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Characteristics, patterns and drivers of rural migration in Senegal

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Abbreviations and acronyms

AAAE	African Association of Agricultural Economists
AFD	French Development Agency
AMP	African Migration Project
ANSD	National Agency of Statistics and Demography (Senegal)
CDF	Cumulative distribution function
CERDI	Centre d'Etudes et de Recherches sur le Développement International
CRES	Consortium for Economic and Social Research (Senegal)
CTA	Technical Centre for Agricultural and Rural Cooperation
DESA	Department of Economic and Social Affairs (UN)
DPEE	Department of Forecasting and Economic Studies
ESAM	Senegalese Household Survey
ESPS	Senegal Poverty Monitoring Survey
FIES	Food insecurity experience scale
FMM	Multipartner Programme Support Mechanism
GPS	Global positioning system
Grdr	Migration-Citoyenneté-Développement
HH	Household
ICAS	Institute for Climate and Atmospheric Science
ICLS	International Conference of Labour Statisticians
IDP	Internally displaced person
IFAN	African Institute of Basic Research
IIED	International Institute for Environment and Development
IMAGE	Internal Migration Around the GlobE
INED	National Institute for Demographic Studies
IOM	International Organization for Migration
IPAR	Initiative Prospective Agricole et Rurale
IRD	Institute of Research for Development (Senegal)
IZA	Institute of Labor Economics
LSMS–ISA	Living Standards Measurement Study – Integrated Surveys on Agriculture
MAFE	Migrations between Africa and Europe
NELM	New economics of labour migration
NESMUWA	Network of Surveys on Migration and Urbanization in West Africa
OLS	Ordinary least squares
OECD	Organisation for Economic Co-operation and Development
PCA	Principal component analysis

PSU	Primary sampling unit
RGPHAE	General Census of Population and Housing, Agriculture and Livestock (Senegal)
RMDA	Red Mangrove Development Advisors
RuLIS	Rural Livelihoods Information System
VIP	Ventilated improved pit
WEIA	Women's Empowerment in Agriculture Index

Abstract

Although migratory flows from rural areas are a common phenomenon in most developing countries, we possess little information on their dynamics and determinants. There is little research on rural migration and it is rarely addressed by government development strategies. In this context, within the framework of the project FMM/GLO/115/MUL "Fostering productive investments to create decent farm and non-farm jobs for rural youth in migration-prone areas in Senegal", FAO and the Senegalese National Agency of Statistics and Demography (ANSD) conducted in September 2017 a household survey in two rural regions of Senegal with the aim of generating information on migration phenomena in rural areas. The survey was conducted among 1 000 households in 67 rural census districts in the Kaolack and Matam regions. The survey results contribute to broadening the available knowledge base on the causes and dynamics of rural migration and aim to inform sectoral economic policies, youth employment and rural development policies.

The data collected from the survey show that in two regions, Kaolack and Matam, 8.9 percent of the rural population are migrants, and one-third of households have at least one migrant member. Matam is strongly characterized by international migration. Despite this, internal migration remains dominant in both regions.

This study attempts to identify the determinants of a broad range of migration types: internal, international, seasonal, potential and return. It found that most migrants are male (82.0%), of young age 15–34 (60.7%) and slightly more educated than the average population. Migrant families are generally less engaged in agriculture, with the exception of families with seasonal migrants. Families with migrants, especially international, are better off than the average. The search for a better job is the main reason for migration (53.3% of all reasons given by current migrants and 69.4% by potential migrants). Factors, such as gender, age, migrant network and the search for a better job, are important in determining potential future migration. Furthermore, migrants move back home mainly for family and personal reasons; a better job rarely exists at home and the most educated are less likely to return.

In order to provide an alternative to distress migration due to lack of employment opportunities, public policies should aim to increase the participation of young people in the local economy, ensuring that they have access to decent jobs in both farm and non-farm sectors, and exploit the development potential of migration.

1. Introduction

Outmigration from rural areas could be considered one of the main components of the structural transformation process in developing countries. Although rural outmigration can be both internal and international, the majority of its flows circulate within a country's border, naturally going from one rural area to another or from rural to urban areas. From a global perspective, internal migration is a larger phenomenon than international migration. Around the period of 2010, there were 1.3 billion internal migrants estimated from a subset of developing countries (FAO, 2018),[1] which was more than five times greater than the number of international migrants at that time.[2] Despite its significant magnitude, little is known about the dynamics, patterns and drivers of rural migration. Evidence on this topic remains scarce and fragmented compared to the abundant literature on international migration.[3] Lack of data constitutes one of the main causes: collecting detailed information on migration is not traditionally a priority for most national household surveys (de Brauw and Carletto, 2012), let alone gathering information specific to rural migration. For example, the phenomenon of seasonal migration, which is a typical aspect of rural livelihoods related to the crop calendar of agricultural production, is rarely captured in existing migration/household surveys. In particular, experts are in unanimous agreement on the scant knowledge about rural–urban migration in sub-Saharan Africa (Lucas, 2006).[4] This situation is problematic given that by 2050 about half of the 60 million people added to the world urban population each year will be in Africa (DESA, 2014), exerting further migration pressure across the continent and beyond. The scarcity of detailed and reliable data, limiting the capacity to generate knowledge about the patterns and drivers of such a tremendous phenomenon, makes it difficult for governments to plan future policies, especially agricultural and rural development policies.

Like most sub-Saharan African countries, Senegal is characterized by high levels of internal and international migration. In 2013, of the total population of around 13 million, Senegal had 1 881 603 internal migrants, equivalent to 14.6 percent of the total population (ANSD, 2014). In 2015, it had an international migrant stock of 586 870 (DESA, 2015a). The projected share of the population living in urban areas in Senegal is expected to increase from 44 percent in 2015 to 55 percent by 2040, which is above the average for sub-Saharan Africa (DESA, 2014). Rural populations, particularly rural youth, migrate to cities and larger agglomerations due to low productivity and poor wages in rural areas. The lack of employment opportunities in the non-farm economy in Senegal is a major driver of rural–urban

[1] In 2005, there were approximately 763 million internal migrants (DESA, 2013a). Based on a broader data set, this is an upward revision of almost 23 million from the 2009 estimate reported by Bell and Muhidin (2009) for the United Nations Human Development Report 2009.

[2] More precisely, in 2015 the number of international migrants worldwide reached 244 million, up from 222 million in 2010 and 173 million in 2000 (DESA, 2016).

[3] The literature on international migration relies on richer and more up-to-date worldwide databases, as it can be estimated through censuses in destination countries, which are mostly Organisation for Economic Co-operation and Development (OECD) countries and whose data can be considered of high standard, updated on a regular basis. On the other hand, internal and rural migration can only be measured through national censuses and surveys, which in the majority of developing countries do not follow the same standards and are not carried out in the same period, and thus do not permit comparisons across countries and time. An exception may be the Internal Migration Around the GlobE (IMAGE) Inventory. However, this project lasted from 2011 to 2015 and to date has not been extended.

[4] Efforts have been made with the World Bank's Living Standards Measurement Study – Integrated Surveys on Agriculture (LSMS–ISA), including more information about the dynamics of rural–urban migration for eight countries in Africa (Burkina Faso, Ethiopia, Malawi, Mali, the Niger, Nigeria, United Republic of Tanzania and Uganda).

labour migration (Herrera and Sahn, 2013). By 2050, the youth population (aged 15–24) of Senegal is expected to reach 6.7 million, i.e. double the current 3 million (DESA, 2015b). Despite the importance of migration from rural areas, the literature review reveals that the majority of studies using Senegalese data focus on international migration and migration from urban areas.

It is in this context that FAO and the National Agency of Statistics and Demography of Senegal (ANSD) conducted a survey of households in the two regions of Kaolack and Matam to collect information on rural migration from September 2017 to January 2018, in the framework of the project FMM/GLO/115/MUL "Fostering productive investments to create decent farm and non-farm jobs for rural youth in migration-prone areas in Senegal". This survey contributes to expanding the knowledge base on the link between migration, agriculture and employment in rural areas, and ultimately contributes to the policy-making process based on sound evidence. Moreover, the richness of the survey on various dimensions of rural livelihoods is exploited by this paper, which constitutes an interesting contribution to close the evidence gap in the rural migration literature. Future demographic dynamics make Senegal a relevant case for analysing the phenomenon of rural migration. Senegal is one of three countries where this survey was first conducted; it was also piloted in Nepal and Tajikistan during the same period.

This paper sheds light on the patterns and drivers of emigration originating from rural Senegal. The household survey carried out by FAO/ANSD captures various patterns of migration in spatial and temporal dimensions. The spatial dimension includes internal, international, rural and urban migration. The temporal dimension includes seasonal, permanent, return and potential migration. Distinctive features are provided in terms of who migrates (i.e. individual and household characteristics), the areas of origin and destination, the migration process and how it takes place. In this study, different methodologies are used and the results are compared in order to identify the most consistent drivers of rural migration. More specifically, this study aims to identify the determinants of internal/international/seasonal migration, as well as potential and return migration.

The survey statistics show that in the two rural areas of Kaolack and Matam, 8.9 percent of the population are migrants and one-third of the households have at least one migrant. Internal migration dominates in both regions, while the phenomenon of international migration is greater in Matam than in Kaolack. Migrants from these two regions, whether internal or international, go mainly to urban areas. Migrants are young: 27.5 percent are 15–24 years old and 33.2 percent are 25–34 years old. They tend to be more educated than the average population. Males dominate the migration phenomenon, accounting for 82.0 percent of all migrants. Compared with the average, migrant families are generally less engaged in agriculture: they have fewer members over the age of 15 engaged in agricultural employment, have less land to cultivate and fewer varieties of crops and livestock, and the contribution of agriculture to their annual gross income is lower. They also tend to have better living conditions than the average population. Families with seasonal migrants are the exception: compared with the average of households with migrants, those with seasonal migrants are much more involved in agriculture and exhibit lower living standards.

Seeking a better job is the main reason for migration among current migrants, accounting for 53.3 percent of all reasons. For women, the major cause of migration is related to family reasons. Among non-migrants with a desire to migrate, 69.4 percent are motivated by the search for a better job. Migrants return mostly because of family or for personal reasons and not because of better job opportunities at home. Those with tertiary education are also less likely to return.

The paper is organized as follows: Sections 2 and 3 offer insight into the state of knowledge about rural migration in Senegal, identify the gaps in the literature, and present the data and methodologies developed herein to fill these gaps. Section 4 provides an overview of the volume, destinations and process of migration from the two rural areas of Kaolack and Matam. Section 5 describes the characteristics of the migrants, Section 6 the socio-economic characteristics of their families; in these two sections, comparisons are drawn between migrant households and the average population. In Section 7, the declared causes of migration are presented and the willingness to migrate and return from migration described. Multivariate regressions are carried out to compare all the potential determinants of rural migration and identify the most significant drivers, considering also how different migratory patterns (i.e. internal, international, seasonal, potential and return migration) may vary in terms of drivers. Section 8 concludes with the main findings and key policy recommendations.

2. The state of knowledge about migration and rural migration in Senegal

In Senegal, in comparison with other countries in sub-Saharan Africa, the data on migration are relatively rich. There are several data sources available to study migration, although many of them present limitations when it comes to rural migration. Therefore, while Senegal possesses a wealth of studies on migration, including information on its patterns, determinants and effects, very few analyses focus specifically on rural migration and its linkages with agriculture and rural development.

Information about migration is collected at national level in population censuses and general surveys, including:

- General Census of Population and Housing, Agriculture and Livestock (RGPHAE), 2013;
- Senegal Poverty Monitoring Survey (ESPS II), 2010;
- Senegalese Household Survey (ESAM II), 2001; and
- Survey of Poverty and Family Structure in Senegal in 2007–2012 by the Institute of Research for Development (IRD).

Many surveys are dedicated exclusively to the collection of data on migration in collaboration with intergovernmental agencies, for example:

- Network of Surveys on Migration and Urbanization in West Africa (NESMUWA) – a project in seven countries (Burkina Faso, Côte d'Ivoire, Guinea, Mali, Mauritania, the Niger and Senegal), 1993;
- Migrations between Africa and Europe (MAFE) – a project led by the National Institute for Demographic Studies (INED), 2008; and
- Migration and Remittance Household Survey in Senegal – part of the African Migration Project (AMP) carried out by the African Development Bank and the World Bank, 2009/10.

Furthermore, Big Data on migration in Senegal also exist. One analysis carried out using Big Data was based on the mobile phone records of Senegal's 9 million users in 2013 (Martin-Gutierrez *et al*., 2016). In addition to quantitative data, qualitative data on migration in Senegal are also relatively abundant. Studies using these data sources enrich the available knowledge on many aspects of the Senegalese migration phenomenon (e.g. Grillo and Riccio, 2004; Jung, 2015).

Migration patterns in Senegal are widely documented (e.g. IOM, 2009a; Sakho and Dial, 2010). According to the most recent General Census of Population and Housing, Agriculture and Livestock (RGPHAE), conducted by ANSD in 2013, internal migration in Senegal concerns 14.6 percent of the total population (1 881 603 of the 13 034 665 residents). Major internal flows are from the border areas of Dakar (Fatick, Kaolack and Louga) to Dakar, Diourbel and Thiès. Migrants are attracted to the region of Dakar as the economic and administrative capital. Diourbel, on the other hand, is important because it comprises Touba where the religious and cultural headquarters of the Mouride brotherhood are located. The regions of Louga and Kaolack are the main areas of internal emigration. With regard to international migration, between 2008 and 2013, a total of 164 901 Senegalese (1.2% of the population) left the country. The major international flows are from Dakar and the regions of the Senegal River Valley (Matam, Saint-Louis, Tambacouda and Kolda) to Europe (France, Italy, Spain etc.). The principal destinations are Europe (44.4%), West Africa (27.5%) and Central Africa (11.5%).

Numerous studies exist about the patterns and characteristics of emigration from Senegal to foreign destinations (e.g. Lessault and Flahaux, 2013), in particular to Europe (e.g. Gonin, 2001; Schmidt di Friedberg, 1993). The Migrations between Africa and Europe project (MAFE) retrospectively collected information on the migration history of individuals from Dakar to France, Spain and Italy. The resulting rich data set allows the analysis of different socio-economic aspects of migration, for example: the determinants of migration between Senegal and France (Baizán, Beauchemin and González-Ferrer, 2013); the impacts of parents' migration on children's well-being (González-Ferrer, Baizán and Beauchemin, 2012); return migration (Kveder and Flahaux, 2013; Flahaux, 2017); and circular migration (Flahaux, Mezger and Sakho, 2011). Irregular migration from Senegal to Europe is also documented and analysed in Maher (2017), Ba and Ndiaye (2008), Willems (2008), Diop (2008) and IOM (2009b).

Existing anthropological studies also offer insight into the history of migration in Senegal, its link with civil conflicts and traditional agricultural activities (Mercandalli and Losch, 2017; Findlay and Sow, 1998). Since the 1980s, the Casamance conflict has generated many internally displaced persons (IDPs) and thousands of Senegalese refugees, particularly in the Gambia and Guinea-Bissau. With regard to agriculture-related seasonal migration, there are historical migrant flows from the semi-arid regions of the Senegal River Valley or the silvicultural area of Ferlo to the Peanut Basin, dating back to the colonial period in the nineteenth century. Seasonal migrants, known as "navétanes", come to cultivate peanut during the rainy season. During the dry season, farmers in the Peanut Basin characterized by rainfed agriculture migrate to new and more dynamic agricultural regions with better irrigation systems, such as the Senegal River Valley Delta where rice and tomatoes are grown, and Niayes with its large horticultural sector (Mercandalli and Losch, 2017). In Ferlo, the transhumance practice of moving flocks to grazing areas still exists. Seasonal migration of fishermen from the Saloum River takes place for various reasons: increased salinity of the river water; difficult living conditions and shortage of drinking water; lack of markets where fish can be sold profitably; and communication difficulties on the island of Saloum. Martin-Gutierrez *et al*. (2016) use 2013 mobile phone data to capture migratory flows in Senegal. They found that most seasonal migration in Senegal follows the agricultural calendar. Recorded seasonal flows are at their most intensive during the planting period from May to July, and during the harvest period from October to December.

There are numerous studies of the impacts of climate change on migration in different areas in Senegal (e.g. Bleibaum, 2010). Gueye, Fall and Tall (2015) show that recurrent drought reduces cultivated land and negatively affects agricultural production in rural Senegal, contributing to the rising flows of rural–urban migration. According to the results of the project "Climate change, changes to the environment and migration in Sahel", carried out in the region of Linguère in Senegal, environmental degradation is not usually reported as the most important factor causing people to migrate, but it is part of the complex interaction between different factors leading to migration for economic reasons (Liehr, Drees and Hummel, 2016). In the same vein, the study by Mertz *et al*. (2009) conducted in eastern Saloum finds that when climate change is not mentioned by the interviewers, households give economic, political and social issues – rather than climate factors – as the main reasons for livelihood change. The compounding effects of climate threats and fragile land rights are also shown to be potential factors contributing to migration (Vigil, 2016). In contrast, Mbow *et al*. (2008) show that migration and population pressure on the urban housing market and unregulated urban sprawl lead to the growth of settlements of migrants in cheap and risky lands. Poor rural dwellers become more vulnerable when they are constrained to live in flood-prone urban areas and are exposed to extreme rainfall events.

The characteristics of the migrants and their motivations to migrate are also well documented and analysed (e.g. Van Dalen, Groenewold and Schoorl, 2005). According to the RGPHAE 2013 (ANSD, 2014),

the majority of migrants are young people aged 20–34 years. The proportions of men and women are substantially the same. The statistics from the Migration and Remittances Household Survey (World Bank and CRES, 2009) show that the Senegalese emigrate abroad for four main reasons: search for employment (73.4%), study and apprenticeship (12.2%), family reasons (6.9%) and marriage (3.3%). According to Herrera and Sahn (2013), youth aged 21–35 years undertake mostly rural–rural and urban–urban migrations. The determinants of youth migration are heterogeneous by gender and destination. The higher the father's level of education, the more likely the daughters are to move to urban areas. Young people who spend their childhood in better-off households are more likely to move to urban areas. The findings using GPS (global positioning system) data by Chort, De Vreyer and Zuber (2017) suggest that Senegalese women are more likely to migrate than men, but that they do not move as far. An analysis of the motives for migration reveals the existence of gendered migration patterns: women migrate mostly for marriage, while men migrate mostly for work. Education is also found to increase the likelihood of migration from rural to urban destinations. The issue of female migration is also documented in Ba (1998) and David (1995), and is shown to be restrictive according to ethnic background (Sy, 1991). Dieng (2008) argues that migration in Senegal is caused mainly by the attraction of better economic prospects at destination. Migration could be the consequence of income shock at origin (Safir, 2009). The characteristics and determinants of migration in Senegal have many similarities with the broader context of other countries in sub-Saharan Africa (Naudé, 2010; FAO, 2017). The growing youth population coupled with the lack of decent job opportunities constitutes the main cause of outmigration in this region (Hathie *et al.,* 2015). Goldsmith, Gunjal and Ndarishikanye (2004) suggest that increased agricultural investment to boost rural per capita earnings would help to reduce rural–urban migration pressure. Return migration is also covered in the literature; for example, Sinatti (2011, 2015) investigates the determinants of return migration. Dia (2005) attributes the "brain drain" phenomenon – i.e. the emigration of scientists – to the economic sluggishness of the origin country and the growing attraction of industrialized destinations.

There are extensive studies on the effects of migration on the areas of origin of migrants in Senegal (e.g. IOM, 2009c, Pison *et al*., 1993) and the impacts of remittances in particular have always received a lot of attention. According to the Migration and Remittances Household Survey in Senegal conducted by the World Bank and the Consortium for Economic and Social Research (CRES) in 2009, of all households receiving remittances, 61 percent are located in rural areas. Also in monetary terms, rural households benefit more from transfers, receiving annually XOF 766 900, against XOF 555 200 for urban households. Nevertheless, transfers are mainly used to cover the daily consumption expenditure of beneficiary households (58.5%); only a small proportion are dedicated to productive investments (1.3%). Regarding funds from return migrants, the preferred investment sectors are services (30.9%) and trade (25.9%). Investment in the agricultural sector occupies a relatively small proportion: 25.7 percent (4.0% for agriculture, 14.6% for livestock, 7.1% for fishing). Using the same data from the World Bank survey (World Bank and CRES, 2009), several econometric studies have been carried out on the effects of remittances on the migrant family. For instance, Ndiaye *et al*. (2016) show that receiving remittances decreases the labour participation of migrant households, who are less likely to start family businesses. The frequency of remittances has also been documented as very irregular: remittances tend to be sent when the stay-behind households face a crisis or have a special event or ceremony (Jung, 2015). The systematization of remittance transfers may be hindered by the widespread existence of informal channels and the high transaction costs (Name and Lebailly, 2016; Sarr, 2009). The limited positive impact of migrants' remittances on development in Senegal is widely documented (Profitos, 2009). In contrast, based on the 2011 Poverty Monitoring Survey in Senegal, the study by Diagne and Diagne (2015) points to the positive

effect of remittances sent by migrants to rural areas. Remittances contribute to reducing the severity of poverty by 6 percent and the depth of poverty by 9 percent. Empirical results from Kaninda Tshikala and Fonsah (2014) demonstrate that migrant households in Senegal are more likely to adopt new farming technologies, especially when they receive international remittances. Aga and Peria (2014) show that international remittances increase households' financial inclusion. Remittances substantially improve school attendance and reduce non-paid activities among children (Cisse and Bambio, 2016). The Senegalese diaspora and return migrants also constitute an active contributor to the country's development (Mezger Kveder and Beauchemin, 2015; Lanly, 1998; Panizzon, 2008; Ba, 2007; Diatta and Mbow, 1999).

Senegal also possesses a wealth of studies on the impacts of the institutional framework on governing migration and maximizing its potential impact for development (e.g. Toma, 2014; Toma and Kabbanji, 2017; Talleraas, 2014; Coderre-Proulx, 2013; Dalberg and RMDA, 2012; Le Masson, Fall and Sarr, 2015; Dia, 2007; Grillo and Riccio, 2004; IFAD, 2015; Maggi *et al*., 2013). Several analyses of Senegal's migration policy framework (Dia, 2009; Fall, 2010; Kabbanji, 2013) come to the same conclusion: there is no clear policy framework and no effective management of migration issues. The fact that migration is a shared domain between many different ministries and committees, coupled with institutional changes, leads to confusion and inefficiency and threatens the coherent implementation of policy.

Overall, data and research studies on migration in Senegal are abundant and multifaceted. Nonetheless, there is scope for improvement with regard to generating knowledge on the link between migration, rural development and agriculture. For example, the seasonal migration phenomenon – closely related to agricultural production – is rarely captured by existing surveys; likewise, there is a need for studies on the interaction between rural migration and different aspects of agriculture and rural livelihoods. Taking advantage of the abundant existing knowledge about migration in Senegal, this study deepens the understanding of the phenomenon from the perspective of agriculture and rural livelihood, and offers a wider picture of rural migration – in Senegal in particular, and in sub-Saharan Africa in general.

3. Data and methodology

This paper uses the migration survey developed and conducted by FAO in collaboration with the ANSD from September 2017 to January 2018. The survey represents an initiative by FAO to fill the data and evidence gap in the field of rural migration and its link with agriculture and employment in rural areas.

The household survey collected a wealth of information on current and past migration. It distinguished different patterns of migration: internal, international, seasonal, return and stepwise. It included questions on willingness to migrate, reasons for migration, sources of information and finance of migration, reception and use of remittances, and perceived impacts of migration. In addition, detailed information on agricultural production (crop production, livestock, and agricultural inputs) and non-farm enterprises was collected. Information about household living conditions was also collected: housing, wealth, food security and social transfers. The survey also contained a special module to measure the Women's Empowerment in Agriculture Index (WEAI).

The survey deliberately oversampled households with migrants (internal and international), interviewing 1 000 households in 67 primary sampling units in rural areas of two regions of Senegal: Kaolack and Matam. The two regions were chosen for their distinctive migration patterns: Kaolack has a high rate of internal emigration; while Matam, situated in the Senegal River Valley and characterized by vast migration flows to France going back to the colonial period, experiences a high rate of international emigration (IFAD, 2015). The two surveyed regions offer compelling insight into diverse patterns of migration.

