

RECENT DEMOGRAPHIC TRANSFORMATIONS IN THE PRUT RIVER BASIN DURING THE 2014-2024 PERIOD: CHALLENGES AND OPPORTUNITIES

DOI: <https://doi.org/10.53486/dri2026.79>
UDC: 314.04"2014/2024"(478)

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Abstract: *This paper analyzes the demographic dynamics within the Prut River hydrographic basin over the 2014-2024 decade, frameworked by the "Siret-Prut-Nistru" and "Lower Danube" Euroregions. The study aims to identify evolutionary trends in population size, age structure, and natural movement indicators across riparian localities. The methodology integrates comparative analysis, statistical methods, and GIS cartographic representation, relying on official usual residence data and census results provided by BNS and INS. The findings reveal severe depopulation, with rural population decline exceeding the critical threshold of 30%. Structural analysis highlights pronounced demographic ageing (mean age >40 years) and a massive productive exodus, phenomena that directly jeopardize the socio-economic sustainability of critical utility infrastructure (water and sanitation). Ultimately, the study underscores strategic opportunities driven by cross-border cooperation, smart water management, and eco-tourism to stabilize and retain regional human capital.*

Keywords: *hydrographic basin, population dynamics, demographic ageing, critical infrastructure, Prut River.*

JEL: J11, R11, Q56.

Introduction

The Prut River Basin is a strategic cross-border area on the eastern border of the European Union, covering an area of approximately 8,250 km² (24.4% of the country) on the territory of the Republic of Moldova. Integrated resource management is integrated in the Danube-Prut and Black Sea District, the region being essential for cohesion policies within the "Siret-Prut-Nistru" and "Lower Danube" Euroregions ("Siret-Prut-Nistru" Euroregion, 2023). The current configuration of settlements in this hydrographic space reflects a close historical interdependence between water resources and the dynamics of riparian human communities (Chirică and Bejan, 2009).

In the decade 2014–2024, the area has experienced radical demographic transformations. The confluence of chronic natural decline, massive emigration of the active population and socio-economic restructuring has triggered a severe contraction of human capital. The sharp depopulation deeply affects rural localities in the vicinity of the Prut riverbed, an evolution statistically highlighted by applying the usual residence indicator to the detriment of the scriptical population (BNS, 2025). This dynamic represents a systemic vulnerability that directly undermines the sustainability of public investments and water supply systems provided for in national strategies (Ministry of Infrastructure and Regional Development of the Republic of Moldova, 2022).

This research analyzes the spatial-temporal disparities of population, age structure and natural movement in riverside localities. Based on official data on structural dynamics (BNS, 2024), the study applies a methodology focused on comparative analysis and cartographic modeling. The aim of the work is to quantify the structural decline and to identify cross-border financing solutions — using the axes of the European programs for smart water networks — in order to capitalize on human potential in sustainable development and eco-tourism projects (Interreg Next Cross-Border Program Romania-Republic of Moldova, 2024).

Methodology and data sources

The research on demographic evolution in the Prut basin is based on data from the National Statistical Office (2024) and the National Institute of Statistics (2024). For comparability, indicators were extracted from the 2004, 2011 (INS, 2013) and 2014 (NSO, 2016) Censuses, supplemented with current estimates (2014–2024). The methodology replaces the stable population with the “usual resident” (USR) population according to international standards (UNECE, 2015), correcting for migration distortions (Gogu, 2021) for persons present for at least 12 months. The indicators cover dynamics, age groups (0–14, 15–59, 60+), average age, natural increase and ageing (Ghenea and Matei, 2018; Penina, 2020).

Data processing integrates the following methods (Muntele, 2010):

- Comparative analysis: Highlights the rhythms of depopulation and territorial structural gaps (Benedek, 2004), revealing patterns of urban and rural contraction.
- Statistical-mathematical methods: Used to calculate the aging, dependency and percentage variation indices (Ghenea and Matei, 2018).
- Cartographic and GIS method: Implemented for the spatialization of indicators at district level (Grozavu and Pleșcan, 2015), identifying critical areas and resilience poles in the “Siret-Prut-Nistru” and “Lower Danube” Euroregions (Savu and Dumitru, 2019).

Analysis of demographic population indicators (2014–2024)

Rural population dynamics: Decline and “desertification” of riverside localities

According to the final results of the 2024 Population and Housing Census (PHC), the population of the Republic of Moldova has undergone profound transformations in the last decade (BNS, 2026).

The numerical contraction affects the entire Prut basin, but with different territorial intensities.

