vision of rural-urban transition, or its blind spots, like the role of financial markets in the redrawing of the map of the world (see, for instance, Hart 2011).

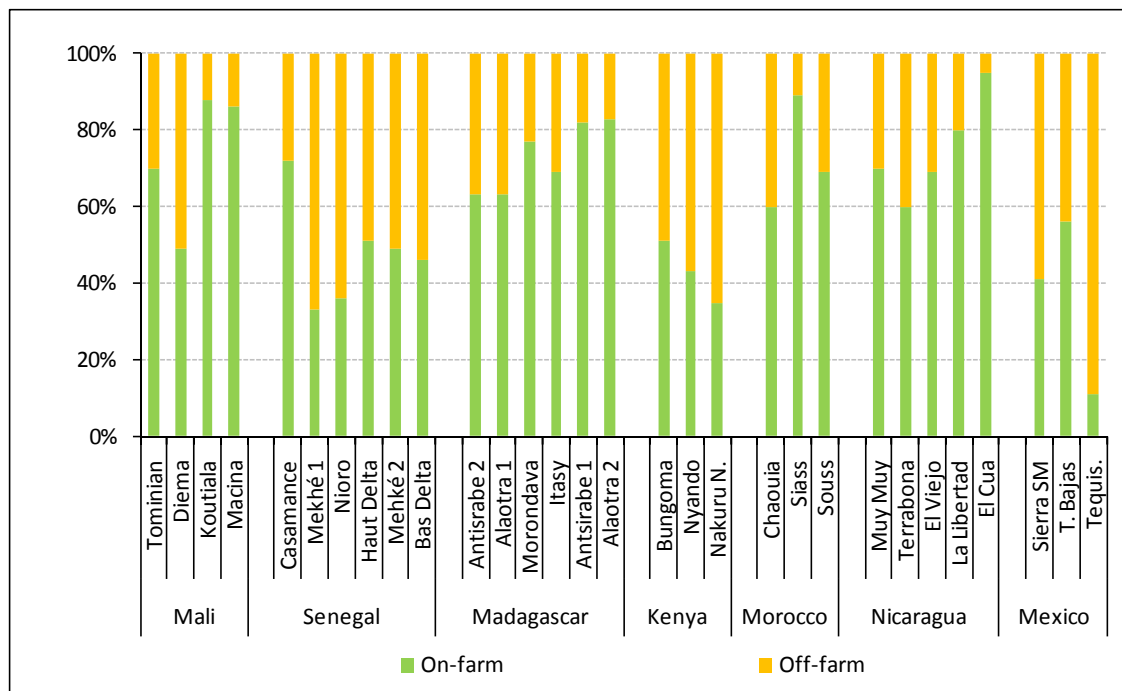
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<sup>76</sup> This calculation is made on the full regional sample including all the households (with farms and without farms) and is based on the share of the regional means corresponding to the regional structure of incomes (see Chapter 6 for the discussion on calculation of means). Off-farm activities are detailed in Chapter 4 and include agricultural wage and non-agricultural wage employment, self-employment, public and private transfers, and rents.

<sup>77</sup> 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 11.

Surveyed regions in Mali, Madagascar, Morocco and Nicaragua are most heavily involved in farm activities, while, unsurprisingly, Mexico shows a very different profile (though the Tierras Bajas zone does illustrate some agricultural specialization). Senegal and Kenya reveal however different patterns: with the exception of Casamance, where many regional characteristics are similar to Mali, all Senegalese as well as Kenyan surveyed regions display a strong level of off-farm income—around 60%. Strong connections to cities due to higher densities and better infrastructure networks (Box 8) are part of the explanation. Nonetheless, the weight of off-farm activities does not necessarily imply a disconnection from agriculture: many of these activities are related to agriculture, notably trade of agricultural products and waged labor in agro-industries.

**Figure 10: Average share of on-farm and off-farm incomes per region**



Sources: RuralStruc Surveys

### Box 8: Urbanization, Transportation Networks, and Rural Livelihoods

The sub-Saharan African countries are broadly part of the WDR08's "agriculture-based world" (although Senegal, one of the very few exceptions, is classified as "transforming country"). However, the RuralStruc SSA countries illustrate very different economic dynamics. Levels of population and population densities, rates of urbanization and types of urban networks, and the quality and density of communication infrastructure all strongly impact the strength of market connections and, consequently, rural households' types of activities.

The following maps, where the surveyed zones are displayed, clearly show the size of remote areas and the regional imbalances in terms of market access. They also show how different countries are at different stages of urbanization and have divergent population patterns. While Mali and Madagascar display highly polarized situations where the transportation network shapes the overall pattern, Kenya and Senegal illustrate dramatic processes of densification.

- In Kenya, a country where urbanization is booming (the share of urban population jumped from 32 to 45% over the last ten years), rural people living in the central highlands, the central part of the Rift Valley, and the western regions can access cities of at least 50,000 inhabitants in less than two hours. Nakuru North, one of the surveyed regions, is very close from the city of Nakuru, which is the fourth largest city in the country (with an estimated 2010 population of 544,000) after Nairobi, Mombasa, and Kisumu. However, over the last 20 years the western part of the country has witnessed a spectacular process of progressive densification of its rural areas and the emergence of two conurbations. One, the "Western conurbation", north of Lake Victoria's Kendu Bay, is today home to around 3.9 million people and includes a network of 13 cities, the largest being Kisumu and Bungoma. The other is the "Nyanza-Kisii conurbation", south of Kendu Bay, and home to 2.1 million people and four main cities (Harre *et al.* 2010). The Bungoma survey zone is part of the rural areas of the Western conurbation, while the Nyando zone is between the two conurbations (east of Kendu Bay) and enjoys similarly high population densities.
- In Senegal, the historical trend of populating the western part of the country has accelerated since the mid-twentieth century with the development of the *Bassin arachidier* and its main cities (Thiès, Kaolack, Diourbel), which flourished with the groundnut industry. However, the last three decades have seen a progressive shift towards the coastal area. A majority of the Senegalese population is located within 100 km of the Atlantic coast and in less than two hours can reach either Dakar, Mbour, Thiès or St Louis. The contrast in densities with neighboring Mali is remarkable.

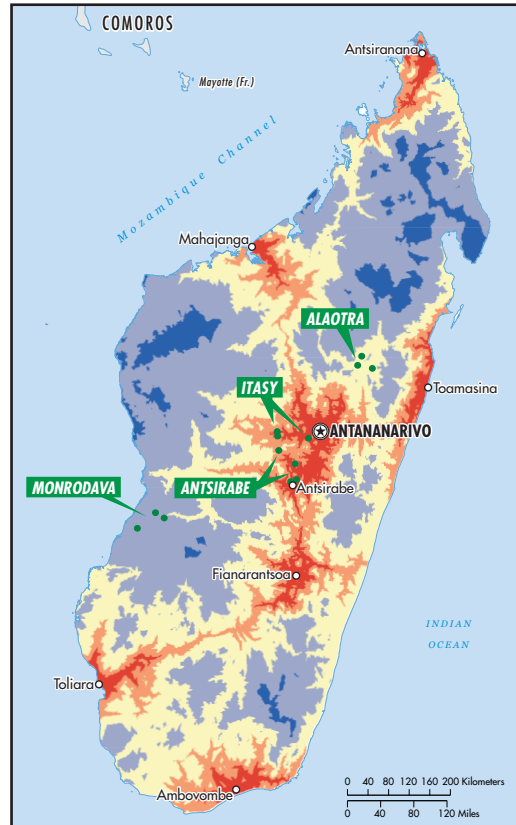
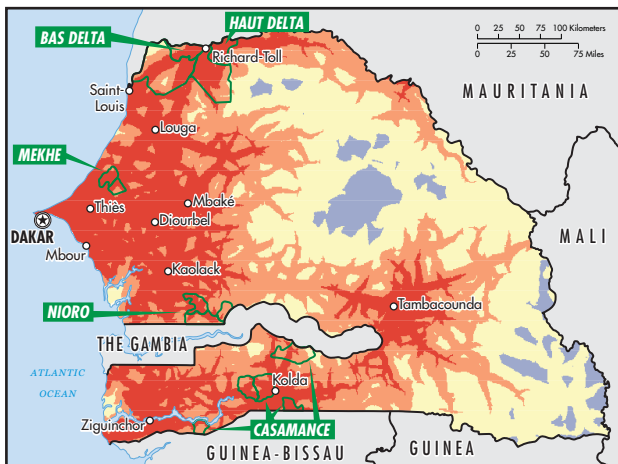
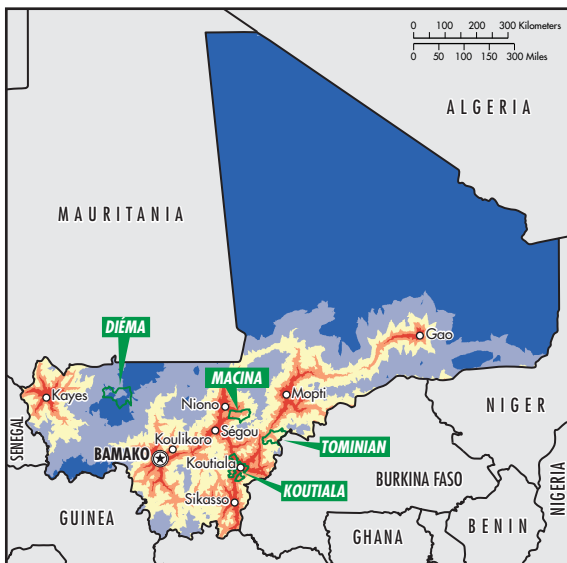
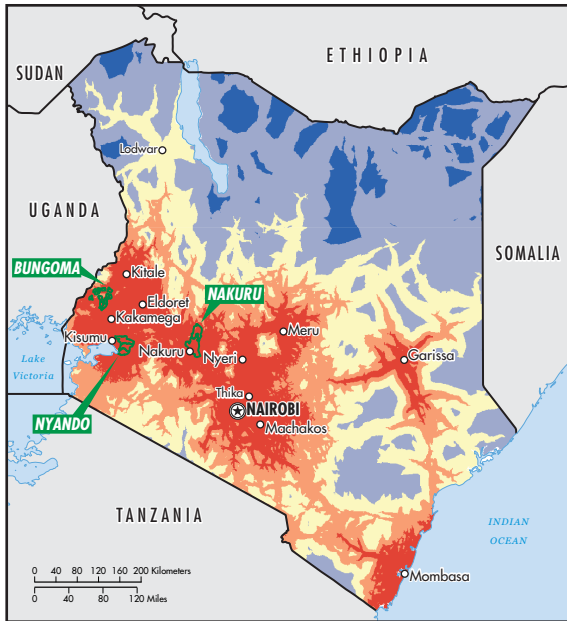
Nevertheless, these maps say nothing about the asymmetric distribution of a country's urban population among its cities. When using the primacy index (population of the largest city / population of the second city), Senegal and Mali reveal the extreme weight of their capital city. Although West African urbanization is becoming more dense in general, the persisting situation in these two countries weakens their urban structures. See the Africapolis study (Denis & Moriconi-Ebrard 2009) and the previous WALTPS work (Club du Sahel-OECD 1998).

#### Level of Urban Concentration in the RuralStruc Countries:

	Largest city	Second city	Primacy indices	Reference year
Kenya <sup>a</sup>	Nairobi	Mombassa	4.2	2010 <sup>e</sup>
Madagascar <sup>b</sup>	Antananarivo	Toamasina	7.8	2005
Mali <sup>a</sup>	Bamako	Sikasso	11.3	2010 <sup>e</sup>
Senegal <sup>a</sup>	Dakar	Thiès	10.5	2010 <sup>e</sup>
Morocco <sup>a</sup>	Casablanca	Rabat	1.9	2010 <sup>e</sup>
Nicaragua <sup>b</sup>	Managua	León	6.5	2005
Mexico <sup>b</sup>	Mexico	Guadalajara	4.9	2003

Sources: <sup>a</sup> e-Geopolis/Menapolis & Africapolis, <sup>b</sup> UnStats (<sup>e</sup> = estimates)

## Travel time to the Nearest City of 50,000 in the four SSA Countries



IBRD 38602  
JUNE 2011

TRAVEL TIME TO THE NEAREST CITY > 50,000 (in hours)

<2 2-4 4-8 8-16 >16

- HOUSEHOLD SURVEY ZONES
- CITIES > 50,000 PEOPLE
- ⊛ NATIONAL CAPITAL

Source: These maps are part of background knowledge products prepared for the Africa Infrastructure Country Diagnostics study published in Foster & Briceño (2010). See [www.infrastructureafrica.org](http://www.infrastructureafrica.org) for more detail. They were generated by Siobhan Murray.

*This map was produced by the Map Design Unit of The World Bank. The boundaries, colors, denominations and any other information shown on this map do not imply, on the part of The World Bank Group, any judgment on the legal status of any territory, or any endorsement or acceptance of such boundaries.*

## 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, the following section compares household results aggregated at the regional level with the objective of providing a general positioning of the sample with reference to existing baselines. It also discusses income differences within countries and between countries.<sup>78</sup> Due to the methodology adopted, the comparison is of course only indicative.

### 2.1 Average Incomes and Poverty Levels

#### 2.1.1 Overall Presentation

A first and very striking observation is the very low level of income in the surveyed regions, even if there is a notable distinction between SSA regions, where poverty is overwhelming, and non-SSA regions (see Figure 11 and Table 10).<sup>79</sup> Not surprisingly, due to the strong and well-known rural-urban divide in terms of welfare, the average income in these rural areas is clearly below the national GDP per capita: only the surveyed zones of Alaotra 2 (Madagascar) and El Cuá (Nicaragua) exceed this threshold.

The largest gap between observed household incomes and published national GDP per capita is recorded in Mexico—where average incomes in surveyed regions are four to seven times below the national average (\$12,780 PPP). The situation of Mexico is worth taking into consideration because the country is by far the most engaged in its structural transformation and can therefore inform discussion about the major characteristics of the process of change. The observed gap confirms the 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 national Gini indexes (*RS I Mexico*).<sup>80</sup> It highlights the difficulty of bringing about convergence between rural and urban incomes which is one of the most sensitive structural problems to be dealt with during the transformation process, as

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<sup>78</sup> 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.

<sup>79</sup> The estimated total income per household is an aggregate of monetary incomes and incomes in kind (self-consumption) valued at the market price (see Annex 1).

<sup>80</sup> This income gap is of course strengthened by the selection of the surveyed regions, as the southern part of the country is more broadly affected by rural poverty and characterized by smaller farm structures.



emphasized by fast transitioning countries like China today (see the structural gap discussion in Chapter 2). This gap also reveals a rural pattern exacerbated by the survey methodology but which has also a more generic dimension: focused on localities defined as rural according to the selected definition (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 (*RS II Mexico*, p.28). As discussed in Chapters 4 and 6, this actually complicates the task of capturing of an evolving rural reality where the “rural” is progressively dissolved within the “urban” through rural depopulation and urbanization.

**Table 10: Overall Annual Income in the Surveyed Regions**

		Ex Ante classification	#HH	Global Annual income per capita in \$ PPP						GINI
				Mean	Median	Min	Max	Perc 05	Perc 95	
<b>Mali</b>	Tominian	<i>losing</i>	155	196	155	29	2,229	50	405	0.37
	Diéma	<i>intermediary</i>	148	303	205	33	5,568	60	727	0.47
	Koutiala	<i>winning</i>	153	301	265	13	995	82	613	0.30
	Macina	<i>winning</i>	154	422	350	31	1,595	64	942	0.37
<b>Senegal</b>	Casamance	<i>losing</i>	239	360	263	1	3,059	33	1,022	0.47
	Mekhé 1	<i>intermediary</i>	111	436	323	23	2,442	55	1,166	0.44
	Nioro	<i>intermediary</i>	252	376	305	16	2,828	78	988	0.41
	Haut Delta	<i>winning</i>	61	443	268	26	2,238	78	1,106	0.47
	Mekhé 2	<i>intermediary</i>	113	641	511	38	2,996	125	1,578	0.39
	Bas Delta	<i>winning</i>	121	1,014	757	64	6,696	182	2,675	0.56
<b>Madagascar</b>	Antsirabe 2	<i>winning</i>	303	340	247	56	2,640	102	822	0.40
	Alaotra 1	<i>intermediary</i>	385	429	315	41	2,679	133	1,078	0.38
	Morondava	<i>losing</i>	506	493	384	39	2,440	132	1,255	0.38
	Itasy	<i>intermediary</i>	503	520	404	95	3,678	176	1,221	0.36
	Antsirabe 1	<i>winning</i>	206	626	440	65	6,272	130	1,456	0.43
	Alaotra 2	<i>intermediary</i>	115	1,181	788	125	7,521	180	3,309	0.53
<b>Kenya</b>	Bungoma	<i>intermediary</i>	299	527	341	5	4,484	30	1,629	0.48
	Nyando	<i>losing</i>	285	568	259	6	11,224	29	1,924	0.56
	Nakuru N.	<i>winning</i>	289	1,973	1,077	14	22,222	197	6,375	0.51
<b>Morocco</b>	Chaouia	<i>losing</i>	228	1,960	882	11	25,833	77	9,832	0.63
	Saïss	<i>intermediary</i>	261	2,941	1,242	9	73,849	81	10,144	0.67
	Souss	<i>winning</i>	240	3,583	1,493	20	54,054	106	12,497	0.66
<b>Nicaragua</b>	Muy Muy	<i>intermediary</i>	299	1,140	543	24	38,466	64	3,783	0.63
	Terrabona	<i>losing</i>	281	1,136	560	4	20,616	71	3,663	0.60
	La Libertad	<i>losing</i>	288	2,038	895	12	106,712	75	3,179	0.60
	El Viejo	<i>winning</i>	290	1,908	1,006	7	50,864	132	5,919	0.68
	El Cuà	<i>winning</i>	300	2,835	1,166	27	32,946	179	11,246	0.65
<b>Mexico</b>	Sierra SM.	<i>intermediary</i>	175	1,571	1,162	264	15,922	391	4,049	0.41
	Tierras B.	<i>intermediary</i>	145	2,728	2,024	216	16,907	548	8,225	0.41
	Tequis.	<i>winning</i>	364	2,486	1,888	50	21,808	470	6,575	0.39
			7,269							

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>81</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 North is a notable exception and has an estimated average income comparable with the other non-SSA countries (Figure 11).

The gap of average income *per capita* between the poorest and the richest zones, highlighted when focusing on the income differences between regions, is an indicator of regional differentiation. The smallest gap is found in Morocco with a ratio of only 1.8, and the highest is in Madagascar and Kenya (3.5).<sup>82</sup> A first look at income distributions shows strong inequalities—a common feature of most agrarian systems—evidenced by the very high incomes of the richest 5% households, which are a clear reminder of the shortcomings of average values.<sup>83</sup> When using the median income *per capita*, the patterns seen within and between the surveyed regions are clearly modified. Though the ordinal ranking of regions from poorest to richest remains unchanged, profiles are more compact, particularly in Morocco and Nicaragua (Figure 12).

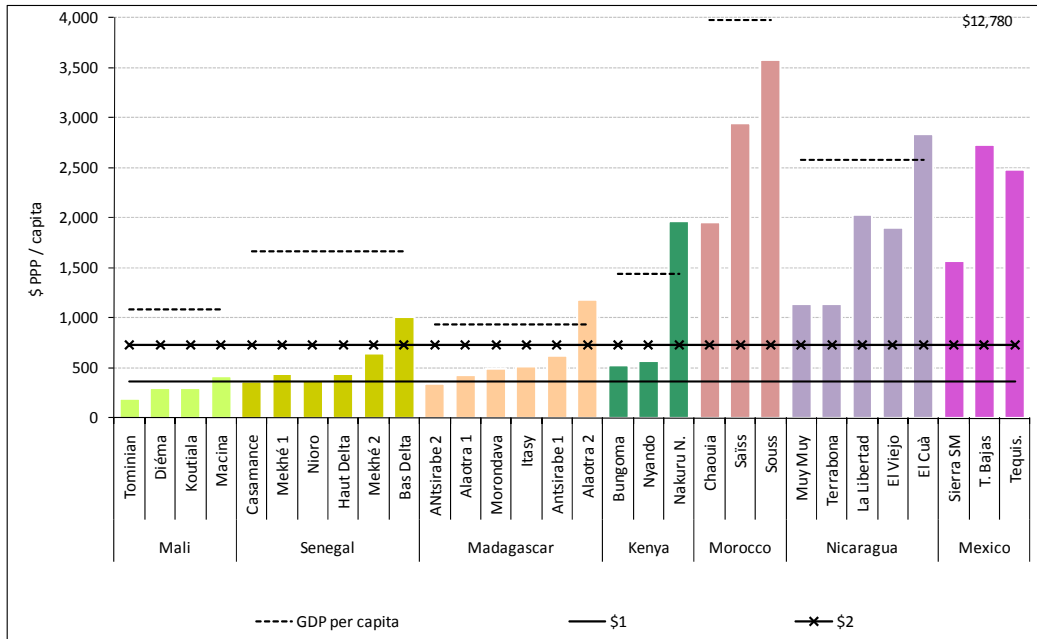
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<sup>81</sup> Annex 4 shows the domestic poverty lines for each country. However, the national definition of poverty, often influenced by political considerations, and the large variety of threshold types do not facilitate the overall discussion. It 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).

<sup>82</sup> The figure recorded in Morocco is striking, because the relative homogeneity among regions is in stark contrast with the huge heterogeneity within regions, among the highest of the seven countries, as expressed by the Gini indices. The presence of some high-income households, whose earnings come mostly from rents (housing), obviously impacts the sample's means and explains this pattern of apparent homogeneity which is undermined by the income distribution (*RS II Morocco*, p.151). The intra-regional heterogeneity also results from the definition of the surveyed regions—particularly in Saïss and Souss—and from the choice of grouping plain and mountain localities. In Souss, the identification of a sub-region for Taliouine in the mountain area could have been an option.

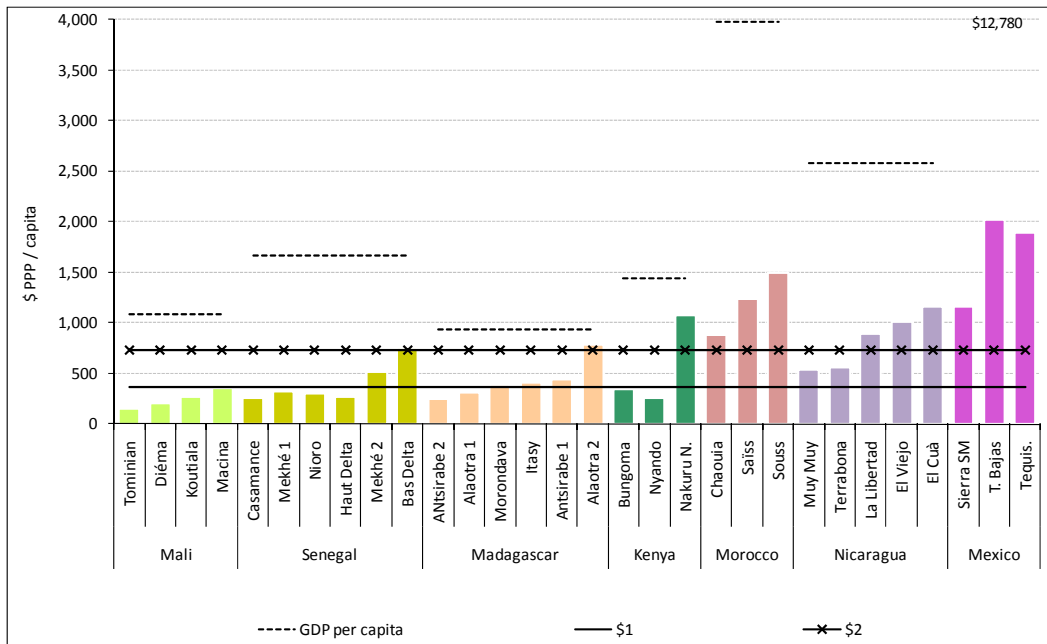
<sup>83</sup> More broadly, and perhaps unsurprisingly, Gini indices tend also to be higher in the richest surveyed regions in every country, with the exception of Mali where the richest region—Macina—is internally equal, which reflects the homogeneity of land assets and production techniques in the irrigation scheme of *Office du Niger* where surveys were conducted.

**Figure 11: Average Annual Income per Capita in the Surveyed Regions (\$ PPP)**



Sources: RuralStruc Surveys for the household incomes, WDI database for GDP data

**Figure 12: Median Annual Income per Capita in the Surveyed Regions (\$ PPP)**



Sources: RuralStruc Surveys for the household incomes, WDI database for GDP data

It is worth noticing that, in spite of the limitations of the survey sample, the differences in income levels and income distributions between rural areas of the seven countries say something about structural transformation: in SSA, at the initial stages of economic transition, the overwhelming rural majority is poor and inequality is limited (with Gini indices between 0.35 and 0.45). In Morocco and Nicaragua, which are moving quickly in the transition, average rural incomes are notably higher but with a strong inequality (Ginis between 0.6 and 0.7). This translates into wide differences between average and median incomes. Mexico, which is the most advanced in the process of structural transformation, displays the highest median rural incomes of the sample for two of the surveyed zones and lower Ginis (0.4).<sup>84</sup> In this country, as reminded above, the inequality question has been displaced: it is now a rural vs. urban issue and the marginalization of the countryside—*el campo*—has become a critical political concern.<sup>85</sup>

A final remark about SSA is related to the apparent disconnect between household income results as shown in Figure 11, and the distance to markets results, illustrated by the travel time maps displayed above. Income results do not seem to reflect proximity to markets, but they do seem to be correlated with a region's share of on-farm income as shown in Figure 10. On one side, Mali and Madagascar are characterized by strong regional heterogeneity of access to markets and by the importance of their on-farm income shares. On the other, Senegal and Kenya exhibit easier market access, as well as more involvement in off-farm activities (which can account for up 40% of earnings). Yet in all four countries, rural areas are equally poor. The three (relative) exceptions to this poverty among the 19 surveyed regions are Nakuru North in Kenya, Bas Delta in Senegal, and one Alaotra sub-region in Madagascar. Nakuru and Bas Delta do not have a better access to cities than the other surveyed regions (Bungoma and Nyando and the *Bassin arachidier*, respectively). This observation is a clear reminder of an obvious fact: time to urban markets is not the silver bullet, and the characteristics of urbanization count (economic diversification, public goods, existing services, levels of urban income—see further discussion in chapter 4).

### 2.1.2 *Characterization and "Classification" 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

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<sup>84</sup> This evolution has similarities with the debated Kuznets' curve, which has been contradicted by new evidence (see Bourguignon & Morrisson 1998, Deininger & Squire 1998). However, the discussion focuses here on rural areas only and not on overall country results and this evolution in inequality sheds light on the process of rural transformation (see Chapter 6).

<sup>85</sup> Inequalities, rural poverty, and growing discontent about the consequences of NAFTA led to a strong social movement initiated by rural producers' organizations in 2002 named *¡El campo no aguanta mas!* (the countryside can't stand it anymore!). See Sánchez Albarrán (2007), Puricelli (2010).

the selection of the regional country cases? If we consider average household income aggregated at the regional level to be a good proxy for regional characteristics in term of rural wealth, and thus for rural dynamism, the survey results reflect well the *ex ante* estimate (see Table 10). However, there are some slight differences in terms of ranking (clearly reduced if medians are used) and a few challenging results.<sup>86</sup>

In Mali, Koutiala, at the center of the cotton zone, was chosen as a winning region. It was supposed to illustrate the success of the cotton “white revolution” in the savannah region. The disappointing income results reveal a crisis in the sector which affects all aspects of regional dynamism. The long-standing unfavorable international cotton price, coupled with uncertainties resulting from delayed reforms has resulted in a progressive reduction in cultivated area and led to a decrease in farm incomes. Large family sizes and migrations to the cotton zone from other parts of Mali (initially motivated by the high returns on cotton) explain growing tensions on resources. Thus, the situation of Koutiala illustrates the famous “paradox of Sikasso”, named after the other major cotton growing area of Mali, which expresses the contradiction between the “success story” of the cotton sector and the relatively low level of income per person in the cotton region (see Box 9).

Even if regions’ income levels are generally consistent with their *ex-ante* classifications, it is worth mentioning the specific situation of the Senegalese regions, the design of which was fine-tuned during the analysis and led to the identification of sub-regions (see Chapter 1). The main remark is the weakness of regional variations. Casamance is indeed the poorest of the surveyed regions, but due to a deep crisis in the groundnut sector the *Bassin arachidier*—which was the historical linchpin of the Senegalese economy—is no longer any better-off. Mekhé 2 was, however, somewhat able to obtain better economic returns through crop diversification (cassava) and off-farm activities (handicraft). Similarly the Haut Delta, in spite of its contract-production of tomatoes, is similar to the other lagging regions and is much poorer than the Bas Delta.

In Kenya, Nyando and Bungoma were chosen to illustrate different situations. Bungoma, the intermediate region, endowed with better natural resources, and engaged in more diversified agricultural activities, particularly coffee production, was supposed to have been better-off. But the estimated incomes in both regions are similarly sobering and do not differ significantly. They both show a high involvement in sugar cane production characterized by low returns, and a reliance on self-consumption. On the contrary Nakuru North, 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 benefiting from a dense and well-connected local urban network, the region is

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<sup>86</sup> The only country where the *ex-ante* classification is fully respected is Morocco.

engaged in maize as well as high value products, notably in the dairy and horticulture industries. There are also many off-farm opportunities in the city of Nakuru, boosted by its strategic positioning on the Mombasa – Nairobi – Uganda corridor. Another specific characteristic of Nakuru North is its low dependency ratio (half of the two other regions), which reveals higher productive capacities per household and consequently higher earnings possibilities (see next section).

The Antsirabe region in Madagascar is a highly diversified agricultural region (rice and temperate cereals, horticulture, dairy), that is well connected to markets and benefits from good infrastructure: Antsirabe, the third largest city in the country at around 200,000 dwellers, is only 150 km from the capital, Antananarivo, with which it is connected with a paved road in good condition. It had originally been selected—without doubt—to illustrate a winning region. However, severe natural constraints (bad weather conditions and phyto-sanitary problems, i.e. potato disease) strongly affected yields and, consequently, farm incomes during the surveyed crop season. Additionally, the regional analysis showed that the region was quite heterogeneous, with remote areas facing marketing difficulties and therefore turning more towards self-consumption activities that brought lower economic returns. This led to the program’s decision to distinguish between the two sub-regions.

In Nicaragua, the surprise comes from the two areas mainly dedicated to livestock production—Muy Muy and La Libertad—which were supposed to illustrate very different situations. 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 than expected, 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 a specific opportunity to produce and sell farm-processed cheese.

Lastly, in Mexico, the aggregated results for the Sotavento region are, as expected, lower than for Tequisquiapan. Nevertheless, and surprisingly, the average income of the Tierras Bajas sub-region is higher than that of Tequisquiapan, the winning region, and proves that the returns from intensive maize production can be significant, and prove more lucrative than a full specialization in off-farm activities (see below and Box 19).

### **Box 9: The Paradox of Sikasso... and Koutiala**

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. It 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 zones. 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.*

### 2.1.3 *Distribution of Rural Incomes*

A closer look at 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 13 and Figure 14).

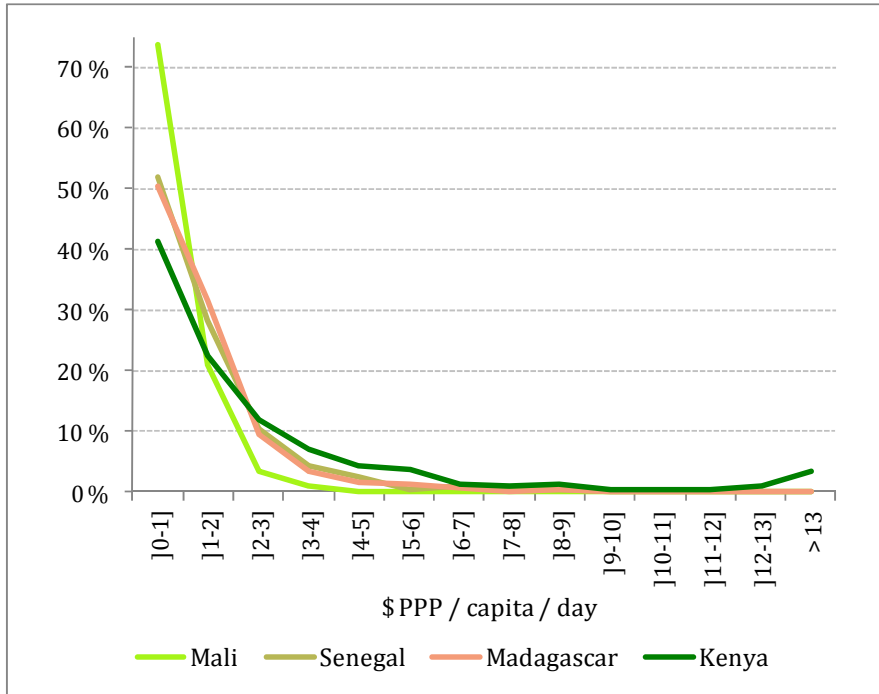
In the sample, the reach of absolute poverty (\$1/day/person) ranges from 3% of the population in the Mexican surveyed regions to 74% in the Malian regions. In the SSA surveyed regions, 90 to 95% of the households are captured within the first three classes (Kenya being slightly better-off and Mali clearly worse-off). 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 non-SSA countries, incomes per person per day upwards of \$13 are relatively common (between 5 and 15% of the sample).

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 15 and Figure 16). 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. A major surprise comes from the poorest regions of Morocco and Nicaragua, which are just as poor as the regions surveyed in Madagascar. With the exception of Mexico, the first quintile always accounts for less than \$1 a day.

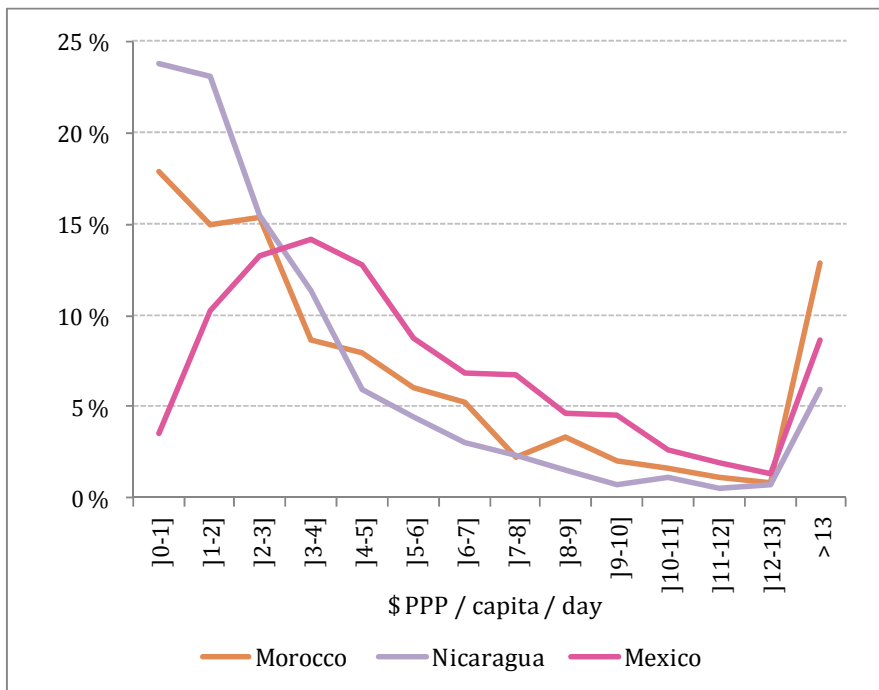


**Figure 13: Distribution of Households by Income Classes in SSA Surveyed Countries**



Source: RuralStruc Surveys

**Figure 14: Distribution of Households by Income Classes in non-SSA Surveyed Countries**



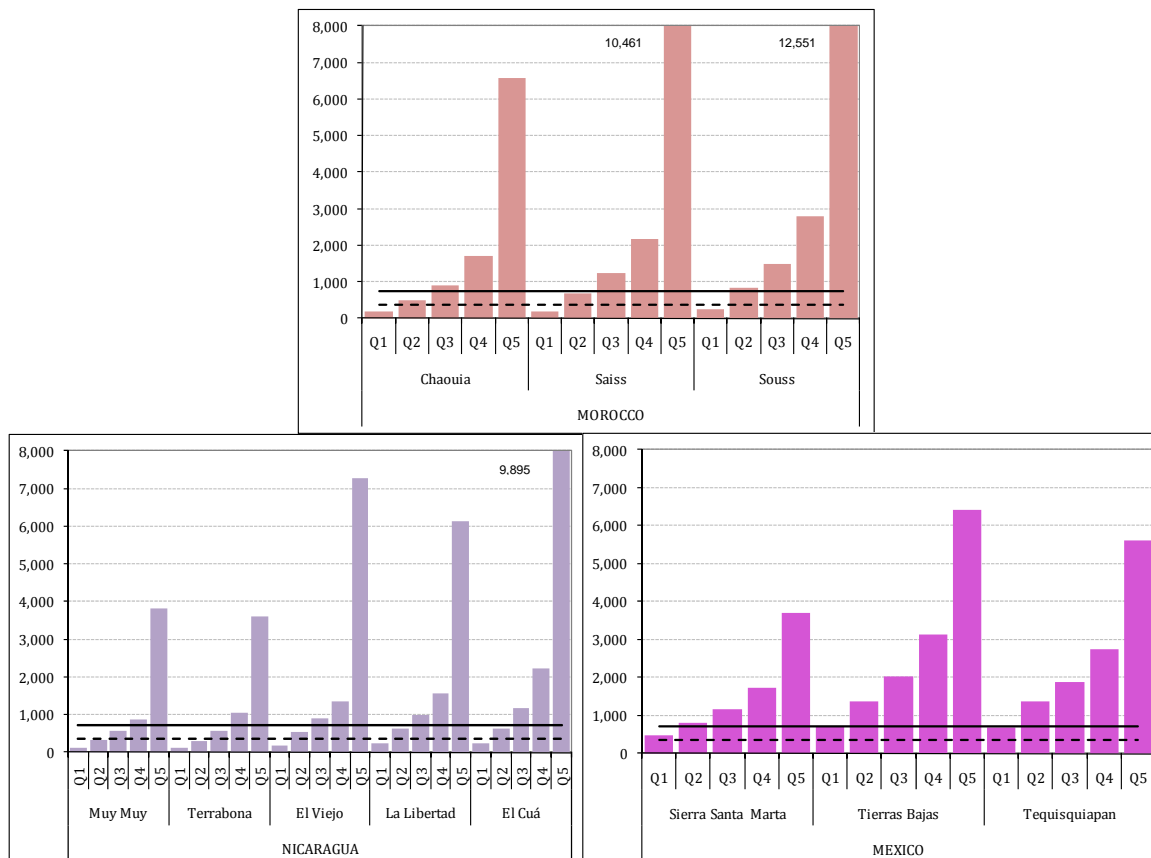
Source: RuralStruc Surveys

**Figure 15: Incomes per Household Quintiles by SSA Surveyed Regions (\$ PPP, per capita)**



Sources: RuralStruc Surveys.  
 \$1 PPP poverty line (---); \$2 PPP poverty line (—)

**Figure 16: Incomes per Household Quintiles by non-SSA Surveyed Regions (\$ PPP, per capita)**



Source: RuralStruc Surveys.

\$1 PPP poverty line (---); \$2 PPP poverty line (—)

More broadly, two common features can be noted from the quintile distributions:

- 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 differs from region to region, yet the income distribution of the richest quintile clearly indicates the same kind of phenomenon in many regions: the average of the fifth quintile is pulled up 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 translated in higher agricultural output, etc.). This feature is illustrated by the descriptive statistics of Q5 in Annex 4.

## 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 higher income households. Nevertheless, it corresponds to the structural reality of the main part of the surveyed household for which food expenditures and self-consumption are essential.

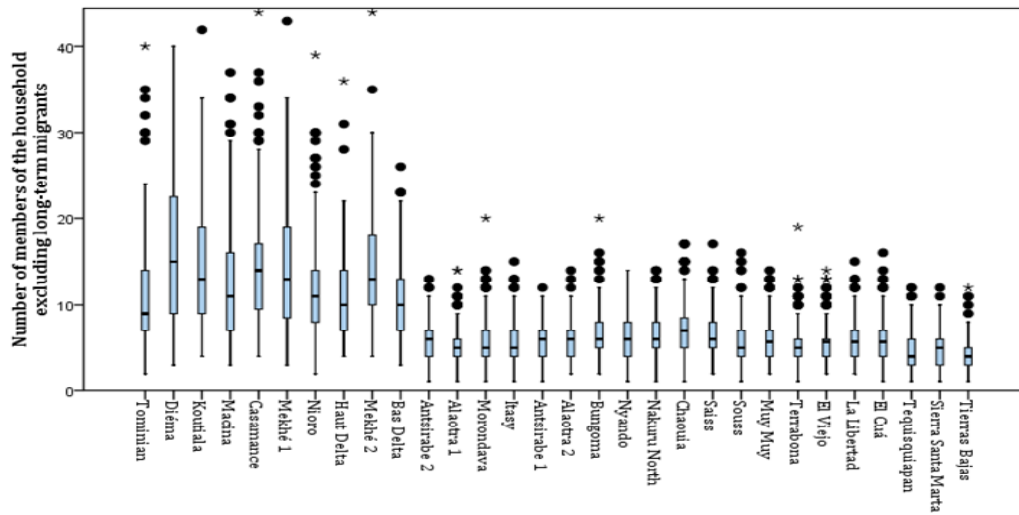
Differences in household structures depend, of course, on demographic dynamics and are exacerbated by social structures and cultural patterns in a given country. Thus, as shown in Figure 17, there are major differences mainly between West African countries, characterized by large households, and the 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>87</sup>

These variations in size and structure translate into different dependency ratios, which directly impact both the production capacity (number of economically active household members / inactive members), the consumption pattern and, *in fine*, the available income in EqA. As seen in Table 11, the higher dependency ratios found in the SSA countries confirm the weight of young people and illustrate the unachieved demographic transition of the continent (see Chapter 2).

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<sup>87</sup> 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.

Figure 17: Size of Households (Number of Person Present)<sup>88</sup>



Source: RuralStruc Surveys

On average, for the surveyed households, the ratio is around 1.1 to 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>89</sup> The non-SSA countries are far ahead in the transition process and should reveal lower ratios: this is the case in Morocco and in two Mexican regions, but Nicaragua as well as Sotavento's Sierra de Santa Marta appear specific.<sup>90</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%.

<sup>88</sup> Figure 17 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.

<sup>89</sup> The mean dependency ratio observed in Nakuru North is consistent with other panel data, which show ratios of 0.60 (*RS II Kenya*, p.79), and acknowledged by national statistics. Among the possible explanations, one can note the demographic characteristics of the city of Nakuru North, 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.

<sup>90</sup> 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 11: Household Structure and Income per Adult Equivalent**

		Household size		Dependency ratio	Total 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

### 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 12, the results are surprising. The “poor farmer” is a common characterization in rural areas of developing countries, and one could have expected a noteworthy income advantage for the households entirely engaged in rural non-farm activities. However, this is not the case. In the six regions where more than 10% of the surveyed households are without a farm, farm households’ income is on average double that of households without a farm (with the exception of Tequisquiapan where the difference is lower).

The situation is easily understandable in Madagascar where, as previously mentioned, families without land access in Alaotra are worse-off and mainly rely on low-paying agricultural wages. The case of the Sierra de Santa Marta in the Mexico is comparable: non-farm households have very few opportunities to sustain their

livelihoods in this somewhat remote area. But the situations of Souss (Morocco), Tierras Bajas and Tequisquiapan (Mexico) are more paradoxical because higher returns from non-farm activities could have been expected. This surprising result from the survey tempers the common view about vibrant rural non-farm activities. It will be explored further in Chapter 4).<sup>91</sup>

**Table 12: 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
	Saiss	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
	T. 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
		<b>6749</b>				<b>520</b>			

Source: RuralStruc Surveys

<sup>91</sup> In Nicaragua, although the share of households without a farm is notably smaller, the results reveal a rather specific situation where the comparison between farm and non-farm households displays opposite results depending on the type of ratio (mean or median). The median incomes of non-farm households are higher than those of farm households, but the average income for farm households is higher than for non-farm households. This indicates that the results are distorted by a small number of specialized and better-endowed farmers.

### 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%).<sup>92</sup>

These differences have multiple explanations, specifically related to diverse ways that different cultures handle certain life incidents (death, divorce) and to diverse migration patterns. In nuclear families, as in Nicaragua and Mexico (and to a lower extent 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.

When a female heads a household, household sizes are logically smaller in nuclear family contexts. The variation of the average income between male and female-headed households is however less important than one might have expected: in a range of 10% lower, with a few exceptions (Macina, El Viejo, and Nyando again). On the contrary, it is worth noting the specific case of Tequisquiapan and of the 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 reality of migrations (cf. Annex 1), these 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, leaving their spouse in charge of the household).

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<sup>92</sup> 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.



**Table 13: Share, Size and Annual Income of Female Headed Households**

		Female Headed HH		HH size in EqA		\$PPP per EqA	
		n	%	Male HH	Female HH	Male HH	Female HH
Mali	Tominian	0	0.0	9.3	-	235	-
	Diéma	0	0.0	15.3	-	368	-
	Koutiala	1	0.7	12.1	4.4	367	495
	Macina	2	1.3	10.6	6.2	520	203
Senegal	Casamance	7	2.9	11.9	9.2	441	365
	Mekhé 1	3	2.7	12.4	6.3	519	799
	Nioro	13	5.2	9.6	7.7	473	698
	Haut Delta	5	8.2	10.5	5.8	499	794
	Mekhé 2	1	0.9	12.5	4.4	772	399
	Bas Delta	6	5.0	9.1	7.0	1,207	1,163
Madagascar	Antsirabe 2	25	8.3	4.9	3.6	409	406
	Alaotra 1	82	21.3	4.6	3.6	516	471
	Morondava	82	16.2	4.8	3.2	601	574
	Itasy	54	10.7	4.7	3.1	616	670
	Antsirabe 1	14	6.8	4.9	2.3	736	852
	Alaotra 2	11	9.6	5.3	3.6	1,362	1,188
Kenya	Bungoma	33	11.0	5.7	4.7	628	745
	Nyando	87	30.5	5.8	4.6	818	300
	Nakuru N.	48	16.6	5.9	4.4	2,255	2,272
Morocco	Chaouia	11	4.8	6.2	4.1	2,299	1,922
	Saiss	1	0.4	5.8	3.0	3,426	1,587
	Souss	4	1.7	5.1	3.8	4,175	1,521
Nicaragua	Muy Muy	35	11.7	4.8	4.3	1,472	1,000
	Terrabona	41	14.6	4.5	4.3	1,467	1,406
	El Viejo	65	22.6	4.4	4.9	2,891	1,491
	La Libertad	30	10.3	4.8	4.7	2,342	2,216
	El Cuá	42	14.0	4.9	4.7	3,670	3,241
Mexico	Sierra SM.	24	13.7	4.1	2.8	1,776	2,621
	T. Bajas	13	9.0	3.8	2.7	3,187	2,712
	Tequis.	50	13.7	4.1	2.8	2,820	3,247

Source: RuralStruc Surveys

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

The breakdown of income results into household quintiles conducted previously illustrated the unbearable situation of households in the first quintile in every surveyed region outside of Mexico. Their situations improve slightly when using EqA (an increase of between 15 and 30% at the regional samples level—see Table 11) but remain 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 quintile 1 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 regions. To do so, household incomes in EqA were transformed into kilocalories by using the local cost of households' main food staple. Incomes in Kcal per EqA per day were then compared with the average individual's daily food needs, estimated by the World Health Organization (WHO) at 2,450 Kcal per adult person per day.<sup>93</sup>

The cost of the kilocalorie varies strongly from one country to the next, and between regions within the same country (Table 14): from \$0.10 PPP to \$0.49 PPP for 1,000 Kcal of corn in Mexico and in Nyando, Kenya, respectively. The cost of a kilocalorie depends, of course, on the type of cereal cultivated in the region and on the overall environment of the value chains. Mali's dry cereals (millet, sorghum, maize), mostly consumed in rain-fed areas, are notably less expensive than rice (\$0.11 PPP vs. \$0.19 for 1,000 Kcal). But rice costs in Senegal, are less than in other countries (\$0.15 PPP) with little regional variation. These low costs can be explained by strong market competition between imported broken rice and local rice. Similarly, Mexico's least expensive kilocalorie results from government support to production of large commercial farmers (through credit mechanisms and technical assistance for the acquisition and use of technical packages) -helping them to resist the strong competition from imported corn and leading to relatively good overall productivity at the national level- and from the permanent pressure of cheap imports from the USA.

Table 14 provides a new vision of the dire reality of the first quintile households and helps to better understand how poor rural households can try to adapt to such low overall income levels in PPP.<sup>94</sup>

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<sup>93</sup> The adopted methodology and conversion table are presented in Annex 1.

<sup>94</sup> It also presents new income gaps between regions. Using Tominian, the poorest region of the RuralStruc sample as a baseline (index 100), the income conversion into kilocalories modifies the scale between the richest and poorest regions. When excluding the Mexican zones -where the kilocalorie cost is very specific- the largest gap is divided by nearly two when looked at in Kcal (2.8 to 1 instead of 4.4 to 1).