With the exception of the WEAI module, just one respondent per household provided answers to the questionnaire modules. The survey instructions indicated that the respondent had to be the most knowledgeable person in the household, whether or not the household head. Nevertheless, during data collection, some respondents had difficulty answering questions (on employment, migration experience etc.) relating to the migrants who were or had been living away from the household. This proved to be a major drawback of the household survey adopted for the collection of migration information.

In the context of this survey, a household comprises people who do not have another family; they are household members even when away for long periods to work, receive education or visit relatives. **Household membership criteria:**

- All children of the man and the woman of the primary couple (whether or not they are currently living in the household).
- Those sharing food from a common source with other household members when present.
- Related family who have lived for a minimum of 6 months (continuously) in the household in the last 5 years.

In line with the FAO migration corporate framework, this study adopts the following definitions of **concepts of migration**:

- **Rural migration:** the movement of a person or group of persons, from and/or to a rural area (including between different rural areas). It may occur within a country or it may require crossing an international border. It may be short term/temporary or long term/permanent.
- **International migration:** the movement of a person or group of people from one country to another, crossing an international border.

- **Internal migration:** the movement of a person or group of people within a country. It is important to note that there is no rule about the minimum distance of movement when defining internal migration. For this reason, even movement of a person to the house adjacent to the family house is an act of migration. Indeed, such a movement usually creates two separate households and has effects on the composition and shared resources of the origin household. If the two houses are separated by a borderline between two administrative units, the person who moves is recorded with a different location on papers. It is thus legitimate to consider him/her as a migrant. Our data set records no person migrating within the commune of origin. The smallest type of internal migration is across communes in the same region.
- **Stepwise migration:** the movement of a person or group of people in a series of steps (at least two). For example, a person from a small village may first move to a rural town before moving to a large city and eventually migrating internationally.
- **Short-term or temporary migration:** the movement of a person or group of people to another place for a short period before returning to the area of origin. Although there is no consensus on how long the period is for this type of migration, a range of 3–12 months is frequently found in the literature.
- **Seasonal migration:** short-term migration that happens in specific seasons. For example, casual agricultural labourers may move to other regions during peak season for short-term employment and later return home, or agricultural workers may move to cities or towns during periods of limited demand for labour in rural areas. Although there is no strict rule, seasonal migration is widely considered to be 6 months. Interestingly, a small number of respondents also considered migration for study (every 9 months in the course of 12 months) to be seasonal migration. Although migration for study is different from migration for work, it does affect the households that stay behind (in terms of labour availability, transmission of knowledge). Declaring a student as seasonal migrant also implicitly indicates that he/she goes and comes back regularly and does not stay permanently at destination. Therefore, in this study, "seasonal migrants" were identified as follows: when respondents declared the migration status of a family member as "seasonal"; and when the question about migration duration prompted a response that a household member moved for 9 months in the 12-month period.
- **Long-term or permanent migration:** the movement a person or group of people to another place for an extended period so that the destination area becomes their permanent residence. If the migrants return home, they are considered return migrants; if they migrate to another place, they are considered stepwise migrants.
- **Return migration:** the movement of a person or group of people to the area of origin after having migrated for an extended period elsewhere.
- **Migrant household:** a household with one or more members who have outmigrated for any period of time.

Sections 4–7 analyse the characteristics, patterns and determinants of rural migration drawn from this survey. Various contrasts between the two sampling regions are highlighted. Mean comparison tests (t-test) ensure that the differences between subpopulations of different sizes are statistically significant. Multivariate regressions are performed in order to determine the most significant drivers of rural migration. Household and individual sampling weights are applied; their calculating methodologies are detailed in Appendix A.

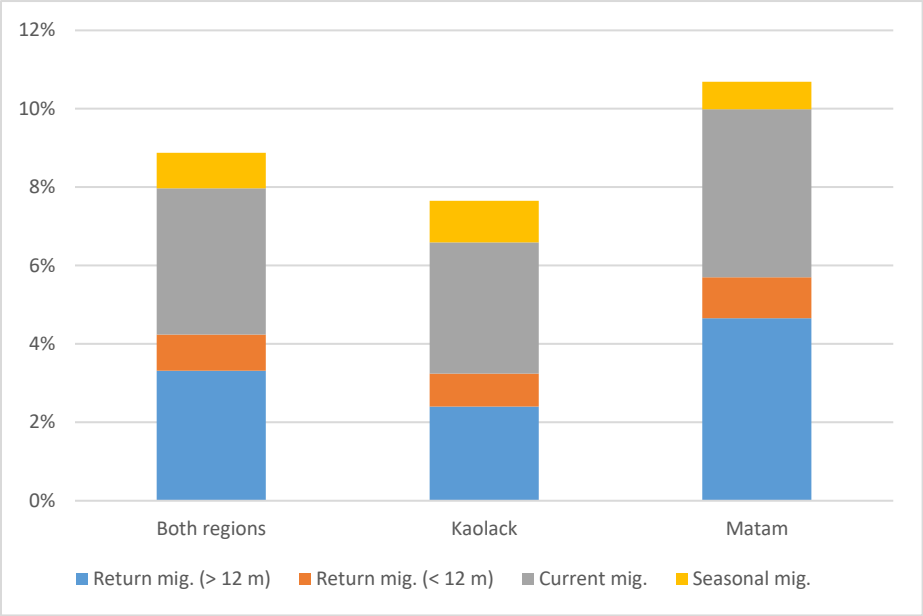
4. Patterns and dynamics of rural outmigration

This section provides descriptive statistics drawn from the data set on the magnitude of different types of migration, the internal and international destinations of the migrants, and the characteristics of migration processes.

Volumes of migrants and households with migrants

In the total sample, 8.9 percent of all individuals are migrants: 3.3 percent returned more than 12 months before the date of the survey; 0.9 percent returned in the 12-month period prior to the survey; 3.7 percent lived outside the household at the time of the survey; and 0.9 percent were declared as seasonal migrants and were either in or outside the household at the time of the survey (Figure 4.1). The seasonal migrants are left out of the shares of those that returned less than 12 months prior to the survey.

Figure 4.1 Share of migrants over total population



Source: FAO, 2018

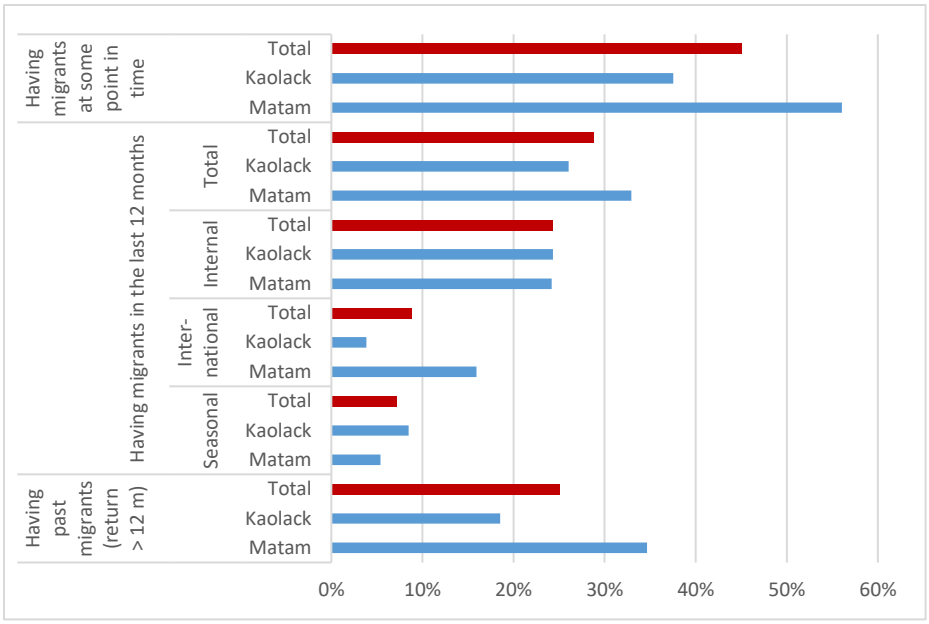
In Kaolack, 7.7 percent of the population have been a migrant at some point in time: 2.4 percent and 0.8 percent are return migrants, respectively, more and less than 12 months prior to the survey; 3.4 percent are current migrants; and 1.1 percent are seasonal migrants.

In Matam, the share of migrants is more important, accounting for 10.7 percent of the population: return migrants constitute 5.7 percent of the total population; current and seasonal migrants account for 4.3 percent and 0.7 percent of the population, respectively.

Throughout this report, “migrants” or “current migrants” refer to those who returned to the household during the 12-month period before the survey, those living outside the household at the time of the survey and those declared as seasonal migrants. This category of migration is influenced by the sociocharacteristics of the households over the preceding 12 months – the time frame intentionally captured by the survey questionnaire. Migrants who returned and stayed in the household less than 12 months prior to the survey are more likely to be temporary returnees than those who have already stayed for 12 months continuously. “Past migrants” principally refer to those who returned more than 12 months prior to the survey. It is important to note that “seasonal migrants” include internal and international migrants. These two subgroups of internal and international migrants within the seasonal category are too small to be considered separately in order to extract significant statistics.

Of all the households in the data set, 28.9 percent have at least one migrant member (26.1% in Kaolack and 33.0% in Matam) (Figure 4.2). Households with internal migrants account for 24.3 percent, nearly three times higher than the number of households with international migrants (8.8%). Only 3.9 percent of households in Kaolack have international migrants, while in Matam the percentage is five times higher (15.9%). In the two regions, the share of households with internal migrants is similar (24.2–24.3%). Of all households, 25.1 percent have at least one past migrant (returned more than 12 months prior to the survey). The inclusion of past migrants brings the percentage of households with a migrant at some point in time to 45.1 percent. This percentage is higher in Matam (56.1%) than in Kaolack (37.5%).

Figure 4.2 Share of migrant households

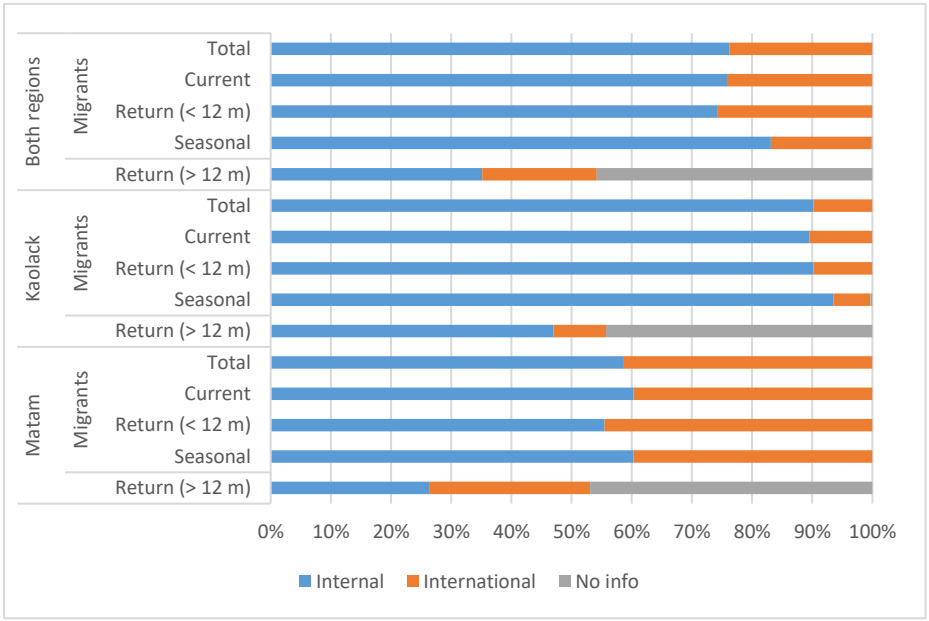


Source: FAO, 2018

Migration destinations

In both regions, the majority of migrants are internal, i.e. 76.2 percent move within the Senegalese borders (Figure 4.3). This percentage is strongly driven by Kaolack, where the internal migrants account for more than 90 percent. Matam is characterized by a higher share of international migrants (more than 40%); nevertheless, internal migration still dominates.

Figure 4.3 Destinations of migration



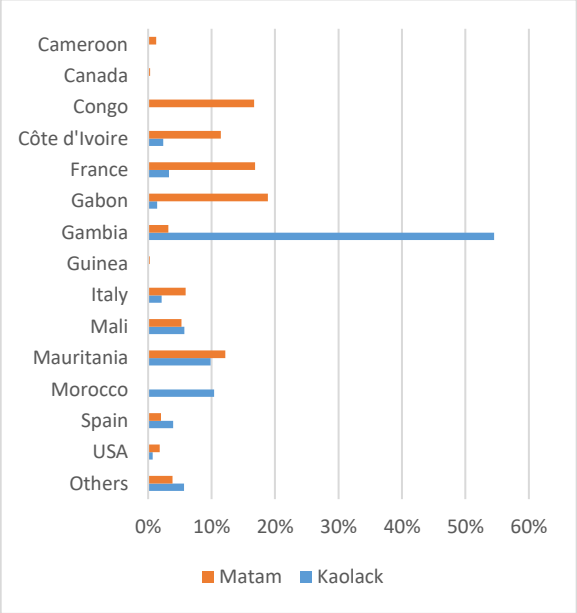
Source: FAO, 2018

The two regions differ greatly in terms of international destination (Figure 4.4). More than half of international migrants from Kaolack move to the neighbouring country of the Gambia. International

migrants from Matam move to a wider range of countries, including Gabon (18.9%), France (16.8%), the Congo (16.7%), Mauritania (12.1%) and Côte d'Ivoire (11.5%).

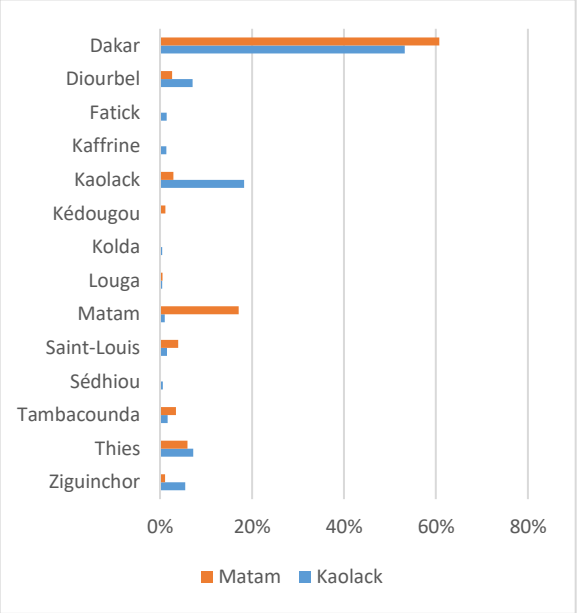
The preferred destination of internal migrants is the capital region of Dakar (Figure 4.5), which receives 53.2 percent of internal migrants from Kaolack and 60.8 percent of internal migrants from Matam. The second-choice destination is the internal migrants' own region: 18.3 percent in Kaolack and 17.1 percent in Matam. The next most popular destinations are Thiès and Diourbel, located on the principal migration axis Dakar–Thiès–Diourbel.

Figure 4.4 Destinations of international migrants



Source: FAO, 2018

Figure 4.5 Destinations of internal migrants

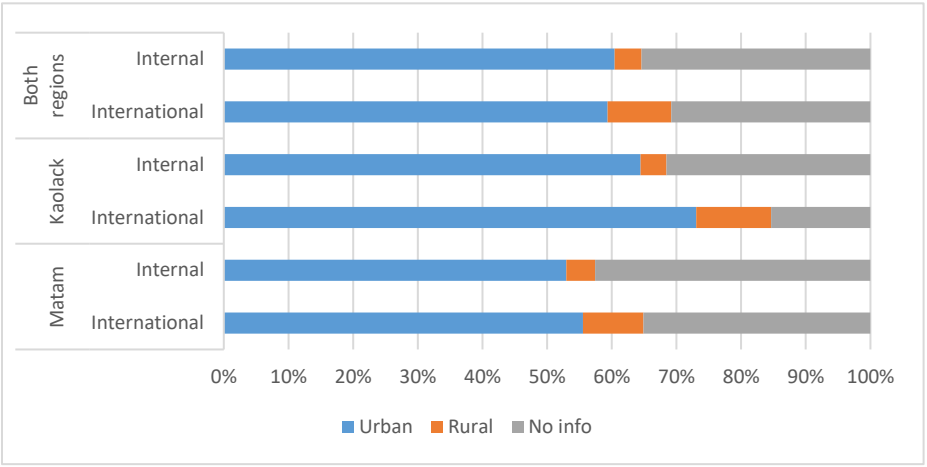


Source: FAO, 2018

Note: The migrants in Figures 4.4 and 4.5 exclude past migrants – those who had migrated but returned more than 12 months prior to the survey.

Whether the migrants' destinations are internal or international, the majority are urban (Figure 4.6). At least[5] 60.5 percent of migrants from both regions move from their rural origins to urban areas. Rural destinations account for much smaller shares (4.2% of internal and 9.8% of international destinations).

Figure 4.6 Rural/urban status of the destinations



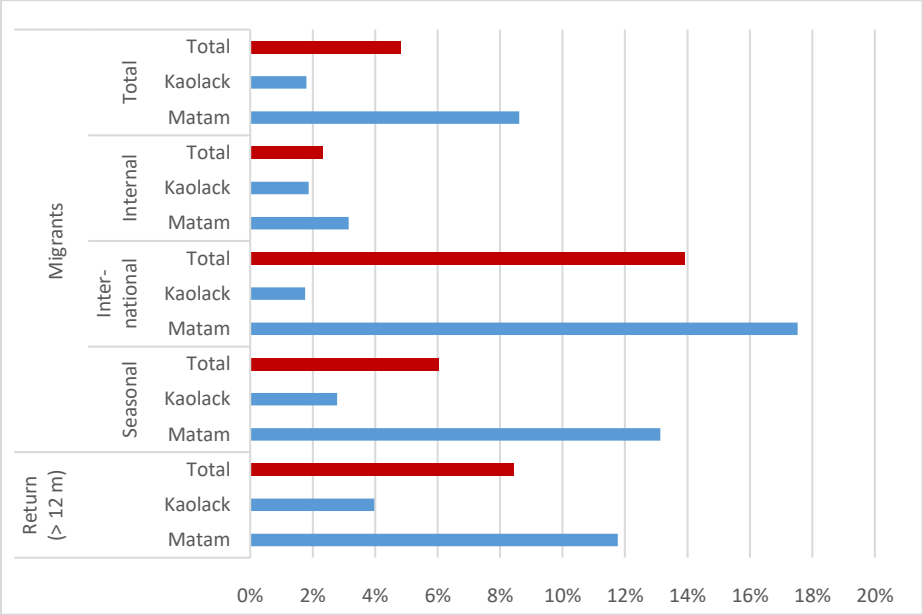
Source: FAO, 2018

[5] Note that, due to the existence of missing values, "at least" refers to the statistics presented.

Migration processes

The survey asked whether migrants passed through an important transit place where they prepared papers and money in order to reach the final destination. The majority of migrants arrived directly at the final destination (Figure 4.7); only 4.8 percent passed through a transit place, although this number is higher among past migrants (8.4%). Passing through a transit place is more frequent in the case of international migration, which unsurprisingly requires more preparation. This phenomenon, however, is mostly driven by Matam: 17.5 percent of international migrants had transited compared with 3.2 percent of internal migrants. The most common transit place is Dakar, the capital. In Kaolack, the percentages of internal and international migrants who had transited are equally low (1.8% and 1.9%, respectively).

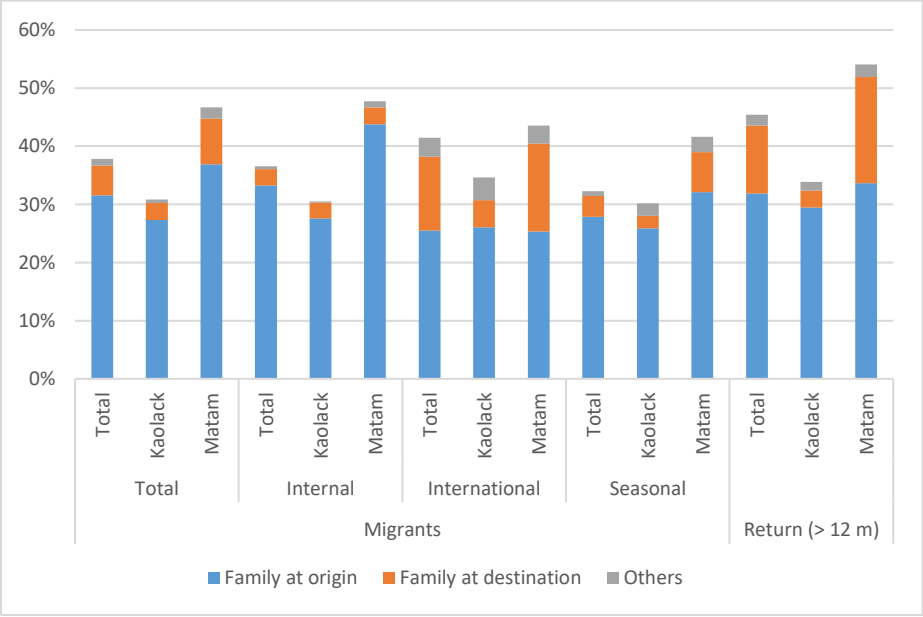
Figure 4.7 Percentage of migrants who have transited before arriving to final destinations



Source: FAO, 2018

More than one-third of migrants (37.8%) have received help migrating (Figure 4.8). The most important source of help is the migrant's family at origin (31.5% on average), followed by the family at destination (5.1%). The form of help – financial or other – was not specified in the questionnaire.

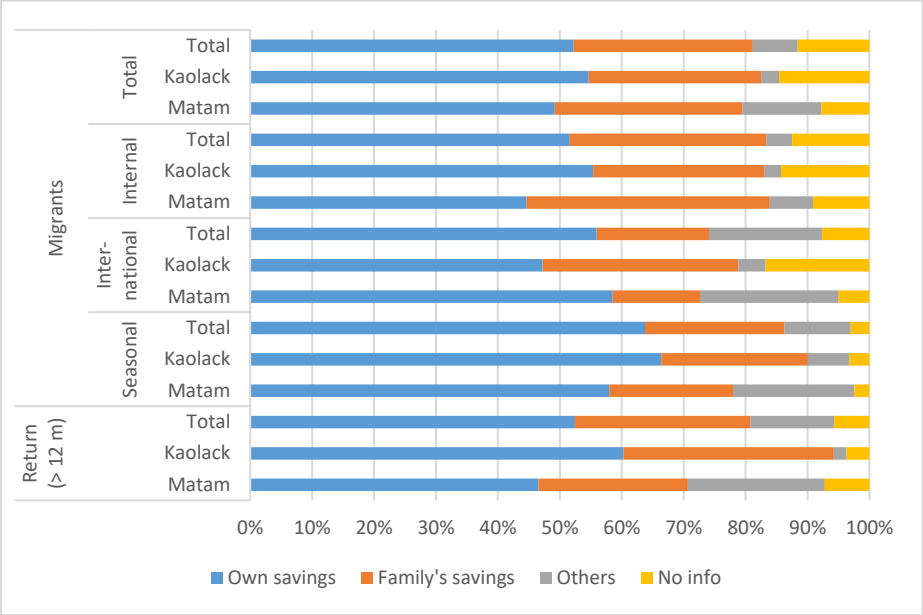
Figure 4.8 Percentage of migrant individuals who have received help to migrate



Source: FAO, 2018

Figure 4.9 shows that the move is financed principally by migrants' own savings (52.2%). Family savings help to pay almost one-third of the monetary costs of migration (i.e. 28.9%).

Figure 4.9 Source of financing migration



Source: FAO, 2018

In summary:

- Migration concerns a large population in rural areas.
- Internal migration and rural–urban migration are the most common forms of migration from the two surveyed regions.
- The preferred destination of internal migrants is Dakar – the capital of Senegal.
- Stepwise migration only concerns a small share of migrants in the sample.

