

Population growth, land pressure, and the restructuring of agricultural areas in the former Arso Villages of Southwestern Côte D'Ivoire

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Abstract

This article analyses the effects of population growth and land pressure on the reconfiguration of agricultural spaces in the former villages established by the Authority for the Development of the South-West Region (ARSO) in Côte d'Ivoire. The study focuses on Boigny Kro, Do-Sakassou, Grobonou-Dan and Nonoua, villages created as part of the resettlement of populations displaced following the construction of the Kossou Dam. The methodology combines population census data from 1975 to 2021, documentary research, direct observation, interviews, and a 2025 survey of 100 household heads, with 25 respondents selected in each village. The results show that the combined population of the four villages increased from 3,186 inhabitants in 1974 to 20,791 in 2021. At the same time, of the 7,980 hectares of cultivable land initially allocated to the villages, only 18 hectares were reported as still available in 2025. This growing land scarcity has been accompanied by a reconfiguration of farming systems: rubber has become the main crop for 54% of the surveyed household heads, compared with 33% for cocoa and 13% for coffee. Village economies have also diversified through the development of trade, crafts and services. Furthermore, among the 221 migrants identified, 77.8% are young people and 86.4% migrate to urban areas. These transformations highlight a transition from a pioneer agricultural model based on relative land abundance and plantation expansion to a rural system increasingly characterized by land saturation, economic diversification and growing youth mobility.

Keywords: Population growth, land pressure, agricultural frontier, agricultural restructuring, southwestern Côte d'Ivoire

Introduction

From the 1960s and 1970s onwards, south-western Côte d'Ivoire was one of the country's main agricultural frontier regions. Its development was supported by public land-use planning policies, agricultural migration and the expansion of cash crops, particularly coffee and cocoa. The availability of forest land encouraged the settlement of people from other regions of the country and neighbouring states, contributing to rapid population growth and the expansion of cultivated areas. The work of P. Léna (1979, p.85), R. Balac (1990, p.5) and A.L. Koffi (1991^[2, 6], p.6) has amply demonstrated the role of these migrations and access to land in the development of the agricultural landscape of the South-West.

This pioneering dynamic has, however, gradually reached its limits. Population growth, the expansion of perennial crops and the continued encroachment on forest reserves have led to a scarcity of available land. In the Lower Sassandra region, E. Léonard and R. Balac (2005, p.149) analyse this development as the 'completion of the pioneering cycle', whilst C.Y. Koffié-Bikpo and A.A. Adaye (2015^[7], p.3) highlight the intensification of land constraints driven by population growth and the plantation economy. Land saturation also affects the opportunities for new generations to settle and contributes to changing social relations surrounding land (G.J. Ibo, 2006^[4], p.4). However, it does not merely lead to a reduction in opportunities for agricultural expansion. Farmers are developing various adaptation strategies, notably the diversification of crops and sources of income. In south-western Côte d'Ivoire, A.M. Tano (2008, p.323 ; 2012^[11, 12], p.15) shows that land, production and economic constraints are contributing to a reorientation of farmers' strategies. Similar trends in

agricultural diversification in response to land saturation have been observed in other parts of Africa (H. Azaou *et al.*, 2020^[1], p.30).

The former villages of the South-West Regional Development Authority (ARSO) provide a particularly relevant case study for analysing these transformations over the long term. Boigny Kro, Do-Sakassou, Grobonou-Dan and Nonoua were established in the early 1970s to accommodate people displaced by the construction of the Kossou Dam. Initially provided with land reserves intended for the settlement of households and the expansion of plantations, these villages have experienced strong population growth: their combined population rose from 3,186 inhabitants in 1974 to 20,791 in 2021. At the same time, opportunities for agricultural expansion have been considerably reduced, whilst rubber cultivation, non-agricultural activities and the migration of young people are playing an increasingly important role in households' strategies.

Whilst research on south-western Côte d'Ivoire has extensively documented the opening up of pioneer frontiers, agricultural migration, the crisis in the plantation economy and land-related tensions, the contemporary trajectory of villages established under the ARSO programme remains less well documented in terms of the interplay between population growth, land saturation and agricultural and socio-economic restructuring. The aim of this study is precisely to analyse, nearly half a century after their creation, the future of these planned pioneer territories. It thus seeks to demonstrate how an area initially characterised by a relative abundance of land and the expansion of plantations is evolving, with the closure of the frontier, towards forms combining the restructuring of agricultural systems, economic diversification and urban mobility.

