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CROSSREF

RAINWATER MANAGEMENT PROBLEMS IN CITIES IN DEVELOPING COUNTRIES: THE CASE OF THE MUNICIPALITY OF ZIGUINCHOR, SENEGAL

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Abstract: Senegalese cities are experiencing very rapid growth in terms of both spatial and demographic development, which has an impact on the management of runoff water, which is increasingly a major concern of authorities and urban populations. In these cities, public sanitation infrastructure is insufficient and unevenly distributed in urban space. The objective of this study is to characterize the problem of rainwater management in the city of Ziguinchor (southern Senegal). The methodology is based on an administration, a questionnaire submitted to 288 heads of households, and an interview guide with 13 actors who stand out in the environmental management component at the local level. The results obtained attest to a real problem of sanitation of rainwater managed in precarious conditions due to the lack of infrastructure and water management methods used by households. The

* Corresponding Author

infrastructural problem is a factor in the poor management of rainwater in Ziguinchor, while rainwater drainage practices do not protect the living environment of the populations. In the city of Ziguinchor, the main strategies adopted in the face of the sanitation network deficit are based on backfilling, the laying of sandbags and stones, evacuation through buckets.

Key words: management, rainwater, flooding, infrastructure, strategy, Ziguinchor

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INTRODUCTION

Access to sanitation is a daily struggle for hundreds of thousands of urban dwellers, particularly in developing countries (ANSD, 2014; Gomis et al., 2019). According to a World Health Organization (WHO, 2009) report, "1.1 billion people or 17% of the world's population lack access to safe drinking water and 2.6 billion or 42% of the world's population lack access to adequate sanitation. Many urban households rely on traditional methods for water supply and sanitation for excreta disposal. Africa is most affected by large regional inequalities on sanitation targets. Of all regions, sub-Saharan Africa has the lowest coverage (< 50%) of safe drinking water (Kaka, 2014). At least 86 million people still practice open defecation and 136 million people do not use improved sanitation services (Kaka, 2014).

In such a context, we understand the importance of questioning the impacts of climate change (CC) on urban water-related uses and services. The meteorological phenomena that can affect the performance or level of service of urban water infrastructure are essentially those: 1) which will modify the volumes and quality of water (surface or groundwater) available; 2) which will affect the abstraction capacity of the catchment structures; 3) which will have an impact on the demand for drinking water; 4) whose intensities and / or durations will be such that they will exceed the evacuation capacities of the rainwater collection networks and 5) which will lead to degradation of the receiving environment at the wastewater discharge points (treated domestic water, rainwater and / or overflow water from unit networks) ((Kaka, 2014; ANSD, 2014; Gomis et al., 2019). The typical meteorological events to be considered are therefore: 1) intense rain events, 2) periods of low rainfall, 3) periods of heatwave and also, more marginally, 4) episodes of winter rain.

Senegal is one of the countries where a low proportion of the population has access to adequate sanitation systems. The collective sewerage networks built by the National Sanitation Office in Senegal (ONAS) cover only a part of urban users, i.e. about 46,240 households throughout the country (ONAS; 2011< Sané, 2018). The evolution of the proportion of access is currently low and lower than expected. This is a major concern for Senegal. The public authorities still do not have quality sanitation systems for sustainable wastewater management. Thus, Vennetier (Vennetier, 1991) states that: "This deficiency is particularly worrying in several areas and endangers the health of thousands of people. The problems posed by water are more acute in terms of both its form and its disposal. This lack of access to water on the one hand and sanitation on the other is the main cause of death among children under 5, the

elderly, and pregnant women (Gomis et al., 2019; Gomis and Thior, 2020). As a result, populations living in informal settlements are the most affected (Soro and Vei, 2017). It is in this sense that Faye (2014) points out that 'the inadequacy of public infrastructure almost hits the most disadvantaged strata, and that the lack of a policy in place increases the unconditional discharge of domestic wastewater into the environment'.

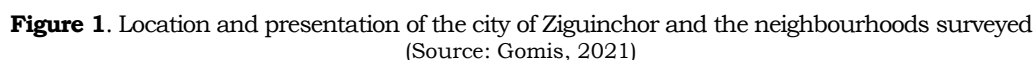
Like all Senegalese cities, Ziguinchor (with a population of nearly 205,294 (ANSD, 2014) is no exception. It is located in the south-west of Senegal between meridians 16° and 17° and parallels 12° and 13°, with an average altitude of 19.30 m. It is bounded to the north by the Casamance River, to the south by the commune of Niaguis, to the west by the Djibélor backwater and to the east by the Boutoute backwater (Figure 1). It has experienced exponential urban growth since the 1970s, 1980s and 1990s, with an urbanisation rate of 51.1%, which is above the national average of 47.5% (ANSD, 2014). The city of Ziguinchor is characterised by a highly contrasted urban fabric, with low, medium and high standard neighbourhoods, as well as non-regulatory and informal settlements generally made of salvaged materials (Gomis and Thior, 2020). These so-called informal settlements are located outside of any planning. Their informal nature means that these neighbourhoods are not equipped with collective sanitation systems by the authorities, who refuse to endorse illegal forms of land occupation (Gomis et al., 2019; Sall and Sy, 2015). The problems of accessibility to drinking water in terms of cost and distance on the one hand, and the lack of adequate sanitation facilities, on the other hand, arise. In addition, we note the frequent flooding in winter due to the absence of drainage channels, problems that constitute an obstacle to the socio-economic development of the neighbourhoods (Sané, 2018; Sané et al., 2019).

Water, sanitation and hygiene are rights for everyone, regardless of the country they belong to. In developing countries, people are denied the rights. This has led to poverty, disease and death, especially among children (Faye et al., 2018). In Ziguinchor, the situation remains the same, enormous difficulty in disposing of excess water. Two small spatial entities with similar physical characteristics, Santhiaba and Belfort, suffer the consequences of the history of their installation on a vulnerable site. The configuration of the city leaves these entities vulnerable to flooding. On the one hand, they constitute a natural receptacle for rainwater from neighbouring districts such as Tilène, Kandialang and Néma. On the other hand, the recent high rainfall recorded in the commune means that today the inhabitants of these neighbourhoods suffer from excess water (Sané, 2018; Sané et al., 2019).

The sanitation system used by the majority of households remains autonomous. The absence of rainwater and domestic wastewater drainage channels, drainage networks and retention basins means that some households feel obliged to use spontaneous techniques as coping strategies. The objective of this study is to characterise the problem of rainwater management in the neighbourhoods of the city of Ziguinchor in southern Senegal). In order to achieve this objective, this study will first analyze the existing public and private sanitation infrastructure, and secondly the rainwater management methods used by households in the city of Ziguinchor. Thus, it is necessary to ask what tools are used to collect and evacuate stagnant water in the city of Ziguinchor? And what methods of rainwater disposal are used by households in Ziguinchor?

DATA AND METHODS

The city of Ziguinchor is located in the south-east of Senegal, embraced by the Casamance River to the north, the commune of Niaguis to the east, the village of Djibélor to the west and the commune of Boutoupa Camaracounda to the south. A former Portuguese town, Ziguinchor has a melting pot population, the majority of who are Joola. It is influenced by a sub-Saharan climate which makes it the rainiest area (isohyets above 1000mm) compared to other parts of the country. Its proximity to the sea gives it a particular micro-climate, with a feeling of coolness during the months of December, January, February and March. The hydrographic network is mainly formed by the Casamance River in the North and its small tributaries, namely the Boutoute and Djibélor backwaters respectively in the East and West of the city. Since its creation until today, Ziguinchor had 27 districts according to the latest census of the National Agency for Statistics and Demography in 2013.



The problem of sanitation is particularly acute in Ziguinchor, which is one of the stations with the highest rainfall in the country (1,500 to 2,000 mm per year). This rainfall is often the cause of heavy runoff and exposes certain areas of the city to the risk of flooding, a phenomenon caused by the stagnation or anarchic runoff of rainwater. This means that, despite a rainwater drainage network, the collection, treatment and evacuation of urban wastewater and rainwater remain an equation with several unknowns, both for the municipal authorities and for the population. And if some people blame the population and point the finger at certain behaviours that are the antithesis of good environmental practices, the latter, on the other hand, point to the failures of a sewage system combined with the absence of an adequate sewage network for wastewater or rainwater. During each winter season, the populations of several districts of Ziguinchor get stuck in the water.

Materials and Methods

The methodology adopted consists of collecting socio-economic data from the population through surveys and interviews. The initial data, i.e. the data that enabled us to carry out our survey, were obtained from the ANSD (National Agency for Statistics and Demography). The collection of socio-economic data was done on the basis of household surveys in the two districts (Table 1). The questionnaire was submitted to 288 heads of households (men and women) in both Belfort and Santhiaba. The reason for choosing the city of Ziguinchor, and the Santhiaba and Belfort neighbourhoods, is that these two neighbourhoods constitute a very important spatial unit of observation for this study. The neighbourhoods covered by the study were chosen according to the type of housing. Some neighbourhoods were selected on the basis of their predominantly progressive housing and others on the basis of their status as residential neighbourhoods. As a result, the main questions of the questionnaire referred to the existing public and private sanitation infrastructure (collection tools), the wastewater management methods used (stormwater drainage methods). Thus, the data obtained were grouped and processed to finally constitute the sampling frame for the results of this research.

Table 1. List of questions used in the questionnaire
(Source: Sané survey, 2018)

Questions	Response hypotheses
1) By what method do you proceed to evacuate rainwater?	Sweep the water... .. / dig an alley... .. / use buckets / others
2) Does your neighborhood have a stormwater drainage system?	Yes No.....
3) Is your house flooded during the rainy season?	Yes No.....
4) If so, how do you dispose of the water?	Evacuation by sampling / Emptying truck.... / Canal / Embankment... / Laying stone... .. / Laying sandbags... .. / No solution... / Other....
5) Do you have a perception on the salubrity?	Yes No.....
6) If yes, which one?
7) How do you view the quality of the	Fairly clean... .. / Clean... .. / Fairly dirty...

environment in your neighborhood?	/ Dirty.... / Very dirty...
8) At what period of the year did you see the resurgence of these diseases?	During the rainy season / Dry season.....
9) If it is wintering, justify?
10) Do you think that rainwater associated with wastewater justifies the resurgence of these hygienic diseases?	Yes..... / No.....
11) Does the municipality participate in the evacuation of wastewater in the neighborhood?	If yes, how? If not, why?

The data was collected through a questionnaire and an interview guide throughout this research. These interviews are intended for public and private actors who are the people in charge of the issue of sanitation in the city. Indeed, these selected persons are managers or technical actors who are well equipped to provide us with the necessary information on the situation. The strategy or method used was the interview survey. In this phase, we worked with the municipal officials in charge of environmental issues, the head of the regional sanitation department, the head of the hygiene brigade, the officials of the NGO PACTE, and the members of the neighbourhood councils in charge of environmental management.