**Table 14: First Quintile Total Income in \$ PPP and Kcal**

		Price of 1000 Kcal in \$PPP	Q1 Total Income per EqA per Day				Kcal Available / Daily Needs	Main Consumed Staples
			in \$PPP		in Kcal			
			Mean	Index	Mean	Index		
Mali	Tominian	0.12	0.21	100	1,730	100	0.7	Millet Sorghum Maize Rice
	Diéma	0.12	0.26	123	2,132	123	0.9	
	Koutiala	0.11	0.39	188	3,557	206	1.5	
	Macina	0.19	0.36	171	1,870	108	0.8	
Senegal	Casamance	0.15	0.18	86	1,197	69	0.5	Rice
	Mekhé 1	0.16	0.25	120	1,556	90	0.6	
	Nioro	0.15	0.34	164	2,268	131	0.9	
	Haut Delta	0.16	0.30	144	1,863	108	0.8	
	Mekhé 2	0.15	0.56	271	3,755	217	1.5	
	Bas Delta	0.15	0.72	349	4,825	279	2.0	
Madagascar	Antsirabe 2	0.23	0.38	183	1,647	95	0.7	Rice
	Alaotra 1	0.21	0.49	235	2,319	134	0.9	
	Morondava	0.20	0.53	253	2,626	152	1.1	
	Itasy	0.25	0.64	309	2,564	148	1.0	
	Antsirabe 1	0.23	0.57	274	2,471	143	1.0	
	Alaotra 2	0.21	0.64	308	3,041	176	1.2	
Kenya	Bungoma	0.44	0.20	98	462	27	0.2	Maize
	Nyando	0.49	0.16	78	329	19	0.1	
	Nakuru N.	0.34	0.92	441	2,693	156	1.1	
Morocco	Chaouia	0.18	0.58	281	3,241	187	1.3	Wheat
	Saïss	0.16	0.61	296	3,841	222	1.6	
	Souss	0.21	0.77	372	3,679	213	1.5	
Nicaragua	Muy Muy	0.18	0.36	176	2,026	117	0.8	Maize
	Terrabona	0.20	0.40	194	2,013	116	0.8	
	El Viejo	0.20	0.64	311	3,222	186	1.3	
	La Libertad	0.19	0.79	382	4,174	241	1.7	
	El Cuá	0.18	0.88	426	4,912	284	2.0	
Mexico	Sierra SM.	0.10	1.49	720	14,942	864	6.1	Maize
	T. Bajas	0.10	2.25	1,086	22,549	1,304	9.2	
	Tequis.	0.10	2.18	1,050	21,795	1,260	8.9	

Source: RuralStruc Surveys

14 out of the 27 surveyed zones where the daily Q1 income is below the \$1 PPP poverty line (i.e. all countries except Mexico) would theoretically be able to satisfy their very basic food needs. In the 13 other zones the situation of the poorest is most critical and confirms a strong food insecurity. All the poorest regions in every SSA surveyed country are characterized by a very high household vulnerability. The case of Bungoma and Nyando in Kenya is particularly awful and exacerbated by the high cost of maize in Western Kenya. It is also worth noting the situation of two regions in Nicaragua (Muy Muy and Terrabona). When moving back to the full sample (Table 15), 11 out of 19 SSA surveyed zones have 10% or more of their households which are unable to reach the 2,450 Kcal threshold and among them three exceed 20% (Casamance, Antsirabe 2, and Nyando).

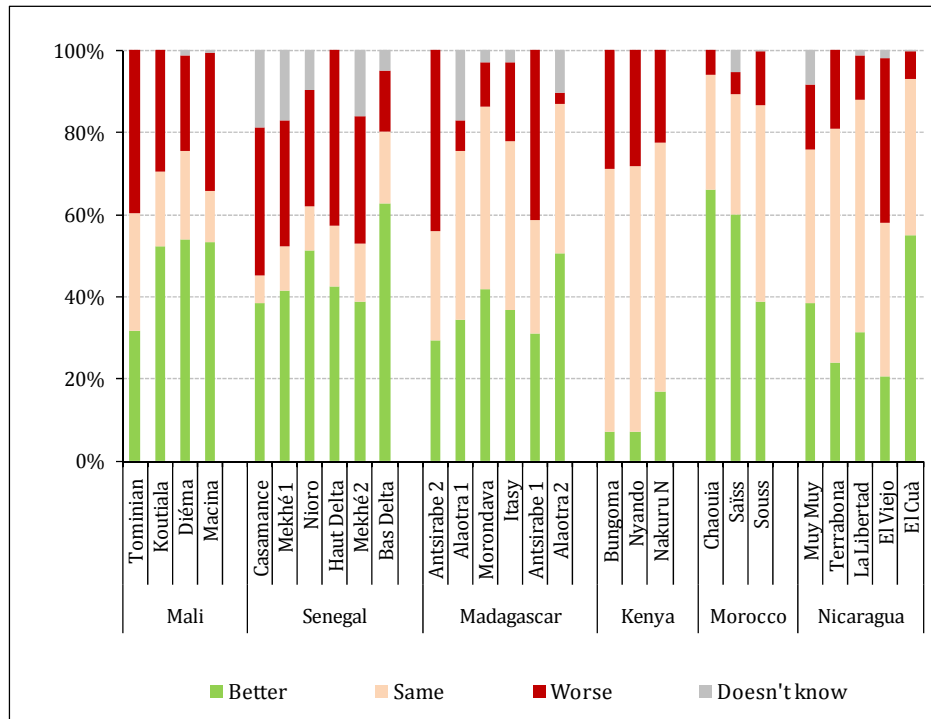
**Table 15: Household Income Distribution Expressed in Kilocalories (%)**

		Classes of Total Income in Kcal per EqA per day		
		<= 2450	2451 - 4900	>= 4900
Mali	Tominian	19	41	40
	Diéma	12	24	64
	Koutiala	5	10	86
	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
	Saïss	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	0	0	100
	T Bajas	0	0	100
	Tequis.	1	1	98

Source: RuralStruc Surveys

In conclusion, the kilocalorie approach usefully complements the comparison on a monetary basis. It helps to better understand the apparent non-viability of low-income households and also confirms the dire reality of poorest households. Food insecurity persists and is a major fact in several regions. This is confirmed by the heads of households' own perceptions as to their own food security situation: 23 to 40% of households in Mali, 15 to 43% in Senegal, and over 40% in some regions in Madagascar (Antsirabe) and in 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 18). This perception may have been exacerbated by the start of the food price crisis during the surveyed year (end of 2007 - early 2008) and has possibly worsened in the following months. It nevertheless corroborates the harsh reality of many rural households in numerous surveyed regions.

**Figure 18: Households' Perception of Evolution of their Food Security**



Source: RuralStruc Surveys  
Results for Mexico are unavailable

### 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 (see Chapter 1), 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>95</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>96</sup> Table 16 and its companion figure (Figure 19) display 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.

Secondly, as previously mentioned, 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 orientation barely weights more than 30%, the exceptions being Mekhé

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<sup>95</sup> 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.

<sup>96</sup> The threshold for each group is 75% of the total income: farm-oriented household 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.

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 migrations.<sup>97</sup> Few households are migration-oriented: only Diéma in Mali, Chaouïa and Souss in Morocco, and Muy Muy and Terrabona in Nicaragua reach a significant 7-8%.

Thirdly, 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 84% 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 (see Table 16). This 15% change strongly modifies the overall 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’s importance is reduced by threefold or more (Antsirabe 1, Alaotra 2, Chaouia, Muy Muy, Tequisquiapan). The diversified category remains dominant only in the two Sotavento zones; and the transfer of households mainly benefits the farm-oriented group (in Mali and Madagascar) and the labor-oriented group (Kenya and Senegal). The labor orientation of Tequisquiapan’s households is strongly increased (86%).

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, 2001 and 1993 respectively)—significant differences emerge, notably in Nicaragua (see Table 16), where the share of labor-oriented households according to RIGA is 48%, instead of a maximum of 30% found in the RuralStruc 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: Box 3.2, p.76).

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<sup>97</sup> See Chapter 4 on the difficulties of capturing remittances.

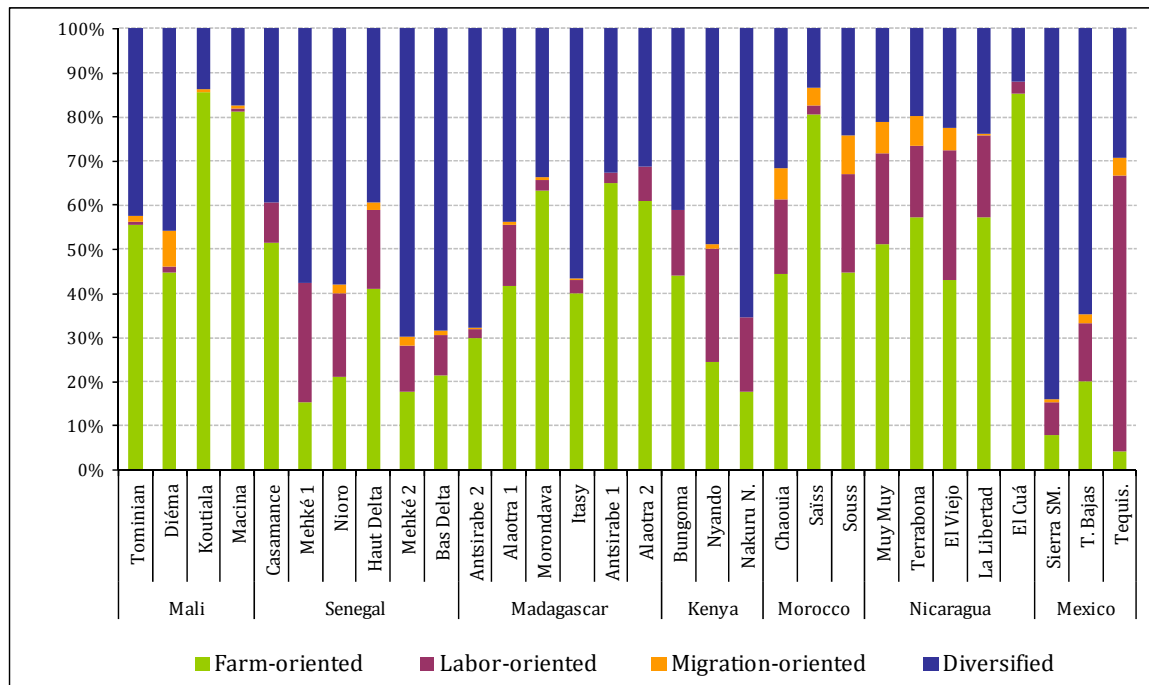
**Table 16: Livelihood Strategies in the Surveyed Regions (WDR08's Typology in %)**

		N	Typology WDR08 - Threshold 75%				Typology WDR08 - Threshold 60%			
			Farm-oriented	Labor-oriented	Migration-oriented	Diversified	Farm-oriented	Labor-oriented	Migration-oriented	Diversified
Mali	Tominian	155	55.5	0.6	1.3	42.6	72.3	1.9	4.5	21.3
	Diéma	148	44.6	1.4	8.1	45.9	60.1	2.7	14.2	23.0
	Koutiala	153	85.6	0.0	0.7	13.7	92.8	1.3	0.7	5.2
	Macina	154	81.2	0.6	0.6	17.5	88.3	2.6	0.6	8.4
Senegal	Casamance	239	51.5	9.2	0.0	39.3	63.6	16.3	1.7	18.4
	Mekhe 1	111	15.3	27.0	0.0	57.7	25.2	46.8	3.6	24.3
	Nioro	252	21.0	19.0	2.0	57.9	33.3	37.7	2.8	26.2
	Haut Delta	61	41.0	18.0	1.6	39.3	52.5	26.2	3.3	18.0
	Mekhe 2	113	17.7	10.6	1.8	69.9	31.0	37.2	2.7	29.2
	Bas Delta	121	21.5	9.1	0.8	68.6	36.4	37.2	2.5	24.0
Madagascar	Antsirabe 2	303	29.7	2.3	0.3	67.7	61.4	11.6	0.3	26.7
	Alaotra 1	385	41.8	13.8	0.5	43.9	55.3	26.2	1.3	17.1
	Morondava	506	63.2	2.6	0.6	33.6	79.6	6.7	0.8	12.8
	Itasy	503	40.2	3.0	0.4	56.5	59.2	14.5	1.2	25.0
	Antsirabe 1	206	65.0	2.4	0.0	32.5	82.0	6.3	0.0	11.7
	Alaotra 2	115	60.9	7.8	0.0	31.3	67.0	19.1	3.5	10.4
Kenya	Bungoma	299	44.1	14.7	0.0	41.1	52.8	30.8	0.0	16.4
	Nyando	285	24.6	25.6	1.1	48.8	33.7	43.9	1.8	20.7
	Nakuru N.	289	17.6	17.0	0.0	65.4	29.8	46.0	0.3	23.9
Morocco	Chaouia	228	44.3	17.1	7.0	31.6	52.6	25.4	11.0	11.0
	Saïss	261	80.5	2.3	3.8	13.4	84.3	3.8	5.4	6.5
	Souss	240	44.6	22.5	8.8	24.2	50.0	28.8	10.4	10.8
Nicaragua	Muy Muy	299	51.2	20.7	7.0	21.1	55.5	28.8	8.7	7.0
	Terrabona	281	57.3	16.0	6.8	19.9	61.6	21.7	8.5	8.2
	El Viejo	288	43.1	29.5	4.9	22.6	45.1	37.8	5.9	11.1
	La Libertad	290	57.2	18.6	0.3	23.8	63.4	26.2	1.0	9.3
	El Cuá	300	85.3	2.7	0.0	12.0	90.3	4.7	0.0	5.0
Mexico	Sierra SM.	175	8.0	7.4	0.6	84.0	14.3	34.9	1.7	49.1
	T. Bajas	145	20.0	13.1	2.1	64.8	32.4	22.1	4.1	41.4
	Tequis.	364	4.1	62.6	3.8	29.4	5.2	86.3	5.2	3.3
		7269								
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.



**Figure 19: Livelihood Strategies in the Surveyed Regions (WDR08's Typology)**



Source: RuralStruc Surveys. Breakdown with the 75% threshold.

### 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 households and the more limited role of alternative strategies based on off-farm activities or migrations. It also serves as a reminder that the alternative options to farming are quite restricted and illustrates the limitations of existing local opportunities, which do not necessarily appear when discussing data aggregated at the national level.

As reminded by the WDR08, what is more difficult to ascertain is the effectiveness of these livelihood strategies as exit options out of poverty. The lack of dynamic data, the high heterogeneity among households, and the small number of households per type of strategy at the regional level prevent any discussion of income levels per livelihood strategy.<sup>98</sup>

<sup>98</sup> "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 leads to two large groupings of households: one is strongly specialized in on-farm activities and the other is more diversified, without any significant specialization in one of the off-farm activities. But, in fact, little is known 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.

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

Unsurprisingly, in the regions surveyed as part of the RuralStruc Program farming activities are extremely prevalent. However, each region is also home to a large amount of off-farm economic activity. This observation raises two questions. First, what are the characteristics of these rural off-farm activities? Second, what determines the extent and progression of their development? These inquiries serve as starting points for a discussion of the second hypothesis (H2) of the RuralStruc Program, concerning the adaptation of rural households to challenges presented by their changing environment. Are these processes of adaptation new and have they led to a reshaping of rural areas? Or are they similar to historical paths of structural transformation? And, above all, do they contribute to the improvement of rural livelihoods? In other words, is the much praised rural-non-farm economy (RNFE) the best answer for dealing with recurring rural poverty?

The results obtained from the surveys provide a rather nuanced picture of the changes currently underway. They depict very different types of diversification, which are strongly related to the opportunities presented by every regional situation. After a first section which briefly reviews the existing literature on the question of diversification, the chapter addresses the different types of off-farm activities in which RuralStruc households engage—wage labor (agricultural and non-agricultural), self-employment, transfers, and rents.

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

#### **1.1 A Brief Overview of Rural Diversification and its Related Debate**

An important research trend has highlighted the observation that rural households in developing countries increasingly derive their incomes from non-agricultural activities and transfers. One of the most up to date reviews of this literature is provided by Haggblade *et al.* (2007) who describe the multi-faceted characteristics of the rural-non farm economy. Haggblade (2007) stresses that the long-standing debate on RNFE covers four perspectives which are all rooted in development economics. The RNFE can be considered alternatively through the lens of agricultural growth linkages, for its contribution to employment, for its role in regional development, and for its essential contribution to household income strategies. This last is the lens adopted by the RuralStruc Program.

This increasing rural diversification at the household level results from both positive and negative changes, or “pull” and “push” factors. On the pull side a major driver is the growth of new employment opportunities that derive from improved

connections between rural areas, markets and cities; a consequence of overall economic development and of improvements in transportation and communication infrastructure as a whole (e.g. cell phones and associated new services like cash transfer systems). But diversification also stems, on the push side, from more difficult farming conditions. These can be related to demographic growth, which can lead to growing pressures on natural resources (smaller landholdings and/or over-used and degraded land), and result in decreasing agricultural incomes. They also stem from the many changes in institutional and economic environments related to liberalization policies and globalization that have occurred since the 1980s. If new market opportunities have developed from these changes, the end of price regulation, the removal of subsidies (particularly for inputs), and the withdrawal of public-funded technical support have also confronted farm households with a more instable and often more difficult environment. These difficulties are exacerbated in remote areas where market imperfections are more numerous (missing markets, high transaction costs) and provision of public goods is even more insufficient.

Facing all these changes, along with the growing costs of many services (particularly education and health in sub-Saharan Africa), many rural households have to deal with an increasing need for cash and more stable incomes. Under intense financial stress, they engage in risk management or “coping strategies”<sup>99</sup> where they seek additional incomes outside of agriculture. As summarized by Barrett & 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*” (2000, p.1-2).

The importance of rural diversification is a strongly debated issue. The widely differing results present in the literature arise from significant differences in the definition of activities, the objective of the study (e.g. income versus employment estimates), and the type of data used (second or first hand and type of collection methods). They also illustrate the huge heterogeneity of income structures between countries, among regions within countries, and between households of the same region, as well as the scarcity of information on rural incomes. At the end, compiling very diverse sources into common aggregated data sets is a common feature of the literature on the RNFE (see Chapter 1).

Based on many existing references, Haggblade *et al.* (2010) point out that non-farm activities account for about 30% of full-time rural employment in Asia and Latin America, 20% in West Asia and North Africa, and only 10 % in Sub-Saharan Africa. However when referring to income data, which include revenues from seasonal and

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<sup>99</sup> Ellis (1998) reminds the common confusion between risk strategies and coping behavior. Risk management is an *ex-ante* strategy to anticipate failures, while coping is the *ex-post* response to a crisis. Ellis points out however that coping can be more than *ex-post* behavior and corresponds to the emergence of new livelihood patterns resulting from distress and crisis reasons.

part-time activities, the estimated figures are significantly higher: 50% for Asia and Latin America, and 35% for Africa. They all suggest that the “old” vision of rural economies purely focused on agriculture no longer fully reflects reality.<sup>100</sup>

## 1.2 How to Classify Rural Activities and Incomes

The discussion of the diversification of livelihoods is difficult because of a lack of agreement on the definition of different types of activities and incomes. It is also complicated by the existing parallel debates on the RNFE which are not necessarily related to the household point of view. Thus, it remains necessary to clarify the picture.

Barrett & Reardon (2000) provide a breakdown of the different types of economic activities in which a rural household can be engaged by using a three-way classification. It distinguishes the sector (primary, secondary, tertiary), the function (self- or wage employment), and the location (local or elsewhere) of each activity. Referring to this classification, the common definition of the RNFE includes all activities other than agricultural activities (i.e. all secondary, tertiary, and non-agriculture primary activities for whatever location and function).

In order to fine-tune the discussion, it is however useful to review the different activities of rural households. 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 and livestock productions, and agricultural wages) make up “agricultural activities”, while the last three (non-agricultural wages, non-agricultural 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 wages and self employment) are “non-farm activities”. Agricultural wage labor (category iii) is always considered an “off-farm” activity, but that term can be misleading. Sometimes it is used exclusively to apply to agricultural wage labor, and other times it is used to refer to all activities that are not conducted on a household’s farm (activities iii through vi).

Transfers are a separate category because they are not an income generating activity but an income source, transferred from household members living elsewhere (typically remittances) or from other households (donations), or from public or nongovernmental bodies (typically subsidies or social grants). The

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<sup>100</sup> For additional sources than the ones already mentioned and for discussion see, among others: for a general approach Barrett & Swallow (2005), Ellis (2000, 2004), Wiggins & Davis (2003); for regional issues, Reardon *et al.* (2001) on Latin America, Barrett *et al.* (2001) and Bryceson (1999, 2002) on Africa.

Program also considered the specific case of rents, which are an income different from transfers generally generated by rental revenues (from physical assets) or securities.

Considering the above, the RuralStruc Program made choices in terms of income classification. The program's taxonomy takes the perspective of the household, rather than of the activity, because its purpose and objectives are to facilitate the identification of patterns that express the complex livelihood strategies adopted by rural households. Consequently, the analysis of the "off-farm" group includes all activities conducted and incomes generated away from the family farm, regardless of the sector or function. This includes agricultural wage employment plus all other non-agricultural activities and incomes. The "off-farm" group is larger than the RNFE by the amount of agricultural wage-labor.<sup>101</sup>

Thus, on-farm income includes: crop and livestock production, on-farm processing of products,<sup>102</sup> and earnings from hunting, fishing and gathering of natural resources.<sup>103</sup> Off-farm income corresponds to: wage employment (agricultural and non-agricultural), self-employment, public and private transfers, and rents (Figure 20).

There is wide range of household strategies corresponding to many possible combinations of these activities and incomes. As previously mentioned, off-farm diversification does not mean the complete abandonment of crop and livestock production. The exact blend of activities in a particular household depends on existing assets and returns, and on the opportunities presented by the economic environment in terms of investment options and risk. Labor and capital can be reallocated locally to other activities –when alternatives exist– or to other places when factor displacement is the only option.

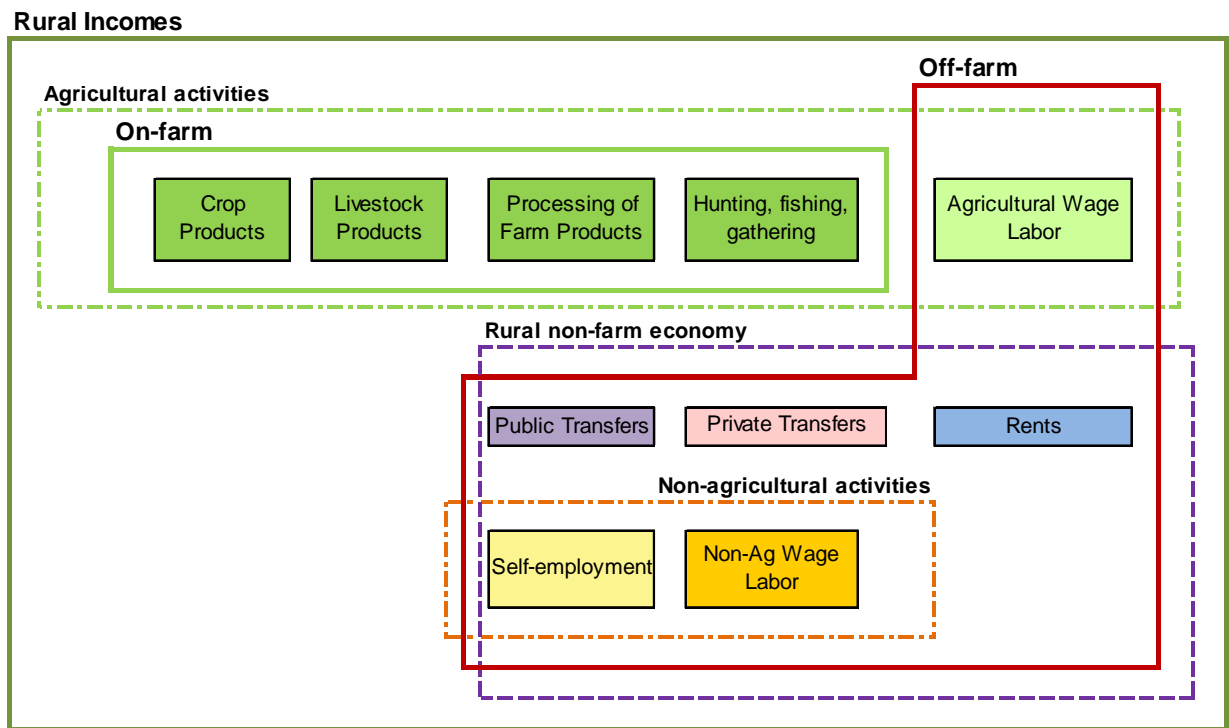
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<sup>101</sup> This is the definition of "off-farm" adopted, among others, by Barrett & Reardon (2000), Winters *et al.* (2001), Davis *et al.* (2007), and Haggblade *et al.* (2010).

<sup>102</sup> Many authors include agro-processing as a whole in rural non-farm activities (see Haggblade *et al.* 2010). This is very debatable and the Program considers that the on-farm processing of raw products should be included in on-farm activities as in most cases it directly contributes 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 or self-employment.

<sup>103</sup> Occasional hunting, fishing and gathering are not agricultural activities *per se* but, as common rural practices based on the utilization of natural resources, they can be included in the on-farm income.

Figure 20: Classification of Activities and Incomes of Rural Households



Source: Authors

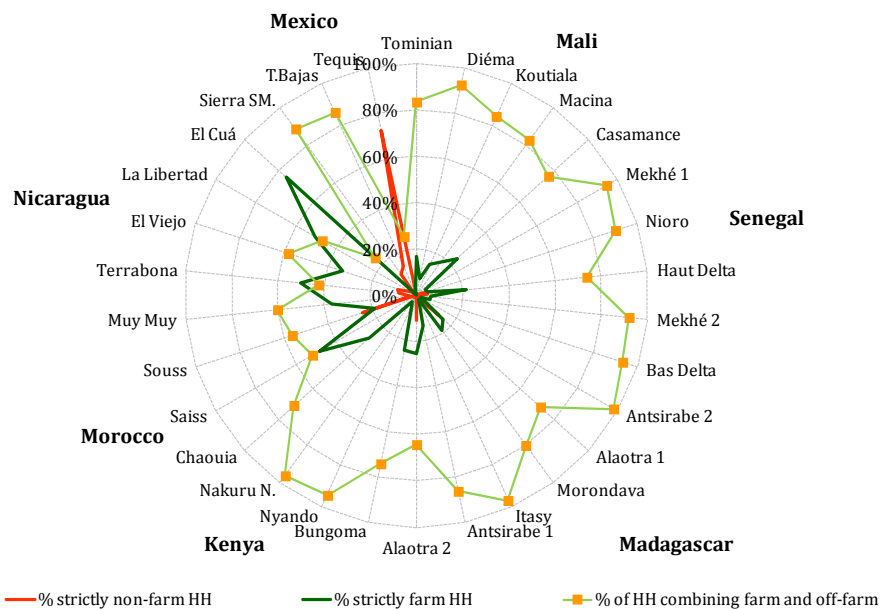
## 2. The Reality of the Off-farm Economy in the Surveyed Regions

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

#### 2.1.1 Widespread Development but Low Returns

While agriculture remains the backbone of rural livelihoods in most of the surveyed regions (as shown in Chapter 3), off-farm activities exist everywhere and provide a substantial complement to on-farm income or—in some cases—progressively replace it. Figure 21 displays the participation rates of surveyed rural households in off-farm activities, distinguishing strictly farm households (with no off-farm activities and incomes), farm households combining both types of incomes (on- and off-farm), and non-farm households (i.e., without a farm and therefore with no on-farm income).

**Figure 21: Participation in Off-farm Activities in the Surveyed Regions (% of Households)**



Source: RuralStruc Surveys

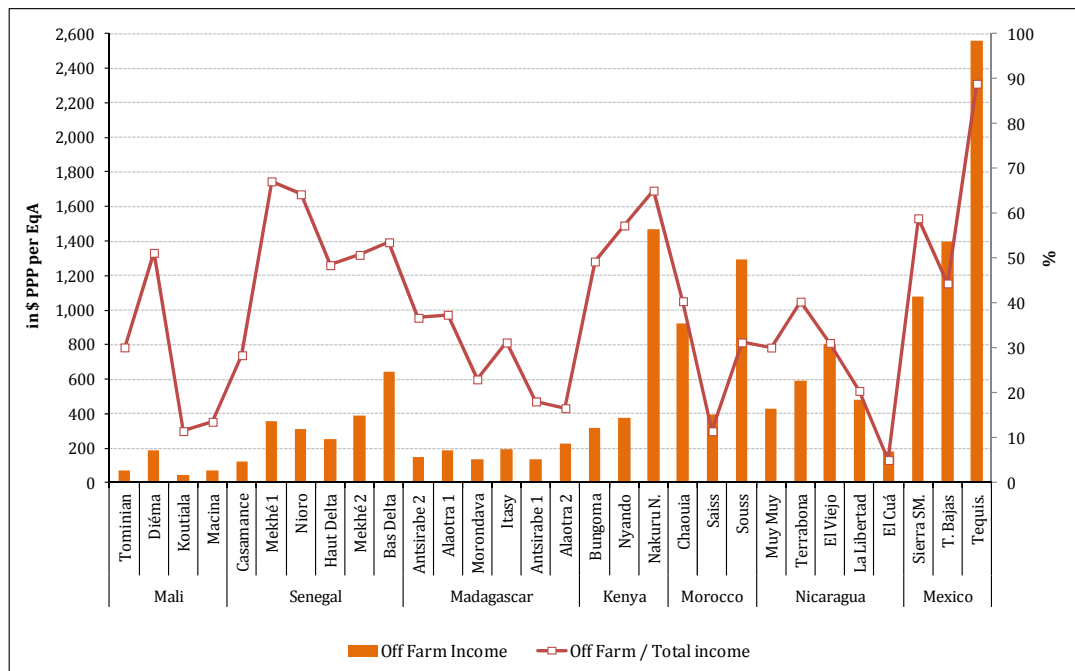
In the sub-Saharan African regions, the level of participation of rural households – which are all farm households with a very few exceptions- in off-farm activities is extremely high (between 80 and 95%) and, contrary to what one may have thought, higher than the levels observed in the non-SSA regions where patterns of on-farm specialization are observed. Specialization is particularly evident in Morocco and in Nicaragua, where a significant share of households rely exclusively on farming activities (notably 50% in Saïss and Terrabona, 75% in El Cuá). The three Mexican



regions are more specific. In Tequisquiapan, many households are no longer engaged in farming at all, while the Sotavento zones are still highly diversified.

When translated into earnings, off-farm activities' contribution to overall household incomes strongly varies by region, as shown in Figure 22. Contrary to the results presented by Reardon et al. (2007), a work which compiled 40 studies in Africa and Latin America, the differences between SSA and non-SSA regions are less important than the differences observed within each group of countries, and SSA regions do not appear to be less diversified than non-SSA ones.

**Figure 22: Average Regional Value and Share of Off-farm Income in the Surveyed Regions**



Sources: RuralStruc Surveys

The paradox clearly highlighted by this chart is obviously the gap between the value of off-farm income and its contribution to the overall household income. In the non-SSA regions, the value and the share follow the same trend, while in the SSA regions, with the exception of Nakuru North, Kenya, very low earnings from off-farm activities contribute a large share of total household income. This major fact, which is particularly illustrated by Senegal, recalls the high level of poverty discussed in Chapter 3 and draws attention to the limited value of available diversification strategies, a topic which will be explored further.

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, Madagascar, or Casamance in Senegal that number dips below \$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 and illustrative of more

dynamic regions. Note that this dynamism cannot be simply read as “proximity to a city.” Other regions in Kenya and Senegal show that a connection to a city is not enough to foster good returns from diversification (for example, Nyando in Kenya is quite close to Kisumu, a city larger than Nakuru - see maps in Chapter 3). In non-SSA countries, with the exception of the agricultural-based regions, the value of off-farm incomes is higher (from \$600 to \$1,600 PPP per EqA). Tequisquiapan (\$2,600 PPP), where 70% of households do not engage in on-farm activities at all, is confirmed as a specific case. It illustrates the situation of wealthier regions where the role of agriculture has significantly diminished, but where the overall welfare of rural households is not necessarily better than in regions that are more focused on agriculture (see Chapter 3).

### 2.1.2 *Heterogeneity of Off-farm Sources*

An important result is the significant dissimilarity between surveyed regions which appears strongly when the off-farm income is further broken down into its different sources. The breakdown reveals diverse situations and strategies, and highlights the opportunities and constraints of the local environment, which shape economic alternatives.

Table 17 displays the distribution of the surveyed households according to their main off-farm activities and that activity’s contribution to overall off-farm income. At the regional level, two major trends can be identified both in terms of types and combinations of off-farm incomes.

The first trend is related to regional wealth levels: the diversity of off-farm incomes rises in richer regions. Households in non-SSA regions engage in a broader variety of off-farm activities. Their main off-farm income sources are more balanced, and the three largest sources generally contribute 75 to 80% of overall off-farm income, (with a few exceptions). In SSA regions, however, the primary activity most often contributes the major share of off-farm income, with the three main sources frequently accounting for 90 to 95% of the total.

The other major trend is the importance of self-employment in SSA regions, and the decreasing importance of this activity in richer regions. Self-employment is the top off-farm activity in 15 of 19 SSA regions, but in only 1 of 11 non-SSA regions (in 2 if the specific case of rents in Morocco is left aside – see section 2.3). In most Western African regions a combination of self-employment and migration dominates off-farm strategies, while in Kenya and Madagascar self-employment pairs with respectively non-agricultural and agricultural-wage labor.

**Table 17: Main Off-farm Activities and Incomes in terms of Contribution to the Overall Off-farm Income (% of average off-farm income)**

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

Source: RuralStruc Surveys

## 2.2 Characteristics of Off-farm Activities

As a way of further exploring the diversification options available to households, this section and the next will review the scope and importance of each category of off-farm income. While there is not enough evidence to draw conclusions about the absolute level of effectiveness of each type of activity as a pathway out of poverty, comparisons can be made between diversification patterns observed in different regions and intermediary conclusions can be drawn about the extent of opportunities for diversification out of agriculture.

The discussion will be centered upon the level of development of each activity (the share of households involved) and the returns that households earn from them (earnings per EAP).<sup>104</sup> A caveat must be made about returns, however. The survey was not sufficiently detailed to identify the specific economic activity of each

<sup>104</sup> Annex 4 displays these results by surveyed region.

economically active person (EAP) in the household. Consequently, for a given household, the total amount of earnings from each activity was divided by the total number of EAPs. This approach likely understates the returns to each activity, and consequently the indicator must be regarded as a proxy.<sup>105</sup>

### 2.2.1 *Agricultural Wage Employment: a Common Activity but Rarely an Exit Option*

#### a. Agricultural Wage Labor and Farm Structures

In developing countries, due to the high share of agriculture in employment, agricultural wage labor is a common feature and a well-developed option for rural households seeking additional income. The development of wage employment in agriculture, however, varies sharply according to local labor demand, which clearly depends on the degree of differentiation among farm structures. The existence of larger farms, which are unable to meet all of their own labor needs, is generally a prerequisite for the availability of agricultural wage employment. Further, the cultivation of certain labor-intensive products for which full mechanization is not an option (typically horticulture and tree crops) can also be a strong driver of labor demand.<sup>106</sup>

In the regions studied by RuralStruc, particularly those in SSA, but also in the surveyed 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, one where this relationship influences 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 members of the household, who are not directly paid for their work. Family farms can also however make use of an external workforce when they are unable to meet all of their labor needs inside the family, for instance in peak period of the activities. External labor can consist both of locally-formed mutual-aid groups (relatives and other members of the community who work on a reciprocity basis without any monetary compensation) and paid-workers, who can be either casual laborers or permanent agricultural employees.<sup>107</sup>

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<sup>105</sup> The program chose to use this proxy rather than confine the analysis of off-farm activities to the household level because it allows for differences in the number of EAPs per household to be taken into account.

<sup>106</sup> On agricultural wage labor related to horticulture, see McCulloch & Ota (2002) on Kenya, Maertens & Swinnen (2007) on Senegal.

<sup>107</sup> Agricultural wages can be fully paid in cash and also partly or fully in kind (e.g. a quantity of product for the staples, and/or meals, housing on the farm for the permanent employees). Agricultural workers are often casual laborers, which makes it complicated to estimate annual values of agricultural wages.

Labor demand rises with the emergence of larger family farms or with the development of managerial and/or large-scale entrepreneurial farms which rely mostly on an external workforce. This type of farm differentiation is generally limited in sub-Saharan African countries where the majority of farms are small-scale units with few assets. It is more prevalent in other regions.

The RuralStruc sample shows different levels of farm differentiation. Farm sizes<sup>108</sup> are bigger in the two Latin American countries, mainly in Nicaragua where the average farm operates on 15 to 20 Ha of land.<sup>109</sup> SSA countries show smaller acreages, particularly Kenya and Madagascar where means are around 1 Ha. Some surveyed regions of the Highlands in Madagascar are home to even smaller farms, a consequence of growing populations cultivating a limited amount of arable land (and also of the hilly landscape).<sup>110</sup> The case of the two West African countries is more specific. There, larger family farms have developed, but family structures are also bigger (as discussed in Chapter 3) and tend to include several households on the same farm.<sup>111</sup> This is why Figure 23 displays the distribution of plot sizes in the sample by “hectare per family worker (EAP).” Figures on average regional farm sizes would be misleading. Extremes are notably important in Nicaragua where land inequalities are high. In La Libertad for instance, a remote livestock region located in the agricultural frontier, 20% of the richest households own large-scale *latifundia* which account for 53% of the total land in the region. In El Viejo, a region located in the Pacific plains, known for unequal land distribution and land conflicts as well as for being heavily engaged in the production of export crops such as sesame and sugar cane, 6% of the surveyed households are landless. A similar situation exists in Alaotra, in Madagascar, where 10% of surveyed households are without land access.<sup>112</sup> They are mainly families who migrated in the region to benefit from agricultural labor opportunities. In Morocco, land access can also be an issue, especially in regions where vast acreages of government agricultural development

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<sup>108</sup> The variable here is “land used”, i.e. the farm area used by the household, whether owned or not, for crops and breeding, including fallow land (see Annex 4).

<sup>109</sup> Farm structures in Mexico reflect the impact of the agrarian reform even if strong disparities subsist at the national level. The surveyed regions are however characterized by small to medium farms. The average size of the surveyed farms in the Sotavento region is around 10 Ha in the lowlands and 6 Ha in the mountain, while in Tequisquiapan size is smaller (2 Ha) and co-exist with several agribusinesses which hire *jornaleros* (laborers).

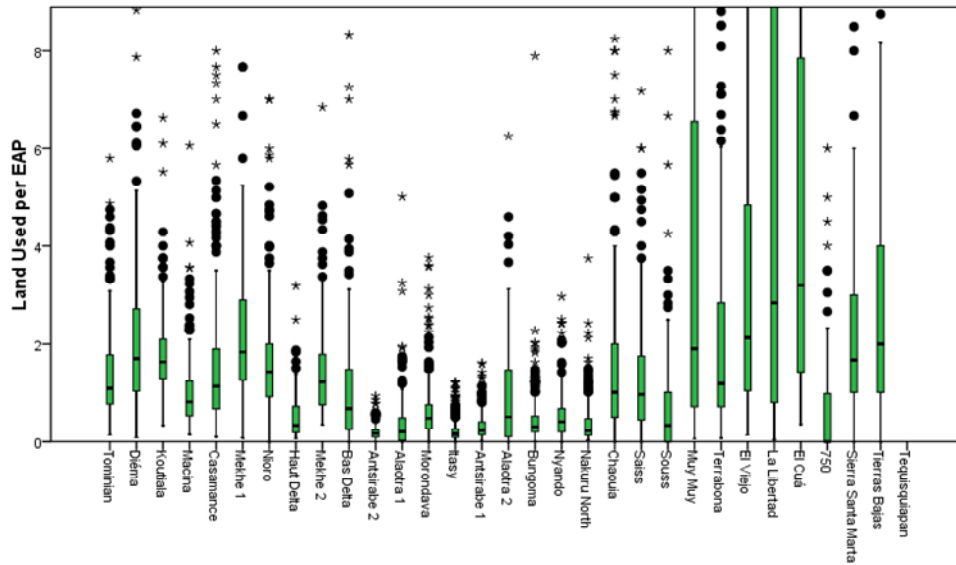
<sup>110</sup> In Madagascar, between the last two censuses (1985 and 2005), the national average size of farms dropped from 1.2 Ha to 0.86 Ha (*RS I Madagascar*).

<sup>111</sup> The number of active people (EAP) per household is between 6 and 9 persons in average in the surveyed regions of Mali and Senegal, which corresponds to twofold or threefold the situation of other regions (see Annex 4).

<sup>112</sup> In addition to Alaotra and El Viejo, already mentioned, the other surveyed regions with significant landless households are the following: Tequisquiapan (19%), Souss (10%), and Sotavento (7%). In the survey, landless households were defined as households engaged in agriculture through agricultural wage employment, but without any access to farm land, no matter the type of tenure.

schemes exist. These very differentiated situations are not common in SSA where land access is mainly based on customary land tenure rights.

**Figure 23: Distribution of Farm Size per Family Worker (EAP)**



Sources: RuralStruc Surveys

It should be noted, however, that whatever the farm structure, some demand for farm labor always exists, at least during the peak season (generally harvest, but also transplanting in the case of irrigated rice).<sup>113</sup> The major constraint, when farm differentiation is limited, is that labor supply appears for all at the same period of the year, during the dry season, when labor demand is scarce, while labor shortages are frequent at harvest time. It explains the development of mutual-aid groups and stimulates, when possible, short-term migrations from other regions with different cropping seasons or different levels of available labor. Such is the case of migrations from the *Bassin Arachidier* to the Senegal River Delta in Senegal, and of similar migrations in Morocco for the wheat harvest, and in El Cuá, Nicaragua, for the coffee harvest. More broadly this situation of cyclical imbalances between labor supply and labor demand highlights the importance of structural under-employment which is characteristic of many rural areas in developing countries.

<sup>113</sup> Peaks of labor occur for all major regional productions: in the rice-growing regions of Madagascar (Alaotra, Itasy), Mali (Macina), and Senegal (Bas Delta); for horticulture in Madagascar (Itasy and Antsirabe) and Morocco (Souss and Saïss); for pineapple in the Tierras Bajas of Sotavento in Mexico (where maize is on the contrary strongly mechanized); for cotton in Koutiala (Mali); for coffee in El Cuá (Nicaragua); and for sugar cane in El Viejo (Nicaragua), Nyando and Bungoma (Kenya).

## b. Extent and Characteristics of Agricultural Wage Labor

Thus, in the surveyed regions, agricultural-wage labor is a relatively common feature. A quarter of the interviewed households earn agricultural wages, and in the more fully differentiated regions of Mexico and Nicaragua almost 40% of them do so. Malagasy households, many of whom are landless poor, also are more heavily engaged in agricultural wage labor (46% of households).

It is worth mentioning however a bias related to the survey methodology. The focus on households prevents a full capture of the importance of agricultural wage labor: wages earned in agriculture by household's members during short-term migrations in other regions are posted in the transfer category, and wages locally paid to migrants have to be counted on the migrant household's side. It probably underestimates the local weight of agricultural wages.

Behind these overall figures, two major facts have to be stressed. The first, perhaps unsurprising, observation is that wage work in agriculture mainly engages the poorest households in each region, and its frequency decreases as overall income rises.<sup>114</sup> This inverse relationship between agricultural wage employment and overall household wealth is clearly illustrated by the share of agricultural wages in income per quintile.<sup>115</sup> Agricultural wages account for between 20 and 30% of overall income for households in the bottom two quintiles, and then its weight decreases sharply, the exception being Nicaragua where the shares remain high till quintile 4 (in Muy Muy, El Viejo, La Libertad).<sup>116</sup>

Agricultural wage work is a major source of income for the poorest households of the first quintiles, notably in the regions where landless households exist.<sup>117</sup> In some extreme cases, households rent their land to larger and better-off farmers or agribusinesses, employing themselves as agricultural workers as they lack the

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<sup>114</sup> There is a negative correlation between the share of agricultural wages in the overall household income and the level of total income. The result is slightly negative for the overall sample (Pearson = -0,068) and higher for the non-SSA regions (Pearson = -0,24). Similarly, the level of agricultural wages decreases with the farm size which indicates better assets and possibly better-off households, but also a better employment rate of the family labor. The correlations between the total farm size (land used) and the value of agricultural wages are significant: -0,114\*\* in Madagascar, -0,096\*\* in Kenya, -0,112\*\* in Morocco, -0,059\* in Nicaragua, and -0,059\* in Mexico. (\*) Correlation is significant at the 0.05 level and (\*\*) Correlation is significant at the 0.01 level.

<sup>115</sup> The shares of agricultural wage labor in the overall income are displayed per quintile and surveyed region in Chapter 6 (Figure 37).

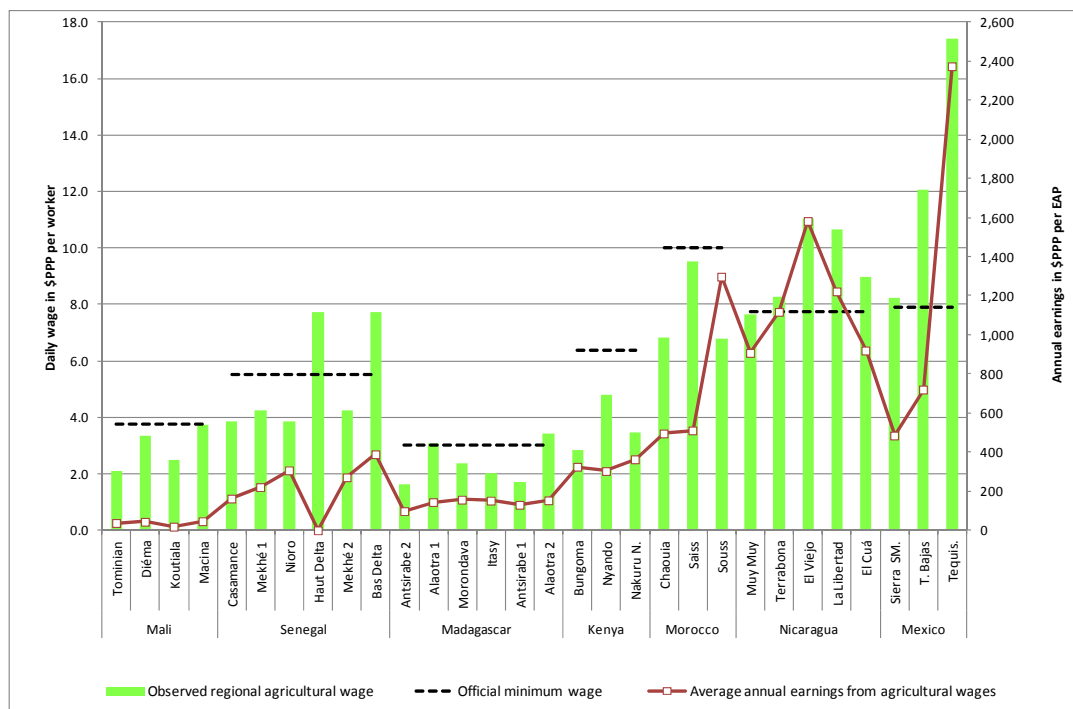
<sup>116</sup> The case of Mali and Senegal is again more specific. Even if household members engage sometimes in agricultural wage labor, it remains very occasional and the amounts earned are small (some percents for all quintiles). This limited development of wage labor is explained by the importance of the family workforce (see above) which limits the demand for external labor.

<sup>117</sup> Agricultural wages of landless households account for about 50% of their overall income in Alaotra, 65% in Souss and Tequisquiapan, 75% in Sotavento, and more than 90% in Nicaragua.

necessary means to develop their own plots. This situation was observed particularly in Souss (*RS II Morocco*).

The second major fact is the low level of earnings related to agricultural wages. Figure 24 illustrates the differences in labor prices between SSA and non-SSA surveyed regions. The official minimum wage varies between \$PPP 3 and 6 per day in SSA and \$PPP 8 and 10 in non-SSA countries.<sup>118</sup> The current agricultural wages observed during the surveys, mainly paid informally, are logically lower, with a few exceptions in regions facing strong pressure –temporary or not– on the labor market. This is the case of regions with important demand peaks, like the rice-producing regions of Mali, Senegal, and Madagascar, and notably the Delta in Senegal, and of regions with a significant number of larger-scale farms or agribusinesses in horticulture (Souss, El Viejo, Tequisquiapan) or livestock (La Libertad and Tequisquiapan).

**Figure 24: Potential and Actual Returns from Agricultural Employment in the Surveyed Regions**



Sources: RuralStruc Surveys; communication RuralStruc teams; and local regulations

The main issue here is that in many regions, especially poorer ones, these local labor prices mainly refer to the peak season, when the available extra labor force of family

<sup>118</sup> The figures correspond to minimum national wages in Mali and Mexico and to minimum rural wages in the other countries.



farms is limited; knowing that during the off-season there is no labor demand at all. They are daily prices for casual labor and cannot be converted to a monthly or yearly basis.<sup>119</sup> Paradoxically, when inter-regional migrations exist, like in the Delta region in Senegal or in El Cuá, Nicaragua, the benefits of this temporary labor demand are reaped by migrant workers. As a consequence, the average income earned from agricultural employment is very limited in the SSA surveyed regions, between \$200 and \$300 PPP per EAP per year, and even more insignificant in Mali. Incomes above \$1,000 PPP (equivalent to \$2.7 PPP per day) only appear in some of the previously mentioned regions of Morocco, Nicaragua, and Mexico, where more permanent labor opportunities exist.

These figures, as well as the narrow number of households engaged in agricultural labor, confirm the limited contribution of agricultural wages to income diversification and to poverty alleviation (Reardon *et al.* 2007). Even in Tequisquiapan where the reported average daily agricultural wage is \$18 PPP (thanks to the substantial development of agribusiness), returns averaged over the course of the year are low. In this case they are around \$6 PPP per EAP per day. At the end, days in which an agricultural laborer can earn \$18 are severely limited in number.

The main conclusion about agricultural employment is the lack of strong remunerative opportunities. Agricultural jobs are overwhelmingly temporary and, above all, provide a very limited return when referred to a yearly basis. They are a limited complement for many rural households (a quarter of the sample), even if they appear as an imperative for the poorest who have very few options. Only permanent jobs can make a difference and create an opportunity to escape poverty, but they are definitely too scarce, and often too poorly paid, to provide a sustainable solution to many.

