

Ephemeral character of earth buildings. Construction techniques in the high plain area of Banat

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Abstract

Earth, the ephemeral and reusable material, has shown its vulnerability in the case of colonies in the Banat area, as highlighted by the repeated destruction caused by the floods - 1970, 2005. Since 1722, the former Banat province was gradually colonized by Germans, Serbs and Hungarians due to their dissatisfaction with the political, social and economic situation in their native areas. The construction of the villages in the high plain area of Banat was made using earth as the main material because of the lack of other resources. The study focuses on the ephemeral character of the settlements of the new colonies, including also a permanent character over the general collective in terms of cultural influences, of the construction techniques used. The colonists' dwellings were placed on previously uninhabited terrains, following a "planchette" urban style, forced to adapt to the conditions of residence imposed by the Habsburg Empire. This moment marks the time for Banat's high plain area residents to abandon the old medieval organizations in favor of the new settlements, following an optimal relationship between cost and possibilities, effect and result.

Rezumat

This paper emphasizes the influence of local materials and possibilities on the building techniques, as well as the way of compliance of the settlement through the presented case study - Giera, Timiș county. This highlights the conformation of the way of life, the building process of traditional societies following the practical utility, resulting in an urban adaptation at the level of housing and settlement - distribution of functions, adjustment to technical requirements and microclimate. These settlements denote intrinsic architectural and urban value: reasonable conformation and density, healthy materials and technologies, community stability through a system of filtering out harmful external actions that rarely touched the core of material and social manners, thus avoiding any inward transformation lacking solid motivations. Lucrarea evidențiază influența materialelor și a posibilităților locale asupra tehnicilor de construcție, precum și modul de conformare a soluționării prin studiul de caz prezentat - Giera, județul Timiș. Acest lucru evidențiază conformarea modului de viață, procesul de construire a societăților tradiționale, urmărind utilitatea practică, care are ca rezultat adaptarea urbană la nivelul locuințelor și așezării, adaptarea la cerințele tehnice și microclimatul. Aceste așezări indică o valoare arhitecturală și

urbană intrinsecă: conformație și densitate rezonabile, materiale și tehnologii sănătoase, stabilitate a comunității printr-un sistem de filtrare a acțiunilor externe dăunătoare, care rar atingeau nucleul material și social, evitând astfel orice transformare interioară lipsită de motive solide.

Keywords: traditional constructive techniques, colonization, urban planning, earth as construction material, sustainable development.

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Fig.1. Typical household in the high plain area of Banat

1. Introduction

Earth is a building material reconsidered today because of its ecological qualities – local, healthy, accesible, reusable, etc. In the Banat province there is a long tradition of using earth as the main building material due to many factors.

The study of earth construction techniques represents an adaptation of the traditional crafts in the high plain of Banat under the conditions of the rulling Habsburg Empire. The lack of a variety of building materials is the main cause of chosing earth, but what is interesting to note and study is the process of adapting a vernacular material to the requirements of a continuously transforming society because of multiple causes.

This process of adaptation takes place in parallel with the major social transformations of the time - the removal of the Turkish rule, namely the establishment of the Austrian regime, the colonization of the area with different nationalities, the compliance with a more rational urbanization with the ultimate goal of exploiting the resources located in the high plain area of Banat, as well as the defense of the southern border of the Habsburg Empire.

On top of all these tense aspects, historically and socially speaking, there are also the technical difficulties found in the territory - extensive floodplains, the lack of a topographic support for planned urban development, the social transformations imposed on local communities still at a medieval level of existence.

Therefore, Banat's high plain area represents an opportunity to study the phenomenon of adapting construction techniques through the influences of the new settlers, but always referring to/taking into account the types of traditional dwellings, the lifestyle of rural societies, having as a common element the built heritage out of earth.

The study methods used consisted of in-situ observations, photographing the built heritage out of earth, analyzing urban and architectural elements, discussions with locals and officials. Historical data has also been consulted from local archives and monographs.