Various data were collected from households and different administrative structures in order to better understand the conditions of wastewater management in the city of Ziguinchor. These data are of an infrastructural, cartographic, socio-economic and cultural nature. The field observation was also very useful, as it allowed us to observe the different practices of households regarding the collection and evacuation strategies of domestic wastewater.

RESULTS AND DISCUSSION

The problem of flooding in Ziguinchor

The natural factors of the floods in Ziguinchor

Since 2009, Senegal has been experiencing an exceptional flooding situation. Dakar, Ziguinchor and several towns in the interior have experienced this phenomenon, which is linked to climate change on the one hand, and to the lack of sanitation infrastructure in urban centers on the other. Located in the south of Senegal, in a hot and particularly humid sub-Guinean climate, the commune of Ziguinchor has a seven-month dry season (November to May) and a five-month rainy season (June to October). In terms of rainfall, it is characterized by abundant rainfall varying between 1,000 and 2,000 mm for 80 to 100 days of rain. The highest rainfall was 2,006.5 mm for 104 rainy days in the 2020 winter season.

The number of rainy days per year fluctuates with an annual average of 83 days. Such quantities of rain received on a marshy substratum that characterizes the above-mentioned neighbourhoods, aggravated by the lack of drainage infrastructure for run-off water, partly explain the sanitation problems experienced by the commune. In the neighbourhoods of Boudody, Lindiane, Goumel and Belfort, for example, the heavy rains of 5 August 2020 affected secondary roads and houses, with people living under water even in their privacy, with a lot of damage.

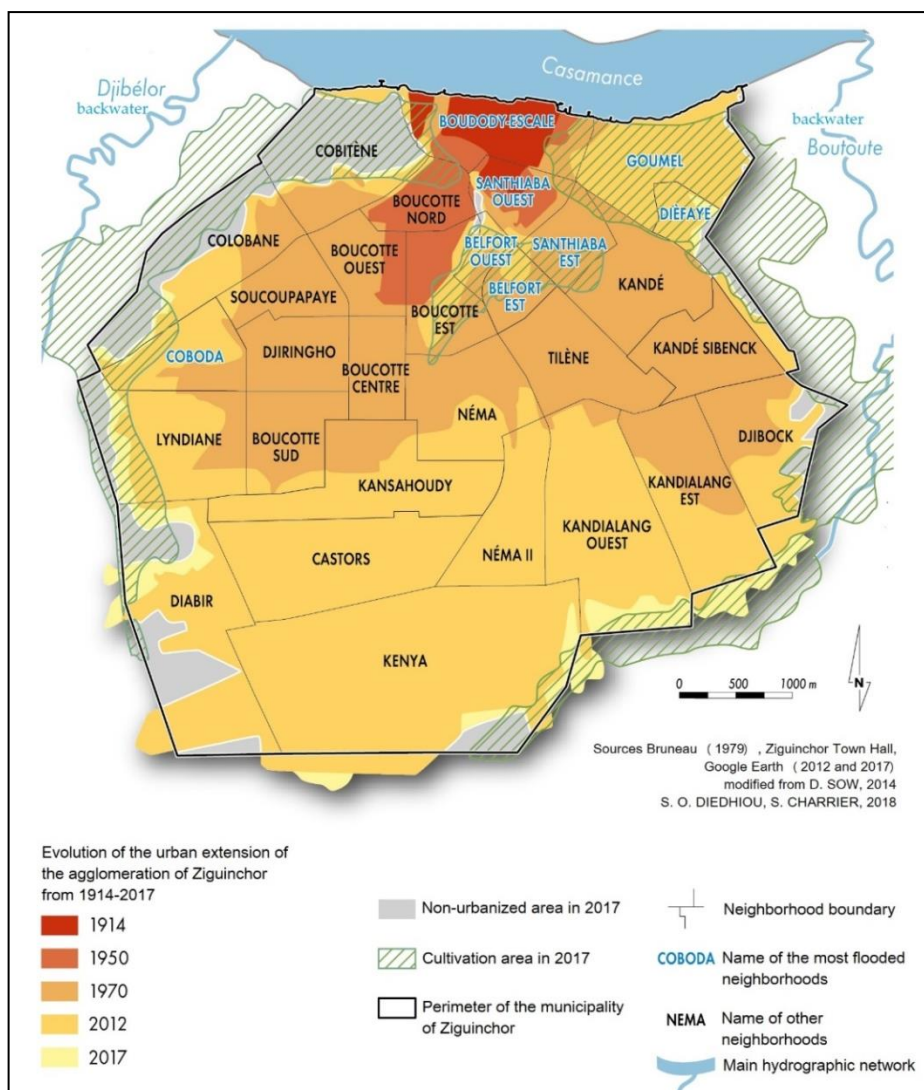


Figure 2. Spatialization of flood-prone areas in relation to the expansion phases of the city of Ziguinchor from 1914 to 2017
(Source: Diédhiou, 2021)

Moreover, the town is built on a basin bordered to the north by the Casamance River, to the south by the commune of Niaguis, and to the west and east by the Djibélôr and Boutoute backwaters, which constitute obstacles to the spatial extension of the town to the east and west. The physical-geographical characteristics of the site thus constitute a determining factor in understanding the manifestation of floods during the rainy season. The analysis in figure 1 shows that a large part of the districts of the municipality is exposed to flooding, especially the districts adjacent to the original core of the city. The neighbourhoods where vulnerability to flooding is most pronounced are those of Goumel, Santhiaba, Belfort, Diefaye and Boudody-Escale. The common denominator of these neighbourhoods is the very low topography, the sub-floor

nature of the water table and the presence of hydromorphic soils, i.e. more or less clayey. In detail, the districts of Boudody-Escale, Santhiaba, Belfort and Goumel are among the areas where the situation is most worrying. The topographical profile of the commune is characterized by a slope inclined towards the river (south-north). The physical characteristics of the site make the city of Ziguinchor vulnerable to flooding. The city of Ziguinchor is, therefore caught in a pincer movement and is enclosed by swamps that are vulnerable to flooding (Gomis, 2021). The low areas are characterized by the Ouljiennes terraces and recent fluvial-marine alluvium. Here we find grey soils and hydromorphic soils (mudflats). In these areas, the infiltration capacity of rainwater is very low or even zero. The water can remain in the low-lying areas for several days or even a large part of the year. The geological cross-section provides a better understanding of the flooding process of the districts in the city in relation to the topography. When it rains, the water converges on the depressions through the water drainage channels and flows into the Casamance River located to the north of the city. The relative steepness of the slope accelerates the runoff of rainwater into the depressed areas currently occupied by human settlements. As the water table is sub-surface in these areas, infiltration saturates the soil depending on the rainy season. This saturation of the soil and the impermeability of the surface (which reinforces runoff because of the high rate of cementing) quickly causes water to stagnate in depressed areas and flood the living quarters. This situation is aggravated by the existence of an undersized and poorly maintained water drainage system that is often clogged with rubbish and sand.

During these last decades, the commune of Ziguinchor knew a very important demographic evolution influenced by a significant arrival of populations of the rural areas of the region and Guinea Bissau. The increase in buildings has been particularly spectacular in Ziguinchor from independence to the present day. It results in the densification of buildings in agricultural areas and buildings constructed in new urban areas (Figure 2). Between 1976 and 2017, the population increased threefold, i.e. an annual growth rate of 4.4%. This rapid evolution of the city's population is at the origin of an unprecedented urban sprawl leading to an anarchic and uncontrolled occupation of certain spaces located on the periphery of the city. Indeed, districts like Kénia and Kandialang- East are located in these depressions or at the level of sites that were reserved for agricultural activities (Gomis et al., 2019; Sané, 2018; Sané et al., 2019; Gomis, 2021). The urbanization of the city of Ziguinchor took place in four phases. The first took place during the colonial period, the second occurs after independence more particularly during the crisis in the rural world, the third around the 1980s following the start of the politico-armed crisis in Casamance and the fourth which corresponds in the 2000s after the creation of basic infrastructure in the municipality.

Inadequate sewage system

The city of Ziguinchor, which is mainly built on a low-lying site, has been living with flooding for several years, the negative impacts of which are clearly visible, especially in the low-lying areas (Le quotidien, 2020). Every rainy season, there is a series of damages to infrastructure and housing, often resulting in the need to temporarily relocate people. The lack of means at the communal level is reflected in the absence of suitable infrastructure for the management of

rainwater and of real urban planning and development policies. Flooding caused by stagnant rainwater blocks access to certain neighbourhoods and concessions during and after the rain, for hours, days or even weeks. Communication routes in these neighbourhoods become impassable because of stagnant water with foul odours, which cause a real public health problem. The consequences of the floods are noted even in the privacy of the population. In the districts of Boudody, Lindiane, Goumel and Belfort, for example, the heavy rains of 5 August 2020 affected secondary roads and houses, with people living under water in their homes, causing a lot of damage (Figure 3).

The town of Ziguinchor, which is mainly built on a low-altitude site, has been experiencing flooding for several years, the negative impacts of which are clearly visible, particularly in low-altitude areas (Le quotidien, 2020). Each rainy season there is a series of damage to infrastructure and housing, often resulting in the need to temporarily relocate people. The lack of resources at the municipal level results in the absence of infrastructure adapted to the management of rainwater and of really urban planning and development policies. Flooding caused by stagnant rainwater blocks access to certain neighborhoods and concessions during and after the rain, for hours, days or even weeks. Communication routes in these neighborhoods become impassable because of stagnant water with foul odors, which poses a real public health problem. The consequences of the floods are seen even in the privacy of the population. In the districts of Boudody, Lindiane, Goumel and Belfort, for example, the heavy rains of August 5, 2020 affected secondary roads and houses, with people living underwater in their houses, causing extensive damage (Figure 3).

The problem of stagnant or uncontrolled runoff of rainwater is a serious one in Ziguinchor. Every year, during the winter season, several areas of the city of Ziguinchor are completely flooded. This situation exposes all the shortcomings of the sewage system. However, with Law No. 2009-24 of July 8, 2009 on the sanitation code, the State has placed particular emphasis on stormwater sanitation, with the definition of a single and harmonized sanitation code. As a result, rainwater drainage networks have been built in several urban centres to improve the living environment of the population and cover their sanitation needs. This is particularly the case in Ziguinchor which is a town that has no sewer system at all. There is only one storm water drainage network with three large storm water channels, to which are added a few secondary sewers connected to it. However, only neighbourhoods such as Escale, Boudody and Boucotte have open channels, but these are much degraded and often inoperable, and constitute wastewater and domestic waste spills. Due to the high runoff and the dilapidated state of the roads, which are gullied by rainwater overflowing the canals, several districts of the city of Ziguinchor are flooded or even exposed to the risk of flooding during the winter months. This is the case in Belfort, Goumel, Djibock, Coboda, Colobane, Santhiaba, Escale, Boudody.