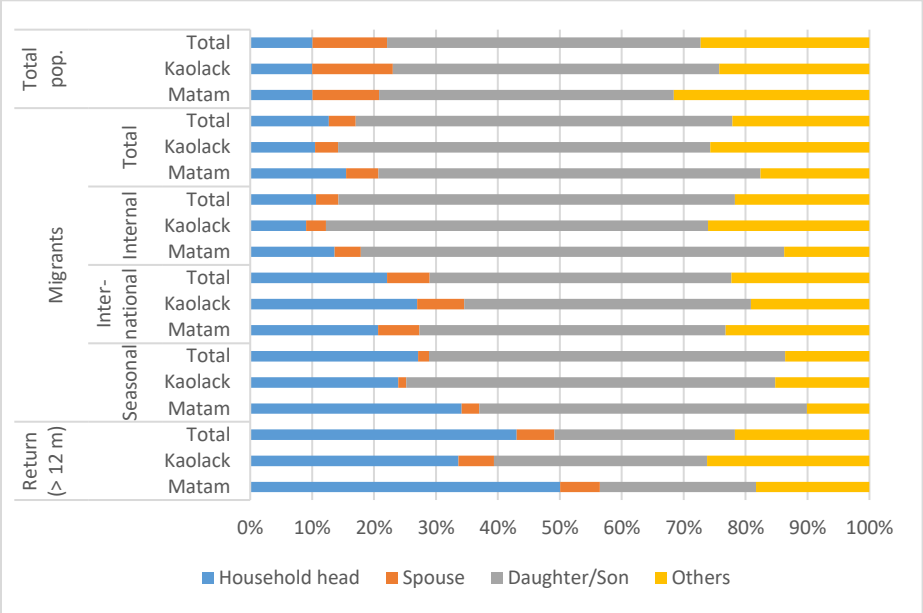
5. Characteristics of migrants

This section provides descriptive statistics about the individual characteristics of migrants: relationship with household head, ethnicity, age, gender, marital status, education level, and employment status and sector.

Relationship with household head

Migrants are typically offspring (more than 50% are daughters or sons) of household heads (Figure 5.1). Among past migrants, almost half are household heads and slightly under one-third are daughters and sons of household heads.

Figure 5.1 Relationship with household head

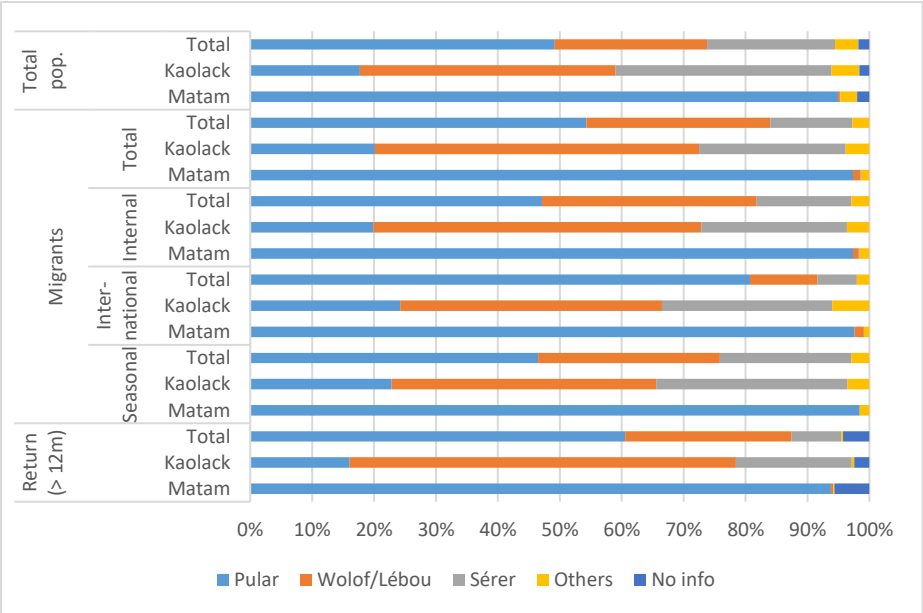


Source: FAO, 2018

Ethnicity

There is no major difference in terms of ethnic group membership when comparing migrants and the general population in each region of origin (Figure 5.2). In Matam, 97.4 percent of migrants come from the Pular ethnic group. In Kaolack, 20.2 percent of migrants are Pular and the majority (52.3%) are of Wolof/Lébou ethnicity.

Figure 5.2 Ethnicity

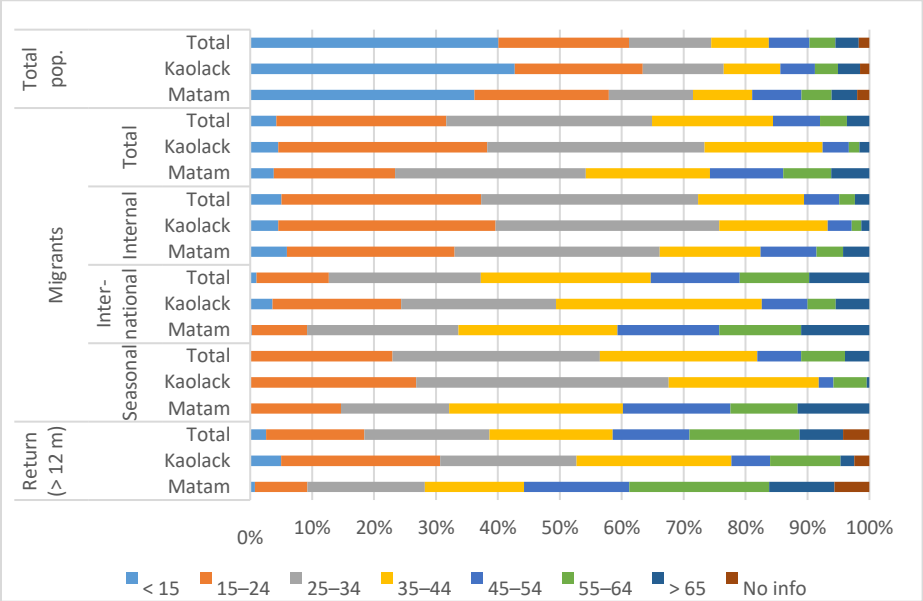


Source: FAO, 2018

Age

The two regions are characterized by a very young population (Figure 5.3). Around 40 percent are children less than 15 years old.

Figure 5.3 Age distribution

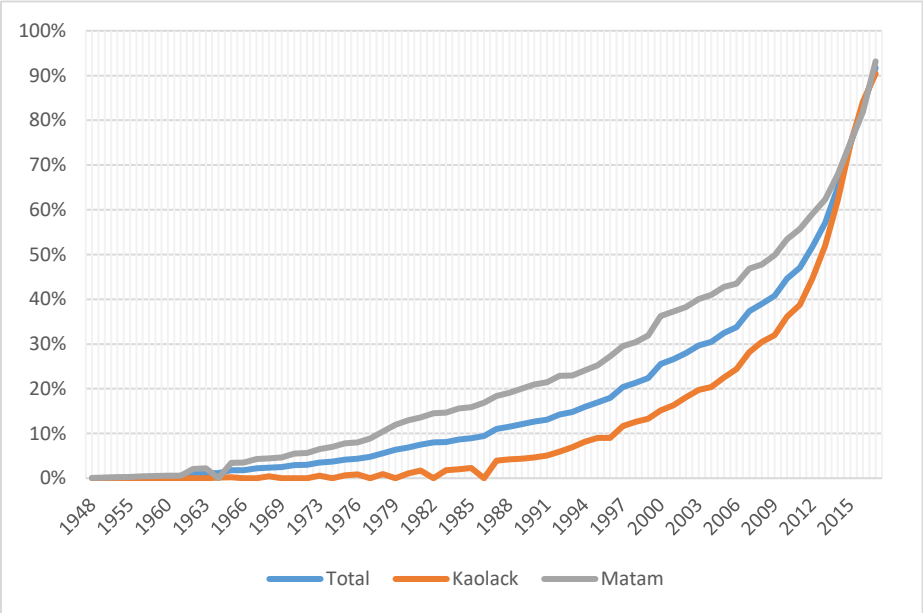


Source: FAO, 2018

The migrants are typically young adults aged 15–24 (27.5%) and 25–34 (33.2%). Thus, more than 60 percent of migrants are in the early working age group (15–34), compared with 34.4 percent of the total population. Internal migrants are younger than international migrants. The latter are slightly more concentrated in the middle working age group (25–44). Migrants who returned more than 12 months before are older than current migrants. No seasonal migrants are found in the age group of less than 15 years.

Of all migrants in the sample, 60.0 percent have migrated in the past 10 years, i.e. between 2008 and 2017 (Figure 5.4). In the past 6 years alone (from 2011/12 to 2017), 50 percent have migrated. This shows a very recent surge of emigration in recent years. Almost 50 percent of all migrants from Kaolack have migrated in the 5-year period from 2013 to 2017.

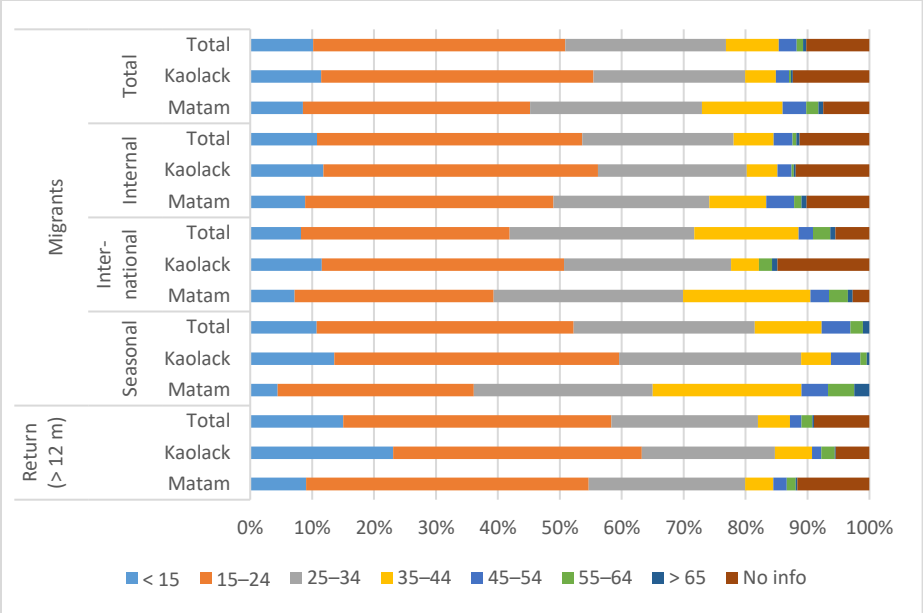
Figure 5.4 Cumulative percentage of migrants in the sample through years



Source: FAO, 2018

Combining the information about current ages and the years when migrants (including past migrants) first migrated, Figure 5.5 shows the distribution of age of first migration. Again, an important share of the young-adult group (66.6% of migrants) migrated when they were 15–34 years old; the same is true of past migrants. This is suggestive of a universal pattern of youth being the most prone-to-migrate group of the population.

Figure 5.5 Age of first migration

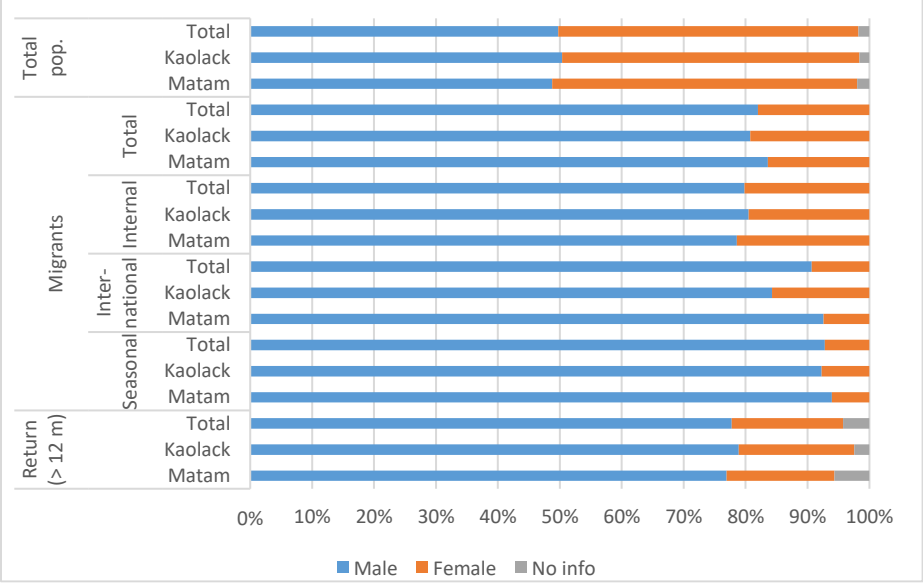


Source: FAO, 2018

Gender

The most striking finding is the domination of male migrants in both rural regions (Figure 5.6). The total population has a balance in gender; in contrast, 82.0 percent of the migrant population are male. The two regions do not differ in this regard. Internal migration exhibits a slightly lower share of men compared to international migration. This in part illustrates the fact that women face more restrictions to long-distance movement than men. Compared to other categories, seasonal migrants have the highest share of male migrants (92.8%).

Figure 5.6 Gender distribution

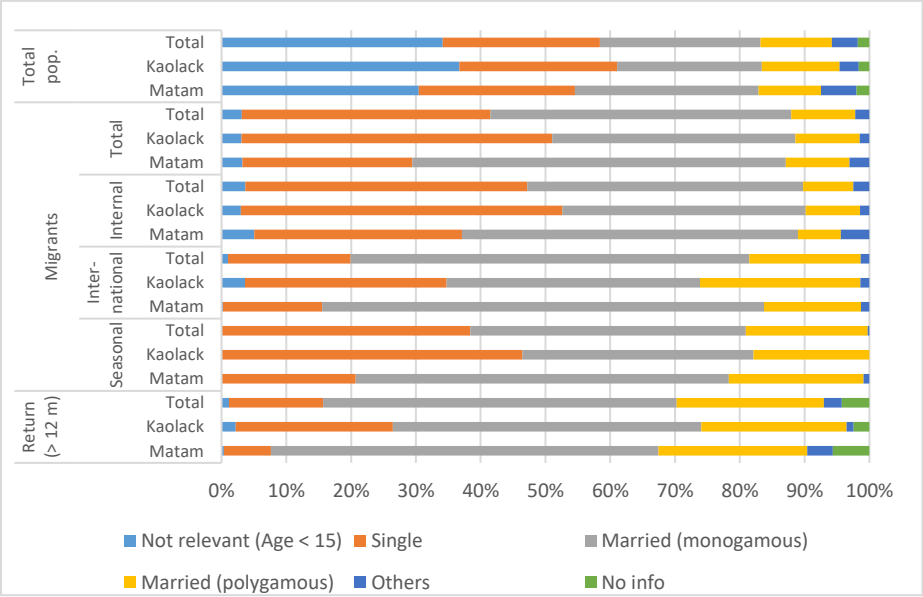


Source: FAO, 2018

Marital status

Migrants are typically single (38.4%) or married in monogamy (46.4%) (Figure 5.7).

Figure 5.7 Marital status



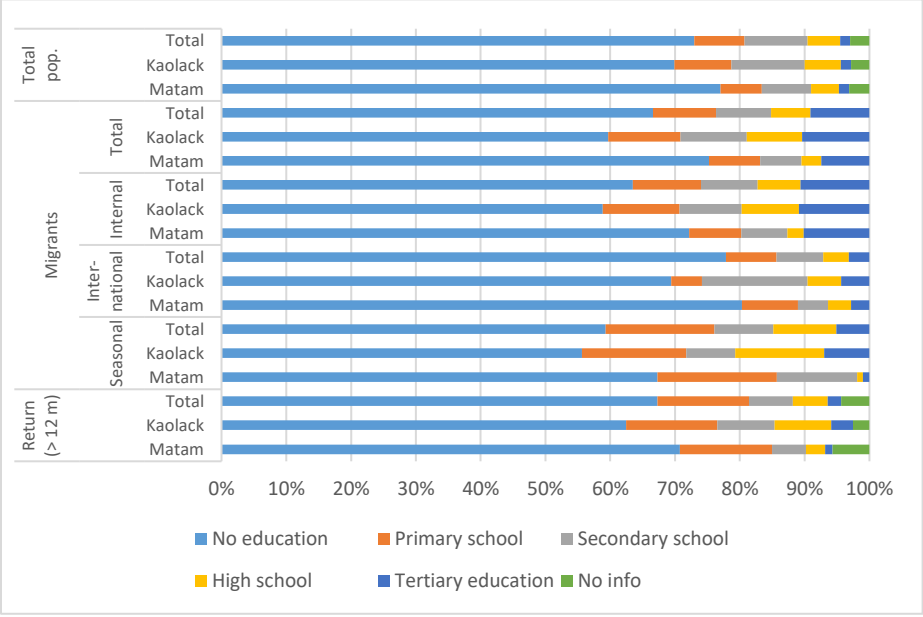
Source: FAO, 2018

The share of singles is greater among internal than international migrants. Among internal migrants, single and monogamous individuals constitute an equal share of about 43 percent. Among international migrants, the share of married (in monogamy) individuals is significantly higher (61.5%), while only 18.9 percent are single. This pattern is associated with the contrast between the two regions, given that they differ in terms of internal and international patterns. The share of single migrants is 48 percent in Kaolack and 26.2 percent in Matam. Individuals married in monogamy account for 37.5 percent in Kaolack and 57.6 percent in Matam. Migrants who returned more than 12 months prior to the survey tend to have more established family: 77.3 percent are married (monogamy/polygamy) and only 14.5 percent are single.

Education

Migrants are more educated compared to the average population aged greater than or equal to 15 years (Figure 5.8): 33.4 percent of migrants have some form of education, compared with 27.0 percent of the total population. The share of individuals with tertiary education is 9.1 percent among the migrant population and only 1.6 percent among the total population of the

Figure 5.8 Education level of individuals aged greater than or equal to 15



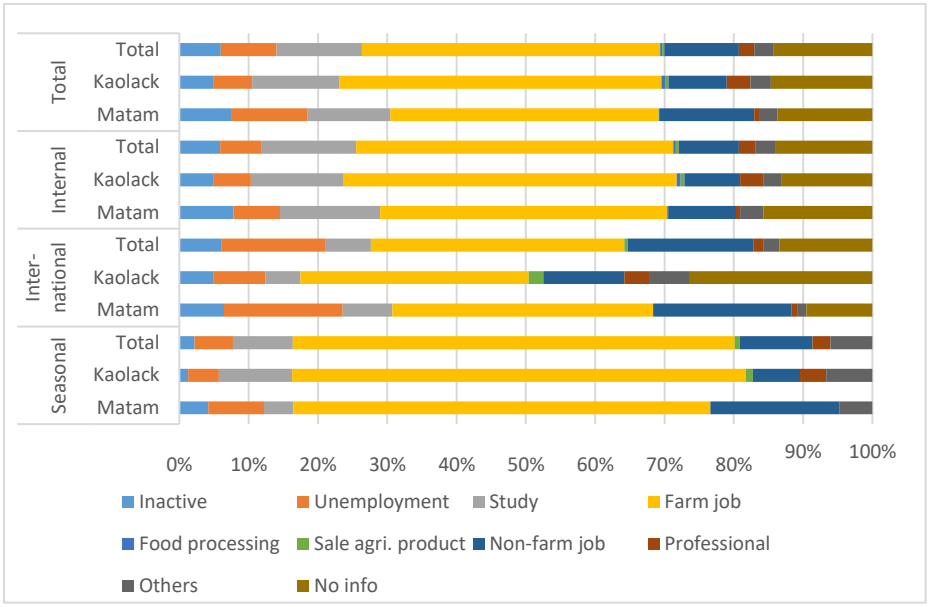
Source: FAO, 2018

two regions. Matam has a lower share of educated migrants: 75.3 percent of its migrants have no education, compared with 59.7 percent in Kaolack. In contrast with the common finding that international migrants are more educated than internal migrants, in the two regions surveyed, 36.5 percent of internal migrants have some form of education compared with just 22.1 of international migrants. This could be due to the older age of international migrants.

Employment before, during and after migration

Before migrating,[6] at least 43 percent of migrants were employed in agriculture, 12.3 percent were studying and 10.8 percent had a non-farm job (Figure 5.9). The construction of employment variables are detailed in Appendix B. During migration,[7] a large share of migrants switched to non-farm jobs, mainly due to fact that most of them moved to urban areas (Figure 5.10). The share of migrants in farm jobs declined to 30.2 percent, while that of non-farm jobs increased to an average of 33.8 percent. International migrants exhibit a slightly higher incidence of being inactive or unemployed before and during migration relative to other migrant types. Before migration, the share of international migrants working in agriculture was lower than that of internal migrants (36.6% vs 45.8%). This situation is reversed during migration: the share of international migrants in agriculture is 33.5 percent – higher than the 30.5 percent of internal migrants in agriculture. However, the higher concentration of international migrants in farm jobs is mainly driven by Kaolack.

Figure 5.9 Employment of migrants before migrating



Source: FAO, 2018

During migration, a higher share of internal migrants pursue study (13.2% compared with 1.3% among international migrants). Seasonal migrants constitute a particular group: their high level of involvement in agriculture does not change substantially after migrating (63.8% before and 58.5% after migrating).

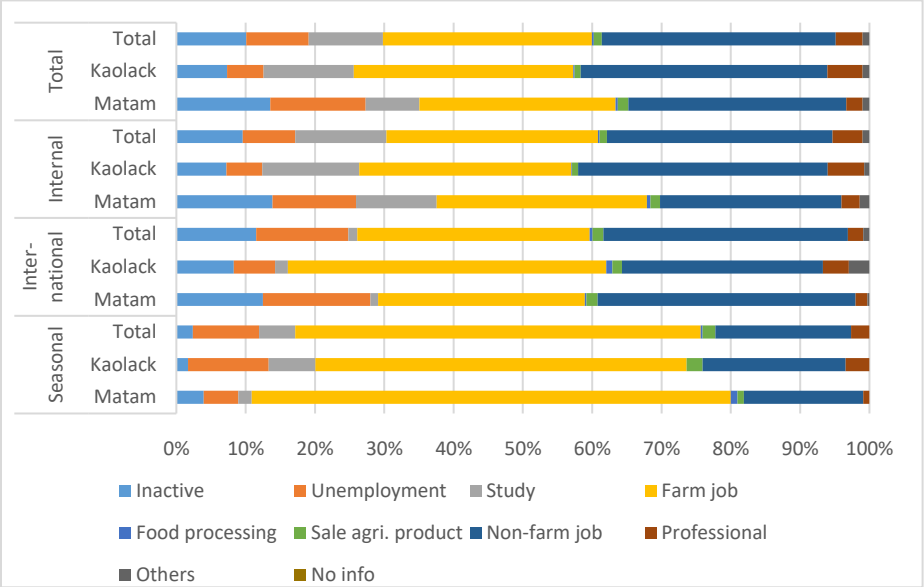
Among past migrants, the dynamics of changing employment sector from farm to non-farm are the same before and during migration (Figure 5.11). However, when migrants returned, the share of farm jobs rose again, while the non-farm share decreased. The current sectors of employment of past migrants reveal

[6] This refers to the employment situation that current migrants had in the past in the areas of origin before they migrated.

[7] For current migrants, this refers to the employment during migration that they had in the previous 12 months at destination. However, there is insufficient information to specify whether it is employment that seasonal migrants had at origin or destination areas. What is certain is that it was the main income-generating activity in the course of 12 months.

little change compared to prior to migration.[8] This points to two facts: first, the types of employment that migrants have access to depend on the variety of jobs in the local market, i.e. farm jobs in rural areas and non-farm jobs in urban areas; second, rural transformation – i.e. the diversification of rural areas away from primary agricultural production – remains weak in both origin regions. The agricultural value chain is almost absent, since the shares of employment in food processing and sales of agricultural products are very modest.