2. Historical background

By capturing the historical context, it is possible to explain and study further the visible social results in the urban structure of societies. The rural environment still preserves the organization imposed by the Habsburg Empire, while the construction techniques evolve gradually as a result of the settling of the colonized population or of the successive migrations. After 1552, the Turkish troops conquer the city of Timisoara and a part of Banat becomes an Ottoman territory. Contrary to certain opinions, the Ottoman regime was relatively favorable to the autonomy of the local population and its institutions, to the peasants' right to land plots, having a great religious tolerance. The rhythm of development has been unstable, slowed, but life has followed its course without radical changes in demographic, social and spiritual terms. The war between 1716-1718 ends with the annexation of the province to the Habsburg Empire. After the conquest of the region, the Habsburgs considered the territory as a newly acquired property, occupied under the law of war, so that there was no recognition or consideration of any title of private or public right prior to 1716.

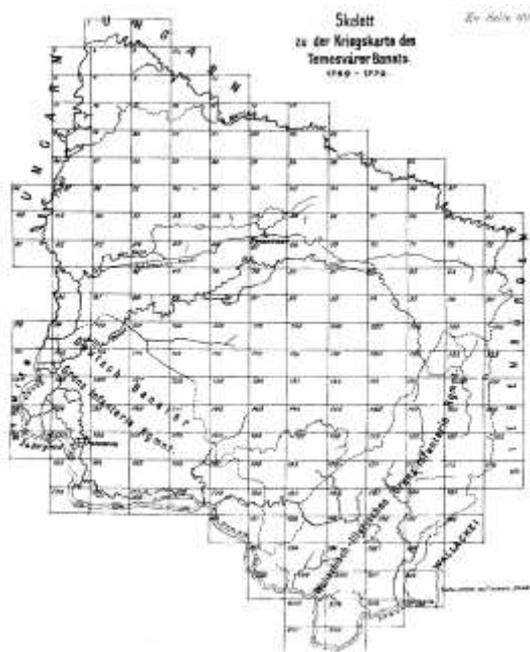


Fig.2. Map of the Banat Province 1769-1772



Fig.3. Map of the Gyr region

2.1. Colonization of the Banat Province

Immediately after the occupation of the Banat province, the military administration began its organizational work and in order to assess the possibilities of the province's fiscal exploitation, a general conscription of Banat that was completed as early as 1717. This conscription was finished in the coming years by elaborating detailed land plans, which will cover all inhabited or deserted settlements of Banat.

The Vienna Court had focused its attention on a more vigorous development of the Banat economy. The conditions of the province allowed the achievement of the expected economic objectives to a great extent: the existence of a fertile land, the possibility to increase the agricultural areas through drainage, repairs, embankments, a rich basement and especially an available labor force - the peasants of Banat became the servants of the Emperor.

Colonization was a requirement stemming from the very status of the province Banat at the border of the empire. Military and religious causes, driven by the need to strengthen the borders and create a mass of Catholic population on which the Habsburg monarchy is based, led to massive colonization of the Banat with a German population as well as with other nationalities (Italian, Spanish, French, Bulgarians etc.)

Unlike other provinces where there was a nobility of landowners and where the colonies and the advantages granted depended on it - in Banat the only landowner was the emperor who exerted, both his political sovereignty and his power of its great feudal ownership. In the absence of any opposition from a noble class or congregations until the end of the 18th century, the colonization took place in the interests of the Court.

The process of colonization was a complex and complicated action, requiring the overcoming of major obstacles, first of all the resilience of rulers that had to allow the departure of inhabitants of their fields, then transport from places of origin to recruitment centers, often hundreds miles away, then the uncertainty of rafting or, at best, small boats. The settlements of the colonists had 40-50 houses built of rammed earth, having one or two rooms, covered with straw or cane.