The central question, therefore, is as follows: how do population growth and pressure on land contribute to the restructuring of agricultural areas in the former villages of the ARSO in south-western Côte d'Ivoire? The aim of this article is to analyse the relationships between population dynamics, pressure on land resources, and the agricultural and socio-economic restructuring observed in Boignykro, Do-Sakassou, Grobonou-Dan and Nonoua.

Materials and methods

1. Description of the study area

The study area is situated to the east of the sub-prefecture of Gabiadji, in the department of San Pedro, in south-western Côte d'Ivoire. Covering an area of approximately 600 km², it comprises four former villages of the Authority for the Development of the South-West Region (ARSO): Boignykro, Do-Sakassou, Grobonou-Dan and Nonoua, as well as their surrounding agricultural areas. It extends between 5°00' and 5°65' north latitude and 6°21' and 6°28' west longitude (Figure 1).

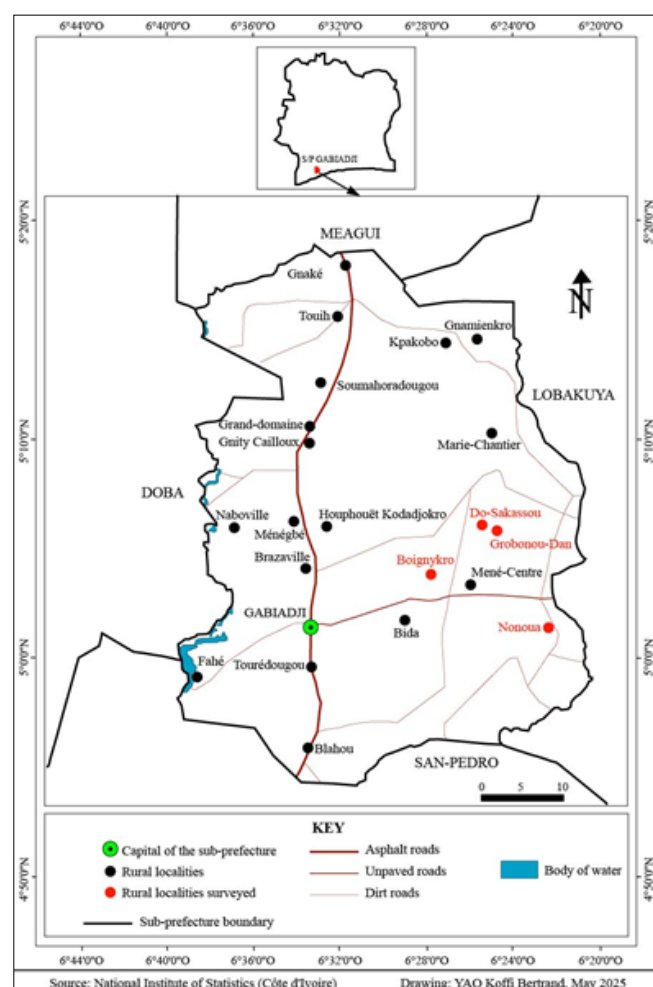


Fig 1: Location of the study area

These villages were established in the early 1970s as part of the ARSO's resettlement programme for people displaced by the construction of the Kossou Dam. Consisting mainly of Baoulé and, to a lesser extent, Gouro, these communities were settled in the Nonoua Forest and allocated land for the development of agricultural holdings, particularly for coffee and cocoa. Subsequent agricultural migration has helped to diversify the population, which now comprises indigenous

and non-indigenous people, as well as people from several countries in the sub-region.

The area belongs to the humid sub-equatorial zone, with annual rainfall exceeding 1,500 mm and soils favourable to agricultural activities. The original dense rainforest has gradually given way to a landscape combining forest remnants, fallow land and agricultural holdings dominated in particular by cocoa, rubber trees and oil palms. The choice of these four villages is primarily due to their unique history: initially established in a context of relative land availability, they now provide an opportunity to observe the long-term effects of settlement and land pressure on the reconfiguration of agricultural landscapes.

2. Data collection and processing methods

Data collection combined desk research with fieldwork. The desk research focused on land-use planning in south-western Côte d'Ivoire, the resettlement of communities following the construction of the Kossou Dam, agricultural migration, the plantation economy and land tenure dynamics. Demographic data were drawn from the general population censuses of 1975 [5], 1988, 1998, 2014 and 2021, supplemented by figures available at the time of the settlements' establishment in 1974. These data enabled us to reconstruct the demographic trends of the four villages over nearly five decades.