Unlike the moderate decline in the period 1989–2009, the decade 2014–2024 is marked by a steep collapse of the population with usual residence (Chirică and Bejan, 2009; BNS, 2025). The districts in the northern sector of the basin, especially Briceni and Edineț, record the highest depopulation rates, exceeding the critical threshold of 15–20% in some localities in just ten years.

Table 1: RURAL population dynamics in the 12 districts of the Prut Basin (2014–2024)

Nr.	District	Number in 2014 (RPL)	Number in 2024 (Est. BNS)	Variation (%)
1	Briceni	62.729	44.300	-29,4%
2	Ocnîța	30.125	21.200	-29,6%
3	Edineț	41.500	29.800	-28,2%
4	Glodeni	41.006	28.500	-30,5%
5	Fălești	66.400	45.300	-31,8%
6	Ungheni	70.264	47.600	-32,3%
7	Nisporeni	41.400	29.200	-29,5%
8	Hîncești	88.335	59.500	-32,6%
9	Leova	37.424	25.600	-31,6%
10	Cantemir	48.715	34.700	-28,8%
11	Cahul	75.324	45.800	-39,2%
12	Rîșcani	55.400	39.800	-28,2%
Total Bazinul Prut (Rural)		658.602	451.300	-31,5%

Data source: statistica.gov.md - Population with usual residence (National Bureau of Statistics, 2024)

The data in Table 1 reveal a severe demographic contraction in the Prut River Basin (2014–2024), defined by the following coordinates:

- Dimension of the decline: The rural population of the basin has generally decreased by over 31.5% (BNS, 2025).
- Critical area: Cahul (-39.2%) and Hincesti districts record the largest absolute losses, indicating a profound destructuring of the communities in the Lower Prut (Bacāl and Țugulea, 2024).
- Central sector: In Ungheni (-32.3%) and Hincesti (-32.6%), the decline is accelerated by the combined pressure of internal migration and cross-border commuting (Muntele, Grozavu and Roșu, 2018).
- Determinisms: Over 80% of this deficit is caused by external migration of the 20–40 age group, a phenomenon that eliminates productive and reproductive capital, while negative natural growth accentuates the trend (Gogu, 2021).
- Geographical and socio-economic impact:
- Infrastructure: The low population density compromises the financial sustainability per capita of new water and sewage networks (Interreg Next Romania-R0M Cross-Border Program, 2024).
- Agriculture: Depopulation and lack of generational succession block the exploitation of irrigation systems and the survival of local farms (Bacal and Burduja, 2018).
- Public services: The decrease in the number of beneficiaries requires the optimization of proximity institutions (schools, medical points), accelerating the exodus of the remaining population (Ministry of Infrastructure and Regional Development of the Republic of Moldova, 2022).

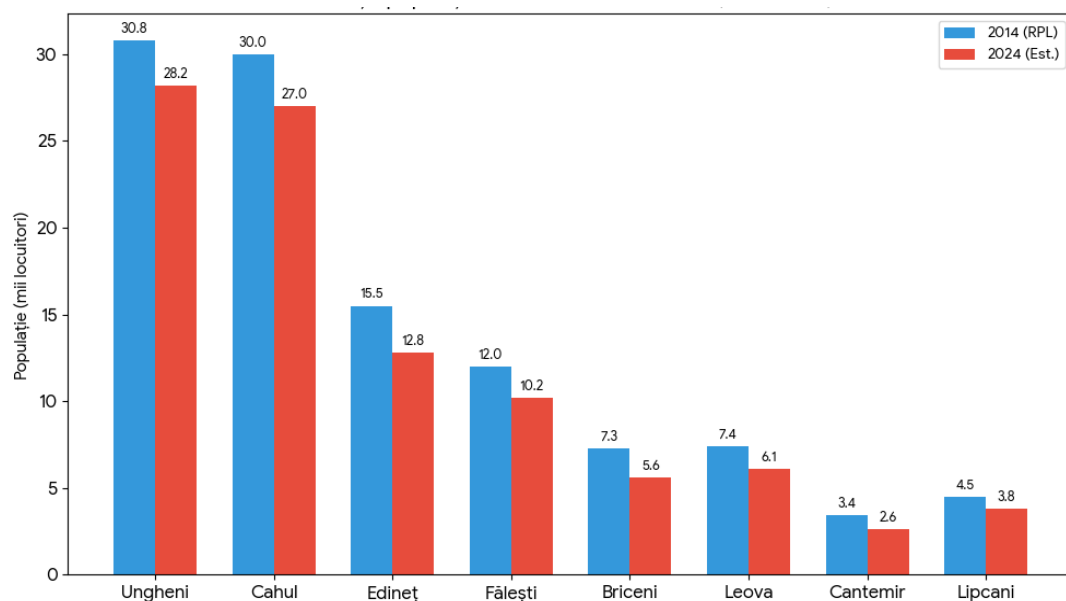


Figure 1. Urban population dynamics in the Prut River basin (period 2014-2024).