The colonists were settled on the strategic routes used mainly for military reasons, but also other natural factors contributed; this area of the first colonization was on a higher terrain, located at the rising of the swamp regions and in the west of the mountain, where the climate was considered more bearable for the newcomers and the soil more fertile. The court also wanted to have a faithful human resource that could be recruited for the army or oppose resistance to a possible Turkish invasion, in close cooperation with the military units. The colonists brought with them advanced agricultural and handicraft techniques which can be seen throughout the following years of development.

The Revolution of 1848-1849 solved one of the political contradictions of the empire - the serfdom - which was dismantled by the Hungarian parliament. After the defeat of the revolution, the Habsburg government, in order to avoid new disturbances, applies landowning. Peasants are now the landowners of the earth who had the form of a serfdom, the feudal obligations being dismantled, the main obstacle to the development of capitalist relations in the economy is removed.



Fig.4. The arrival of the Swabians in Banat - painting by Stefan Jäger

2.2. Systematization of the villages in the high plain area of Banat

Organizing the defense of the border with the Ottoman Empire is a great priority for the Court of Vienna. Indeed, the frequent wars between the two empires during the 18th century confirm the strategic importance of this contact area. The guarding of the Danube border is ensured by the establishment of two confederate regiments, which had both Danube frontier duties and guard duties in the interior area of Banat

Of all the solutions discussed, the most effective was the militarization of the local villages, and only the officers and non-commissioned employees would be settled. For the move to the new location, the border guards received a financial compensation, the relief of the military service in the year when this move was made, free wood from the regimental forest. The household was to be constructed in four weeks. The bailiff received a piece of land in which he would build his house (for which he did not pay a tax) and another on the border of the commune. Sometimes the resisting inhabitants were moved by force.

The particular history of the militarization (or de-militarization) of the Romanian villages at the eastern border of Banat has, among other things, the appearance of profound transformations from the point of view of the community organization and the regime of border rights and obligations. Of these, the former are of particular importance; they are irreversible transformations, the result of which is equally visible today, in the arrangement and construction of households in the mentioned villages (as it is, moreover, visible in all the regions of the former border region of the Austrian Empire in particular.

As it emerges from the imperial dispositions of 1766, the rationality of compact villages emerges in the collection of taxes and the supervision of the inhabitants, and from 1770 a similar systematization of the Romanian villages is made. This rhythmical arrangement of households, with dwellings perpendicular to the street line, created the premises of the appearance of the shrouded

household in all areas of Banat. The house and all the other household annexes make up a square with the opening on to the street.

The Imperial Administration repeatedly issues instructions about the material used and the house plan without imposing the style of building. However, there is an indirect stylistic influence, through the systematization itself. One of the most relevant consequences of this systematization occurs in the second half of the 20th century, more than half a century after the imperial administration disappeared.

Generally, there is a three phase evolution from the point of view of the material used in the construction of the houses: the dwelling of the woven rods, then the dwelling made out of rammed earth, followed by the stone and brick dwellings. Partitioning varies from single-cell homes to multi-cellular homes.

The 17th century is dominated by dwellings made out of woven rods. These houses are cheap and easy to build up, so they are also recommended for colonists. Since the beginning of the 19th century, with the Confederation Constitution of 1807, only the construction of durable material houses is permitted for the border area. In addition, by the middle of the century, the authorities have granted border guards a tax exemption for ten years if they accept to build a stone home.

The tricellular dwelling is increasingly preferred, consisting of two rooms arranged symmetrically to a central utility room. This plan is in line with both the local tradition of succession, which requires the firstborn to remain with the parents after marriage, thus providing enough housing for both families. Also, especially at the beginning of the century, the substantial presence of mono and bicellular houses continues, due primarily to the socio-economic circumstances of the peasantry.

The 20th century represents the complete success of brick and stone architecture - in the second half of this century only in brick, although in the first decades there is still a large presence of houses in rammed earth or wood. It is remarkable that the triumph of the brick architecture is accompanied by a multicellular type of dwelling. In certain periods there is also the custom of building houses with porch, partial or continuous, although the customary norm of construction in Banat seems to have been rather the house without a porch. With the architecture of stone and brick, the place of the wooden pillars of the porch is taken from the brickwork, and under Serbian influence the ends of the porch are closed, sometimes a door at the end of the street. There is also the case where the building of the stone house is made without a vestibule ("târnaț"), but it is added later.