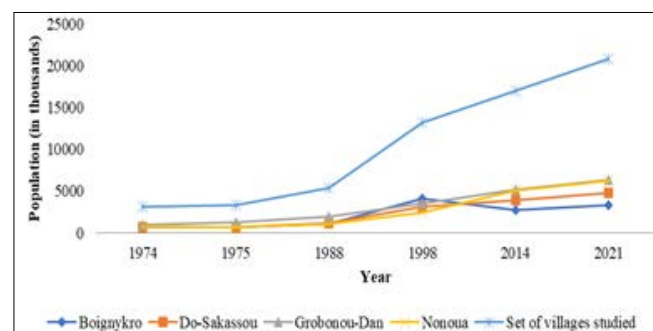
The field investigations, carried out in 2025, combined direct observation, interviews and a questionnaire survey. Observations made in the villages and their agricultural areas focused on land use, land availability, crops grown and changes to the landscape. These were supplemented by interviews with village authorities and key informants familiar with the local land and agricultural history. The questionnaire survey involved 100 agricultural household heads, i.e. 25 in each of the four villages. Their selection was based on a purposive sampling approach, prioritising household heads directly involved in agricultural activities and with knowledge of land access conditions and changes to farms. The even distribution of respondents serves a comparative purpose by giving each village equal weight in the analysis. Given the non-probabilistic nature of the sampling, the results allow trends within the surveyed households to be identified, but do not constitute statistical estimates that can be generalised to all farming households in the area.

The quantitative data underwent descriptive statistical analysis based on the calculation of counts, frequencies and proportions, and were then summarised in the form of tables and graphs. Demographic trends were assessed on the basis of changes in population figures and the Average Annual Growth Rate (AAGR) between the various intercensal periods. Land pressure was analysed by comparing the arable land initially allocated with that reported as still available in 2025, supplemented by information gathered from households and key informants. Changes in agricultural structure were examined based on the role of the main crops on farms, whilst non-agricultural activities and the migration of household members provided insight into the diversification of economic strategies. Qualitative data from interviews and observations were subjected to thematic analysis and used to contextualise the quantitative results. Finally, spatial data were used to map the study area and locate the villages.

Results

1. Sustained population growth, but varying over time

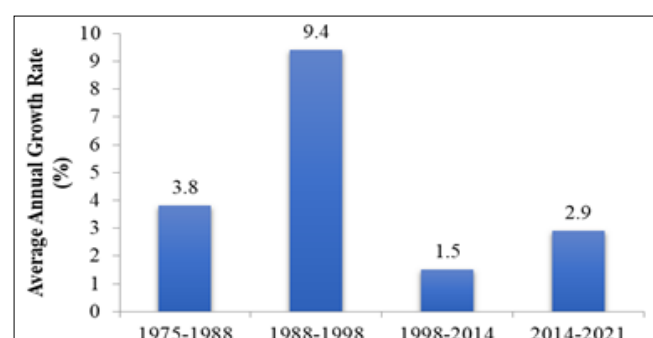
The historic villages of the ARSO have experienced strong population growth since people first settled there. Their combined population rose from 3,186 inhabitants in 1974 to 20,791 in 2021, representing an increase of approximately 6.5-fold over 47 years (Figure 2). This increase was particularly marked between 1988 and 1998, a period during which the population rose from 5,352 to 13,232 inhabitants, representing an increase of nearly 2.5-fold in ten years.



Source: RGP, 1975; RGPH, 1988, 1998, 2014 and 2021.

Fig 2: Population trends in the former villages of the ARSO from 1974 to 2021

The average annual growth rates confirm this divergent trend (Figure 3). From 3.8 per cent between 1975 and 1988, the rate peaked at 9.4 per cent between 1988 and 1998, before slowing to 1.5 per cent between 1998 and 2014, and then rising again to 2.9 per cent between 2014 and 2021.



Source: RGP, 1975; RGPH, 1988, 1998, 2014 and 2021.

Fig 3: Trend in the average annual population growth rate of the former villages in the ARSO

The demographic trend thus reveals an initial phase of strong growth up to the late 1990s^[9], followed by more moderate growth. The acceleration in population growth is linked to the settlement of non-native and foreign populations, attracted in particular by the area's agricultural potential. However, the available data do not allow for a quantitative distinction to be made between the contribution of net migration and that of natural increase. This sustained population growth has taken place in an area with limited land resources and has been accompanied by a sharp reduction in available arable land.

2. A sharp decline in available land

Population growth has been accompanied by a sharp reduction in land reserves intended for agricultural expansion. Of the 7,980 ha initially allocated to the four villages, only 18 ha are reported to remain available in

2025, representing approximately 0.2 per cent of the reference area (Table 1). The situation is particularly acute in Boigny Kro and Do-Sakassou, where no reserves are reported, whilst Grobonou-Dan and Nonoua have only 15 and 3 ha respectively remaining.