Figure 5.10 Employment of migrants during migration (current employment)

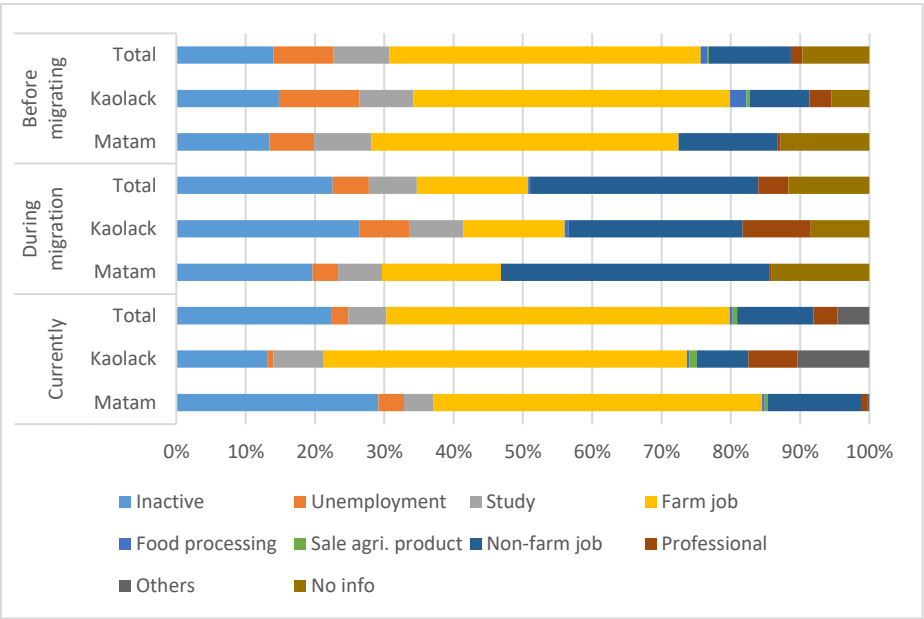


Source: FAO, 2018

In summary:

- Men outnumber women in the migration process.
- Migrants are typically young (15–34), the sons or daughters of the household heads, and with a higher than average level of education.
- The switch from farm to non-farm jobs is significant after migrating, except in the case of seasonal migrants.

Figure 5.11 Employment of past migrants (return more than 12 months)



Source: FAO, 2018

[8] For past migrants, current employment refers to their employment situation in the origin areas.

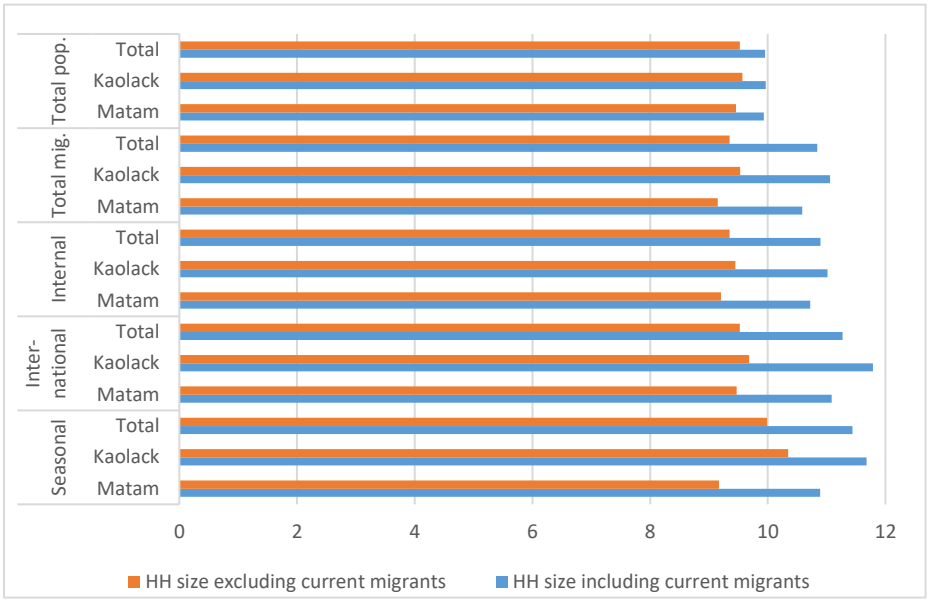
6. Characteristics of migrant households

This section describes the statistics of households with at least one migrant in different categories and compares them with the average household of the population. The characteristics include household size, engagement in agriculture, living conditions, migration history and network.

Household size

Migrants tend to come from larger families (Figure 6.1) averaging 11 members – including the migrants – compared to the population average of 10 members. This could be because migrant families are more likely to have a household head in a polygamous marriage (42.0% compared with 37.8% in families without migrants). Efforts to send offspring out to migrate could be one aspect of rivalry between co-wives in polygamous households.[9] Families with international migrants are likely to be larger than families with internal and/or seasonal migrants.

Figure 6.1 Household size excluding and including migrants



Source: FAO, 2018

Household agricultural activities

Migrant families are generally less engaged in agriculture than the average household of the population. The contribution of agriculture to annual gross income is lower than in the average household (Figure 6.2). The methodology to construct the income variables is detailed in Appendix C. Agriculture contributes to 61.5 percent of an average household's annual income in both regions; this share falls to 56.5 percent among households with a migrant member. This number is even lower in Matam (48.2%) than in Kaolack (62.3%). The difference is clearly apparent between households with internal and international migrants. In households with international migrants, only 48.3 percent of income comes from agricultural activities compared with 58.9 percent in households with internal migrants.

[9] Rossi (2016) found that women's fertility choice is influenced by rivalry between co-wives in polygamous households in Senegal. The success of one wife in giving birth to an additional child increases the fertility responses of the other wives in the race to grasp a greater share of the household resources controlled by the husband.

Figure 6.2 Share of agricultural income on gross income

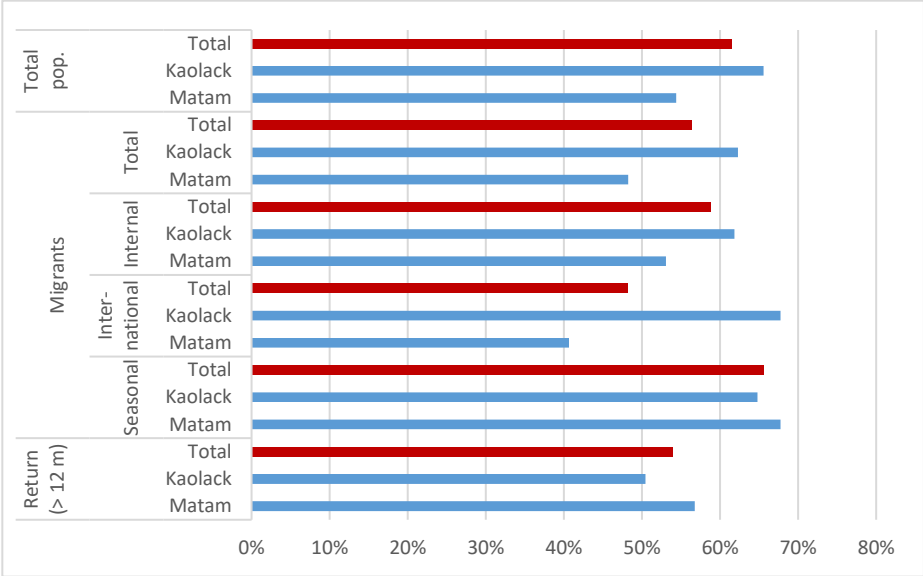


Figure 6.3 Share of members aged greater than or equal to 15 in agriculture

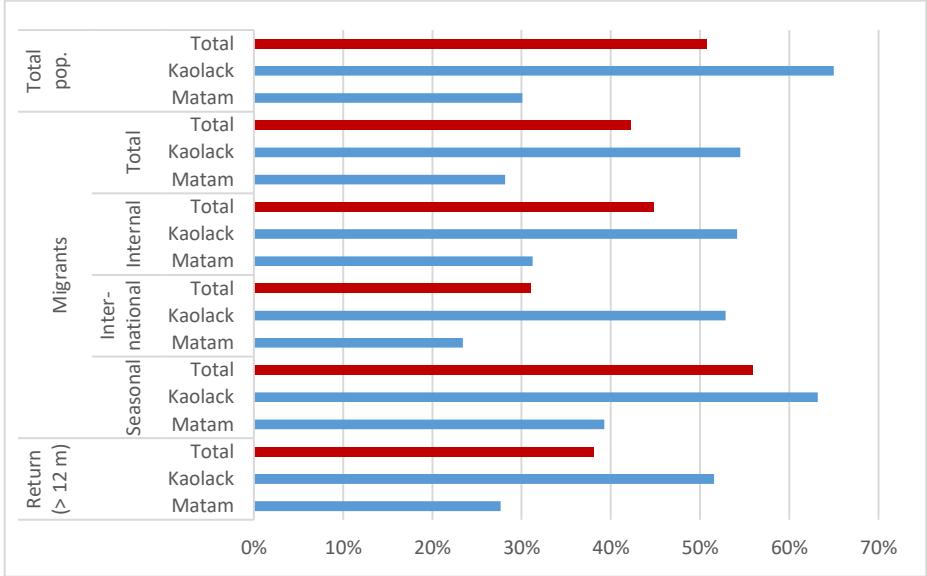
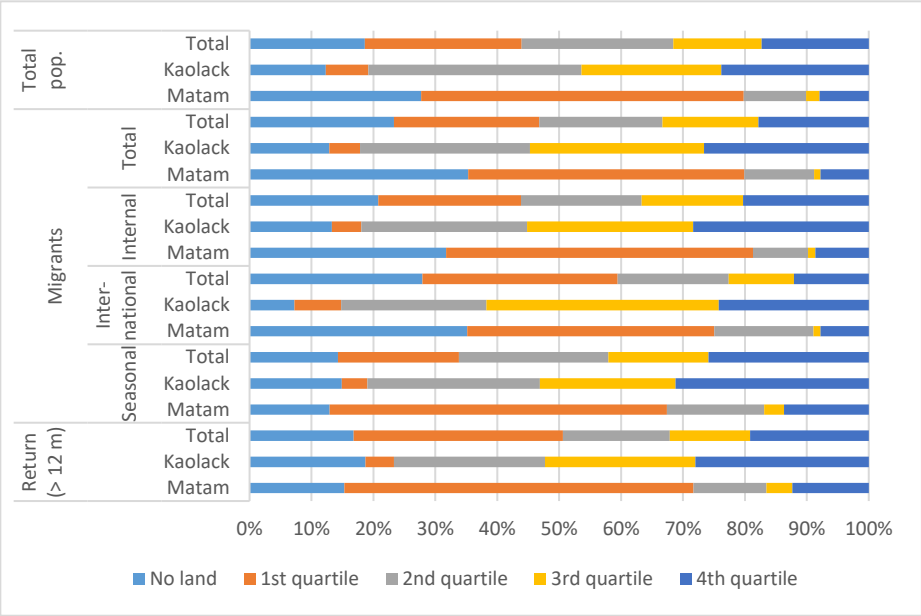
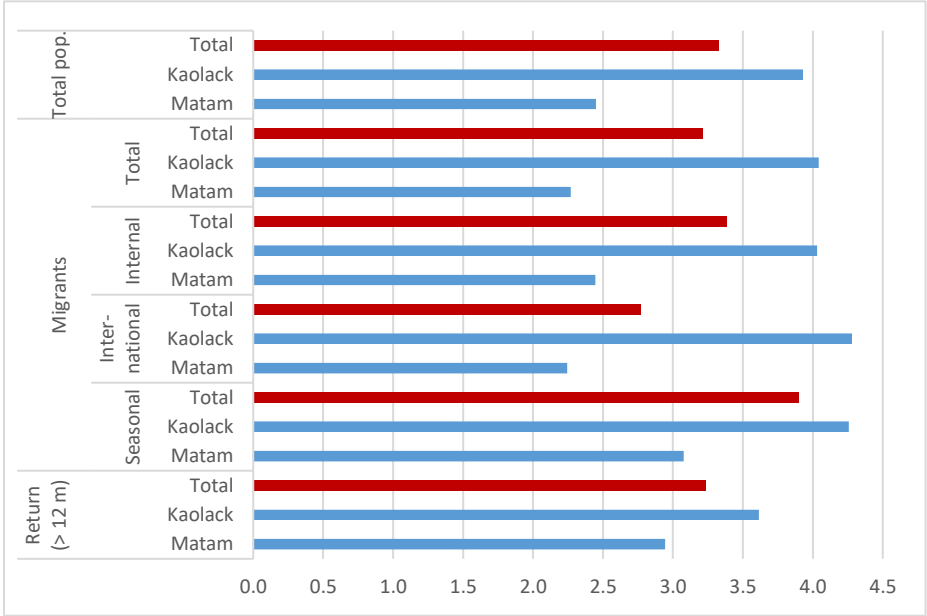


Figure 6.4 Percentage of households in quartiles of agricultural land size (ha)



Note: Land size is divided into five groups: no land (i.e. 0 ha) and four quartiles of intervals [0.005,1], [2,3], [4,5], and [6,800].

Figure 6.5 Number of varieties of crops and livestock



Source: all graphs are FAO, 2018

Migrant households also have fewer members in the working age employed in agriculture in the 12-month period prior to the survey (Figure 6.3). In an average household in both regions, half of the members aged greater than or equal to 15 are engaged in agriculture, but there is a big regional difference (65.0% in Kaolack, 30.1% in Matam). In households with migrants, only 42.2 percent of all household members aged greater than or equal to 15 are engaged in agriculture, again with a regional difference (54.5% in Kaolack, 28.1% in Matam) strongly correlated with the difference between households with internal migrants and those with international migrants. Households with internal migrants have more adult-aged members working in agriculture than do households with international migrants (44.8% vs 31.1%).

Agricultural land size[10] differs slightly between the average household and those with migrants (Figure 6.4). Of the migrant households, 23.3 percent possess no agricultural land compared with 18.6 percent of all households. The share is higher in Matam (27.7%) and in households with international migrants (27.9% compared with only 20.8% of households with internal migrants). Furthermore, the percentage of households possessing agricultural land in the highest quartile of the total population is 17.3 percent. This percentage is smaller among households with international migrants (12.1%) and migrant households located in Matam (7.8%). Reduced access to cultivable land may push people to migrate to search for available land elsewhere. However, households with migrants in this case seem to be less engaged than average in agriculture; therefore, in the two surveyed regions, access to land may not be the motivating factor to migrate. In addition, only 0.2 percent of all migrants declared that they migrated because they did not possess land.

With regard to the variety of crops and livestock possessed by the average household in both regions, households with migrants have fewer varieties of crops and livestock (Figure 6.5). This tendency is driven by households with international migrants (2.8 varieties of crops and/or livestock – compared with 3.4 for households with internal migrants, and 3.3 for the population average).

Households with seasonal migrants are much more involved in agriculture than the average household and than households with other kinds of migrants. Indeed, the agriculture-related statistics are higher for households with seasonal migrants. In addition, households of past migrants are less engaged in agriculture than the average migrant household.

Household living conditions

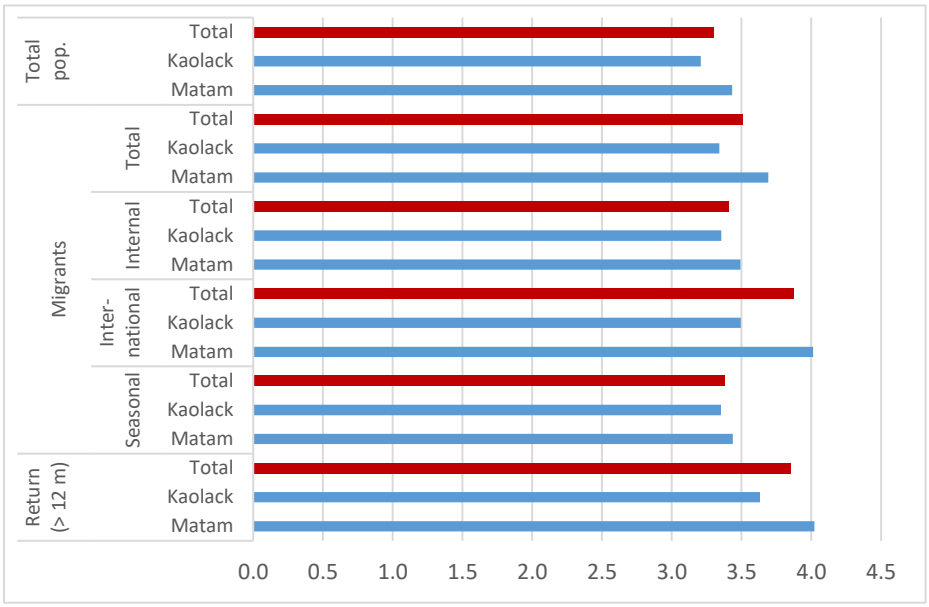
Household living conditions are depicted through four representative descriptive statistics: the wealth index, whether or not the house has electricity, the food insecurity experience scale (FIES) and the time needed to reach public transport.

The wealth index is a composite indicator generated from principal component analysis (PCA). It captures different dimensions of house ownership, dwelling quality (quality of roof, wall, floor), access to basic facilities (electricity, water on premises) and possession of durable goods (TV, radio, computer, mobile and/or fixed-line phone, motor vehicle, bicycle). The methodology used to construct this variable is detailed in Appendix D.

[10] Land size (in hectares) is divided into five groups: no land (0 ha) and four quartiles of intervals [0.005,1], [2,3], [4,5] and [6,800].

Migrants are more likely to come from better-off families (Figure 6.6). Families with migrants – most notably international migrants – exhibit higher levels of wealth. Matam consistently reveals better living conditions than Kaolack – for households both with and without migrants. It is important to note that these simple descriptive statistics are not sufficient to infer whether better-off families have more resources to send people abroad or whether migrants (especially international ones) send remittances back to their families of origin and make them better off. Section 7 and Appendix G examines this endogeneity and analyses the determinants of migration. However, it is not possible to assert that this study fully resolves the problem.

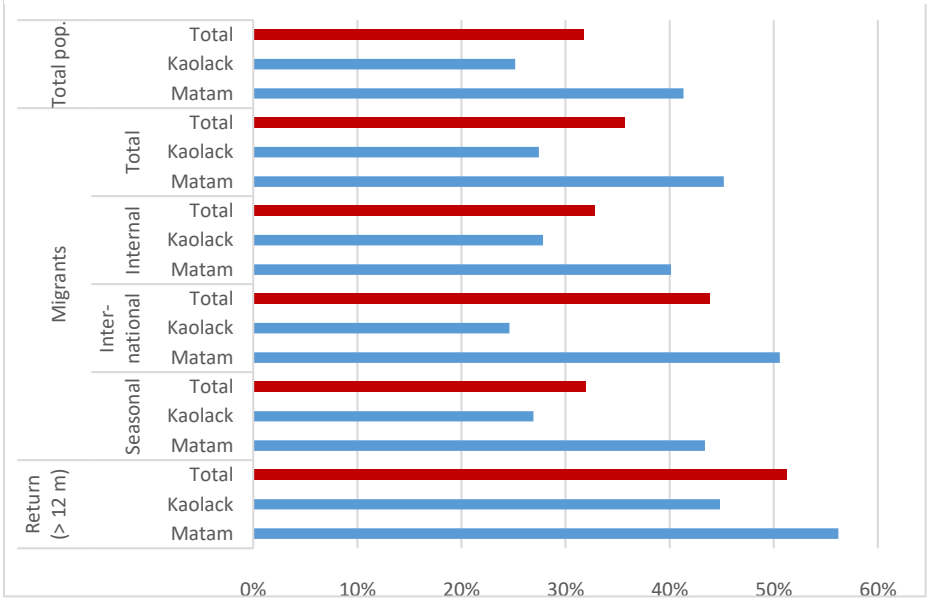
Figure 6.6 Wealth index



Source: FAO, 2018

Electricity in the household was selected as an example to illustrate the overall availability of basic facilities (Figure 6.7). The proportion of migrant households with electricity (35.7%) is higher than the average for the two regions (31.8%). However, this percentage is found to be slightly lower for households with internal migrants (32.8%). The average is boosted mostly by the households with international migrants, of which 43.8 percent have access to electricity in the dwelling. Kaolack lags behind Matam in this regard.

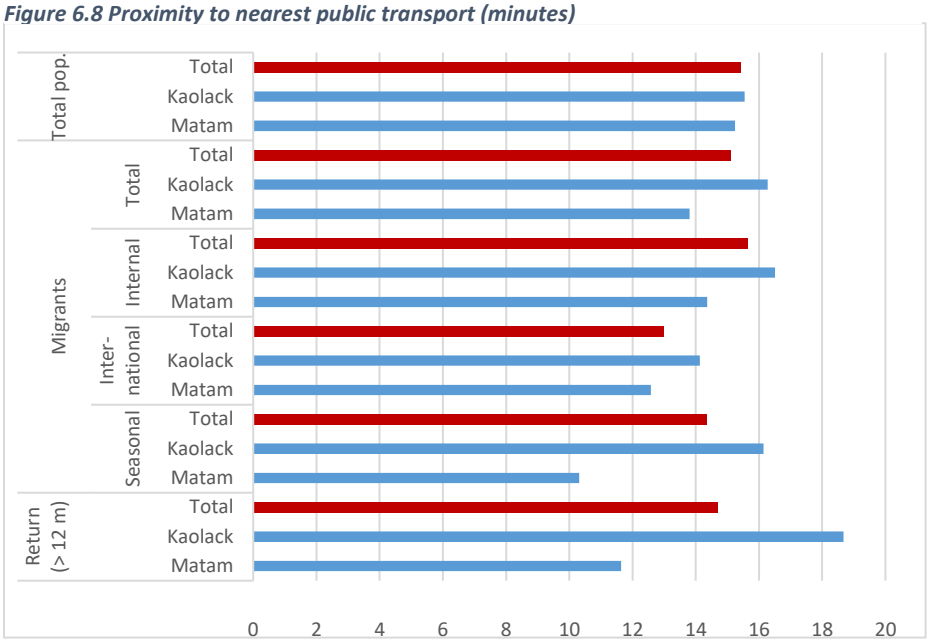
Figure 6.7 Electricity on premises



Source: FAO, 2018

Households with international migrants also have better access to public transport – compared to both the average household and households with internal migrants (Figure 6.8). On average, international migrant households require 13.0 minutes to reach public transport. More time is required for households with internal migrants (15.6 minutes), which may explain the insignificant difference between the average migrant household and the average of all households in the sample (Table F1 in Appendix F). The regional difference is consistent across the population subgroups: there is better access to public transport in Matam than in Kaolack, despite the fact that it covers a much vaster area (Kaolack is 16 010 km^2, Matam is 25 083 km^2).

Figure 6.8 Proximity to nearest public transport (minutes)

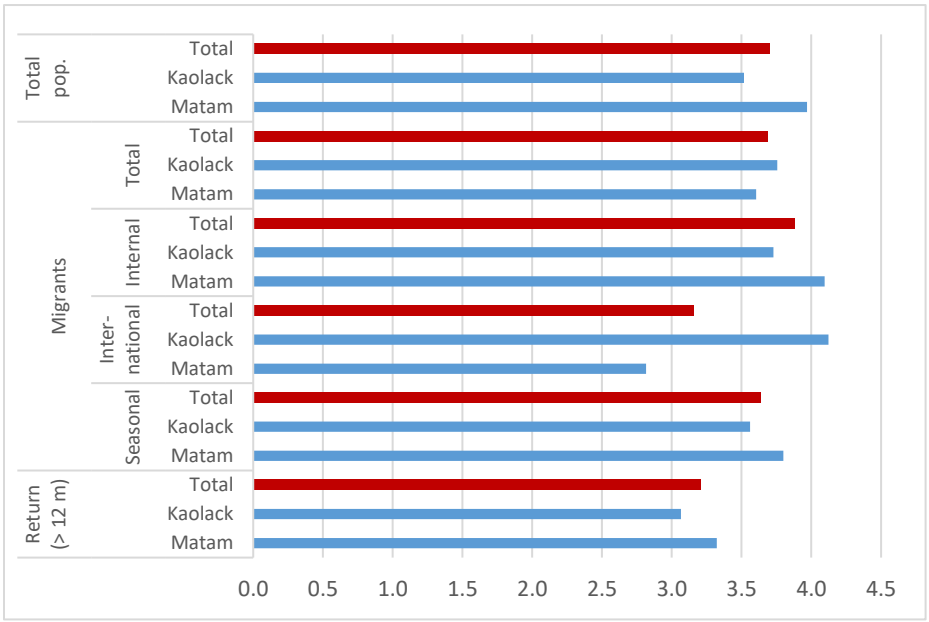


Source: FAO, 2018

The FIES is an indicator developed by FAO to measure the severity of food insecurity. The information is based on eight questions in a specific module of the questionnaire. The eight questions were asked in a predefined order expressing an increasing degree of food insecurity as perceived by the respondents. Further information about the FIES and its methodology are presented in Appendix E.