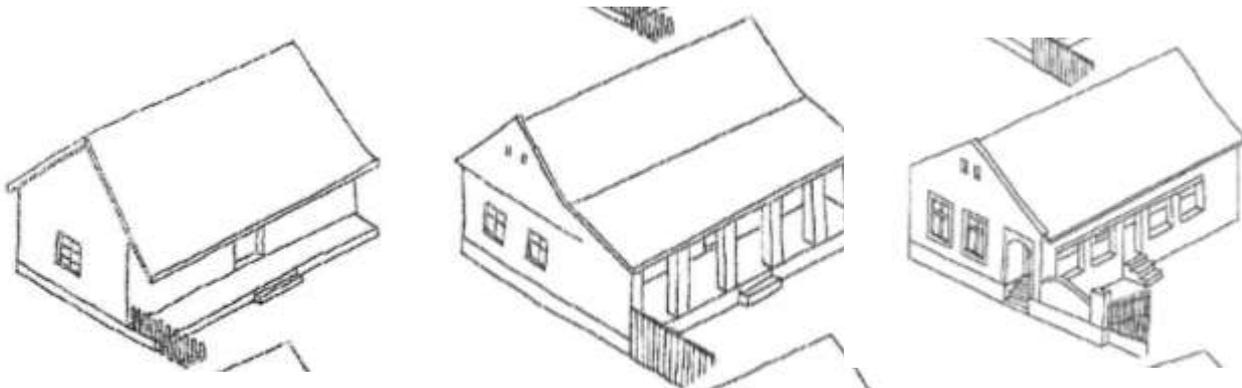


Fig.5. Typical households in the Banat area

2.3. Immigration from the Banat province at the End of the 19th Century and its consequences for the rural society

The historical stage at the turn of the 19th and 20th centuries was marked by important changes in the Banat society. The evolution on the path of capitalist development and modernization has impelled a rapid rhythm of economic growth, social and cultural processes in community life, and influenced people's mentality. Major changes took place also in rural settlements through the use of modern agricultural inventory, transformations that cause mutations in social structures. One of the key consequences of these changes was the enhancement of the social mobility of the population of Banat. The extensive landowners and wealthy peasant households are attracting seasonal, temporary labor, but Banat villages have had a significant labor surplus generated by the large number of peasant farms or landless households. The historical province of Banat has fallen into this European demographic mobility, the phenomenon having a greater extent towards the end of the 19th century, in the general context of economic realities. The demographic structure of Banat was defined by the dominance of the rural population. According to the census of 1910, it represented 87.23% of the total population. The village of Banat was marked by a pronounced social stratification, generated by the level of properties on agricultural land. There was a small social category of properties with over 100 yokes. (0.58 ha), representing 0.63% of the total agricultural property in the province. A medium social blanket and a wealthy peasantry with lots of 10-100 yoks gradually crystallized. (5.8 - 58 ha), which accounted for 29.25% of the agricultural properties. They were stable households in the economic sphere, which partially absorbed labor. These realities have been the main causes of the emigration in Banat. For many of the inhabitants of Banat villages with small lots of land and very small incomes, emigration to the USA, Germany or Romania was a way of overcoming the lower social condition, a chance of important financial accumulations, allowing them, in the event of a return in their home town, to buy land, agricultural inventory, to form a cost-effective household.