This situation is also the result of the lack of an efficient sanitation, collection and disposal service for household waste. This is noted in the outlying districts with the presence of a poor sanitation policy. Thus, the absence of such a system, particularly in these neighbourhoods, is reflected in the unhealthy urban environment. As a result, the street and even the drains become receptacles for solid and liquid waste. And the observation is that every time the sky opens its floodgates, a good part of the rainwater floods the city, instead of ending up in its outlet.



Figure 3. Flooded neighbourhoods in Boudody, Lindiane, Goumel and Belfort
(Source: Gomis, 2021)

Neighbourhoods located on rice-growing sites

It is true that all these neighborhoods located in flood-prone areas and which live permanently in the water during the rainy season, mainly housed agricultural activities in the past. Several factors explain the very high level of exposure to flooding in neighborhoods such as Goumel, Santhiaba, Boudody, Belfort, Djefaye, Djibock, Kandé (which are non-aedificandi areas). We can cite among others: urban dynamics, laxity and bad political strategies in terms of sanitation, the absence of an effective sanitation system, site constraints in Ziguinchor and the return of the rains. Thus, in each winter season, the rainwater from these districts flows into a very degraded natural canal which crosses the city; a canal invaded by wastewater at various places discharged into the stormwater network and which creates serious unsanitary problems (Le quotidien, 2020). With a population of nearly 205,294 inhabitants (ANSD, 2014), the city of Ziguinchor has neither a functional wastewater treatment network nor an effective stormwater management strategy. Failures combined with popular practices and behaviors which often result, thanks to the spatial dynamics of the city, in the occupation by the communities of non-aedificandi areas and where the lack of adequate sanitation infrastructure affects this the most deprived and underprivileged layers and threaten their living environment.

The occupation of these areas, formerly naturally inundated, poses the problem of floods which disrupt the socio-environmental life of the population. Poorly planned or controlled urbanization can increase the risk of flooding due to inappropriate changes in land use. The strong land pressure encouraged by

demographic growth thus leads to a lack of control over the spatial dynamics of the city. One of the important aspects to remember in this context is the dysfunctional use of space (Figure 4). The habitat is not welded in some places where the land under construction or not built becomes areas where water stagnates part or all of the year. These flooded areas increase the risks to health, safety and mobility. All these elements increase the city's vulnerability to flooding phenomena.



Figure 4. Peri-urban agriculture in Ziguinchor (cohabitation of houses with rice-growing plots) in the Lyndiane district
(Source: Gomis, 2021)

The negative impacts of flooding in the municipality are exacerbated by the failures of the development of the municipal area, with in particular an anarchic urbanization characterized by an irregular installation of the most disadvantaged populations of the non-aedificandi areas, in particular in the areas low, and the ineffectiveness of the flood management system, particularly the dilapidated stormwater drainage network where it exists. This situation contributes to the multiplication of risks which make vulnerable populations located in areas with low topography.

The Korenthalas, the main stormwater drainage channel in poor condition

The Korenthalas is one of the oldest collectors in the city of Ziguinchor. It was erected in 1996 in the municipality of Ziguinchor with AGETP and municipal funding. It plays a very important role in stormwater drainage. It begins in the northwest of the Boucotte Est district at street level and successively crosses Belfort-Ouest, Santhiaba-Ouest and Boucotte Nord over a total length of approximately 2,630 m. Currently, it is degraded in its downstream part. Over much of the canal, the walls have subsided either due to erosion or human action. The canal is used by the populations as a dumping ground for solid waste of all kinds, in particular the traders of the Saint Maur des Fossés market. In addition, it is also used as a wastewater outlet, sometimes even by direct connection to local residents' toilets, as on the entire section between the Saint Maur des ditches market and the old IPRES. It is also very silted up especially in its downstream part after the bridge located on the road to Cape Town. The sand heights in the channel can reach in places more than 80% of the total height. This silting up comes from various origins but to a large extent it comes from the runoff from the sand streets towards the canal. During the rainy season, the canal overflows from its channel and participates in the

flooding of surrounding neighborhoods such as Belfort. This situation is aggravated by the existence of an undersized and poorly maintained water drainage system often clogged with garbage and sand (Figure 5).



Figure 5. Wastewater and rainwater drainage channels blocked by rubbish on boulevard 54, Tilène, Corentas and Escale in Ziguinchor
(Source: Gomis, 2021)

In several districts (such as Belfort, Boudody, Coboda.), wintering rhymes with the plight of the populations. Symbol of the failures of the sanitation system, Belfort is a district which adjoins the Boulevard des 54 M and which is bordered by a poorly maintained canal that serves as a spillway for all kinds of garbage. This canal also crosses the Boucotte and Korenthas districts (Gomis, 2021). With each rainy season, the daily life of the populations is combined in Belfort with despair, anger, bitterness and helplessness. In addition, due to the impassability of the access routes, the mobility of populations is always compromised; and many houses are constantly inundated. It often happens that water floods the bedrooms and living rooms of many families who will almost lose their furniture, food and other everyday items. Added to this is the outbreak of mosquitoes which expose populations, especially children, to malaria, diarrheal diseases, and skin diseases so frequent during the winter in Ziguinchor.

This dramatic situation is daily in winter. In addition, it highlights the difficulties of household waste management and the failures of the sanitation system. These failures are also manifested by the piles of garbage everywhere and the discharge of water of all kinds into the sewers. Ziguinchor, with an average of 1,500 mm of rain per year, suffers from a notable lack of rainwater systems (Gomis, 2021). For many of the citizens we met, it is urgent to improve the level of sanitation in the various districts of the city; solve environmental problems caused by the discharge of untreated wastewater near concessions; and reduce flooding caused by stagnation or uncontrolled runoff of rainwater.

Resilience and adaptation strategies to flooding in Ziguinchor

Urban populations in West Africa are increasingly vulnerable to flooding. In Ziguinchor, in the immediate outskirts of the city in particular, the repetition of these phenomena has led the populations to adopt multiple responses to the risks and consequences that may result from them. Although insufficient, these responses have implications for household income.

Sketches of solutions for the population that are far from ending their ordeal

Coping strategies are implemented before, during and after floods to preserve household and community assets. The affected populations react spontaneously with precarious means. These include, among other things, the use of bricks, sandbags and tree trunks, the making of backfill (with sand, rubble, waste), water drainage with rudimentary means (buckets and basins), drainage, pumping, laying of precarious pipelines (digging trenches or using PVC pipes) and protective dikes and the development of access to houses to mitigate the risks. The rainwater drainage methods used by the households in our sample are therefore traditional types and are temporary (Table 1).

Table 2. Evacuation mode in case of flooding

(Source: Sané survey, 2018)

Households	Drainage of water by means of a bucket	Backfilling the house	Use of gravel	Sandbagging	No solution	No answer	Total
Number	48	29	37	19	59	193	385
Frequency	12,5	7,5	9,6	4,9	15,3	50,1	100

The survey results show that the main solution adopted in the event of flooding is to collect water (bucket or basin) with a frequency of 12.5% of the 192 households confronted with the flooding phenomenon. This was followed by the 9.6% of flooded households who filled their houses with gravel or shells. This gravel sucks up standing water and mitigates infiltration when the ground is at some point saturated. These households sometimes buy the gravel and transport it with carts. Embankment is the third solution adopted by flooded households (7.5%). Their techniques consist of building an embankment to prevent water from overflowing into their plots. Sandbagging accounts for 4.9%. Some households are forced to stay under water because they have no solution (15.3%) to deal with it. However, it should be pointed out that these techniques

are non-structural in that they do not put an end to the flooding problem for good. They only provide relief to the population.

The interventions of the populations on the dwellings concern the modification of the pits and the toilets, the construction in height, the work on the roofs. In addition, there are other strategies such as paving, flooring, raising walls, sealing cracks and changing the slope of roofs. The relocation of some household members is also part of these adaptation strategies: in 2011, a third of households in the districts of Coboda, Néma II, Lyndiane or Soucoupapaye had at least one member who moved due to flooding.

Outlines of solutions from the authorities that are far from curbing the plight of the population

The Senegalese state is making many efforts to solve the problem of the lack of public sanitation infrastructure in Senegalese cities. However, the inadequacy of this infrastructure in the city of Ziguinchor remains a major difficulty facing the authorities and the urban population. Given the urgency of the situation and the environmental and socio-economic challenges, it has become imperative for the State to pay much more attention to the city's sanitation problems. In 2010, the State allocated 6860205.78 euros from the African Development Bank (ADB) to the city for the implementation of a sanitation master plan. Answers to the problem of sanitation in the city will allow the construction of 22 km of wastewater networks, 1863 sewer connections, a treatment plant with a capacity of 3900 m³ per day. And according to the communications officer of the town hall of Ziguinchor, the city is, he said, being equipped with a faecal sludge treatment and recovery unit; a project now over 95% completed. This is in parallel with the All to the Sewer Project for wastewater financed by the AfDB and AFD (French Agency for Development) and executed by ONAS for the benefit of the municipality of Ziguinchor (Le quotidien, 2020).

This state of affairs requires structural investments and pipelines to drain water into the river. To achieve this, the town hall of Ziguinchor relies on decentralized cooperation, in particular with the Euro-Mediterranean agglomeration communities and the Norman agglomeration community in France, to support the strengthening of the stormwater drainage network. Despite the many efforts of the Town Hall, land constraints and also those related to changes in mentality and behavior of Senegalese in relation to the management of their environment, constitute enormous weaknesses in relation to the sanitation policy. If we estimate in linear meters, Ziguinchor is much better endowed with pipelines than many large local authorities in Senegal. But there is the behavior of the population, who dump any type of garbage anywhere in the city.

In the city of Ziguinchor, the production of garbage is around 46,800 tonnes in 2020 (Gomis, 2021). However, there is no modern infrastructure (landfill or treatment center for the sustainable management of solid waste. urban), the existing system consists of collecting garbage and forwarding it to the final landfill of Enamport. Trucks, tricycles and carts are set up to collect garbage from transit points and take it to landfill. At the municipal level, the town hall manages the pick-up and collection system with a concessionaire (the Robotech Company), based in Dakar. The collection system consists of picking up garbage in markets and collection points, illegal garbage dumps in the thirty-six districts of the municipality of Ziguinchor due to two rotations per day and

forwarding them to the final landfill. The maintenance of the landfill and the garbage which is sent to the final landfill is the responsibility of the municipality of Enamport which houses the landfill. Garbage collection in Ziguinchor by the service provider Robotech is experiencing a number of logistical difficulties. The company has a dilapidated fleet of vehicles including three trucks, two tampers and a mechanical shovel that often breaks down. Faced with this situation, the city is very often inundated with garbage and the populations often deposit their garbage everywhere in the city. Despite the information / sensitization campaign of the populations regarding the correct disposal of garbage, the situation persists.