### 2.2.2 *Non-agricultural Wage Employment: Limited to Specific Regional Settings*

The development of non-agricultural wage labor in general is a critical process in the standard model of structural transformation; and many developing countries which are well engaged in their economic transition show significant shares of waged activities in the production of non-agricultural goods and services. However,

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<sup>119</sup> In the Senegal River Delta, *Les Grands Moulins du Sénégal*, a subsidiary of *La Compagnie Fruitière*, is one of the very few agribusinesses engaged in horticulture production for export (mainly production of cherry tomatoes under greenhouses). The company employs 1,200 temporary workers over a period of 4 months and 80 permanent workers. The wage for the temporary workers is FCFA50,000 per month (\$193 PPP), which is quite similar to the \$8 PPP daily agricultural wage observed in the Bas Delta region (at a standard 22-day work month). But if the earnings of these lucky few, that accrue in their entirety over the course of four months, were averaged over a year, the daily rate would be \$PPP 2.1 per day. Sources: *RuralStruc interviews*, March 2008.

patterns of non-agricultural wage employment depend on national and regional economic characteristics as well as a region's stage in the diversification process.

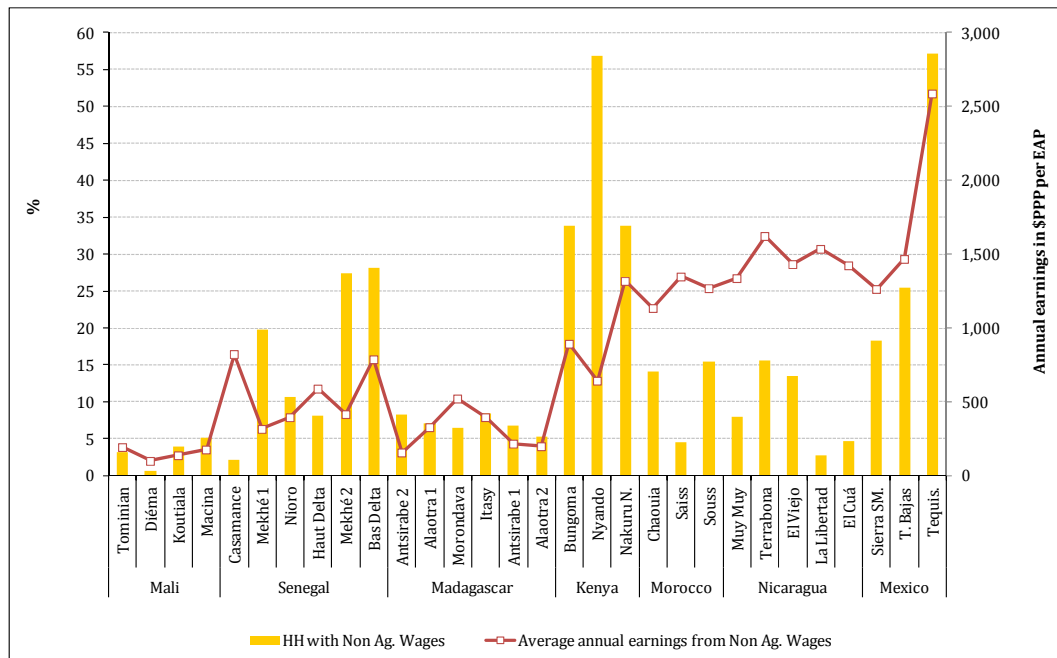
Here again it is worth mentioning methodological issues related to the characteristics of non-agricultural wage employment as a category. Its definition is quite vague, because it corresponds to all the activities paid by a salary which are not related to agriculture *sensu stricto*, i.e. the production stage (and not the many other upstream and downstream segments related to processing and marketing of the products). This very broad definition includes extractive activities (mining, quarrying, etc.), off-farm processing activities in agribusinesses (cleaning, grading, industrial processing, and packaging), manufacturing (intermediate or final goods), construction, and all kind of services, public or private, in education, health, information, transportation, child care, security, etc. All these activities refer to both skilled and unskilled jobs and can be developed with very different types of businesses in terms of size, capital, and management.

The breadth of the category, as well as the importance of the informal sector and small businesses in most of developing countries, means that distinguishing self-employment from non-agricultural wage employment can be a real issue. It 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 grouping as formal office work (e.g. civil servant) or industrial work. The category is very heterogeneous and this must be kept in mind when comparing very diverse economic and institutional contexts.

In the RuralStruc regions, about 25% of the surveyed households were engaged in agricultural wage labor, but non-agricultural wage employment only engages 15% of them and displays strong differences between regions (Figure 25).

In terms of participation, Kenya and Mexico stand out, with 40% of their households involved in non-agricultural wage labor, while Madagascar and, above all, Mali are falling far behind. Even in Mexico and Kenya, disparities are important: Tequisquiapan and Nyando count 57% of their households participating in non-agricultural waged activities, Bungoma and Nakuru 34%, and the two Sotavento sub-zones only 21%. In Senegal, the Bas Delta and the north of the *Bassin Arachidier* (Mekhé) reach 20 and 25%. Souss, Terrabona and El Viejo, in Morocco and Nicaragua, attain 15%, the sample average.

**Figure 25: Participation in and Returns from Non-agricultural Wage Employment in the Surveyed Regions**



Sources: RuralStruc Surveys

This situation is obviously challenging and raises a question about the determinants of non-agricultural wage employment. As usual there are micro- and meso/macro-levels of explanation for the observed differences between households. At the micro-level, as broadly reported in the literature,<sup>120</sup> the capability of households to seize local job opportunities mainly depends on their skills, as shown by the existing positive and significant correlation between level of education and participation in non-agricultural wage labor.<sup>121</sup> Table 18 illustrates the vast differences between RuralStruc countries when it comes to education. Interestingly, a household's income quintile seems to have no effect on its participation in non-agricultural wage labor. Households in every income group engage in this type of labor, and the correlation between non-agricultural wage participation and total income level can even be negative.

<sup>120</sup> See for instance Reardon *et al.* (2001), De Janvry & Sadoulet (2001).

<sup>121</sup> 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 every country, but particularly in the SSA countries: 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.

**Table 18: Education level of the Surveyed Households (country average in %)**

		No education	Primary School started	Primary School finished	Secondary School started	Secondary School finished or University
Head of Household	Mali	84	10	2	4	0
	Senegal	79	16	3	2	0
	Madagascar	18	56	7	18	1
	Kenya	0	68	14	8	9
	Morocco	50	15	22	10	3
	Nicaragua	39	4	52	5	1
	Mexico	24	38	22	1	15
Highest Level in the Household	Mali	40	20	33	7	0
	Senegal	17	40	25	14	4
	Madagascar	6	34	8	28	24
	Kenya	0	26	28	26	20
	Morocco	7	4	42	39	9
	Nicaragua	0	0	8	56	36
	Mexico	n.a	n.a	n.a	n.a	n.a

Sources: RuralStruc Surveys.

At the meso- and macro-levels, beyond the few jobs related to education, health and local administration (primary school teachers, medical assistants, civil servants), the opportunities for non-agricultural employment depend on regional dynamics. These encompass existing natural assets, the level of population and population growth, the quality of infrastructure and provision of public goods, densities and access to cities (as highlighted in Chapter 3 by the travel time maps) and, lastly, the presence of leading economic sectors that enhance economic growth and generate labor demand. Local effects can be huge and can distort regional results when surveyed rural household are in the range of a factory that provides hundreds of jobs for its neighborhood.

In the RuralStruc surveys, manufacturing related to the apparel industry exists in Terrabona in Nicaragua, as a result of the development of Free Trade Zones (see Box 10). But it is most strongly prevalent in Tequisquiapan, Mexico, where a long tradition of *maquiladoras*, stimulated by NAFTA, has led to small production units spreading into the countryside (see Box 11). The jobs provided by these factories are relatively well paid and have a strong impact on local wealth.

**Box 10: The Development of Free Trade Zones and Non-agricultural Wage Labor in Nicaragua**

In Nicaragua, factories operating under Free Trade Zones (FTZs) have increased considerably since the 1990s. The first industrial park, "Las Mercedes," opened in 1976 with 11 factories. Today, the FTZ system consists of a dozen industrial parks with about 50 firms, mainly from Taiwan and the USA and with the vast majority engaged in the production of apparel for export (to the USA mostly). The sector has been very dynamic in terms of job creation: the number of jobs increased from 1,003 in 1992 to 38,792 in 2001, and around 70,000 today. 15,000 new jobs are expected in the 3 to 5 next years. It is estimated that 55% of the workers are young women with low education levels.

Factory work is highly concentrated in the Matagalpa and Managua zones and benefits the nearby rural areas (Corral & Reardon 2001). In the RuralStruc surveys, it is mainly found in Terrabona where the annual salaries generated by jobs in FTZs range from \$2,500 to 4,500 PPP per capita. This is in line with estimates made by other studies, which place monthly salaries at a maximum of US\$500/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 RSII Nicaragua*

In Souss, Morocco, the development of services related to the tourism industry with the nearby city of Agadir and the coastal resorts offer some limited opportunities. In the two other regions, non-agricultural employment remains mainly related to agriculture through the processing and marketing of agricultural products, and to construction and services.

In Senegal, Bas-Delta benefits from a good connection to the city of St-Louis, and the location of Mekhé on the major highway between Saint-Louis and Dakar helps explain the relatively higher participation of surveyed households there in non-agricultural wage employment. Nioro, and above all Casamance, are farther from the dense area of economic activity around the coast, (even if they are close to population centers) and Casamance is on the other side of The Gambia. However, as previously discussed in Chapter 3, these differences in terms of opportunities and market access do not significantly change overall household incomes.

**Box 11: The *maquilas* of the textile sector in La Fuente (Tequisquiapan, Mexico)**

The village of La Fuente in the *municipio* of Tequisquiapan is very illustrative of the deep process of “densification” and diversification of the rural economy in the south of the Querétaro state. With 3,884 dwellers (2005 census), La Fuente is located 18 km from Tequisquiapan (26,858 inhabitants) and 24 km from San Juan del Rio, a city of 210,000 which is connected by interstate highway to Querétaro and Mexico City. In spite of its urbanized environment, La Fuente remains significantly involved in agricultural activities with 24.3% of the local value added coming from agriculture in 2000, while agriculture’s share dropped to 3.5% in Tequisquiapan. Three *maquilas* are however settled in the village with a workforce of 150, 100 and 80 employees. All workers are La Fuente residents or come from nearby villages. The large majority of them are women.

The two largest factories are specialized in *ropa barata* (cheap clothings), i.e. basic apparel for export, and have been suffering over the last years from intense competition with China. The third—maquila *Lecuria La Fuente*—is specialized in fine lingerie for the upper segment of the domestic market and sells its products under the brand *Vanity* to high end boutiques like *Liverpool* or *Palacio de Hierro*. This market positioning and the higher-skill tasks required have so far protected the company from foreign competitors. The business was founded by two associates, including the maquila director, a textile engineer who was born in the village. The land for the factory was bought from an *ejidatario* (a local resident benefiting from property rights coming from the *ejido* system –the collective land distributed under the agrarian reform).

The fabric is directly imported from South Korea and Japan and is cut by laser before sewing together in lingerie pieces. This is a highly specialized work (ten months are necessary to train a worker) and consequently the work is well paid. Labor contracts are based on a price per minute and minutes per piece, and workers are paid depending of their yield above or below the average time needed to sew a piece. The standard contract for a permanent worker provides a monthly Mexican \$2,400 wage (\$330 PPP), plus social security and benefits. A good worker can earn 30% more (M\$3,120 or \$427 PPP, \$5,130 PPP per year). Short term contracts also exist on a weekly basis for extra work when peaks occur. These contracts are offered to trained reserves and are better paid (+30%) at M\$800 per week but without benefits. These wages have to be compared to M\$500 weekly wages for farm workers or, most often, M\$120-140 per day (\$16-19 PPP) for casual work.

49 households were surveyed in La Fuente by the RuralStruc Program. Only 14 have a farm (see Table below). In spite of the presence of well-paid non-agricultural jobs, farm households earn more on average than non-farm households (\$13,645 instead of \$8,286 PPP). This is broadly explained by the multi-activity pattern of the farm households which are all also engaged in off-farm activities, mainly agricultural and non-agricultural wage labor (notably practiced by women). Half of the sample’s households earn agricultural wages, and half receive non-agricultural wages. 15% earn both of them. 55% of the households of La Fuente have an average annual income per EqA higher than \$2,000 PPP (and 10% higher than \$5,000 PPP).

**Level and structure of income in La Fuente**

Households	#	Total income (mean in \$PPP)		Means of share of total income (%)						
		HH	EqA	On-farm	Ag. wages	Non Ag. wages	Self-empl	Public transfers	Remitt.	Rents
without farm	35	8,286	2,542	0	34	39	20	2	4	1
with farm	14	13,645	3,800	28	22	25	6	7	0	13

Sources: RuralStruc interviews, January 2008; RuralStruc Surveys; RS II Mexico

Perhaps the most paradoxical situation is in Kenya, one of the most urbanized countries of sub-Saharan Africa, and a place where that urbanization process is still booming (see Box 8 in Chapter 3). This urban growth however was not accompanied by industrialization—the lack of which is a major feature of urbanization in SSA—and therefore non-agricultural employment comes mainly from low-skill and often temporary jobs in the agro-processing industry (sugarcane plants, canning), construction, handicraft, and in low-paid services (trade, transport, catering).

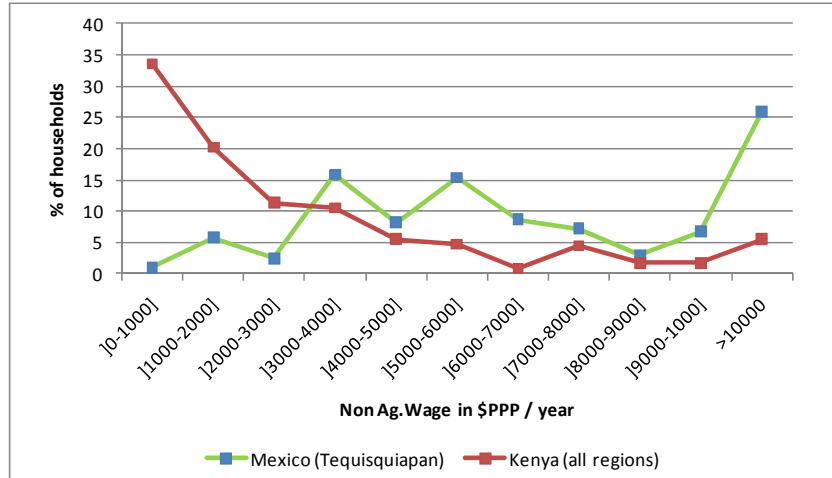
As a consequence of these much contrasted patterns between regions and countries, major differences are observed in households' participation in, and earnings from, non-agricultural employment. Nevertheless, incomes earned from these activities are limited in the surveyed regions. The striking result here is the difference between SSA regions and non-SSA regions. In SSA regions, the average returns are in the range of \$500 PPP per EAP per year, while in Morocco, Nicaragua, and Mexico, returns are near \$1,500 PPP/EAP/year. Nakuru and Tequisquiapan deserve special attention. In Nakuru returns are around \$1,500 PPP on average, much closer to levels observed in Nicaragua and Morocco than to levels in the rest of Kenya. In Tequisquiapan, remuneration for non-agricultural wage labor can reach \$2,500 PPP/EAP/year, well above any other opportunities observed in the RuralStruc surveys.

The two cases of Nakuru and Tequisquiapan, and more broadly Kenya and Mexico, illustrate well the previous discussion on the importance of economic settings in determining the options available in non-agricultural wage labor. In Nakuru North, where about 34% of households are engaged in non-agricultural wage labor, the proximity of the city and nearby local tourism assets (Nakuru national park) give some household members access to jobs in public administration, education (teachers), trade and transportation (the city is located on the main Kenyan transport corridor), and the tourism industry. However, in Nyando, more than half of the households are engaged in non-agricultural wage employment (20% more than in Nakuru), but their earnings are clearly lower. Nyando's workers are employed in poorly paid jobs coming from sugar plants and petty services. The difference in the type of non-agricultural wage labor available is decisive. In Mexico, the higher returns in Tequisquiapan further confirm this point. They are a direct result of the well paid and sometimes highly-specialized jobs available in the *maquilas*.

The difference in the type of non-agricultural employment available, and hence in the level of income obtained from this work, is confirmed by the distribution of annual household earnings by classes of income (Figure 26). In Kenya, more than 50% of households earn less than \$2,000 PPP, and only 5% make more than \$10,000, a result of the fact that non-agricultural wage jobs are very low paying. In Tequisquiapan, households earn more money from non-agricultural wage labor. Twenty-five percent of households involved in these activities earn more than

\$10,000 PPP (which is possible with two household members working in a *maquiladora*—see Box 11—or of course participation in higher qualified jobs).

**Figure 26: Distribution of Households per Classes of Non-agricultural Income (Kenya and Mexico)**



Sources: RuralStruc Surveys

Overall, non-agricultural wage labor appears to be a limited option, the availability of which is highly dependent on the characteristics of the regional economy. Opportunities, when they exist, most often come in the form of low skill and low-paying jobs, the rare exception being manufacturing. Without a significant amount of further economic diversification (which is not necessarily related to urbanization, as exemplified by Kenya), this option is far from broadly accessible to the majority of households in the short and medium term.

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

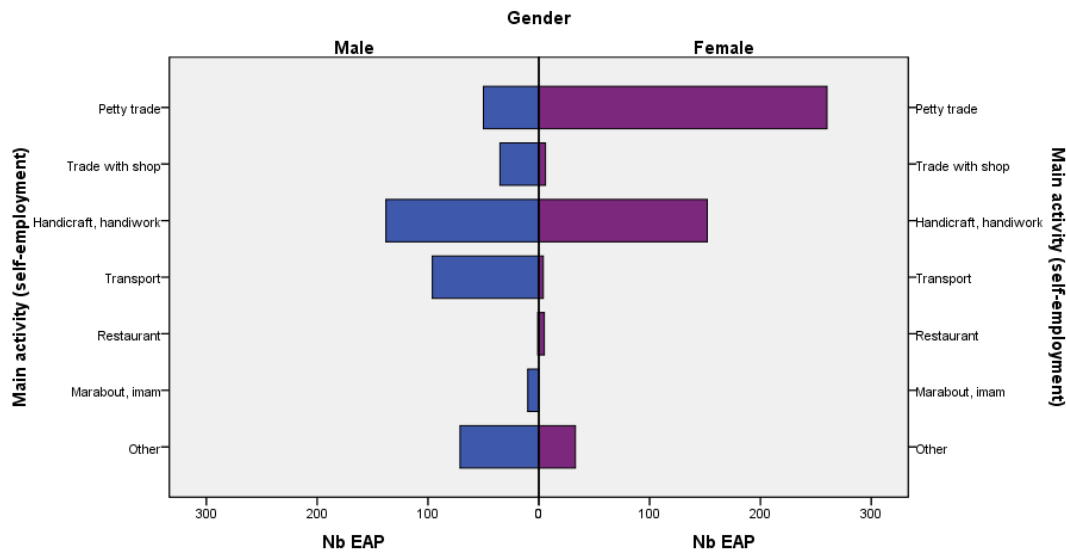
As already mentioned in section 1 of this chapter, self-employment represents the most common off-farm income in most of the surveyed regions and is the main diversification option in the poorest ones. Contrary to wage employment where the worker is a “labor taker”, with self-employment the worker is a “labor maker” who seizes existing opportunities to develop his own activity depending on his/her skills and capital.

As a consequence, self-employment covers a broad range of trade and handiwork activities. Activities include those which rely on the transformation, transport, distribution and sale of local natural and agricultural products (farm products, wood, forestry products, and charcoal), the transport and trade of manufactured goods for the local rural market (small hardware shops), handicraft (pottery, basket making, jewelry, tailoring, shoe-making, etc.), and services (e.g., hair-dressing, eateries, letter-writing, or repairs of farm equipment, vehicles, TVs and other appliances).



This diversity is illustrated by Figure 27 below which presents a breakdown of the activities in which the surveyed households in Senegal engage. It displays the number of active persons (EAP) engaged in each of the main categories of self-employment by gender, and shows both the diversity and gender specialization of the activity.

**Figure 27: Self-employment Activities in Senegal**



Sources: RuralStruc Surveys

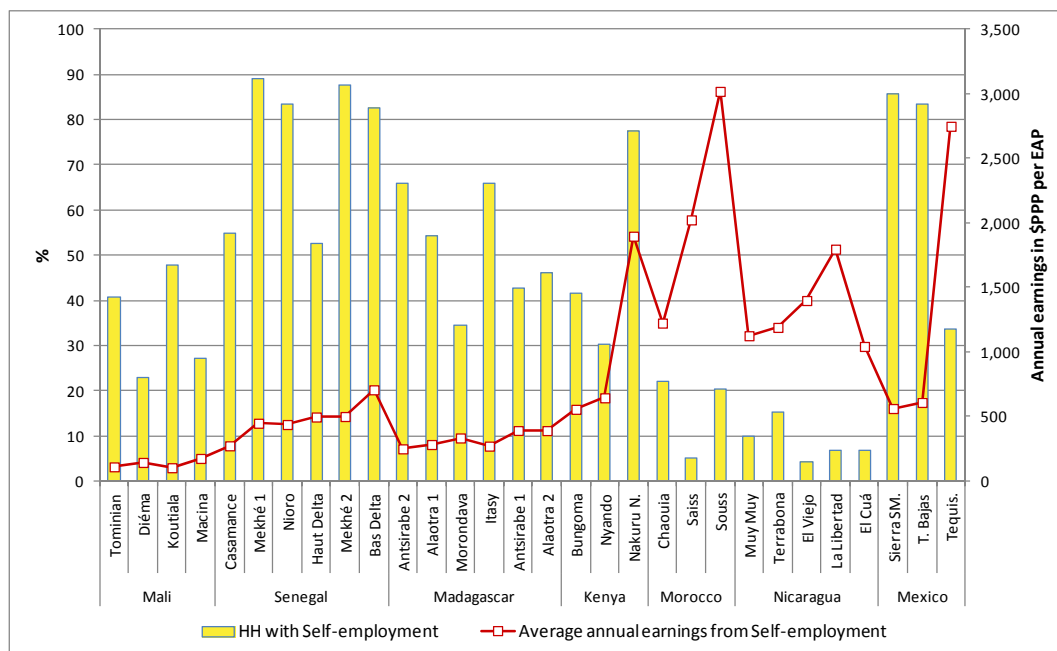
The returns from these self-employment activities are highly dependent on the purchasing power of customers, which directly relates to the regional level of wealth. Returns to self employment activities are therefore as diverse as the array of activities themselves. When the self-employment activity does not involve any specialized equipment or unique skill, set returns tend to be close to the local labor price.

There is a strong heterogeneity among surveyed regions in regards to the share of households participating in self-employment. The survey also observed a high level of variance in the returns from self-employment at the household level. As shown by Figure 28, these characteristics evolve in opposite directions and highlight two main types of situations.

The first type corresponds to regions with medium to high participation in self-employment (between 35 and 80%) but low returns to these activities. This type includes most of the SSA regions as well as those of the Sotavento in Mexico, where the level of engagement in self-employment is the highest in the survey. In this group of regions, the average annual return from self-employment is around \$500 PPP/EAP, the *Bassin arachidier* and Delta in Senegal, and the Sotavento reaching \$750 PPP/EAP/year.

The second type corresponds to regions with a low or very low level of participation in self-employment (around 5 to 15%). This is the case of Morocco and Nicaragua, and somewhat of Tequisquiapan, where rural households are little engaged in self-employment because other opportunities exist (wage labor and migrations). The returns to self-employment in these regions are incomparably higher, on average around \$1,500 PPP/EAP/year, with Souss and Tequisquiapan exhibiting even higher average returns (between \$2,500 and 3,000 PPP/EAP/year, though these results mainly indicate wealthier regional contexts). Nakuru in Kenya is again a specific case, one where the levels of returns to self-employment rival those observed in Morocco and Nicaragua. Nakuru is widely stratified in terms of self-employment earnings, however. Though many households are engaged in this activity (77%), a limited number of them have very high returns, pulling up the regional average.<sup>122</sup>

**Figure 28: Self-Employment Returns in the Surveyed Regions**



Sources: RuralStruc Surveys

Behind this diversity, two major patterns appear. The first one corresponds to a sort of “positive diversification“, where self-employment contributes significantly to household income. It is generally a full-time activity, a micro-business with some equipment, which explains why better-off households, with more or better assets and/or the ability to make a significant initial investment due to their financial, social or human capital, are more disposed to take advantage of these opportunities

<sup>122</sup>40% of the households earn less than \$500 PPP per EAP/year, a number closer from the other SSA averages (61% earn less than \$1,000 PPP/EAP/year).

shaped by the local market. Of the entire survey sample, 41% of households are engaged in self-employment, but only 13% earn more than \$5,000 PPP per year from this activity.<sup>123</sup> These households are not necessarily located in regions broadly engaged in self-employment: 58% of the Moroccan and 27% of the Nicaraguan households having a self-employment activity are in this group, against 22% in Mexico and Kenya, and only 13% in Senegal.

The second pattern illustrates a more “neutral diversification”, where the poorest and most marginalized households develop coping or “survival” strategies by mostly accessing minor self-employment activities with very low returns. These activities are most often a complement to their on-farm incomes, but pay far too little to serve as a viable poverty exit option. A full 51% of surveyed households engaged in self-employment earn less than \$1,000 PPP per year, or \$2.7 PPP per day.

A final result is that self-employment activities are not limited to places that offer no permanent waged activities outside of agriculture –the conventional wisdom on the issue. The diversity of the regional situations shows that both coping strategies in poor rural areas with limited options, and positive diversification strategies in richer and diversified regions are possible. Further, self-employment incomes benefit substantially from dynamic economic environments.

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

As previously mentioned, off-farm incomes are not only generated through local activities implemented by the household members, they are also generated by activities implemented in distant locations by migrant workers who can send a portion of their earnings home. These remittances play a very significant role in several surveyed regions. They constitute the major part of the “private transfers” income category, which can also include gifts or donations from other households (though these are much more rare).

Public transfers are another off-farm income group, and they refer to subsidies from the central state or local government (support to economic activities or social groups), as well as grants from NGOs or other local communities. In the RuralStruc surveys, public transfers are mainly observed and are only significant in Mexico.<sup>124</sup>

The other category of non-activity generated off-farm income is rents. This category includes rental revenues from physical assets (land, equipment and housing), and would have included securities income if any had been observed. Between 5 and 10% of the surveyed households reported rental revenues, with the exception of

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<sup>123</sup> This threshold is somewhat arbitrary. It corresponds to \$14 PPP per day. 22% of the households earn more than \$3,000 and 4% more than \$10,000.

<sup>124</sup> Other transfers were observed found, mainly in Tominian, Mali (support from a religious charity to poor families), and in some villages of Madagascar, and they are marginal.

households in Kenya where the number is much higher (40%). But revenues from rentals are very low: 45% of households with rental revenues earn less than \$100 PPP per year.<sup>125</sup>

### 2.3.1 *Migrations: Different Patterns for Different Regions*

Rural households have always developed livelihood strategies which combine fixed and mobile assets, where assets consist of both physical and human capital (Augustins 1989). As such, today, millions of people move every year to another region, to a city, or across borders and oceans, seeking to reduce what they see as the gap between their own position and that of others in wealthier places (Black *et al.* 2005). Adopting a more structural and historical perspective, migration is frequently about the inter-sectoral movement of labor and results from differences in returns to labor between economic sectors, notably between agriculture and the rest of the economy (Larson & Mundlak 1997). These migrations of labor have been one of the most powerful drivers of economic transformation (see Chapter 2).

Oftentimes migrations are not permanent, do not include the entire household, or both. This sort of intermediate type of movement creates situations where transfers of goods and cash between different geographical settings and between different household members are frequent. As such, the development of temporary migrations (which can still be long-term), facilitated by improved conditions of transportation, has resulted in a significant increase of private transfers and notably of international remittances, the role of which in economic development has been much discussed over the last decade.

However, this global picture can be misleading. Not only do patterns of mobility differ broadly across regions—as illustrated by the RuralStruc countries (see Box 12)—but the impact of remittances varies depending on whether a micro or macro-level analysis is undertaken. At the macro level, private transfers from abroad can weigh heavily on national accounts, but the impact of these monies at the regional or household level can be very different. This is particularly the case in rural areas, for which the role of migrations has often been overstated. As noted by Reardon *et al.* (2007), both the literature and the conventional wisdom among policy makers tend to emphasize the importance of migrant remittances, but many field studies suggest that the share of households involved in migrations is actually relatively low.

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<sup>125</sup> The exception here is Morocco which deserves a specific comment: 19 households have rental revenues above \$10,000 PPP per year which mainly correspond to urban rentals in the regional cities. These high incomes of course impact the regional averages and explain why in Morocco rents appear as the first source of off-farm income, which is a major distortion. The exclusion of these households from the sample was discussed but it was considered that they were part of the rural reality and as such deserved to be taken into account (*RS II Morocco*, p. 40).

The discussion of the impact of migration is complicated by the difficulty of capturing the different characteristics of mobility: domestic or international, short term or long term, etc. The importance of these different types of migration changes from country to country and results in different patterns of migration. It is also difficult to estimate the amount of remittances, due largely to their irregularity and the fact that they arrive through many different channels<sup>126</sup> and, in some specific situations, respondents are reluctant to provide information.<sup>127</sup>

In the RuralStruc regions, migrations are a common feature. All types of migrations (domestic or international, long or short term)<sup>128</sup> concern 24% of the sample on average and the core range is between 15 and 40% of the surveyed households. The exceptions are Alaotra in Madagascar, La Libertad and El Cuá in Nicaragua, the Sotavento in Mexico, where the number of households engaged in migrations drop below 10%. On the opposite end, Tominian and Diéma in Mali, and Nioro in Senegal, exceed 60% (see Figure 29).

The determinants of migration are of course multiple and relate to the many “pull” and “push” factors existing in individual regions. The economic situation of the household, the lack of opportunities at the local or the national level, the hopes of a distant Eldorado, and the importance of existing obstacles combine themselves and shape individual or collective decisions (migration is often a choice at the household rather than individual level and sometimes, for international migrations, it is a decision of the community as a whole). Therefore, migration often relies on the ability of certain groups to create and maintain bonds of solidarity with diaspora members.

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<sup>126</sup> Official banking and cash-transfer channels are an important vehicle but significant flows are transferred from abroad through informal networks.

<sup>127</sup> This is particularly the case in Mexico where it is increasingly difficult today to capture information about remittances, many respondents refusing to answer. This situation is mainly related to illegal migration which, even if overwhelmingly developed, is under official scrutiny, and to fears linked to the criminalization of money transfers. Surveyors were confronted with this problem during the RuralStruc surveys.

<sup>128</sup> During the survey, long-term migrants were defined as persons who are geographically distant from the household for more than six months yearly and sending (or not) remittances, whatever the amount.

### Box 12: Different Patterns of International Migration in the RuralStruc Countries

Patterns of international migration 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. This option is less possible in sub-Saharan African countries, except in Mali where about 11% of the population lives abroad. Kenya and Madagascar display extremely low rate of emigration.

	Mali	Senegal	Madagascar	Kenya	Morocco	Nicaragua	Mexico
Stocks of emigrants in 2005 (Millions)	1.2	0.5	0.2	0.4	2.7	0.7	11.5
Population in 2005 (Millions)	11.4	11.7	17	33.4	29.9	5.6	104.3
Emigrants / Population	10.6%	4.0%	0.9%	1.3%	9.1%	12.2%	11.0%
Remittances in 2005 (Millions \$US)	175	511	16	494	4.724	600	21.802
Remittances (% GDP)	3.9%	6.7%	0.4%	3.4%	9.4%	13.3%	3.5%
Remittances (\$US / migrants)	144	1,103	106	1,156	1,738	878	1,895

Sources: Ratha and Shaw 2007, WDI

The destination of migrants heavily impacts the returns earned from migration. In Mexico and Morocco, where the overwhelming majority of migrants work in OECD countries, the returns per migrant are on average high (near \$2,000). At the other extreme, the case of Mali illustrates the low returns earned from regional migrations in SSA. Even though the Kayes region, in the west of the country near the Senegalese border, has a long tradition of emigration to France, 90% of Malian migrants stay in West Africa, mainly Côte d'Ivoire, and their returns are less than 10% of those earned by Mexican or Moroccan migrants. Nicaragua and Senegal illustrate an intermediary position where around half of their migrants work in rich countries while the other half work in neighboring countries (Costa Rica for Nicaragua, Gambia and Mauritania for Senegal), with a proportional impact on the overall level of remittances sent. In the case of Senegal, transfers have surprisingly increased steadily since 2005.

		Migrants's country of origin (% in 2005)						
		Mali	Senegal	Madagascar	Kenya	Morocco	Nicaragua	Mexico
To developed countries	Canada	1		1	5	1	1	
	France	4	20	54		29		
	Israel					8		
	Italy		15	1		11	1	
	Netherlands					6		
	Réunion			17		0		
	Spain	1	5			25	1	
	United Kingdom			1	34	1		
	United States		3	1	11	2	36	90
	Others	1	3	3	7	9	1	2
	Sub total	7	46	78	57	91	40	92
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	16	18	8	9	9	11	8
	Sub total	93	54	22	43	9	60	8
<b>Total</b>		100	100	100	100	100	100	100

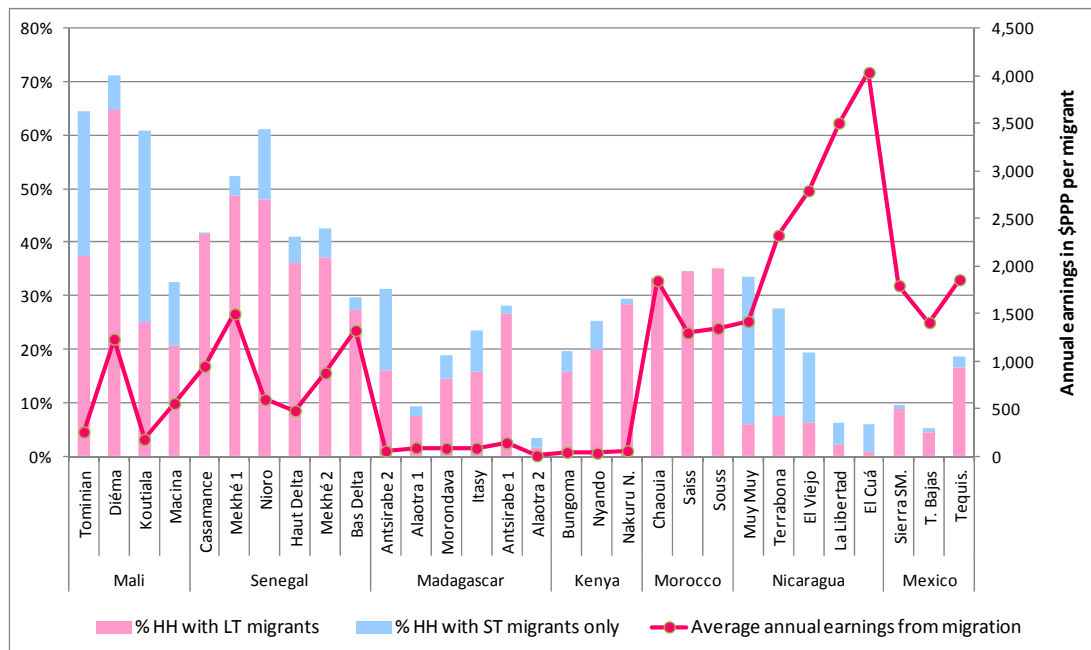
Sources: Ratha and Shaw 2007, authors' calculations.

When it comes to international migration, the decision to migrate is often not enough to make it work: pathways can be long and costly, particularly when the destination is a rich country where regulations are increasingly adverse. Due to travel and other associated costs, households engaged in this type of international migration are likely richer. Not only does it cost money to migrate, but the family may have to wait for many months or years before the migrant is able to send his/her first remittance.

Households with international migrants are also likely more skilled and have better social networks, both of which facilitate the success of these migrations. Income and human and social capital, the key determinants of international migration, all combine to present unique, customized opportunities to households. There is no clear relationship between one individual determinant and the success of migration as all three are important.

Remittances are the top off-farm income in only three of the 30 surveyed regions (Tominian and Diéma in Mali, Terrabona in Nicaragua). They are ranked as the second largest off-farm income source in nine others (including regions in Senegal, Morocco and Nicaragua, see Table 17). However, even in regions where migration is important, earnings per migrant are very diverse (Figure 29).

**Figure 29: Importance of Migrations per Surveyed Regions**



Sources: RuralStruc Surveys

A core group of regions displays earnings between \$1,000 and 2,000 PPP (Diéma, Mekhé 1 and Bas Delta, all the surveyed zones in Morocco, and Mexico), while Kenya and Madagascar show evidence of very low transfers. The five surveyed regions of Nicaragua, where average returns are above \$2,500 PPP, clearly stand out.<sup>129</sup> In comparison, the earnings of Mexican migrants appear surprisingly low given what is known about the development of migrations in that country.<sup>130</sup>

From this very diverse picture, three main patterns can be identified based on the regional importance and the duration of migrations, as well as the main destination of migrants (Figure 30). The first pattern observed corresponds to international long-term migrations, mostly towards OECD countries (Diéma, Souss and Saïss, Tequisquiapan). The second pattern illustrates migrations to neighboring countries. It is exemplified by the specific case of Nicaragua with short-term migrations to Costa Rica and El Salvador, where migrants are engaged in waged activities, mainly in agriculture (export crops) and services (construction, maidservants and security guards in particular). One of the explanations of the higher returns observed in Nicaragua relates to the fact that migrants maintain closer links with the household because of the proximity of their destinations. Migrants often return home after a couple of months away and carry the main part of their incomes with them in cash, which is not the case of the long term migrants who organize transfers on a more irregular basis. The third pattern corresponds to internal migrations, to the capital city or major cities, or to other rural regions. These migrations can be heavily weighted towards short-term work, as shown by Tominian and Koutiala in Mali, or by Terrabona in Nicaragua, but can also be long term. In the poorest regions and for the poorest households these migrations do not aim only at generating income (in Kenya and Madagascar they don't). They are more aimed at helping to decrease the number of mouths to feed during the inter-crop season, when on-farm family labor is not needed and the labor surplus is massive (*RS II Mali*). Or, more durably, they are a radical way to reduce household expenses. The activities of these migrants (maidservants, odd jobs) often earn them very low returns and simply provide a way to sustain their most basic needs.

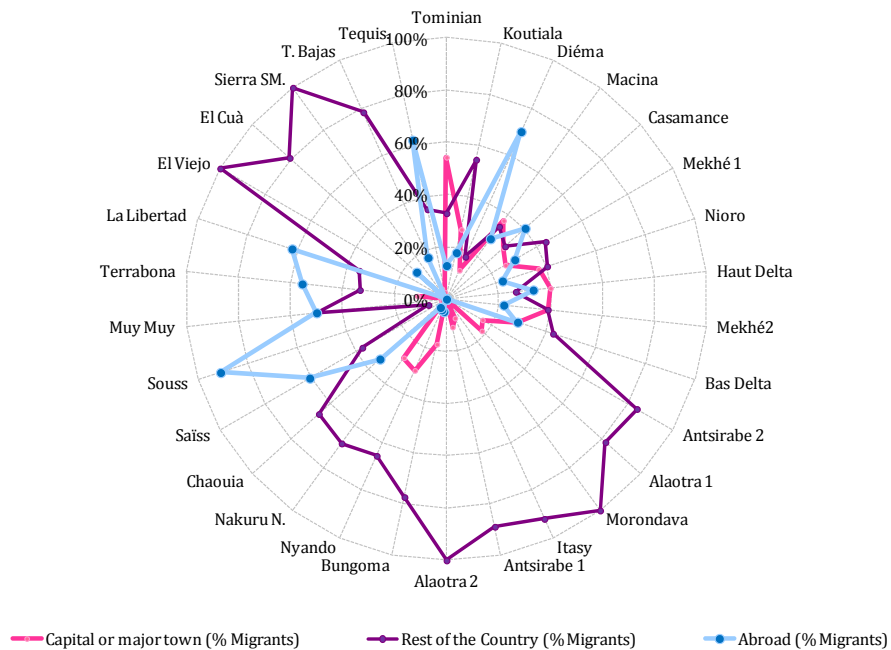
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<sup>129</sup> The high returns in El Cuá and La Libertad (more than \$4,000 PPP per migrants) must be put in perspective with the little number of households involved (5%) and migrants' destination: mostly the USA and Spain.

<sup>130</sup> Even though the Sotavento is not a traditional emigration zone, short and long term migrations to the irrigated perimeters of the Pacific Coast have developed. The earnings from migration declared during the survey were mainly related to long term migrants. Their level is fully related to the caveat presented above about survey conditions.



**Figure 30: Migrants' Destination by Surveyed Region**



Sources: RuralStruc Surveys

Table 19 identifies these patterns by providing a breakdown of migration in 23 out of the 30 surveyed regions, based on their major characteristics.

The first pattern observed corresponds to international long-term migrations, mostly towards high income countries (Diéma, Souss and Saïss, Tequisquiapan). The second pattern illustrates migrations to neighboring countries. It is exemplified by the specific case of Nicaragua with short-term migrations to other Central American countries, where migrants are engaged in waged activities, mainly in agriculture (export crops) and services. One of the explanations of the higher returns observed in Nicaragua relates to the fact that migrants maintain closer links with the household because of the proximity of their destinations. Migrants often return home after a couple of months away and carry the main part of their incomes with them in cash, which is not the case of the long term migrants who organize transfers on a more irregular basis. The third pattern corresponds to internal migrations, to the capital city or major cities, or to other rural regions. These migrations can be heavily weighted towards short-term work, as shown by Tominian and Koutiala in Mali, or by El Viejo in Nicaragua, but can also be long term. In the poorest regions and for the poorest households these migrations do not aim only at generating income (in Kenya and Madagascar they don't). They are more aimed at helping to decrease the number of mouths to feed during the inter-crop season, when on-farm family labor is not needed and the labor surplus is massive (*RS II Mali*). Or, more

durably, they are a radical way to reduce household expenses.<sup>131</sup> The activities of these migrants (maidservants, odd jobs) often earn them very low returns and simply provide a way to sustain their most basic needs.

Table 19: Main Migration Patterns among the Surveyed Regions

		% of households with migrants			
		>50	30-50	10-30	<10
>50% of migrants by destination	Abroad		Saïss		
		Diema	Souss	Terrabona	La Libertad
			Muy Muy	Tequisquiapan	
	Capital city	Tominian			
	Other regions		Chaouia	El Viejo	El Cuá
		Koutiala	Antsirabe 2	Kenya (all)	Tierras Bajas
				Madagascar (others)	Sierra SM Alaotra 1 & 2

 >40% of migrants are short term

Sources: RuralStruc Surveys

The seven remaining surveyed regions (the six Senegalese regions plus Macina) present a very mixed picture in terms of the destination of migrations—as clearly displayed by Figure 30. They illustrate strong combinations of all available migratory options. This situation is exemplified by the *Bassin arachidier* in Senegal, whose migration pattern provides further evidence of a regional catch-all strategy in terms of activities and incomes. Good connections to Dakar, Thiès, and Saint-Louis offer multiple opportunities that help households cope with the deep crisis in the groundnut sector. Nevertheless, this strategy of engaging in multiple activities, characterized by the accumulation of “*petits boulots*” (odd jobs), within the village, in the nearby small town, or in the capital city and, for some households, abroad, offers only a partial answer and does not truly offer an exit option out of poverty (as evidenced by the low level of incomes of the region) –see Box 13.

<sup>131</sup> 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\*\*), and Madagascar (0,168\*\*)

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

Two main conclusions emerge from this discussion of surveyed households' involvement in and earnings from migrations. The first is the overwhelming importance of geography. Places which are near high income countries (Mexico, Morocco) or with easy access to dynamic middle income countries (Nicaragua) have a clear advantage because cost and difficulty of access are –relatively- less of a constraint and workers have access to better paying jobs. Though it is not an absolute barrier (as illustrated by Senegal, Mali), distance complicates the story, particularly when it is large and prevents ground transportation (the case of Kenya and above all Madagascar is revealing).

The second conclusion refers to an emerging pattern which progressively reshapes many rural economies. Better transportation and communication everywhere have deepened the opportunities for connections to a wide array of locations—the nearby city, the regional or the national capital, locations outside the home country—which lead to family networks connecting members of the same household working in these different places and for different periods of time. These networks correspond to new composite multi-localized systems, which clearly redefine country-to-city linkages. In these “archipelago models”, the household remains firmly based in the countryside and inserted in its rural environment (economically, socially, and culturally), with a decision center (the head of household) which manages several income sources earned by household members living and working in different locations (like archipelago islands coordinated with their capital).<sup>132</sup> Though these new family networks can facilitate permanent migration and exit from the countryside, they are most often a way of “leaving to stay”<sup>133</sup>. By combining multiple livelihood strategies, households adjust to their new and evolving environments and maintain their affiliation to the local community, even if some members must leave to allow them to do so.

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<sup>132</sup> The concept of “archipelago model” was initially developed in Andean studies in the 1970s to describe the multiple settlements of households across varied ecological landscapes related to the altitude (see Van Buren 1996). It has then been applied to the new patterns of rural economies characterized by the importance of short and long term migrations, notably in Mexico. See particularly: Quesnel & del Rey (2005), Léonard *et al.* (2004), del Rey (2008), and Gastellu & Marchal (1997). In parallel, the concept was also used for qualifying the spatial dynamics of globalization (Veltz 1996, Viard 1998)

<sup>133</sup> This is the evocative title of Cortes' book (2000) on Bolivian peasant communities.

### **Box 13: Migrating to Dakar to Sell Phone Cards: An Illusory Pathway out of Poverty**

A good example of the “*petits boulots*” in which many Senegalese households engage is the sale of mobile phones cards –a proliferating activity which characterizes all African cities. Many young people coming from rural areas of Senegal try their luck at Dakar’s traffic lights for a couple of months.

Figures help here to understand the reality of this way of sustaining ones livelihood. These peddlers earn CFA75 (\$0.28 PPP) for every CFA1,000 phone card sold (a 7.5% margin), or CFA900 for a CFA10,000 phone card (9%). They can thus make \$2 a day by selling 7 CFA1,000 phone cards (earning them CFA525), knowing that selling a CFA10,000 card is a rare event. This target is not unrealistic but the competition is harsh. It is worth recalling that, on this meager income, vendors must also pay for meals and a place to sleep. Since the price of a basic place to spend the night is about CFA30,000 per month, it means a worker must reach a sales target of 400 phone cards per month. There are of course ways of mitigating these costs to a certain extent -sharing a room with many others or even sleeping in the street- but the point remains that, with this type of migratory activity, it is a challenge even to cover one’s costs. The result is that this activity does not provide any real room for maneuver to bring back any cash to the village.

*Source: RuralStruc interviews, October 2009*

### *2.3.2 Public Transfers: Specific to Mexico*

In the surveyed regions, public transfers are only significant in Mexico. Since it is an upper-middle income economy with a strong fiscal base, the Mexican state has implemented a well-developed public support system targeted toward rural areas (Léonard & Losch 2009). The transfer programs mainly focus on poverty alleviation with social safety nets that target specific social groups (e.g. *Oportunidades* for the poorest), and subsidies to the agricultural sector through several support programs (*Procampo* for production, *Aserca* for marketing, and *Alianza* for investment). The level of support a farm receives from Procampo is related to the size of its area under cultivation and as such the program benefits every farm no matter its wealth level. The two other programs however are dedicated to large farms or agrobusinesses. These transfers have played a significant role and their multiplier effect on incomes has been confirmed through research (Sadoulet *et al.* 2001). They have been complemented over the past few years by new programs related to decentralization (e.g. *Ramo 033* or ‘remote areas’ programs) and environmental protection, which mainly benefit local governments or communities.

More than fifteen public programs were observed in the income structures of the surveyed households. Most of the farm households were involved in the *Procampo* program which explains why a higher share of households is involved in public transfers in the two Sotavento zones (80%), rather than in Tequisquiapan (where very few households have farms). However, there are questions about how well these transfers are targeted. In the Sotavento they represent between 12 and 20% of household income in all quintiles, which indicates a disconnect between the level of income and the amount of transfer allocation received (see Box 14).

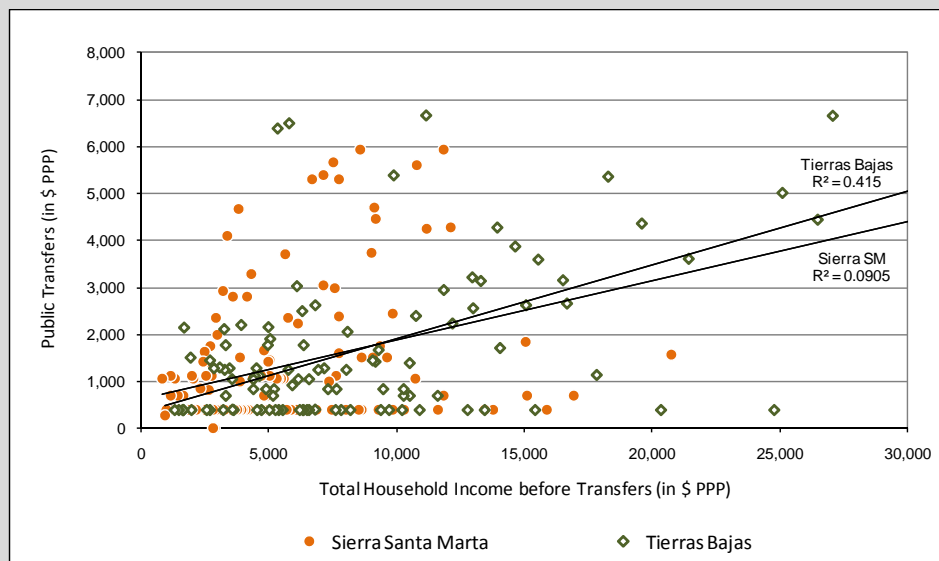
### Box 14: Inequality of Access to Public Transfers in Mexico's Sotavento Region

In the two surveyed zones of the Sotavento, public transfers are the first and second sources of off-farm incomes in Tierras Bajas and Sierra de Santa Marta, respectively. They represent 32% of total off-farm income, and constitute on average 15% of total income. 77% of the surveyed households receive grants from social programs, and 24% of them receive subsidies from *Procampo* (*RS II Mexico - Sotavento*, p25.)