*Source: Prepared by the author based on data from the National Bureau of Statistics
 (RPL 2014 and Population with Usual Residence 2024).*

The analysis of urban centers in the Prut basin (2014–2024) highlights a generalized demographic contraction of the population with usual residence, but with major disparities determined by the capacity for economic polarization.

Ranking	Example cities	Population 2024 (Est. RPL)	Trend
Regional Poles (>20 thousand)	~30-35 thousand	~30-35 mii	Moderate decline, resilience
Small Cities (10-20 thousand)	~10-12 thousand	~10-12 mii	Severe decline
Agro-industrial Cities	<10 thousand	<10 mii	Critical depopulation

Large cities (Ungheni, Cahul) show structural resilience due to their administrative, industrial and university functions. They retain a critical mass of over 20,000 inhabitants, limiting the decline to 8-10%. In contrast, medium-sized cities (Briceni, Edineț, Făleşti) record a much steeper decline curve, losing human capital at an accelerated rate and reducing their role as support poles for the rural hinterland.

The critical situation is evident in small cities (Cantemir, Lipcani), which fall below the minimum thresholds of demographic safety. In these localities, maintaining social infrastructure and public services becomes financially unsustainable due to high operating costs per capita.

Table 2. Dynamics of the population with usual residence in representative cities and districts in the Prut River basin (2014-2024)

Administrative-territorial unit / Urban node	Population (2014)	Population (2024)	Absolute decrease (people)	Decline rate (%)	Demographic typology / Functional impact
Ungheni Municipality (Large urban center)	30.800	27.950	-2.850	-9,2%	Regional resilience zone; retains critical mass.
Cahul Municipality (Large urban center)	28.700	25.900	-2.800	-9,7%	University and administrative pole; moderate decline.
Edineț City (Medium urban center)	15.500	12.950	-2.550	-16,4%	Structural contraction; loss of support function.
Făleşti City (Medium urban center)	12.100	10.050	-2.050	-16,9%	Steep decline; reduction of active labor force.
Briceni City (Medium urban center)	7.300	5.950	-1.350	-18,5%	Severe decline in the northern sector; aging.
Cantemir City (Small urban center)	3.450	2.600	-850	-24,6%	Critical threshold; expensive public services per capita.
Lipcani City (Small urban center)	4.450	3.300	-1.150	-25,8%	Critical safety threshold; major risk of urban collapse.
Rural Environment (Cahul/Cantemir)	84.300	56.800	27.500	>-30,0%	Acute human desertification; ghost points in the meadow.

Source: Prepared by the author based on data from the National Bureau of Statistics of the Republic of Moldova (RPL 2014, RPL 2024).

The comparative population visualization (Figure 2) highlights the generalized nature of the demographic regression, with no administrative unit in the Prut basin registering increases or stagnation. The difference between the values of 2014 and 2024 represents the active labor force that left the region. While water resources remain constant, the critical mass of users necessary to justify investments in treatment and irrigation is rapidly decreasing (Bacal and Burduja, 2018). In the context

of the "Siret-Prut-Nistru" Euroregion, the dynamics suggest the need for a common labor force planning to compensate for depopulation through digitalization (Euroregion "Siret-Prut-Nistru", 2023).

The pace of decline is not uniform, but affects all the areas analyzed:

- Cahul (-39.2%): Records the largest rural demographic shock, indicating an extreme vulnerability of the villages in the southern sector (Bacāl and Țugulea, 2024).
- Hîncești (-32.6%) and Ungheni (-32.3%): The massive losses in these large districts demonstrate that proximity to strong urban centers could not stop the rural exodus.
- Briceni and Rîșcani (~28–29%): In the northern sector, although the percentages are slightly lower, the contraction is critical for the local economy because the population base was already reduced (BNS, 2025).