The municipal institution often carries out a vast operation of cleaning the gutters at certain strategic sites such as Colobane, Soucoupapaye, Boucotte, Santhiaba, Belfort, Nema II, Kandialang checkpoint and at the Jules Bocandé stadium. Despite the cleaning work carried out by the town hall each year before the fall of the first rains in Ziguinchor, these practices of the populations living in the open canals block the evacuation of rainwater. Today, it is obvious that the management of the problems linked to the floods is not yet effective in several districts of the city of Ziguinchor. Even though many efforts are being made by the State, the town hall and their partners, the risks of flooding are still very real, especially with the return of the rains. Pending the establishment of an effective system for the management of rainwater, it is incumbent on the competent authorities to sensitize the populations on a certain number of practices and behaviors assimilated to environmental damage and which destroy any development effort.

The rubbish dumped in the open canals and the sand that fills them no longer allows rainwater to drain away. It often ends up in houses or in the arteries of neighbourhoods, most of which have not yet benefited from the paving programme and/or are in an advanced state of degradation. Added to this is the pollution of the water table in the low-lying areas, directly exposed to the infiltration of toxic elements from household waste. This causes public health problems in these areas, as most people do not have a drinking water connection to the SEN'EAU and use wells for their domestic needs. As the slope is inclined towards the lower points following the channels and the natural water paths, runoff remains significant. However, at this level, the water table is outcropping, so when infiltration saturates the soil, the water rises.

The wait-and-see attitude and lax reaction of the municipal authorities to the recurrence of floods has led the populations of certain flooded neighbourhoods to demonstrate their discontent. During the winter season, heavy rains are permanently recorded in the city, making communication arteries impassable and access to certain districts difficult. The drainage channels are overflowing. And the sanitation work underway as part of the PROMOVILLE programme is aggravating the problem. Several neighbourhoods in the city, notably Belfort, Boudody, Grand Dakar, Lyndiane, Korentas, Santhiaba and Boucotte are flooded.

The recurrent floods in cities like Ziguinchor reveal the dysfunctions and inconsistencies of several decades of public policies in terms of development, occupation of urban space and sanitation in the city. Faced with the urgent need to find solutions to the increasingly dangerous and costly floods, the State of Senegal and the municipal authorities have set up an intervention and support system for the victims of this disaster. In Ziguinchor, the town hall is supported by the National Group of Firefighters, which is responsible for flood management

under the control of the Governor of the Region. The firefighters come in to help and fight against the phenomenon which exceeds the populations. For the most affected layers, food aid and materials are often distributed immediately to meet the needs of the victims. It is in this logic that a large batch of equipment was deployed in July 2011, August 2013, and August 2017 on the most affected sites in the municipality for the evacuation of stagnant water in the streets and primary schools.

The strategic orientations to reduce the risks of flooding in the city of Ziguinchor must seek the right balance between infrastructural and non-infrastructural measures with certain cross-cutting measures and plan their implementation and evolution over time according to available resources and those that can be mobilized (Gomis et al., 2019; 9, Sall and Sy, 2015, Sané et al., 2019; Gomis, 2021).

- Infrastructure measures require significant investment and will only bear fruit in the medium and long term. Their planning must be done in coherence with an urban restructuring plan which should cover all peri-urban areas.

- Non-infrastructural measures allow a shift from a defensive approach against calamities to a risk management approach. It is recommended to favor these measures while planning the protection and drainage works. These are mainly: - Emphasis on flood prevention through urban planning and management; - Strengthen the preparation framework; - Set up a forecasting and early warning system; - Promote resilience for behavioral changes and resilience; - Integrate disaster risk reduction (DRR) into all communal development programs; - Establish partnerships and networks on DRR.

- The institutional aspects contributing to flood control in the city of Ziguinchor concern (i) the clarification of the institutional, regulatory and financial framework, and (ii) the capacity building of the actors concerned by the implementation of the strategy.

The development of a flood risk reduction strategy in the city of Ziguinchor is therefore a process leading to a prioritization of these measures and above all to find the right mix between infrastructural and non-infrastructural measures and to plan evolution over time. This balance must be adapted to the socioeconomic context of the city of Ziguinchor in particular and Senegal in general.

Discussions

The objective of this study was to characterize the problem of rainwater management in the city of Ziguinchor. The results obtained attest to a real problem of sanitation of rainwater managed in precarious conditions due to the lack of infrastructure and water management methods used by households. The infrastructural problem is a factor in the poor management of rainwater in Ziguinchor, while rainwater drainage practices do not protect the living environment of the populations. In the city of Ziguinchor, most of the sanitation infrastructures relate to gutters and structures set up for the evacuation of rainwater. Given their fragility, households have the heavy burden of managing the water that stagnates in their homes according to their financial means. However, as for the Senegalese state, there is a lack of financial resources at the household level.

According to the results obtained, in Ziguinchor, wastewater is managed in precarious conditions due to the infrastructural problem and the drainage

methods used by households. These results confirm those obtained by Ngnikam et al. (Ngnikam et al., 2007) when they state that the situation in African urban areas is one of precarious sanitation. The example of the informal settlements in Yaoundé and the coastal areas subject to flooding in Douala is a good illustration.

The few existing public sanitation infrastructures, namely the gutters, are insufficient and unevenly distributed over the urban territory. And even the existing network of drains for the evacuation of rainwater is very limited. It is only found in a few areas of the city centre, to the detriment of the peripheral areas and the informal settlements. These results confirm those obtained by Soro and Vei (2017), when they state that: 'the under-equipment is general in the legally evolving neighbourhoods, and the infrastructures or collective equipment are non-existent in the housing neighbourhoods not allocated by the administration'.

These results confirm those obtained by Faye (2014) in the municipality of Ziguinchor when he states that the situation is one of precarious sanitation. The example of a few spontaneous neighbourhoods in Ziguinchor (Nema 2 and Coboda), where each family has only one infrastructure, most of which does not comply with standards, is also a good illustration (ANSD, 2014). Kafando (2004) follows the same logic when he says that "In Ouagadougou wastewater is managed in difficult conditions". The practice for the majority of households (nearly 90%) is to throw wastewater into the street, into the gutters or onto the ground of their concessions", (Kafando, 2004). "In such situations, one quickly ends up with a poor state of hygiene and permanent contamination of the environment" (Nkenku, 2005). These authors deplore the sanitation conditions in certain towns in the West African sub-region. In Ziguinchor, as in these cities, autonomous sanitation predominates, and the wastewater management methods used by households are generally inappropriate (Gomis et al., 2019; Sané, 2018; Gomis and Thior, 2020; Sané et al., 2019).

These precarious wastewater collection and evacuation infrastructures and strategies are adopted by households given the deficit in public sanitation infrastructures (Soro and Vei, 2017). Indeed, in Ziguinchor, there is no sewage system capable of ensuring the collection, evacuation and treatment of wastewater (Sané, 2018). The inadequacy of public sanitation infrastructure exists because of limited financial resources at the level of urban authorities and especially the state. This assertion is supported by Vei (2012) who notes that 'the lack of financial means at the level of the Ivorian state and the communes, as well as the lack of technical capacity have been accentuated by the socio-political crisis since 2002'. This has led to excessively problems in the urban environment... (Sall and Sy, 2015). In most inland towns, there is no infrastructure for domestic wastewater treatment, which poses a real environmental problem. All of these difficulties are the main factors behind the poor management of wastewater in Ziguinchor (Gomis et al., 2019). In this city, where the issue of wastewater management is a major concern for both urban authorities and households (Sané, 2018), new strategies are needed to achieve adequate wastewater management and protect the population's living environment from wastewater. These strategies will have to be adopted at both state and household levels, with an emphasis on the management methods used by households.

The problems of drainage of rainwater in urban areas must be studied from a particular angle, hence the need to develop collective resilience actions.

Since they are concerns for the population questioned, a search for alternative solutions to the issue of recurrent flooding in the city must be a priority for the actors in charge of the component. In Ziguinchor, we noted a handful of initiatives that were certainly developed, but their follow-up had hitherto been a major constraint. The issue of land legislation needs to be better taken into account by town planning departments and local authorities. On this point, we share the suggestions of Sy et al. (2012) which consist in enforcing standards and regulations in terms of town planning, evicting inhabitants occupying flood-prone sites, developing them and cleaning them up. This approach seems to be the best suited to finally put an end to these problems of occupancy of beds and waterways. Of course, it will be a very complex operation, including the social realities of our African cities, but the authority remains the primary actor and decision-maker in regional planning.

Regarding drainage works, even if they are also undersized, maintenance must be carried out by the authorities. Also, these structures and their downstream maintenance are not the only alternatives to flood control in these neighborhoods. However, we suggest that quite simply that there is a good mastery of stormwater by initiating additional techniques to fill the deficit of the drainage network, especially since Dasylyva et al. (Dasylyva et al., 2002) the suggested in Dakar. For them, these works are less expensive and only intended for rainwater and would serve as a back-up and not as a substitute for current drainage networks. Obviously if these structures are well constructed, they will undoubtedly be of great use in the city. This is all the more true as experiences have shown that the use of alternative technologies to storm sewerage networks does not increase the costs of servicing the equipped area. In addition, they contribute to a very significant reduction in the costs of structuring sanitation equipment (Deutsch, 2003).

The search for solutions to sanitation problems must be seen from several angles, in this dispute of the rapid evolution of the city's population, which is at the origin of an unprecedented urban sprawl and an anarchic and uncontrolled occupation of certain spaces located on the outskirts of the city (Diedhiou et al., 2020; Sakho et al., 2016; Nouaceur, 2020). Their impacts are still inestimable in the city, and it is necessary to involve the population to fight against the consequences. The work starts with a change in the behaviour of the population, first of all, from the discharge of wastewater into the drainage system. Certainly, some neighbourhoods are not well served by drainage infrastructure, but it is important not to obstruct it with rubbish and so on. This work will involve local authorities, decentralised state services, the population and NGOs in order to provide a significant response to the issue of sanitation and to ensure the well-being of the population and protect the living environment of the population (Sané et al., 2019).

The perverse negative impacts of climate change in the countries of sub-Saharan Africa require appropriate measures. However, populations and productive systems in many developing countries are highly dependent on natural resources and often have relatively limited adaptive capacity. The list of biophysical and socio-economic impacts which worsen the current related problems is long, in particular the floods which are increasingly recurrent and which even affect urban planning. In West Africa, the phenomenon is felt with varying degrees of intensity (Tchindjang et al., 2019; Abroulaye et al., 2015; Maloba Makanga, 2017). Despite the enormous sums swallowed up, the floods

seem to defy the cities, the causes being to be found in the population growth and the unprecedented urbanization that these cities are experiencing. All this is combined with the rural exodus, industrialization, the anarchic occupation of hydro systems by precarious dwellings and finally the non-respect or non-application of the existing urban master plan (Tchindjang et al., 2019).