As reflected by the chart below, one of the most striking survey results in Sotavento is the inequality of the distribution of public subsidies, both with 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 Tierras Bajas, where three-quarters of the richest households surveyed in the Sotavento are located, the average level of public transfers is regionally higher (\$1,797 PPP) than in the mountain area (\$1,329 PPP); above all, subsidies levels are strongly correlated with incomes.

Instead of smoothing income inequalities and compensating for differences in asset provision, it appears that public transfers in fact contribute to accelerated differentiation with a "transition" towards a specialization in agriculture on bigger farms and attendant measures (safety nets) for other households.

#### Repatriation of Public Transfers by Surveyed Zone and Level of Household Income



Sources: Adapted from *RS II Mexico*

### 3. Off-farm Diversification and Rural Transformation

Broadly, the literature suggests that “diversification is the norm” among all developing countries’ rural economies, and that it leads to the emergence of vibrant RNFES. However, the RuralStruc results provide a more nuanced picture that helps to temper these general conclusions. Indeed, though diversification is present everywhere, its characteristics are dramatically different and vary significantly between regions, as clearly highlighted by the survey results.

Differences, both between and within regions, are important and reflect the strong heterogeneity of the studied situations. One notes however a major distinction between SSA and non-SSA countries which plainly echoes different levels of economic development. This distinction does not refer to households’ levels of participation in off-farm activities (these are in fact quite similar between the two groups of countries), rather it refers to the specifics of diversification: the type of activity and its economic returns.

Two types of diversification appear in the RuralStruc sample. In the sub-Saharan African countries, diversification mainly represents coping strategies—the obvious answer to a strong and persistent poverty. On-farm activities dominate and are accompanied by a structural under-employment that reflects the seasonality of agriculture, the lack of overall economic diversification and, consequently, limited job opportunities. Off-farm activities mainly correspond to low-return self-employment, while opportunities for waged labor (in agriculture and even more in other sectors) are scarce, low paid—reflecting the situation of the labor market—and mostly temporary. As a result, off-farm incomes have a very low value and remain only a partial response to poverty, even if they can contribute significantly to overall household income in regions facing difficult agricultural situations (as exemplified by the *Bassin arachidier* in Senegal). Some households in every region do obtain better returns: this is the case of the few households which can access permanent non-agricultural jobs—for which an education is a strong asset—or which can develop specific types of self-employed activities (here skills and/or existing income can make the difference). But these exceptions do not change the overall picture.

In non-SSA countries, where the level of wealth is higher and the economy more diversified, off-farm activities are more lucrative. They correspond to a more “positive diversification” and often represent a full-time activity. This means that households, or some household members, specialize in other activities while in parallel other households more fully specialize in agriculture. This is clearly illustrated by the surveyed regions in Nicaragua and Morocco, and in Tequisquiapan, Mexico, where the number of households combining on-farm and off-farm activities is dramatically lower than in SSA.

Thus, based on the RuralStruc observations, one can put forward that the characteristics of off-farm diversification somewhat mirror the process of economic

transition as a whole: an incipient – low return diversification at the early stages of structural transformation, and a more mature diversification which consolidates the process of change at later stages.

Nevertheless, three final interesting and cross-cutting outcomes can be observed. The first refers to a specific result of the surveys which partly contradicts a piece of conventional wisdom about the role of urbanization and demographic density: they are absolutely not enough to propel economic growth by themselves. The poor economic results obtained by the surveyed households in the dense coastal area of Senegal and in western Kenya make this clear. Urbanization and density certainly count, and can facilitate and expedite the process of rural transformation, but their characteristics—the quality of densification—are also important, as well as the characteristics of the economy as a whole, notably its diversification and its productivity.

The second result relates to the difficulty of capturing the whole of the process of economic diversification. Because they targeted rural households only—i.e, households settled in areas defined as rural—the surveys missed those households which migrated into urban settings during the process of transformation. These new urban households were able to access better services and living conditions, to engage in broader off-farm activities, and even sometimes to keep their own farm—a situation observed in the Mexican survey. This methodological bias leads to more general conclusions. It shows that the distinction between rural boroughs and small cities is at least somewhat theoretical and that a major challenge in terms of information systems is to capture the reality of the rural-urban continuum which evolves through the process of densification. More fundamentally, it highlights the somewhat ephemeral nature of the rural non-farm economy. The RNFE tends to grow and at the same time be dissolved into the urbanization process itself, with the migration of off-farm specialists into urban areas, and “cities moving to the country”—a consequence of increasing demographic densities and of the territorial development of cities related to the urban growth process itself.

The third outcome refers to what is learnt from migrations. Though it is difficult to capture information on the amount of transfers, the surveys do show that 24% of the households interviewed are engaged in migration, a somewhat low level which is however consistent with many rural studies. The surveys also show that the economic returns from migration are definitely related to the destination of migrants, which is itself strongly influenced by geography (particularly by the nearness of high income countries). However, in addition to the direct income benefit of migration in the form of remittances, there is also a network effect that can provide more indirect returns. The survey results point to the development of “archipelago systems” whereby a household earns income from a string of members in different locations. These workers can be spread along a geographic continuum from rural, to peri-urban to urban, and can be located in other regions of the country or even abroad. But all remain part of the same household. This type of organization, facilitated by improvements in transport and communication infrastructure, allows

for greater diversification and risk management, and improves the economic prospects of households.

If characteristics of the historical pathways of structural transformation are present, the development of these new types of linkages could modify the modalities of rural transformation by fostering additional opportunities in terms of activities. But they also highlight the necessity of access to services and of an adequate provision of public goods—in addition to infrastructure—in order to strengthen rural-urban linkages and to create efficient density.



## **CHAPTER 5. SEARCHING FOR NEW PATTERNS OF ON-FARM SPECIALIZATION**

A major finding of the RuralStruc surveys, discussed in Chapter 3, was the persistent importance of on-farm activities in rural livelihoods. In almost all of the regions surveyed, between 90 and 100% of rural households have a farm, the major exception being one region in Mexico: Tequisquiapan. Further, the share of households' on-farm incomes remains very significant in every region, though there is noteworthy variance due to the differing importance across regions of the off-farm diversification processes presented in Chapter 4.

A core objective of the program, as reflected in its first hypothesis (H1), was to investigate the extent to which the restructuring of agrifood markets linked to liberalization and globalization has led to the emergence of modern value chains, and to assess the persistence of more “traditional” products and market organization patterns. A subsequent question was related to the development of specialization in agriculture—one of the WDR08's possible exit pathways out of rural poverty—notably through growing vertical integration.

The impacts of new integration processes along globalized value chains, as well as the spread of the so-called “supermarket revolution”, are known to have affected developing countries to very different degrees. These differences are directly related to the integration of national markets and their connection to the global economy, and as such to the overall process of economic transition. This is why over-focusing on upheaval in agrifood markets—often done in the literature—can be somewhat of a straw man. It tends to overshadow the reality that large areas of the rural world remain disconnected, and it therefore over-emphasizes integration dynamics which play out only gradually. Due to the large range of situations represented in the RuralStruc countries, significant variations were expected among them. However, the findings about new integration patterns suggest that across the sample they remain quite limited. In looking for these patterns, the Program's investigation of on-farm activities became something of an elusive quest for a new agriculture. The selection of countries of course weighs heavily in this conclusion, and the Mexican surveyed regions have clearly evolved significantly, but the overall picture remains gray. It is marked everywhere by the extent and consequences of rural poverty.

After a brief overview of the general characteristics and consequences of the global restructuring of agrifood markets, the chapter focuses on the main features of on-farm activities in the surveyed regions, notably the importance of self-consumption and commercialization. Then it reviews the different patterns of crop specialization or diversification and finishes with an assessment of the ongoing processes of market integration.

## 1. General Background: The Big Restructuring<sup>134</sup>

The process of agricultural liberalization has been occurring over a long period of time and is not yet complete. Starting in the early eighties, agriculture was subjected to the same process of state withdrawal that affected other economic sectors, but at a slower pace due to the fact that governments perceived it as a strategic sector.<sup>135</sup> This process, far from finished, continues today through the difficult and seemingly never-ending WTO Doha Round (see Chapter 1). The liberalization of international markets is particularly difficult with reference to the question of market access and public supports, but changes within national markets have been more radical. The dismantling of regulatory bodies and public companies and the subsequent wave of privatization have led to the entrance of new players into the market (often with strong international connections), to the gradual dissemination of new rules of the game, to progressive new balances of power, and to the emergence of what can be referred to as a new food regime.<sup>136</sup>

### 1.1 The Main Processes of Change Underway

#### 1.1.1 *Domestic Market Liberalization*

##### a. Context Prior to Liberalization

In all of the RuralStruc countries, as in many developing countries, agricultural markets prior to liberalization were 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 growth in the agriculture sector, because capital accumulation in agriculture according to the development paradigm was seen as the first stage in the development process; ii) stabilize producer prices (and incomes) over the course of a single crop season, and reduce price variability between seasons, with the objective of reducing risks; iii) increase farmgate prices and improve farmers' investment incentives by reducing the number of intermediaries

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<sup>134</sup> The objective here is not to provide an extensive review of the abundant literature on this global restructuring but rather to give the necessary background reminder about the major developments of the last three decades.

<sup>135</sup> Agriculture has always been over the time and whatever the political regimes a "state affair" (Coulomb *et al.* 1990). In last resort, the sector provides the very basic need of the population and governments' constituents.

<sup>136</sup> On food regimes see Friedmann & McMichael (1989) and McMichael (2009) for a "genealogy". McMichael suggests the progressive consolidation of a new "corporate food regime".

along the commodity chains; and iv) facilitate exports by managing the entirety of the national agricultural supply.

On the other hand, a few traditional non-staple markets (mostly “fresh” products, such as fruit and vegetables and dairy) were almost free, with little or no state intervention or price regulation. Spot transactions involving 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 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 for economies of scale. State control was justified by the need to process quickly, particularly because of perishability, and by stringent quality requirements of export products (like palm oil or tea).

#### b. Withdrawal of the State

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 and were perceived as symbols of state inefficiency. More broadly, state withdrawal was a prerequisite for moving toward full market liberalization. Thus, the first steps in reforming agricultural markets were the dismantling and privatization of these state-run structures, as well as the reduction of tariffs and export taxes, consumer subsidies, and producer price controls.

Table 20 and Table 21 present some examples of the dismantling of former public bodies in RuralStruc countries.<sup>137</sup> 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 each country’s historical trajectory, the starting point, the scope, and the pace of liberalization were all country-specific and explain large variations among countries.

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<sup>137</sup> These tables only provide a couple of examples per country while most of the time dozens of parastatals existed. See the country reports for more details.

**Table 20: Scope of Market Reforms in non Sub-Saharan RuralStruc Countries**

	<b>BEFORE liberalization</b>	<b>AFTER liberalization</b>
<b>Morocco</b>		
<b>ONICL</b> <i>Office National Interprofessionnel des Céréales et Légumineuses</i>	<u>State marketing board</u> : full control on marketing of grains through fixed prices (especially wheat), and strictly controlled imports	1988-96: progressive liberalization of the grain market Quotas subsist for the “national flour”
<b>OCE</b> <i>Office de Commercialisation et d'Exportation</i>	<u>State marketing board</u> : monopoly on exports for citrus, horticultural products, canned foods etc.	1985: end of the monopoly and liberalization of exports
<b>Nicaragua</b>		
<b>ENABAS</b> <i>Empresa Nacional de Alimentos Básicos</i>	<u>State marketing agency</u> : monopoly on staples commercialization and export crops such as peanuts, sesame and soy	1984: elimination of price differential for basic grains 1990: full liberalization of staple commercialization
<b>Mexico</b>		
<b>CONASUPO</b> <i>Compañía Nacional de Subsistencias Populares</i>	<u>State-run enterprise</u> : monopoly on imports, supervision of exports, and domestic market supply for staples with controlled prices	1989: end of marketing monopoly on imports and on domestic market for all staples but maize and beans 1999: end of market intervention for maize and beans
<b>INMECAFE</b> <i>Instituto Mexicano del café</i>	<u>State marketing board</u> : support to farm production, processing and marketing, and monopoly on coffee exports	1993: dismantling of the board and liberalization

Source: RuralStruc Country Reports, Phases 1 and 2

**Table 21: Scope of Market Reforms in Sub-Saharan RuralStruc Countries**

	<b>BEFORE liberalization</b>	<b>AFTER liberalization</b>
<b>Mali</b>		
<b>OPAM</b> <i>Office des Produits Agricoles du Mali</i>	<u>State marketing board</u> : monopoly on commercialization of grains	1986: end of the monopoly 1989: liberalization of imports and domestic commercialization
<b>Office du Niger</b>	<u>Parastatal</u> : management of water, land and irrigation infrastructure in the Office area; monopoly on marketing and processing of rice	1994: end of intervention on rice (except forextension)
<b>CMDT</b> <i>Compagnie Malienne de Développement des Textiles</i>	<u>Semi public company</u> (40% to the French DAGRIS, now Geocoton): inputs supply, extension, marketing, and processing of cotton seed, supply of cotton fiber to the domestic public textile industry (COMATEX) and exports	On-going liberalization since 2004
<b>Senegal</b>		
<b>ONCAD</b> <i>Office nationale de commercialisation et d'assistance au développement</i>	<u>State marketing board</u> : monopoly on commercialization of domestic agricultural products (groundnut, grains) and imports, and supervision of producers' cooperatives	1979: liquidation 1991: liberalization of local market and imports of rice
<b>SONACOS</b> <i>Société nationale de commercialisation des oléagineux du Sénégal</i>	<u>State-run enterprise</u> : processor for groundnut oil	2006: privatization
<b>Madagascar</b>		
<b>BCSR</b> <i>Bureau de Commercialisation et de Stabilisation du Riz</i>	<u>State marketing board</u> : full monopoly on rice	1983-86: end of monopoly on domestic commercialization of rice 1990: privatization of imports 1991: end of the buffer stock 2005: end of import taxes
<b>HASYMA</b> <i>Hasy Malagasy</i>	<u>Semi public company</u> (36% the French DAGRIS, now Geocoton): inputs supply, extension, marketing, and processing of cotton seed, supply of cotton fiber to the domestic public textile industry and exports	2004: privatization (90% of the capital held by DAGRIS)
<b>Kenya</b>		
<b>NCPB</b> <i>National Cereals and Produce Board</i>	<u>State marketing board</u> : monopoly on grain marketing (domestic market and exports)	1991-95: privatization and liberalization of marketing
<b>KCC</b> <i>Kenya Cooperative Creameries</i>	<u>Cooperative company</u> : monopoly on processing and sales of dairy products in all urban areas	1992: end of monopoly 1999: collapse as a consequence of new competition 2000: buyout and creation of KCC Holdings 2003: take over by the Government and "revitalization". Creation of New KCC.
<b>CBK</b> <i>The Coffee board of Kenya</i>	<u>State marketing board</u> : monopoly on collection, processing and exports of coffee	2001: end of monopoly. Now advisory role only
<b>TBK</b> <i>The Tea Board of Kenya</i>	<u>State marketing board</u> : regulation of the tea industry (production, research, processing, trade and promotion on domestic and international markets)	no change
<b>KTDA</b> <i>Kenya Tea Development Authority</i>	<u>Public development agency</u> : management of production through provision of inputs, extension, collection, processing and marketing of tea	2000: privatization. Now Kenya Tea Development Agency with technical support to the industry

Source: RuralStruc Country Reports, Phases 1 and 2

### c. New Market Regulation

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. These changes had several consequences that can be summarized by two interlinked 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. Often, one of the conditions for survival was to increase alliances with foreign capital, a phenomenon that exacerbated an asymmetrical situation between many fragmented producers and larger but fewer marketing agents or processors which progressively controlled the value chains. The result was a process of concentration with the emergence of many “big players” that deeply transformed market dynamics.

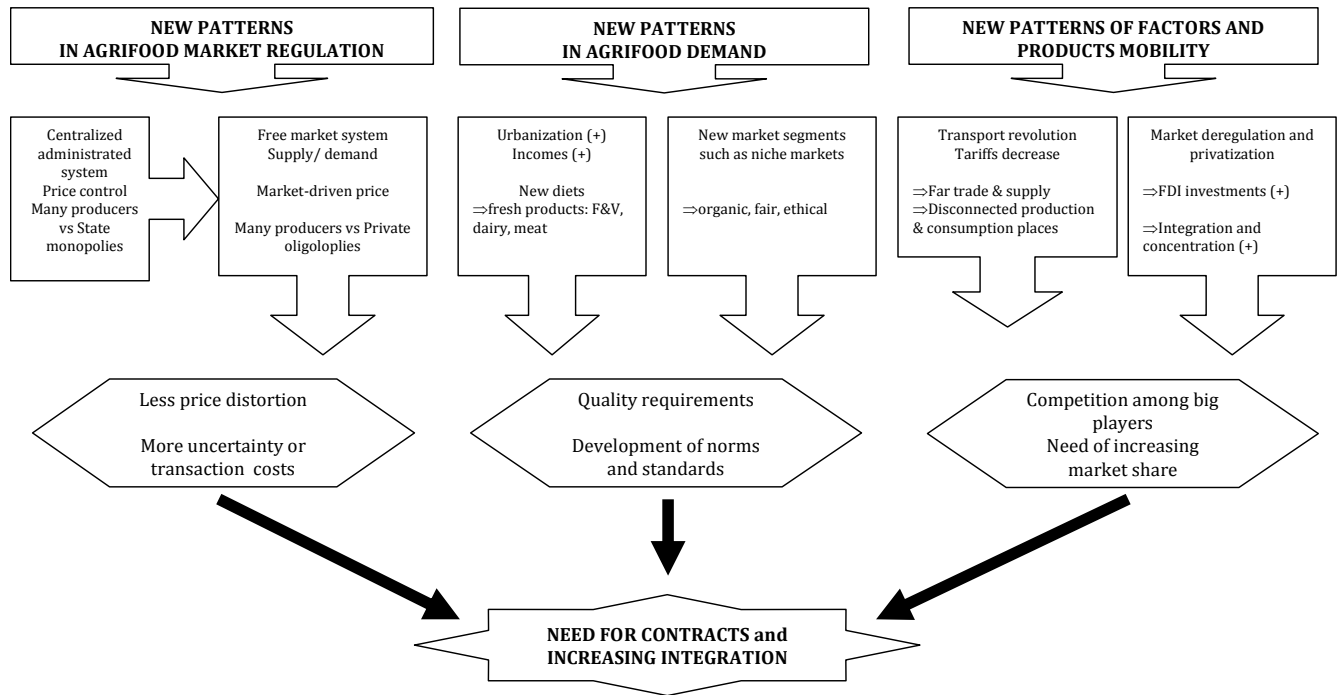
Second, due to the removal of administrated regulation and price management, uncertainty and transaction costs increased for those private actors engaged in this increasingly competitive environment. A response to this new context from trade and processing companies was to secure their supplies through the implementation of contracts with producers, producers’ organizations, or buying agents. Some of these companies engaged in closer integration by buying local subsidiaries, organizing supply networks with specific support to producers, etc. which resulted in completely new rules of the game.

#### 1.1.2 *The New Agrifood Markets*

These major changes in the domestic markets have to be put into perspective with other major restructuring processes within international agrifood markets. These processes are the result of the liberalization dynamics described above, 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 31).

The main consequence of this evolution, which started in the 1980s, is a trend towards increasing levels of integration which feeds and consolidates the on-going restructuring of domestic markets. The main attributes of these processes of integration are the development of standards and closer relationships between producers and buyers. These changes, 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 RuralStruc countries.

**Figure 31: New Patterns and Trends in the Agrifood System Resulting from Liberalization and Globalization**



Source: Authors

a. New Patterns in Agrifood Demand

There are several major trends behind the observed changes on the demand side which can be summarized as follows: 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, and fish and seafood products) grew rapidly. Telecommunications allowed 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 safety standards.<sup>138</sup> This change is evident in the growing attention paid to the risks associated with agricultural inputs (residues from pesticides, veterinary medicines, etc.) and with microbiological contamination. The implementation of stricter food safety and quality standards in the high income countries 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 can be provided to strengthen these new linkages.

Further, this 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 in rich countries 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.<sup>139</sup>

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 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).

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<sup>138</sup> It is worth noting that this expanding trade in agricultural products has also developed from OECD countries towards many low income and middle income countries (notably exports of meat products) and is often associated with lower concerns in terms of health and food safety.

<sup>139</sup> The creation of the *International Federation of Organic Agriculture Movements* (IFOAM), which bases its “organic” certification on issues such as health, ecology, fairness and the principle of precaution, is a good illustration of this trend.



b. New Patterns of Factor Mobility and Trade, and Rising New Actors

Since the 1980s, growing long-distance trade and increased Foreign Direct Investment (FDI), facilitated by liberalization policies and the implementation of Free Trade Agreements (FTA), 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 (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 and strategic alliances between major companies have gained growing control over specific national markets (Box 16) and 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 “supermarket revolution” (Box 15).

**Box 15: The World Spread of the Supermarket Revolution**

The penetration of modern food retailing varies among developing countries. Reardon & 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”.*

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 are: first, income level and urbanization, correlated with the opportunity cost of time (in particular that of women), then reduction in transaction costs through improvements in roads and transport, and development 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. The RuralStruc countries are a good illustration of this much contrasted evolution (see Box 20).

### Box 16: The Restructuring of the Mexican Maize Industry

Mexico is a good example of a country where a deep process of restructuring has occurred in the agricultural sector. It began at the end of the 1980s with the termination of a state-run company's monopoly on marketing (*Conasupo*—see Table 20, Yunes Naude 2003), price deregulation, and the implementation of NAFTA with the USA and Canada in 1993 (Appendini 2001). During this process, the maize sector received preferential treatment due to the crop's importance as the main component of Mexican diets, its weight in the agricultural sector, and its social, cultural, and political status. First, producers were offered transitional, non-distortive targeted support through a subsidy based on plot size called *Procampo*, that was due to expire in 2008. Second, the domestic value chain was protected from a surge of NAFTA-related imports through a transitional quota system. US imports would be limited to a yearly duty-free quota of 2.5 million tons, subject to a 3% annual increase. Imports beyond 2.5 million tons were to be taxed at a rate of 215%. This quota system was also planned to be progressively dismantled by 2008 (Lederman *et al.* 2005).

All of these policy changes led to strong processes of concentration. Mexico's large commercial maize farms benefited from numerous public supports. One was the *Procampo* subsidy, which awarded more funds to farms with larger acreage under cultivation. Though this program was designed with a cap on subsidy amounts, it resulted in a situation where Mexico's large maize farms (only 10% of the total) were capturing 53% of *Procampo*'s resources by 2003. Moreover, large farms also benefited from specific programs designed to support their modernization and their connection to markets. The *Aserca* and *Alianza* programs targeted farms with the best prospects for productivity growth with large subsidies for marketing and investment. Over time, the Ministry of Agriculture's (*Sagarpa*) budget shifted in favor of the latter programs. While *Procampo* represented 70% of its budget of during President Zedillo's term (1995-2000), it fell to 50% under President Fox's administration (2001-2006), with the difference going to fund *Alianza* and *Aserca* (Zahniser & Coyle 2004).

The concentration of production led to shifts in the geography of the sector (*RS II Mexico*, p.36). Mexico's 2 million smallholders previously dominated the national market and are mostly located in the central and southern regions. The country's 300,000 large commercial farms, which have in the last 20 years grown to occupy 23% of the land under cultivation while supplying 35% of the market, are mostly located in the northwest (particularly Sinaloa), where irrigation is widespread and productivity can be up to 9.8 tons/ha (vs. 1.4 tons/ha for smallholders elsewhere). On the processing side, state withdrawal, privatization, the end of fixed tortilla prices, and supports to the industrial flour industry led to a strong erosion of the artisanal tortilla sector. In turn, a powerful oligopoly of industrial millers came to control 52% of the flour supply (SAGARPA 2007) and leveraged this control to vertically integrate tortilla producers through licensing systems (Léonard 2010). Today, two major groups supply the industrial flour market: *Maseca* (75%) and *Minsa* (15%). The dominant position of the industrial producers was strengthened by their involvement in importing yellow corn from the USA, and they benefited greatly from the government's decision to only sporadically enforce the quota restrictions and import duties discussed above (Wise 2009). Imports of maize increased from 1.3 million tons in 1992 to 8.8 million tons in 2008, well beyond the allowances created under the quota system. More than half of these maize imports (which are 95-98% yellow corn) are controlled by seven companies (de Ita 2008). These include the two major millers—*Maseca* (in which *ADM* holds a 25% equity stake) and *Minsa* (associated with *Corn Products International* which took control of *Arancia* Mexican corn refining company in 1998)—as well as *Cargill-Continental*, three major companies involved in the poultry and feed production industries (*Bachoco*, *Pilgrim's Pride*, and *Purina*), and *Diconsa*, a state owned company spun off from the former *Conasupo* that remains charged with supplying basic food products to marginalized rural communities.

The incorporation of yellow corn—traditionally used for feed stuffs—into flour production is a dramatic change that is modifying the structure of the Mexican maize market, as well as consumption patterns (tortillas are traditionally produced with white maize). It is directly resulting in domestic producer prices well below the international reference price, while final tortilla prices have continued to rise (Appendini 2008).

## 1.2 Expected Consequences of Restructuring for Farming

Predictably, all these changes in agrifood markets 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. Indeed, smallholders are constrained by capital and liquidity difficulties, as well as by a lack of access and / or capacity to adopt technological innovations, and contract farming with supermarkets, processors or export agents could help them overcome these constraints. These views have fostered a renewed interest in value chain approaches within the donor community, leading to an extensive literature as well as new programs and projects.<sup>140</sup>

However, as previously mentioned and as reiterated by Reardon & 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 with which they can connect farmers are a real opportunity only for those producers who are able to respond to their requirements. For the others, increasing contractualization of supply chains presents a substantial risk of marginalization, particularly when the overall economic and institutional environment is not favorable for the large majority of producers—the situation of many countries, notably in Africa (Gibbon & Ponte 2005). This evolution could be decisive for the development of modern 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 17), 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 (Vorley *et al.* 2007, Huang & Reardon 2008). This progressive differentiation among producers is exacerbated by the practices of major retailers or by the supermarkets’ procurement systems.

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<sup>140</sup> See World Bank (2007), p.127. A good illustration in terms of applications of these new approaches is presented in Webber & Labaste (2010).

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 17: 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.

The Program 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, it 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 these new forms of market integration trickle down in different developing countries, for which it is well known that the pace of change has differed? What numbers are at stake? How many farmers are engaged in these new chains?

Agricultural or customs statistics provide data on high-value products or exports, but nothing exists about the number of producers participating in the different types of value chains—a recurring obstacle to appreciating these new developments. RuralStruc teams were unsuccessful in trying to collect accurate data on value chain participants during the First Phase sector reviews, but the few numbers gathered suggest that in every country thousands of farmers are engaged in these new value chains while hundreds of thousands (or even millions) remain involved in more traditional agriculture. The now famous success story of development of horticulture in Kenya is a good illustration of the potential and limitations of high value exports (see Box 18).

**Box 18: The Kenyan Success Story in Horticultural Exports: How Many and Whom?**

In the last two decades horticultural products (fruits, vegetables, and cut flowers) have become the largest category in world agricultural trade and now account for 20% of global agricultural exports. In SSA, horticulture exports have developed rapidly but production remains localized in a few key regions. Kenya is a famous example: it is the second largest horticultural exporter on the sub-continent after South Africa, the second-largest developing country exporter of flowers after Colombia, and the second-largest supplier of vegetables to the EU after Morocco. Horticulture has become Kenya's second largest commodity export sector, after tea (English *et al.* 2006).

Though this is an indisputable success story in terms of market shares, export earnings, and growth (fears exist however about its impact on water resources), it is useful to examine the development of these horticulture exports and to put them in perspective with the structure of the Kenyan agricultural sector as a whole. Although information is scarce because there are no statistics, it is possible to build a generalized picture from targeted surveys and interviews with major stakeholders, notably exporters.

Several authors report that, in the early 1990s, the majority of horticulture exports were produced by smallholders (Harris 1992 and Jaffee 1994, among others). However, Dolan & Humphrey (2000) estimated that, by the late 1990s, when horticulture exports were much larger, 40% of them came from the exporters' own estates or leased land, 42% came from large commercial farms, and only 18% came from smallholders, who had difficulty meeting the safety and quality requirements of international buyers. Jaffee (2003) offered more optimistic figures on smallholder engagement, with smallholders' share of the export market at 27% for fresh vegetables and 85% for fresh fruit, for an overall sector share of 47%. These estimates still represent a situation where the majority of export growth occurred outside of smallholder agriculture.

The estimation of the number of smallholders involved in the industry is equally difficult. According to the last national survey, which is more than 15 years old (\*), the number of farms in the country was estimated at 3.4 million, while the number of smallholders engaged in horticultural exports was very low: less than 20,000 according to Jaffee (1995) or Asfaw *et al.* (2008). English *et al.* (2006) estimate the total employment generated by the horticultural export industry in a range of 120 to 150,000 jobs in 2003, with 1/3 in the cut flower industry where smallholders are not involved. The other 2/3 is in fruits and vegetables, where employment is split between smallholder farms (40,000 jobs), processing plants (10,000), and in the large estates and packhouses (50,000).

This analysis indicates that although the sector offers important macro-level returns and opportunities for tens thousands of households (whom McMulloch & Ota show to be richer than the average household in their area), one must keep in mind the size of the overall farming sector and the existing dynamics of the labor market. There were 840,000 new labor market entrants in 2010 (650,000 for the rural sector alone)—see Chapter 2. Further, Muendo & Tschirley (2004) show that in Kenya, over 90% of smallholder farmers in non-arid regions produce horticultural products, mostly for domestic consumption; and that fruits and vegetables for the domestic market account for over 90% of total horticultural output by volume. This overall perspective serves as a useful reminder of the challenges that remain despite the impact of horticultural exports on Kenya's economy, as well as the existing potential for growth in other production sectors, which could also benefit from policy makers' attention and support.

(\*) The 1994 Welfare Monitoring Survey is the last survey to offer national coverage. The 1997 version does not.

## 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 RuralStruc countries are no exception and the regions surveyed by the Program illustrate a large diversity of situations.

The striking results of the fieldwork are however the continued high share of staple crops in the farm production of surveyed households—even in regions involved in export crops—and the particularly important proportion of self-consumption. The latter 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 of crop diversification and connection to markets. This is not the case and, even in the most integrated regions of the sample, agricultural production patterns remain relatively “domestic-oriented” and “traditional”.<sup>141</sup>

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

### 2.1 Characteristics of On-Farm Income

#### 2.1.1 General Overview

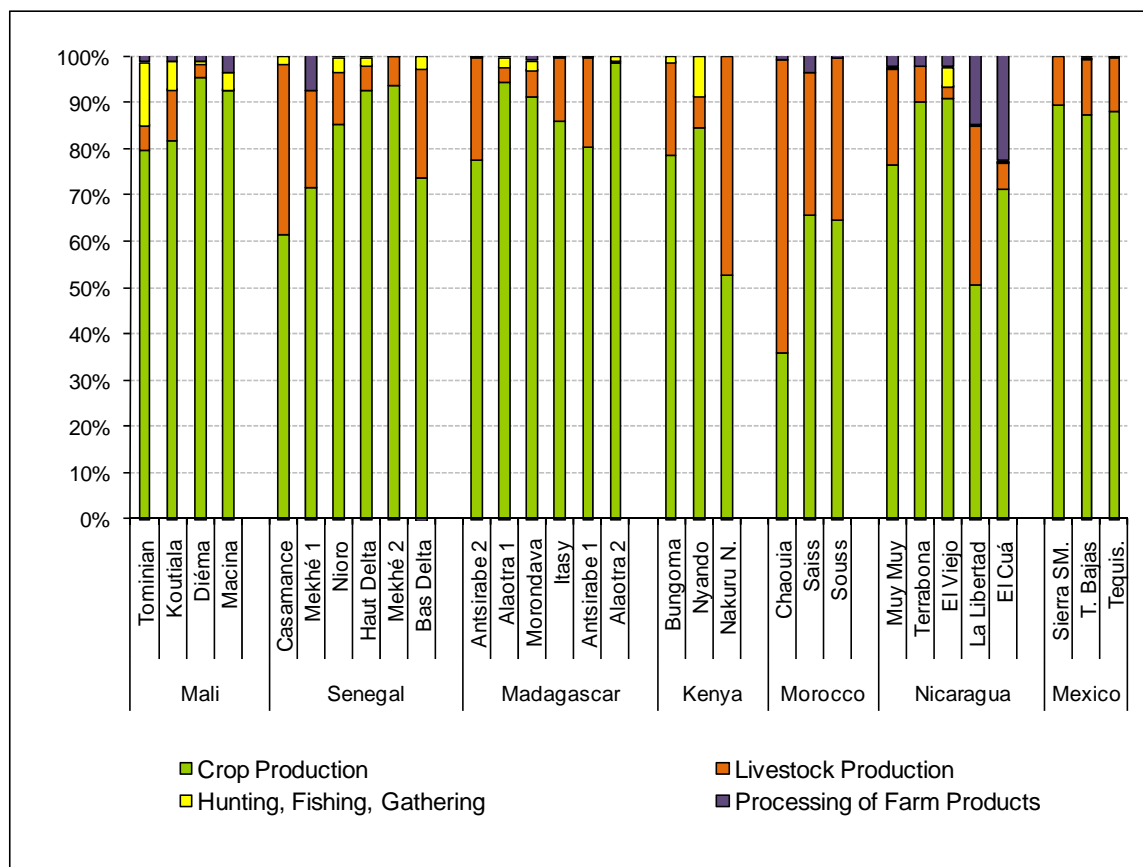
On-farm incomes can be divided into four main types of rural incomes (see Figure 20 in Chapter 4): crops; livestock; income from hunting, fishing and gathering; and income from on-farm transformation processes (such as the on-farm transformation of milk into cheese). Figure 32 shows that crop production generates the main share of on-farm income and dominates regional output everywhere. Its dominance is only challenged in La Libertad in Nicaragua, Chaouia in Morocco, and Nakuru North in Kenya, where livestock accounts for around 50% of on-farm income.

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<sup>141</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 as well as in high-value crops. The meaning of “traditional” here corresponds to those crops which are not involved in new integrated value chains.

The figure also shows us that the surveyed farm households do not rely so much on natural resources for income generation.<sup>142</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 Pacific Coast in Nicaragua (El Viejo); and the gathering of fruits in Tominian and Koutiala (Mali). Processing of on-farm products remains surprisingly limited. Where it does occur, processing concerns livestock products (mostly low-quality cheese production) and initial processing of coffee in Nicaragua, cheese and olive oil in Morocco (Saïss), and groundnut paste in Senegal.

**Figure 32: Overall Structure of the On-Farm Income (in % per surveyed region)**



Source: RuralStruc Surveys

<sup>142</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 and which are often self-consumed. However, wild fruits, animals and fish often play a core role in the food security of the rural households.

In order to analyze agricultural production further, five main categories of products (presented in Table 22) were designed by summarizing more than 30 products identified during the 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>143</sup>

**Table 22: 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 Commodities	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 33 displays the overall structure of the households' gross farm product across the regions.<sup>144</sup> The striking result is the large share of staple food crops. Ninety percent of the farm households in the sample are engaged in staple production (98% in SSA and 76% in non-SSA regions). In 18 out of the 30 surveyed zones (the main exceptions being Morocco, and more partially Kenya and Senegal), staple production is above 50% and sometimes reaches 80% of the gross farm product. Generally, staple production concerns one main type of product, usually cereals, and is rice throughout Madagascar, in Macina (Mali), and in Senegal's Delta and Casamance; millet and sorghum in the three other regions of Mali and in the *Bassin arachidier* in Senegal; wheat in Morocco; and maize in Kenya, Mexico and Nicaragua. The production of cereals is mainly rain fed but, in some cases, farmers

<sup>143</sup> 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 (with Saiss, Morocco) 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.

<sup>144</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 value of sales and self-consumption of crops and livestock productions) instead of income. This option reflects the methodological choices of the Program 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).



have also developed irrigated rice (Madagascar, Senegal, and Mali) and maize (Mexico).<sup>145</sup>

Beans are the second staple crop in Nicaragua, and 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. Roots, tubers, and plantains are grown in most regions (except in Morocco). In Senegal, cassava developed in the *Bassin arachidier* and appears as one of the major diversification options in response to the deterioration of the groundnut sector.

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 coastal 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 milk and dairy products, and there is also a traditional on-farm low-quality processed cheese industry in La Libertad where industrial processing units are missing due to infrastructure constraints. Nakuru North in Kenya, as well as Antsirabe in Madagascar, and the Saïss region in Morocco, each have dairy belts that led to the development of agro-industries. 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., fresh refrigerated milk for processors and supermarkets that supply cities vs. home-made low-quality cheese for local rural markets in Nicaragua), and also the strength of reachable local demand (proximity and access to cities).

The importance of livestock income (in absolute and relative terms) can be affected by specific conditions. This is the case of Chaouia in Morocco where a very bad crop season deeply affected cereal yields and obliged many farmers to sell off their productive assets (live cattle and small ruminants).<sup>146</sup> Similarly, the significance of livestock in the cotton zone of Mali (Koutiala) results from 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. Conversely, the good crop season in Macina led to the opposite effect, with low sales of, and increased investment in

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<sup>145</sup> Though traditional irrigated production systems existed in Madagascar, irrigation development has benefited from public infrastructure through irrigation schemes in other countries, notably Senegal and Mali. Irrigated maize in Mexico mainly concerns large commercial farms. However, the situation of Sotavento's Tierras Bajas zone is somewhat unique due to its natural floodplains.

<sup>146</sup> Due to a severe draught, the Moroccan production of cereals dropped by 73% during the crop season 2007 and affected most of the regions, notably Chaouia (*RS II Morocco*, p.145), and livestock sales increased significantly in absolute and relative terms (p.156).

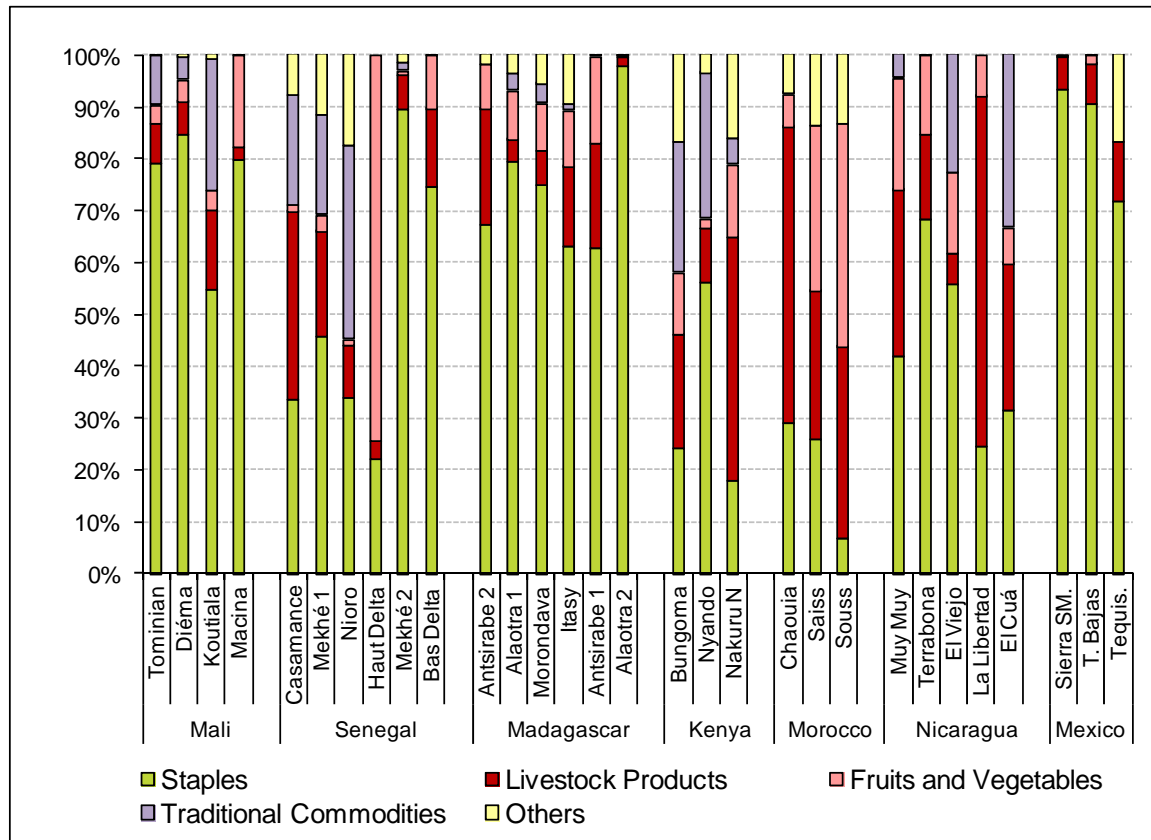
livestock. In Mali, and more generally in all of sub-Saharan Africa, livestock is often a patrimonial asset, which provides draft force, supplies manure for crop productions, and also embodies financial savings which are stored to help deal with difficult times.

Horticulture is a common activity, as vegetables are grown everywhere for domestic 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 Saiss and Souss in Morocco, where production of fruits and vegetables for exports or the agro-industry (mainly fruits and tomato) has 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. The fact that many of the surveyed households are located in the collection area of the factory explains the high share of horticulture in their gross product. Fresh products targeting cities also developed in Antsirabe and Itasy (Madagascar), where temperate fruits and vegetables (peaches, apples, carrots, etc.) can be grown.<sup>147</sup> Onion production has flourished in Saiss (Morocco) and also in Office du Niger (Macina, Mali) where it supplies the domestic and regional markets, contributing nearly 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).

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<sup>147</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 Box 21).

**Figure 33: Main Farm Productions per Surveyed Region (in % of Gross Farm Product)**



Source: RuralStruc Surveys

The importance of traditional commodities 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 have generally played a major role in shaping the region's agricultural complexion, due to their long-standing economic and sometimes political importance (even if this importance has in places faded over time). This is the case of cotton in Koutiala and Casamance, groundnut in the *Bassin arachidier*, coffee in El Cuá and Bungoma, or sugar cane in El Viejo, Nyando and Bungoma.

### 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 RuralStruc sample is the importance of self-consumption.<sup>148</sup> It accounts for a large share of gross farm product and variations between regions reflect differences in market connections. It is important to note however that even when self-consumption is important it does not necessarily imply disconnection from markets. Households have different patterns of market engagement and, even if they cannot sell much of their farm output, they can sell their labor force (see Chapter 4) and they act also as consumers buying goods (including food) and services. Taking the example of Mali in Table 23 below, one can note that even in regions with very significant levels of self-consumption, a large percentage of households participate in food markets as consumers.<sup>149</sup>

**Table 23: Malian Households’ Participation in Food Markets**

	<i>HHs with Food Purchases</i>	<i>HHs with Staple Sales</i>
Tominian	60%	8%
Diéma	64%	53%
Koutiala	58%	77%
Macina	71%	89%

*Source: RuralStruc Surveys*

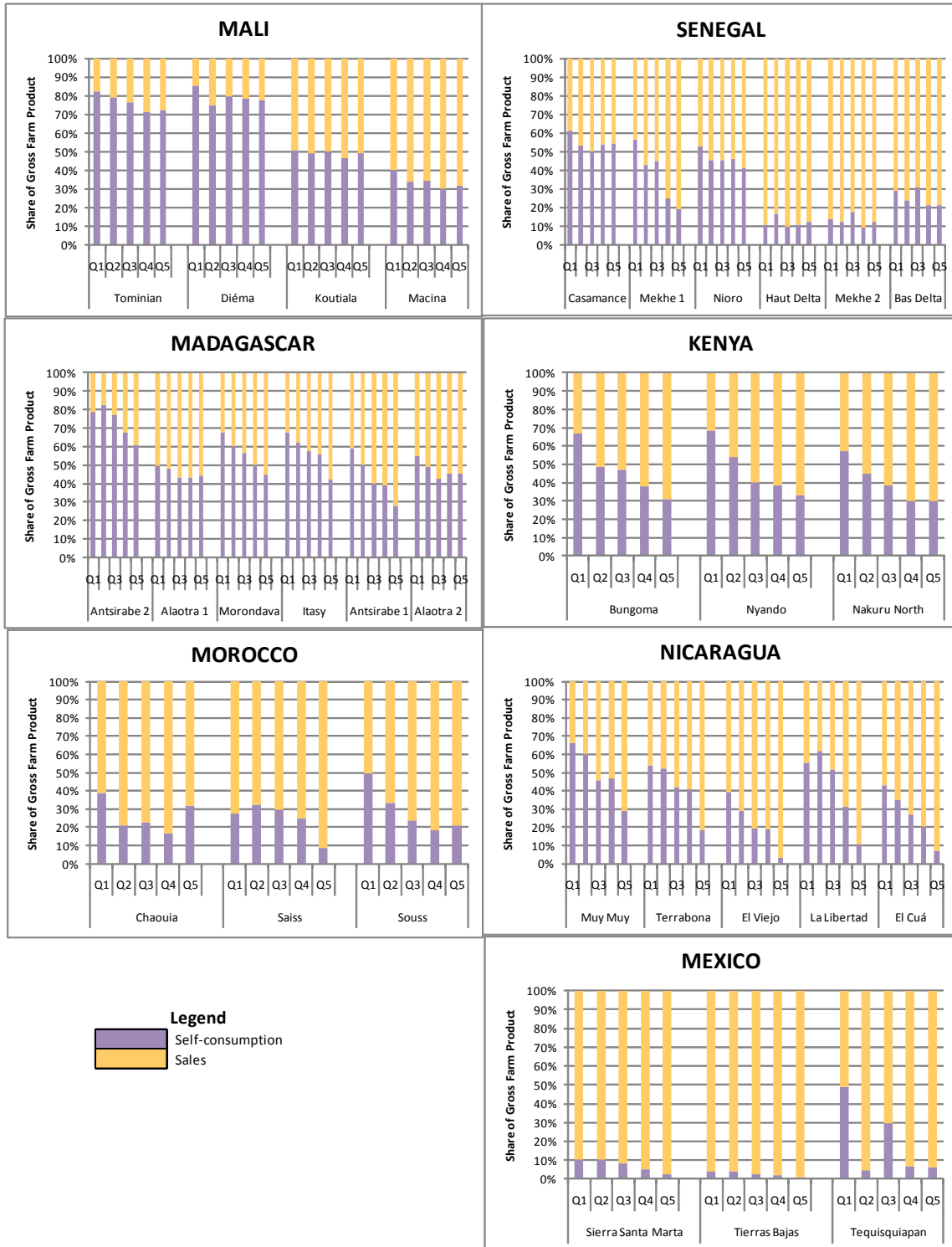
Nevertheless, as displayed by Figure 34, the point remains that self-consumption levels stay high in many surveyed regions—more than anticipated with regard to the methodology for region selection—the major exception being Mexico (Box 19). The RuralStruc sample also highlights significant differences between countries, regions and, within regions, between income levels.

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<sup>148</sup> Self-consumption includes gifts to family, and to social and religious networks. It also includes food reserves (see Annex 1).

<sup>149</sup> The case of Tominian is however amazing: 30 to 40% of households do not participate in food markets at all, either as buyers or sellers.

**Figure 34: Share of Self-consumption (% of Gross Farm Product per Household Quintile)**



Source: RuralStruc Surveys

In richer countries and richer regions, households apparently self-consume a smaller share of their output and the poorest households are more oriented towards self-consumption. The differences between quintiles seem to be strongest in Madagascar, Kenya and Nicaragua, though present almost everywhere.<sup>150</sup>

Two main driving phenomena of self-consumption can be identified. The first depends mostly on distance to markets and / or possibilities for integration through specific value chains and can be referred as a “demand effect”: e.g., self-consumption is lower in Koutiala because a strong demand for cotton provides opportunities to move away from subsistence farming; the same occurs with tomato and cassava in Haut Delta and Mekhé 2, respectively.

On the contrary, households that self-consume much of their own output could do so because there is little demand for their products, most often because their connection to markets is difficult.<sup>151</sup> When demand exists, either through proximity to a large market or through the presence of a specific buyer, self-consumption decreases. Demand effects are more likely to appear at the regional level 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 notably the case in remote areas of Chaouia or Souss in Morocco, and was the reason made for the distinction between Antsirabe 1 and 2).

The second phenomenon is related to risk and level of income. Households with very weak incomes face food security challenges (see Chapter 3) 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. Consequently, supply effects are more likely to arise between income quintiles in the same region.

Nicaragua is a good illustration of a country where differences between household quintiles 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 agricultural markets (i.e., their self-consumption share is 100%). Yet only one region, La Libertad, is characterized by physical seclusion

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<sup>150</sup> The case of Mali, which displays very small differences between quintiles, is challenging. It can be explained by the low level of income, even for the richest households, and a preference for maintaining grain reserves given that high level of stocks are taken as a sign that households are better-off. Additionally, the 2004-05 crop season was very bad and in 2007 many households were still replenishing their stocks.

<sup>151</sup> The connection of rural *producers* to agricultural markets is frequently discussed and a common approach. Nevertheless, the connection of rural *consumers* to markets for goods and services can also be a real stumbling block: when there is nothing or little to buy, there is no incentive to sell, and to increase output. This “reverse side” of markets is surprisingly mostly ignored in the policy debate.