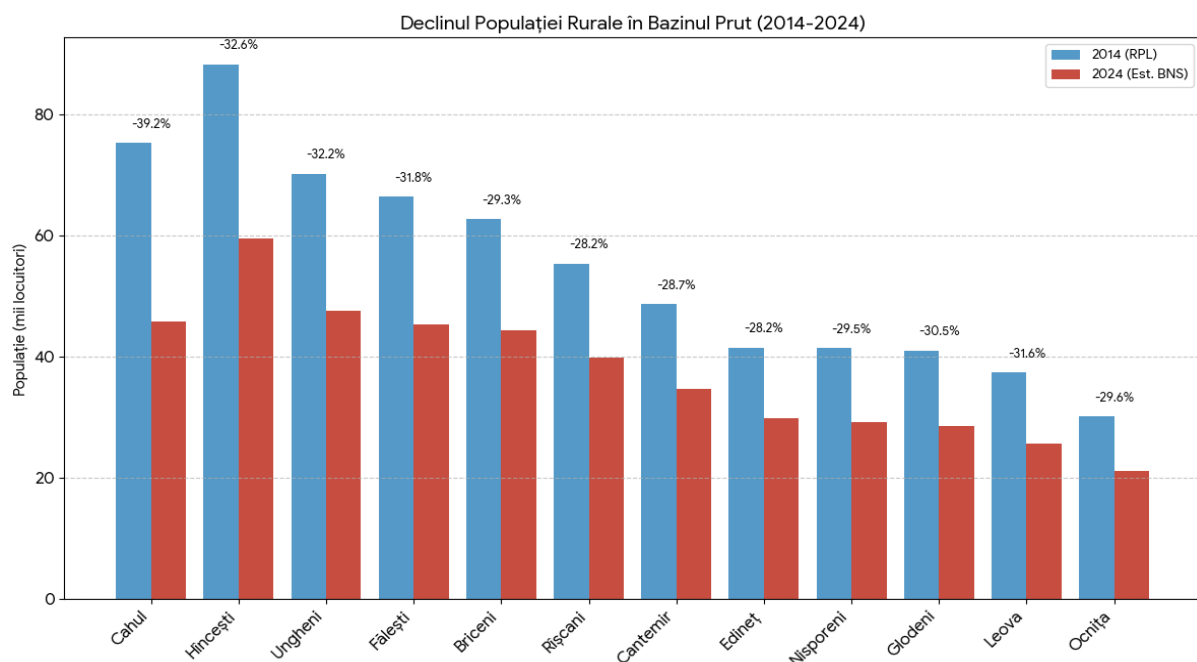


Figure 2. Urban population dynamics in the Prut River basin (period 2014-2024) .

Source: Prepared by the author based on data from the National Bureau of Statistics (RPL 2014 and Population with Usual Residence 2024).

Age structure and demographic aging process

The analysis of the age structure in the 12 districts of the Prut basin reveals an alarming transition towards a senescent type structure, indicating a structural biological decline.

The dynamics of the main age groups highlight:

- The youth group (0-14 years): It fell below the critical threshold of 17-18%. The reduction of the school quota in the villages of Glodeni and Fălești determines the migration of young families to Ungheni or Cahul, canceling the rural rejuvenation resource.
- Adult and active group (15-59 years): It constitutes 58-60% of the total, being marked by a "productive exodus". The labor force in the "Siret-Prut-Nistru" Euroregion migrates massively to the logistics centers in Iași or the European Union, generating a severe shortage of qualified personnel.
- Elderly group (60+ years): It exerts increased socio-economic pressure, exceeding the share of 25% in the northern districts (Briceni, Ocnița). In the Prut meadow, the structural ratio reaches 1.5 elderly people per single child, an indicator of an irreversible biological decline.

The increase in the average age above the 40-year threshold confirms the senescent character of the region. Spatial disparities show a considerable advance of aging in the North sector, while the Center and South sectors maintain a fragile demographic resilience, strictly dependent on the urban poles of Ungheni and Cahul. These territorial gaps are quantitatively detailed in the table below.

Table 3. Population structure by age groups and demographic aging index (RPL 2024 estimates).