Table 1: Changes in arable land allocated in 1974 and still available in 2025 in the former villages of the ARSO

Localities	Area allocated in 1974 (ha)	Area still available in 2025 (ha)
Boigny Kro	1,850	00
Do-Sakassou	1,410	00
Grobonou-Dan	2,660	15
Nonoua	2,060	03
Total	7,980	18

Source: Field surveys, 2025.

This virtual disappearance of reserves reflects a high degree of land saturation and marks a break with the situation that prevailed when the villages were first established, when the availability of land allowed households to settle and plantations to expand. This has coincided with a sharp increase in the population, which rose from 3,186 inhabitants in 1974 to 20,791 in 2021. However, the available data do not allow for the establishment of an exclusive causal link between these two trends. The reduction in available land is also the result of the gradual occupation of land and the expansion of perennial crops. This now limits the scope for farm expansion and is contributing to the restructuring of agricultural systems.

3. A restructuring of agricultural systems characterised by the rise of rubber cultivation

The agricultural systems of the former ARSO villages, initially centred on coffee and cocoa, now feature rubber cultivation as a major component. In 2025, 54 per cent of the 100 heads of agricultural households surveyed cited rubber as their main agricultural sector, compared with 33 per cent for cocoa and 13 per cent for coffee (Table 2).

Table 2: Breakdown of heads of agricultural households by main crop sector in 2025

Localities	Cocoa (number of trees)	Cocoa (%)	Coffee (number of trees)	Coffee (%)	Rubber (number of trees)	Rubber (%)
Boigny Kro	12	48.0	2	8.0	11	44.0
Do-Sakassou	11	44.0	6	24.0	8	32.0
Grobonou-Dan	4	16.0	2	8.0	19	76.0
Nonoua	6	24.0	3	12.0	16	64.0
Total	33	33.0	13	13.0	54	54.0

Source: Field surveys, 2025.

However, this pattern reveals significant differences between the four villages. The growth of rubber cultivation is particularly marked in Grobonou-Dan, where it is the main livelihood for 76 per cent of the heads of households surveyed. It is also dominant in Nonoua, accounting for 64 per cent of those surveyed. In these two villages, cocoa accounts for only 16 per cent and 24 per cent respectively of the main crops reported, whilst coffee occupies an even smaller share, at 8 per cent and 12 per cent. Rubber cultivation thus appears to be the main agricultural focus for the households surveyed in these two villages.

The situation is different in Boignykro and Do-Sakassou, where cocoa retains the top position. In Boignykro, it is the main crop for 48 per cent of respondents, compared with 44 per cent for rubber and only 8 per cent for coffee. The gap between cocoa and rubber is therefore narrow, reflecting an agricultural structure divided between these two crops. In Do-Sakassou, cocoa remains more clearly dominant at 44 per cent, followed by rubber at 32 per cent and coffee at 24 per cent. This latter village is notable for its relatively higher proportion of coffee, whereas this crop has become very much a minority in the other three villages.

Across the entire area, the results thus reveal a new hierarchy of the main crops: rubber (54 per cent), cocoa (33 per cent) and coffee (13 per cent). Coffee, which, along with cocoa, formed one of the cornerstones of the initial

agricultural development of these villages, now occupies a secondary position amongst the households surveyed. Cocoa retains an important place, but rubber has emerged as the primary crop reported. This does not therefore signify the disappearance of the coffee-cocoa system, but rather a restructuring of cash crops in favour of rubber cultivation. Field observations confirm the presence of rubber trees in the agricultural landscapes of the former ARSO villages. Plantations are notably found in Nonoua, including in marshy areas, as well as on the outskirts of Boignykro (photographic plate 1). Their presence spatially reflects the importance this crop has acquired on farms.

Photographic plate 1: Presence of rubber cultivation in the agricultural areas of Nonoua and Boignykro



Source: Field surveys, 2025.

Photo 1: Rubber tree plantation in a marshy area in Nonoua



Photo 2: Rubber tree plantation at the entrance to the village of Boignykro

These results therefore highlight a transformation in the agricultural structure of the former ARSO villages, albeit with varying degrees of intensity across different areas. Grobonou-Dan and Nonoua are clearly dominated by rubber tree cultivation, whilst Boignykro and Do-Sakassou remain more heavily reliant on cocoa. This restructuring of cash crops is accompanied by another change: the development of economic activities outside agricultural production, which reflects a growing diversification of sources of livelihood in the four villages.