(and therefore faces transportation problems), which means that infrastructure is not the major explanation.

Risk-management strategies seem to be a main reason for this limited connection to agricultural markets. However, one can also suggest that, due to the limited quantities produced by very small farmers, middlemen show little interest in engaging into costly collection of products while they can access larger quantities from large farmers—a clear argument for collective action on small producers' side. Specific local conditions can also shape the characteristics of households' strategies. This is the case of Terrabona where alternative off-farm options (wage-labor in agriculture and in *maquiladoras*) allow a dual strategy, mixing self-consumption of farm products on one side, and insertion into labor markets on the other side: households prefer to maintain food crop productions for family consumption and earn cash revenues from wage labor in order to meet specific monetary needs (schooling, health, consumption goods, etc.).

## **2.2 Regional Patterns of Product 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?

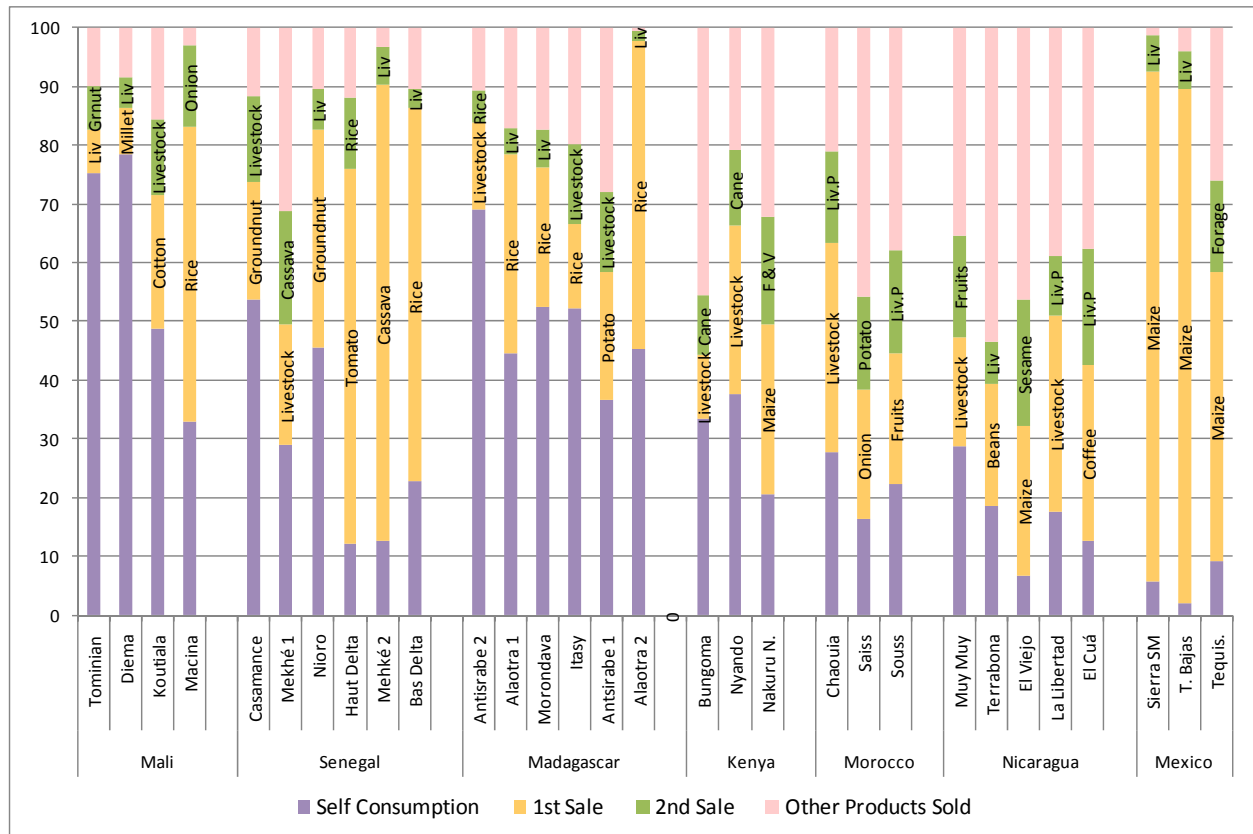
In order to analyze on-farm production further, Figure 35 below displays the overall structure of households' gross farm product across regions. It focuses on the type of products on which households concentrate. It tells the share of farm output self-consumed and the share of on-farm income that comes from selling the two most important sales products. It also displays the name of the dominant sales products of each region.

A first observation of the Program's analysis of commercialized products is the confirmation of 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 subsequent sales of livestock assets). This means that staples are often one of the best options available to farm households, even the richest, and reflects a generally low level of opportunity for specialization in higher value crops.

The high presence of self-consumption at the aggregated regional level, especially in poorer regions, is clearly confirmed; however it also highlights the patterns of on-farm diversification. In sub-Saharan Africa, households in 13 of 19 surveyed regions earn on average more than 70% of their on-farm income either through self-consumption alone or through self-consumption plus the sale of only one type of product. This is the case just in two of the 11 non-SSA regions and sub-regions: the two Sotavento zones in Mexico where a very specific process of deep specialization in maize production has developed (Box 19). Generally, 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.

**Figure 35: Farm Output Break Down by Self-consumption and Main Sales**



Source: RuralStruc Surveys

Note: Liv = Livestock; Liv.P = Livestock Products)

On-farm diversification is a trend not only between poorer and richer regions, but also between poorer and richer households within regions. In 20 of the 30 surveyed zones, households in the fifth household quintile are more diversified than households in the bottom quintile: sales of their top three products make up a smaller portion of their on-farm income (on average about eight percentage points less, though the difference can reach 16%). This increase in on-farm diversification between the poorest and richest quintiles is seen in 10 of 11 non-SSA zones and only 10 of 19 SSA zones, consistent with the previous observation that diversification is less widespread in SSA in general.

On-farm diversification between households 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 zones 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 commodities or high-value



products. Of the 20 zones 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 livestock or traditional commodities (coffee in El Cuá, groundnut in Senegal, cotton in Koutiala).

The same pattern is observed between regions when looking at Figure 35. 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 richer regions are more specialized in fruit and coffee, respectively.

Thus, it can be concluded that the types of products grown result from the unique situation in each region in terms of natural resources, public goods, private investments, 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. Staples and certain commodities seem to be within reach of all farmers in any given region. But richer households, with more assets, are able to take better advantage of more of these opportunities, resulting in generally higher levels of diversification among richer households.

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 this specific 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 RuralStruc 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.

**Box 19: The Sotavento Exception: On-farm Specialization and the Collapse of Self-consumption**

In the RuralStruc survey, Sotavento in the state of Veracruz is very specific and has been characterized by specialization in maize production, increased integration in marketing channels, and dramatic reduction in self-consumption.

The significant development of maize in the 2000s occurred in spite of an adverse economic environment. Indeed, between 1994 and 2007, real prices of maize fell by 60%—a consequence of the major restructuring of the sector (see Box Box 16)—while input prices grew by about the same proportion (Léonard & Palma 2002, Zahniser & Coyle 2004, *RS II Mexico*). Despite these unfavorable circumstances maize acreage increased in the two surveyed Sotavento zones (Tierras Bajas and Sierra de Santa Marta). The increase was most pronounced in the lowlands, a 30% rise in production, while in the mountain areas it grew by a more meager 6%. However, in Veracruz state as a whole maize acreage fell by 18% over the same time period.

This specific trend can be explained by two very different sets of reasons (*RS II Mexico - Sotavento*). In the lowlands, large floodplains offered high fertility and allowed economies of scale through mechanization. Large farms developed but small producers were able to participate in this restructured market through producers' organization. They allowed smallholders access to mechanization services, contracts (mostly informal) with buyers or large farms, and the incentives offered to the commercial sector by *Aserca* and *Alianza* programs (Brun 2008). In the Sierra, remoteness restricted opportunities for diversification—both on-farm and off-farm—and in light of the *Procampo* program maize remained the best agricultural option. As a consequence, in both zones, on-farm specialization increased and other farm products were abandoned, like rice in the lowlands (in the Sierra this even included beans, which are traditionally inter-cropped with maize).

This specialization in maize production was accompanied by an amazing collapse in self-consumption, notably in Tierras Bajas where it is now nearly absent. This situation is quite far removed from the traditional food system based on home-grown maize (with *la milpa*, small plots where local varieties of maize and beans are grown for family consumption) and can be explained by four major features. First, to access public credit and technical support via the large enterprises, producers were required to sell all of their output to the private firms. Second, the opportunity to sell all of their output, rather than store it on the farm, offered a welcome relief to farmers because the new hybrid maize varieties were highly vulnerable to rodents after harvest, making storage difficult. Third, in the Sotavento lowlands, the maize harvest was completely mechanized through services provided by the firms. And fourth, in the lowlands, women were increasingly engaged in off-farm activities and no longer able to dedicate time to the preparation of *tortillas* from farm-grown maize. Consequently, farmers sell their hybrid corn and buy industrial maize flour or prepared *tortillas* at the local markets—a consequence of the rapid restructuring of the “maize-*tortilla* complex” (Appendini & Gómez, *forthcoming*).

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. It also illustrates how quickly production-consumption patterns can be radically modified over a ten year period. Finally, it highlights the strong impact that public support programs can have in households' processes of adaptation.

## 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 were supposed to introduce new types of marketing arrangements through connection with foreign buyers located in higher income countries and highly competitive markets, are in fact extremely limited.

Although the RuralStruc countries find themselves at different stages in terms of penetration of modern food retailing systems, they are, with the possible exception of Mexico, very far from the “supermarket revolution” (see Box 20). Yet, even when a significant degree of supermarket penetration has occurred the effects on the “average” family farmer remain limited. *Regoverning Markets* reminds 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 RuralStruc 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, regional and international markets (i.e., retail systems and exporters). They include wholesalers and the agents or brokers<sup>152</sup> working for them, as well as independent buyers. 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.

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<sup>152</sup> A wholesaler takes possession of the product; a broker does not.

### **Box 20: The Contrasted Development of Modern Food Retailing in the RuralStruc Countries**

According to the *Regoverning Markets* program (Reardon & Huang 2008), the RuralStruc countries can be classified into three levels of modern food industry development: “advanced stage” countries are those where more than 40% of overall food sales are in supermarkets (Mexico); “intermediate stage” countries are those where the supermarket’s share is between 10% and 40% of food sales (Nicaragua, Kenya, and Morocco); and in “initial stage” countries supermarkets make up less than 10% of sales. This is the case of the three other SSA countries, in spite of otherwise strong differences between them.

**Mexico:** The development of modern food retailing occurred in three stages. Before 1980, the development of supermarkets focused on large cities in the north and center of the country and was mainly based on domestic capital, although some chains were set up with US capital. In the 1980s, supermarkets began to move from their regional bases and started their consolidation through alliances with both domestic and foreign capital in a context of intense competition. From 1990, very rapid expansion occurred, impelled by the entry of giant chains from the USA (*Walmart*) and France (*Carrefour*) (Schwentesi & Gomez 2002). Today, supermarkets make up 55% of modern food retailing. However, strong regional disparities and a significant urban-rural divide are masked by country’s overall average.

**Nicaragua:** Supermarkets began developing in the 1990s. Initially only Nicaraguan enterprises were involved. Then, Costa Rican enterprises established a competitive supermarket chain and regional enterprises like *Hortifruti* engaged in wholesaling. Finally, in the 2000s, *Walmart* bought up regional supermarkets and intermediary companies such as *Pali*, *La Union*, *Paiz* and *Hortifruti*. Supermarkets deal today with about 20% of the consumer demand for quality standards (*RS I Nicaragua*, p.58-60).

**Morocco:** Following initial and limited development in Casablanca and Rabat in the early 1960s with *Monoprix* (France), supermarkets started to grow in the 1990s led by several Moroccan-owned chains, notably *Marjane*, *Label’Vie* and *Aswak Assalam*. The first major foreign investment was made in 2001 when *Auchan* (France) entered into a joint venture with *ONA (Omnium Nord Africain)*, Morocco’s largest consortium of private companies, and took control of *Marjane* and then *Acima* in 2002 (Codron *et al.* 2004). *ONA* holds 51% of the joint-venture and *Auchan* 49%. The number of hypermarkets grew from 6 stores in 1993 to 19 in 2007 (*RS I Morocco*, p.104).

**Kenya:** Supermarkets have developed from a tiny niche market only 15 years ago to almost 20-30% of urban food retail today, and continue to gain prominence quickly. The first store outside Nairobi was built by *Uchumi* in Nakuru in 1993, starting a national competition. The rivalry between the two leading chains—*Uchumi* and *Nakumatt*—became an important growth driver as a new strategy by one chain forced imitation and/or a counter strategy by its competitor (Neven & Reardon 2004). In 2003, there were already 225 large format stores in Kenya – 209 supermarkets and 16 hypermarkets.

**Madagascar:** The share of supermarkets in retailing remains limited, but supermarkets have developed in the main cities of the country through three foreign companies. Until the recent political events the settings were as follows: the South African chain *Shoprite*, operating in Madagascar since 1992 when it bought out local assets of the French *Champion*, has seven stores (five in Antananarivo, one in Antsirabe and one in Toamasina); *Leaderprice* (France) has three stores in Antananarivo; and *Score* (bought by the *Vindemia* group, now subsidiary of the French *Casino*), has three hypermarkets in Antananarivo and two supermarkets in the other provinces (*RS I Madagascar*, p.63).

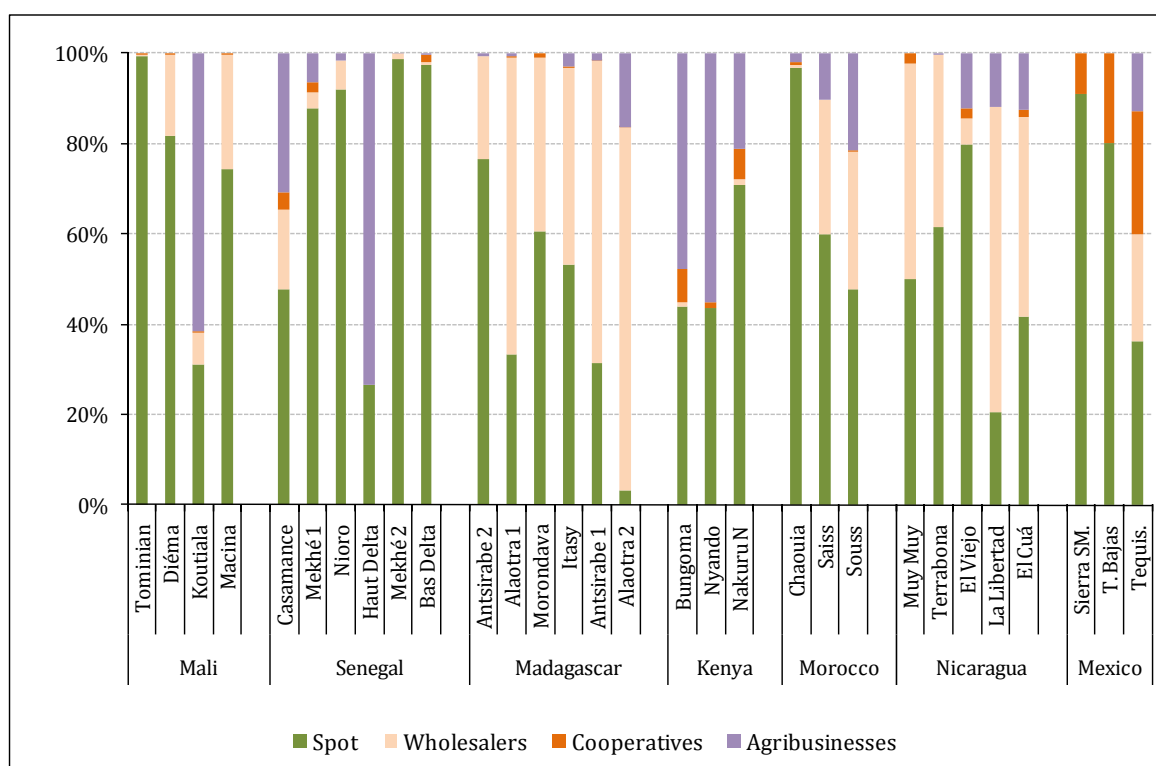
**Senegal:** Modern food retail is very limited in the country with only three supermarkets in Dakar. Initially created by *SCOA* (France) under the brand name *Score*, they are franchised with *Casino* (France) since 2007.

**Mali:** There is no significant modern food retail in Mali.

*Sources: RS Country reports and other references cited.*

In the surveyed regions traditional marketing is dominant. Figure 36 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>153</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 (Alaoatra, where wholesalers are based) and horticulture products (Antsirabe 1, in the vicinity of the city), and in Nicaragua.

**Figure 36: Methods of Commercialization in the Surveyed Zones (% of the value of sales)**



Source: RuralStruc Surveys

Surprisingly the share sold to cooperatives, a 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

<sup>153</sup> 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.

Sotavento, new producers' organizations were created to support the development of maize production, but these organizations were assembled primarily as a way to access public subsidies (see Box 19). In Tequisquiapan, farmers sell maize or forage to producers' organizations which are often under contractual arrangements with large cattle enterprises.

On the contrary, sales to agribusinesses are more 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 production 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 –Compagnie Malienne pour le Développement des Textiles*). High levels of sales to agribusiness are also observed 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>154</sup> In other regions, the importance of commercialization through agribusinesses is lower, and generally accounts for less than 20% of sales. This is the case with tomatoes, citrus and olives in Saïss and Souss (Morocco), tomatoes and dairy products in Nakuru North (Kenya), coffee in El Cuá (Nicaragua), rice to rice mills in Alaotra 2 and green beans for export in Itasy (Madagascar).

### 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 Program teams 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

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<sup>154</sup> 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* in Senegal and for *CMDT* in Mali.

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 24 makes this point clear: only 539 of the households surveyed (7.4% of the sample) claimed to be engaged in at least one contractual arrangement.<sup>155</sup>

This low level 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 *Walmart/La Union-Palí* 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 in the survey: 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.

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<sup>155</sup> Contractual arrangements displayed in this table include formal written contracts as well as informal contracts perceived by the producer as effective.

**Table 24: Importance of Formal and Informal Contractual Arrangements per Surveyed Region**

		HH with contract		type	Type of industry and contracting agents
		#	%		
Mali	Tominian	1	0.6		
	Diéma	0	0.0		
	Koutiala	0	0.0	df	Cotton industry (CMDT)
	Macina	16	10.4	I	Rice industry
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
	Alaotra 1	2	0.5		
	Morondava	15	3.0	I	
	Itasy	50	9.9	F	Green beans processor ( <i>Lecofruit</i> ) and tobacco
	Antsirabe 1	46	22.3	F/I	Milk industry ( <i>Tiko</i> ) and vegetables collectors
	Alaotra 2	8	7.0	I	Rice industry
Kenya	Bungoma	75	25.1	F	Sugar industry
	Nyando	7	2.5	F	Sugar industry
	Nakuru North	16	5.5	F/I	Milk industry and tomato processing
Morocco	Chaouia	1	0.4		
	Saiss	20	7.7	F	Milk Industry
	Souss	1	0.4		
Nicaragua	Muy Muy	9	3.0	I	Milk industry ( <i>Parmalat</i> and <i>Eskimo</i> )
	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	df	Producers' organizations
	Tierras Bajas	6	4.0	F/df	Maize Industry and Producers' organizations
	Tequis.	29	8.0	F	Producers' organizations
		539	7.4		

Source: RuralStruc Surveys

Note: F = formal; I = informal; (df) de facto contracts

#### 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 *Bassin arachidier* (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 Agro-Processors

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 the recent political events) 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 and Souss, Morocco, and in Nakuru North, Kenya.

Comparable 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. 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.<sup>156</sup>

### 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 RuralStruc 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 21). 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 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.

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>157</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.

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<sup>156</sup> For long-standing, public or semi-public monopsonies—like *CMDT*—had the obligation to buy all producers' outputs. After years of negotiation, *CMDT*'s privatization has finally been launched in 2010; however, it will not fundamentally change the market pattern and the company will be replaced by regional monopsonies.

<sup>157</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.

**Box 21: *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 (1,000m<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 (\$0.83 PPP).

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.

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. Similarly, the tomato producers under contract with SOCAS in the Haut Delta in Senegal are not in a significantly different economic position from other Senegalese households. 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.

### **3. On-farm Specialization and Rural Transformation**

On-farm specialization is one of the three exit pathways out of rural poverty. Households surveyed by the RuralStruc Program are broadly specialized in agriculture—on-farm incomes keep a high share of their total income—but they remain poor. This contradictory assessment, highlighted by the third chapter, justified a close examination of the characteristics of rural incomes in general and of the observed on-farm specialization.

As shown by the fourth chapter, while nearly all of SSA households are engaged in farming most of them are also diversified and engaged in off-farm activities, which are part of general coping strategies. Complete on-farm specialization is very limited. And does occur in several regions in Nicaragua and Morocco, where more robust value chains can offer secure returns.

On average, on-farm incomes are characterized by high levels of self-consumption, the importance of staples, and more heterogeneous patterns of product diversification that develop in response to region-specific opportunities. This picture is quite far from the new agriculture that has been widely discussed in the literature. The results do not display the increasing processes of integration, new players, and new rules of the game that this literature predicts.

So far, in the surveyed regions, self consumption remains very significant. Its levels are driven both by a supply and a demand effect. The supply effect corresponds to risk-management strategies that households employ to retain control over their food supply—a direct response to incomplete and imperfect markets. The demand effect expresses the weak demand for their products that households face due to poor access to and integration with markets. Limited infrastructure can be a major obstacle, but it can be reinforced by weak marketing systems where middlemen do not have enough incentives in collecting limited quantities of low value products—a consequence of low productivity of staple crops—particularly in low density areas where collection costs are high.

Most private collecting agents operating in the RuralStruc surveyed areas rely on informal relationship-based strategies to obtain output from small farmers, while agribusinesses generally employ traditional contract farming practices. Contractualization remains very low, even for those farms which are firmly integrated into markets through 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.

The share of self-consumption decreases with wealth both at the regional level and the household level, and surveyed regions in sub-Saharan Africa are logically less advanced in this process. The richest SSA surveyed households are also less diversified than their non-SSA counterparts. This is mainly explained by differing

market environments, which offer sub-Saharan Africa fewer opportunities to engage in new value chains. This lack of opportunity also explains the persistently high share of staple products in households' production baskets, even when they move away from self-consumption and even when they become richer. Staples are not only the prerogative of poor farmers. More generally, the development of on-farm product diversification (its extent and the types of products involved) depends on a process which encompasses a region as a whole. The result tends to be that all households can participate in new value chains, with their level of participation depending on their own assets (production factors, human and social capital). The famous high-value chains focused on exports are few and far between. They employ a very small share of the farmers surveyed and their development depends on existing operators (processors, exporters) and their capacity to develop contracts with foreign markets.

In spite of the slew of changes that have occurred in many developing countries' agricultural sectors in the last few decades, old agricultural patterns persists. Full on-farm specialization remains limited and on-farm incomes in general are characterized by a trend towards product diversification: a way to seize existing opportunities and also to share risks in economic environments which often remain uncertain.

## **CHAPTER 6. FROM REGIONAL PATTERNS OF RURAL TRANSFORMATION TO POLICY GUIDELINES**

The previous three chapters provided a detailed analysis of the level of income and the characteristics of on-farm and off-farm activities in the surveyed regions. The goal was to investigate the hypotheses of the program. How do farm households adapt to the new evolving environment, and do they more fully specialize in agriculture as they become more deeply inserted into markets (hypothesis one)? What are the characteristics of rural households' adaptation strategies in terms of combining activities towards more diversified patterns of income (hypothesis two)?

A burning question remains however, which refers to the link between these specialization and diversification patterns, and the level of total income. What does this relationship say about the viability of different pathways out of poverty and the overall process of rural transformation?

This sixth and final chapter explores this relationship. It begins with a review of the determinants of total income, which were not directly addressed in Chapter 3—whose main goal was to present an overview of regional characteristics and rural poverty. The chapter then fine-tunes regional patterns of income diversification, and discusses the relationship between income levels and income structures, leading to an investigation of regional specialization and diversification. The identified dynamics at play yield evidence of poverty traps for most of the regions in sub-Saharan Africa.

In its second section, the chapter proposes a grouping of households depending on their income-based room for maneuver and draws conclusions about the significance of the observed rural realities in terms of policy making. It then suggests policy options for facilitating rural transformation in this context.

### **1. Regional Patterns of Income Diversification and Specialization**

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

A household's level of income per capita results from an array of different factors. These include the type of economic activities in which it is engaged, the returns to those economic activities, the assets available to the household, the size and the demographic structure of the household, and its economic environment. Chapters 4 and 5 explored the types of activities in which households are engaged, and found a strong heterogeneity between households and regions, with no evidence that any one particular type of activity was the best option in every case. Consequently, the investigation of income determinants presented below does not test the usefulness of particular activities. Rather, it focuses on determinants that allow a household to take advantage of regional opportunities.

The analysis of the determinants of total income unfolds along four lines of inquiry: household characteristics and human capital, assets related to farm productivity, environment and market access, and off-farm diversification. To pursue this investigation the program 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 Annex 5, a brief overview of the motivation, and a summary of key results are presented below.

The regression work primarily took place at the regional level (aggregating the households of each region), and was conducted in all thirty RuralStruc surveyed zones. The analysis only includes households with farm, as including households without farm would have reduced the explanatory power of variables relating to farm assets. In each regression, the dependent variable is the log of household income per adult equivalent.<sup>158</sup>

The program 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 are not) 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 25 and Table 26 give an overview of the results of the regression analysis and display the significant variables.

Table 25 is complex in that it offers many results with many 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 the regression, laden down with variables related to farming, has limited explanatory power). The main results by category of variable are discussed below, except for the level of diversification (“diversification index”) which will be discussed in the next section.

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<sup>158</sup> Every effort was made to run the same regression in all thirty surveyed zones. This was not always possible, as certain pieces of information were available in some regions and not in others, or some variables were locally irrelevant (e.g. irrigation); however, in general, the specification in each region is very similar (see Annex 5).



**Table 25: Region Level Regression Results**

	Mali				Senegal				Madagascar				Kenya		Morocco		Nicaragua			Mexico		# of regions significant											
	Tomini	Diema	Koutiala	Macina	Casamance	Mekhé 1	Nioro	Haut Delta	Mekhé 2	Bas Delta	Antsirabe 2	Alaotra 1	Morondava	Itasy	Antsirabe 1	Alaotra 2	Bungoma	Nyando	Nakuru N.	Chaouia	Souss	Souss	Muy Muy	Terrabona	El Viejo	La Libertad	El Cua	Sierra SM.	T. Bajos	Tequis.	at 5% level	at 10% level	
Demographics and Human Capital	Number of Persons in HH (Nb_PersonsPres_hh)																															17	1
	Dependency Ratio																															1	4
	Number of Long Term Migrants / HH																															4	0
	Number of Short Term Migrants / 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
Market Integration	HH Uses Tractor for Draft (binary)																															4	3
	Transportation is Easy only Part of the Year (binary)																															7	1
	Transportation is Difficult (Qualitative binary)																															4	3
	Transportation Difficulty in Unknown (binary)																															1	1
	c_50000 (c_ports in Kenya, Sub-Regions in Morocco)																															4	1
	Contract (binary)																															5	1
Diversification Index																															17	1	

**Table 26: Nationally Aggregated Regression Results**

	Mali	Senegal	Madagascar	Kenya	Morocco	Nicaragua	Mexico	# significant at 5% level	# significant at 10% level		
Demographics and Human Capital	Number of Persons in HH (Nb_PersonsPres_hh)									6	0
	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
Household Assets related to Productivity	HH Head has at least Completed Secondary Education (binary)									2	1
	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
Market Integration	HH Uses Tiller for Draft (binary)									2	0
	HH Uses Tractor for Draft (binary)									2	1
	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	

**Legend**

- Significant at the 5% level
- Significant at the 10% level
- Not Included in the regression (see Appendix)
- Included but not significant
- N The coefficient is negative
- P The coefficient is positive

**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 it is able to earn. 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 may not have enough labor. This conclusion makes sense in light of labor requirements of cotton farming.

Given the prevalence of surplus labor in households, discussed in Chapter 4 and illustrated by the regression results, 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, returns to migration depend strongly on the destination of the migrant, which varies significantly between countries, but less so within them, meaning an effect is unlikely to be captured in within-region or within-country regressions. Secondly, migrations are less common in the survey than one may have thought.<sup>159</sup> Long term migrants are present in only 20% of the entire sample of farm households. Short term migrants are even less common, only appearing in 10% of the sample. The regression work reflects the discussion in Chapter 4 about strong barriers to migration that currently make it a non-viable option for many households.

Conclusions from the education variables are less clear. The education level of the head of the household is less frequently associated with income in the countries of North and West Africa (Senegal, Mali, and Morocco) and also Mexico. In North and West Africa, this is explained by the overall low levels of education (see Chapter 4). In Mali for example, 84% of surveyed household heads have no formal education. This however is changing. The surveys show that very frequently the most educated person in the household is not the household head. Children are becoming better educated than their parents, implying that these regions stand to benefit from increased education in years to come.<sup>160</sup>

**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

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<sup>159</sup> The difficult capture of migration incomes is of course an issue addressed in Chapter 4.

<sup>160</sup> There also seem to be important level effects, but not necessarily “certificate effects”. The most significant difference in incomes is associated with the jump from having completed primary education to having some secondary education.

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 by the second important finding: the comparatively broad insignificance of the technical package variable.<sup>161</sup> 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 (Madagascar and Kenya). 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 Access Variables:** Even with the caveat that insertion and integration into markets is difficult 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 connections to markets along two axes: (i) distance to markets (including a qualitative assessment of transportation quality), and (ii) level of integration into value chains through the number of households with contracts (what constitutes a contract having been more specifically discussed in Chapter 5).

The variable on travel time to markets (c\_50000) left little in the way of patterns to be discerned. Further, the variable about 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.<sup>162</sup>

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<sup>161</sup> A caveat here is that the survey did not address a detailed review of intensification practices. The technical package variable represents access to fertilizer and improved seeds only.

<sup>162</sup> These regions are the following: Bas Delta (Senegal), the two Antsirabe zones (Madagascar), El Cuá (Nicaragua), and Tequisquiapan (Mexico). These results are not straightforward to interpret, but make a point about the relative importance of physical distance to a city vis-à-vis quality of roads.

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 all countries are engaged into contract agriculture, and Kenya and Nicaragua are not particularly well endowed. The difference is where the contracts are concentrated on the income spectrum. For instance, in the Haut Delta region of Senegal, where over 90% of farmers have contracts with the local 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. Through this arrangement they receive preferential access to farm inputs they can use for other crops but this is generally not enough to alleviate poverty and furthers their dependence on the factory. 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 main results. The first is the persistence of old patterns of wealth. In regional situations where agriculture plays a major role, income still responds in the same way it did hundreds of years ago throughout the world: accessing land and increasing the amount of land under cultivation remain the best way to improve farm incomes. Further, depending on existing economic alternatives and local constraints (availability of natural resources and access to resources), population dynamics remain decisive and, as household's size goes up, income per head falls.

The second result 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 environment 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 extensively 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 27. 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

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Where the transportation quality variable is negatively significant, physical proximity to a city matters a lot. Where it is positively significant, it is better to have a good road network than to be physically close to a city (see Annex 5).

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 RuralStruc 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 Used”, there is no particular variable that appears as a main determinant of income in more than six regions. Additional patterns of significance in the chart are indiscernible.

**Table 27: Variables Most Strongly Associated with Income by Region**

	Mali				Senegal				Madagascar				Kenya			Morocco			Nicaragua			Mexico			Significance Scores									
	Tomianian	Diema	Koutiala	Macina	Casamance	BA Nord 1	BA sud	Haut Delta	BA Nord 2	Bas Delta	Antsirabe 2	Alaoatra 1	Morondava	Itasy	Antsirabe 1	Alaoatra 2	Bungoma	Nyando	Nakuru N.	Chaoiua	Saiss	Souss	Muy Muy	Terrabona	El Viejo	La Libertad	El Cua	Sierra SM.	T. Bajos	Tequis.	# of 1st	# of 2nd	# of 3rd	total
Demographics and Human Capital	Nb_PersonsPres_hh		P		N		N						N												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																		N									N		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 (Land 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	
	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  
N The coefficient is negative  
P The coefficient is positive

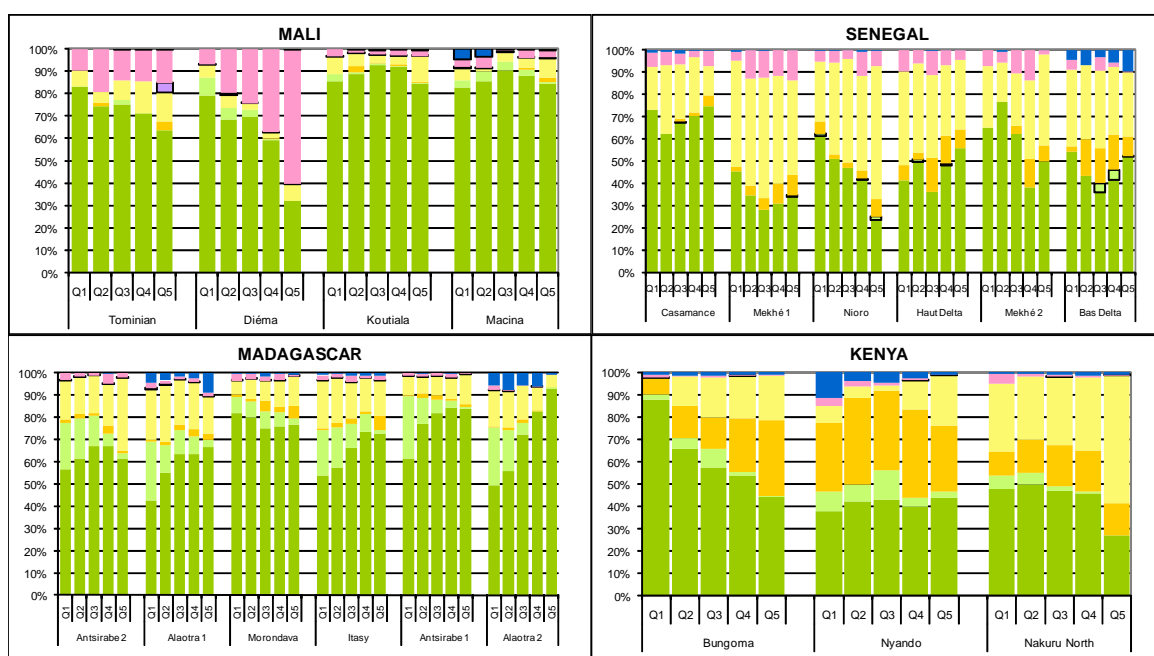
Sources: RuralStruc Surveys

## 1.2 Fine-tuning the Regional Patterns

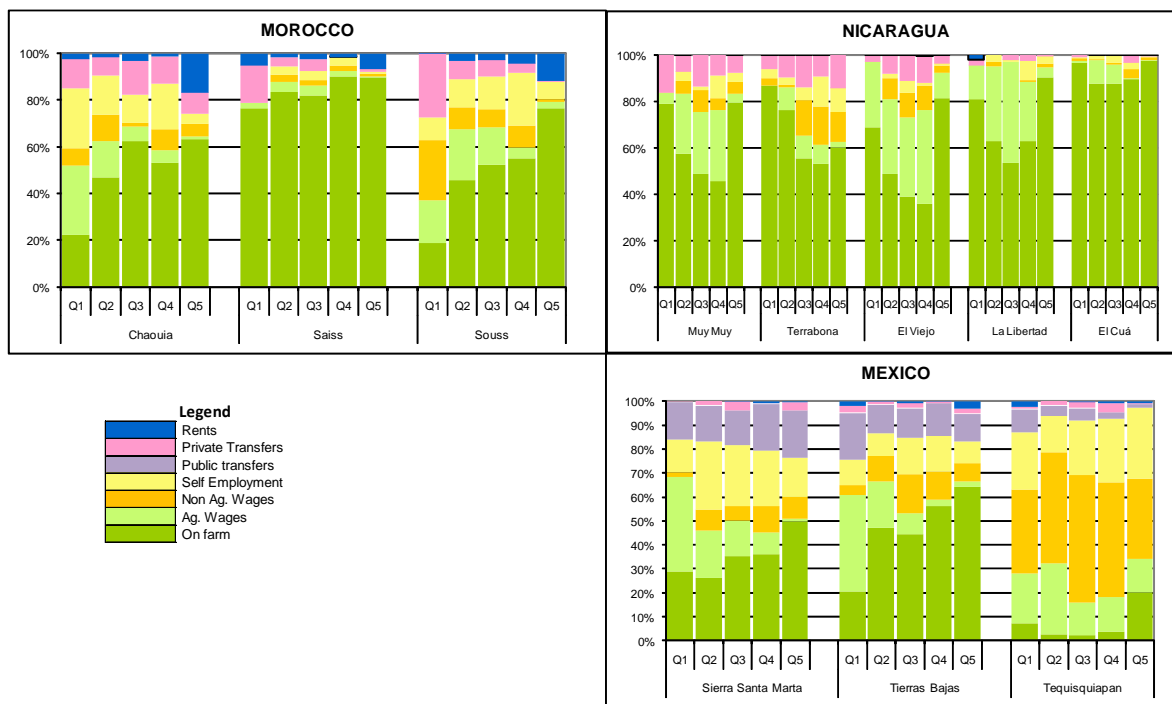
### 1.2.1 First Overview

The final line of inquiry into determinants of income in the regression involved diversification. But before beginning to analyze 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. Figure 37 below builds on the analysis of Chapters 4 and 5 and provides a combined picture of income structures by quintile and region.<sup>163</sup> This is the first step on the way to understanding diversification patterns. The charts display regional income patterns per quintiles using on-farm income as a whole and the six off-farm incomes discussed in Chapter 4: agricultural wages, non agricultural wages, self-employment, public transfers, private transfers, and rents.

**Figure 37: Income Structure by Quintiles in the Surveyed Regions (in % of \$PPP / EqA)**



<sup>163</sup> The Figure displays the shares of regional means by income sources and by regional quintiles. See section 1.3 for discussion of the meaning of the different types of average calculation.



Sources: RuralStruc Surveys

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 for most of the quintiles in Mali, Madagascar, Nicaragua, Casamance in Senegal, and Saïss in Morocco. In a number of regions, on-farm activities are the dominant income source of the richest households. On the other hand, off-farm incomes are very significant in Senegal, Kenya, Mexico, and in Chaouia and Souss in Morocco. Furthermore, the configuration of off-farm incomes varies: self-employment is a key activity in Senegal; non-agricultural wages and self-employment are important in Kenya; agricultural wages play a large role in Nicaragua; and Mexico is more broadly diversified.

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



### 1.2.2 *Characterizing the Trends*

To shed more light on this subject, the RuralStruc Program created an index of household diversification that is based on the well-known Herfindahl-Hirschman index (HHi).<sup>164</sup> The index is set between 0 and 1, and returns higher values as a household becomes more heavily involved in more types of activities. Therefore, higher values of the diversification index mean more diversification, while lower values mean more specialization.

Figure 38, which was constructed based on the overall sample, tells us the average level of the diversification index by region and household quintile and, looking at this figure, trends begin to emerge. These trends can be analyzed on three levels: between countries, between regions of the same country (regional effects) and between income quintiles of the same regions (quintile effects).

#### a. “Country” Level

First, at the country level, there is 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 household 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 zones of the Mexican Sotavento (Tierras Bajas and Sierra Santa Marta) and is largely a result of the way the index is constructed.<sup>165</sup> Even with the presence of these exceptions, it seems that between countries, household diversification tends to fall as country incomes increase.

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<sup>164</sup> Although constructed in a way that makes it more like 1-HHi. See the definition of the index in Annex 1.

<sup>165</sup> As the diversification index is based on seven types of incomes (on-farm and the six off-farm 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. Tequisquiapan's index is not raised in this way because although public transfers are present, only 27% of households have on-farm incomes and consequently the weight of subsidies related to agriculture (Procampo) is lower.

### b. Regional Level

Patterns also emerge between regions of the same country. However these “regional effects” do not follow any specific trend. Some regions tend toward diversification with rising incomes: in Senegal, the Bas Delta is significantly more diversified than Casamance; and in Kenya Nakuru North is more diversified than Nyando. But the opposite exists as exemplified by Mali and Mexico.

Local characteristics are fully at play. It is clear, for example, that the higher household specialization in the two richer regions of Mali (Koutiala and Macina) reflects long-standing Government attention given to the cotton industry in Koutiala and to rice in the Office du Niger irrigation scheme in Macina. In Mexico, Sierra Santa Marta households have a significantly higher diversification score than their compatriots in Tierras Bajas and Tequisquiapan. In the Sierra, households are unable to either specialize in maize as do their neighbors in the lowlands, or to specialize in off-farm activities as do households in Tequisquiapan (see Figure 37). This stems partly from their isolation, the agro-ecological characteristics (mountain area versus large flood plains), and the subsequent lack of access to technical packages and the large maize buyers associated with them, but also from smaller plot sizes and the lower land productivity of mountains terrain.

### c. Household Level

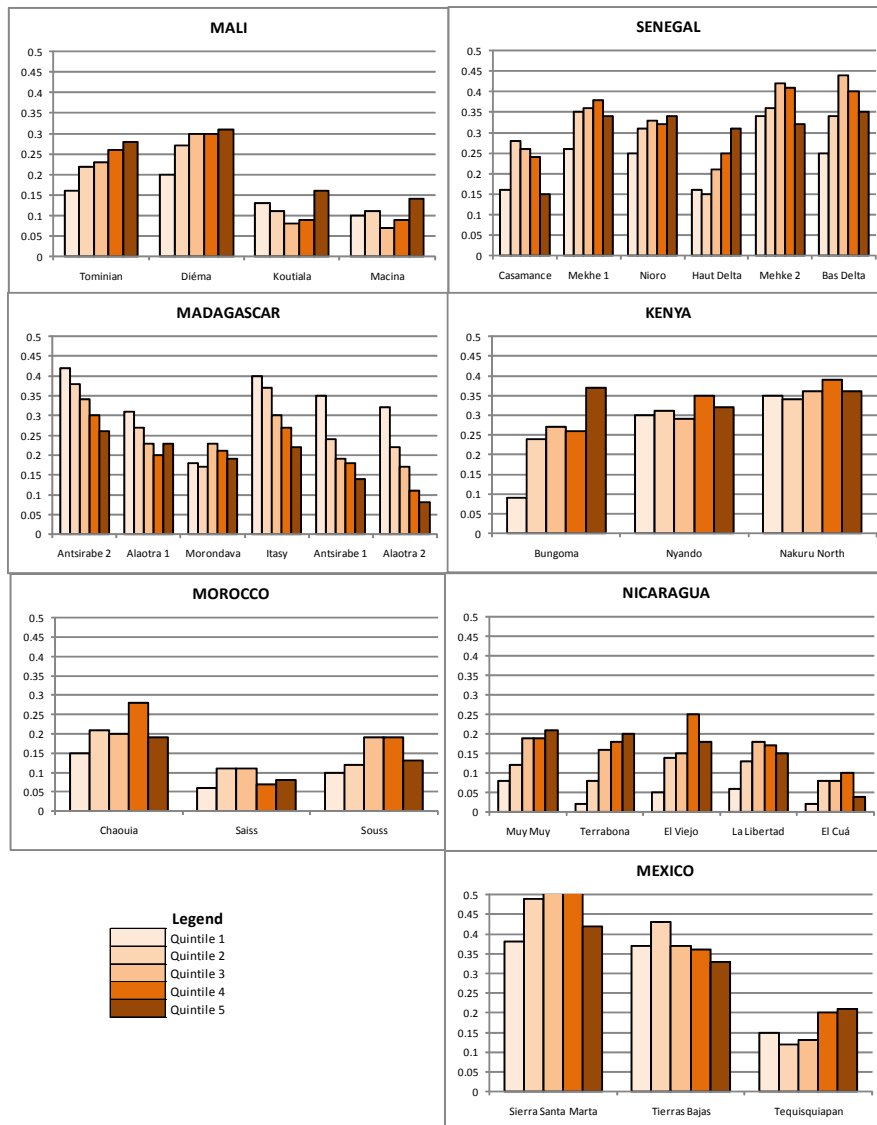
These regional effects, however, tend to be less pronounced than intra-region “quintile effects.” Though in some regions richer quintiles are more diversified, and in others they are more specialized, in most regions the change from quintile to quintile is important. Clearly there is a strong relationship between income and diversification.

A first trend to note is that the direction of the quintile effect (i.e. whether richer households tend to be more specialized or more diversified) appears to be the same for regions of the same country, with a few notable exceptions (like Morondava in Madagascar, Casamance in Senegal, or El Cuá in Nicaragua). Secondly, a preliminary attempt to classify regions by the nature of the relationship they exhibit between diversification levels and household quintiles yields additional results. Though these relationships are diverse, eleven regions exhibit a pattern that could roughly be described as an inverted U (the most common pattern). These regions are characterized by a situation where at lower income levels (quintiles 1-3), as households become richer, they also become more diversified, but above quintile 3 or 4 they begin to specialize again.<sup>166</sup>

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<sup>166</sup> The regions that exhibit this type of pattern are the following: Casamance, Mekhé 1 and 2 and Bas Delta in Senegal, Chaouia and Souss in Morocco, El Viejo, La Libertad, and El Cuá in Nicaragua, and Tierras Bajas and Sierra Santa Marta in Mexico.

**Figure 38: Diversification Index (1-HHi) per Region and Quintile**



Sources: RuralStruc Surveys

### 1.2.3 The Diversification – Income Relationship

A closer scrutiny to the relationship between diversification and income requires the consideration of the full distribution of households, masked in the previous analysis by the quintile averages. These averages are particularly distorted by the large jump in income which characterizes the gap between the fourth and fifth quintiles in every region (see Chapter 3).

Plotting all household of a region on a plan with axes representing income and diversification, and conducting second order polynomial regressions, confirms and strengthens the classification identified above: 22 out of the 30 surveyed regions display an inverted U pattern.<sup>167</sup> Among the 8 regions challenging this inverted U, 7 of them show a U shape and one has a downward slope (Box 22).

#### **Box 22: Challenging the Inverted U Pattern**

The surveyed regions in **Madagascar** challenge the inverted U pattern: five out of the eight regions whose distributions do not follow this shape are found here. Except for Morondava, they follow a U shape, which means that poor households are already diversified, then engage in specialization, and finally tend to diversify.

Households in poorer quintiles in Madagascar are more diversified than in other surveyed regions because there is a class of households which do not have the resources to survive by subsistence agriculture alone. High population densities have resulted in very small farm sizes (lower than half a hectare), as well as a sizeable group of landless peasants. Consequently the very poorest must seek off-farm work and find it in agricultural wage labor supporting the rice industry (see Figure 37). On a per day basis this is among the most poorly paid activities in the entire survey. Households obviously try to exit this situation and to reach a point where they can subsist on agriculture alone, which is equivalent to a specialization. The situation of Morondava, which is the exception among the Malagasy surveyed regions and follows the inverted U shape, is explained by a lower population density and larger farms. There, the poorest households are able to survive by subsistence farming. Further, the region is less specialized in rice, and consequently fewer opportunities for agricultural wage labor exist. Therefore, income improvement means accessing additional sources of incomes and diversification, before a possible specialization in fewer activities.

The two other surveyed regions which do not follow the inverted U pattern are Koutiala in Mali and El Cuá in Nicaragua. **Koutiala**, like the regions in Madagascar, displays a U shape. Here, the cause is the presence of a cash crop with a guaranteed buyer. For poor households, deeper involvement in cotton is the best option because it benefits from a somewhat secure environment. However, the “paradoxical” limitations in the development of the cotton growing areas (decreasing land availability and fertility—see Box 9) means that cotton can only earn a household so much. Richer household are the ones which engage in diversification activities.

**El Cuá** is the only region to display a full downward slope, meaning a trend towards specialization across all income levels. The driving force here is the same: a cash crop with easy access to markets. However, returns to coffee farming are much higher than returns to cotton farming and so the need to supplement incomes is not as strong.

Based on the persistence of this inverted U pattern, one can postulate that households prefer to specialize. This is, after all, what those with the most resources choose to do. If households prefer to specialize but at poorer levels do not do so, it must mean that they cannot. The implication of an inverted U pattern is therefore

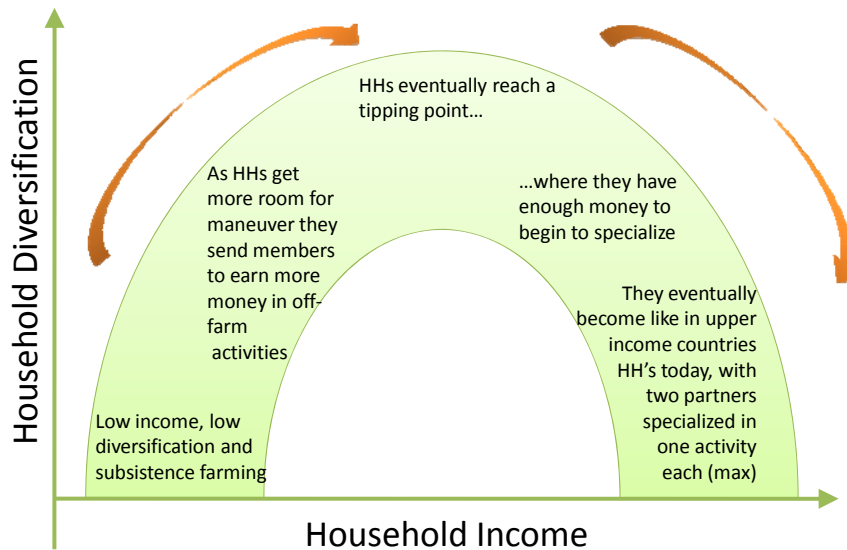
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<sup>167</sup> It is worth noticing that this inverted U shape holds even when dropping off the households with the highest incomes, which bear heavily upon the 5<sup>th</sup> quintile’s averages. The only exception is Saiss, Morocco, where excluding the five richest households leads to a different regression result and a U shape instead of an inverted U (see Chapter 4 for a discussion of existing high incomes in Morocco related to rents).

that poor households diversify as a way of earning more money to meet their basic needs and mitigate their very high levels of risk, but beyond a certain income threshold they begin to specialize (Figure 39).