Year	Caraș – Severin		Timiș		Torontal		Timișoara		Vârșeț		Panciova		Banat Total		Remained in foreign countries
1900	140	13	312	44	537	68	60	-	5	4	-	-	1054	129	925
1901	264	22	312	54	539	45	57	-	61	4	141	-	1374	125	1249
1902	174	1	666	30	1117	60	53	-	52	4	124	-	2186	95	2091
1903	295	27	1647	89	2778	79	73	-	32	-	126	-	4951	195	4756
1904	906	40	2283	121	3988	211	201	-	84	2	97	-	7559	374	7185
1905	2176	61	5265	258	7456	632	751	4	109	1	62	-	15819	956	14863
1906	2278	112	5358	697	11498	1576	868	3	113	-	213	-	20328	2388	17940
1907	3140	103	9353	1189	18138	3044	1095	1	133	-	237	-	32096	4337	27759
1908	1280	159	1744	1907	2663	4785	337	-	84	-	62	-	6170	6851	681
1909	820	90	3774	683	7271	1803	483	-	93	-	106	-	12547	2576	9971
1910	973	82	3424	956	6478	2410	422	-	97	-	116	-	11510	3448	8062
1911	584	71	2361	1251	3934	2679	475	6	93	-	124	1	7571	4008	3563
1912	817	51	3957	874	5947	1923	574	-	102	9	67	6	11464	2863	8601
1913	1022	36	3471	874	3643	1543	509	-	89	-	67	-	8801	2453	6348
TOTAL	15287	870 5,7%	44260	9056 20,5%	76798	20958 27,3%	6026	14 0,2%	1159	31 2,6%	1548	7 0,5%	145078	30936	114142
Remained in foreign countries	14417	-	35204	-	55840	-	6012	-	1128	-	1541	-	114142	-	114142

Table 1: Emigration in the Banat province between 1900-1913

3. The morphology of the settlements in the high plain of Banat

Prior to the conquest of the Banat province by the Habsburg administration, the settlements of the local population (Romanians and Serbs) were entirely different due to the cultural structure of the society, which strongly influenced the use and occupation of the land. The principles that have been modeled on the territory of Banat were those of the mercantilism and absolutism of the Habsburg administration found in the use of land, morphologies of settlements, lotisations, architecture, etc. Thus, the old settlements have been relocated, systematized or re-established according to very clear rules.

Paragraph 13 of the Impopulations-Haupt-Instruktion (the Banat Settlement Regulation of 1768) states that the planning of new settlements is done by engineers. The rectangle divided into a grid is the geometric shape most appropriate for a predefined settlement in Banat. Through a regular geometry of the settlement, it was desired to influence the inhabitants towards an orderly life.

Only where the uneven terrain did not allow a geometrical shape of the plan, the few smaller locations adapted their shape to the structure of the topographic surface. Thus, the households were joined to the main streets, as in the case of "street-type villages" (rarely developed villages through small transversal streets and sloping down the slope).

The land area required for a family to be developed (arable land, meadow, orchard) was regulated, and the plots on which the households were to be built were between 23-29m street front and 140-190m deep. Originally, these batches could not be divided by being inherited by the big son, but in some cases this rule was abandoned resulting in different batches. This originally regulated organisation has transformed over time with society, but never radically as the whole Banat cultural landscape has been transformed during the Habsburg colonization. With the growth of the population in the nineteenth century, new settlements had emerged, the old settlements had either expanded or densified, but had preserved the spatial and constructive characteristics of the previous villages. Only a general trend towards diminishing the lots due to the decrease of land availability, but also examples of unification of properties in the case of wealthy families.

A special situation occurs at the end of the 20th century within the social structure of the high plain area of Banat changes radically, when the Germans left the province and Romanians were brought into their place. Due to the precarious material situation of the new inhabitants, they did not make radical changes to the Swabian households, but they did not maintain them properly, as many households were degraded today by using inappropriate materials.

A radical phenomenon has been taking place lately, the depopulation of villages, which will rapidly transform the Banat cultural landscape, already visible through many abandoned households. On the other hand, the transformation of the villages around the cities into "dormitory quarters" is another distortion, due to the lack of town-planning regulations that take into account the local specificity and the real estate speculation, factors that have caused an inappropriate lotisation and the application of the General Regulation of Urbanism, including in the historical centers of villages.