To achieve a real urban planning policy in Senegal, public decision-makers should consider more evaluation in the development of public policies in a holistic manner. The call for more evaluation is part of an environment that marks the transition from the classic system of government to governance to better reflect the interaction of several actors and the integration of several parameters in the search for performance of public action.

This study shows the role of physical (oro-hydrography, rainfall.) and human (anarchic land use) factors in the occurrence of floods in Ziguinchor. We have seen, for example, that the urban extension of Ziguinchor between 1984 and 2017 was carried out primarily on the major bed of the river and its backwaters made up of gently sloping land and numerous formations, swamps, thus exposing various socioeconomic issues to the risk of flooding. Several factors limit the use of traditional approaches to assessing flood factor in the study area. The first limitation is caused by the inclusion of individual vulnerability (perception, representation of risk) in the analysis. We are aware of the limitation imposed by this specific case study in the goal of generalization on a larger scale, however we believe that this research may provide an interesting database for future research on flooding.

Proper management of sanitation requires sustainable urban development. Planning urban development for universal access to essential services is a categorical imperative for a country like Senegal. Indeed, providing quality essential services that guarantee a decent living environment for the population requires the adoption of both a global planning of the territory and a differentiated planning according to the districts. In the interests of equity, precarious neighbourhoods must be a priority target for public policies on access to basic services in Senegal. As a key actor who makes political choices that affect the country's future, the Senegalese public decision-maker should undertake actions that are underpinned by consensual decisions articulated through a decision-making mechanism. The decision-making mechanism should be understood here as a process involving a plurality of actors with different preferences, interests and identities. This logic refers to the good governance that this work promotes. Good governance pursues an ideal of dignity and progress. It contributes to the satisfaction of the vital needs of the population. It contributes to the promotion and well-being of men, women and children, with the aim of ensuring education, work, care and social protection for all. It enables a fair distribution of national wealth. It allows initiative to develop.

Methodologically, this work was based on various data obtained from information collected from households and administrative structures. The main difficulty lies in the organisation and processing of the mass of information obtained during the data collection. The management of rainwater is one of the major challenges of the city today. The question demands all the more attention as the sum of the constraints weighing on the Third World city continues to grow. The sustainable management of rainwater therefore requires a global reflection that takes into account all the problems, constraints and challenges of the area considered.

CONCLUSIONS

With this research work, we tried to approach in an integrated way the problem of rainwater in the management of space, in the case of the city of Ziguinchor. With this work, we have tried to bring elements of knowledge and answer in a broader perspective. The systemic analysis made it possible to highlight the disruptive effects of the faulty management of space on the urban rainwater management system. This finding of the deficiency calls into question urban policy in general.

Apart from this difficulty, this work has made it possible to present relevant and usable results in the context of urban sanitation in Senegal, particularly in Ziguinchor. Indeed, this study made it possible to analyse the conditions of rainwater management in the city of Ziguinchor. At the end of the study, it was found that wastewater in the city of Ziguinchor is administered in precarious conditions, hence the presence of wastewater in the living environment of the city's populations. In reality, the way wastewater is disposed of in Ziguinchor does not meet the fundamental objectives of individual sanitation, namely the elimination of all causes of environmental pollution and the protection of the population against health risks. On the contrary, this type of sanitation increases the damage to the environment and exposes the population to diseases linked to the dissemination of wastewater. The management of run-off water in Ziguinchor is a concern for the population. The high rainfall levels, combined with the area's sensitivity to infiltration and the problem of drainage, have increased the phenomenon. To cope with this problem, some households are organising themselves individually to find so-called non-structural solutions, such as backfilling, placing sandbags and stones or even building walls and ledges around their houses. These local initiatives are deployed by the populations in order to better cope with the constraints. Moreover, the indifference of local authorities to this problem justifies the incoherence and obsolete nature of environmental management policies in our cities.

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THE NATURAL AND MIGRATORY MOVEMENT OF THE RURAL POPULATION OF THE BANAT MOUNTAINS (1993-2016)

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Abstract: The article is based on the study of population dynamics in the rural area of the Banat Mountains. The study period ranged from 1993 to 2016. The aim of the paper was to observe the numerical evolution of the population and to make calculations on the evolution of some demographic indicators. Demographic indicators such as the natality, mortality, natural growth, natural, migratory movement and migratory growth of communes have been analyzed over the period mentioned. A first objective was to physically and then administratively delineate the Banat Mountains. The second objective was to obtain the necessary numerical data, then to process the data for each indicator. Data processing resulted in a series of indicator rates, and in addition, graphs were developed with the numerical evolution of newborns and deaths. The numerical data on the number of newborns and deaths were taken from the website of the National Institute of Statistics. There have been introduced in the Microsoft Excel 2013 program a few graphs. Also, through Microsoft Excel 2013, rates for demographic indicators were calculated, and then the results obtained were introduced into Arc Gis version 10.3. Finally, a series of maps on the territorial distribution of values for each indicator was generated.

Key words: natural dynamics, migratory dynamics, rural population, Banat Mountains

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INTRODUCTION

The Banat Mountains are a mountain group belonging to the Western Carpathians. In the south, they are bounded by the Danube River, in the eastern part of the Timis-Cerna aisle, north of the Lugoj Plain, and in the west are bounded by a series of hills. The Banat Mountains have shown interest in research due to the abundant historical past. Studies have been carried out aiming at the research of relief dynamics and studies on the population, tourism activities.

The Banat Mountains came to the attention of the researchers (Grigore, 1965; Olaru, 1995; Olaru, 1996; Olaru, 2000; Lazăr, 2011; Ianăș, 2011) who have conducted various studies on the dynamics of relief, population and tourist activities. Other studies have been conducted on other areas of the country on population dynamics (Mălăescu and Mihăescu, 2008; Mihalca, 2010; Niță, 2010; Vilcea, 2011; Pavel and Fonogea, 2011; Fonogea et al., 2012; Tofan, 2012; Persu, 2017; Lung, 2018; Lung and Gligor, 2018; Lung and Diaconescu, 2019; Lung and Mureșan, 2020). Population has shown interest in research for researchers around the world (Muhsam, 1987; Dellapergola, 2001; Josipovic and Repolusk, 2003; Leridon, 2004; Attané and Barbieri, 2009; Prioux and Mazuy, 2009; Kerbler, 2015; De Luca Barrusse, 2018; Franke and Kulu, 2018; Kozina, 2018) with demographic studies from different perspectives.

The Banat Mountains are rich in subsoil resources, which led to their anthroposis during historical periods. Due to industrialization during the socialist period, the population thrived because there were jobs and the economy was based on industrial activities. After 1989, massive restructurings took place in the industrial sector, which triggered economic regression and subsequently demographic regression. The purpose of the study is to carry out radiography on demography in the Banat Mountains' rural area after the socialist period. In this way, demographic indicators such as natality, mortality and natural growth were taken into account. Also, the demographic evolution after 1989 was taken into account.

METHODOLOGY

The geomorphological map was used for the physical delimitation of the studied area (Posea and Badea, 1984). The administrative delimitation was made by overlapping administrative-territorial units above the contouring physical boundary. All the administrative-territorial units whose estates, overlapping even partially, over the mountain unit were included in the western mountainous area (Surd et al., 2017). After the application of the method, 38 administrative-territorial units were formed, which make up the rural area of the Banat Mountains. After the administrative delimitation was followed the identification of the rural space, the next step is to get the necessary numerical data. Obtaining data for the targeted demographic indicators was made through the Tempo-Online Platform accessible on the National Institute of Statistics website. After the acquisition of the numerical data, the rates of the three indicators were calculated. Calculation of rates was made using Microsoft Excel 2013, and will be processed with Arc Gis version 10.3. After their processing, a series of maps were obtained, and in addition they were created graphs to highlight as clearly as possible the evolution of the investigated indicators in the period 1993-2016.

RESULTS AND DISCUSSIONS

Numerical evolution of the population

After the socialist period, the population of the Banat Mountains' rural area began to decline significantly. In 1993, the rural area registered 80,467 people, and in 2000 the population would decrease to 74,557 people. The demographic decline in the eight years was 7.3 %, which means almost half of the entire 1993-2016 period when the population dropped by 16.8 %. From 2010 to 2016, in the six years, the population declined by 4.7 %. The rural area of the Banat Mountains has a small population, so in 2016 the 38 communes had a population of 66,911, and the largest city, Resita, had 87,951 inhabitants. The share of rural population in the Banat Mountains in 2016 was 46.7 % (figure 1).

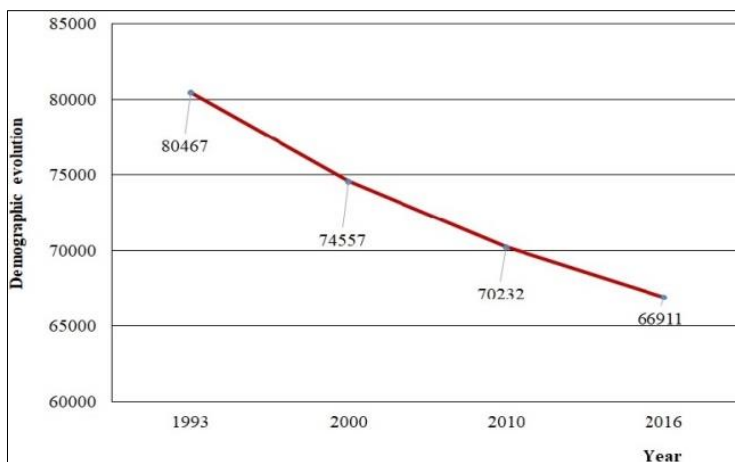


Figure 1. Demographic evolution in the rural area of the Banat Mountains in the period 1993-2016

(Source: data processed after the NIS)

The evolution of birth

Natality in the rural area between 1993 and 2016 had values between 1 ‰ and 20 ‰.

The lowest values between 3-5 ‰ were in four communes respectively Brebu Nou (3.6 ‰), Cărbunari (4.5 ‰), Mehadica (4.9 ‰) and Sasca Montană (5.0 ‰). Of the 38 communes, 34 were placed with birth rates between 1-10 ‰. Eșelnița commune had 10 ‰, followed closely by the Văliug and Coronini, which had rates of 9.9 ‰, respectively Socol commune with 9.1 ‰. The maximum birth rates in the rural area of the Banat Mountains in the period 1993-2016 were in only four communes. The highest value in the whole rural area was in Dognecea 14.2 ‰, Ocna de Fier 12.0 ‰, Gârnici 11.8 ‰ and Șopotu Nou 10.2 ‰ (figure 2)

In terms of percentage, the territorial distribution of birth rates is dominated by values between 1-10 ‰, in 89 % proportion.