The regression work presented earlier in the chapter (see Table 25 and Table 26) provides further evidence of a strong relationship between diversification and income. The diversification variable is significantly associated with income between surveyed regions in every country (i.e. at the nationally aggregated level). Within regions diversification is also widely significant (17 of the 30 regions, making it the third most commonly significant variable in the regression).<sup>168</sup>

**Figure 39: Stylized Representation of the “Inverted U” Pattern**



*Sources: Authors*

Moreover, at the regional level, the direction of significance of the diversification variable (the sign on the regression coefficient) tends to match that of the nationally aggregated level.<sup>169</sup> The two countries where diversification is negatively associated with income at the nationally aggregated level are Madagascar and Mexico, which

<sup>168</sup> One must keep in mind that this regression work was applied on farm households only.

<sup>169</sup> For example, diversification is positively associated with income in Senegal, and also positively significant in 5 out of 6 regions in the regional level regression. The diversification variable is not significant in Haut Delta because of the high specialization in tomato production (see Chapter 5).

are respectively among the poorest and the richest subsets of the sample. In Madagascar, this relationship stems from the already highly diversified structure of poor households' incomes (see Box 22); in Mexico, on the other hand, it has to do with farm households' specialization in maize.

To conclude, the evidence from both the investigation of income structures and the regression work indicates that the diversification - income relationship is mainly governed by an inverted U pattern, whereby poorer households diversify to mitigate risks, but more well-off households tend to specialize. The next section introduces an additional perspective that further advances the idea of the inverted U pattern and relates this observation to broader issues of structural transformation.

### **1.3 Household Specialization, Regional Diversification and Structural Transformation**

Literature about rural diversification mainly concentrates on its development and on how it affects the reshaping of the rural economy. The progressive erosion of on-farm activities and the development of new activities feed the process of structural transformation (Hazell *et al.* 2007a). However, little is said about the difference between diversification / specialization patterns at the household level and at the regional level, a comparison which illustrates important transformation dynamics.

To illustrate the difference between these patterns and how it is related to the household's inverted U shape, consider a hypothetical country where no structural transformation has occurred, with the following stylized historical sequencing. At the beginning of the transformation process, 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 is unlikely that these "early diversifiers" will risk their food supply and give up their plots. Consequently, the diversification observed at this first stage of transformation will be largely *within* every household. However, as the country continues to transition and markets become more reliable, early diversifiers may get to the point where they are well established in a non-farm activity and can rely on other sources of income for their food supply. At this point, they may stop farming altogether and dedicate most of their time to the new activity (small business or waged labor). When this switch and progressive specialization in off-farm activities begin to occur, diversification *within* every household starts to fall on average across the country, but the diversification *between* households, which are now each specialized in different activities, continues to grow at the regional and national levels. The end result is a country where many households are specialized and earn income from only one or a very limited number of activities, while the regions or the country as a whole have diversified.

Understanding this story makes it clear that a discussion of income levels and diversification / specialization patterns must in fact be more nuanced. Rather than

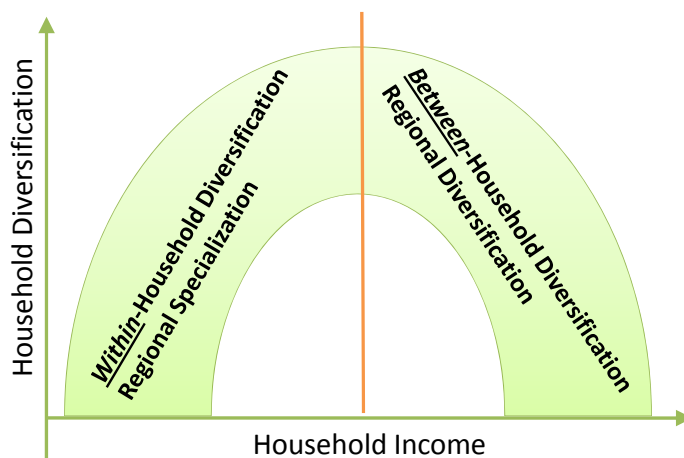
speaking only of absolute diversification or specialization, one must consider the patterns of change both *within* household and *between* household.

At the beginning of the transformation process *within* household diversification will be the major trend as households try to diversify from their on-farm base, and the region as a whole remains characterized by the weight of agriculture (overall specialization in farming). As the transformation continues, patterns of specialization begin to emerge and then dominate at the individual household level. Consequently, the diversification *between* households grows and the region corresponds to a more diversified economy (Figure 40).

This evolution of the diversification/specialization patterns between the household and regional levels can be illustrated by the RuralStruc survey data, which allows a comparison of different stages of transition within the structural transformation process due to the characteristics of the country sample.

Instead of using the average diversification index of a region presented in the previous section, it is possible to more closely investigate this process by using the share of household income from off-farm sources as a proxy for diversification. As discussed above, at the initial stage of the transformation process, the share of off-farm incomes is low, and both households and regions are specialized in farming. Then, as the structural transformation begins off-farm incomes grow. However, because “off-farm” is an aggregate, corresponding to different activities and incomes, this increasing off-farm share could imply that households are increasingly specializing in different off-farm activities, leading to diversification at the regional level.

**Figure 40: Within and Between Household Diversification along with the Inverted U Pattern**



Sources: Authors

One can use the “average share of off-farm income” to explore this distinction because it can be calculated in two ways: once as a “mean of household shares”, and once as a “share of regional means” (see Box 23).

Table 28 shows that significant differences between the mean of household shares (MoHS) and the share of regional means (SoRM) can exist. This is because the two different types of means refer to the two different types of patterns. Since the mean of household shares calculates the off-farm share at the household level, it clearly refers to patterns *within* households. The share of regional means indicator, however, refers to more than that. As a region-wide aggregate, it also takes account of patterns occurring *between* households and expresses the average regional pattern of change.

The difference between these two means says something about the diversification / specialization pattern in every surveyed region. This pattern can be captured and synthesized by computing a “diversification gap” (defined as the difference between MoHS and SoRM) (Box 23).

The diversification gap is a good illustration of a region’s stage within the structural transformation process. A negative value of the gap corresponds to a stage of transition where households are still deeply involved in on-farm activities. They are individually testing out diversification without giving up their farming plots and their share of off-farm incomes remains limited (even if households are engaged in many off-farm activities, they tend to be to low return “coping” activities). The region as a whole remains specialized in farming, but a limited number of households (the richest) have already diversified<sup>170</sup> pulling the regional means at a higher value (which explains why MoSH < SoRM and why the gap value can be strongly negative).

On the other hand, a positive value of the diversification gap corresponds to a situation where households’ shares of off-farm income are growing: average incomes are increasing; many households are much more fully engaged in off-farm activities, and consequently the effect of the outliers is reduced (the value of the SoRM weakens). This process is strengthened by the specialization in different activities corresponding to the inverted U: specialization in different off-farm activities for most households, of course, but also specialization in on-farm for a few. These “on-farm specialists” (the new outliers on this side of the inverted U) are captured more effectively by the SoRM, pulling down the mean and pulling up the positive value of the gap.

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<sup>170</sup> Some of these households are engaged in services (e.g., health, education, local administration, or trade and transportation) and earn higher revenues.



**Box 23: From Income Diversification Means to the Diversification Gap**

Calculating average shares is a simple operation that can produce nuanced results because there are two ways of performing it.

In the first way, each individual household’s share of off-farm income in total income is computed, and then these shares are averaged at the regional level: this is the “*mean of household shares*” (MoHS). In the second way, the average of value of off-farm income is computed for an entire region, and then divided by the average of regional households’ total income: this is the “*share of regional means*” (SoRM). In simple terms, the distinction between these two variables is that the mean of household shares smoothes the effect of outliers while the other does not.

These means correspond to the formulas below:

<p>• Mean of Shares</p> $\frac{\sum_i \left( \frac{O_i}{y_i} \right)}{n}$ <p>Where:  <math>O_i</math> = off-farm income of HH i,  <math>y_i</math> = total income of HH i,  <math>n</math> = number of HH in region</p>	<p>• Share of Means</p> $\frac{\left( \frac{\sum_i O_i}{n} \right)}{\left( \frac{\sum_i y_i}{n} \right)} = \frac{\sum_i O_i}{\sum_i y_i}$
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In the RuralStruc surveys, the difference between these two means is strongly correlated with income (the Pearson correlation is relatively high: 0.60). The value of this difference is directly influenced by the distribution of those households engaged in diversification along the income gradient. A negative sign corresponds to a situation where the richest households diversify while the majority does not. A positive sign corresponds to the opposite, when the poorest households diversify.

$$\frac{\sum_i \left( \frac{O_i}{y_i} \right)}{n} - \frac{\sum_i O_i}{\sum_i y_i}$$

The difference between the two means is named the “*diversification gap*”.

**Table 28: Diversification Gap in the Surveyed Regions**

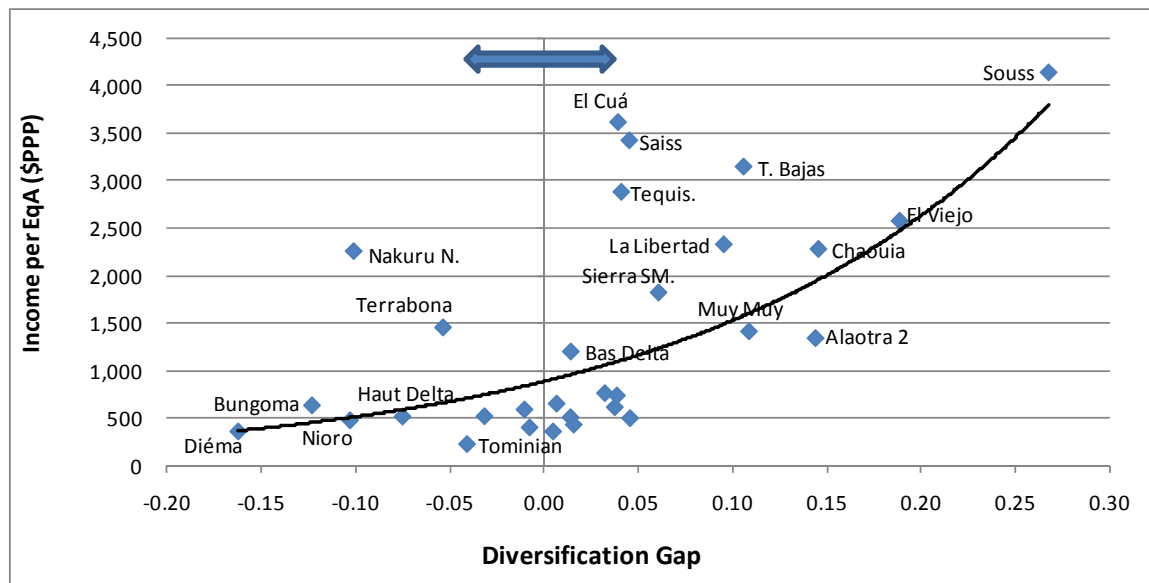
		Specialization / Diversification Pattern		Diversification Gap (MoHS - SoRM)	Average Income \$PPP per EqA
		Mean of HH off-farm Shares (MoHS)	Share of Regional off-farm Means (SoRM)		
Mali	Tominian	0.26	0.30	-0.04	235
	Diéma	0.35	0.51	-0.16	368
	Koutiala	0.12	0.12	0.00	368
	Macina	0.15	0.14	0.01	516
Senegal	Casamance	0.30	0.28	0.02	439
	Mehke 1	0.64	0.67	-0.03	527
	Nioro	0.54	0.64	-0.10	484
	Haut Delta	0.41	0.49	-0.08	524
	Mehke 2	0.54	0.51	0.03	769
	Bas Delta	0.55	0.54	0.01	1,205
Madagascar	Antsirabe 2	0.36	0.37	-0.01	409
	Alaotra 1	0.42	0.37	0.05	506
	Morondava	0.22	0.23	-0.01	597
	Itasy	0.35	0.31	0.04	622
	Antsirabe 1	0.22	0.18	0.04	744
	Alaotra 2	0.31	0.17	0.14	1,346
Kenya	Bungoma	0.37	0.49	-0.12	641
	Nyando	0.58	0.57	0.01	660
	Nakuru N.	0.55	0.65	-0.10	2,258
Morocco	Chaouia	0.55	0.40	0.15	2,280
	Saiss	0.16	0.11	0.05	3,419
	Souss	0.58	0.31	0.27	4,131
Nicaragua	Muy Muy	0.41	0.30	0.11	1,417
	Terrabona	0.35	0.40	-0.05	1,458
	El Viejo	0.50	0.31	0.19	2,575
	La Libertad	0.30	0.20	0.10	2,329
	El Cuá	0.09	0.05	0.04	3,610
Mexico	Sierra SM.	0.65	0.59	0.06	1,824
	T. Bajas	0.55	0.44	0.11	3,144
	Tequis.	0.93	0.89	0.04	2,879

Source: RuralStruc Surveys

Thus the diversification gap, as a single and composite indicator, reflects the complexities of rural income diversification and illustrates the process of rural transformation. It explicitly accounts for an inverted U shape, whereby patterns of household diversification observed at early stages of economic transition give way to household-level specialization and emerging patterns of regional diversification.

As such, it is interesting to note the relationship between the diversification gap and incomes displayed in Figure 41, which plots each region as a single data point on the income – diversification gap space.

**Figure 41: The Relationship between Income and the Diversification Gap**



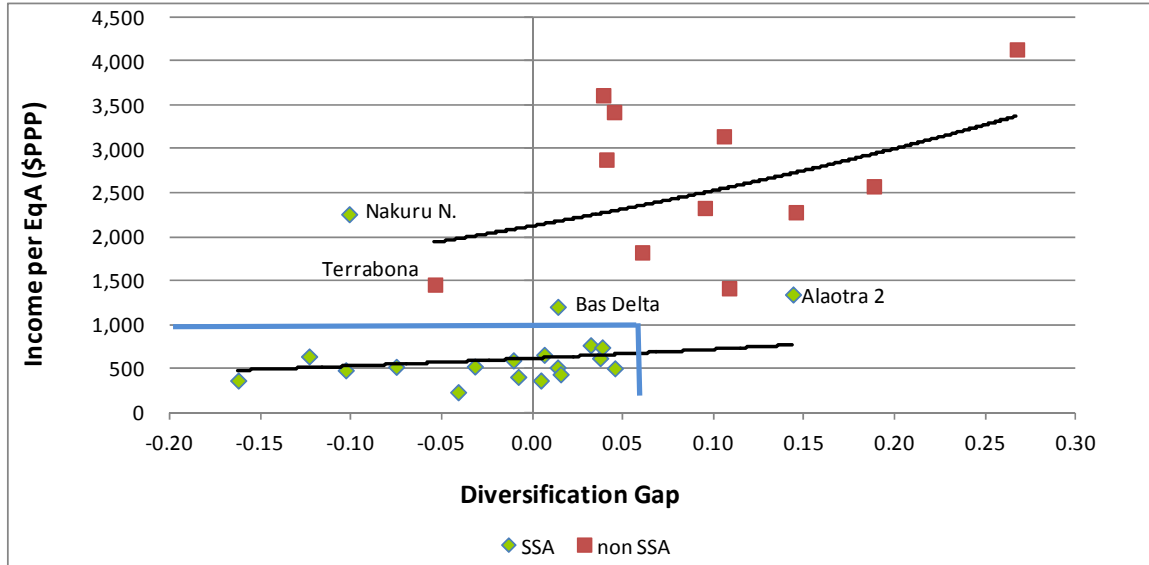
Source: RuralStruc Surveys

At low levels of income, the gap can take any number of negative values, but it is generally not until the gap gets to be positive that incomes begin to grow substantially. Several features of this figure are noteworthy. The first is the shape of the trend line. It is clearly upward sloping and confirms, as noted previously, a strong positive relationship between income and the diversification gap. But there also appears to be an exponential component to this relationship suggesting that, up until a given level of the diversification gap, incomes do not generally rise. Then, after passing a threshold value, incomes increase rapidly. Thus, every region that has a diversification gap of above 0.05 has an average income above \$1,000 PPP/EqA/year. Alternatively, of the regions with a negative value for the diversification gap, all but two have incomes below this \$1,000 PPP threshold.

Beyond the general shape of the distribution, the specific position of the sub-Saharan African countries can be noted (Figure 42). Every SSA region, save Alaotra 2, has a diversification gap of less than 0.05. Further, all of these regions (save Bas Delta and Nakuru North) have an average income below \$800 PPP/EqA—very near the \$2 PPP/day threshold. This means that 16 of the 19 sub-Saharan African regions are characterized by very low incomes and limited regional diversification. Among these 16 regions, the explanatory power of the diversification gap on income is very small. This suggests that households may be encountering something of a barrier: one in which they are unable to transition from patterns of household diversification to patterns of regional diversification (i.e. household specialization)—because their incomes are too low and diversification opportunities are too limited. This observation indicates the possible presence of a

poverty trap (Box 24) and refers to the idea of transition impasses suggested in the Program’s third hypothesis.<sup>171</sup>

**Figure 42: The Income - Diversification Gap Relationship in SSA and non-SSA Surveyed Regions**



Source: RuralStruc Surveys

The surveyed regions outside of sub-Saharan Africa, however, do not seem to encounter any such traps or barriers. With the exception of Terrabona, they are scattered generally well above and to the right of the SSA regions.<sup>172</sup> They also do not tend to cluster around a specific value of the diversification gap. Further, the trend line that emerges for the non-SSA regions is nearly twice as steep as the one observed in SSA regions. So, not only are non-SSA regions richer and more diversified regionally, they also tend to respond more strongly to increasing regional diversification.

The underlying explanation for these observations is likely the returns to available economic activities. As presented in Chapter 4, in very poor regions of sub-Saharan Africa, it is possible for a household to be deeply diversified in many low-return

<sup>171</sup> The three SSA regional outliers—Nakuru North, Alaotra 2, and Bas Delta—correspond to the highest regional average incomes of the SSA sample and are the “richest” region in each country. In Nakuru North, the negative gap value corresponds to a situation where the regional income is pulled by a few richer households which are deeply engaged in off-farm activities. In Alaotra 2, the positive gap value highlights a situation where the richest households are deeply specialized in on-farm activities (rice), pulling down the off-farm regional average. The position of Bas Delta, near the thresholds, is more neutral and reflecting the higher returns to the richest households activities.

<sup>172</sup> In Terrabona, one of the two poorest regions in Nicaragua, households are mainly engaged in on-farm activities with low return off-farm diversification. But the richest households have access to better paid jobs in maquiladoras.

activities (a situation where all EAP household members and often children work at least one and, sometimes, multiple jobs). In this situation, a household may still not earn enough to make their income sufficiently secure so that they can begin to specialize. At this point, the household becomes trapped: it cannot earn more, and it consumes all that it earns (and sometimes even more if it consumes its assets). This is the definition of a poverty trap.

Outside of sub-Saharan Africa however, the poorest households in every region are engaged in activities that earn them much higher incomes (see Chapters 4 and 5). Consequently, available diversification options are able to provide enough security to eventually allow households to begin to specialize. And as households begin to specialize, they become more productive—which means higher returns—and incomes increase at a greater rate.

**Box 24: The Poverty Trap Pattern**

Poverty traps, at a basic level, are situations where households are unable to accumulate assets over time and remain mired in poverty. They “*can’t get ahead for falling behind*” (Barrett & Carter 2001). A vast literature describes the causes, symptoms, and mechanisms of poverty traps, the existence of which depends on “*locally increasing returns to scale and exclusionary mechanisms that keep some people from enjoying higher return livelihoods or technologies*” (Barrett & Carter 2004). Locally increasing returns often appear when poor households make less-than-optimal allocation decisions because they have to deal with risks. Poverty traps are also accentuated by the existence of exclusionary measures, like lack of credit access or of lack of financial skills, which prevent households from accessing any room for maneuver.

*An example would be a household that spends all its resources on seeds and all its family labor on staple production so that it will have enough to feed itself. If the household was not so food insecure it might invest in fertilizer, which would greatly increase the returns to the household’s overall expenditure. As a consequence of this choice however, land degradation can occur rapidly and falling fertility results in increasingly lower returns each year, while at the same time the family is possibly growing. In order to cope with this adverse situation, the household will send members to work in other sectors or areas to try to make up for lost productivity on the farm, not always successfully.*

This kind of “coping strategy,” is frequently observed in the RuralStruc data. Consequently, the overall picture of a region whose rural households are on average struggling with poverty traps is characterized by within-household diversification (households diversify in low returns activities). This is the situation illustrated by Figure 42 where the surveyed regions seem to be stuck, unable to specialize and unable to increase their incomes.

At this point in the discussion it is clear that the survey’s micro-level data on diversification/specialization patterns illustrates a country’s stage within the structural transformation process. Further, most regions in a country follow the same pattern. It corroborates the idea that there are national characteristics that determine the possible alternatives for diversification or specialization. These characteristics include assets, market functionality, business climate, institutional arrangements, overall governance and political stability. The specific alternatives

they make available further illustrates a country's stage in the economic transition process.

A final remark has to be made. The trends which have been presented, and their characteristics, are based on the survey data and correspond to the situations of the surveyed households in their respective regions. These trends are not deterministic; rather they suggest where regions stand in the diversification-specialization process. They illustrate changes which occurred in the past and suggest the causes of observed transition impasses. They do not predict future paths, as these will depend on the idiosyncrasies of every local context and the nature of its interactions with the outside world.

## 2. Policy-making Guidelines

From the previous analyzes, it appears that if the determinants of rural household income and household diversification are mostly micro (household assets, portfolio characteristics, managerial skills), the determinants of returns to an activity refer broadly to meso and macro conditions. Markets are decisive, but the institutional environment is equally critical. The low returns to non-agricultural activities and the difficulty of on-farm diversification observed in sub-Saharan Africa are clear reminders of the limitations of the overall context.

Designing adequate public policies in order to support the process of change is a clear challenge and there is no easy way. A significant mistake would be to assume the existence of a silver bullet, which is, of course, not the case. On the contrary, the huge heterogeneity of local situations, clearly reflected by the Program's results, recommends a careful design targeted to regional specifics: there are no one-size-fits all policies, and tailor-made approaches must be the rule. A couple of orientations can however be presented, which refer to policy-making methodology, and to possible building blocks.

### 2.1 Methodological Considerations

#### 2.1.1 *Reengaging in Development Strategy Design*

Though there are no obvious recipes, a review of the last two decades of development policies provide a well-known "shopping list" of policy measures that everyone can find in every good publication related to economic development in general, and rural development in particular. The main ingredients in the recipe for success are: public goods provision (infrastructure, research, information, and capacity building), improvement of imperfect markets (that involves both the sourcing of inputs and the commercialization of the product, and implies the cut of transaction costs), incentives for the development of missing markets (credit, technical support, assurance), and risk mitigation mechanisms. What is more difficult is to mix these ingredients in the policy bowl, to devise genuine policies (because good recipes are home-made), and to define their adequate sequencing based on necessary prioritization and targeting.

To identify priorities for action, the Program's results suggest the need to re-engage in development strategies in order to deal with the critical challenges faced by many developing countries. This is particularly the case for sub-Sahara Africa, a continent that has to simultaneously manage its demographic and economic transitions, in the context of globalization, and under the new constraints of global climate change (see Chapter 2).

Indeed, in many countries, there has been a long-term neglect of overall strategy design (most often since the end of the seventies): a consequence of liberalization policies and state withdrawal, of policy segmentation, and of disinvestment in

information systems, which appears to be a major obstacle for adequate policy design.

A development strategy is more than the articulation of sector policies. It is the result of a process leading to a shared vision of the future, expressing an agreement between stakeholders or constituents, which helps to make choices and set up priorities. As such, and as illustrated by Stiglitz (1998), a development strategy is a public good and deserves strong public support in its design.

Reengagement in development strategies implies first and foremost reinvesting in knowledge creation. As illustrated by the country reviews implemented during the first phase of the Program, information is missing in general, and the right information about evolving rural economies is notably absent. The survey results show that heterogeneity leads to complex rural settings which require efficient information systems to understand. Statistical systems have to be reestablished and redefined in order for policy to account for the evolution of rural economies, the increasing mobility of people, and new family networks resulting from archipelago models (see Chapter 4). Reengagement also implies reinvesting in processes. Here, consultation is the key word, because ownership is the determining factor of commitment. Such an approach takes time and must be cautiously planned. Finally, reengagement in development strategies means an investment and a reinvestment in capacity building. In many countries skills are missing to manage information systems, to analyze results, to accompany and monitor processes, and to elaborate scenarios. The situation is particularly critical in sub-Saharan Africa where many central governments lost their technical skills in the aftermath of state withdrawal in the 80s, where new local government institutions created by decentralization campaigns are generally unprepared for this type of approach, and where civil society organizations or think tanks are few.

### 2.1.2 *Prioritizing and Targeting*

A critical issue for policy makers is, most often, the need to do everything at the same time. Of course, this is not possible due to limitations on financial and human resources. Choices need to be made, and making them is even more difficult under the specific conditions of many developing countries—where the means for policy making are limited.

Given this setting, prioritization and sequencing are required. They need to be supported by adequate analyses for which general, sector, and regional diagnoses must be developed in order to identify existing binding constraints. Adopting the Program's perspective to rural transformation, a preliminary step would be to



identify the regional constraints to agricultural growth—the necessary stage for increasing rural demand and rural diversification.<sup>173</sup>

Then, priorities need to be discussed in terms of targets, which can be defined for groups of economic agents, sectors (types of products), and regions. Though it is not the Program’s purpose to propose priorities and targets for the different countries and surveyed regions, it is possible to provide an illustration of a first step of this kind of fine-tuning. This helps to identify a set of priorities and facilitate the definition of possible building blocks, which contribute to the design of the necessary policy instruments, thus feeding the overall policy process.

A rough identification of target groups (referring to levels of income) was tested using the survey results. This approach is of course limited and a classification based on a more detailed typology, notably one using households’ assets and their local opportunities and constraints, would be necessary. It remains useful however and does allow one to consider general options based on the overall economic situation of the surveyed households.

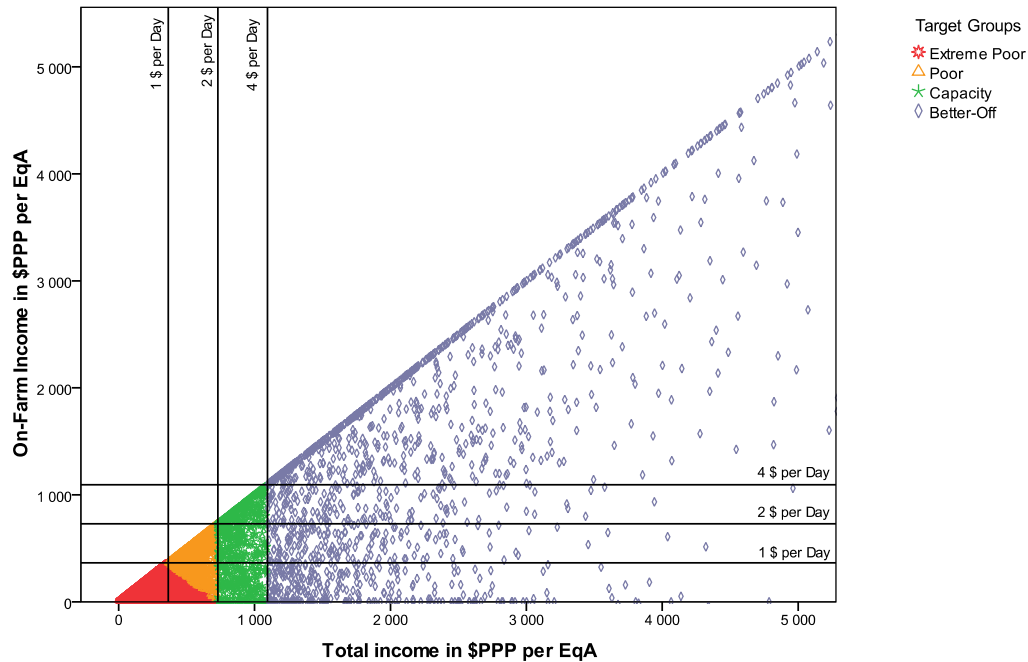
Four groups of households were defined with reference to their levels of total income and their levels of on-farm income in order to assess their capacity for investment—a core indicator of the existing room for maneuver for action at the household level, an understanding of which is crucial for identifying appropriate incentives or supports.

Figure 43, which has an unusual shape, plots each of the 7,269 households of the RuralStruc sample as a single data point on the total income – total on-farm income space (in PPP per adult equivalent): “better-off” households (>\$4 per day); “capacity” households (>\$2 per day); and “poor” and “extreme poor” households (<\$2 per day). Even though the exercise remains highly theoretical, one can consider that for households above \$2 per day, basic needs are covered and earnings are no longer fully allocated to consumption, but can also be used for investment and savings. Above \$4 PPP, existing options for income allocation are obviously greater. The situation below \$2 PPP is more critical: all revenues are dedicated to basic needs and they are still not enough. Among those below \$2 PPP, the “poor” group is made up of those households that could exit poverty if they were to double their current on-farm income. The “extreme poor” group corresponds to those households which could not. Even if they were to double their on-farm income they would still remain below \$2 PPP.

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<sup>173</sup> A clear reference here is the Growth Diagnostics method developed by Hausmann, Rodrik and Velasco (2005) which could be usefully adapted to a regional approach.

**Figure 43: Method of Targeting Households' Groups**



Sources: RuralStruc Surveys

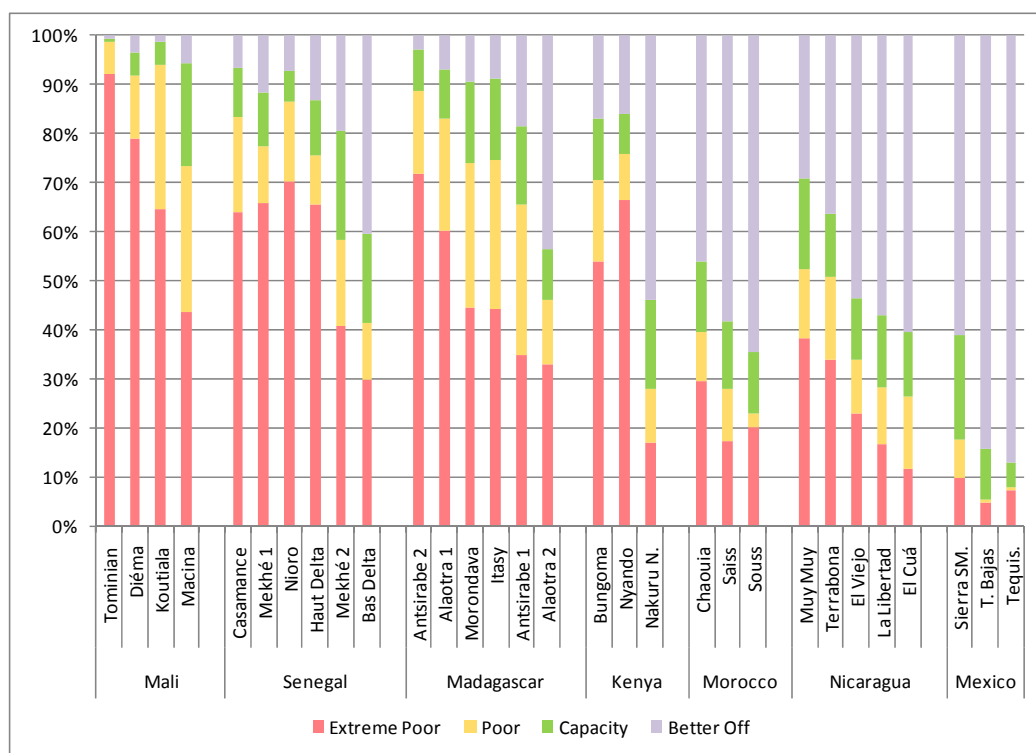
Table 29 presents the share of the surveyed households that falls into each income group, and Figure 44 performs this breakdown at the regional level. Together, they show the very difficult situations faced by SSA regions, particularly those in Mali and Senegal, and echo the discussion of poverty traps presented in the diversification - specialization analysis. They are a strong reminder of the stark reality faced by most rural households. The two “poor” groups—which include the vast majority of households surveyed in sub-Saharan Africa—face huge challenges. The extreme poor group would remain poor even if its on-farm incomes were doubled. And it is quite clear that the prospect of raising the poor group’s farm revenues by 100% appears out of reach in most regional situations over the short to medium term.

**Table 29: Distribution of Households per Target Group in the RuralStruc's Sample**

	Target Groups			
	Extreme Poor	Poor	Capacity	Better Off
Mali	69.8	19.7	7.7	2.8
Senegal	58.5	15.6	11.8	14.0
Madagascar	49.9	25.8	13.6	10.8
Kenya	45.7	12.5	12.8	29.0
Morocco	21.9	8.0	13.6	56.5
Nicaragua	24.6	13.8	14.4	47.3
Mexico	7.3	2.6	10.2	79.8
TOTAL	40.2	16.0	12.6	31.1
SSA	53.6	20.2	12.3	13.9
non-SSA	19.8	9.6	13.2	57.4

Sources: RuralStruc Surveys

**Figure 44: Distribution of Households per Target Group and Region**



Sources: RuralStruc Surveys

The results presented in these figures provide preliminary lessons, and are a helpful step in thinking about possible policy orientations.

It is unrealistic to expect households whose incomes are less than \$2 per EqA/day, and which are not able to satisfy their basic needs (the “poor” and “extreme poor” groups), to engage in any investment on their own. They will need local public goods provision in terms of infrastructure (e.g. transportation, water, and electricity), land rights, and research.

They will also need more direct support through smart subsidies,<sup>174</sup> particularly to facilitate input access and extension services, as well as very low interest rate loans which are the only way to improve the existing farming systems, facilitate innovation, and increase productivity.<sup>175</sup> Price risks are another major stumbling block. The increasing volatility of global markets, as well as the well-known seasonal volatility of domestic food markets, require actions which the private sector has little incentive to carry out. Public support is needed for implementing information systems—a preliminary and indispensable step—and, beyond those, stabilization instruments have to be adapted to local situations depending on the type of instability (endogenous or imported).<sup>176</sup>

Further, any support related to public goods provision and market improvement/facilitation will benefit all farm households. “Capacity” and “better-off” groups will of course be able to take full advantage as well. As such, these policies do not pit one income group against another. They can benefit all rural households while allowing the poor to catch up more rapidly.

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<sup>174</sup> The case of subsidies is very sensitive but positions have changed over the last years (World Bank 2007). It is now acknowledged that smart subsidies can help to unlock access to input markets for the producers and provide incentives to the providers. Voucher systems are a major reference as they facilitate targeting (farmers groups and regions). The major issue is of course the adequate management of this type of system and the ability to scale-down.

<sup>175</sup> In sub-Saharan Africa, Fuglie (2009) demonstrated—based on long-term review and modeling—that total factor productivity levels has grown at a very low pace over the last 45 years—a major difference with other developing countries with a couple of exceptions in West Africa.

<sup>176</sup> The price stabilization systems which developed worldwide between the two World Wars—and were implemented by the colonial powers in their former colonies—were all dismantled during the liberalization wave of the 1980s (with a few exceptions like the Ghana Cocoa Marketing Board). Many attempts were made to implement market instruments (options, futures) to be completed by safety nets for the most vulnerable households; but results were very limited and uneven. The need for governments’ involvement in market management is more accepted today, notably since the 2008 food price crisis. However, structural options for instability reduction and management remain highly debated. They refer to keeping high productivity growth through investment and to maintaining coping instruments available for crisis response (e.g. individual country reserves, price bands). See Byerlee *et al.* (2005), Poulton *et al.* (2006), World Bank (2007), Galtier (2009), Timmer (2010). The dominant role played by global firms in agricultural markets since state withdrawal from supply management is a major issue, and many proposed solutions depend strongly on cooperation between firms. However, their willingness to do so is subject to some debate (Losch 2007).

Nevertheless, the extreme poor group's prospects for escaping poverty by remaining completely within agriculture are severely restricted and additional opportunities in terms of activities and incomes will be necessary. Options are limited in the short and medium terms, but a necessary condition will be to improve skills and capacities in order to facilitate diversification. As such, a critical objective for governments related to public goods provision is the education of youth. The surveys show that the situation is heterogeneous among countries but improving: the next generation has achieved—at least formally—higher levels of schooling. However, a huge push still must be made in education. A higher education level facilitates greater mobility in the labor market and easier access to off-farm activities.

Again, strengthening the education level will benefit all rural households. Concurrently, it will also help the “on-farm side”. Higher skills mean possible access to new agricultural technical packages and cultivation practices that facilitate greater productivity and easier compliance with the more stringent demands of modern agricultural markets.

## **2.2 Building Blocks for Fostering Rural Transformation**

Though the section has focused so far on heterogeneity and the resultant need to reengage in targeted development strategies on a national (or even sub-national) level, there are trends that emerge in the RuralStruc results and common themes that appear. The Program has distilled these results into building blocks for policy, keeping in mind the pressing need to make choices and thus to be very selective. These building blocks are mainly targeted to sub-Saharan Africa, which faces major transition challenges. They are not recommendations in and of themselves, but rather frameworks that should be kept in mind while creating targeted development strategies.

There is no doubt that agriculture must remain a firm priority. In the agriculture-based countries of sub-Saharan Africa, the major push for structural transformation—and for progressively unlocking the poverty traps—has to occur in agriculture. Even if public policies are also needed to facilitate the development of other sectors, transformation will depend first on increasing farm incomes and on creating a more secure economic environment, changes which will then foster rural demand and facilitate rural diversification.

Based on the evidence gathered over the two phases of the RuralStruc program, three main building blocks are suggested: a clear support to family agriculture; a priority for staple production and the improvement of staple markets; and the strengthening of rural-urban linkages.

### 2.2.1 *Supporting Family Farms*

The RuralStruc results make a contribution to the controversial (and often misleading) debate about the optimal size of farm structures, a topic of renewed discussion in recent years. This debate has been reignited largely by the food price crisis of 2008 and the related trend of increased “land grabbing” (Chapter 1); and consequently has until now been mostly couched in terms of food security. Part of the confusion was fostered by the publication of two essays by Paul Collier (2008, 2009), that focused mainly on food supply. Yet some of his provocative arguments were used to feed the small versus large-scale debate.

This debate postulates a false dualism between smallholder and subsistence agriculture on one side, and large-scale and commercial agriculture on the other side, when the reality corresponds to a continuum of situations shaped by local assets and the economic and institutional environment. Family agriculture remains the overwhelmingly dominant type of agriculture around the world. It covers a large spectrum of situations, from micro-farms to larger holdings (sometimes hundreds of hectares) that employ mechanization and wage labor, and are major suppliers to world food markets.<sup>177</sup> Family agriculture can therefore be subsistence, commercial, or a combination of both. It has displayed, throughout history and in every region of the world, a remarkable capacity for adaptation and an ability to respond to growing demand. This is certainly the case in sub-Saharan Africa, where it has done so in spite of very adverse situations (Mortimer 2002, Toulmin & Guèye 2003).

However, the arguments in the farm-size debate are often as follows. Advocates of large-scale farming highlight the wide and growing gap in output per hectare between land that is farmed by large-scale, mechanized operations and land that is worked by smallholders. They argue that developing countries (notably in SSA), by beginning to favor large scale production and thereby producing more food from their own land, could control their growing trade deficits in food and reduce their vulnerability to swings in international food prices.

Proponents of smallholder agriculture similarly often frame their arguments in the language of food security. They point to the well-known lack of economies of scale in agriculture and refer to many failures of previous large-scale agriculture projects.<sup>178</sup> They strongly argue that family labor has many benefits, such as the absence of costs of worker supervision, very high effort levels by workers (who are directly

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<sup>177</sup> As highlighted in Chapter 4, family agriculture is defined by the strong link between household structure and farming activity in terms of assets and management. Its opposite is managerial or capitalist agriculture based entirely on a waged labor force and on shareholding. This type of agriculture targets returns to capital investment, while family agriculture mainly targets returns to labor (Lamarche 1991, Losch & Fréguin-Gresh *forthcoming*).

<sup>178</sup> In the case of Africa, see Poulton *et al.* (2008) who also show that the few apparent successes in Eastern and Southern Africa were nurtured by strong public support.

interested in the farm's output), flexibility and adaptation (to varying labor needs over the year and to varying economic results depending on the crop season) and the importance of local knowledge that can make the smallholder model efficient.<sup>179</sup> For example, the recent *Awakening Africa's Sleeping Giant* study (World Bank 2009b) demonstrated that: African smallholder agriculture has competitive production costs when compared to large scale farms (in this case to those of the Cerrado region in the central-south of Brazil), is competitive in its domestic markets, but is disadvantaged in global markets due to high logistics costs (which relates to countries' economic and institutional environment and not to farm size).<sup>180</sup>

Thus, this small vs. large-scale debate is an example of the kind raised in Chapter 1, a situation where a discussion about policies that will have long-term effects is being driven by a focus on short-term issues (in this case the consequences of the food price crisis). By targeting food production only, it fails to take into account the broader role that agriculture plays in economic development and forgets its contribution to structural transformation.

In the specific case of sub-Saharan Africa, an incipient economic transition and an on-going demographic transition ensure that agriculture will still have a role to play over the medium term, notably for the absorption of a rapidly growing labor force. The 195 million rural youth that must be employed between now and 2025 will have to work in agriculture or in the rural non-farm economy.

Knowing that currently the majority of rural people are involved in family agriculture, and that non-farm activities are both directly and indirectly supported by farmers' incomes (and will develop with their improvement), the relevant question for rural development then concerns the type of agricultural development model which will offer the best outcomes in terms of overall revenues, employment, and poverty alleviation.

This observation suggests that if governments were to encourage large managerial farms—which most probably would mean new technical systems and mechanization—they would risk hampering the development of labor opportunities related to more labor-intensive family agriculture. In this light, the recent trend of large land purchases in Africa by foreign operators is troubling and paradoxical. As reminded by Brooks (2010), "*large numbers of African young people with*

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<sup>179</sup> See Hazell *et al.* (2007b), Wiggins (2009), Binswanger-Mkhize *et al.* (2009). There are few exceptions to the lack of economies of scale in agriculture. They are mostly related to the transformation or packaging of perishable products. Byerlee & Deninger (2010) also show that new computer related technologies for farm management and technical operations could challenge this historical advantage of small farms.

<sup>180</sup> The study confirmed existing economies of scale for some specific products (oil palm, horticulture) and pointed the advantages of large-scale for reaching high quality requirements.

*agricultural experience are joining the labor force, (when) the land that could secure their futures may pass under long-term rights to foreigners because of constraints on capital and property rights”.*

Policy choices must avoid radical positions. Investments in large-scale farming, including foreign investments, can of course offer opportunities for growth and employment, depending on the local context and the type of production. They can help the development of new value chains by facilitating the reach of minimum production thresholds. Similarly, they can facilitate agricultural development in sparsely populated regions. However, as reminded by the *Sleeping Giant* study, these investments could be better oriented towards segments of the value chains where capital is missing: input supply, marketing, transformation of products, and thus favor the use of the huge smallholder potential for production.

These arguments have strong consequences in terms of policy design. They mean that, among the many policy ingredients related to public goods provision and market improvements, a priority is to focus on land access and land rights, a conclusion confirmed by the Program’s survey results which show that land access remains the most critical determinant of farm income (see section 1.1, this chapter).

In countries that are deeply constrained in terms of land availability, the only solution for increasing both farm income and farm employment is through labor-intensive improvements in land productivity. Although input markets are a main stumbling block (in terms of access and costs), the adoption of technical innovations at the farm level offers a wide range of sustainable answers.<sup>181</sup> They imply secure land tenure without which economic risk level is unacceptable.

In countries where increasing the amount of farmland under cultivation remains an option, unlocking access to this resource through infrastructure provision, adequate regional planning and land rights can be a powerful means for increasing farm income and farm labor. This is the case in many parts of Africa, notably the Guinea savanna where only 10% of 400 million hectares of potential farm land are currently cultivated (World Bank 2009b).<sup>182</sup> In these situations, a preliminary step is the cataloguing of existing resources, critical information that does not exist in most SSA countries.

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<sup>181</sup> Most of these technical innovations refer to agro-ecological practices which have been fully endorsed by the *International Assessment of Agricultural Knowledge, Science and Technology for Development* (IAASTD 2009). One can cite improved cultivation practices and plot management, like erosion control through terracing and ground cover, agro-forestry, integrated crop-livestock systems, etc.

<sup>182</sup> In the RuralStruc countries, this is the case in Mali (the broad savanna zone near the Guinean border in western Mali and the inland Niger delta), in Madagascar (the western and north-eastern parts of the country), and in Nicaragua (the Caribbean coast). See *RS I Country reports*.



Additionally, the difficult and rarely discussed question of land access for youth has to be raised. Many young people are locked in agrarian systems where land tenure and farm management are under the control of the elders. In SSA, young household heads most often remain dependent on their father or grandfather until the elder's death, a situation that hampers initiatives and technical innovations which could more easily be adopted by young people. Facilitating access of young rural dwellers to farm land, the transmittal of farm assets to young family workers, and the standing down of elders is a critical issue that has to be tackled by public policies. It will directly contribute to the economic insertion of youth and to agricultural growth.

A final recommendation relates to increasing the economies of scale of family farms, which are often hindered by the relatively limited production levels of each individual farm. This obstacle can be overcome through effective producers' organizations, though developing these groups requires adequate incentives and supports. Producers' organizations can facilitate the marketing of products through primary collection, but also play a major role regarding investments in storage facilities or equipment for transformation of products, and organizing profitable input supply. Larger volumes of products can moreover facilitate contractualization with downstream economic agents (wholesalers, agribusinesses, exporters), and the producers' organizations can use their increased bargaining power in contract negotiation.

### 2.2.2 *Promoting Staple Crops*

In the RuralStruc sample, staple production is above 50% of gross farm product in 18 out of the 30 surveyed zones. In some cases this number reaches as high as 80%. This result expresses a dual reality (see Chapter 5). First, it illustrates the remaining importance of self-consumption. Its share in households' gross farm product reflects risk-management strategies (supply effect) that households employ to respond to a persistently insecure environment (incomplete and imperfect markets and sometimes unstable natural conditions which can affect the crop season). Second, it mirrors a potentially weak demand due to poor access to and integration with markets (demand effects): the importance of staples highlights that lack of existing market opportunities in the surveyed zones, as well as regional situations where alternatives related to traditional commodities or new value chains are limited. Even if non-SSA surveyed regions display more on-farm diversification (the selected Mexican regions being an exception), the importance of staple markets is a general pattern. It concerns households at all income levels, as even households in richer quintiles can be strongly engaged in staple production and commercialization.

These results provide evidence-based justification for giving priority to policies that support staple production and the improvement of staple markets. And it must be recalled that this priority was the mainstay of the structural transformation of Asian economies, with the clear objectives of poverty alleviation, diminishing food costs,

and of managing and slowing the exit from agriculture—a way to adjust to the pace of the overall structural transformation.

More generally, this case for staples can be supported by four broad arguments. The first argument refers to their inclusiveness, which results from their widespread development: every farm household is engaged in staple production (98% and 76% of the surveyed households in SSA and non-SSA regions respectively), while other agricultural products concern a more limited population. Most notably, this is the case of the oft-cited high value exports, which frequently only impact tens of thousands of producers in a country or less (out of hundreds of thousands or even millions). Thus, targeted policies promoting and supporting staples can impact the overwhelming majority of rural households.

Generally, staple products are not very valuable when compared to other farm products like horticulture or livestock. They offer a lower return and it is quite clear that a production increase in staples cannot be the only solution for poverty alleviation. However, rising food prices are resulting in progressively better returns to staple farming, and in any case the constraint of relatively low earnings is offset by the breadth of staple production, which offers major leverage in terms of labor, overall income, and growth linkages. By contributing strongly to farm incomes (and thus rural incomes) at the aggregated level, staples can play a major role in increasing rural demand and facilitating the emergence of other activities. This pro-staple option was a decisive component of the Asian Green Revolution, which facilitated the rural transformation of Asian countries (Delgado *et al.* 1998). It is also worth noting that it is easier for producers to access staple markets because they do not have the same standards requirements that are found in the markets for higher value products, particularly when these high value products are sold globally.

The second argument is related to the critical role played by staples in risk-management. 75% and 30% of surveyed households in SSA and non-SSA regions respectively are in the two “poor” groups, where the total income per adult equivalent is below \$2 PPP per day. These households face severe risks and food insecurity is present for a significant share of households.<sup>183</sup> In such situations, self-consumption and storage (when possible) are the rule, and any type of risk related to new crops, new production techniques, new marketing channels, or off-farm diversification is carefully avoided. Consequently, any increase in staple production can serve as a catalyst: it contributes to risk alleviation and can therefore help unlock the potential for innovation and diversification, both on-farm and off-farm.

The third pro-staple argument is of course the huge growth potential of the sector. As a consequence of demographic growth—nationally, regionally, worldwide—and

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<sup>183</sup> In 11 out of 19 SSA surveyed regions and in two regions in Nicaragua more than 10% of households are food-insecure (see Chapter 3).

of increasing urbanization, demand for all types of staple products will rise steadily over the next decades. Progressive changes in diets related to rising incomes will of course result in the rapid development of meat, dairy, and horticulture products (Collomb 1999), but staples—and notably cereals—will still account for the bulk of food demand for years to come.