At colonization, the buildings could all be built on one side of the land with a short façade on the street, so that between the buildings of two neighbours there would remain an intermediate space free of at least 9 fathoms (i.e., about 17m). The stables, chutes and sheds must not be allowed to be built otherwise than behind the houses, in a straight line to the garden, but in any case, not in the yard, so that the fire can not spread through such transverse and median buildings from one house to another.

The colonists' households were initially equal (sometimes there were other typologies depending on

the size of the family or according to the administrator), but with the material, social and cultural development of families, the households also turned to meet these needs.

In the first phase, households grew only long, annexing new household spaces (slopes, stables, workshops, etc.) in parallel with the transformation of old annexes into living quarters. It is important to note that the architecture and the way of occupation of the colonists' land has strongly influenced the architecture of the native populations (lot positioning, architecture and constructive systems). Prispa is an element considered to be taken from the native architecture (from Romanians and Serbs). Initially, colonists' homes lacked a porch and only had a prolonged cornice on the side of the access. Through time, these buildings have borrowed this constructive element. Also, the appearance of the summer kitchen or elderly home as a building block opposite is considered by some to be an influence of Serbian architecture.

An evolution of this typology is the L-shaped or U-shaped household that is open to the street. And this typology is found throughout the Banat province, being dominant in the northern zone. Much later, the houses appear along the street (half the width of the lot), then the houses with the total closure of the street front. Chambers with parallel fronts with the street were considered a sign of prosperity. Barn only later could be built perpendicular to the lot (after the middle of the 19th century), and when there was a house on the street along the front, the passage through the house and the barn was made in the extension. In the areas where we have this typology we have continuous street fronts.

From this stage, it is mentioned the typology of the houses that were initially disposed longitudinally but in time they were extended with a partial transversal body or along the whole street front. This typology can also be found in all the province, being more visible in the central area of the old settlements where the families were wealthier.

In the last period (since the 1990s), the houses built after the General Urbanism Regulations have appeared. Typically, these homes are seated away from the alignment, outlining them as individual presence in the context and having more than a ground floor. These buildings located in the old villages' centers are not only unspecific to the area but distort the whole rural landscape.

Due to the intense systematizations undertaken by the Habsburg Empire, the structure of the household from the pre-Austrian colonization (before the 18th century) was substantially altered, with the first building made with the local construction technology being maintained. Thus, further reference is made to the evolution of traditional households and houses from the 18th century, when they were built by the Habsburg administration, following a regulatory system.

The initial confinement was accomplished through a simple fence that allowed physical and visual communication between the batch, the porch and the street. Then there is a high-wall closure where the communication was made through the hollow of the straight door of the porch. Once the fronts with the houses were closed, communication was done through street banks or windows.

During the industrial period workshops and factories of construction materials (brick, pavements, tiles, glass, etc.) appeared in cities and large villages, which changed the appearance of the settlements and the old dwellings. Households were becoming more and more compact with a number of dwelling buildings and annexes that close and define an interior space - the courtyard of about 400 square meters, relatively rectangular.

During the 20th century, there were no major changes at the urban level, but at the household scale, after 1960, suddenly the traditional habitation principles were abolished. The reasons for the rupture of the natural evolution of traditional architecture were collectivization, depopulation of villages,

sudden abandonment of old materials and then questionable stylistic loans.

The barn may be of large size, representing the vertical element of the household (usually positioned transversally on the lot) or of the size relative to the size of the house (positioned in the extension of the house or across the lot). The structure has burnt stone or brick foundations, whole or partial walls of wood and brick or in some regions of stone. The roof is in two waters (sometimes drilled) or four waters.

Barns can be placed freely on the batch or can be articulated to the dwelling. At the same time, other smaller constructions could be attached to a part of the yard. Cotarca (maize barn) is smaller in plan than the regular barn, with widths between 80cm and 2m. The structure has isolated wood or burnt brick foundations, with pillars and wooden beams, and the walls are made of wooden planks. The roof is simple, in two slopes, and the cover material is out of manual or industrial ceramic tile. The specific ambience of the rural environment is largely determined by the unity of the street fronts, a unity obtained by joining buildings that, although not identical, respect dimensions, proportions similar and the same ratio to the human scale. Observing the rhythm of buildings and even the faults of the facades is a key factor in shaping the unitary framework of the traditional village.