District / Region	Age group 0-14 years (%)	Age group 15-59 years	Age group 60+ years (%)	Aging Index *	Profile and structural impact
1. Briceni (Nord)	15,8%	58,2%	26,0%	1,64	Critical degradation; the most severe age imbalance.
2. Ocnița (Nord)	15,4%	57,9%	26,7%	1,73	Profoundly senescent structure; chronic shortage of young people.
3. Edineț (Nord)	16,1%	59,1%	24,8%	1,54	Advanced aging; rapid contraction of the school group.
4. Rîșcani (Nord)	16,3%	59,5%	24,2%	1,48	Structural decline; high pressure on medical systems.
5. Glodeni (Centru)	16,5%	59,3%	24,2%	1,46	Above-average aging; shortage of young people in the meadow.
6. Fălești (Centru)	17,2%	59,8%	23,0%	1,33	Trend of regression; massive exodus of the active group 15-39 years old.
7. Ungheni (Centru)	18,2%	61,3%	20,5%	1,12	The most resilient district; the urban mass tempers the decline.
8. Nisporeni (Centru)	17,9%	60,8%	21,3%	1,19	Moderate resilience; fragile balance between generations.
9. Hîncești (Sud)	17,6%	60,1%	22,3%	1,26	Stable external migratory pressure on the adult group.
10. Leova (Sud)	17,3%	59,0%	23,7%	1,37	Demographic restructuring; risk of collapse in the school network.
11. Cantemir (Sud)	16,8%	58,8%	24,4%	1,45	Rural structural collapse; heightened vulnerability.
12. Cahul (Sud)	17,5%	59,4%	23,1%	1,32	Regional pole; the municipality supports the group 15-59 through students.
Basin Average	17,2%	59,6%	23,2%	1,35	Aging pool; undermined reproductive base.

Source: Author's calculations based on usual residence data (NBS, RPL 2024 results).

The socio-geographical impact of senescence

This regressive structure has direct implications for flood risk management: an elderly population is much more vulnerable to natural hazards and requires much more complex civil protection protocols. At the same time, the low share of young people below 17% portends a severe deficit in entering the labor market for the next decade. In the absence of a policy to attract young people back to poles such as Cahul or Ungheni, the Prut river basin risks becoming a transit space managed by a third-age population, dependent on social assistance and foreign remittances.

Age Structure Analysis (Regressive Pyramid)

The graphic analysis of the demographic structure through the age pyramid reveals a profound mutation in the Prut basin. The transition from the 2004 relative stabile base to the 2024 regressive model (BNS, 2026) is characterized by:

Narrowing of the base (0–14 years): Low birth rates and family migration erode the base of the pyramid, generating a critical deficit of generational replacement in the meadow (Muntele, Grozavu and Roșu, 2018).

Migration "gap" (20–45 years): The "strangulation" of the adult segment reflects the massive exodus of the labor force (Gogu, 2021). Gender asymmetry (men in construction/technical sectors in the EU, women in services) weakens the social structure.

Bulging of the top (60+ years): The expansion of the upper segment is dominated by women, against the background of male excess mortality (Penina, 2020), overloading social assistance in the "Siret-Prut-Nistru" Euroregion ("Siret-Prut-Nistru" Euroregion, 2023).

The "urn-shaped" pyramid confirms biological decline (Muntele, 2010). Cross-border strategies 2030–2050 can no longer rely on labor market growth (Ministry of Development, 2022), requiring a reorientation of axes towards:

Automation of agriculture and water management (Interreg Next Cross-Border Program, 2024);

Adaptation of public services for an aging population (Ministry of Infrastructure, 2022).