In the case of sub-Saharan Africa, staple production has by and large been quite successful in growing to meet rising demand (Bricas *et al.* 2009); and this incentive will remain in place for some time due to the demographic prospects of the region. The sector already represents three-quarters of total agricultural output.<sup>184</sup> Additionally, higher international food prices will mean that competition from low-priced imports will be less severe and will serve as a supplementary incentive for increasing regional production. The \$23 billion of food imports into sub-Saharan Africa represent a lucrative business that domestic producers will be better positioned to attempt to capture.<sup>185</sup>

The final argument for a pro-staples policy involves the huge potential for downstream activities related to the processing of products. The initial transformation of staple products generally occurs either at the farm level for self-consumption, or at the village level for the local consumption (typically shelling and grinding). But most sales of staples, notably those directed to urban consumers in large cities, consist of raw products, and the value-added is appropriated by urban economic agents.

Growth in staple production could easily result in more value-added locally, strengthen the linkages between rural areas and their nearby small towns, and contribute to rural diversification. This evolution of course would require an improved investment climate, but investment needs are not necessarily high. Local transformation can be achieved with small equipment and labor-intensive transformation units, which can deal with initial processing but also engage in secondary transformation of products and packaging for urban consumers.

Given the survey results it is easy to say that policies should focus on staples, but developing recommendations for specific policies to increase staple production risks recreating the long “shopping list” related to productivity discussed above.<sup>186</sup>

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<sup>184</sup> See World Bank (2008c). The overall value of staples also weights heavily when compared to total agricultural exports: according to Diao *et al.* (2007) its estimated market value in 2003 was \$50 billion versus \$16.6 billion for exports.

<sup>185</sup> Source: WITS/Comtrade (SITC Revision 3), year 2008, product groups 0 (food and live animals) and 4 (animal and vegetal oils and fats). Imports of cereals (product group 04) represent 39% of total imports (\$9 billion).

<sup>186</sup> Irrigation, seeds, and fertilizer were the main ingredients of the Asian green revolution. They were complemented by massive government investments in infrastructure, research, and extension, and—also—by strong price protection and support (on both inputs and products).

However, in the case of sub-Saharan Africa, it appears that two major issues must be addressed up front. The first relates to post-harvest losses. This is an old theme, promoted after the 1970s' food crises, that remains fully relevant due to the lack of storage equipment in most of rural areas. Though estimates are difficult, particularly for roots and tubers, the range of post-harvest grain losses is generally agreed to be between 10 to 20% of total output.<sup>187</sup> Many actions can be promoted that relate to the whole post-harvest process (sorting, drying, pest-control, early processing), but good storage appears to be a major component, and one that can be supported by adapted institutional arrangements, such as warehouse receipt systems, which can simultaneously ease the cash situation of producers and contribute to reducing their level of economic risks (World Bank 2010a).

The second issue relates to regional trade. Sub-Saharan Africa as a whole represents a huge and rapidly growing market, but it is however constrained by the heavy political fragmentation of the continent and subsequent large number of international borders, a situation highlighted by the WDR09. On average, in the 2000s, only 20% of SSA's agricultural exports were oriented towards other SSA countries (Lipchitz *et al.* 2010). Important progresses occurred over the last two decades as a consequence of progressive regional integration and achievements of the regional economic communities (RECs). Generally, tariffs on goods were removed within regional groupings, but this did not really lead to an increase in regional trade (Faivre Dupaigne 2007). Difficulties are related to the non-enforcement of RECs' rules, to many persistent non-tariffs barriers related to standards (both on products and inputs), and to abnormal practices, mainly related to border crossing—bureaucratic hassle is often the rule.<sup>188</sup> Political commitment for effective harmonization and trade facilitation must be a key part of the solution, parallel to continued support to investment in transport infrastructure (Ndulu 2006, Foster & Briceño-Garmendia 2010)—the target of one of NEPAD's major program.

A caveat here is that although it is important to focus on staples, it should not be done exclusively. Where other opportunities exist or when they arise, they should of course be supported. Traditional commodities or higher value products can offer important local alternatives. This is the case of livestock products which are developed in many surveyed regions.<sup>189</sup> This is also the case in non-SSA regions where more diversified agricultural sectors and better economic and institutional environments provide bigger room for maneuver for agricultural diversification, notably access to higher value markets—a conclusion which is consistent with the WDR08's policy recommendations regarding non agricultural-based countries.

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<sup>187</sup> In Eastern and Southern Africa they are estimated to value nearly \$2 billion per year (World Bank 2008b). A value to be compared to the \$9 billion of SSA's cereals imports (see above).

<sup>188</sup> A detailed analysis of prevailing trade policies and practices in West Africa (ECOWAS and WAEMU) is provided in Rolland & Alpha 2010.

<sup>189</sup> In 6 out of 19 SSA regions, livestock products share is higher than 20% of the gross farm product. And all regions in Morocco and all but two in Nicaragua regions are above this threshold.

### 2.2.3 *Strengthening Rural-Urban Linkages for Territorial Development*

Rural transformation is all about the diversification - specialization relationship, where regional economies evolve from a situation of on-farm specialization to one of rural diversification. This process occurs through risk alleviation and higher returns to on-farm activities—resulting from increased agricultural productivity and diminishing transaction costs—which translate into growing rural demand for non-agricultural goods and services. This rural demand generates new activities (processing of products, trade in and trade out, services) that concentrate in rural boroughs and small towns so as to benefit from economies of scale, while agriculture is, by nature, an activity scattered in multiple production units throughout the countryside.

The strengthening of local rural-urban linkages between small towns and their surroundings is particularly critical for development. It has made important contributions to economic transition all over the world. This strengthening creates better local market opportunities, facilitates access to services, builds community, and more broadly contributes to the weaving together of a region's economic and social fabric. These linkages progressively accelerate with increasing agricultural output and farm incomes, but changes occur slowly and are likely to develop over generations.

Therefore, the question is how to strengthen these connections and to reinforce the territorial (or regional) dimension of development, knowing that the growth of strong and localized rural-urban linkages has been challenged over the last decades by the emergence in many developing countries of new urbanization patterns characterized by rapid metropolization. Indeed, as discussed in Chapter 2, better transportation networks in much of the world allows easier access to major cities, which concentrate more services and offer superior job prospects. This often results in straightforward migration from rural to metropolitan areas (UNSRID 2010).

This process often inhibits the development of smaller towns, where dense rural-urban and on-farm-off-farm linkages could occur and offer multiplier effects for development. Simultaneously, it complicates urban management in large cities, which are burdened by an influx of poor and unskilled rural migrants that feed the sponge-like informal urban sector. This growing population in metropolitan areas confronts city planners with difficulties in terms of infrastructure, equipment and services, because poor urban dwellers cannot contribute to their maintenance (Paulais 2010 and *forthcoming*). It explains the growing importance of slums in developing countries' metropolitan areas (UN-Habitat 2003).

New evidence on the significance of regional rural-urban dynamics strengthens existing arguments advocating for the critical role of small and intermediary urban centers and reinforce the need to focus development efforts on the local level. Christiansen & Todo (2009) show that rural migration out of agriculture into what they call the “missing middle” (secondary towns and the associated rural non-farm

economy) has powerful effects in terms of poverty reduction. This is not the case with large-scale urbanization in mega-cities—a result that questions the benefits of concentration stressed by the WDR09. Based on poverty data over a panel of 49 countries, Christiansen & Todo demonstrate that if agglomeration in mega-cities translates into faster general growth, it also leads to higher inequality, while diversification into the “missing middle” smoothes the process and results in more inclusive development.

The question of how to support the linking of small cities with their immediate surroundings is of course a major one, and it has drawn significant attention from academia and development practitioners over the last decades without the emergence of any definitive recipe.<sup>190</sup> As with general economic development and economic transition, there is no silver bullet for territorial development. However, there are useful reminders which should guide policy makers and which relate (again) to methodology, to local institutions, and to the strengthening of the economic functions of small cities, for which inclusive family farm development, staple markets and local transformation of local products (respectively the two suggested other building blocks) are key.

Fostering a territorial approach that strives to understand local strengths and weaknesses and binding constraints is an important way to promote rural and local development.<sup>191</sup> It implies a careful diagnostic, created jointly by local stakeholders, that allows for efficient prioritizing, sequencing, and targeting. Such a process parallels the development of local institutions and local governance. Decentralization and the strengthening of civil society organizations offer good opportunities for making local policy choices. However, local governance bodies are frequently weak, and decentralization often precedes the development of the information systems and local analytical capacities necessary for effective governance—a clear field for external support.

Strengthening the economic functions of small cities has of course to do with their connection to markets and the type and level of services they provide. An important caveat here is that if transportation infrastructure is key—conventional wisdom in the development debate—it is not enough. An important result of the RuralStruc surveys is that well-connected rural areas with easy access to major urban centers

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<sup>190</sup> See among others Davis *et al.* (2002), Satterthwaite & Tacoli (2003), de Ferrandi *et al.* (2005).

<sup>191</sup> About territorial development, a major international experience to be cited is the European Union rural development policy and its flagship program—*Leader*—which provides regional structural funding. A number of successful and promising territorial development experiences have occurred or are underway in Latin America. See for instance the debates related to the “nueva ruralidad” (the new rurality) and the *Rural Territorial Dynamics Program* managed by RIMISP (Latin American Center for Rural Development). On *nueva ruralidad* see, among others, Pérez *et al.* (2008). On a comparison between *nueva ruralidad* and the European multifunctionality approach: Bonnal *et al.* (2004).

are not necessarily better-off than more remote areas, as exemplified by the situation of rural households in Western Kenya or in the *Bassin arachidier* in Senegal (see Chapter 3). This discussion strengthens the debate about the “missing middle” which is all about the “quality” of urbanization and not only about avoiding excessive metropolization.

The characteristics of urbanization in West Africa are a clear reminder that metropolization does not necessarily prevent the development of small and medium-sized cities, and that small and medium-sized cities are not necessarily the recipe for regional growth. As shown by the Africapolis study (Denis & Moriconi-Ebrard 2009), the number of urban centers with population over 10,000 dwellers has grown rapidly in West Africa and resulted in shorter distances to cities and a new geography of the region (Bossard 2009). However, the question here is the level of public goods provision and the quality of infrastructure and services. These are absolute necessities for a city to assume its economic role, and without them urban growth is characterized by an agglomeration of poor people. In many countries in sub-Saharan Africa, public funds are exhausted in servicing a dominant capital city, preventing the wider provision of infrastructure and services that would facilitate a “positive urbanization process” (see Box 8).

Thus, what appears to be critical at the regional level is the adequate provision of public goods (related to local administration, health, education, communication infrastructure—not only roads), and of basic factors such as water and electricity, which cannot easily be provided by the private sector in the first stages of development. These public goods are indispensable to facilitate private investment and to improve living conditions of urban dwellers—a condition necessary to minimize rural depopulation towards metropolitan areas. They correspond to spatially targeted public interventions which need to more often be the rule rather than an individual response to a very specific situation.<sup>192</sup> Public goods provision can usefully be accompanied by fiscal incentives aimed at helping local service providers and entrepreneurs.

These public investments and supports have shown their positive impact on regional growth, the development of non-farm employment, and the strengthening of rural-urban linkages (Fan 2008). They can directly contribute to promoting a territorial development that makes use of local assets and resources, eases value addition to local products, and facilitates the provision of environmental services.<sup>193</sup>

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<sup>192</sup> The latter is a recommendation of the WDR09, which favors more spatially blind interventions and limits spatially targeted interventions to the most disadvantaged situations (see Box 7).

<sup>193</sup> As advocated by Gutman (2007), supply of environmental services could boost rural development and inaugurate a new type of rural-urban relationship (which he names a “new rural-urban compact”). The way to promote payment for these services remains the major issue and will necessitate an evolution of the policy debate.

As such, agro-clusters which take advantage of local knowledge, local networks, and specific geographical denominations of local products can be powerful engines.<sup>194</sup>

This perspective acknowledges the multifunctionality of agriculture and the fact that it can be a driving force for rural and regional development. It can serve as the foundation for a new *rural-urban compact* based on a new type of regional governance, which would reconcile “urbanists” and “ruralists” and allow for an effective process of structural transformation that reconnects cities with their regional surroundings.

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<sup>194</sup> The agro-cluster approach has been quite successfully developed in several Latin American countries and has facilitated the development of local agro-food systems based on the promotion of local assets. “Geographical indications”, which refer to the unique geographical origins of a product (based on specific natural or human factors), are increasingly referred to in the development debate, and are now strongly challenged by trade liberalization policies. They are a major topic of WTO’s TRIPS discussions (trade-related aspects of intellectual property rights). On local agro-food systems, see Muchnik *et al.* (2007). On geographical indications, see Giovannucci *et al.* (2009).



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## **ANNEXES**



**ANNEX 1**  
**HOUSEHOLD SURVEYS**  
**AND DATA ANALYSIS**

## 1. The Survey Instrument

The survey instrument was designed through on a collaborative process that included the country teams and the Program coordinators. The questionnaire was organized in five modules presented in Figure 45.

*Module 1 - "Rural Household"* aimed to characterize the surveyed household. Survey questions included information about household members their age, gender, and level of education; the characteristics of the household's accommodation and amenities; a description of the economic activities of all members of the household (including non-farm activities and related income sources); the characterization and identification of the household's migrants (long- and short-term migrations) and of remittances sent to the household; of the level and type of public transfers received; and the human and social capital of the head of household and his/her spouse.

The objective of *Module 2 - "Assets and Production Factors"* was to describe a household's capital. This was done by examining the stock of (and recent changes in) a household's endowment of assets and production factors, specifically land (owned or rented), equipment (owned or rented), rentals, and other properties dedicated to economic activities (and estimates of the resulting income stream).

At the end of those first two modules, the data collected allowed for a first 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.

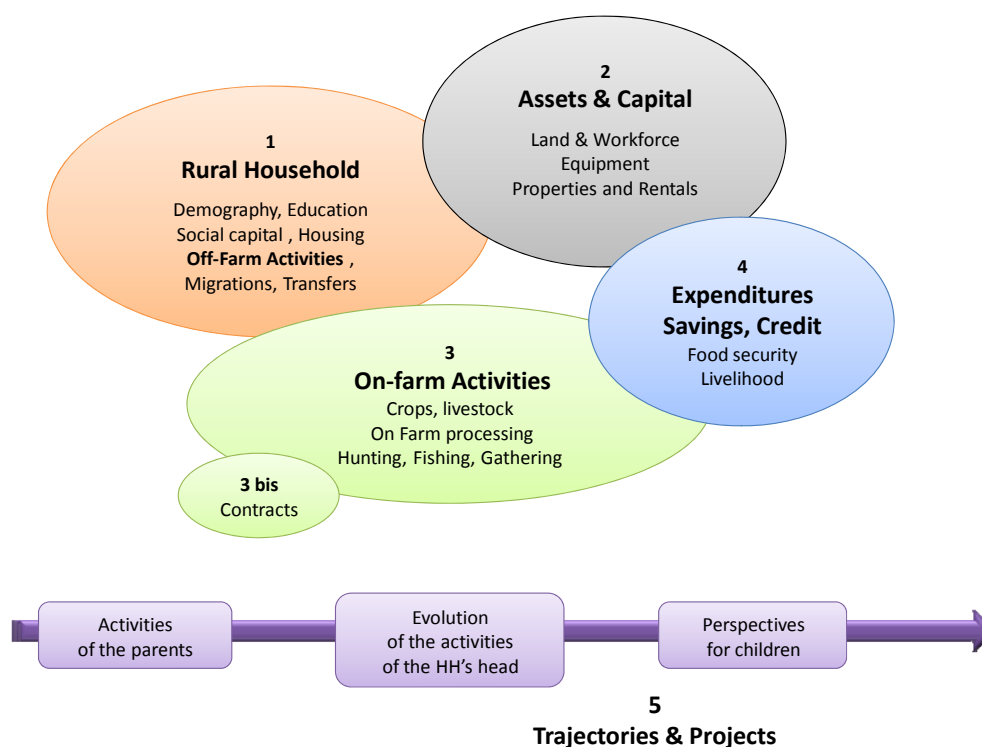
*Module 3 - "On Farm Activities"* aimed to a detailed understanding of on-farm activities (crops, livestock, fishing, hunting and gathering activities, processing on-farm of vegetal and animal products). A specific module (*Module 3bis*) was designed to take into account market integration and contractualization issues. Since those issues applied neither to *all* crops and livestock productions nor to *all* households, Module 3bis was only used on an "as needed" basis. The data collected by Module 3 allowed for the estimation of total on-farm income (in its broad sense) based on farmers' statements about their own levels of sales and self-consumption. Farm output was estimated for the last crop season prior to the survey.

*Module 4 - "Food and household expenditures"* included questions related to the cost of food, as well as its source (farm products, purchases, gifts, etc.). It also included questions related to strategies for food shortage management and to household perceptions of the evolution of their food security. Regarding expenditures, questions dealt with recurring 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, a better understanding of access to services (health, transport, etc.), and supplemented information previously collected about vulnerability and sustainability.

*Module 5 - "Trajectories and Projects"* related to the life cycle of the household, the professional trajectory of its head, and its prospects for the future. It included open-ended and qualitative questions, which explored issues related to parents' activities,

development of non-farm activities, and the economic outlook for children in terms of activities and farm transferability. Qualitative dynamic information was also collected in module 5 in order to appreciate household head's perceptions in terms of assets endowment (past and future evolution), food security, livelihoods, housing and living conditions, etc.

**Figure 45: Framework of the RuralStruc Household Surveys**



All country survey questionnaires were based on this framework and adapted to take into account country-specific contexts. Each country team conducted pilot surveys to test and adjust the instrument. The national survey instruments are posted on the World Bank's Micro Data Library.<sup>195</sup>

This common survey framework was complemented at the national level by specific context-related questions, such as in regards to public support programs in Mexico. In Mali, the household survey was implemented at the level of the head of the family farm and was also complemented by specific surveys targeting dependent households and women.

In order to deal with the constraints of a “one shot” survey (only one interview, which prevented any double-checking of results), 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

<sup>195</sup> <http://microdata.worldbank.org/index.php/catalog/670>

cross-analysis of the information collected. The size of the instrument was justified by the need to collect very extensive data in order to accurately estimate agricultural incomes. This required an extensive review of endowments of production factors and of the economic results of the farm. As a consequence, the time needed to administer the questionnaire was quite substantial: between 1 to 4 hours, depending on the size and the complexity of the household's demographic, activity and income structures. In Mali, the survey of a large family farm often took one full day (see *RS II Mali*).

## 2. 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 to select specific localities (villages or communities) to be surveyed in within each type of region (“winning”, “losing”, or intermediary), and it was done in consideration of regional characteristics and national team expertise. The second step was the sampling itself, which was done based on existing census lists or specific locality household lists prepared especially for this program. Then, households were selected at random, targeting a sufficient number of households per locality allowing representativeness at local 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. Surveyors were often selected from well-known surveyor pools. In other cases, surveyors were identified locally through a selection process based on their skills and their good knowledge of local conditions. *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 implemented by a private consultancy specialized in surveys.

In the seven RuralStruc countries, 8,061 rural household surveys were conducted in 26 regions and 167 localities (the number of localities per region depended on the settlement structure) between November 2007 and May 2008 (Table 31, Table 30).

In Mali, the 634 household surveys (at family farm level) were complemented by 643 interviews with dependent households and 749 interviews with women.

**Table 30: Implementation Schedule of the Rural Household Surveys**

	2007		2008						
	N	D	J	F	M	A	M	J	
Kenya									
Madagascar									
Mali									
Maroc									
Mexique									
Nicaragua									
Sénégal									

Source: RuralStruc Surveys

**Table 31: Surveyed Households per Country, Region and Sub-region**

Country	Region and Sub-region	Interviewed HH	Selected HH	Nb of HH members	Average Members per HH
Mali	Tominian	172	155	1,962	12.7
	Diéma	150	148	3,147	21.3
	Koutiala	157	153	2,328	15.2
	Macina	155	154	2,056	13.4
	<b>Total</b>	<b>634</b>	<b>610</b>	<b>9,493</b>	<b>15.6</b>
Senegal	Casamance (Kolda)	249	239	3,608	15.1
	Mekhé (Groundnut Basin North)	255			
	- Mekhé 1		111	1,726	15.5
	- Mekhé 2		113	1,766	15.6
	Nioro (Groundnut Basin South)	285	252	3,182	12.6
	Senegal River Delta (Dagana)	250			
	- Haut Delta		61	770	12.6
- Bas Delta		121	1,347	11.1	
<b>Total</b>	<b>1,039</b>	<b>897</b>	<b>12,399</b>	<b>13.8</b>	
Madagascar	Antsirabe	509			
	- Antsirabe 2		303	1,889	6.2
	- Antsirabe 1		206	1,288	6.3
	Alaotra	500			
	- Alaotra 1		385	2,259	5.9
	- Alaotra 2		115	817	7.1
	Morondava	526	506	3,140	6.2
Itasy	503	503	3,001	6.0	
<b>Total</b>	<b>2,038</b>	<b>2,018</b>	<b>12,394</b>	<b>6.1</b>	
Kenya	Bungoma	300	299	2,138	7.2
	Nyando	303	285	1,896	6.7
	Nakuru North	299	289	2,118	7.3
	<b>Total</b>	<b>902</b>	<b>873</b>	<b>6,152</b>	<b>7.0</b>
Morocco	Chaouia	302	228	1,792	7.9
	Saïss	300	261	1,939	7.4
	Souss	298	240	1,539	6.4
	<b>Total</b>	<b>900</b>	<b>729</b>	<b>5,270</b>	<b>7.2</b>
Nicaragua	Muy Muy	311	299	1,757	5.9
	Terrabona	313	281	1,581	5.6
	El Viejo	317	288	1,645	5.7
	La Libertad	305	290	1,692	5.8
	El Cuá	312	300	1,801	6.0
	<b>Total</b>	<b>1,558</b>	<b>1,458</b>	<b>8,476</b>	<b>5.8</b>
Mexico	Sotavento (Veracruz)	320			
	- Sierra Santa Marta		175	823	4.7
	- Tierras Bajas		145	654	4.5
	Ixmiquilpan (Hidalgo)	306		-	
	Tequisquiapan (Quéretaro)	364	364	1,708	4.7
<b>Total</b>	<b>990</b>	<b>684</b>	<b>3,185</b>	<b>4.7</b>	
<b>TOTAL</b>		<b>8,061</b>	<b>7,269</b>	<b>57,369</b>	<b>7.9</b>

Source: RuralStruc Surveys: national and merged datasets

### 3. Data and Results Management

#### 3.1 Preparation of the Databases

Each national team was in charge of the process of designing and producing a complete national database (including data capture and cleaning) based on a list of variables previously discussed at the Program level. During the cleaning process, teams engaged in additional checks when needed, specifically by following up with the survey implementer or by checking household data against other known information sources.

In parallel, and in order to engage in cross-regional and cross-country analysis, the Program's coordination team prepared a merged database that was composed of a set of 171 core variables, mostly extracted by the national teams from their databases.<sup>196</sup>

The metadata related to that merged dataset provides a detailed documentation of each variable which in most case refers to specific questions of national questionnaires or are derived from existing variables.<sup>197</sup> The consolidation of this merged database necessitated additional cleaning of the national dataset. Indeed, when analyzing the data for the cross-country work, errors and/or outliers were identified and necessary corrections were made.

*In fine*, 7,269 households (out of 8,061 surveys) were kept for the cross-country statistical analysis (see Table 31).

#### 3.2 Conversions and Formulas

##### 3.2.1 Diversification index

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

The definition of the index is the following:

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

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 share of every income source in the total income.

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<sup>196</sup> Data mining, analysis and interpretation were conducted by using both the SPSS and Stata programs.

<sup>197</sup> The merged database documentation is accessible on:  
<http://microdata.worldbank.org/index.php/catalog/670>



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

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

In order to allow for comparison between countries, the monetary results were converted from local currency units (LCU) into international dollars (\$ PPP) (see Table 32).

Purchasing Power Parities (PPPs) are currency conversion rates that convert local currencies to a common currency named 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, PPPs 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>198</sup>

**Table 32: Average Conversion Rates between Local Currency Unit (LCU) and \$ PPP**

	LCU	\$ PPP
Mali	<i>CFA Franc</i>	239.6
Senegal	<i>CFA Franc</i>	258.6
Madagascar	<i>Ariary</i>	758.7
Kenya	<i>Kenyan Shilling</i>	34
Morocco	<i>Dirham</i>	4.8
Nicaragua	<i>Cordoba</i>	6.7
Mexico	<i>Mexican Peso</i>	7.3

Source: Development Data Platform, World Bank 2009

Note: the period of reference is January 2007 – April 2008

### 3.2.3 Conversion into Adult Equivalent (EqA)

Per capita measures do not deal with different demographic household structures and, consequently, present serious drawbacks because they ignore household members' differentiated needs depending on age and gender. This is why household demographic structures were converted into adult equivalent values (EqA).

<sup>198</sup> See World Development Indicators 2008, pp. 1-11.

Many sophisticated methods exist for EqA conversion, notably based on expenditure structures and economies of scale (Deaton & Zaldi 2002); but the Program selected a simple approach based on nutritional needs as defined by the World Health Organization (see

Table 33). This choice is, of course, disputable: being based on nutrition criteria, the scale over-emphasizes the role of food consumption. However, because food consumption is the main expenditure of poor households, this option is a good proxy to estimate. Although it creates a bias for the richer quintiles and the richer countries of the sample, like Mexico, such a conversion method is still more appropriate than the OECD scale, which focuses on economies of scale in services and housing and strongly under-weights children, young adults, and any additional household member.<sup>199</sup>

**Table 33: Conversion in Adult Equivalents**

Age	Male Weight	Female Weight
< 1	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 - >60	0.84	0.74

Source: World Health Organization. See Dercon (1998)

### 3.2.4 Conversion into Kilocalories (KCal)

In order to estimate the capacity of every household to sustain its basic food consumption needs, households incomes were converted from \$ PPP to Kilocalories (Kcal). The conversion was made with reference to cereals, knowing that they are the main component of diets in every surveyed region.

The main cereal of each zone (or basket of cereals in the case of Mali) was used, and the conversion between Kilograms (Kg) of cereals and Kilocalories was made by applying the Kcal equivalents offered in the FAO's Food Balance Sheets (FAO 2001). The prices of cereals are those that the RuralStruc surveys used to estimate the value of self-consumption (see below).

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<sup>199</sup> The so-called "OECD-modified equivalence scale" assigns a value of 1 to the household head, of 0.5 to each additional adult member and of 0.3 to each child.

Knowing both average cereal prices and kilocalorie ratios enabled the calculation of a price for 1000 Kcal in \$ PPP. Using this information, national teams converted the estimated monetary incomes of households into incomes in kilocalories equivalent (see Table 34).

**Table 34: Estimation of the Average Calorie Price for Cereals in the Surveyed Regions**

Country	Region	Average Price of Main Cereals		Conversion in Kcal/kg	Price of 1000 Kcal in \$PPP	Main Cereals
		in LCU/kg	in \$PPP/kg			
Mali	Tominian	100	0.42	3400	0.12	Millet, Sorghum
	Diéma	94	0.39			
	Koutiala	88	0.37	3480	0.11	Millet, Sorghum, Maize
	Macina	129	0.54	2800	0.19	Rice
Senegal	Casamance	111	0.43	2800	0.15	Rice
	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	498	0.66	2800	0.23	Rice
	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	15.05	0.44	3560	0.44	Maize
	Nyando	16.67	0.49		0.49	
	Nakuru N.	11.39	0.34		0.34	
Morocco	Chaouia	2.94	0.61	3340	0.18	Wheat
	Saïss	2.64	0.55		0.16	
	Souss	3.36	0.70		0.21	
Nicaragua	Muy Muy	4.30	0.64	3560	0.18	Maize
	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.	2.50	0.34	3560	0.10	Maize
	T. Bajas	2.50	0.34		0.10	
	Tequis.	2.50	0.34		0.10	

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

### 3.2.5 Conversion into Livestock Units (LU)

For the convenience of statistical analysis and to allow comparisons between households holding different types of livestock (cattle, horses, donkeys, sheep, goats, poultry, etc.), households' livestock endowments were converted into "livestock units," making it possible to estimate the live capital of the surveyed households (Table 35). The weight coefficients and methodology for creating this variable come from Ziébé *et al.* (2005).

**Table 35: Coefficient of conversion into Livestock Units (LU)**

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

Source: Ziébé *et al.* (2005)

### 3.3 Additional Comments and Limitations

Estimating on-farm incomes is always a challenge because of the complexity of farming systems and the inter-annual variations of crop and livestock productions, among other things. Due to constraints related to the survey design and budget, and in order to avoid overly long and unmanageable questionnaires, the Program chose to determine on-farm income through the estimation of production outputs and of overall production costs.

Several choices were made collectively during methodological workshops (see Annex 2). They addressed specifically the following issues.

*Self-consumption* value was estimated at the individual producer's price level, except in Madagascar where the team used the median market price in each surveyed village. As opposed to a method based on the cost of factors used in the production process, this method increases the value of self-consumption. It is however easier and more reliable due to the lack of systematic market prices for production factors; and it is equivalent to the income the household would have spent had it bought on the market the same basket of food that it actually consumed.

*Livestock production* income estimates were made using a cash flow approach, i.e., one that considered only the sale of live animals (reared on the farm), the sale of livestock products, and the related production costs (veterinary, feed, shepherding, etc.). It explicitly ignored stock variations. This practical option, which resulted from conditions in the survey, certainly led to an under-estimation of overall livestock income because it did not value the natural growth of the herd and it did not take into account the purchases of live animals (which can be related to capitalization). However, the consequences of this choice regarding on-farm costs and on-farm income are mitigated by the conditions of the surveyed regions: very few households invested in cattle over

the surveyed year, a fact confirmed when analyzing the evolution of livestock units at the farm level. The only exceptions were in Mexico and Nicaragua where some farm households engaged in intensive commercial livestock production.

*Production costs* were estimated at the overall farm level for crop and livestock production, for processing of agricultural products, and for other activities related to gathering, hunting and fishing. More detailed information would have required data collection at the plot level which was not possible within the existing survey design. Costs were estimated based on farmers' declarations, verified and consolidated by using additional information collected before the survey on yields, levels of intensification, and unit costs of inputs. Nevertheless, costs were possibly underestimated.

Finally, the specific pay-offs related to *contractualization* were difficult to estimate, despite the use of a detailed module for the topic. Identifying different types of contractual arrangements and estimating their returns requires very detailed data collection (exact quantities and prices at the plot level for both inputs and outputs), which was not possible within the survey framework. The consequences were of course mitigated by the very limited number of formal contracts in the survey.

Similarly, the estimation of off-farm incomes relied on statements by the head of household with reference to specific off-farm activities of household members, their returns and costs. Though earnings from waged activities, even temporary ones, are relatively easy to capture, the survey instrument did not allow a detailed understanding of self-employment activities, the returns to which are more difficult to estimate. However, both underestimation and overestimation may have occurred. Additionally, consistency checks were run during the data cleaning processes and helped the survey to avoid major errors.

Finally, remittances are difficult to capture without a specifically targeted survey, as there is frequently an under-reporting bias. Further, their very nature makes them hard to estimate: they are sent from time to time, usually only to the head of household, sometimes in cash and sometimes in kind, and often in small amounts. However, sometimes very large amounts of money are sent in order to finance investments (construction). These extreme values tend to push up average results.



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

## 1. A Knowledge Sharing Process

Although the RuralStruc Program is a donor initiative, it was of course implemented only after presentation to, discussion with, and acceptance by official counterparts in the seven survey countries. 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 decision to implement the Program through local teams was taken in order to foster ownership of the Program's core themes, facilitate the knowledge process (data collecting, mining, analysis, results sharing, and dissemination), and provide more credibility when feeding the policy making process. Although this was not the easiest way to implement the Program (transaction costs were high) it has paid off, especially in reference to the policy debate.

### 1.1 Country 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 (Table 36).

**Table 36: Existing Partnership in the RuralStruc Countries**

Country	Institutional Partner	Operational Partner
<b>Mali</b>	Ministère de l'agriculture	CEPIA (Phase I) Institut d'Economie Rurale - Michigan State University - CIRAD (Phase II)
<b>Senegal</b>	Ministère de l'agriculture	Initiative Prospective Agricole et Rurale (IPAR) and Association Sénégalaise pour la Promotion du Développement à la Base (ASPRODEB)
<b>Madagascar</b>	Programme d'Action pour le Développement Rural (PADR)	APB Consulting
<b>Kenya</b>	Ministry of Agriculture	Tegemeo Institute (Egerton University)
<b>Morocco</b>	Conseil Général du Développement Agricole (CGDA)	Institut Agronomique et Vétérinaire Hassan II (IAV) (Phase I) Ingénieurs Conseils en Economie et Environnement (Icon2e) (Phase II)
<b>Nicaragua</b>	Ministerio Agropecuario y Forestal (MAGFOR)	Instituto de Investigación Aplicada y Promoción del Desarrollo Local (Nitlapán - Universidad Centroamericana)
<b>Mexico</b>	Secretaría de Agricultura, Ganadería, Desarrollo Rural, Pesca y Alimentación (SAGARPA)	Facultad Latinoamericana de Ciencias Sociales (FLACSO)

The institutional counterparts were either public bodies or platforms for policy debate that were interested by the objectives of the RuralStruc Program, in the dissemination of its results, and in feeding discussions about the future of agriculture and rural development.

The operational partners in charge of the implementation of the research work were 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>200</sup> or through a call for tender.

## 1.2 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 that intensified with the launching and ending of each phase and with the several workshops presented in Table 37.

Three general workshops that assembled the seven national teams were held. In addition, specific country or regional workshops or meetings were organized for the preparation of the Second Phase.<sup>201</sup> These meetings were the opportunity to fine-tune the objectives, discuss difficulties and reach consensus on the methodology and the expected outputs.

**Table 37: RuralStruc Workshops (2006-2008)**

	Dates	Location
<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

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

These workshops and missions were complemented by the regular exchange of information and by direct contacts that included intensive back and forth and were carried out through emails, phone calls and a few videoconferences. The preparation of

<sup>200</sup> To identify the possible operational partner in Nicaragua, support was provided to the coordination team by RUTA (*Unidad regional de asistencia técnica*), platform for sustainable development in Central America.

<sup>201</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.

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 the Program to reach an agreement on the design of the household survey instrument (the “final” version was the 15<sup>th</sup> iteration of the design). National teams adapted the standard instrument in consideration of local specificities, and the country questionnaire (as well as the general country survey design) was then validated by the coordination team.

## **2. Dissemination of Results**

### **2.1 At the Country Level**

Because one of the Program’s objectives was to contribute to the national policy debates, the original design required the country teams to organize a series of events throughout the course of the work, but specifically one each after completion of the First Phase and the Second Phase. They were held according to the schedule presented in Box 25 below. These meetings or one-day workshops targeted different audiences depending on the local situation and on the dynamics of the national debate.<sup>202</sup>

The dissemination of final results started in 2010 in Mali and Senegal with two workshops gathering institutional counterparts, government bodies and ministries, farmers’ organizations, donors, research institutions, and media. In these two countries, the debates were supported by sets of policy briefs prepared by the country teams that addressed the main outcomes of the Program. Teams in Madagascar and Nicaragua have also engaged in the preparation of such policy briefs. The continuation of the dissemination process in the different countries will depend on local opportunities and political agendas.

### **2.2 At the International Level**

Since the launch of the Program in 2006, results have been progressively disseminated at the international level by the national teams and the coordination team through participation in workshops, seminars and conferences—a process which will continue over the medium term (Box 26). Additionally, early contributions have been published by the national teams and the coordination team in journals or book chapters.<sup>203</sup>

Among these initiatives, the organization of a preconference workshop at the 27<sup>th</sup> International Conference of Agricultural Economists (IAAE, Beijing 2009) is worth mentioning. This workshop was implemented with several national teams and offered a good opportunity to share and confront results within an international academic setting.

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<sup>202</sup> The Kenyan team did not formally present its results. This situation was initially related to political events (the period before the 2008 presidential election prevented any presentation of the First Phase results and complicated the launching of the Second phase). Then a change in the research team management and team members complicated the necessary follow-up with the institutional partner.

<sup>203</sup> See the following references in the bibliography: Anseeuw *et al.* (2008), Dabat *et al.* (2008), Fréguin-Gresh *et al.* (2010), Gabas & Losch (2008), Giordano & Losch (2007), Losch (2006, 2007, 2008, 2010a,b,c) and Losch & Fréguin-Gresh (*forthcoming*).

The workshop's title was "Rural restructuring and the difficult ways of specialization or diversification: Lessons from a cross-country approach". It was complemented by an invited panel organized by the Program titled "A world without agriculture? Historical trends, statistical evidence and harsh reality: the challenge of structural transformation in a globalized economy".

The Program also co-organized a parallel session of the ABCDE 2009 Conference in Seoul, Korea, on the "The Growth-Employment Challenge: A Comparative Approach between Asian Economic Transitions and Africa Today". The contribution in the panel was "Africa's Traps and Challenges: What Can We Learn from East Asia?"

#### **Box 25: Dissemination Process of the Results in the RuralStruc Countries**

##### **Madagascar**

- September 2006 - roundtable on the first results with ministries, donors, university and researchers
- May 2007 - presentation of the First Phase report to ministries, donors, university and researchers
- November 2008 - Platform of the donors for rural development (SMB - Secrétariat multi-bailleurs)

##### **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
- April 2010 - final workshop - discussion of the Second Phase results its policy implications to institutional counterparts, farmers' organizations, donors, and researchers

##### **Mexico**

- June 2010 - presentation of the main results of the Program - Centro Tepoztlán (Tepoztlán, Morelos)

##### **Morocco**

- December 2006 - Conseil Général du développement Agricole (CGDA) - presentation of the Program in the 5<sup>th</sup> Institutional Seminar of the CGDA
- 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 7<sup>th</sup> Institutional 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 - presentation of the First Phase report to the seven rural producers' organizations platforms of Senegal
- July 2007 - presentation to the 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 2009 - Platform of the donors for rural development
- June 2010 - final workshop - discussion of the Second Phase results and its policy implications to institutional counterparts, farmers' organizations, donors, and researchers
- November 2010 - presentation of the main results of the Program to the International Conference "Comment les exploitations familiales peuvent nourrir le Sénégal" organized by FONGS and CNCR.

## **Box 26: International Dissemination of Results**

*Brussels, September 27, 2006:* Meeting of the EU Heads of Rural Development Departments.

*Geneva, June 14, 2007:* Lecture, Institut Universitaire d'Etudes du Développement (IUED).

*Berlin, June 18-21, 2007:* 2<sup>nd</sup> European Forum on Sustainable Rural Development in Africa.

*Montpellier, September 4, 2007:* Journée d'échange "Pour une recherche agronomique ouverte sur le monde". CIRAD.

*Johannesburg, September 26-28, 2007:* 45<sup>th</sup> Annual Conference of the Agricultural Economics Association of South Africa.

*Paris, November 6-7, 2007:* Forum international "Équité et Développement". HCCI – OCDE – Banque mondiale – Réseau Impact.

*New York, February 28–March 1, 2008:* "Migration and Development: Future Directions for Research and Policy", Conference. Social Science Research Council.

*Beijing, March 5-6, 2008:* "Inclusive Business in Agrifood Markets: Evidence and Action", International Conference of the Regoverning Markets Program.

*Crans-Montana, September 17-20, 2008:* 1<sup>st</sup> Conference of the Geneva Trade Development Forum (GTDF).

*Washington DC, October 14, 2008:* "Migration Challenges in an Integrating World", Special Event. Carnegie Endowment for International Peace.

*Poindimié, October 27-30, 2008:* « Ruralité et Développement durable - Ateliers sur les enjeux et les politiques de développement rural ». Institut agronomique calédonien.

*Windhoek, February 9-10, 2009:* "African Agriculture in the 21<sup>st</sup> century: Meeting the Challenges, Making a Sustainable Green Revolution". High-level CSD InterSessional Meeting, United Nations, Commission on Sustainable Development.

*Rome, May 8, 2009:* IFAD Policy Seminar on the First Results of the RuralStruc Program.

*Paris, May 19-20, 2009:* 8<sup>th</sup> Partnership meeting on rural development in Western and Central Africa. AFD – World Bank.

*Rio de Janeiro, May 11-14, 2009:* LASA XXVIII International Congress (Latin American Studies Association).

*Johannesburg, June 15-19, 2009:* Program of Support to Farmers Organizations in Africa - Start-Up International Workshop. Southern African Confederation of Agricultural Unions (SACAU).

*Seoul, June 22-24, 2009:* Annual Bank Conference on Development Economics. ABCDE Korea 2009 Conference.

*Beijing, August 16-22, 2009:* 27<sup>th</sup> International Conference of Agricultural Economists (IAAE).

*Wageningen, February 27-28, 2010:* "Forward Thinking in Agriculture and Food" Workshop. FI4IAR – CTA.

*Addis Ababa, April 16, 2010:* Workshop on the RuralStruc Program. Economic Commission for Africa.

*Brussels, June 16, 2010:* "Youth and Rural Development in ACP Countries". 19<sup>th</sup> Brussels Development Briefings, CTA – ACP-EU

*Cambridge (MA), August 19, 2010:* Lecture on the RuralStruc Program Results. Harvard J.F. Kennedy School of Government.

*Addis Ababa, October 13, 2010:* Rural Futures Program Launch. NPCA and ECA.






*Lund, October 14, 2010:* "Rural Economies and Structural Transformation". Development Research Day, Lund University.

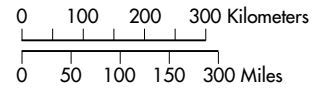
*Ouagadougou, December 6-8, 2010:* Colloque international sur l'agriculture africaine, CEDRES.

**ANNEX 3**  
**MAIN CHARACTERISTICS**  
**OF THE SURVEYED REGIONS**

# Mali

Region	TOMINIAN	DIEMA	KOUTIALA	MACINA
<b>A priori Classification</b>	Losing	Intermediary	Winning	Winning
<b>Population characteristics</b>	32 inhabitants/km <sup>2</sup> . High dependency ratio (1.1). Seasonal emigrations to main cities of the country (Bamako, Ségou et Sikasso)	12 inhabitants/km <sup>2</sup> . High emigration to foreign countries (African countries, Europe, USA).	41 inhabitants/km <sup>2</sup> . Limited emigration. High pressure on land due to internal migrations to the cotton zone.	High density in the Office du Niger area but regional average of 18 inhabitants/km <sup>2</sup> . High immigration trend related to the irrigation scheme including from other countries.
<b>Accessibility and proximity to major cities and markets</b>	Mainly rural area (no city exceeding 5,000 inhabitants in 1998). A tarmac road serves the town of Tominian and dirt roads serve the other localities with very difficult accessibility during the rainy season.	Diéma: 10,900 inh. Main crossroad of the roads Bamako-Kayes-Dakar and Bamako-Nioro-Mauritania. Kayes: 87,000 inh. (est.2010).	Koutiala: 97,800 inh. (est.2010). Good accessibility with 4 national tarmac roads (notably the main road Bamako-Burkina-Faso-Côte d'Ivoire) and a network of dirt roads	Macina: less than 5,000 dwellers. Good accessibility within the irrigation scheme (except during the rainy season) and a tarmac road to Ségou located at 80 km (116,000 inh. est. 2010)
<b>Agro-ecological characteristics</b>	Intermediary region between a South-Sahelian and a North Sudano-Guinean climate (600-900 mm of rain concentrated in 4 months: June to September). Mainly tropical ferruginous soils, which are fragile and easily erodible	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	Sudanese climate (750-1,000 mm of rain). Soils highly fragile and easily erodible with possibility of acidification, particularly in the cotton area	Sahelian climate (450-650 mm of rain, concentrated from July to October). Fertile alluvial plains located in the Delta of the Niger River. Irrigation scheme.
<b>Main agricultural productions</b>	Staples (millet, maize, sorghum, <i>niébé</i> , <i>fonio</i> ), groundnut, sesame	Staples (millet, maize, sorghum, <i>niébé</i> , <i>fonio</i> , groundnut, potatoes and cassava, rice), horticulture (onion), cattle	Cotton, dry cereals (millet, sorghum, maize), cattle (mainly for draft force and manure production)	Irrigated rice, horticulture (onion), dry cereals, cattle, fisheries along the river
<b>Existing agribusinesses or integration processes</b>	No agribusiness or integration process. Low level of commercialization of agricultural products	No agribusiness or integration process. Low level of commercialization	Vertical integration within the cotton industry (CMDT)	No agribusiness or integration process. Rice and onion are well commercialized in traditional value-chains
<b>Existing job opportunities</b>	Few opportunities out of the agricultural sector, but possible use of natural resources (gathering, wood, quarrying)	Few opportunities: agricultural seasonal workforce, trade and service activities in Kayes	Opportunities for seasonal or permanent employment in Koutiala, highly related to the situation of cotton.	Seasonal employment as agricultural laborer, limited opportunities outside agriculture

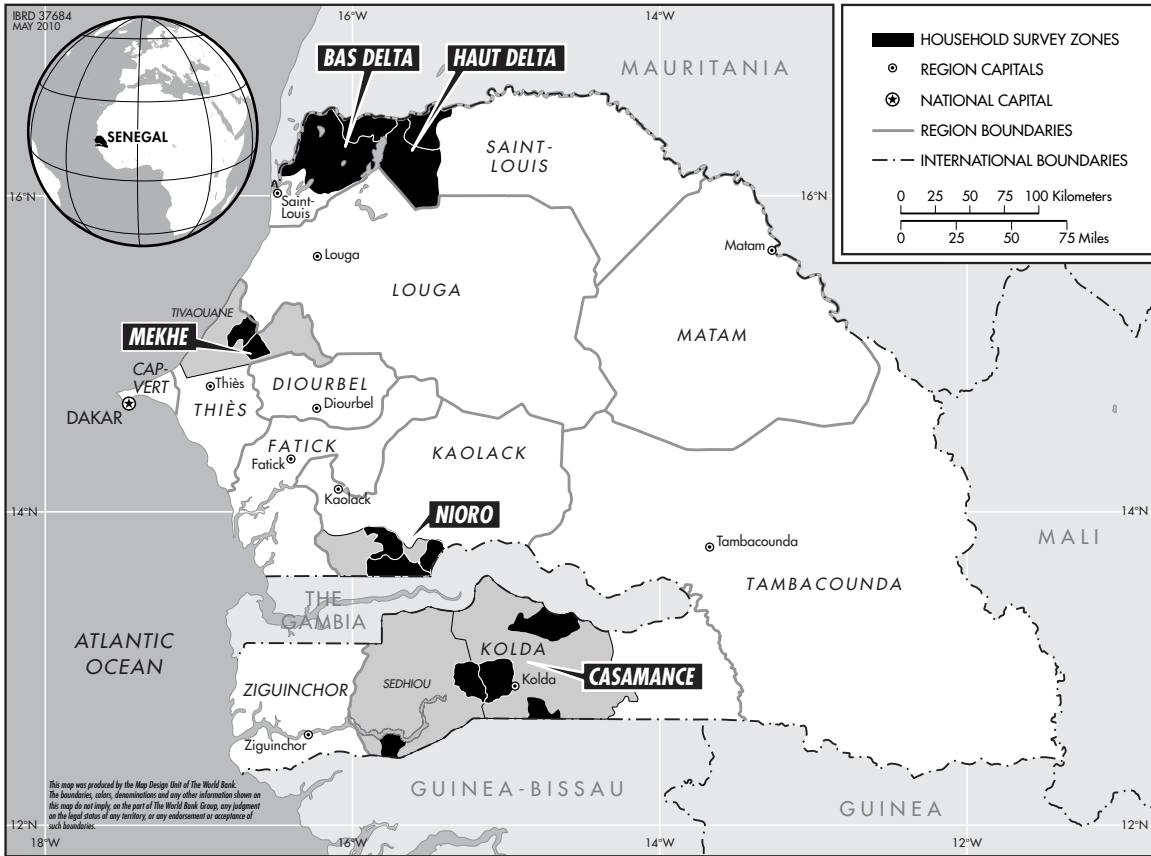
-  HOUSEHOLD SURVEY ZONES
-  PROVINCE CAPITALS
-  NATIONAL CAPITAL
-  REGION BOUNDARIES
-  INTERNATIONAL BOUNDARIES