Until the first half of the nineteenth century, the façade was approximately square, and the height of the gable wall was equal to the height of the house to the cornice. After this period, the width of the façade widened, and around 1900 the cross-sectional house appeared.

Both longitudinal and transverse houses are characterized by horizontal decorative elements (cornice, socket, ornamental strips marking) that dominate the composition and contribute to the uniqueness and identity of the entire street profile. The proportion and grouping of voids (doors and windows) and vertical decorative elements (frames, columns) have the role of harmonizing and balancing the composition of the façade.

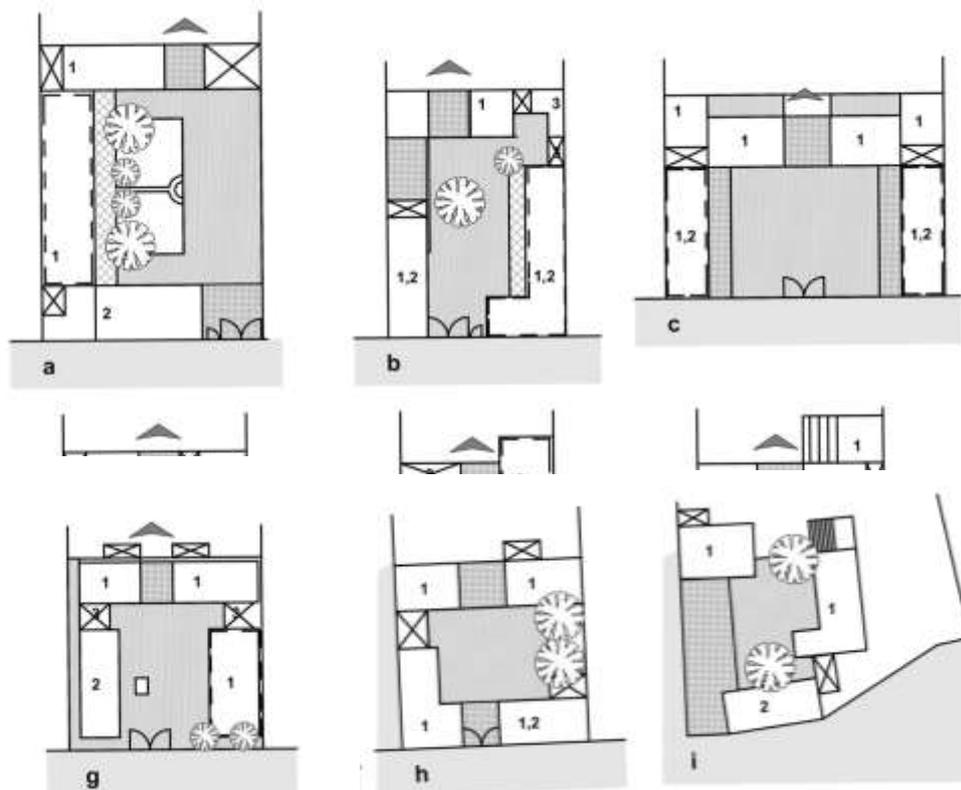


Fig.6. Typical households in the Banat area

4. Current urban planning in the high plain area of Banat

At the European level, the Territorial Agenda 2020 recommends urban development in a territorial context of the Europe 2020 Strategy and promotes balanced polycentric territorial development as well as urban, rural and specific use of integrated, polycentric and balanced development approaches.

The importance of small city development is to reduce territorial polarization of economic performance, polycentric development by creating synergies and avoiding sectoral dispersion of regional policy resources. To this end, there must be sufficient flexibility to take account of regional particularities and to help regions lagging behind in their efforts to overcome their socio-economic difficulties.