4. Diversification of economic activities beyond agriculture

The restructuring of agricultural landscapes in the former ARSO villages is not limited to the changes observed in cash crops. It is also accompanied by a diversification of economic activities, evidenced by the presence of trade, crafts and services linked to information and communication technologies. The survey carried out in 2025 identified 83 informal economic enterprises in the four villages (Table 3).

Table 3: Breakdown of informal economic activities identified in the former ARSO villages in 2025

Types of business	Nature of business	Boignykro	Do-Sakassou	Grobonou-Dan	Nonoua	Total	%
Crafts	Bicycle/motorbike repairs	1	1	3	1	6	7.2
Retail	Shops	4	2	8	3	17	20.5
	Food retail	6	4	23	6	39	47.0
	Footwear retail	0	0	2	0	2	2.4
	Second-hand clothing retail	0	0	3	1	4	4.8
	Orange Money service points	1	0	3	1	5	6.0
ICT	Telephone booths	2	1	4	2	9	10.9
	Mobile phone repairs	0	0	1	0	1	1.2
Total		14	8	47	14	83	100.0
Share per village (%)		16.9	9.6	56.6	16.9	100.0	

Source: Field surveys, 2025.

The structure of these activities reveals, first and foremost, a strong commercial focus. The various forms of trade account for 67 out of the 83 businesses surveyed, representing approximately 80.7 per cent of the total. Food retail alone is the main activity, with 39 businesses, or 47

per cent of the total. This is followed by shops, which account for 17 businesses (20.5 per cent). Other forms of retail (second-hand clothing, footwear and Orange Money services) remain less numerous, but reflect a diversification of the goods and services offered to the local population.

ICT-related activities play a more limited role, with 10 businesses, including nine telephone booths and one mobile phone repair shop. Bicycle and motorbike repair accounts for six businesses, or 7.2 per cent of the total. The presence of these various services therefore reflects a local economy that does not rely exclusively on agricultural production. The spatial distribution of activities also reveals significant disparities between villages. Grobonou-Dan alone accounts for 47 of the 83 units surveyed, representing 56.6 per cent of the total. This predominance extends to almost all categories: 23 of the 39 food retail outlets, eight of the 17 shops, three of the six mechanical workshops, three of the five Orange Money service points and four of the nine

telephone booths are located there. Grobonou-Dan thus emerges as the main hub of non-agricultural activities amongst the four localities studied. Conversely, Do-Sakassou comprises just eight units, or 9.6 per cent of the total. Boigny Kro and Nonoua occupy an intermediate and identical position, with 14 units each, representing 16.9 per cent of the activities recorded respectively. Economic diversification is therefore common to all four villages, but its extent varies considerably from place to place.

Photographic plate 2: Some non-agricultural economic activities in the former villages of the ARSO



Photo 3: Orange Money service point and maquis in Nonoua



Photo 4: Bicycle and motorbike repair workshop in Nonoua



Photo 5: Second-hand clothes shop in Nonoua

Source: Field surveys, 2025.

Photographic panel 2 illustrates the diversification of economic activities in Nonoua through the presence of shops, services and craft activities. The Orange Money outlet and the 'maquis' (photo 3), the bicycle and motorbike repair shop (photo 4) and the second-hand clothes shop (photo 5) bear witness to the expansion of the village's economic functions beyond agricultural production. These activities meet growing needs for financial services, consumer goods, transport and manufactured goods. They thus corroborate the findings of the survey and demonstrate the emergence of a network of non-agricultural activities that is contributing to the diversification of the village

economy, without undermining the central role that agriculture still plays.

5. Migration dominated by young people and directed towards urban areas

The socio-economic restructuring of the former ARSO villages is accompanied by the migration of some members of farming households. The survey of 100 heads of household identified 221 people who had left the four villages studied. Analysis of these movements highlights variations in the intensity of out-migration across villages, a strong predominance of young people, a clear preference for

urban centres, and employment primarily in the secondary and tertiary sectors.

5.1 The rate of out-migration varies from village to village

Out-migration occurs in all the localities studied, but the scale of it varies considerably from one village to another (Table 4).

Table 4: Breakdown of registered migrants by village of origin in 2025

Localities	Number	%
Boigny Kro	107	48.4
Do-Sakassou	27	12.2
Grobonou-Dan	42	19.0
Nonoua	45	20.4
Total	221	100.0

Source: Field surveys, 2025.

Boigny Kro has the highest number of migrants, with 107 people, accounting for 48.4 per cent of all recorded departures. This village alone thus accounts for nearly half of the migrants identified among the households surveyed. It is followed by Nonoua, with 45 migrants (20.4 per cent), and Grobonou-Dan, with 42 people (19 per cent). Do-Sakassou has the lowest number, with 27 migrants, representing 12.2 per cent of the total.