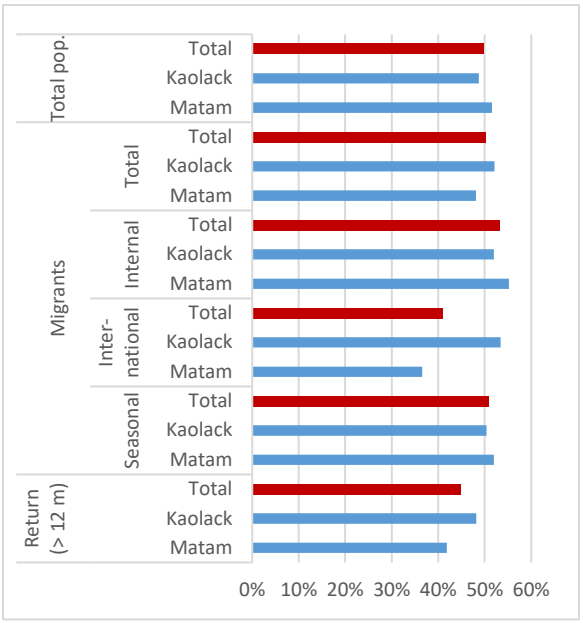
The raw score of the FIES is shown in Figure 6.9 and is used to calculate the probability of being moderately and severely food insecure. Figure 6.10 shows the latter and Figure 6.11 shows the stacked numbers of the two categories. The difference in food insecurity between families with migrants and the average household is not statistically significant (Table F1).

Figure 6.9 Food insecurity raw score



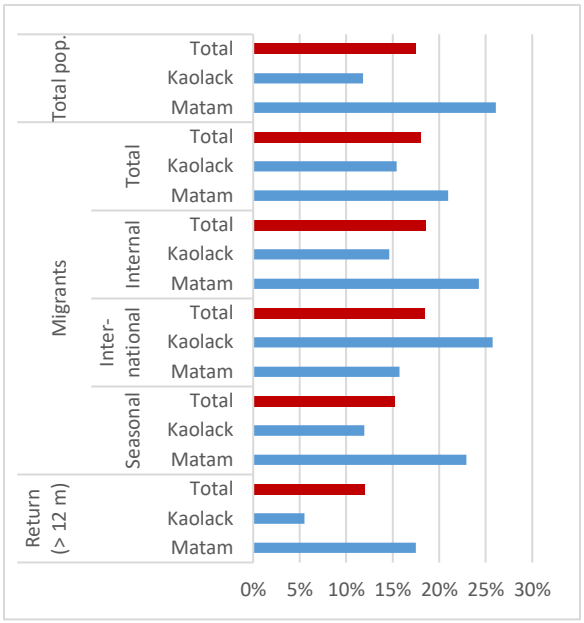
Source: FAO, 2018

Figure 6.10 Probability of being moderately or severely food insecure



Source: FAO, 2018

Figure 6.11 Probability of being severely food insecure



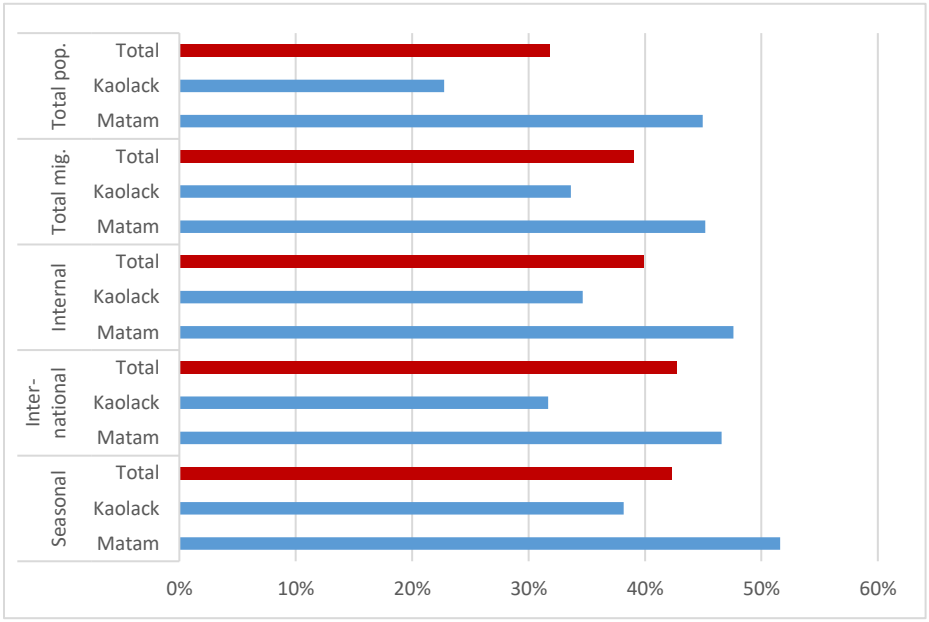
Source: FAO, 2018

A significant gap is found between households with internal and international migrants. The raw indicator is 3.9 among households with internal migrants and falls to 3.2 among households with international migrants (Figure 6.9). Among international migrant households, 41 percent are moderately or severely food insecure compared with 53.3 percent of internal migrant households (Figure 6.10). This reflects the difference in wealth between the two population groups.

Household migration history and network

Families with migrants are more likely to have a past migrant (Figure 6.12). Of all households, 31.8 percent have at least one past migrant (i.e. those who returned more than 12 months prior to the survey) and/or close relatives (grandparents, parents and siblings of the household head and his/her spouse) who have migrated. The figure rises to 39.0 percent among all

Figure 6.12 Having a past migrant in the family

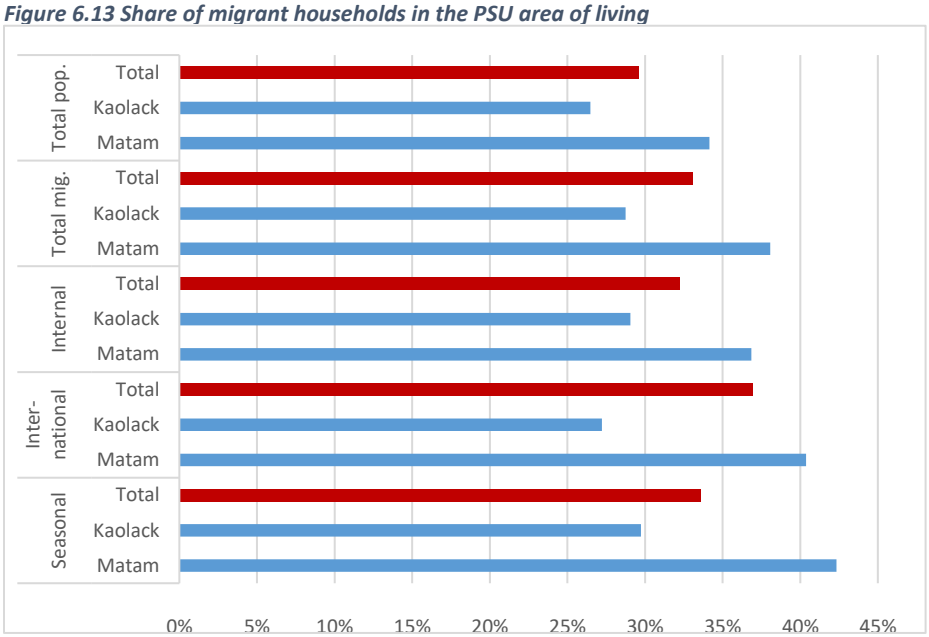


Source: FAO, 2018

migrant households, and by a further 3.7 percentage points among households with international migrants (42.7%).

At the same time, migrant families tend to be found in PSUs with higher migration rates (Figure 6.13). The listing of all the households in the two rural regions allows us to construct the share of migrant households in each PSU.[11] On average, 29.6 percent of all households in each PSU have at least one migrant, and migrant households tend to be concentrated in PSUs with a higher share (33.1% on average). Households with international migrants are located in those PSUs that on average contain more migrant households (37.0% of total households).

Figure 6.13 Share of migrant households in the PSU area of living



Source: FAO, 2018

Both information suggests the existence of network effect that facilitates migration.

In summary:

- Households with migrants are less engaged in agricultural activities.
- Households with international migrants are better off than those with internal or seasonal migrants. This suggests a financial constraint linked to international migration, which is often more costly. However, the causal link is not totally clean, because international migration usually brings greater benefits – monetary and non – to the origin households. This issue is addressed in Section 7 and Appendix G.
- The values of the indicators of agricultural intensity, living conditions, migration history and network exhibited by households with internal migrants tend to lie between those of households with seasonal and international migrants. This suggests a gradual progression of difficulty and affordability of the three types of migration: international migration is the most difficult to afford, followed by internal and seasonal migration.
- The difference between internal and international migrants is strongly correlated with the different socio-economic characteristics of the two surveyed regions.

[11] The surveyed households were randomly drawn from each primary sampling unit (in Senegal, this corresponds to “district de recensement”).

7. Determinants of rural migration

Sections 5 and 6 provide descriptive statistics about the characteristics of migrants and their families, offering an initial insight into what drives rural migration. A more in-depth analysis is provided in this section, with a study of the determinants of **three types of migrants:**

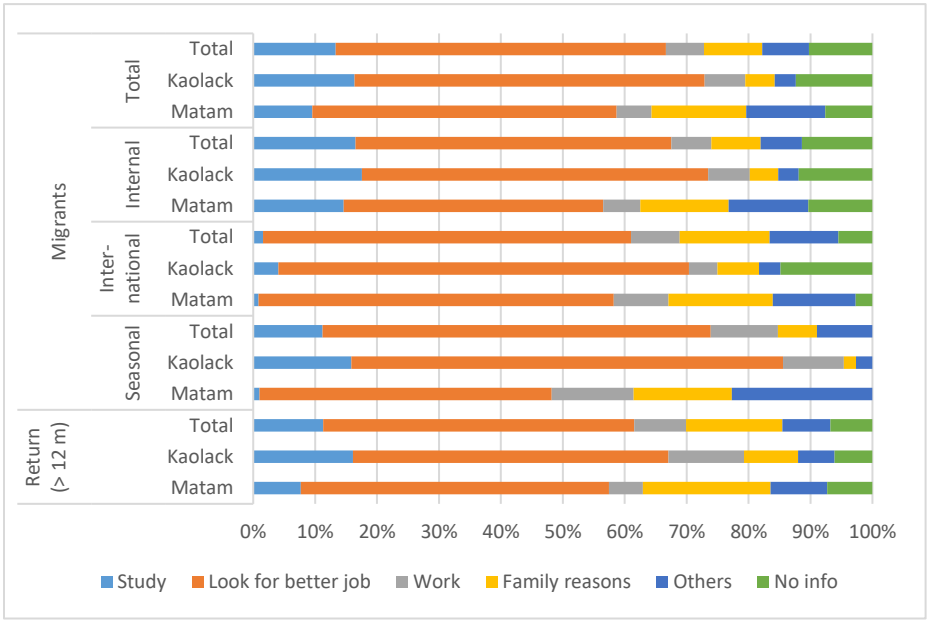
- **Migrants during the 12 months prior to the survey:**[12] the total number and the separate categories of internal, international and seasonal migrants.
- **Potential migrants:** those who are declared to have a desire to migrate but have not been migrants at any point in time.
- **Returnees:** migrants who returned to the origin households more or less than 12 months prior to the survey. These two groups are analysed together. Those who returned more than 12 months prior to the survey (and have thus stayed continuously in the household for 1 year) are also analysed separately (on the basis that they are likely to have settled down more permanently in their areas of origin).

Appendix G presents the methodology for the multivariate regressions, including the strategy to deal with the endogeneity bias. The results of the three sets of determinants are analysed in Sections 7.1–7.3, presenting first the migrants' declared reasons for migrating, the reasons for wanting to migrate given by the non-migrants or potential migrants, and the reasons for returning provided by the past migrants. The various potential drivers are then compared in multivariate regressions, in order to determine the most statistically significant determinants of rural migration in Senegal.

7.1. Determinants of migration

This subsection examines the factors determining the probability of a person to be migrant during the 12 months preceding the survey. It helps understand what drives people's decision to migrate and the realization of their migration.

Figure 7.1 Reasons for migration of all migrants



Source: FAO, 2018

Declared reasons for migration

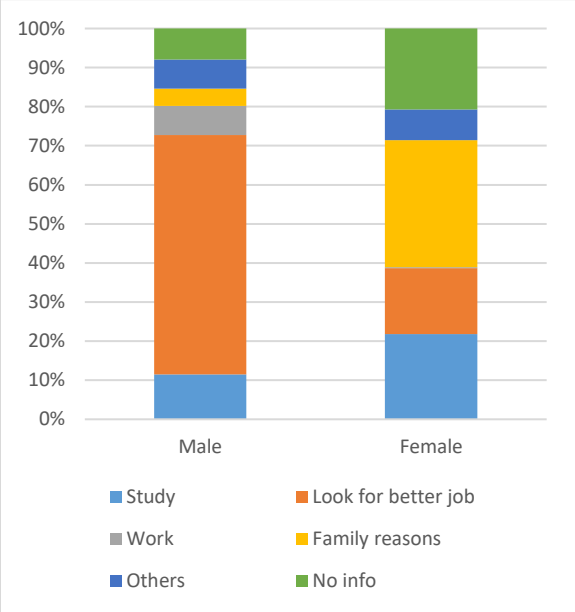
Figure 7.1 presents the declared reasons for migration of all the

[12] Note that they can be referred to as "migrants" or "current migrants" as in the previous sections.

migrants in the sample. The most important reason for migration is the search for a better job,[13] accounting for 53.3 percent of the reasons stated by migrants, and 50.3 percent among past migrants (who returned more than 12 months prior to the survey). The second reason is study, especially among internal migrants. Study, on the one hand, could be the first step towards long-term migration; on the other, it could be due to the unavailability of higher education in rural areas. As the major universities in Senegal are concentrated in the Dakar and Saint-Louis regions, it is common for young people to migrate to those two regions for tertiary education.

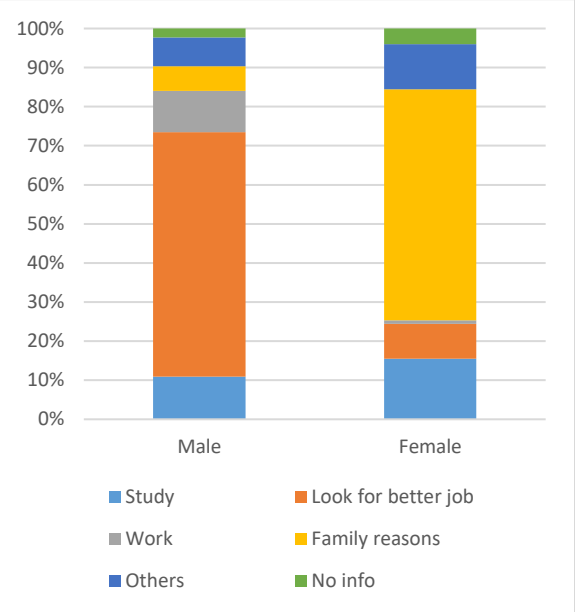
Figures 7.2 and 7.3 present the statistics differentiated by gender. Men and women migrate for different reasons. For men, the principle reason is to look for a better job (61.3% of migrants, 62.6% of past migrants). For women, family is the reason for almost one in three migrant women (32.5%); the share rises to 59.1 percent for past migrant women. In contrast, family reasons concern 4.4 percent of male migrants and 6.3 percent of men who are past migrants.

Figure 7.2 Reasons for migration of migrants – by gender



Source: FAO, 2018

Figure 7.3 Reasons for migration of past migrants (return more than 12 months) – by gender



Source: FAO, 2018

Note: "Work" includes "Assignment/Employment opportunity", "Seasonal work opportunity", "Civil or military war". "Family reasons" includes "Joining spouse/marriage", "Death of spouse", "Family problems", "Joining other members of the household". "Others" includes "Non-possession of or insufficient cultivable land", "Poor quality of land or degraded land", "Health problems", "Drought", "Floods", "Inadequate access to social protection/social benefits such as healthcare benefits, pension benefits", "Education of children", "Security reasons/crime" and "Other".

Determinants of migration from multivariate regressions

The methodological analysis and multivariate regressions of the determinants of migration are presented in Tables H1 and H2 in Appendix H. Overall, the effects are of expected signs. Of the econometric findings

[13] Note that there is a difference between "look for a better job" and "work". The latter refers to people migrating in order to take up a job opportunity already available to them at destination, while the former refers to people who need to find a job on arrival at destination.

presented in this subsection, the most persistent results regarding the determinants of rural migration in Senegal are as follows:

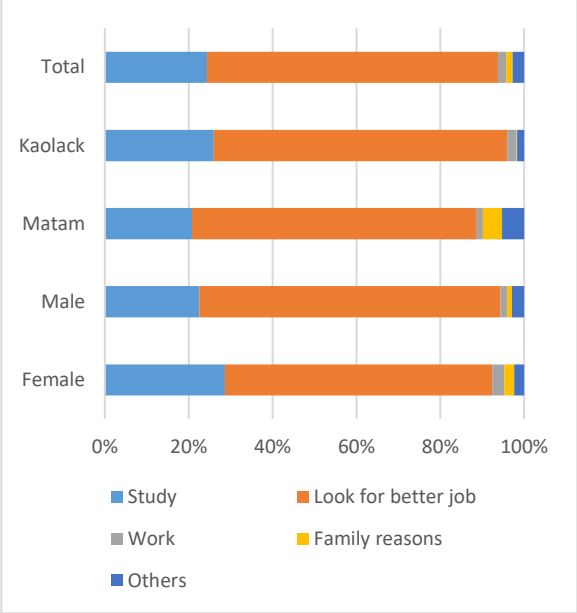
- Women are less likely than men to migrate. This might be due to an existence of cultural norms or social discrimination constraining female emigration (e.g. a woman requires permission to migrate or must be accompanied by a male family member; girls and women have less access to the schooling or employment opportunities that facilitate migration; or traditional norms which see men as the main breadwinners and assign women to taking care of household).
- On average, the propensity for migration is highest in the 25–34 age group. The 15–24 years group are more likely than those of age less than 15 years to migrate. The probability rises through to 25–34 years, then falls as individuals reach older age groups. The youth factor is more significant for predicting the probability of internal migration than international migration. The latter is sometimes associated with increased difficulty and a stepwise migration strategy may emerge in this context. Domestic migration can be the first step towards migration abroad, as people constantly look for better employment opportunities as they get older. Based on nationally representative samples for 138 countries collected by the Gallup World Poll from 2007 to 2017, FAO (2018) shows that across all country income groups, the share of people planning to migrate internationally is higher for those who have moved internally in the past compared to those who have not. Finally, no clear age pattern emerges among seasonal migrants.
- High correlation exists between the effects of age and the effects of marital status. Since young people aged 15–24 are more likely to be single and those aged 25–34 are more likely to be married in monogamy, it is not surprising that marital status affects migration in the same order as age does.
- Ethnic group does not significantly affect the propensity to migrate.
- Migrants seem to be concentrated in the two extremes of education level, with tertiary education having the most statistically significant effect on the probability of being migrants. In a comparison between internal and international migrants, tertiary education only significantly affects internal migrants. This is the result of migration to other regions for study – as suggested by the descriptive statistics in Section 5. In addition, having a higher education degree could increase the probability of remaining in urban areas after study.
- Being the eldest offspring in the household significantly increases the probability of migrating internally.
- Household size does not have a significant effect on migration in the multivariate regression.
- Having at least one past migrant in the family positively affects the probability of other members migrating.
- Migrant network proxied by the share of total migrant households in the PSU significantly increases the chance to migrate, especially for seasonal and international migrants.
- Distance to the nearest border has a significant effect on seasonal migration.
- Matam as the region of origin significantly decreases the probability of becoming seasonal migrants and increases the probability of being international migrants.
- Wealth positively impacts the chance to migrate abroad.

7.2. Determinants of potential migration

This subsection analyses the factors leading people to develop a desire for migration. All individuals in the sample were asked whether they would like to migrate. The replies were: 68.6% "No", 10.8% "Yes", 20.6% "Don't know" (or no answer). Among the 10.8 percent wishing to migrate, 1.6 percent have already been migrants at some point, either currently or in the past. The study considers only the remaining 9.2% to be potential migrants, i.e. non-migrants who would like to migrate. Willingness to migrate is the first step towards migration. The causes of the aspiration to migrate contribute to the determinants of migration. Using the information on migration aspirations from the Gallup World Poll survey, Bertoli and Ruyssen (2018) demonstrate a high correlation between migration flows in a given year and migration aspirations in the previous year.

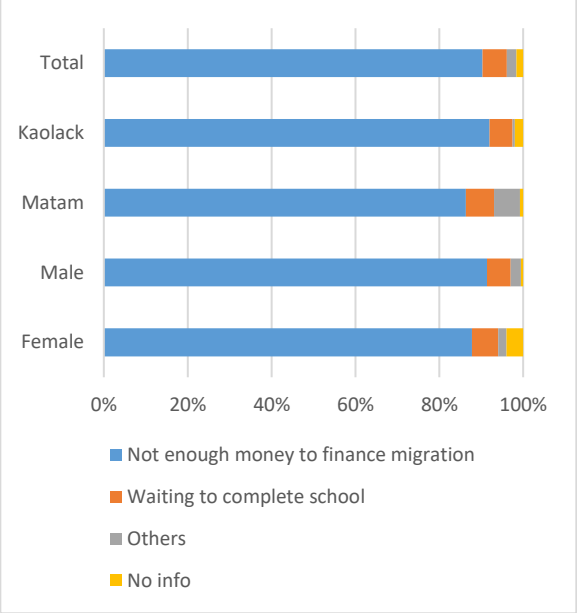
Declared reasons for willingness to migrate of non-migrants

Figure 7.4 Reasons for willingness to migrate of non-migrants



Source: FAO, 2018

Figure 7.5 Reasons for not yet having migrated



Source: FAO, 2018

Note: In Figure 7.4, "Work" includes "Assignment/Employment opportunity", "Seasonal work opportunity", "Civil or military war". "Family reasons" includes "Joining spouse/marriage", "Death of spouse", "Family problems", "Joining other members of the household". "Others" includes "Non-possession of or insufficient cultivable land", "Poor quality of land or degraded land", "Health problems", "Drought", "Floods", "Inadequate access to social protection/social benefits such as healthcare benefits, pension benefits", "Education of children", "Security reasons/crime" and "Other". In Figure 7.5, "Others" includes "Do not have a passport, birth certificate or other necessary documents", "Anxious about not knowing anyone at destination", "The rest of the family does not approve", "Concerned about not having access to social assistance (unemployment benefits, healthcare, and school expenses)" and "Other".

The descriptive statistics in Figure 7.4 pointed to the search for a better job as the major reason for migration willingness among non-migrants, accounting for 69.4 percent of all reasons. No major difference between regions and gender is notable in this regard. Study is in second place, especially among people from Kaolack and among women. Figure 7.5 details the reasons why non-migrants have not yet migrated. Almost 90 percent of the declared reasons for not yet migrating are lack of financial capacity

("not having enough money to migrate"), followed by waiting to complete current studies – cited by a mere 6 percent.

Determinants of potential migration from multivariate regressions

Table H3 in Appendix H presents the results of the Probit estimations. The principal results from the regressions on an individual's propensity to emigrate are as follows:

- Women are less likely than men to develop a willingness to migrate.
- Young people aged 15–34 express a strong desire to migrate.
- Single people (including those who have never been married, and those who are widowed, separated or divorced) are more likely to express a willingness to migrate, while it is not the case with married individuals.
- Ethnic status does not impact on the willingness to migrate.
- People of all education groups below tertiary education (i.e. primary, secondary, high schools) express a significant desire to migrate. Tertiary education does not significantly affect migration willingness. Two explanations can be provided. The first one is probably because those with this education level have already migrated and very few of them remain, which leads to the difficulty in finding statistical significance on this dummy variable. This also suggests the existence of a barrier associated with migration, which tends to be higher for the less educated. The second reason could be that those with tertiary education can get already access to better paid jobs at home due to their high educational level.
- Being the eldest child in the family slightly increases the willingness to migrate.
- Compared to the inactive, all individuals in unemployment, in study, with farm/non-farm jobs and others strongly express the intention to migrate. We do not find statistically significant willingness to migrate among the professionals.
- Household size, the share of members engaged in agriculture, region and level of wealth do not have a significant impact on the intention to migrate.
- Having a past migrant in the household, share of migrant households in the living PSU area and proximity to closest border (measured in minutes of travel) positively affect individuals' willingness to migrate.