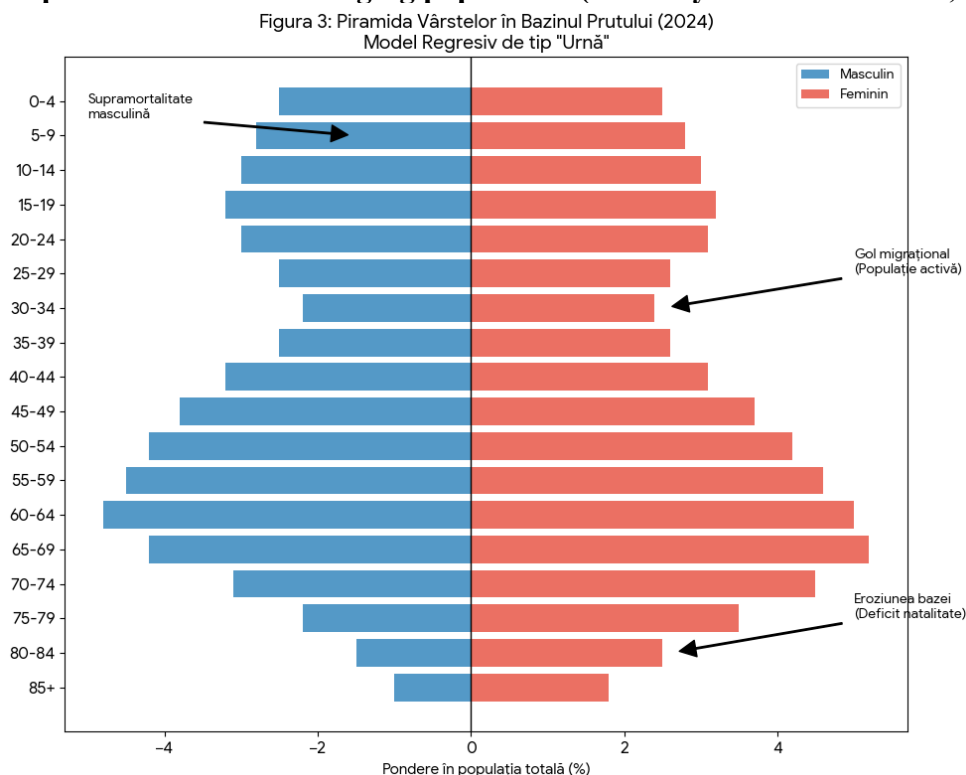


Figure 3. Population pyramid with usual residence in the Prut river basin: Structural transition from the mature profile (2014) to the senescent "urn" profile (2024)

Source: Developed and mapped by the author based on data from the Population and Housing Census (RPL, 2014) and structural estimates of the National Bureau of Statistics of the Republic of Moldova (BNS, 2025).

"Urn" Shape: The base of the pyramid (0-14 year old groups) is visibly narrower than the middle, confirming that the number of births no longer ensures the replacement of generations. Migration "Strangulation": A retraction is observed in the 25-40 year old age groups, the most dynamic segment, which left the region for opportunities in the EU. Upper Asymmetry: The top of the pyramid (75+) is much "wider" on the right (female) side, highlighting the phenomenon of feminization of old age, with major social implications for isolated rural localities.

Migration: The engine of transformations in Euroregions

Migration is the main factor in the remodeling of human dynamics in the "Siret-Prut-Nistru" and "Lower Danube" Euroregions, manifesting itself through:

Transition to family migration: Unlike the previous decade, the period 2014–2024 is marked by the complete departure of families. This phenomenon explains the severe contraction of the school population in districts such as Făleşti or Leova (Bacăl and Țugulea, 2024).

Cross-border commuting: The geographical proximity to Romania facilitates pendular migration. Many residents of Ungheni or Cahul work daily in the neighboring counties of Iași or Galați (Muntele, Grozavu and Roșu, 2018).

The paradox of remittances: The money transferred exclusively supports household consumption, but cannot compensate for the acute labor shortage in large utility infrastructure projects (Government of the Republic of Moldova, 2021).

The "Brain Drain" phenomenon: The exodus of qualified young people from university centers (Cahul) to Romania or EU states weakens the local administrative capacity to access and implement European projects (Gogu, 2021).

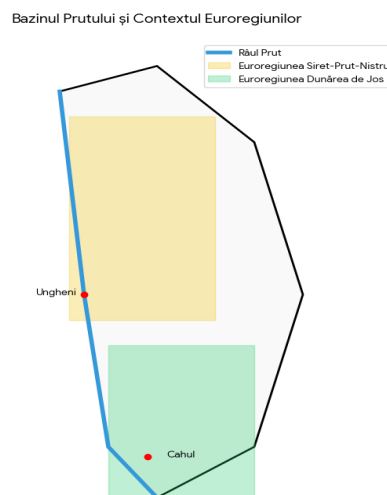


Figure 4. Spatial location of the Prut basin in the context of cross-border cooperation structures

Source: Developed by the author based on data from the "Siret-Prut-Nistru" Euroregion (2023).

The map presented in Figure 4 highlights the dual membership of the area to distinct Euroregional structures. The North and Center Sector (with the Ungheni pole) is integrated into the Siret-Prut-Nistru Euroregion, being influenced by the Iași economic pole. The South Sector (centered on the municipality of Cahul) belongs to the Lower Danube Euroregion, with a strategic opening towards the Galați-Brăila-Tulcea nodes. From a geographical perspective, this positioning should retain the population through mobility projects. However, the data show that, despite these frameworks, migration flows to the west remain dominant, transforming the basin into an area of demographic vacuum. Cross-border cooperation must move from the declarative level to common infrastructure projects (aqueducts, industrial parks) capable of stabilizing the age structure.

Gender structure: Feminization of aging and territorial imbalances

Between 2014 and 2024, the male-female ratio in the Prut basin underwent significant changes, influenced by selective migration and gender-differentiated mortality. This context outlines a profound demographic paradox: migration flows have transformed the region from a strategic area into a transit space marked by the transition to permanent family emigration. The phenomenon

generates a chronic negative migration balance and a pronounced feminization of rural aging, leaving communities dependent on deficient social services.