Figure 2. Distribution of birth rates in the period 1993-2016
(Source: data processed after the NIS)

Numerical evolution of newborns

Your birth number has been steadily decreasing by 2010, and in 2016 the number will grow very little with only three newborns. Throughout the time span, the number of newborns was 2,398 children.

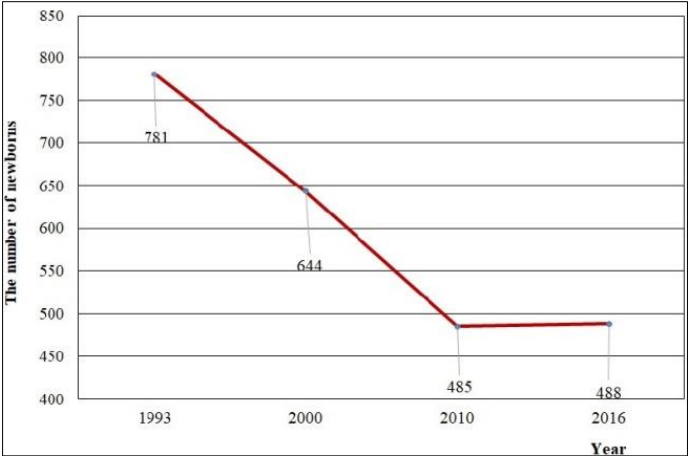


Figure 3. Numerical evolution of newborns
(Source: data processed after the NIS)

The maximum was recorded in 1993 when 781 children were born, and in the next eight years, in 2000, the number dropped to 644. The decrease was 17.6 %. Over the next ten years, the number of babies dropped from 644 to 485, which means a decrease of 159 children. Percentage decrease was 24.7 % in the ten years 2000-2010. From 1993 to 2016, the decrease in the number of newborns in the rural area of the Banat Mountains was 37.6 %. Only six of the 38 have registered over the period 1993-2016 a number of newborn babies over 100. The six are: Dognecea with 123, Eşelnița with 116, Berzasca with 113, Carașova with 105, Prigor and Bucosnita with 101. The lowest value was in Brebu Nou commune of only four newborns, given that the entire commune had in 2002 only 87 inhabitants according to the data from the census (figure 3)

Evolution of mortality

The mortality rates in the Banat Mountains rural area are among the highest values, which are distributed throughout rural areas. Of the 38 communes, only two have lower mortality rates with values between 1-10 ‰. The communes are: Brebu Nou with 1.0 ‰ and Coronini with 8.7 ‰. The two are the only ones who have had mortality rates below 10 ‰ throughout the entire period. The maxims were recorded in eight communes: Cărbunari (20.6 ‰), Ezeriș (20.8 ‰), Târnova (20.9 ‰), Goruia (22.6 ‰), Ciclova Română (23.3 ‰), Brebu (24.1 ‰)) and Sasca Montană (27.2 ‰). The majority of administrative-territorial units (28 out of 38) are in the range of 10.1-20 ‰ (figure 4).



Figure 4. Distribution of mortality rates in the period 1993-2016
(Source: data processed after the NIS)

Unfortunately, the distribution of mortality rates shows that the rural population in the Banat Mountains faces major demographic failures. Only, the communes of the Coronini and the Brebu Nou have slightly lower rates, the rest having high values, increasing continuously. Among the highest mortality rates are common where in the socialist period prospered the mining industry. After 1989, when the socialist regime was over, the mining industry was destructured, following the emergence of far-reaching negative socio-economic phenomena. They put their mark on the living standards of the population, which without the object of work could hardly prosper. They followed migrations of the young demographic component, behind remaining elders. Many miners in the mining communes suffered from diseases characteristic of the mining environment, leading to their exit from the system before the weather. Class of rates ranging from 10.1-20 ‰ dominates clearly with 74 % of the territory, the second being class 20.1-30 with 21 %, respectively with grades 1-10 ‰ with only 5 %.

Numerical evolution of deaths

The number of deaths in the rural area of the Banat Mountains between 1993 and 2016 was 4,923. From 1993 to 2016 the numerical evolution of deaths was downward but with values above the number of births. The year 1993 recorded the maximum of 1443 deaths, and in 2000 the number would reach 1,273 with 170 (11.8 %) less than in 1993. During the first decade of the 21st, 2000-2010, the decrease in deaths continued by 5.9 %, with the largest decrease in the studied period between 2010-2016, a decrease of 16 %. The highest values were in 15 communes each with more than 150 deaths. Three communes registered over 200 deaths, Pojejena 219, Berzasca 227 and Bozovici 251. Reporting the number of deaths in the period 1993-2016 to the population registered in 2016, the Pojejena population decreased by 7.7 %, the municipality of Berzasca by 8.3 % and the municipality of Bozovici by 8.4 %. From 1993 to 2016, deaths declined by 30.1 % (figure 5).

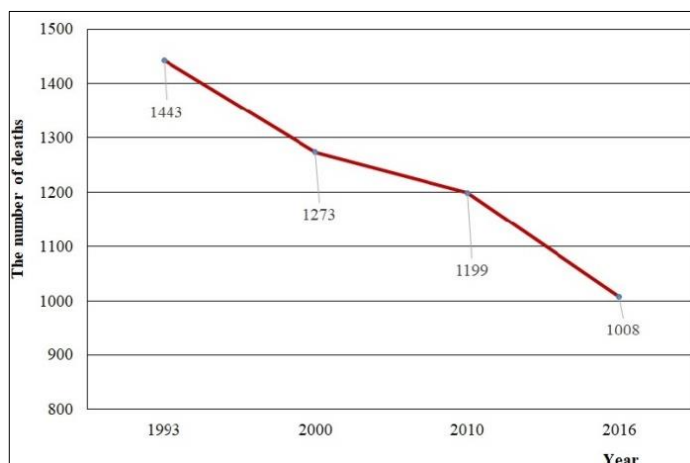


Figure 5. The numerical evolution of deaths
(Source: data processed after the NIS)

Evolution of natural growth

The continuing decline in deaths has not helped to record positive natural enhancement values in only three of the Dognecea, Brebu Nou and Coronini communities. The causes of the natural spores of these three communes have different origins. Dognecea was a well-industrialised commune, but after the disappearance of industry, the population began to enter other fields of activity, even to work in neighbouring administrative units. Many of the houses were bought by people from Timiș County, who wanted a quiet place with fresh air after the closure of the industry. Brebu Nou, is a commune in which there is no ethnic majority, the ethnic structure being divided between Romanians, Germans and Hungarians. Basically, the birth policies of each ethnicity have resulted in positive natural growth. The commune of Coronini continues to thrive due to its geographic position at the banks of the Danube. The population is trained in tourist and fishing activities. Most of the Banat Mountains' rural area is subject to negative values of natural growth. The Sasca Montană commune had the lowest natural increase (-22.3 ‰) followed by another 13 administrative units (Lăpușnicel -10.2 ‰, Pojejena -10.4 ‰, Sichevița -11.0 ‰, Dalboșeț -11.3 ‰, Bozovici -12.6 ‰, Buchin - 13.1 ‰, Târnova -13.7 ‰, Ezeriș -14.1 ‰, Ciclova Română -14.8 ‰, Goruia -15.0 ‰, Cărbunari -16.0 ‰, Brebu -17.4 ‰, Mehadica -20.0 ‰). 21 municipalities had natural increase values between 0 and -10 ‰ (figure 6).

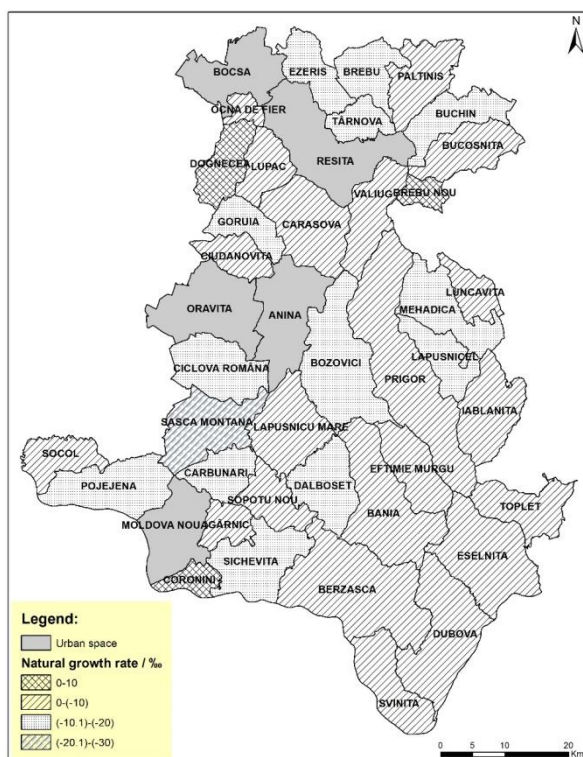


Figure 6. Distribution of natural growth rates during 1993-2016
(Source: data processed after the NIS)

Dynamics of emigrations

Between 1993 and 2016, 4,524 people left the countryside of the Banat Mountains. Out of the 38 communes only three (Bucosnița 9.7 ‰, Lupac 8.7 ‰, Carașova 6.8 ‰) the emigration rate (figure 9) was below 10 ‰. In the opposite direction, the communes with the highest departure rates were Brebu Nou with 42.9 ‰ and Ciudanovița with 42.1 ‰. Brebu Nou is an administrative unit in which there is no ethnic majority, and the number of Germans has been continuously decreasing. Former settlers, some of them have returned to their places of origin. In 1993, the population of Brebu Nou commune was 247 inhabitants, with the population census falling to 119 inhabitants at the 2011 census. The demographic decrease of the commune in the 20 years was 48.2 %. For much of the population (27 %), the ethnic situation is unknown. Ciudanovița is a commune in which the departures have been accentuated due to anthroposis. As early as the socialist period, uranium deposits were found and exploited in the administrative territory. Unfortunately, these have been exploited without taking certain measures to protect the population. The high level of radioactivity has in time led to the illness of the commune's workers and inhabitants.



Figure 7. Normal plant cover



Figure 8. Plant cover on the dump

Massive departures began after 1989, when the exploitation activities ceased and the exploitation areas remained uncologized. Authorities have not been involved in greening activities, many of the heaps being only briefly fenced. Even after decades, radioactivity can be seen in the evolution of the plant cover. The chromaticity is quite different between the vegetation developed on the dump and around the heap (figure 7) and the vegetation at a greater distance from the dump (figure 8).

The weights of migration rates in the Banat Mountains rural area represent a majority (71 %) of the values between 10.1-20 ‰. The second place is occupied by the values between 20.1-30 ‰ with a weight of 16 %. Looking at these weights, we can say that the rural area is experiencing the depopulation phenomenon, the values of departures being among the highest (figure 10).