Migration therefore affects all four villages, but appears to be quantitatively much more significant in Boigny Kro. This distribution highlights an uneven participation of the localities in migratory flows. Beyond these differences in numbers, an analysis of the age structure provides a clearer picture of the populations affected by out-migration.

5.2 Mobility mainly affecting young people

The age structure of migrants reveals a very high proportion of young people among the out-migration recorded in the four villages (Table 5).

Table 5: Breakdown of migrants by age group in 2025

Localities	Young people		Adults		Elderly	
	Number	%	Number	%	Number	%
Boigny Kro	83	77.6	22	20.5	02	01.9
Do-Sakassou	17	63.0	10	37.0	00	00.0
Grobonou-Dan	36	85.7	06	14.3	00	00.0
Nonoua	36	80.0	08	17.8	01	02.2
Total	172	77.8	46	20.8	03	01.4

Source: Field surveys, 2025.

Of the 221 migrants recorded, 172 fall into the ‘young people’ category, representing 77.8 per cent of the total. Adults account for only 20.8 per cent and older people 1.4 per cent. Migration therefore appears to be a phenomenon that primarily affects the younger generations of farming households.

This predominance is observed in all four localities, although its extent varies. It is particularly pronounced in Grobonou-Dan, where young people make up 85.7 per cent of migrants, and in Nonoua, where their proportion reaches 80 per cent. They also account for 77.6 per cent of departures recorded in Boigny Kro. Do-Sakassou has the lowest proportion, but young people still constitute a large majority there, accounting for 63 per cent of migrants.

In contrast, the mobility of older people remains marginal: only three individuals in this category were recorded amongst the 221 migrants. This age distribution thus highlights the predominantly youthful nature of migration from the former villages of the ARSO.

5.3 Migration flows mainly directed towards urban centres

The chosen destinations show that migration flows from the former villages of the ARSO are overwhelmingly directed towards urban areas (Table 6).

Table 6: Breakdown of migrants by destination in 2025

Destinations	Boigny Kro	Do-Sakassou	Grobonou-Dan	Nonoua	Total	%
Gabiadji	11	04	06	04	25	11.3
San Pedro	27	10	08	12	57	25.8
Méagui	18	05	08	08	39	17.6
Soubre	08	01	05	03	17	07.7
Sassandra	03	00	00	02	05	02.3
Abidjan	11	03	05	02	21	09.5
Other urban areas	08	02	07	10	27	12.2
Total urban destinations	86	25	39	41	191	86.4
Former site (Centre)	13	01	00	00	14	06.3
Other rural localities	08	01	03	4	16	07.2
Total rural destinations	21	02	03	04	30	13.6
Grand total	107	27	42	45	221	100.0

Source: Field surveys, 2025.

Of the 221 migrants recorded, 191 – or 86.4 per cent – are heading for urban areas, compared with just 30 people (13.6 per cent) heading for rural areas. Migration from the four villages is therefore predominantly rural-to-urban.

Among the destinations, San Pedro is the main destination, with 57 migrants, or 25.8 per cent of the total. This town is followed by Méagui, which receives 39 people (17.6 per cent). Gabiadji receives 11.3 per cent of the migrants, whilst Abidjan receives 9.5 per cent and Soubre 7.7 per cent. Other urban localities account for 12.2 per cent of departures.

The geographical distribution of these destinations highlights, above all, the importance of urban centres in south-western Côte d’Ivoire. San Pedro, Méagui, Gabiadji, Soubre and Sassandra together account for 143 out of 221 migrants, or 64.7 per cent of all recorded departures. Migration flows therefore remain predominantly confined to the regional area surrounding the villages studied. Abidjan also acts as a magnet, but its influence remains less significant than that of San Pedro or Méagui.

Rural destinations are significantly less common. They account for 30 migrants, of whom 14 are heading for the former sites of the Ivorian Centre and 16 for other rural localities. The migration observed therefore reflects not so much a move towards new agricultural areas as a predominant trend towards towns, particularly those in the South-West.

5.4 Labour market integration dominated by secondary and tertiary sector activities

The predominant trend of migration towards towns is accompanied by a diversification of the activities

undertaken by migrants. The analysis here focuses on the 191 people who have settled in the previously identified urban destinations (Table 7).