Structural mutations are manifested by two major imbalances:

Deficit of men at advanced ages: In the over-65 group, the ratio is distorted (60% women and 40% men) due to premature male excess mortality. The phenomenon leaves a population in the riverside villages predominantly made up of single elderly women, with high vulnerability (Penina, 2020).

The imbalance in the working age between urban and rural areas: While in villages women predominate, taking care of fragmented households, in the Ungheni and Cahul poles the share of active men is higher. This urban retention is favored by the concentration of jobs in industry, logistics and transport, sectors stimulated by the Free Economic Zones and the infrastructure of the Giurgiulesti Port (Ministry of Infrastructure and Regional Development of the Republic of Moldova, 2022).

Table 4. Population structure by sex and annual migration dynamics in the 12 districts of the Prut basin

District / Region	Female population (%)	Male population (%)	Migratory Balance (Est. annual average)	Structural profile and migration behavior
1. Briceni (Nord)	52,8%	47,2%	Negative (-1,8%)	Severe exodus of young people; rapid aging of the remaining population.
2. Ocnița (Nord)	53,1%	46,9%	Negative (-2,0%)	Advanced depopulation; high dependence on remittances.
3. Edineț (Nord)	52,5%	47,5%	Negative (-1,6%)	Permanent emigration of young families; negative natural increase.
4. Rîșcani (Nord)	52,4%	47,6%	Negative (-1,5%)	Constant losses in villages near the hydrographic node.
5. Glodeni (Centru)	52,6%	47,4%	Negative (-1,7%)	Structural decline; aging workforce in the agricultural sector.
6. Făleşti (Centru)	52,3%	47,7%	Negative (-1,6%)	Acute deficit of active human capital; exodus to the EU and Romania.
7. Ungheni (Centru)	51,5%	48,5%	Negative (-1,2%)	The most stable district; the municipality partially retains the male population.
8. Nisporeni (Centru)	51,8%	48,2%	Negative (-1,4%)	Intense pendular migration to the industrial pole Ungheni.
9. Hîncești (Sud)	51,9%	48,1%	Negative (-1,5%)	Constant migratory pressure to the capital and foreign destinations.
10. Leova (Sud)	52,1%	47,9%	Negative (-1,7%)	Demographic aging; contracting of local public services.
11. Cantemir (Sud)	52,3%	47,7%	Negative (-1,9%)	Critical demographic decline; rural localities exposed to desertification.
12. Cahul (Sud)	52,0%	48,0%	Negative (-1,5%)	Strong regional pole; attracts labor force but loses qualified young people.
Rural Average per Basin	53,2%	46,8%	Negative (-2,1%)	Major imbalance; human desertification in the meadow.

Source: Data estimated by the author based on the correlation of indicators of usual residence and demographic structure, National Bureau of Statistics of the Republic of Moldova (2024)

The demographic paradox of the Prut basin is that, although it is a strategic area of cross-border cooperation, migration flows have transformed the region into a transit space marked by the transition from individual to definitive family emigration; this phenomenon generates a chronic negative migration balance and a pronounced feminization of rural aging (60/40 ratio at ages over 65), leaving

communities vulnerable, lacking an active workforce and dependent on deficient social services that undermine any attempt at sustainable revitalization.

Identified problems and structural risks (challenges)

The severe demographic decline in the rural area of the Prut basin, which exceeds the threshold of 30%, generates a multidimensional domino effect with systemic impact on the cross-border region (Muntele, Grozavu and Roșu, 2018).

The major structural implications of this decline include:

Human desertification: Small villages in Cahul and Cantemir districts risk physical disappearance due to contractions of over 32% (BNS, 2025). Ocnița, Briceni and Leova districts have become areas of acute vulnerability, recording the largest declines in the country, of over 28%.

Degradation of human capital: The numerical contraction in Cahul district (BNS, 2024) represents a massive loss of active population. The phenomenon induces a chronic dependence on remittances to the detriment of local production (Gogu, 2021), while the urban poles of Ungheni and Cahul constantly lose qualified young people through brain drain (Chirică and Bejan, 2009).

Collapse of social infrastructure: The decrease in population has imposed the optimization of the school network by closing institutions in riverside villages (Ministry of Infrastructure and Regional Development of the Republic of Moldova, 2022). The high cost of maintenance per capita generates a vicious circle: the lack of educational services forces the permanent exile of young families.

Compromise of public utilities: New water and sewage systems risk economic inoperability due to the shortage of active beneficiaries (Interreg Next Romania-Republic of Moldova Cross-Border Program, 2024). Technically undersized consumption causes water stagnation in pipes, the appearance of biofilms and the deterioration of drinking water quality (Bacal and Burduja, 2018).