Figure 9. Distribution of emigration rates
(Source: data processed after the NIS)

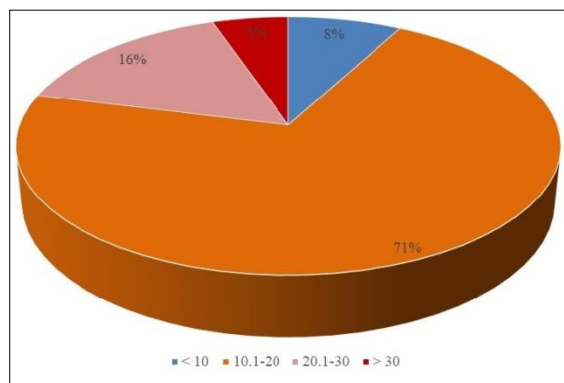


Figure 10. The weights of emigration rates
(Source: data processed after the NIS)

Immigration dynamics

For the entire timeframe analyzed the number of establishments was 4,257. Regarding the immigration of the population, eight communes were recorded (Coronini 9.9 ‰, Gârnici 9.9 ‰, Eftimie Murgu 8.8 ‰, Lupac 8.8 ‰, Prigor 8.8 ‰, Șopotu Nou 7.9 ‰, Luncavița 7.8 ‰, Carașova 5.9 ‰) was below 10 ‰. Another eight communes (Ezeriș 26.3 ‰, Brebu 25.1 ‰, Buchin 23.8 ‰, Sasca Montana 23.5 ‰, Văliug 23.4 ‰, Ciclova Română 23.0 ‰, Goruia

23.0 ‰, Bozovici 22.0 ‰) recorded the highest values of immigration. 22 communes had immigration rates ranging from 10.1 to 20 ‰ (figure 12).

Immigration rates are ranked first with 58 % values between 10.1-20 ‰ and the second place with equal weights are below 10 ‰ and between 20.1-30 ‰ (figure 11).

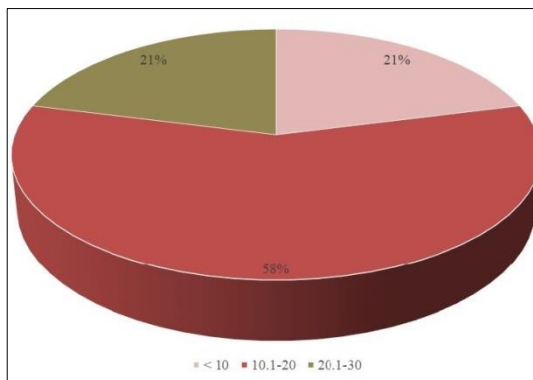


Figure 11. The weights of immigration rates
(Source: data processed after the NIS)



Figure 12. Distribution of immigration rates
(Source: data processed after the NIS)

Migratory growth

The migratory increase of the population in the rural area of the Banat Mountains is negative. Between 1993 and 2016, 4,257 people were settled in the countryside and 4,524 people left. It follows that the migration rate has a negative value.

CONCLUSIONS

The rural area of the Banat Mountains is subject to risky demographic phenomena. The period 1993-2016 was a poor demographic with values of negative natural growth for most communes. Of the 38 communes, only three recorded natural positive growth (Brebu Nou, Coronini, Dognecea). The highest negative value was in Sasca Montana commune to -20.1 ‰. For the whole period the number of deaths was well above the number of newborns, respectively mortality values were above birth rates. The numerical evolution of the population in the rural area of the Banat Mountains has been steadily decreasing over the whole period studied.

The migratory dynamics was negative, so the departure values were higher than the set values. The territorial distribution of emigration and immigration rates is a homogeneous one in which the highest and lowest values can be observed.

Consequently, the rural area of the Banat Mountains is experiencing real demographic dysfunctions. Negative values of natural growth, coupled with negative values of migratory growth, are converging towards deploying and deploying demographic risk phenomena such as depopulation.

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THE CONTINENT OF MASTERS DECISION-MAKING POWERS OVER EUROPE

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Abstract: Europe has been ruled in the past centuries from different centers depending on the dominant power, from within or outside the continent, from: Rome, Venice, Madrid, Paris, London, Vienna, Berlin and finally from Moscow and Washington. Now with the formation of the European Union, it seemed that the center was established in Brussels, but this city is far from having decision-making power, often: Berlin, Frankfurt, Washington, Paris or more recently: Istanbul, Beijing, Warsaw, Cairo, Jerusalem or Dubai are getting better rated, Brussels being only the scene in which the decisions already established in other centers are presented, without reaching a central leadership dominated by a single state.

Key words: spheres of influence, domination, decision-making centers, great powers, alliance

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INTRODUCTION

For many years the heart of Europe was represented by Greece, followed by the Roman Empire that dominated the southern part of the continent. In time, the Great Migration that brought the main linguistic groups and peoples we know today, led to the endangerment of the Romans, splitting into the Western Roman Empire that dominated Western Europe and the Eastern Roman Empire or later Byzantine Empire, which represents the eastern part (Mășu, 2014). But migration continued to bring many different peoples, then forming over three quarters of today's Europe, remaining authentic only: Italy, Spain and Portugal (from the Roman Empire), Romania from Dacia, Greece, Albania or Armenia, while The French are only semi-new, appearing after the

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migration of the Franks on the territory of Gaul, which was a Roman province. The rest of the states: Russia, Belarus, Ukraine, Poland, Czech Republic, Slovakia, Bulgaria, Serbia, Croatia, etc. were born from the migration of Slavs, Hungary and Finland were established from the migrations of the Ugro-Phoenicians, Denmark, Sweden, Norway or Iceland are the heirs of the Vikings, Germany, Great Britain, Holland, Austria and so on appeared from their german ancestors, while the turkish states: Turkey and Azerbaijan were kept in contact with Europe with Asia.

During all this time, it was not the case for a single power to dominate the whole continent, or for the other states to want it, leaving them selves submissive. After a difficult period in which the territorial appearance of the newly formed states following migration was difficult, only Venice and Genoa made the prestige of Europe, followed by Bruges in Belgium, or the Holy Roman Empire, a confederation as emblem of the former Roman Empire (northern half of present-day Italy) and the newly emerged German peoples (current states: Germany, Austria, Switzerland, the Netherlands, Belgium, the Czech Republic or eastern France) (Kissinger, 2015; Attali, 2016). Nor did the emergence of Western European imperial powers favor the emergence of a single dominator over the entire continent of Europe, such as Spain, Portugal, France, England, the Netherlands and finally Belgium, Denmark or Italy in the west and the Ottoman Empire and the Russian Empire (Tsarist) in the east they held only small areas of influence even though outside Europe, together, they accumulated more than 80% of the world's territory for several hundred years. The Islamist world was dominated by the Ottoman Empire, the Slavic world was dominated by the Russian Empire (a short time sharing this trophy with the union of the Kingdom of Poland and the Grand Duchy of Lithuania), the Vikings were represented by Denmark in places along with Sweden or Norway and the Latin world well represented, dominated global influence with the help of: Spain, Portugal, France and later Italy. But the German peoples, very populous and influential, were flanked to the south by the Latin world, to the southeast by the Ottomans, to the east by the Russians and to the north by the Danes (Vikings). This is how the numerous riots and escape attempts appeared.

The freer British among the Germans, located on an ocean island, managed to go out into the world by building the largest empire in human history, overcoming the old title held by the Mongol empire. The Dutch, in turn, with too little territory and population, tried to seize territory around the globe, but eventually became the largest naval power, attracting the formation of the new empire of Belgium (Latin-German). But the German provinces in central Europe, heavily populated, flanked on all sides, took the path of industrialization, leaving the ranks mainly Austria, Prussia or Bavaria. After Prussia united most of the provinces giving birth to Germany and Austria expanded the Habsburg Empire (Austrian or Austro-Hungarian), the thirst for domination and escape led them to the First World War, after which Austria lost its empire, and Germany continued its desire to dominate all the "evil" states that had immobilized it for so many centuries (France, The Netherlands, England, Poland, Denmark, Russia and so on), together with two much weaker allies and with their own interests (Italy and Japan) triggered what World War II did. After that, even ruined, Europe could not be dominated by a single power.

At first Russia through the USSR and the United States had partial control, but the harsh interventions in Budapest in 1956 or Prague in 1968 did not make Russia the master of the eastern part, here there is a continuous flanking of Greece and Turkey in the south, Romania or Poland continued to reject Russian pressure and Yugoslavia did not even want to hear about its membership in the communist bloc (Mazower, 2019). In the western part, the US with financial support provided by the Marshall Plan, often politically conditioned, did not have control in France, D.R. Germany or Italy, these remaining powers in conditions of neutrality (Steil, 2018). After the fall of communism and the split of the USSR, the United States hoped to dominate power in Europe as a bigger brother, but that did not happen. Now, through the enlargement of the U.E., through the customs, monetary, political, and so on union and the attempt to form a single bloc, they gave hopes to Germany and France that by this they will easily dominate the whole of Europe, but the exit of Great Britain from the union, the surrender of influence, the “troubles” created by Poland that does not accept submission, Russia’s return to hegemony, the rapid turn to Islamic culture and Turkey’s economic miracle, or Italy’s attachment to the pro-China idea of the New Silk Road rejects any chance of Europe it becomes subject to a single dominant power.

THE 7 INFLUENTIAL POWERS OVER EUROPE

1. Germany (and the German community from: Austria, Switzerland, Czech Republic, Poland, Italy, Romania, Luxembourg, Belgium and so on) with major influence on Central and Eastern Europe;

2. Italy with influence over the Mediterranean and the Balkans;

3. Great Britain with influence on the seas and oceans surrounding Europe;

4. France with influence on the continental mass;

5. Russia with influence over the Eastern European half;

6. Turkey represents the Islamist population in Europe;

7. US with influence over Europe through state corridors: Poland, Czech Republic, Romania, Croatia, United Kingdom, Kosovo;

Although there are apparently agreements between some of these powers and obedience from others, they are only periodic, and the individual character always appears. There have been numerous trends in coagulation between: France and Italy, Germany and the United Kingdom, Germany and Russia, Turkey and Russia, Germany and Turkey, the USA and the United Kingdom or the USA and Turkey, but none of them has been lasting.

It was considered until recently that the France-Germany tandem would dominate the European Union and with it the entire eastern flank waiting to be part of this union, until the regular alliances Russia-Turkey, USA-Poland and Great Britain's exit from the union gave the plans Franco-German overhead. Then Germany declared itself the master of Europe, here being the most influential city on the center of the continent in Berlin, the financial capital and the E.U. banking headquarters in Frankfurt, as well as the most dynamic city in Munich, and Italy, which is one of the decision-making powers, had handed over its economic administration to the Germans, seeming to capitulate, until it first signed the Chinese New Silk Road project in 2019 and Russia annexed Crimea in 2014, confusing German plans. In 2015, the USA came to Central Europe with the Three Seas Initiative project

(Baltic Sea, Adriatic Sea and Black Sea, including Poland, Croatia, Romania and 9 other connecting states), where it gathered its former allies, but German pressure on Austria, the Czech Republic, Slovakia, Romania and Croatia or Russian pressure on Hungary, Serbia or Bulgaria made this project discontinuous (Frankopan, 2019; Friedman, 2015; Sayle, 2019).