Table 7: Breakdown of urban migrants by sector of activity in host towns in 2025

Place of origin	Primary		Secondary		Tertiary	
	Number	%	Number	%	Number	%
Boigny Kro	07	08.1	42	48.9	37	43.0
Do-Sakassou	03	12.0	10	40.0	12	48.0
Grobonou-Dan	06	15.4	13	33.3	20	51.3
Nonoua	11	26.8	15	36.6	15	36.6
Total	27	14.1	80	41.9	84	44.0

Source: Field surveys, 2025.

The sectoral breakdown highlights the limited role of primary sector activities in the labour market integration of urban migrants. Only 27 people, or 14.1 per cent, are employed in the primary sector. By contrast, 80 migrants (41.9 per cent) work in the secondary sector and 84 (44 per cent) in the tertiary sector. These two sectors thus account for 85.9 per cent of the 191 migrants living in the town.

This general trend varies somewhat depending on the village of origin. Migrants from Grobonou-Dan are mainly employed in the tertiary sector, which accounts for 51.3 per cent of their employment. The same is true in Do-Sakassou, where the tertiary sector accounts for 48 per cent of migrants. For those from Boigny Kro, the secondary sector ranks first at 48.9 per cent, ahead of the tertiary sector at 43 per cent. Nonoua shows a more balanced distribution between the secondary and tertiary sectors, each accounting for 36.6 per cent, whilst the primary sector accounts for 26.8 per cent there – the highest proportion of the four villages.

The low representation of the primary sector amongst urban migrants contrasts with the agricultural background of the households surveyed. Migration is thus accompanied by a shift in occupation towards non-agricultural activities, mainly in the secondary and tertiary sectors. In the destination areas, this trend is in line with the economic diversification already observed within the villages themselves through the development of trade, crafts and services.

Discussion

1. From abundance to land saturation: the long-term effects of settlement in a former frontier region

The results highlight a profound transformation in the relationship between population and land resources in the former villages of the ARSO. Between 1974 and 2021, their combined population rose from 3,186 to 20,791 inhabitants, whilst, of the 7,980 ha initially allocated, only 18 ha are still reported as available in 2025. This development reflects the transition from an area characterised by a relative abundance of land to a territory where the scope for agricultural expansion is now severely limited.

This trajectory forms part of the history of the frontier in south-western Côte d'Ivoire. P. Léna (1979, p.4) shows that the development of this region was based on the availability of forest land, immigration and the expansion of cash crops. R. Balac (1990 ^[2], p.5) and A. Anoh and A.L. Koffi (1990 ^[2], p.13) also highlight the role of the search for land and the establishment of plantations in migration to this region. The villages studied are part of this dynamic, though with the distinctive feature that their initial settlement was organised

by the state as part of the resettlement of populations displaced by the Kossou Dam. As early as 1990 ^[9], Anoh and Koffi were already raising questions about the land-use constraints likely to result from the intensification of settlement in the South-West.

The current situation corresponds to what E. Léonard et R. Balac (2005, p.149) describe as the 'completion of the pioneering cycle': when land reserves are exhausted, the agricultural system can no longer sustain itself through the continuous opening up of new land. C.Y. Koffié-Bikpo and A.A. Adaye (2015 ^[7], p.3) also observe in Bas-Sassandra a shift from a situation where demand for land could be met to a scarcity of available land resulting from its gradual occupation. The saturation observed in the villages of the ARSO is thus the culmination of a cumulative process involving settlement, migration, the establishment of farms and the expansion of perennial crops.

This closure of the frontier also affects the conditions under which farms can be sustained. G.J. Ibo (2006 ^[4], p.4) shows that the scarcity of land in the former Ivorian frontiers particularly jeopardises the establishment of younger generations and fuels intergenerational tensions. The case of the ARSO thus provides a diachronic perspective on the future of a planned frontier: nearly half a century after its creation, the initial model, based on land availability and the expansion of plantations, has reached its limits and is leading households to seek other forms of adaptation.

2. The restructuring of agricultural systems and economic diversification as responses to land constraints

The increasing scarcity of land does not merely result in a reduction in opportunities for agricultural expansion. It is accompanied by a restructuring of production systems: 54 per cent of the household heads surveyed cited rubber as their main crop, compared with 33 per cent for cocoa and 13 per cent for coffee. At the same time, the 83 non-agricultural units recorded reflect the growth of trade, crafts and services. Household responses thus reflect both agricultural transformations and economic diversification.

This trend is consistent with E. Mollard's (1993, p.61) analyses of agriculture in frontier regions. When opportunities for spatial expansion diminish, the extensive plantation model is driven to transform through processes of reconversion, intensification or diversification. The rise of rubber cultivation in the villages of the ARSO can be interpreted in this light: it does not signify the disappearance of the plantation economy, but rather its restructuring beyond the traditional coffee-cocoa pairing.