# Senegal

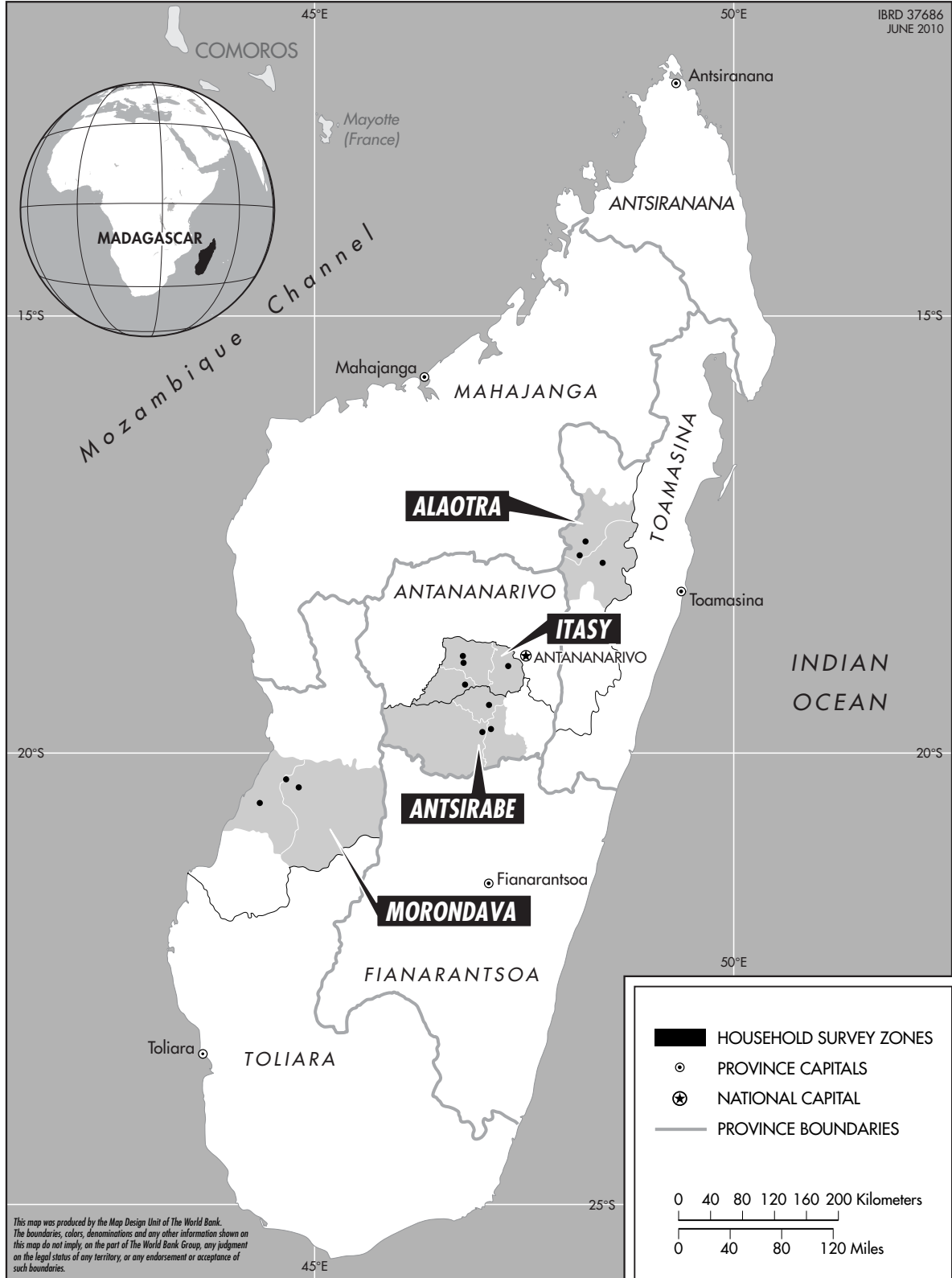
Region	DELTA	Bassin Arachidier NIORO	Bassin Arachidier MEKHE	CASAMANCE
<b>A priori Classification</b>	Winning	Intermediary	Intermediary	Losing
<b>Population characteristics</b>	11-40 inhabitants/km <sup>2</sup> . 37% of the population at regional level is urban	88 to 229 inhabitants/km <sup>2</sup> (144 inh. on average). Importance of emigration and seasonal migration to Kaolack, Dakar, Ziguinchor and Gambia	200 inhabitants/km <sup>2</sup> (Tivaouane). Migrations to Dakar, Thiès, Touba, coastal areas for fisheries and to foreign countries.	60 inhabitants/km <sup>2</sup> . Importance of immigration from <i>Bassin Arachidier</i> and Gambia in particular
<b>Accessibility and proximity to major cities and markets</b>	St-Louis: 152,000 inh. (est.2010), Richard-Toll (56,000), Dagana (23,000). Very good accessibility to Dakar. One major road linking Saint Louis to the upper Senegal River and to Mauritania. A network of dirt roads serves the irrigation scheme.	Nioro: 15,000 inh. (est.2010). Good to medium accessibility. Near the Gambia border and the city of Kaolack (pop. 180,000, est. 2010 )	Mekhé: 17,000 inh. (est.2010). Very good accessibility (located on the St-Louis, Thiès, Dakar road). Near the city of Thiès (pop. 263,000 est. 2010).	Kolda: 63,000 inh. (est.2010). Medium to poor accessibility. Difficult connection with the rest of Senegal (border with Gambia)
<b>Agro-ecological characteristics</b>	Semi arid climate (200 to 400 mm of rain). 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 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)	Sudano-Guinean climate (1000 mm of rain) and clay to sandy or silty tropical soils, combined to high hydrographic net, offer high potential for agriculture
<b>Main agricultural productions</b>	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 ruminant (but also donkey and horse for draft force)	Staples (millet, <i>niébé</i> , cassava), groundnut, cattle and small ruminants	Staples (maize, sorghum, millet, rice, <i>fonio</i> ), cotton, groundnut, cattle (mainly meat, but also dairy), fisheries
<b>Existing agribusinesses or integration processes</b>	Agribusiness (tomato processor = SOCAS, sugar cane industry = CSS, Grands Moulins = horticulture) and integration processes in the rice industry	Integration processes through groundnut industry	Integration processes through groundnut industry and with informal actors for cassava	Integration processes through groundnut industry - Development of the dairy industry.
<b>Existing job opportunities</b>	Many job opportunities in trade and services due to the proximity to the city of Saint Louis, but also jobs in agroindustries	Due to the proximity to Gambia, existing many trade activities and opportunities in the informal sector	Trade activities. Strong development of handicrafts (basketry, leather)	Very limited except trade and services in Kolda





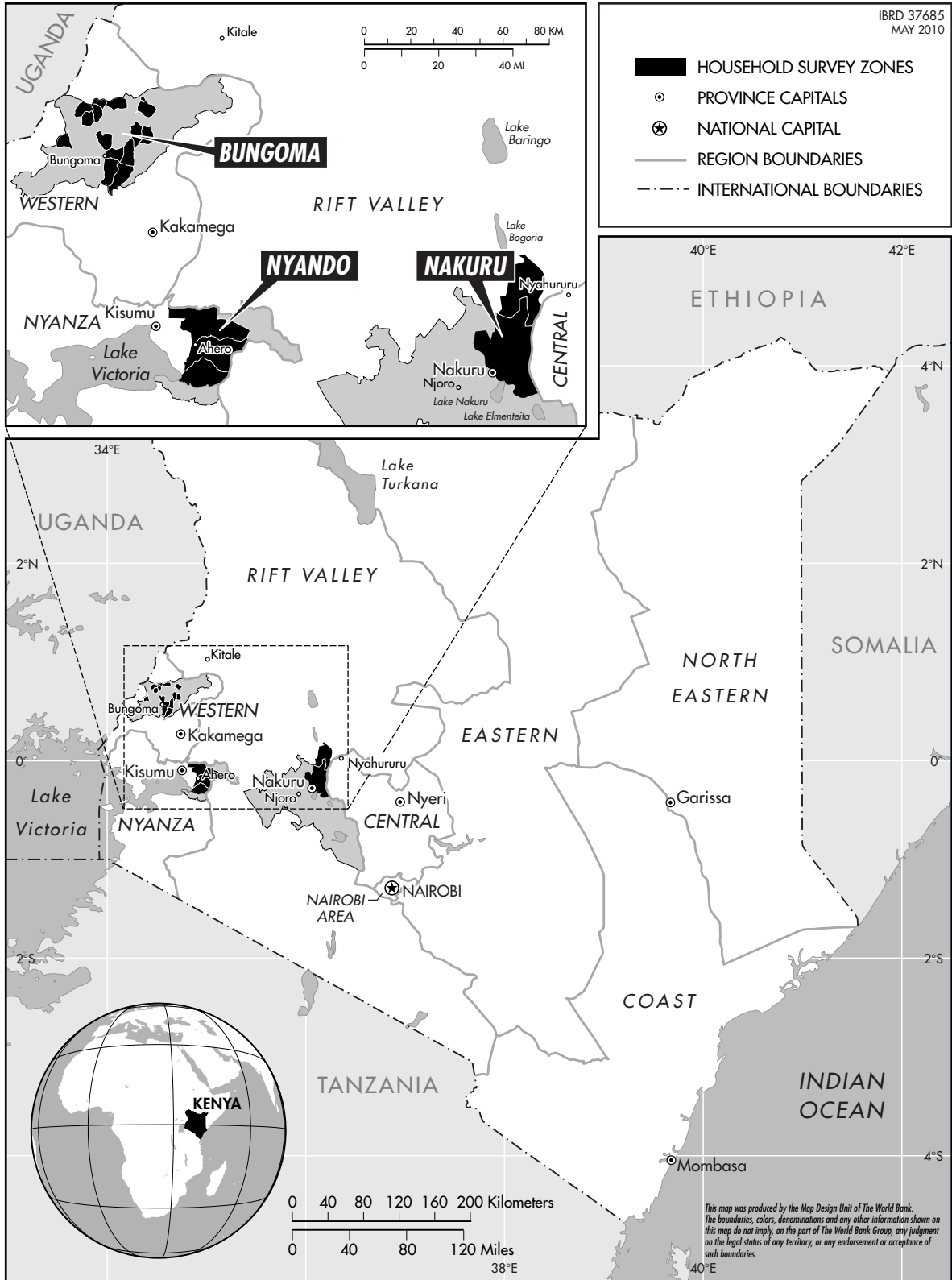
# Madagascar

Region	ANTSIRABE	ITASY	ALAOIRA	MORONDAVA
<b>A priori Classification</b>	Winning	Intermediary	Intermediary	Losing
<b>Population characteristics</b>	90-125 inhabitants/km <sup>2</sup> - migrations related to land scarcity	105 inhabitants/km <sup>2</sup> . Migrations related to land issues.	55 inhabitants/km <sup>2</sup> . Seasonal immigration (for harvesting and agricultural works in general, but also for trade of paddy rice)	12 inhabitants/km <sup>2</sup> . Immigration from the Highlands.
<b>Accessibility and proximity to major cities and markets</b>	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). Easy access to the capital city.	Region served by a major highway (RN43) many local accessibility issues. Nearness of the the capital city, Antananarivo (pop. 1.7 million).	Dirt road or tarmac road (RN44) => medium accessibility due to high difficulties during the rainy season	Dirt roads or paths without bridges, which imply difficulties during the rainy season. Near the city of Morondava (pop. 40,000)
<b>Agro-ecological characteristics</b>	Located in the Central Highlands (altitude 1,500-1,900 m) characterized by red lateritic soils and tropical highland 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 island's most fertile and productive rice fields. The climate is semi-wet tropical (1,091 mm of rain, 17 to 24°C)	Located on the west coast (altitude 50-75 m) composed of sedimentary formations that allow broad alluvial plains, which are believed to have great agricultural potential. The climate is tropical to wet-dry tropical (25 to 27 °C, 750 to 1,250 mm of rain)
<b>Main agricultural productions</b>	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)	Rice, beans ( <i>Phaseolus lunatus</i> ), maize, cattle (draft oxen)
<b>Existing agribusinesses or integration processes</b>	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.)	Private actors (maize, beans)
<b>Existing job opportunities</b>	Trade and handicraft (embroidery)	Trade and handicrafts (embroidery, basketry)	Mostly, agricultural labor opportunities in the rice industry	Charcoal production, trade



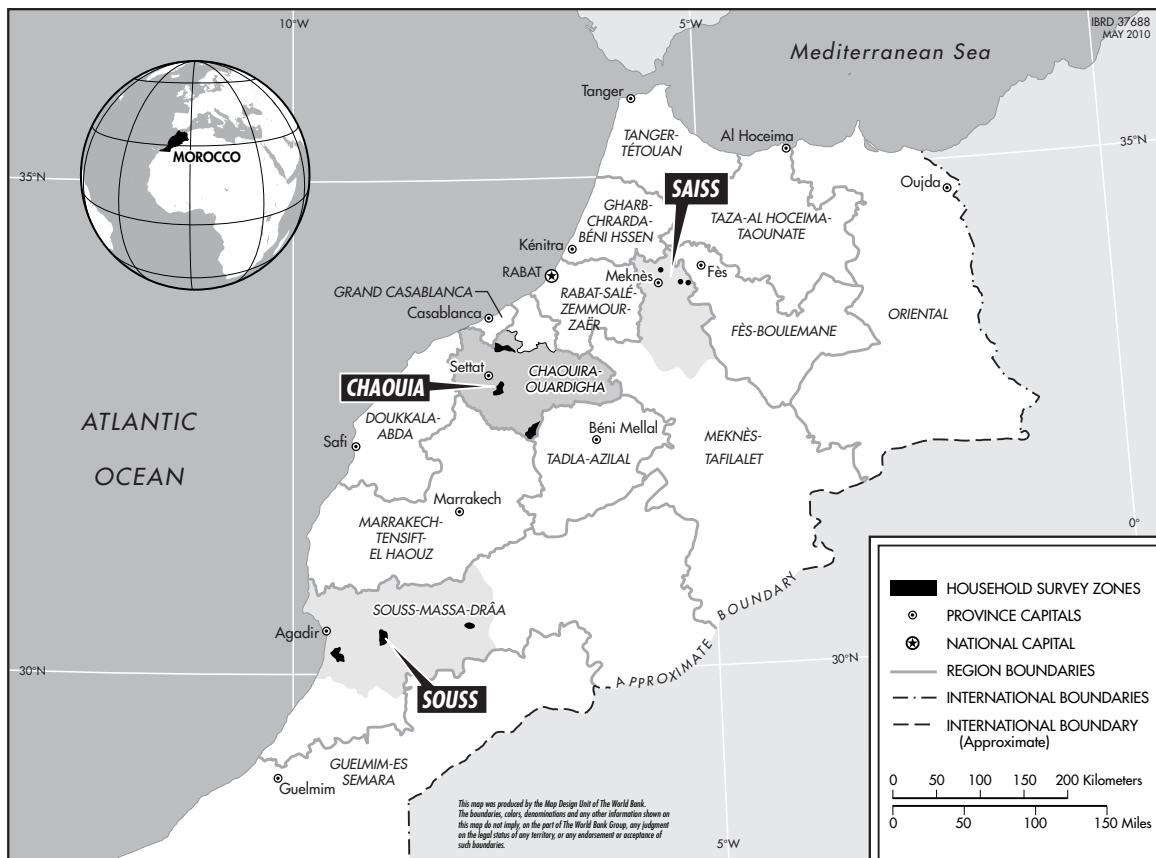
# Kenya

Region	Nakuru North	Bungoma	Nyando
<b>A priori Classification</b>	Wining	Intermediary	Losing
<b>Population characteristics</b>	Provincial density of pop = 220 hab./km <sup>2</sup>	Provincial density of pop = 424 hab./km <sup>2</sup>	Provincial density of pop = 357 hab./km <sup>2</sup>
<b>Accessibility and proximity to of major cities and markets</b>	The region has many classified roads, half of them being tarmac roads. Good access to Nakuru (219,366), the fourth largest town in Kenya, located on the main transportation corridor (Mombassa - Kampala).	Bungoma: officially 75,000 inhab. (2000). The district is part of the " Western conurbation", one of the fastest growing urban areas, with an estimated population of 3.9 million (2010). The region shares borders with Uganda. Poor road network (165 km of tarmac roads only), mainly impassable during rainy season, lack of river crossings and proper bridges. The railway crosses the district with main stations in Bungoma and Webuye	Ahero: 70,000 inh. (est.2010), located 30 km east of Kisumu, officially the third largest city in Kenya (332,000 in 2000), but also part of the "Western conurbation". Tarmac highway with Kisumu, Kericho and Kisii but many local difficulties related to flooding
<b>Agro-ecological characteristics</b>	Located between 900-1800 m with annual rainfall between 950 and 1500 mm, the region has a high potential for agriculture and livestock. The region is home to Lake Nakuru, one of the Rift Valley lakes, and its national park.	Good soils, generally abundant, and well distributed rainfall, making it an agriculturally productive area. Several large rivers, which are used for small-scale irrigation	Large plains (Awach and Nyando rivers) but facing perennial flooding and erosion. Series of hills and scarps to the South, and the Kano Plains going down to Lake Victoria in the Northwest (better soils)
<b>Main agricultural productions</b>	Large variety of crops : wheat, maize, millet, beans, pyrethrum, tea, coffee, potatoes and vegetables. Cattle ranching, poultry and bee-keeping are also largely developed .	Maize, beans, potatoes, and sorghum for subsistence. Sugarcane, tobacco and coffee for the cash crops. Production of horticultural crops (passion fruits, tomatoes, onions, citrus and capsicum) in some districts	Maize, groundnuts, beans, sorghum, cassava, sweet potatoes (mainly for subsistence). The main cash crop is sugar cane, produced by individual households and estates. Cotton and rice are now residual. Dairy farming and coffee production can be suited in the higher altitudes
<b>Existing agribusiness or integration processes</b>	Kabazi Cannery and Subukia Tea and Coffee Ltd are leading agro-businesses relying on local supply.	Nzoia Sugar Company, Malakisi Ginnery, British American Tobacco and Mastermind Tobacco factories and Kitinda Dairies for milk processing	Milling sugar cane factories in Muhoroni (in difficulty) and Miwani (closed). Cotton ginneries stopped
<b>Existing job opportunities</b>	The many towns located around the district such as Nakuru, Gilgil and Nyahururu have many businesses and industries which offer many non-farm employment opportunities. Tourism is well developed and has a large potential.	The industries in the region providing employment opportunities include Webuye Paper Mills, East Africa Heavy Commercial, and the several agro-industries	Very limited due to the extremely poor state of the existing value chains, the insufficient provision of public goods, and the low level of incomes. Nearby Kisumu, the major town, faces recession.



## Morocco

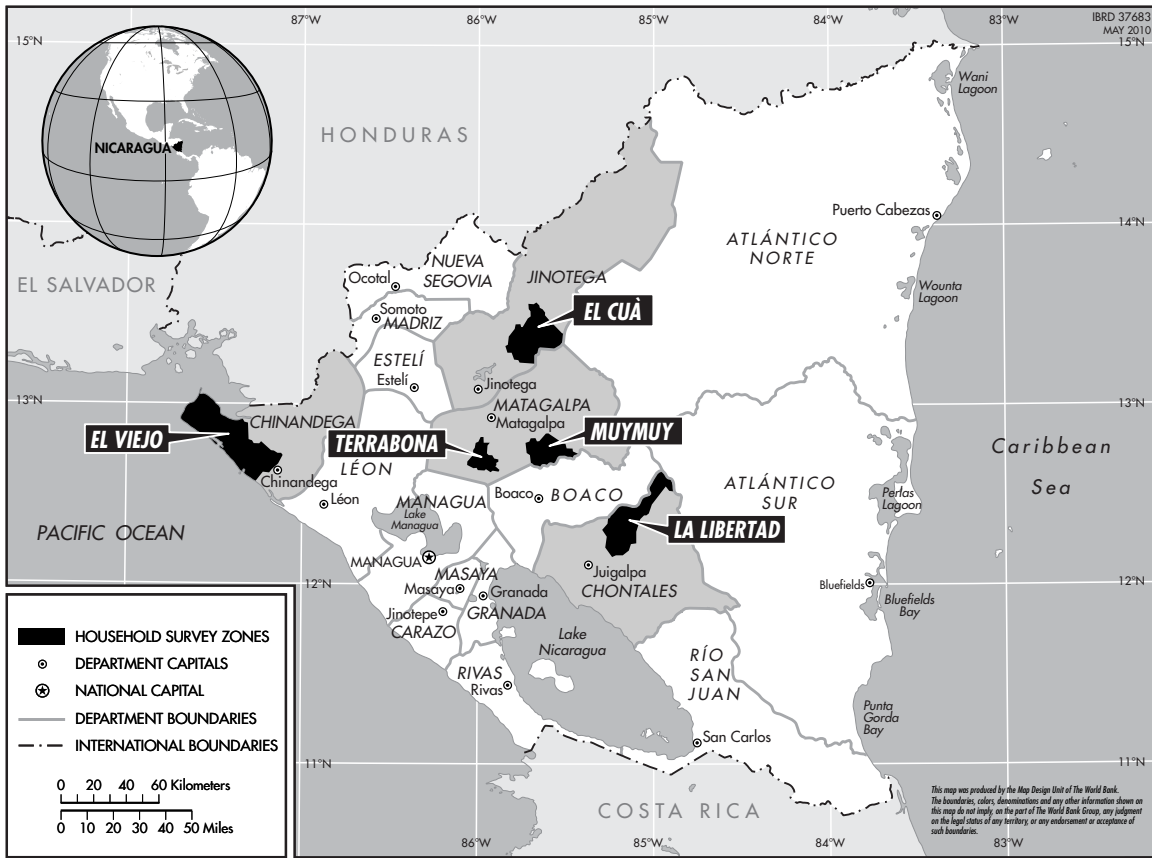
Region	CHAOUIA	SOUSS	SAISS
<b>A priori Classification</b>	Losing	Winning	Intermediary
<b>Population characteristics</b>	236 inhabitants/km <sup>2</sup> . Immigration of people coming to work in the engineering and carpentry workshops of Berrechid. Old emigration to Casablanca and to Europe (from the 1960s)	40-50 inhabitants/km <sup>2</sup> (but very large region with people mainly concentrated in urban localities). High level of emigration to Europe in the mountain.	197 inhabitants/km <sup>2</sup> in plains, 40 inhabitants/km <sup>2</sup> in mountains, regional average 25 inhabitants/km <sup>2</sup>
<b>Accessibility and proximity to major cities and markets</b>	Important road network. Dirt roads serving small localities can be in bad condition during the rainy season. Nearness of Casablanca (pop. 3-4.5 m) for one of the surveyed localities - Jaqma (30 Km)	Medium accessibility depending on localities (mountain areas). Easy access to Agadir (4th largest Moroccan city)	Medium accessibility depending on localities (mountain areas). Easy access to Fes and Meknes.
<b>Agro-ecological characteristics</b>	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	Continental climate (255-625 mm of rain)
<b>Main agricultural productions</b>	Cereals (wheat, ), cattle, small ruminants	Horticulture, fruits (citrus, banana, almond, olive ), cereals, forage, saffron (in the mountain area)	Cattle (dairy), tobacco, cereals, horticulture, orchards (such as apple, pear and olive trees)
<b>Existing agribusinesses or integration processes</b>	Few agribusinesses (flour, oil, etc.)	Irrigation schemes. Integration processes for early vegetables and fruits (especially citrus)	Integration processes in the milk industry
<b>Existing job opportunities</b>	Many opportunities in urban areas due to the proximity to Casablanca	Major opportunities in trade and services, notably tourism	Many agricultural labor opportunities (for industrial crops, horticulture and fruit trees)



# Nicaragua

Region	EL VIEJO	EL CUA	MUY MUY	TERRABONA	LA LIBERTAD
<b>A priori Classification</b>	Winning	Winning	Intermediary	Losing	Losing
<b>Population characteristics</b>	30 inhabitants/km <sup>2</sup> . Relative proximity of 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	4-9 inhabitants/km <sup>2</sup> . Relatively recent colonization area (1970s)
<b>Accessibility and proximity to major cities and markets</b>	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.), an important center with agribusinesses related to coffee production	At the junction between the municipalities of Boaco, Matiguas and Matagalpa. Good network connections between the Pacific and central area. Very unequal quality of dirt roads. Easy access to Matagalpa	Medium-to-poor accessibility with dirt roads, but relative proximity to a major tarmac road (Pan-American road)	Dirt roads with very difficult accessibility. Secluded region
<b>Agro-ecological characteristics</b>	Located in the Pacific plains. Mainly volcanic soils with good level of fertility and good potential for agriculture. Tropical 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° 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	Tropical climate (1,200-1,400 mm of rain) which allows 2 to 3 cropping seasons for maize and beans, and fragile, easily erodible soils (low mineral fertility)
<b>Main agricultural productions</b>	Sesame, sugar cane, maize, beans, industrial sorghum, cattle	Coffee, maize, beans, cattle (meat)	Maize, beans, cattle (dairy and meat)	Maize, beans, vegetables, cattle (meat)	Maize, beans, roots, fruits, cattle (dairy and meat). Many big cattle producers from the dry areas are increasingly accessing the pastures
<b>Existing agribusinesses or integration processes</b>	Main industries and agribusinesses are located in the Pacific Plains (cotton, sugar cane, sorghum, sesame, etc.)	Agribusiness related to coffee processing and export	Strong integration in the dairy value chain: collection of fresh milk processed in pasteurized cheese for export to El Salvador and USA (Calbri y Anael.SA) and local dairy chains (Parmalat, Eskimo and Prolacsa)	Integration processes for horticulture (with supermarkets such as HortiFruiti, WalMart, etc.) for domestic market	Low level of integration but increasing implementation of collectors working for the dairy industry
<b>Existing job opportunities</b>	Agricultural labor (e.g. sugar cane harvest) or agribusinesses (oil, flour, groundnut and shrimp industry, sugar cane and liquor factories) in El Viejo and Chinandega	Agricultural labor (coffee harvest) and job opportunities in <i>maquiladoras</i> (textile factory in Matagalpa)	Mostly, agricultural labor (coffee, cattle) and processing of agricultural products	<i>Maquila</i> industry, services and trade activities	Mainly agricultural labor





# Mexico

Region	Sotavento - Tierras Bajas	Sotavento - Sierra Santa Marta	Tequisquiapan
<b>A priori Classification</b>	Intermediary	Loosing	Winning
<b>Population characteristics</b>	Density of population = 50 inh./km <sup>2</sup> . Sotavento was an immigration area throughout the 20th century (due to strong public policies fostering land settlement and industrial development in the Coatzacoalcos-Minatitlan area).	Density of population = 55 inh./km <sup>2</sup> . Old refuge area throughout the colonial period and most of the 19th century due to big estates expansion in the lowlands and remoteness. High percentage of indigenous population and high poverty levels.	Density of population = 350 km <sup>2</sup>
<b>Accessibility and proximity to major cities and markets</b>	Presence of small rural towns (Isla, Acayucan). Relative proximity of two major harbors (Veracruz and Coatzacoalcos). Relatively good infrastructure	Bad accessibility	Located north of the Querétaro-San Juan del Rio corridor linking Mexico City with the north and west of the country. However 55% of the traffic is local and boosted by a strong network of secondary highways. High accessibility.
<b>Agro-ecological characteristics</b>	This lowland area offers high agricultural potential related to annual floods of the rivers and high temperatures (two cropping cycles) and the possibility of mechanization.	Mountain area, with consistent erosion risks. Low potential for mechanization. The Sierra de Santa Marta hosts a natural reserve (Reserva de la Biosfera Los Tuxtlas).	Temperate climate (average of 17 °C). Access to irrigation from the San Juan River the region. High level of pollution (aguas negras) caused by the industrial residues of the neighboring district of San Juan del Rio. The region benefits from high-quality soils
<b>Main agricultural productions</b>	Specialization in maize (mainly hybrids). Industrial pineapple production and cattle breeding in the surrounding uplands	Strong development of hybrid corn. Associated crops like beans and tubercules have gradually been eliminated by the use of herbicides.	Maize dominates, grown alone or intercropped with beans. Animal production is important, particularly poultry, meat and milk. Sorghum, alfalfa and oats are cultivated for feed. Mechanization has developed. Horticulture is a growing sector with major investors.
<b>Existing agribusinesses or integration processes</b>	Industrial maize flour processors in Chinameca (MASECA) and in Jáltipan (MINSa)		Many agro-businesses related to maize, cempasúchitl, frozen and processed vegetables, barley and beer, poultry and milk. Vegetable agro-industry for exports has developed with contract farming (eg La Cascada) and also large farms (Expo-Hort).
<b>Existing job opportunities</b>	Job opportunities in pineapple industry and cattle ranches. Same impact of the restructuring of the petro chemistry industry (see Sierra)	Following the restructuring of public petro chemistry industries in Coatzacoalcos and Minatitlan (1990s), opportunities have dried and labor migrations have reoriented towards the fruits and vegetables production basins of northern-pacific coast	Many factories in Querétaro and San Juan (automobile, aeronautics, equipment and machinery) as well as agro-industries (food, beverages and tobacco). Maquiladoras related to the textile industry have developed in rural areas.





## **ANNEX 4: TABLES**

**Table 38: Domestic Poverty Lines (in \$ PPP)**

	Mali	Senegal	Madagascar	Kenya	Morocco	Nicaragua	Mexico
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

Note: various years were adjusted to 2007 when needed - WDI database

**Table 39: Income per Capita of the 5<sup>th</sup> Quintile**

		Q5 Total 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 N.	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
	T. 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 40: Surveyed households' Involvement in Off-farm Activities**

		Households' involment in off-farm activities									
		# HH	All types	Agricultural wage labor		Non agricultural wage labor		Self-employment		Migrations	
			%	%	\$PPP / EAP	%	\$PPP / EAP	%	\$PPP / EAP	%	\$PPP / migrant
Mali	Tominian	155	83.2	3.9	38	3.2	194	40.6	111	64.5	258
	Diéma	148	92.6	19.6	44	0.7	100	23.0	144	73.6	1,233
	Koutiala	153	84.3	25.5	19	3.9	138	47.7	103	58.8	181
	Macina	154	82.5	45.5	46	5.2	177	27.3	176	32.5	557
Senegal	Casamance	239	76.6	0.4	162	2.1	824	54.8	273	41.8	948
	Mekhé 1	111	95.5	0.9	221	19.8	317	89.2	448	52.3	1,499
	Nioro	252	94.8	2.0	307	10.7	396	83.3	438	61.1	600
	Haut Delta	61	78.7	0.0	0	8.2	590	52.5	497	41.0	481
	Mekhé 2	113	93.8	1.8	271	27.4	417	87.6	500	42.5	878
	Bas Delta	121	94.2	8.3	389	28.1	789	82.6	708	29.8	1,324
Madagascar	Antsirabe 2	303	98.0	54.5	98	8.3	157	66.0	250	31.4	58
	Alaoatra 1	385	84.7	44.7	144	7.0	329	54.3	283	9.4	93
	Morondava	506	81.0	32.4	157	6.5	523	34.6	335	19.0	87
	Itasy	503	98.0	55.3	152	8.3	396	65.8	271	23.5	87
	Antsirabe 1	206	86.4	46.6	130	6.8	217	42.7	392	28.2	144
	Alaoatra 2	115	74.8	47.0	154	5.2	200	46.1	391	3.5	9
Kenya	Bungoma	299	74.2	8.0	325	33.8	894	41.5	556	19.7	44
	Nyando	285	95.1	17.2	303	56.8	643	30.2	646	25.3	36
	Nakuru N.	289	96.2	9.7	363	33.9	1,319	77.5	1,897	29.4	60
Morocco	Chaouia	228	72.4	21.1	495	14.0	1,135	21.9	1,224	33.3	1,846
	Saiss	261	51.7	8.8	511	4.6	1,349	5.0	2,023	34.5	1,298
	Souss	240	80.8	21.7	1,297	15.4	1,270	20.4	3,018	35.0	1,346
Nicaragua	Muy Muy	299	63.2	25.8	907	8.0	1,338	10.0	1,126	33.4	1,420
	Terrabona	281	49.8	8.5	1,117	15.7	1,624	15.3	1,190	27.8	2,322
	El Viejo	288	66.3	39.6	1,582	13.5	1,433	4.2	1,399	19.4	2,791
	La Libertad	290	49.3	38.3	1,222	2.8	1,537	6.9	1,797	6.2	3,502
	El Cuá	300	24.3	8.7	920	4.7	1,425	6.7	1,043	6.0	4,033
Mexico	Sierra SM.	175	100.0	52.0	485	18.3	1,264	85.7	562	5.1	1,795
	T. Bajas	145	100.0	42.1	720	25.5	1,468	83.4	609	18.6	1,407
	Tequis.	364	98.1	27.7	2,374	57.1	2,589	33.5	2,748	9.6	1,856
		7269									

**Table 41: Land Used per Farm Household (in Ha)**

		Land used per Farm Household (*)				
		Mean	Median	Minimum	Maximum	Standard Deviation
Mali	Tominian	7.32	6.00	1.00	30.00	5.49
	Diéma	18.72	12.75	.75	142.00	19.86
	Koutiala	11.60	10.70	1.00	39.25	6.24
	Macina	6.12	5.07	.40	30.28	5.17
Senegal	Casamance	9.34	6.50	1.00	46.00	7.92
	Mekhe 1	14.18	12.00	1.00	41.00	7.96
	Nioro	8.35	7.20	.00	35.98	5.25
	Haut Delta	3.10	2.50	.50	15.00	2.62
	Mekhe 2	9.72	9.00	2.40	27.36	4.96
	Bas Delta	7.96	3.52	.00	100.00	13.63
Madagascar	Antsirabe 2	.52	.41	.01	3.28	.42
	Alaotra 1	.98	.54	.00	13.00	1.42
	Morondava	1.41	1.08	.00	7.93	1.17
	Itasy	.56	.39	.00	4.29	.56
	Antsirabe 1	.82	.66	.05	7.07	.74
	Alaotra 2	3.34	1.65	.00	25.01	4.64
Kenya	Bungoma	1.33	1.01	.03	9.72	1.28
	Nyando	1.32	.81	.00	12.55	1.38
	Nakuru N	1.45	1.01	.10	8.91	1.52
Morocco	Chaouia	8.16	4.40	.00	92.00	12.29
	Saïss	6.44	4.00	.00	80.00	9.24
	Souss	2.85	1.00	.00	40.00	4.75
Nicaragua	Muy Muy	25.88	5.68	.36	875.09	81.36
	Terrabona	13.89	3.55	.36	608.17	46.73
	El Viejo	14.72	5.68	1.07	480.28	36.47
	La Libertad	76.60	8.84	.09	2668.68	208.09
	El Cuá	24.17	10.60	1.07	737.58	52.73
Mexico	Sierra SM	6.06	4.00	.00	27.00	5.15
	T. Bajas	9.50	5.00	.00	169.00	17.86
	Tequis.	1.86	.00	.00	14.00	2.85

(\*) Farm area used by household for crops and breeding, including fallow land, whether owned by the household or not (i.e. including property in use that is rented or lent by this household from other households)



**Table 42: Number of EAP per Household**

		Total Number of Economically Active Population (EAP)				
		Mean	Median	Minimum	Maximum	Standard Deviation
Mali	Tominian	5.7	5.0	1.0	19.0	3.2
	Diéma	9.1	7.0	2.0	34.0	6.8
	Koutiala	7.0	6.0	1.0	25.0	3.7
	Macina	6.4	6.0	1.0	20.0	3.8
Senegal	Casamance	7.1	7.0	2.0	26.0	3.6
	Mekhe 1	8.1	7.0	1.0	27.0	5.1
	Nioro	5.9	5.0	1.0	17.0	2.9
	Haut Delta	6.9	5.0	2.0	25.0	4.4
	Mekhe 2	7.9	7.0	2.0	30.0	4.5
	Bas Delta	5.8	5.0	2.0	15.0	2.7
Madagascar	Antsirabe 2	2.9	2.0	.0	8.0	1.4
	Alaotra 1	2.8	2.0	.0	9.0	1.5
	Morondava	2.7	2.0	.0	14.0	1.6
	Itasy	2.7	2.0	.0	8.0	1.4
	Antsirabe 1	2.8	2.0	.0	7.0	1.3
	Alaotra 2	3.3	3.0	1.0	8.0	1.5
Kenya	Bungoma	3.3	3.0	.0	11.0	1.8
	Nyando	3.1	3.0	.0	10.0	1.8
	Nakuru N.	4.7	4.0	.0	12.0	2.5
Morocco	Chaouia	4.7	4.0	.0	13.0	2.4
	Saïss	4.6	4.0	.0	11.0	2.3
	Souss	4.1	4.0	.0	12.0	2.0
Nicaragua	Muy Muy	3.1	3.0	.0	8.0	1.6
	Terrabona	3.3	3.0	.0	11.0	1.9
	El Viejo	3.2	3.0	.0	9.0	1.7
	La Libertad	3.3	3.0	.0	9.0	1.7
	El Cuá	3.3	3.0	.0	11.0	1.7
Mexico	Sierra SM	2.7	2.0	.0	8.0	1.3
	T. Bajas	2.8	3.0	.0	9.0	1.6
	Tequis.	3.0	3.0	.0	8.0	1.6



**ANNEX 5  
RESULTS  
OF REGRESSION ANALYSIS**

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 the variables that were chosen. The second section will detail the country cases.

## 1. 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 surveyed region, and also at the aggregated level to show variation both within and between regions.<sup>204</sup>

### 1.1 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. The decision was made to use income per adult equivalent, rather than total income per household, to reduce certain reverse causality problems. Specifically, since a goal was to use demographic variables as regressors, the team was concerned that using income per household (HH) would necessarily show a positive association between income and HH population. It would not be possible to disentangle the productive effect of more workers on income from the effect of richer families having more children. Further, the results would say nothing about whether an additional person costs more to sustain than he or she adds to HH productivity. Another reason for not using income per head was the 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 would have different consequences than it would for a HH with few children. The team therefore settled on using income per Adult Equivalent, as it both avoids the reverse causality problem with demography and allows for greater consistency across regions.

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<sup>204</sup> To create the "aggregated level" regressions (also sometimes named "nationwide" in the regression work), all households in a given country were grouped together rather than separated by regions.

## 1.2 The Explanatory Variables

### 1.2.1 *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.

**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. The variable is included simply because one must control for it in order to get an accurate interpretation of the *Number of Persons Present* variable. If this is not done, then 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 the regression holds 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 something worthwhile about the economic returns to additional HH members. Before including the variable in the regression it was multiplied by 100 for the ease of interpretation of the regression result. The coefficient on the Dependency Ratio can now be interpreted as follows: 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 had not been done then the interpretation would have been a “one hundred percentage point increase”, which would have been 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 maintains 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'."

### 1.2.2 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. The regressions 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. It is important to keep in mind that when interpreting the coefficient on this variable, the regression controls 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. Area per Equivalent Adult is used to avoid the same multicollinearity issues.

**Technical Package (*c\_TechPackage\_hh*):** is a binary variable that gives a 1 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 conversion table is 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 a binary was created 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). The regression includes *Animal Draft*, *Tiller Draft*, and *Tractor Draft*, excluding 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."

### 1.2.3 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 the other qualitative variables in the survey, the regression used a series of binary variables for each possible outcome of *c\_AccessTransp\_hh*. The variable for “easy all year” was dropped from the regression, so all of the “transp” variables are interpreted as a comparison to those households with easy access to transportation year-round.

**Distance to nearest city (in minutes of travel time) (c\_50000 and c\_ports):** The RuralStruc surveys were conducted in selected villages in each region, and in every 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.<sup>205</sup> 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. The Kenya regression was first tried with the *c\_50000* variable and no significant correlations within or between regions were found. The team 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. It was 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 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 it was thought that this regression specification was worth testing. The Program did not have access to the data from the “Global Map of Accessibility” outside of sub-Saharan Africa. In Nicaragua and Mexico the variable for physical remoteness was excluded. In Morocco, however, the team believed that a variable for remoteness was needed, so it was decided to include binary variables for sub-regions. Each region in the Morocco

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<sup>205</sup> The data were provided by research supported by the World Bank’s Development Economics Research Group and the Knowledge for Change Program, under the project title, “*An African Green Revolution: Finding Ways to Boost Productivity*”. The authors would like to thank Siobhan Murray, Chris Marques, Sean Sylvia and Donald F. Larson for their assistance. 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>.

survey includes three sub-regions, and each regional regression 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.

The two RuralStruc variables discussed so far that relate to Market Access (transportation quality and distance in minutes to nearest city) interact with each other in a complex way and create results that could seem counterintuitive. Specifically, the regressions occasionally show the transportation quality variables to be strongly significant, but positive (poorer transport quality appears to be associated with higher incomes). The explanation is as follows: the coefficient observed on the “transportation quality” variable implicitly holds constant the time it takes to travel to a large city because this “travel time” variable is another dependant variable in the regression. Since the time it takes to travel to a city is a function of two things, physical distance and transportation quality, the result actually makes a statement about the importance of minimizing the physical distance to a city. If travel time is held constant, and transportation quality decreases, then physical distance must also have decreased. Being located closer to a city is likely associated with higher incomes. Therefore, it makes sense that in certain cases the “transportation quality” variable is significant with a positive sign. This does not mean that households with poorer transportation quality are better off, it means households physically closer are better off.

**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).

#### 1.2.4 *Variables Related to Income Diversification*

**Diversification Index (*1-HHI*):** This is a composite index constructed by the RuralStruc 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).



## 2. Country Results

The regression results for each of the seven RuralStruc countries will be presented in the same format. First, econometric issues specific to the country are presented, and explanations as to why any variables are missing or were added are offered. This is followed by a presentation of conclusions and a discussion of results. Finally, the actual regression output for each country is presented.

### 2.1 Mali

#### 2.1.1 *Specific econometric issues:*

Due to their low number, HHs with a value of 1 for “Tiller” or “Tractor” were dropped from the regression. This is only 4 HHs.

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 Tominian and Macina, while the later was dropped in all regions. Because the education variable is cumulative these households were still included in the regressions, but for example those households whose head has completed primary school will be listed under “at least some primary education completed.” Therefore, no distinction was made between completing primary school and only having some primary education. The data are not complete enough to allow this.

The one HH with a contract in Tominian as well as the one HH with irrigation were dropped from the Tominian level regression, but not from the national level regression. 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”).

#### 2.1.2 *Conclusions and Discussions*

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.

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.

Diversification is a significant determinant of income in every region except Diéma. 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 (see this discussion in Chapter 6).

## Mali Regression Results

VARIABLES	Nationwide Log of Rev per EqA	Tominain Log of Rev per EqA	Diema Log of Rev per EqA	Koutiala Log of Rev per EqA	Macina 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

## 2.2 Senegal

### 2.2.1 *Specific econometric issues:*

There were data issues associated with the draft force variable in the Senegal regression. The team chose not to include it at all. Therefore the one HH with a tractor in Nioro was dropped from the regression.

The “Secondary School finished” variable was dropped from the regression because there were not enough observations. However, since the education variable is cumulative these HHs were still included under “At least some secondary education”. In Mekhé 1, because of the dearth of education, these HHs were included in “at least some primary school complete” and all other education variables were dropped. In Haut Delta they were included under “At least Primary School Finished”. In Mekhé 2, because of lack of variance, the only education variable used was “At least Primary School Started.”

Because every surveyed HH in Haut Delta had the technical package that variable was not included in the regression for that region.

Due to lack of variance, the contract variable was not included for Nioro and Haut Delta. The one HH with a contract in Nioro was dropped from the regression, as was the four without a contract in Haut Delta.

Because only two HHs in Mekhé 2 responded “Don’t Know” to the transportation survey question, they were deleted from the regression and the variable was not used.

In Mekhé 2, only 2 HHs had irrigation. This was not enough variance to detect a result, so the *Ha\_IrrigLand\_EqA* variable was dropped. In Haut Delta, even though every HH had irrigation, the variable was kept. Though every HH has irrigation, the amount will vary from HH to HH and may be significant.

The variable *c\_50000* had no variance in Haut Delta and was not used.

In Casamance, the two HHs with Short Term Migrants were dropped and the variable not included.

### 2.2.2 *Conclusions and Discussions*

Except in Casamance and in the two Delta regions, Senegal displays the lowest R-squared results in the regression work. Casamance and Haut Delta have significantly higher shares of on-farm income than other regions in Senegal, and this is what explains their higher R-squareds. Because many independent variables used in the regression have to do with farm assets, the low on-farm income shares explain this specific result in in the *Bassin arachidier* regions. The Bas Delta case is more difficult. It displays a significant R-square and also has low on-farm income shares. Clearly, in Bas Delta, something is missing from the regression.

Casamance seems to be different than the other regions in Senegal, and in fact its patterns look more like those of regions 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.

The significance of diversification in all regions aligns with the earlier conclusions that HHs in Senegal diversify into self-employment.

Bas Delta displays the strange pattern discussed above 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. As discussed, this shows the effect of being physically closer to the city. 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

## 2.3 Madagascar

### 2.3.1 *Specific econometric issues:*

The irrigation variable was not included because of very severe multicollinearity issues with Land Use, as a very high share of farmland used in Madagascar is irrigated.

In Itasy and Antsirabe 1, there were not enough HHs with Tractors to include them in the regression. They were dropped from the region-level regressions. In Alaotra 2, no HHs had a Tiller, so that variable was also dropped.

The variable for “Secondary School Finished or University” was only included for the national regression and for Morondava and Itasy. In other regions these HHs were included in the “At least some secondary education” category. In Alaotra 2 the 3 HHs whose highest level of education was completing primary school were included in the “At least some primary school” group.

The technical package variable was not included for the Alaotra 2 regression. There were only 2 HHs that had the technical package. They were dropped from the regression.

In Alaotra 1 there were only two HHs with a contract. Consequently, this variable (and the two HHs) were not included in the regression.

The “Transportation Access” variable gave a suspect result in Alaotra 2, and therefore it was not included. “Easy only some months” is not included in Morondava and “Difficult” is not included in Antsirabe 1, for lack of observations.

Migration variables were not included in Alaotra 2 because so few HHs had them. Likewise *Short Term migrants* were not included in Antsirabe 1, because only 4 HHs had them. The HHs with the relevant type of migrant in these instances were dropped from the regression.

Manure was excluded from the Antsirabe 2 regression because almost everyone had access to it. The one HH that did not was dropped.

The variable *c\_50000* was included only for the “national level” 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 masked the “transportation quality” effect. In Alaotra 2, there was no variance in the *c\_50000* variable.

### 2.3.2 *Conclusions and Discussions*

Land Access is an important determinant of farm income everywhere in Madagascar.

The fact that diversification is not significant in any region in Madagascar is consistent with the previous observation that household diversification in Madagascar occurs quite

frequently at low levels of income, indicating a high prevalence of “coping strategies” (see Chapter 6 Box 22 on “Challenging the Inverted U Pattern”).

## Madagascar Regression Results

VARIABLES	Aggregated Regions	Anstirabe 2	Alaotra 1	Morondava	Itasy	Antsirabe 1	Alaotra 2
	Log of Inc per EqA	Log of Inc per EqA	Log of Inc per EqA	Log of Inc per EqA	Log of Inc per EqA	Log of Inc per EqA	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)	0.388 (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)
OneMinusHHlx100	-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

## 2.4 Kenya

### 2.4.1 *Specific econometric issues:*

In Kenya almost every household head had at least some primary education. Because of the low amount of variance the variable was not included 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.

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.

The variable *c\_ports* was used instead of *c\_50000*, as explained in section I of this annex.

### 2.4.2 *Conclusions and Discussions*

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. This is first evident in looking at Nyando, then at Bungoma. Nyando’s most important factor is *Land*, perhaps signifying that when productivity is constrained, the only way to increase output is to have more land. Furthering this view, the regression shows large effects from the technical package (though it is used only in limited households). On the contrary, in terms of market access, there seems to be no response from contracts or transportation access. Moving to Bungoma, these productivity regressors are still significant, but there are strong effects from contracts and transport, suggesting that market access becomes important as the productivity constraint is gradually relaxed.

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.

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*, vary much more significantly between regions in the survey than within them. It seems that while remoteness does have a negative effect on incomes in Kenya, the regions surveyed by RuralStruc were too physically small to detect any 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

## 2.5 Morocco

### 2.5.1 *Specific econometric issues*

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.

The one household with a contract in Chaouia and the one in Souss were deleted, but not from the national level regression.

The *Short Term Migrants* variable was dropped because no households reported short-term migrants.

The “manure” variable was not available for use in the Morocco regressions.

### 2.5.2 *Conclusions and Discussion*

There are very large regional effects on income. In fact in Morocco the regional binary variables are the most significant determinant of income.

It is surprising that education is a significant determinant of income only in Chaouia, and between regions. At first, this observation suggests that since household heads in Saiss and Souss are better educated than those in Chaouia, returns to schooling in those regions are diminished. However, education levels in both Saiss and Souss remain low in an absolute sense. Consequently, there is a surprising lack of returns to education in these two regions.

The fact that “difficult transportation” enters the national-level regression positively likely reflects the fact that the “losing region” selected in Morocco (Chaouia) includes a locality close to Casablanca.

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.

## 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

## 2.6 Nicaragua

### 2.6.1 *Specific Econometric Issues*

The Tiller variable was only included in the national level and the El Cuá regression. The 4 HHs with Tiller Draft in El Viejo were dropped.

The “secondary education complete” variable was included only in the national level regression. In Terrabona and El Cuá, the “primary complete” variable was not included and all HHs with at least some primary and no secondary education were grouped together.

In Terrabona, HHs with contracts were dropped from the regression, as there was not enough variance.

There are only three HHs with *Long Term Migrants* in El Cua. Those HHs were dropped, and the variable was not included (though it was kept in the national regression).

The “manure” variable was not available for use in the regressions.

“Land Used” has been replaced by “Land Owned” because land access is an issue in Nicaragua where large land owners coexist with smallholders. Nicaragua is the only country in the RuralStruc Program where land tenure is so asymmetric and unequal. As such, there are important differences between land used and land owned.

### 2.6.2 *Conclusions and Discussion*

Note the strong significance of contracts in many regions in Nicaragua which reflects the somewhat higher development of contractualization in the country.

Income structures in every region diversify as families become richer (less in El Cuá): 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 that 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 in these three regions. To summarize, households diversify their way out of poverty and then specialize in on-farm activities at higher income quintiles, a pattern that corresponds to the inverted U presented in Chapter 6. It is not possible to 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 (as they tend to be smaller).

As in Kenya, surveyed regions in Nicaragua are physically small and therefore transportation is more likely to be an important determinant of incomes between, rather than within, regions. The region where this does not hold is in El Cuá, 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 well explained but one must keep in mind the high value of coffee which means that buyers always come to collect product.

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, the variable is not significant in any of them.

*Long-Term Migration* is an important part of the income structure in Nicaragua.

*Land Owned* is a significant determinant of income everywhere except in La Libertad where farmers are mainly landlords specialized in extensive ranching on large farms.

## 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

## 2.7 Mexico

### 2.7.1 *Specific Econometric Issues*

There was no observed variance in *Draft*. So all draft variables for Mexico were dropped.

With Education, HH heads 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.

Because no HHs in Sierra Santa Marta had a contract, the variable was not included in that regression.

The two HHs that had irrigation in Sierra Santa Marta were dropped and the variable was not included.

All three HHs with *Short Term Migrants* were dropped from the regression and the variable was not included in any of the Mexico regressions.

The “manure” variable was not available for use in the regressions.

The “Livestock Equivalent” variable was not calculated in Mexico because only information on cattle was available. “Number of cattle” was used for the regression.

### 2.7.2 *Conclusions and Discussion*

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. It is consistent with the inverted U pattern discussed in Chapter 6.

Irrigation is an extremely important determinant of income in Mexico, while in Nicaragua it is not.

The fact that education is not significant is surprising. However, 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



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