At the moment the balance of power between the 7 influences exists, seeing against them, without being able to consider that most decisions are dictated only by a single power, whether it is: Paris, London, Berlin, Frankfurt, Brussels, Rome, Vienna, Moscow, Istanbul or Washington. Dangerous alliances that carried Europe into the arms of foreign powers seem to be only periodic and have the role of pulling European powers out of times of crisis, so alliances of Russia, Turkey or Italy with China or alliances of France, Britain, Spain or Germany with the US had only a nuance of periodicity.



Figure 1. Decision-making powers over Europe

Source: original ideas of the author and data processed after: Krastev, 2017; Barro, 2020; Carpenter, 2019; Pomeranz, 2001.

Table 1. States with decision-making power over Europe

Source: original ideas of the author and data processed after: Hobson, 2004;
 Chomsky, 2019; Bulatov et al., 2019; Suciuc et al., 2010; Glenny, 2020;
 Ramet and Hassenstab, 2019; Abulafia, 2014; Vlad et al., 2010.

No.	Decision-making powers on Europe	Surfaces of influence	The origin of power
1	Germany	European Union Central Europe German community	Economic power, raw material processing trade, multinational companies
2	Italy	Mediterranean Sea Balkan Peninsula	Historical, Mediterranean power
3	Great Britain	The seas and oceans that surround Europe	Maritime power, world decision-making power
4	France	Continental mass of Europe	European, institutional-administrative power
5	Russia	Eastern European half	Continental, military, Eurasian, agricultural and raw material exporting power
6	Turkey	Turkish community of 15 million, from: Germany, France, Holland, Bulgaria, Cyprus, Greece and so on. Islamic states: Kosovo, Albania, Bosnia and Herzegovina	Strategic, Islamic, transit power
7	United States	The NATO bloc Great Britain Tri-seas: Poland, Romania, Croatia, Czech Republic	Old world power, strategic world power, military, western and democratic
8	Spain	Southwestern Europe	Latin American power
9	Poland	Visegrad Group, Romania, Lithuania, Western Ukraine and Belarus, the Slavic world in the European Union	Central-continental power, confluence of the great powers
10	China	In the first part: Eastern and Southern Europe: Greece, Russia, Ukraine, Italy, Poland, Romania, Serbia, Hungary and so on, with influences on the whole of Europe and the growing communities of ethnic Chinese.	New world power, financing and building power
11	Sweden	Northern Europe	Nordic power, high standardization
12	Egypt	The Arab world in the cities of Europe with 7-10 million: Paris, London, Brussels, Barcelona, Marseille, Athens, Vienna, Stockholm, Berlin, Amsterdam and so on.	Arab, strategic, civilizational-ancient and cultural power
13	Other European countries with individual aspirations: Hungary, Czech Republic, Greece	These states are often directed towards Asia, seeking their own alliances and not complying with E.U. requirements.	Confluence powers
14	Other non-European countries with influence over Europe: Japan (and South Korea), Israel,	- Japan with Asian tigers; - Israel or the rich states of the Persian Gulf have some economic influence; - Latin America has come to influence the Iberian Peninsula, Spain and the American community; - India will become increasingly	Technological powers Tourist, religious and cultural powers Agricultural powers

	Brazil (and Spanish Latin America), India , the Arab World (Saudi Arabia , Dubai , Maghreb and so on), Iran (and the Shiite community), Nigeria (and Sub-Saharan Africa)	economically influential, with a sphere of influence in the UK and perhaps Italy, Portugal, Greece, historical partners and a closer relationship with the rom-gypsies community; - the Shiite Muslim, Sunni or Persian world culturally imposes on the growing Muslim community in Europe over 47 million (23 million in the European Union); - The population of sub-Saharan Africa, often Christian, will migrate in increasing numbers to Europe, most likely represented by Nigeria.	Demographic strength Religious powers and hydrocarbons New demographic power, future emigration power
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THE FUTURE NEW POWERS OVER EUROPE

8. Spain could become a center in the future without being ruled by France or Italy, with the main influence within the E.U. on the 450 million Spanish speakers worldwide (plus almost 4 million from Latin America throughout Europe), especially since they represent the great mass of migration to Europe but also the USA (with over 50 million speakers this could be in the future the second national language after English) (Baten, 2016; Neğüt and Rusu, 2012). But for now, Spain seems to be happy with the representation that France and Italy offer it in Europe and does not want an individual statement yet, although at times such as the Iraq war (when it joined the United Kingdom and the United States) it has shown some removal from unanimous European decisions.

9. Poland, like Romania, is restricted between the direct interests of Germany and Russia, so the two emerging states remained loyal to US interests in Europe, being abandoned by Turkey which reaffirmed its position as an individual leader with its own interests with the miracle economic growth from recent decades. Even if the United States remains influential in Central and Eastern Europe, loyal states may move toward some independence. Poland wants an individual statement together with its own allies such as: Romania, the Czech Republic, Slovakia and maybe Greece and Croatia. These countries being disadvantaged between the individual alliances of Germany, Russia and Turkey but also between them there are multiple affinities such as agreements: Hungary-Russia, Serbia-Russia, Austria-Germany, Russia-Italy, Russia-Germany or Turkey-Russia.

10. China. Britain, Germany and France relied for a time on a tacit alliance with China to recover their economies, followed by Russia, which found support in Asian power following Western economic sanctions following the military invasion of Crimea, Lugansk and Donetsk, coming out economically to the detriment of Ukraine, which at the time turned its hopes on the European Union, which was later absorbed by the Chinese economy. It was followed by Turkey and plots in this segment: Poland, Greece, Serbia or Italy (Bertonha, 2009; Reilly, 2021). It is becoming more and more likely that in the not too distant future China will have an influence on the continent that is economically and decisively equivalent to the USA (but less military). These could create in Central and Eastern Europe a bifurcation of the spheres of power of: USA (with allies: Poland, Czech Republic, Croatia, Romania, Georgia), China (Greece, Ukraine, Serbia, Italy), Germany (Austria, Hungary, Croatia, Slovenia, Slovakia), Turkey (Bosnia, Albania, Kosovo) and Russia (Hungary, Serbia, Slovakia,

Belarus, Greece, Bulgaria, Armenia) and France and Great Britain, which will flirt somewhat with Romania, Poland and Greece, being observers.

11. Sweden could draw in a tacit agreement: Finland, Norway, Denmark and perhaps Estonia and Iceland, creating an area of high Development Index with slight influences from Britain, Germany, Poland and Russia in Europe and Canada and Japan abroad, but it is clear that the northern states do not seem to meet the demands of the great European powers in a timely manner, looking for their own alternatives.

12. Egypt. There are some European states very involved in the life of Islamist states, against the background of religious differences and especially historical conflicts there are antipathies between: Spain, Italy and France on the one hand and the Islamist Maghreb states, between the Christian Orthodox states: Greece Bulgaria, Macedonia, Serbia or Armenia in conflict with Turkey and its Muslim allies: Albania, Bosnia and Herzegovina, Kosovo, Northern Cyprus and Azerbaijan and so on., but all European states are looking for economic links with the vast Islamist world around the Mediterranean and the Middle East. Unlike Turkey, which occupies the territories of Armenia and Greece and has always been an invader, Egypt, with 20 million more people, was the good ally of ancient Greece and Italy (Roman Empire), being perceived as a civilized, inspirational nucleus and never as an aggressor state, this role still existing today, having good relations with both the Maghreb and Arabia, as well as with Shiite Islamist Iran or Jewish Israel.

How the Turkish Muslim population in Europe no longer growing (5 million in Germany) and the states Islamized by the Ottoman Empire (Albania, Bosnia, Kosovo) are somewhat in economic drift while the big western cities are increasingly sought after by Arab Muslims, Egypt is most likely to replace the role of Turkey as a representative of Muslims in Europe. Also, the population around the Indian Ocean is growing and the E.U. will move economically towards this perimeter (Diaconescu, 2018), and the union's intention to integrate Turkey and maybe a Kurdistan state, and from here through Iran or what is left of Iraq to have access to the Indian Ocean is starting to be no longer viable, also the integration or alliance with Israel does not give it a coast too extensive on the Red Sea (part of the Indian Ocean) even though this country plans to build its own naval route between the oceans "Suez 2". Instead, collaboration - alliance with Egypt would provide 1900 km of coastline to the Red Sea and the Suez Canal that makes the naval connection with the Mediterranean Sea (Miller, 2020; Abulafia, 2014). Egypt's geopolitical and strategic importance will be overwhelmingly greater than Turkey's importance in the near future (Turkish importance is given mainly by the control of the Bosphorus and Dardanelles that connect the Black Sea-Danube with the Mediterranean Sea, but the canal planned to be built by the Chinese, connecting Morava to Vardar crossing Serbia, Northern Macedonia and Greece, directly between Danube and Aegean Sea, would reduce the Turkish influence on the European Union). Also, the Egyptian civilization was Islamized and Arabized with the sword, and today between 5 and 20% of the population is expected to still tend to be Coptic (the Christian religion present until Islamization), which says a lot about the freedom of Egyptian society. Other possible decisively independent powers with influence over Europe could be the states: Hungary, Czech Republic or Greece, and outside Europe: maybe India, Japan, Israel, Iran, Saudi Arabia, regions: Maghreb, Latin America, sub-Saharan African states, among which especially Nigeria, which have slight, complementary influences.

CONCLUSIONS

Continent Europe, though small in size and less and less important in population and economy, has been for centuries a great center of civilization and expansionist power, with European communities existing on all continents in large numbers (dominant on the continents of North and South America, Australia and Oceania) and religion, culture, administration or behavior have spread from here to the rest of the world, with the main inspiration being the "Western world". It's just that this continent, the size of the USA, Canada, China or just over half of Russia, was not dominated by just one great power, here there are always a series of rivalries that led to the outbreak of the first two great world wars of what existed in the world. In the last five centuries there have always been at least 9 powers in Europe alone, these being represented by Turkey (or the Ottoman Empire), Spain, France, Great Britain (England), Austria (along with Hungary), Germany (Prussia to the beginning), Poland (along with Lithuania or the Czech Republic), Russia, Italy (or a province of it: Papal State, Kingdom of Naples, Lombardy, Venice and so on) and a Nordic state represented by Denmark or Sweden, adding to this list and less powers influential but still independent such as Portugal or the Netherlands. What is a single state in other parts of the world, in Europe has represented 9 powers and more countries, and the influence of the US or other states outside the continent that tend to multiply with the demographic and economic problems of the continent, does not leave that this land mass be dominated by a single power.

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