This subsection complements and deepens the analysis of the drivers of rural migration in the previous subsection 7.2. The main and most consistent results suggest that being young is the strongest determinant of migration – in terms of both decision and realization – to seek a better job outside the rural areas of origin.

7.3. Determinants of return migration

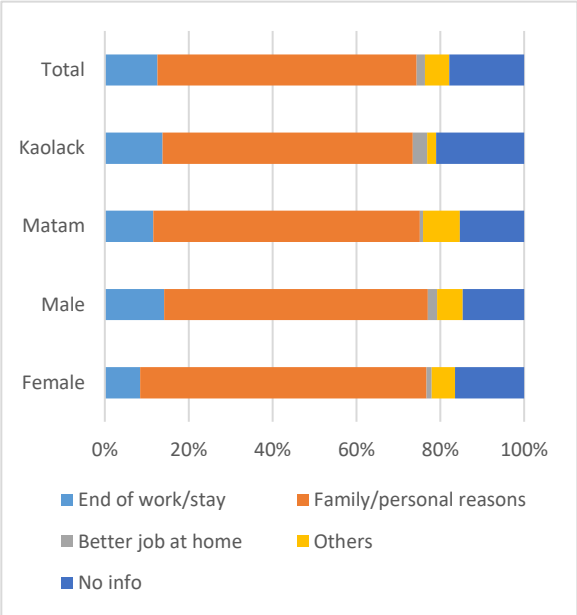
This subsection offers a glimpse at the factors leading migrants to return to their area of origin. Indeed, the questionnaire was not designed for in-depth study of return migration. There are a limited number of questions on the migrants' experience in the destination areas (about employment sector and status). Nonetheless, the survey contains a wealth of information on the migrants themselves and the families living in the areas of origin. Factors including education, age, number of dependants in the family and accumulated wealth level at home are relevant for explaining the migrants' decision to return (Gibson and McKenzie, 2009; Groen and Polivka, 2010; Makina, 2012; De Haas, Fokkema and Fihri, 2015; Junge, Diez

and Schätzl, 2015). The study considers migrants who have returned regardless of when (i.e. more or less than 12 months prior to the survey); it also considers separately those who returned more than 12 months prior to the survey, since they are more likely to have settled permanently in their area of origin.

Declared reasons for return migration

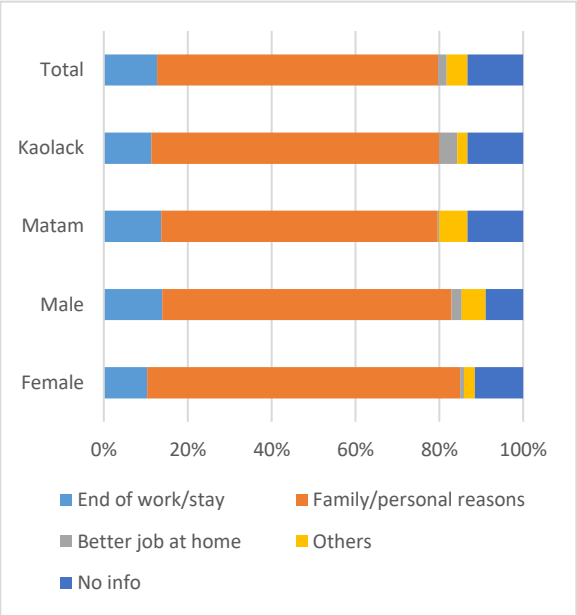
One question asking why migrants returned to their area of origin reveals family and/or personal reasons (marriage, homesickness) to be among the main causes of return migration (Figures 7.3 and 7.4), accounting for a consistently high share: 61.8 percent among all past migrants and 67.1 percent among those who returned more than 12 months prior to the survey. More or less similar shares are found in each region and for both genders. The second most frequent reason is the end of work or stay in the destination area (12.6% for both groups of migrants). Interestingly, "better employment at home" accounts for a very small share – 2 percent – of all the reasons for return. This statistic suggests that the economic conditions in the two rural areas are not an incentive for emigrants to go back.

Figure 7.3. Reasons for return of past migrants (both more than 12 months and less than 12 months)



Source: FAO, 2018

Figure 7.4 Reasons for return of past migrants (only more than 12 months)



Source: FAO, 2018

Note: "End of work/stay" includes "Job ended", "Could not obtain a working contract there", "Visa/Work permit/Residence permit expired", "Was expelled". "Family/personal reasons" includes "Family reasons", "To get married", "Homesickness". "Others" includes "Have saved enough", "No longer have financial capacity" and "Other".

Determinants of return migration from multivariate regressions

The regressions for the determinants of return migration are presented in Table H4 in Appendix H. The results of the factors affecting the probability of a migrant becoming a returnee are as follows:

- Gender does not significantly affect the chance of migrating back. There was just a small negative effect of being female on return migration.
- Compared to the oldest group (of age more than 65 years), younger migrants are less likely to return to their area of origin.
- Being married (whether in monogamy or polygamy) is a major cause for a migrant to return home.

- Migrants in the Pular and Wolof/Lébou groups are more likely to return than those in the Sérer group.
- Tertiary education strongly reduces the propensity for return migration, implying a brain drain phenomenon in the two rural areas studied.
- During the period of migration, all migrants in unemployment or study, with farm or non-farm jobs or at higher occupation levels are less likely to return home than the inactive. This variable concerning the employment status of all migrants should be interpreted with caution, because the information regarding current and past migrants does not refer to a single period and could, therefore, be influenced by a macro situation fluctuating with time.
- The bigger the household, the less likely a migrant member is to return.
- Of the two variables capturing the number of dependents at home, only the number of children aged less than 15 years has a positive effect on return migration, while the number of elderly aged more than 65 years does not. The former may correlate with the fact that returnees are more likely to be married and to have established families with children. For the latter, it is also suggestive that care of elderly people is implicitly assigned to members that do not migrate.
- The migrant network exerts a negative effect on the probability of return. It points to the existence of communities of migrants in destination areas, facilitating the integration of migrants, improving their well-being and reducing the need to move back home.
- Region of origin does not affect the probability of return. The effect of this variable may have been absorbed by the ethnicity variable: Pular migrants (mostly from Matam) and Wolof/Lébou migrants (mostly from Kaolack) are more likely to return.
- Household wealth has a positive effect on the decision to return though statistically significant in one specification only. This finding is in line with the hypothesis that migrants return home once enough wealth has been accumulated.

8. Conclusion and policy recommendations

Based on the various dimensions of analyses presented in the study, it may be concluded that the most **statistically significant variables for the probability of migrating** are:

- sex (male);
- age (youth 15–34 years);
- marital status (single or married in monogamy);
- existence of a large migrant network; and
- family of origin (well-off families – in particular for international migrants).[14]

Overall, **the search for a better job is the main driver of the desire of the rural population in Senegal to migrate, especially among young people.**

The same strong, positive effects of gender, age, network and the search for a better job also determine the willingness to migrate of potential future migrants, while returnees principally move back home because of family and for personal reasons. A better job at home rarely exists and the most educated are less likely to return.

The results indicate that Senegalese rural areas tend to lose the younger and more skilled members of the workforce. This poses a major problem with regard to the adoption of new technologies in agriculture; moreover, the exodus could threaten the vitality of the entire economy of rural areas.

The data also reveal that **agriculture is the largest employment sector in the two surveyed areas**. Most individuals are contributing family workers. This suggests that the majority of the population relies on small-scale subsistence agriculture. Other income-generating activities related to agriculture, such as processing or trade of agricultural products, are very rare. The potential of non-farm sectors has yet to be fully exploited. All these elements point to a **lack of decent and stable income-generating activities in rural areas**.

Policies need to be more targeted at young people in rural areas. There are few economic opportunities: therefore, the search for economic opportunities is a major determinant of rural emigration. Existing research in sub-Saharan Africa shows that migrants from rural areas tend to join the informal sector in large cities, contributing to the growth of the "urban poor" population. Africa's urban space is not either sufficiently dynamic to provide decent jobs for migrants.

To encourage youth participation in rural economy, rural areas must be made more attractive. The solution to this problematic requires **multisectoral policies**. Their objectives should be to create decent and well-paid agricultural and non-agricultural jobs; foster productivity in both farm and non-farm activities; establish larger value chains; support youth to access input/output markets and financial services. By providing support to a new generation of agro-entrepreneurs through job creation and agro-entrepreneurial opportunities, Senegal will be able to: minimize the negative impacts of massive emigration; limit pressure on urban labour markets; and harness the development potential of a young, active and growing population to revitalize the rural economy. In addition, youth should have universal

[14] However, these results must be interpreted with caution because of the endogenous effects of migration with wealth.

access to the health and education services that are needed to break the intergenerational transmission of poverty. The enhancement of food security and reduction of rural poverty will alleviate the pressures of distress migration.

Exploiting the development potential of migration is also important. Return migrants and the diaspora have improved access to knowledge, information and financial resources; this could be used to invest productively in the rural economy, supporting job creation and development in the regions of origin.

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Appendix A - Sampling weights

Calculation of the draw probability of a primary sampling unit (PSU)

The survey covers 67 primary sampling units ("districts de recensement" in French), 39 of which are in the rural area of Kaolack and 28 in the rural area of Matam. A systematic draw of PSUs in each region (in rural areas) was carried out, with probabilities proportional to the size of the PSU (size being the number of households per PSU). PSUs were drawn independently in each region. The probability of drawing a PSU is calculated independently in each region. It is calculated as follows:

$$P_{hi} = \frac{N_h * M_{hi}}{\sum M_{hi}}$$

where:

P_{hi} is the probability of selecting the PSU i of the region h;
N_h is the number of PSUs to be drawn in the region h;
M_{hi} is the number of households in the PSU i of region h.

Calculation of the draw probability of a household

The household draw took place after listing all the households in each drawn PSU. The listing provides all the information concerning the migration situation of each household. For the purposes of selecting households in the survey, five subgroups of households were identified in each PSU:

- Households with migrants receiving family allowance;
- Households with international migrants without family allowance;
- Households with internal migrants without family allowance;
- Households without migrants receiving family allowance;
- Households without migrants and without family allowance.

A systematic draw in each subgroup in each PSU was performed. This means that all households in the same subgroup have the same chance of belonging to the sample. The number of households to be drawn varies according to the size of the subgroups. The probability of drawing a household within a PSU is:

$$P_m = \frac{m_{ki}}{M'_{ki}}$$

where:

m_{ki} is the number of households drawn in the subgroup k of the PSU i;
M'_{ki} is the total number of households in the subgroup k of the PSU i.

Calculation of household and individual sampling weights

The household sampling weight is the inverse of the product of the probabilities of probing. It is calculated for each household according to the following formula:

$$P_m = \frac{1}{P_m * P_{hi}}$$

The weight of the individual k_{ihs} is obtained by multiplying the weight of the household by the number of household members.

Generation of replicate weights

A set of replicate weights for the data set is created to accompany the Jackknife variance estimator. Each set of replicate weights is calculated by deleting one PSU (i.e. setting the sampling weights for observations in that PSU to zero), and then adjusting the sampling weights for the remaining observations to reproduce the full-sample totals. The number of replicate weights is thus equal to the number of PSUs.

Appendix B - Employment variables

To construct the variables of employment, the definition in the current guidelines of the International Labour Organization is referred to, taking into consideration the resolution concerning statistics of employment adopted by the 19th International Conference of Labour Statisticians (ICLS) in October 2013.

Four categories of employment:

- Employment: all those of working age greater than or equal to 15 who, in the 12 months prior to the survey, were engaged in any activity involving the production of goods or provision of services for pay or profit.
- Unemployment: those aged greater than or equal to 15 who during the 12-month period were:
    - without work, i.e. not in paid employment or self-employment;
    - currently available for work; and
    - seeking work, i.e. had taken specific steps in a specified recent period to seek paid employment or self-employment.
- Inactivity: those not in the labour force, i.e. not working and not seeking work.
- Study: those declared as being so rather than in employment.

Five categories of people in employment:

- Employees: waged and salaried workers.
- Self-employed workers (divided into four subcategories):
    - Employers: those who hold self-employment jobs (i.e. whose remuneration depends directly on the [expectation of] profits derived from the goods and services produced) and engage one or more person to work for them as employees on a continuous basis.
    - Own-account workers: those who do not engage any employees on a continuous basis.
    - Members of producers' cooperatives: those who hold self-employment jobs in a cooperative producing goods and services.
    - Contributing family workers: those who work in a market-oriented establishment operated by a related person living in the same household.

According to the 19th ICLS in October 2013, those engaged in the production of goods, mainly or exclusively intended for final use by the household or family (e.g. production and processing of goods from agriculture, fishing, and hunting and gathering), are no longer considered to be in employment; they are measured separately as persons engaged in specific forms of work. Employment refers exclusively to work performed for others in exchange for pay or profit. Herein, however, due to the data limitation, this definition is not applied: all contributing family workers are still considered to be in employment. The survey does contain a question asking whether 50 percent of family production is market-oriented. However, this variable contains many missing values and does not allow to precisely construct the employment variable in line with the 19th ICLS.

Five categories of activities:

- Farm work: planting, fishing, husbandry.
- Processing of agricultural products: skin tanning, milk production, juice processing.

- Sale of agricultural products: sale of all agricultural products processed or not (crops, fish, meat, live animals, frozen donuts, ice cream, fish, fruit etc.); tobacco vending; collection and sale of wood/coal.
- Non-farm activities: transport of goods and persons (truck/car/bus/taxi driver – carrier of agricultural and non-agricultural products); commerce (trader, shopkeeper of non-agricultural products); vehicle repair (mechanic, vulcanizer); masonry, construction, bricklaying and sand collection; artisanry (cobbler; manufacturer of household utensils, agricultural tools, pots and pottery; repairman; weaver of mats, fabrics, tents and carpets; dressmaker; dyer); hairdressing; domestic service (boy or housemaid); factory work; security (guard).
- Professional jobs: teacher, public officer, nurse, doctor, lawyer, bank employee.

Appendix C - Income variables

The methodology is based on the resolution concerning household income and expenditures statistics adopted by the 17th ICLS. This includes data on the various sources of income. Total household income is composed of the income from wage employment (both agricultural and non-agricultural), self-employment, crop and livestock production, fishery and forestry activities, transfers, and other sources of income such as non-labour earnings. The various income components are detailed below:

- **Employee income:** an employee's compensation received in either cash or kind from primary, secondary and any additional jobs held in a 12-month period, including benefits received from the employer.
- **Total revenue from crop-related activities:** the sum of: i) revenues from crop production and ii) revenues from by-products. Income from crop production is equal to the monetary value of the total quantity harvested minus operating costs. The value of the total quantity harvested is the value of the crop sold/consumed by the household. Operating costs comprise all variable costs (payments in cash and kind of agricultural inputs such as fertilizer and seeds, and occasional labour) and fixed costs (hired labour, land rent and technical assistance costs). The survey does not collect information on by-products and crop waste. Using the crop sales, the median unit price for every crop unit is estimated at the different geographic and sample levels (village, commune, department and region).
- **Total revenue from livestock activities:** the monetary values of i) livestock products (tradable outputs such as meat, skins, milk, eggs and honey) and ii) by-products (non-tradable outputs, such as dung/manure and draught power). Gross income from livestock activities is equal to the sales of livestock heads minus purchases of livestock heads and the total value of additional cash expenditures incurred for obtaining livestock production, including hired labour and technical assistance. The monetary value of products and by-products includes the value, not only of the sale of products and by-products, but also of own consumption of products and by-products, minus the total value of production expenditures, including land, labour, services received, additional input and transport. Since the value of own consumption is not specifically asked in the questionnaire, it is estimated using the methods described for crop production, i.e. the price of each livestock is the median of livestock sales at the different geographic and sample levels (village, commune, department and region).
- **Income from non-farm enterprises:** the net benefit following the deduction of all expenditures on inputs, salaries and other costs.
- **Income from transfers:** private and public transfers received by the household, in both cash and kind. Private transfers refer to: incoming remittances and benefits from private organizations and/or associations. Public transfers are divided into: state-funded pensions and social benefits, including welfare support, maternity benefits and educational transfers.

Net income (whether of each income source or in total) is potentially negative if expenses are higher than revenues. Negative values of net incomes become problematic when calculating the share of a specific income source over the total income. The FAO Rural Livelihoods Information System (RuLIS) suggests setting to zero all negative income values in the income components and considering only positive income when computing shares. However, in the survey's data set, 12.7 percent of households have negative agricultural income, and 5.5 percent have negative total income. If the RuLIS recommendation is followed, there is a risk of losing a large amount of information. Therefore, in order to construct the variable of

agriculture's contribution to a household's total income, only gross values are used, corresponding to the inflow of revenues, without considering the outflow of revenues.

Appendix D - Wealth index

The wealth index is a composite variable generated by principal component analysis (PCA). The inputs are derived from information on house ownership, housing quality (including access to basic facilities) and ownership of durable goods. Table D.1 details all the variables constructed to estimate the wealth index, as well as their statistics and a comparison between the different types of migration. Four mutually independent components are generated by PCA. Only the first one is retained; it captures the highest variation.

House ownership (owned, rented or assigned under rent-free agreement):

- Of all the households in the sample, 94 percent own their house. No difference emerges between the average household and those with internal, international or seasonal migrants.

Housing quality:

- Number of rooms per household member: calculated as the ratio of the total number of rooms in the dwelling over the number of household members, excluding migrants living outside the household at the time of the survey. Migrant households have a significantly higher number of rooms per member than the average household (0.48 vs 0.54 rooms/person).
- Non-dirt floor: mainly made of wooden planks, parquet, vinyl, ceramic tiles, brick tiles, cement and/or carpet. Dirt floors are made of mud, earth or raw stone. This limited information about the floor materials is unlikely to be sufficient to fully reflect the quality of the floor. Households with international migrants have a significantly higher probability of having a non-dirt floor than do households with internal migrants (82% vs 72%).
- Durable wall: mainly made of cement, stone with lime/cement, bricks or cement blocks. A non-durable wall is made of materials such as canes, tree trunks, sod, mud and stones, plywood, cardboard, refused wood, wooden planks or shingles. Households with international migrants have a higher probability of having durable walls than do households with internal migrants (74% vs 67%).
- Durable roof: mainly made of corrugated iron sheets, brick tiles, metal (harvey) tiles or asbestos sheets. A non-durable roof is made of thatch grass and wood. The share of migrant households possessing a durable roof is significantly higher than that of the average population (72% vs 66%). The share is even higher among households with international migrants compared to those with internal migrants (78% vs 69%).
- Toilet system in dwelling: household has sewage system (flush toilet), own pit latrine or own ventilated improved pit (VIP). The opposite category is when households declare to have no toilet or to use a bush or a public/shared toilet. No difference between different types of household is detected.
- Electricity: household has access to electricity. A significant difference is found between households with international and internal migrants (46% vs 34%).
- Water on premises: source of drinking water is piped water. The opposite category is when the source of drinking water is from a well, hand-pumped tube well, spring water or river. Of all migrant households, 68 percent have water on the premises compared with 63 percent of total households.

Possession of durable goods (variables take a value of 1 if one of the household members possesses the corresponding items; otherwise, the value is 0):

- Telephone: mobile phone, smartphone, fixed phone. Mobile phone coverage is very high in Senegal. Major differences are found between households of different types. International migrant households are more likely than the average migrant household to have a smartphone and fixed phone.
- Computer. A significant difference is found between households with international and internal migrants (8.3% vs 4.5%).
- TV. No major difference is found between different types of migrants.
- Radio. Migrant households are more likely than the average household to possess a radio (65% vs 59%).
- Motor vehicle and bicycle. No major difference is found between different types of migrants.

Table D.1 Variables used to calculate the wealth index and comparison between average households and migrant households

Variables	(1) Total population			Migrants / Household with migrants											Pr (|T| > |t|)		
				(2) Total			(3) International			(4) Internal			(5) Seasonal			(1) vs (2)	(3) vs (4)	(2) vs (5)
	Obs	Mean	Sd	Obs	Mean	Sd	Obs	Mean	Sd	Obs	Mean	Sd	Obs	Mean	Sd			
House ownership	994	0.94	0.24	647	0.92	0.26	282	0.91	0.29	503	0.93	0.25	164	0.91	0.28	0.1938	0.1739	0.6804
No. of rooms / household member	994	**0.48**	0.29	647	**0.54**	0.36	282	0.57	0.41	503	0.53	0.35	164	0.49	0.28	**0.0004**	0.2202	0.0572
Non-dirt floor	994	0.76	0.43	647	0.75	0.43	282	**0.82**	0.39	503	**0.72**	0.45	164	0.73	0.45	0.6092	**0.0012**	0.6143
Durable wall	994	0.67	0.47	647	0.69	0.46	282	**0.74**	0.44	503	**0.67**	0.47	164	0.67	0.47	0.3318	**0.0362**	0.6063
Durable roof	994	**0.66**	0.47	647	**0.72**	0.45	282	**0.78**	0.41	503	**0.69**	0.46	164	0.67	0.47	**0.0177**	**0.0049**	0.3100
Toilet system	994	0.41	0.49	647	0.40	0.49	282	0.39	0.49	503	0.41	0.49	164	0.36	0.48	0.9614	0.6165	0.3483
Electricity	994	0.34	0.47	647	0.37	0.48	282	**0.46**	0.50	503	**0.34**	0.48	164	0.48	0.48	0.1999	**0.0011**	0.6209
Water on premises	994	**0.63**	0.48	647	**0.68**	0.47	282	0.73	0.44	503	0.68	0.47	164	0.70	0.46	**0.0166**	0.1042	0.6888
Mobile phone	994	0.92	0.27	647	**0.91**	0.28	282	0.89	0.31	503	0.93	0.26	164	**0.96**	0.20	0.6046	0.0856	**0.0295**
Smartphone	994	**0.18**	0.39	647	**0.23**	0.42	282	**0.30**	0.46	503	**0.22**	0.41	164	0.18	0.39	**0.0173**	**0.0088**	0.1519
Fixed phone	994	0.01	0.11	647	0.01	0.10	282	**0.03**	0.18	503	**0.01**	0.08	164	0.01	0.07	0.8337	**0.0196**	0.4731
Computer	994	0.04	0.20	647	0.05	0.22	282	**0.08**	0.28	503	**0.05**	0.21	164	0.06	0.24	0.3015	**0.0497**	0.7309
TV	994	0.26	0.44	647	0.29	0.46	282	0.34	0.47	503	0.29	0.45	164	0.28	0.45	0.132	0.1818	0.7563
Radio	994	**0.59**	0.49	647	**0.65**	0.48	282	0.65	0.48	503	0.65	0.48	164	0.67	0.47	**0.0147**	0.9645	0.5106
Motor vehicle	994	0.05	0.23	647	0.05	0.23	282	0.06	0.24	503	0.05	0.23	164	0.08	0.27	0.9851	0.8026	0.3237
Bicycle	994	0.05	0.21	647	0.05	0.22	282	0.05	0.22	503	0.05	0.22	164	0.07	0.25	0.7665	0.9905	0.4076

Note: With the exception of the variable "No. of rooms per household member", all variables are binary: value of 1 if "Yes" and 0 if "No". Statistics in bold indicates significance at 95% confidence level.