Agricultural and food crisis: The aging of the rural population, where the average age exceeds 40 years (Penina, 2020), blocks the digitalization and expansion of modern irrigation systems. The lack of skilled labor keeps agriculture at a rudimentary primary subsistence level.

Social pressure and polarization: There is a forced urbanization towards the centers of Edineț, Ungheni and Cahul (Table 2), transforming villages into satellite localities dominated by the elderly (Benedek, 2004). Family fragmentation through migration isolates the elderly and minors, overloading the social assistance of depopulated rural municipalities.

Opportunities, challenges and cross-border cooperation

Structural challenges and systemic demographic risks

The negative demographic transition in the Prut river basin generates cascading dysfunctions on the settlement network and the regional economy:

Systemic vulnerability: Ocnița, Briceni and Leova districts constitute critical areas, recording the most severe population contractions at the national level, of over 28%.

Decline of public services: The reduction of the school quota requires the closure or optimization of educational institutions, determining the permanent exodus of young families from rural areas (Ministry of Infrastructure and Regional Development of the Republic of Moldova, 2022).

Impact on the agricultural sector: The chronic labor shortage in agriculture directly compromises investments in modern irrigation systems and processing units (Bacal and Burduja, 2018).

Acute social pressure: The phenomenon of children left without parental care and the isolation of the elderly overstrains the budgets and operational capacity of social assistance services (Benedek, 2004).

Strategic levers and mechanisms of bilateral cooperation

The structural crisis can be mitigated by transforming demographic challenges into levers of sustainable development. Maximizing absorption through the Interreg Next Romania-Republic of Moldova programs allows for the co-financing of utilities and the digitalization of services for senescent communities. In parallel, the interconnection of cross-border aqueducts (Iași-Ungheni-Făleşti axis) stabilizes the viability of critical infrastructure, ensuring quality drinking water for the

remaining population (Government of the Republic of Moldova, 2021). The growth poles Ungheni and Cahul support regional resilience: Ungheni through its proximity to Romania and the performance of the Free Economic Zone, and Cahul through its university and tourist status (Ministry of Infrastructure, 2022). These poles constitute anchors capable of stopping the exodus of young people through digitalization, jobs and diversification of non-agricultural functions in small towns (Iargara, Costești).

Economic revitalization depends on the integration of infrastructure in the "Siret-Prut-Nistru" and "Lower Danube" Euroregions. New bridges and modernization of customs will transform the basin from a periphery into an active logistics corridor, facilitating daily commuting to the detriment of permanent migration. This framework allows access to funds for smart water management systems (Smart Water Management) and ecological tourism in the "Lower Prut" Biosphere Reserve (Academy of Sciences of Moldova, 2020). By automating meadow agriculture with technologies independent of the volume of the workforce, the region ensures its food security, offering young people economic arguments to project their future in the Prut basin.

Conclusions

The analysis of demographic dynamics in the Prut basin (2014–2024) highlights a systemic vulnerability defined by pronounced rural depopulation, structural regression and critical pressure on public investments (Muntele, Grozavu and Roșu, 2018). The population decrease by over 25–30% in the riverside villages (Cahul, Ungheni, Briceni), confirmed by the usual residence indicator, reveals an acute structural crisis masked by scriptural data (BNS, 2025). This decline has generated a severe generational imbalance (average age >40 years, ratio of 1.5 elderly/child), amplifying the gap compared to the resilience of the urban poles of Ungheni and Cahul. This aging directly endangers the sustainability of critical infrastructure (Penina, 2020), with the shortage of young specialists jeopardizing the maintenance of water systems (Bacal and Burduja, 2018).

In the "Lower Danube" Euroregion, a major discrepancy appears between investments and beneficiaries (Ministry of Infrastructure, 2022); the new highways risk serving an aging population, with minimal consumption and low payment capacity, altering the technical and economic depreciation indicators. In order to optimize the settlement network, the transition to territorial efficiency and non-agricultural diversification in small towns such as Iargara or Costești is imperative (Benedek, 2004). Recovery depends on the partnerships of the "Siret-Prut-Nistru" Euroregion with the counties of Iași and Vaslui for technological transfer in water management (Euroregion "Siret-Prut-Nistru", 2023). The "urn" demographic structure requires automated systems (Smart Water Management) to compensate for the lack of active labor force (Interreg Next Cross-Border Program, 2024). Integration through new infrastructure and eco-tourism in the "Lower Prut" Biosphere Reserve can transform this periphery into a dynamic economic corridor, avoiding demographic collapse (Academy of Sciences of Moldova, 2020).

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