The findings are also consistent with those of A.M. Tano (2008, p.332 ; 2012 ^[11, 12], p.186) in south-western Côte d'Ivoire. His research shows that farmers facing economic, land-use and production constraints are diversifying both their crops and their sources of income, notably through rubber cultivation and off-farm activities. A similar trend was observed by H. Azaou *et al.* (2020 ^[1], p.32) in Santchou, Cameroon, where land saturation and the coffee crisis have encouraged the diversification of cash crops and the restructuring of agricultural landscapes. In both cases, therefore, the reduction in opportunities for expansion does not lead to the abandonment of agriculture, but rather to the transformation of production systems within a space that has become more constrained.

The presence of shops, craft workshops and services in villages extends this reconfiguration beyond individual farms. It aligns with the distinction drawn by A.M. Tano (2012 ^[12], p.186) between agricultural and non-agricultural income diversification. Land constraints should not, however, be regarded as the sole determinant of these transformations, which also depend on economic conditions, the availability of labour, the state of the plantations and local opportunities. The former villages of the ARSO are thus evolving towards a more diversified rural economy, combining perennial crops with non-agricultural activities.

3. The migration of young people to towns and cities as a strategy for the restructuring of farming households

This restructuring also affects patterns of mobility: of the 221 migrants recorded, 77.8 per cent are young people and 86.4 per cent are moving to urban areas. Of those who have settled in towns, 85.9 per cent are employed in the secondary and tertiary sectors. These findings show that the diversification of economic trajectories now extends beyond farming and the village to encompass predominantly urban mobility.

This development marks a remarkable transformation in the migratory patterns of the South-West. A.L. Koffi (1991 ^[6], p.6) shows that, historically, Baoulé migration was directed towards this region due to the availability of land and the opportunities offered by coffee and cocoa. R. Balac (1990 ^[2], p.20) also highlights the role of differences in land availability in the movements accompanying the expansion of agricultural settlement. The former villages of the ARSO, once places of welcome for people seeking land, are therefore also becoming places of departure, particularly for young people.

This partial reversal can be linked to the analyses by G.J. Ibo (2006 ^[4], p.8), according to which the scarcity of land in former frontier areas reduces opportunities for new generations to set up in farming. It also ties in with the work of A.M. Tano (2012 ^[12], p.186), which shows that households facing the constraints of the plantation economy combine several diversification strategies. From this perspective, urban migration may constitute a spatial extension of these strategies: diversification concerns not only activities, but also the spaces in which household members seek their livelihoods.

This interpretation must, however, be treated with caution: whilst the data establish the predominance of young people and urban destinations, they do not allow each departure to be attributed to land saturation. Employment, training, individual aspirations and urban opportunities also play a part in migration choices. Nevertheless, the low proportion of migration to rural areas (13.6 per cent) and the fact that the majority of migrants are absorbed into the secondary and tertiary sectors indicate a spatial and occupational diversification of migration trajectories. Thus, the closure of the 'pioneer frontier' is accompanied by a more general shift in the household reproduction model, now based on a combination of agricultural restructuring, non-agricultural activities and urban mobility.

Conclusion

The study of the former villages of the ARSO highlights a profound transformation in the relationships between settlement, land availability and the organisation of rural activities. Over nearly half a century, Boigny Kro, Do-Sakassou, Grobonou-Dan and Nonoua have evolved from

agricultural areas with relatively substantial land reserves into territories characterised by near-saturation. The combined population rose from 3,186 inhabitants in 1974 to 20,791 in 2021, whilst only 18 ha of the 7,980 ha initially allocated were still reported as available in 2025.

The gradual closure of this frontier is accompanied by a shift in household strategies. This is reflected in the growing importance of rubber cultivation – the main livelihood for 54 per cent of the heads of households surveyed – the development of commercial, craft and service activities, and the significant level of urban migration. Young people account for 77.8 per cent of the migrants recorded, and 86.4 per cent of those leaving are heading for towns and cities. These changes show that adaptation to land scarcity no longer takes place primarily through the spatial expansion of farms, but through a combination of agricultural restructuring, economic diversification and migration.

The contribution of this study thus lies in highlighting the long-term trajectory of a planned frontier, which has evolved from a model based on the relative abundance of land and the expansion of plantations to a rural system characterised by land saturation and the diversification of household livelihood strategies. This evolution raises, in particular, the question of younger generations' access to land and the renewal of rural economies in former frontier areas. Diachronic analyses of land use and land transfer mechanisms would enable these findings to be extended and would provide a better understanding of the spatial transformations associated with the closure of the frontier cycle.

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