Appendix E - Food insecurity experience scale (FIES)

The survey includes a special food insecurity experience scale (FIES) module. The FIES concept and methodology were developed by FAO. The FIES module comprises eight questions to gauge the severity of people's lack of access to adequate food:

With reference to the last 12 months:

1. Were you or others in your household worried about not having enough food to eat because of a lack of money or other resources?
2. Was there a time when you or others in your household were unable to eat healthy and nutritious food because of a lack of money or other resources?
3. Was there a time when you or others in your household ate only a few kinds of foods because of a lack of money or other resources?
4. Was there a time when you or others in your household had to skip a meal because there was not enough money or other resources to get food?
5. Was there a time when you or others in your household ate less than you thought you should because of a lack of money or other resources?
6. Was there a time when your household ran out of food because of a lack of money or other resources?
7. Was there a time when you or others in your household were hungry but did not eat because there was not enough money or other resources for food?
8. Was there a time when you or others in your household went without eating for a whole day because of a lack of money or other resources?

An algorithm takes the data collected from the survey as inputs and generates a continuous scale from 0 to 8, i.e. from the lowest to the highest level of food insecurity. Calibrating the scales on a common metric ensures comparability between countries and subpopulations. Nevertheless, the comparison needs to be made with an awareness of nuances in translation and of the different ways that food insecurity is experienced and managed in diverse cultures and livelihood systems.[15]

[15] For more information, please see http://www.fao.org/in-action/voices-of-the-hungry/using-fies/en/

Appendix F - Comparison tests of descriptive statistics

$$\begin{cases} \text{Ho: diff} = 0 \\ \text{Ha: diff} \neq 0 \end{cases}$$

Table F.1 Characteristics of individuals and households – migrant or non-migrant, comparison tests

Variables	(1) Total population			Migrants / Household with migrants												Pr(|T| > |t|)		
				(2) Total			(3) International			(4) Internal			(5) Seasonal			(1) vs (2)	(3) vs (4)	(2) vs (5)
	Obs	Mean	Sd	Obs	Mean	Sd	Obs	Mean	Sd	Obs	Mean	Sd	Obs	Mean	Sd			
Age	10 374	**23.06**	18.54	1 369	**31.72**	13.59	441	**40.61**	15.35	967	**29.43**	12.27	214	**34.20**	12.93	**0.0000**	**0.0000**	**0.0100**
Year of education	10 370	**2.00**	3.82	1 369	**3.69**	5.70	441	**2.21**	4.51	967	**4.06**	5.89	214	4.11	5.61	**0.0000**	**0.0000**	0.3108
HH size (including migrants)	999	**9.95**	4.77	652	**10.84**	5.26	284	11.27	5.68	507	10.89	5.36	164	11.44	4.41	**0.0005**	0.3636	0.1357
Share of agric. in annual gross income (%)	919	**61.54**	39.69	603	**56.45**	38.99	258	**48.27**	40.06	473	**58.86**	38.25	157	**65.66**	34.45	**0.0137**	**0.0006**	**0.0041**
Share of HH mem. aged more than 15 year old in agriculture (%)	999	**50.73**	33.20	652	**42.20**	28.35	284	**31.06**	27.41	507	**44.82**	27.26	164	**55.88**	24.94	**0.0000**	**0.0000**	**0.0000**
Agric. land size (ha)	999	16.60	80.45	652	21.45	93.37	284	27.19	112.28	507	21.85	93.43	164	24.81	99.94	0.2764	0.4967	0.6977
No. of variety of crops and livestock	999	3.33	2.36	652	**3.22**	2.36	284	**2.77**	2.06	507	**3.39**	2.40	164	**3.90**	2.44	0.3571	**0.0002**	**0.0015**
Food insecurity raw score	999	3.70	3.10	652	3.69	3.14	284	**3.15**	3.35	507	**3.88**	3.08	164	3.63	3.02	0.9226	**0.0028**	0.8446
Wealth index	994	**3.30**	1.80	647	**3.51**	1.79	282	**3.88**	1.83	503	**3.41**	1.80	164	3.38	1.78	**0.0233**	**0.0006**	0.4171
Having electricity (%)	994	31.77	46.58	647	35.72	47.95	282	**43.81**	49.70	503	**32.83**	47.01	164	31.94	46.77	0.0993	**0.0026**	0.3591
Time to nearest public transport (minutes)	999	15.42	18.25	652	15.12	16.63	284	**12.98**	14.39	507	**15.63**	17.11	164	14.36	17.40	0.7280	**0.0209**	0.6125
Having past migrants in the family (%)	999	**31.82**	46.60	652	**39.01**	48.82	284	42.72	49.55	507	39.92	49.02	164	42.27	49.55	**0.0029**	0.4454	0.4506
Share of mig. HH in PSU (%)	999	**29.62**	18.70	652	**33.09**	19.12	284	**36.96**	17.14	507	**32.23**	19.33	164	33.59	20.04	**0.0003**	**0.0004**	0.7740

Note: Statistics in bold indicates significance at 95% confidence level.

Appendix G - Methodology of the multivariate regressions

Econometric regressions are performed to determine all the factors significantly affecting the probability of being a migrant, an internal/international/seasonal migrant, a potential migrant and a return migrant. The set of explanatory variables captures various characteristics of individuals, households and communities. The drivers of migration can be defined as the forces that induce and perpetuate migration.

Dependent variables

The outcomes are obtained from five binary variables to determine whether or not an individual belongs to one of the following categories:

- **Migrant** – has been or was living outside the household during the 12-month period prior to the survey. Migrants who returned during this period are included in this category because they might have returned temporarily and the socio-economic situation of the household over the past 12 months still influenced their migration.
- **Internal migrant** – a migrant according to the definition above and whose migration destination is in an area inside the Senegalese territory.
- **International migrant** – a migrant according to the definition above and whose migration destination is in an area outside the Senegalese territory.
- **Seasonal migrant** – is declared to migrate for seasonal jobs or study during a fixed period of less than 9 months every year. Seasonal migrants may be internal or international migrants; therefore, seasonal and internal/international are not mutually exclusive categories.
- **Potential migrant** – a non-migrant expressing a willingness to migrate.
- **Returnee** – a migrant who returned more or less than 12 months prior to the survey.

If individuals correspond to these categories, the binary variables take a value of 1; otherwise, they take a value of 0.

Explanatory variables

The explanatory variables capture individual characteristics and household characteristics. They are used in the multivariate regressions to explain emigration propensity and return probability. These variables are basically those shown in Sections 5 and 6 offering descriptive statistics on univariate correlations. The inclusion of an independent variable in one regression or another depends on its relevancy in explaining the type of migration being studied.

Variables of individual characteristics:

- **Gender**: male or female. Being female is expected to be negatively correlated with the probability of being a migrant – as suggested by the descriptive statistics in Section 5.
- **Age group**: ≤ 15, 15–24, 25–34, 35–44, 45–54, 55–64, and ≥ 65 (adopting DESA's common classification of 10-year-interval age groups). In the case of Senegal, higher migration propensity is expected among the young population, especially those aged 20–34 years, as shown in the latest population census, RGPHAE 2013. Many studies on the determinants of migration only

consider the adult age group[16] in order to capture the determinants of the decision to migrate (a decision that can only be made by people of adult age). In contrast, this study considers all age groups, because the purpose is to capture the propensity to migrate and not merely the decision. Moreover, a migration decision can be taken at household level according to the new economics of labour migration (NELM), and not only at individual level. As in many countries in sub-Saharan Africa, child fostering is widespread in Senegal (Beck *et al*., 2015): children are sent to live with a host family that has better means to rear the children or requires workforce to do domestic chores. Lack of school facilities in rural areas is another potential reason for sending out children. The group aged less than 15 years is set as a base for the age variable because it comprises the largest number of observations, which could help to reduce standard error and decrease confidence interval width of other category coefficients. Young adults aged 15–24 are expected to be the most prone to migrate. Existing studies in Matam and Kaolack show that migration can be considered a "rite of passage" from childhood to adulthood, helping young people to build their identities.[17]

- **Marital status**: single; married in monogamy; married in polygamy; widowed, separated or divorced; and information not relevant for individuals aged less than 15 years.
- **Ethnicity**: Pular; Wolof/Lébou; Sérer; and other ethnic groups. Since the ethnic group of migrants does not differ from that of the origin population – as seen in Section 5 – this characteristic is not expected to have a significant effect on the chance of being migrant.
- **Education**: no education; primary school; secondary school; high school; and tertiary education. The education variable is based on the highest level of education reached. According to the most recent population census, RGPHAE 2013, migrants are concentrated at the two extremes: no education and tertiary education.
- **Eldest offspring**: eldest (or not) child of household head. This binary variable is expected to increase an individual's probability of participation in migration for economic reasons. Elder children are usually expected to help the household head to improve the family's means of subsistence. This factor significantly affects migration in Senegal (Chort, De Vreyer and Zuber, 2017) and in Mexico (Bratti, Fiore and Mendola, 2016).
- **Employment situation**: inactive; unemployed; employed; and in study. This composite variable combines employment status and sector of occupation. Within employment status, occupations are grouped into six sectors: farm job; food processing; sale of agricultural products; non-farm job; professionals; and other. The definition of and methodology for constructing this variable are detailed in Appendix B. In Herrera and Sahn (2013), unemployment is demonstrated to be one of the main causes driving youth migration in Senegal. Information about the job and employment status of migrants prior to migration is obtainable; however, the same information is not available for non-migrants (i.e. although we know the current employment of all people, we do not know the employment of non-migrants in the period prior to the migration of the migrants). In addition, given that people migrate at different points in time, it is not possible to make a comparison between migrants and non-migrants in terms of employment prior to the migration of the

[16] Adult age is usually greater than or equal to 18 years, but may vary slightly depending on the legal adult age set by countries.

[17] Guèye, S.B. (n.d.) Migration et Développement: Sénégal: La migration des jeunes et le développement régional dans la croissance économique du Sénégal. Diaspora en ligne, last time accessed at http://diasporaenligne.net/?p=1621 on February 2019.

migrants. Furthermore, the current employment situation of the migrants is more an outcome than a cause of migration. This variable of the current employment situation is excluded from the regression for "migrants during the 12 months prior to the survey" and enters the regression for "potential migrants".

Variables of household characteristics:

- **Size of household (including migrants)**: expected to exert a positive impact on the chance of migrating. For most households in the survey, agriculture is the main economic activity, and hectic periods of cropping and harvesting may be characterized by labour shortages, in which case, letting go an able-bodied member may not be preferable. This is not a constraint for larger households, which therefore tend to have more migrant members.
- **Number of children aged less than 15 in the household**: represents a pull factor of return migration.
- **Number of elderly aged more than 65 in the household**: represents a reason for migrants to return because of caring responsibilities.
- **Share of household members aged greater than or equal to 15 engaged in agriculture**: a proxy for the intensity of the household's agricultural activities. The impact of the household's agricultural activities on migration is not straightforward. [18] It could be positive because in the context when agricultural yields are volatile migration represents a potential tool to diversify the income risk. The sign of the impacts could vary depending on the migration types. Income diversification and seasonal labour need could act as channels behind the positive effect of household's agricultural intensity on the propensity to migrate seasonally; while labour need for agriculture could decrease the motivation for long-term and long-distance migration. Moreover, if households with agricultural income-generating activities tend to lag behind in terms of wealth compared to households engaging in secondary and tertiary sectors, this could deter their members from participating in long-distance migration, which is usually more costly. The direction of the effect – whether migration influences household engagement in agriculture or whether the intensity of agriculture affects the decision to migrate – is difficult to determine a priori without panel data or good instruments.
- **Level of wealth**: the stock of long-term wealth accumulation, which is less volatile than annual income and therefore more accurate for assessing a household's level of well-being. Level of wealth is a composite index constructed using PCA based on highly collinearly correlated variables: housing quality, access to basic facilities and ownership of durable goods. The methodology for constructing this variable is detailed in Appendix D. While household income could have an ambiguous effect on the decision to migrate, the incidence of international migration is expected to be significantly higher in well-off families. The regression also includes the quadratic terms of the wealth index. The goal is to assess whether migration follows an

[18] The intensity of agricultural activities could also be captured by the share of agriculture in annual income. This variable was constructed and used in Section 6. However, it contains a large number of missing values (data on all types of income are missing for 6.8 percent of all the households in the sample) and is thus not included in the regressions of migration propensity.

inverted-U-shaped relationship with wealth.[19] If this is the case, the linear and quadratic terms are both expected to be statistically significant, with a positive sign for the former and a negative sign for the latter. The logarithmic transformation of the wealth level is used to reduce the size of the quadratic term.

- **Share of migrant households in the PSU living area**: a proxy for the migrant network. The migrant network is widely shown in the literature to reduce both the costs related to the migration process and the difficulties of settling in destination areas (Beine, Docquier and Ozden, 2015; McKenzie and Rapoport, 2010). The higher the share of migrant households that an individual may be acquainted with, the higher the chance of them becoming a migrant.
- **Having past migrant in the family**: this binary variable indicates that household has or not at least one member and/or close relatives (grandparents, parents and siblings of the household head and his/her spouse) who have migrated in the past. This variable is expected to exert similar network effect facilitating migration.
- **Proximity to international border (in minutes)**: captures distance to potential destination. A shorter distance to the nearest international border are expected to exert a positive impact on migration propensity.
- **Region**: Kaolack or Matam. This variable absorbs the fixed effects induced by regional socio-economic differences. Moreover, the chance of being an international migrant is expected to be strongly associated with the origin area of Matam.

A number of variables are found in the literature but not included in the regressions. For instance, information about the household head is usually used to describe the family background of an individual. However, this information is influenced by migration. For example, in many rural contexts, since men are usually more migratory than women, the head of a migrant household tends to be female rather than male. Other household characteristics, such as size (including migrants) and education level, are also directly affected by having a person who has left. It was decided not to use information about the household head and to construct all the variables of household characteristics with the inclusion of the migrants. Local socio-economic conditions and individual satisfaction with community services or amenities are in general expected to impact the decision to migrate (Beauchemin and Schoumaker, 2005; Dustmann and Okatenko, 2014). However, the survey unfortunately did not collect such information; this dimension will be partially captured using regional fixed effects. The literature also shows that relative deprivation (i.e. the household's economic standing in the community) could have an impact on the decision to migrate (Stark and Taylor, 1991). However, the oversampling of migrant households combined with the lack of information about the full distribution of income of each community makes it impossible to construct the relative deprivation index.

Estimators

Given that all the dependent variables are binary, the Probit estimator is used. More precisely, the probability of an individual *i* being a migrant (internal/international/seasonal/potential/return) M_i takes two values, 0 and 1:

[19] The relationship between migration and income is widely documented to be in the shape of an inverted U. Migration propensity is relatively low among the poor; it increases as income rises to a certain level, and then falls again. For a comprehensive literature review on this topic, refer to Clemens (2014).

$$M_i = \begin{cases} 0, & if\ No \\ 1, & if\ Yes \end{cases}$$

The probability that $M_i = 1$ is a function of the independent variables:

$$P = Pr[M_i = 1|x] = F(x'\beta)$$

where F is the cumulative distribution function (CDF) of the standard normal distribution.

The migration variable is determined by:

$$M_i = \beta_0 + \beta_i X_i + \beta_h X_h + \varepsilon$$

where X_i is the set of individual characteristics, X_h is the set of household characteristics, β_i and β_h are the coefficients respectively attached to X_i and X_h, β_0 is the intercept and ε the error term.

In all the regressions, household sampling weights are applied. The calculation of the weights is detailed in Appendix A. To correct the potential problem of heteroscedasticity, different cluster levels are tested: no clustering; and clustering at village, commune and department levels. The results yield similar standard errors, and the option of no clustering is therefore selected.

Endogeneity issues

The highly endogenous relationships between the decision to migrate and wealth and other explanatory variables challenge the establishment of causality. Three endogeneity issues that could bias standard estimation are identified as follows:

- **Reverse causality**: the effect (positive or negative) of a family's level of wealth on the chance that a household sends out a migrant and the potential reverse effect of having a migrant. Migration impacts a household's wealth through various channels, including: in-cash and/or in-kind transfers; transmission of income-generating knowledge; and reduction of the number of dependents and/or contributing members in the household. Other explanatory variables may be influenced by migration, for example: intensity of agricultural activities; education investment; and fertility choice. The NELM argues that migration is part of a household's income diversification strategy to cope with the hazardous nature of agricultural production; therefore, households with a higher intensity of agricultural activities would have a higher probability of having a migrant. However, there is evidence that households whose members engage in migration significantly reduce farm production (Adaku, 2013; Li and Tonts, 2014; Black, 1993), or in the opposite direction improve agricultural activities (Gray and Bilsborrow, 2014; Taylor, Rozelle and de Brauw, 2003).
- **Selection bias**: a household's tendency to select themselves to migration. The assumption of random participation in migration is improbable if households expected to suffer negative impacts of migration are unlikely to choose to migrate, and if their personal reservation income exceeds the potential income resulting from moving from home. Therefore, the outcome variable of migrating or not is unobserved due to the non-random selection of migration.
- **Omitted variable bias**: unobservable characteristics. These may differ significantly between non-migrant, internal migrant and international migrant households. They include risk-taking behaviour, inherent optimism and motivation. The non-capture of these unobservable characteristics could bias the estimations.

As the survey is not a panel, it is not possible to use either household fixed effects to control for the omitted variable bias or lagged income variable to account for the reverse causality bias. The survey contains very little information on pre-migration, except for the occupation status of the migrant and their activities prior to departure.

Acknowledging this empirical challenge, the aim is to find a methodology that could partially absorb the endogeneity bias between migration and the level of wealth. (In Appendix H, it will be demonstrated that the proxy for agricultural intensity will be arguably removed due to its high correlation with the wealth variable.) To address the reverse causality issue, an instrumental variable method could be implemented, involving the identification of an instrument that affects migration only through its local impact on wealth. Rainfall intensity is widely used as an instrument in the literature (Alem, Maurel and Millock, 2016; Rose, 2001); it is supposed to affect local income shock. However, since the survey concerns a limited geographic area and not a wider national territory, weather shock tends to be spatially correlated and does not offer a lot of variation.

The strategy adopted involves finding a counterfactual wealth level when households have no migrant and no remittance. This methodology is inspired by that used in Konseiga (2006).[20] The counterfactual wealth level is estimated based on the sample of 228 households that have never had any migrant member and received no remittances in the 12 months prior to the survey.[21] The explanatory variables are:

- **Number of children aged less than 15 years**: captures the number of dependent members who are assumed to not have a major contribution to the household's income-generating activities.
- **Education level of household head**: designed to capture the household's access to income-generating activities and its ability to manage them. Due to the restricted sample, the category of household heads with a higher education comprises a very small number of observations. For this reason, the continuous variable of education level in years is used instead of the education variable with five categorical groups.
- **Marital status of household head**: expected to be a good indicator of the wealth of the household. Polygamous marriage is very common in Senegal, especially among wealthier men who can afford to have multiple wives.
- **Three agricultural variables**: share of family members aged greater than or equal to 15 years in agriculture; agricultural land size (ha); and number of varieties of crops and livestock. These variables represent the intensity of agricultural activities and agricultural production. According to the descriptive statistics, households more engaged in agriculture are expected to be less wealthy.
- **Proximity (in minutes) to public transport**: a proxy for access to the transport network, which could facilitate income generation by reducing the time to reach work or the marketplace. In addition, well-off families could choose to live in locations with better access to services.
- **Regional fixed effect**: absorbs all regional variations that lead to different wealth level.

[20] Konseiga (2006) uses Heckman's two-step estimation procedure to correct for selection bias. The argument is that households do not select themselves into migration if they perceive the net benefit from migration is lower than the benefit of staying. Konseiga (2006) estimates incomes in both cases. The resulting income gap is then used to explain the probability of seasonal migration.

[21] The questions on receiving remittances refer to the past 12 months only.

The model specification is as follows:

$$W_h^0 = \alpha_0 + \alpha_j Z_j^0 + \epsilon$$

where W_h^0 is the wealth level of the households h that have never had migrants and have not received remittances in the 12 months prior to the survey, Z_j^0 is the list of independent variables explaining the wealth level as previously mentioned, α_0 is the intercept and ϵ the error term. The coefficients α_j are estimated from the sample of non-migrant households.

The coefficient α_j and the intercept α_0 are then estimated using ordinary least squares (OLS). Using α_0 and α_j estimated, the expected wealth level is computed; it is the counterfactual level of wealth in the case of zero migrants and zero remittances:

$$W_h = \hat{\alpha}_0 + \hat{\alpha}_j Z_j$$

Table G1 presents the results of the OLS regression. The signs of all effects of the explanatory variables on the level of wealth are as expected. The higher the number of children aged less than 15 years, the lower the household's wealth level. The education level of the household head positively affects the wealth level. Compared to the status of being single, being married positively predicts wealth level. Polygamous marriage of the household head has the strongest correlation with the family's wealth. Among the three variables measuring the intensity of agricultural activities, only agricultural land size has a significant negative effect. The more time is needed to reach public transport, the lower the wealth level; however, this variable is not statistically significant. Lastly, which of the two regions the family lives in does not have a significant effect on the household's wealth. The second regression only includes the significant variables of the first regression. Their estimated coefficients are then used to predict the wealth level of the household with migrants. This predicted wealth level, which is supposed to not be influenced by migration, is used to correct in part the endogeneity bias. The coefficients used to compute this variable are estimated based on a small subsample and then applied to the whole sample. For this reason, whenever this variable is included in a regression, Jackknife estimation of variance is used to obtain unbiased standard errors. The existence of sampling weights requires the generation of replicated weights for each replication. The methodology for replicating the sampling weights is detailed in Appendix A. Nevertheless, this study cannot claim to fully address endogeneity bias. Therefore, the results are not interpreted in terms of marginal effects.

Table G.1 Predicted wealth with the sample of households with no migrants and no remittances – OLS estimation

Variables	(1) Household Wealth index	(2) Household Wealth index
Number of children < 15 in household	-0.095***	-0.093***
	(0.033)	(0.032)
Education of household head (continuous)	0.135***	0.134***
	(0.039)	(0.038)
Marital status of household head = Married (monogamous)	1.005**	1.043***
	(0.392)	(0.327)
Marital status of household head = Married (polygamous)	1.968***	2.025***
	(0.467)	(0.407)
Marital status of household head = Widowed/Separated/Divorced	1.616***	1.550***
	(0.500)	(0.496)
Share of family members aged ≥ 15 in agriculture	-0.376	
	(0.496)	
Agricultural land size (ha)	-0.003*	-0.003**
	(0.002)	(0.001)
Number of crops and livestocks	0.052	
	(0.067)	
Time to closest station of public transport (minutes)	-0.005	
	(0.006)	
Region = Matam	-0.170	
	(0.392)	
Constant	2.158***	1.941***
	(0.583)	(0.303)
Observations	228	228
R-squared	0.173	0.162

Robust standard errors in parentheses
*** p < 0.01, ** p < 0.05, * p < 0.1

Note: The base levels in the regressions are: Marital status of household head = Single; Region = Kaolack.

Appendix H - Results of the multivariate regressions

Determinants of migration from multivariate regressions

Tables H1 and H2 present an estimation of the results of the propensity for migration (columns 1–2), internal (columns 3–4) or international (columns 5–6) or seasonal migrant (columns 7–8), during the 12 months prior to the survey. For each type of migrant, the odd-numbered columns correspond to the specification with only linear variable of the wealth index and the even-numbered columns correspond to the specification with both linear and quadratic wealth variables. Tables H1 and H2 present the Probit estimations, respectively, before and after the correction for endogeneity bias (by using the predicted wealth index instead of the actual one). The share of family members aged greater than or equal to 15 engaged in agriculture is included in regressions in Table H1 and excluded in Table H2 for the reason explained in the next paragraph. For seasonal migrants, the number of observations is insufficient to compute Jackknife standard errors; therefore, the Table H1 regressions (7) and (8) are included in Table H2 to simplify the comparison between migrant categories.

Table H1 shows that the share of family members aged greater than or equal to 15 working in agriculture negatively affects the propensity to be a migrant, internal and international migrant. Positive impact is limited to seasonal migrants; this is consistent with the fact (see Section 6) that households with seasonal migrants tend to have more intensive agricultural activities. Overall, the result does not point to a strong effect of a risk diversification strategy, according to which higher involvement in agriculture induces migration. In addition, the hypothesis that high labour need caused by intense agricultural production reduces the chance of long-distance migration does hold either because we have shown in Section 6 that agriculture intensity is very low among households with internal and international migrants in comparison to households with seasonal migrants. Instead, the more pronounced negative effect on migration coincides with the fact that higher agricultural intensity is usually found among less well-off families. Thus, the levels of wealth and agricultural intensity are very likely to be negative cofounders.

Table H2 presents the regression when: the variable of agricultural intensity is removed; and the wealth index is replaced by the counterfactual wealth index, which corresponds to the situation in which households have no migrants and no remittances. The positive effect of wealth level on the chance of being an international migrant was found to be only slightly significant. Nowhere in the regressions are both the linear and quadratic terms of the wealth index significant.

Table H.1 Propensity of being a migrant, internal/international/seasonal migrant in the 12 months prior to the survey – Probit estimation

Variables	(1) Migrant	(2) Migrant	(3) Internal migrant	(4) Internal migrant	(5) International migrant	(6) International migrant	(7) Seasonal migrant	(8) Seasonal migrant
Gender = Female	-0.827***	-0.826***	-0.727***	-0.727***	-0.917***	-0.915***	-0.918***	-0.911***
	(0.059)	(0.059)	(0.065)	(0.065)	(0.084)	(0.084)	(0.112)	(0.111)
Age group = 15–24	0.055	0.055	0.307*	0.307*	-0.581***	-0.575***	-0.156	-0.162
	(0.146)	(0.146)	(0.162)	(0.162)	(0.187)	(0.186)	(0.257)	(0.256)
Age group = 25–34	0.445***	0.444***	0.635***	0.634***	-0.164	-0.162	0.296	0.286
	(0.129)	(0.129)	(0.141)	(0.141)	(0.162)	(0.162)	(0.224)	(0.224)
Age group = 35–44	0.352***	0.352***	0.452***	0.452***	0.009	0.013	0.331	0.328
	(0.132)	(0.132)	(0.142)	(0.142)	(0.175)	(0.175)	(0.230)	(0.230)
Age group = 45–54	0.110	0.111	0.183	0.183	-0.135	-0.127	0.024	0.033
	(0.134)	(0.133)	(0.148)	(0.148)	(0.167)	(0.166)	(0.231)	(0.232)
Age group = 55–64	-0.041	-0.040	-0.092	-0.092	-0.064	-0.059	0.158	0.161
	(0.179)	(0.179)	(0.240)	(0.240)	(0.191)	(0.190)	(0.269)	(0.268)
Marital status = Single	0.197*	0.196*	0.263**	0.263**	-0.146	-0.154	-0.083	-0.087
	(0.114)	(0.114)	(0.123)	(0.123)	(0.153)	(0.153)	(0.180)	(0.181)
Marital status = Married (monogamous)	0.249***	0.248***	0.288***	0.288***	0.040	0.035	-0.199	-0.201
	(0.086)	(0.086)	(0.095)	(0.095)	(0.126)	(0.126)	(0.138)	(0.138)
Marital status = Widowed/Separated/Divorced	0.068	0.066	0.296*	0.295*	-0.476**	-0.481***	-0.755**	-0.765**
	(0.145)	(0.146)	(0.158)	(0.159)	(0.185)	(0.185)	(0.345)	(0.343)
Ethnicity = Pular	0.171	0.170	0.140	0.140	0.186	0.189	0.176	0.163
	(0.132)	(0.132)	(0.143)	(0.143)	(0.172)	(0.173)	(0.172)	(0.171)
Ethnicity = Wolof/Libou	0.306**	0.307**	0.309**	0.310**	0.073	0.081	0.085	0.084
	(0.137)	(0.137)	(0.145)	(0.145)	(0.201)	(0.204)	(0.172)	(0.172)
Ethnicity = Sirer	-0.020	-0.020	-0.039	-0.039	0.015	0.019	0.028	0.020
	(0.150)	(0.150)	(0.157)	(0.157)	(0.232)	(0.234)	(0.193)	(0.193)
Education group =, Primary school	0.184**	0.185**	0.245**	0.245**	-0.018	-0.014	0.509***	0.514***
	(0.092)	(0.093)	(0.100)	(0.100)	(0.124)	(0.124)	(0.147)	(0.148)
Education group =, Secondary school	0.049	0.050	0.048	0.048	0.085	0.092	0.213	0.217
	(0.080)	(0.081)	(0.084)	(0.085)	(0.112)	(0.112)	(0.133)	(0.133)
Education group = High school	0.094	0.097	0.122	0.123	-0.058	-0.043	0.371**	0.392**
	(0.121)	(0.121)	(0.123)	(0.123)	(0.144)	(0.144)	(0.183)	(0.182)

Education group = Tertiary education	1.302***	1.305***	1.384***	1.385***	0.112	0.129	0.514**	0.542***
	(0.168)	(0.167)	(0.155)	(0.156)	(0.206)	(0.205)	(0.201)	(0.205)
Eldest child of household head = Yes	0.223***	0.224***	0.173**	0.173**	0.239***	0.240***	0.217**	0.221**
	(0.064)	(0.064)	(0.068)	(0.068)	(0.075)	(0.075)	(0.087)	(0.087)
Share of family members aged ≥ 15 in agriculture	-0.595***	-0.597***	-0.510***	-0.511***	-0.483***	-0.490***	0.312***	0.294**
	(0.088)	(0.088)	(0.095)	(0.094)	(0.111)	(0.112)	(0.120)	(0.120)
Household size including migrants	-0.004	-0.004	-0.005	-0.005	0.002	0.002	-0.001	-0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.005)	(0.005)	(0.006)	(0.006)
Having past migrant in the family = Yes	0.069	0.069	0.122**	0.122**	-0.046	-0.043	0.196**	0.195**
	(0.051)	(0.051)	(0.057)	(0.057)	(0.063)	(0.063)	(0.086)	(0.086)
Share of migrant households in the PSU	0.781***	0.779***	0.797***	0.797***	0.424**	0.409**	0.887***	0.885***
	(0.144)	(0.144)	(0.159)	(0.159)	(0.180)	(0.180)	(0.233)	(0.233)
Time to closest border (minutes)	0.001*	0.001*	0.002*	0.002*	0.001	0.001	0.002**	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Region = Matam	-0.212***	-0.210***	-0.390***	-0.389***	0.373***	0.382***	-0.236*	-0.220*
	(0.081)	(0.081)	(0.090)	(0.090)	(0.119)	(0.120)	(0.123)	(0.125)
Household wealth index (log)	-0.011	0.064	-0.149**	-0.118	0.280***	0.670*	-0.201**	0.372
	(0.061)	(0.283)	(0.065)	(0.282)	(0.073)	(0.351)	(0.085)	(0.412)
Household wealth index (log squared)		-0.029		-0.012		-0.142		-0.225
		(0.106)		(0.108)		(0.130)		(0.170)
Constant	-1.592***	-1.634***	-1.756***	-1.773***	-2.290***	-2.534***	-2.365***	-2.678***
	(0.219)	(0.262)	(0.235)	(0.276)	(0.292)	(0.350)	(0.311)	(0.388)
Observations	6,599	6,599	6,599	6,599	6,599	6,599	6,599	6,599
Log likelihood	-126784	-126781	-106831	-106830	-42561	-42538	-33931	-33881
Pseudo R-squared	0.159	0.159	0.159	0.159	0.194	0.195	0.155	0.157

Note: The base levels in the regressions are: Gender = Male; Age group = < 15; Marital status = Age < 15 – not relevant; Ethnicity = Other ethnicities; Education group = No education; Eldest child of household head = No; Having past migrant in the family = No; Region = Kaolack.

Table H.2 Propensity of being a migrant, internal/international/seasonal migrant in the 12 months prior to the survey – Probit – Correction for endogeneity – with Jackknife variance estimate

Variables	(1) Migrant	(2) Migrant	(3) Internal migrant	(4) Internal migrant	(5) International migrant	(6) International migrant	(7) Seasonal migrant	(8) Seasonal migrant
Gender = Female	-0.770***	-0.770***	-0.675***	-0.674***	-0.871***	-0.872***	-0.921***	-0.921***
	(0.082)	(0.082)	(0.090)	(0.090)	(0.093)	(0.091)	(0.110)	(0.110)
Age group = 15–24	0.395**	0.395**	0.447***	0.446***	3.490***	3.534***	-0.099	-0.098
	(0.172)	(0.173)	(0.167)	(0.168)	(0.333)	(0.346)	(0.261)	(0.262)
Age group = 25–34	0.806***	0.806***	0.783***	0.783***	3.924***	3.968***	0.317	0.318
	(0.196)	(0.196)	(0.192)	(0.193)	(0.345)	(0.344)	(0.230)	(0.230)
Age group = 35–44	0.750***	0.750***	0.628***	0.628***	4.137***	4.178***	0.347	0.347
	(0.200)	(0.200)	(0.197)	(0.197)	(0.359)	(0.367)	(0.236)	(0.237)
Age group = 45–54	0.508**	0.509**	0.365	0.366	3.986***	4.027***	0.065	0.064
	(0.226)	(0.225)	(0.225)	(0.223)	(0.369)	(0.384)	(0.234)	(0.234)
Age group = 55–64	0.374	0.374	0.097	0.098	4.085***	4.126***	0.165	0.164
	(0.271)	(0.271)	(0.315)	(0.314)	(0.365)	(0.367)	(0.271)	(0.272)
Age group = > 65	0.419*	0.420*	0.192	0.193	4.143***	4.183***	*(empty)*	*(empty)*
	(0.250)	(0.250)	(0.240)	(0.240)	(0.392)	(0.392)		
Marital status = Single	0.753***	0.753***	0.702***	0.702***	-2.578***	-2.619***	0.678*	0.682*
	(0.155)	(0.155)	(0.165)	(0.165)	(0.393)	(0.414)	(0.351)	(0.351)
Marital status = Married (monogamous)	0.796***	0.796***	0.720***	0.720***	-2.393***	-2.434***	0.573*	0.575*
	(0.198)	(0.198)	(0.204)	(0.205)	(0.396)	(0.415)	(0.337)	(0.337)
Marital status = Married (polygamous)	0.457**	0.457**	0.344	0.344	-2.508***	-2.554***	0.759**	0.760**
	(0.206)	(0.206)	(0.211)	(0.211)	(0.421)	(0.451)	(0.340)	(0.340)
Marital status = Widowed/Separated/Divorced	0.565*	0.565*	0.668**	0.668**	-2.931***	-2.979***	*(empty)*	*(empty)*
	(0.299)	(0.300)	(0.298)	(0.299)	(0.439)	(0.460)		
Ethnicity = Pular	0.144	0.144	0.135	0.135	0.137	0.138	0.163	0.164
	(0.163)	(0.163)	(0.165)	(0.165)	(0.189)	(0.190)	(0.165)	(0.166)
Ethnicity = Wolof/Libou	0.216	0.217	0.222	0.222	0.026	0.023	0.032	0.031
	(0.269)	(0.270)	(0.260)	(0.261)	(0.319)	(0.321)	(0.168)	(0.168)
Ethnicity = Sirer	-0.114	-0.114	-0.097	-0.097	-0.122	-0.123	0.022	0.021
	(0.239)	(0.240)	(0.232)	(0.233)	(0.360)	(0.362)	(0.192)	(0.192)
Education group = Primary school	0.163**	0.164**	0.198**	0.199**	-0.003	-0.008	0.451***	0.449***
	(0.081)	(0.082)	(0.090)	(0.091)	(0.136)	(0.135)	(0.140)	(0.140)

Education group = Secondary school	0.096	0.097	0.061	0.063	0.164	0.155	0.144	0.141
	(0.098)	(0.101)	(0.111)	(0.114)	(0.109)	(0.098)	(0.129)	(0.131)
Education group = High school	0.117	0.119	0.104	0.107	0.035	0.021	0.273	0.266
	(0.122)	(0.120)	(0.128)	(0.127)	(0.152)	(0.156)	(0.191)	(0.196)
Education group = Tertiary education	1.320***	1.322***	1.354***	1.357***	0.171	0.145	0.383*	0.375*
	(0.186)	(0.176)	(0.167)	(0.163)	(0.225)	(0.207)	(0.197)	(0.200)
Eldest child of household head = Yes	0.210***	0.210***	0.157***	0.157***	0.240***	0.240***	0.228***	0.228***
	(0.055)	(0.055)	(0.055)	(0.055)	(0.074)	(0.073)	(0.086)	(0.086)
Household size including migrants	0.003	0.003	-0.001	-0.001	0.011	0.011	-0.004	-0.004
	(0.007)	(0.007)	(0.007)	(0.007)	(0.009)	(0.008)	(0.006)	(0.006)
Having past migrant in the family = Yes	0.138	0.139	0.170*	0.170*	0.025	0.023	0.140	0.140
	(0.087)	(0.088)	(0.086)	(0.087)	(0.104)	(0.103)	(0.086)	(0.087)
Share of migrant households in the PSU	0.717*	0.717*	0.691	0.691	0.568*	0.567*	0.893***	0.893***
	(0.389)	(0.390)	(0.438)	(0.438)	(0.317)	(0.316)	(0.238)	(0.238)
Time to closest border (minutes)	0.001	0.001	0.001	0.001	0.001	0.001	0.002**	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.001)	(0.001)
Region = Matam	-0.060	-0.060	-0.253	-0.253	0.492**	0.492**	-0.361***	-0.363***
	(0.191)	(0.193)	(0.178)	(0.180)	(0.198)	(0.199)	(0.109)	(0.109)
Predicted household wealth index in case	0.415*	0.553	0.342	0.614	0.439*	-0.413	0.014	-0.494
without migrant and remittances (log)	(0.247)	(1.884)	(0.260)	(1.984)	(0.243)	(1.252)	(0.233)	(1.363)
Predicted household wealth index in case		-0.051		-0.100		0.326		0.188
without migrant and remittances (log squared)		(0.724)		(0.765)		(0.480)		(0.515)
Constant	-3.470***	-3.563***	-3.315***	-3.501***	-4.552***	-4.003***	-3.155***	-2.816***
	(0.408)	(1.277)	(0.428)	(1.319)	(0.469)	(0.961)	(0.509)	(0.978)
Observations	10,365	10,365	10,365	10,365	10,365	10,365	6,664	6,664
Log likelihood							-34247	-34244
Pseudo R-squared							0.148	0.148

Note: The base levels in the regressions are: Gender = Male; Age group = < 15; Marital status = Age < 15 – not relevant; Ethnicity = Other ethnicities; Education group = No education; Eldest child of household head = No; Having past migrant in the family = No; Region = Kaolack. For seasonal migrants, the number of observations is insufficient to compute Jackknife standard errors; therefore, the Table H1 regressions (7) and (8) are included in Table H2 to simplify the comparison between migrant categories.

Determinants of potential migration from multivariate regressions

Similar regressions are run to estimate the probability of a non-migrant developing a willingness to migrate. The sample is restricted to non-migrants, excluding those who have been a migrant at any point in time. Therefore, the results are a comparison between all non-migrants and those among them who would like to migrate. The other difference is that it is possible to assess the impact on the intention to migrate of an individual's current socio-economic situation, including current employment situation and household wealth level, without worrying about the issue of time inconsistency between events.

Table H.3 Probability of being a potential migrant (non-migrants who expressed a desire to migrate) – Probit estimation

Variables	(1) Potential migrant	(2) Potential migrant
Gender = Female	-0.623***	-0.622***
	(0.075)	(0.075)
Age group = 15–24	0.610***	0.613***
	(0.157)	(0.157)
Age group = 25–34	0.755***	0.755***
	(0.183)	(0.183)
Age group = 35–44	0.395**	0.399**
	(0.200)	(0.200)
Age group = 45–54	0.095	0.101
	(0.223)	(0.223)
Age group = 55–64	-0.160	-0.158
	(0.296)	(0.296)
Age group = > 65	-0.688**	-0.686**
	(0.327)	(0.326)
Marital status = Single	0.322*	0.319*
	(0.177)	(0.177)
Marital status = Married (monogamous)	0.276	0.273
	(0.210)	(0.210)
Marital status = Married (polygamous)	0.236	0.236
	(0.239)	(0.239)
Marital status = Widowed/Separated/Divorced	0.589**	0.582**
	(0.277)	(0.278)
Ethnicity = Pular	-0.126	-0.138
	(0.158)	(0.158)
Ethnicity = Wolof/Libou	-0.244	-0.249
	(0.162)	(0.162)
Ethnicity = Sirer	0.273*	0.261
	(0.165)	(0.165)
Education group = Primary school	0.530***	0.531***
	(0.087)	(0.087)
Education group = Secondary school	0.327***	0.330***
	(0.106)	(0.107)
Education group = High school	0.583***	0.589***
	(0.142)	(0.142)
Education group = Tertiary education	0.167	0.173
	(0.324)	(0.324)

Eldest child of household head = Yes	0.184**	0.185**
	(0.091)	(0.091)
Employment = Unemployment	0.667***	0.658***
	(0.146)	(0.146)
Employment = Study	0.267**	0.267**
	(0.117)	(0.117)
Employment = Farm job	0.378***	0.376***
	(0.106)	(0.106)
Employment = Food processing	*(empty)*	*(empty)*
Employment = Sale agriproduct	0.370	0.357
	(0.367)	(0.367)
Employment = Non-farm job	0.610***	0.605***
	(0.150)	(0.150)
Employment = Professional	0.376	0.387
	(0.383)	(0.387)
Employment = Others	0.700***	0.684***
	(0.252)	(0.252)
Household size including migrants	-0.006	-0.005
	(0.005)	(0.005)
Having past migrant in the family = Yes	0.201***	0.201***
	(0.065)	(0.064)
Share of migrant households in the PSU	0.628***	0.629***
	(0.169)	(0.169)
Time to closest border (minutes)	0.002***	0.002***
	(0.001)	(0.001)
Share of family members aged ≥ 15 in agriculture	0.197	0.189
	(0.123)	(0.124)
Region = Matam	-0.172*	-0.166
	(0.102)	(0.103)
Household wealth index (log)	-0.024	0.270
	(0.070)	(0.295)
Household wealth index (log squared)		-0.117
		(0.117)
Constant	-2.197***	-2.348***
	(0.211)	(0.263)
Observations	8,547	8,547
Log likelihood	-195948	-195870
Pseudo R-squared	0.225	0.225

Note: The base levels in the regressions are: Gender = Male; Age group = < 15; Marital status = Age < 15 – not relevant; Ethnicity = Other ethnicities; Education group = No education; Eldest child of household head = No; Employment = Inactive; Having past migrant in the family = No; Region = Kaolack.

Determinants of return migration from multivariate regressions

To identify the determinants of return migration in multivariate regressions, the sample is restricted to individuals who have been migrants, whether currently or in the past. Therefore, the propensity for return is drawn from the comparison between return migrants and current migrants. In addition to the set of explanatory variables previously presented, regressions in this section include an extra pull factor of return migration which is the number of elderly aged above 65 in the household. Table H4 presents the results of the Probit estimation. In columns 1–2, the variable explained is being past migrants, regardless of the moment of return. The data in columns 3–4 aim to explain only the propensity to return of those who returned more than 12 months earlier.

Table H.4 Probability of being a return migrant – Probit estimation

Variables	(1) Return migrants (both < 12 m and > 12 m)	(2) Return migrants (both < 12 m and > 12 m)	(3) Return migrants (only > 12 m)	(4) Return migrants (only > 12 m)
Gender = Female	-0.176	-0.169	-0.274*	-0.272*
	(0.137)	(0.137)	(0.159)	(0.159)
Age group = 15–24	-0.700**	-0.691**	-0.250	-0.245
	(0.292)	(0.291)	(0.342)	(0.341)
Age group = 25–34	-0.821***	-0.818***	-0.420	-0.418
	(0.252)	(0.251)	(0.290)	(0.289)
Age group = 35–44	-0.785***	-0.776***	-0.407	-0.403
	(0.246)	(0.245)	(0.284)	(0.284)
Age group = 45–54	-0.612**	-0.604**	-0.183	-0.179
	(0.261)	(0.260)	(0.300)	(0.300)
Age group = 55–64	0.081	0.092	0.347	0.352
	(0.276)	(0.277)	(0.322)	(0.322)
Marital status = Married (monogamous)	0.554***	0.554***	0.644***	0.644***
	(0.142)	(0.141)	(0.171)	(0.171)
Marital status = Married (polygamous)	0.522**	0.525**	0.820***	0.822***
	(0.204)	(0.204)	(0.230)	(0.231)
Marital status = Widowed/Separated/Divorced	0.463	0.454	0.733**	0.730**
	(0.293)	(0.292)	(0.318)	(0.318)
Ethnicity = Pular	0.614*	0.614*	1.044**	1.040**
	(0.348)	(0.348)	(0.434)	(0.434)
Ethnicity = Wolof/Libou	0.541	0.543	1.164***	1.162***
	(0.345)	(0.344)	(0.436)	(0.436)
Ethnicity = Sirer	0.188	0.187	0.697	0.693
	(0.378)	(0.377)	(0.462)	(0.462)
Education group = Primary school	0.146	0.152	0.213	0.216
	(0.172)	(0.173)	(0.175)	(0.175)
Education group = Secondary school	0.128	0.134	0.212	0.215
	(0.171)	(0.171)	(0.200)	(0.201)
Education group = High school	-0.088	-0.069	-0.119	-0.109

	(0.210)	(0.210)	(0.229)	(0.230)
Education group = Tertiary education	-0.245	-0.225	-0.971***	-0.956***
	(0.201)	(0.202)	(0.276)	(0.278)
Eldest child of household head = Yes	-0.213*	-0.210*	-0.093	-0.091
	(0.124)	(0.124)	(0.134)	(0.134)
Employment during migration = Unemployment	-1.162***	-1.165***	-0.931***	-0.933***
	(0.207)	(0.206)	(0.236)	(0.236)
Employment during migration = Study	-0.705***	-0.711***	-0.434*	-0.436*
	(0.202)	(0.202)	(0.239)	(0.239)
Employment during migration = Farm job	-1.066***	-1.070***	-0.900***	-0.902***
	(0.163)	(0.163)	(0.187)	(0.187)
Employment during migration = Food processing	-0.532	-0.542	-0.334	-0.337
	(0.588)	(0.587)	(0.688)	(0.687)
Employment during migration = Non-farm job	-1.045***	-1.050***	-0.742***	-0.744***
	(0.152)	(0.152)	(0.171)	(0.171)
Employment during migration = Professional	-0.824***	-0.811***	-0.228	-0.223
	(0.286)	(0.286)	(0.304)	(0.305)
Household size including migrants	-0.069***	-0.069***	-0.059***	-0.059***
	(0.014)	(0.014)	(0.016)	(0.016)
Number of children < 15 in the household	0.134***	0.135***	0.127***	0.128***
	(0.023)	(0.023)	(0.026)	(0.026)
Number of elderly > 65 in the household	0.086	0.091	0.120	0.122
	(0.068)	(0.069)	(0.074)	(0.074)
Share of migrant households in the PSU	-0.685***	-0.697***	-0.780***	-0.785***
	(0.250)	(0.251)	(0.296)	(0.296)
Region = Matam	-0.081	-0.060	0.149	0.159
	(0.148)	(0.149)	(0.177)	(0.178)
Household wealth index (log)	0.353***	0.919	0.241	0.485
	(0.133)	(0.605)	(0.148)	(0.650)
Household wealth index (log squared)		-0.210		-0.090
		(0.219)		(0.234)
Constant	0.531	0.172	-1.036*	-1.190*
	(0.504)	(0.618)	(0.579)	(0.697)
Observations	1,576	1,576	1,576	1,576
Log likelihood	-38333	-38296	-35861	-35854
Pseudo R-squared	0.190	0.191	0.196	0.196

Note: The base levels in the regressions are: Gender = Male; Age group = < 15; Marital status = Age < 15 – not relevant; Ethnicity = Other ethnicities; Education group = No education; Eldest child of household head = No; Employment during migration = Inactive; Region = Kaolack.

Although migratory flows from rural areas are a common phenomenon in most developing countries, we possess little information on their dynamics and determinants. In 2017, FAO and the Senegalese National Agency of Statistics and Demography (ANSD) conducted a household survey in two rural regions of Senegal with the aim of generating information on migration phenomena in rural areas. The survey was conducted among 1 000 households in 67 rural census districts in the Kaolack and Matam regions.

This report presents the results drawn from the data collected. It sheds light on the characteristics, patterns and drivers of rural migration from these two Senegalese regions.

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