An integrated and territorial approach is multidimensional, adapted to features and results specific to the field. This may involve overcoming administrative boundaries and may require greater willingness from different levels of government to cooperate and coordinate action to achieve common goals. It also corresponds to the new territorial cohesion objective introduced by the Lisbon Treaty, which recognizes that economic and social cohesion can not be achieved at European level in the absence of a stronger focus on the territorial impact of EU policies.

The prospective and general diagnosis through which the main phenomena and processes evolving in the county territory, which are important through their spatial aspects, will be the basis of the formulation of the intervention directions and of the measures necessary to achieve the general and specific strategic objectives of each area of the territorial planning.

In order to analyse the existing situation of the territorial system and to prefigure the development, it was tried, where possible, to create the hierarchy of important elements, for the Banat high plain area.

Favourability factors:

- the presence of the most important and varied mineral resources in the county: oil, natural gas, useful mineral substances, carbonated and thermal mineral waters, mofetic gaseous emissions.
- soils with high fertility of chernozem type, favourable to crops,
- area of high concentration of natural heritage: natural areas protected by national, county, community, international,
- the area with the most water-regulating works to prevent floods,
- potential for the exploitation of solar, wind, geothermal energy as a renewable resource.
- possibilities of practicing and other varied forms of tourism: tourism in protected areas, cyclotourism, sport fishing.
- areas with hunting background.
- the presence of the bird migration route, the Panono-Adriatic road.

Main Issues:

- increasing the frequency of producing extreme temperature and precipitation values,
- risk of desertification in the western, south-western and central part of the county,
- manifestation of the phenomenon of subsidy, which determines the increase of the underground water level,
- the geo-pedochemical constitution of alluvial materials from which some fields are formed, is the basis of the long range of persistent flood waters,
- excess moisture leads to salinization, and in dry time, these formations suffer contractions,

- cracking and peeling that favours an early deflationary process,
- forest deficiency area, most of the localities with very narrow forest areas, less than 1% of the surface area of U.A.T.
 - an increase of zonal urban plans for the extension of localities in the vicinity of protected natural areas,
 - poor capitalization of carbonated, geothermal mineral springs, although known for a very long time,
 - anthropogenic pressure in areas protected mainly by uncontrolled tourism and waste disposal,
 - the presence of the most critical areas in terms of air and surface water pollution, groundwater and soil
 - the presence of vulnerable zones to nitrate pollution,
 - the use in large quantities of chemical fertilizers and pesticides for fertilization, namely the control of diseases and pests,
 - lack of a landfill for household waste,
 - the vast majority of communes do not have water supply and sewerage in a centralized system,
 - insufficiently treated wastewater discharged into natural receptors,
 - the presence of the areas where the highest underground water flows are required,
 - agricultural lands affected by degradation by saturation and acidification,
 - risk of degradation of the natural environment due to natural factors: floods on streams and watercourses, earthquakes
 - the presence of the most significant technological risk areas related to the chemical industry or the mining industry (areas for the extraction, embarkation and processing of petroleum products).
 - the fragile balance of protected natural areas that may be at risk of degradation phenomena, abusive pasture or uncontrolled tourist traffic, descending freaking water, harvesting protected species of flora and wildlife.

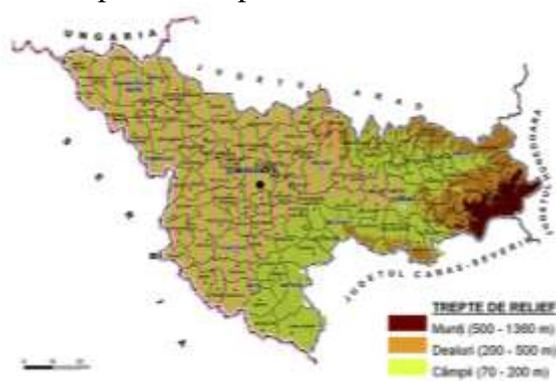


Fig.7. Stepped relief map



Fig.8. Risk of desertification

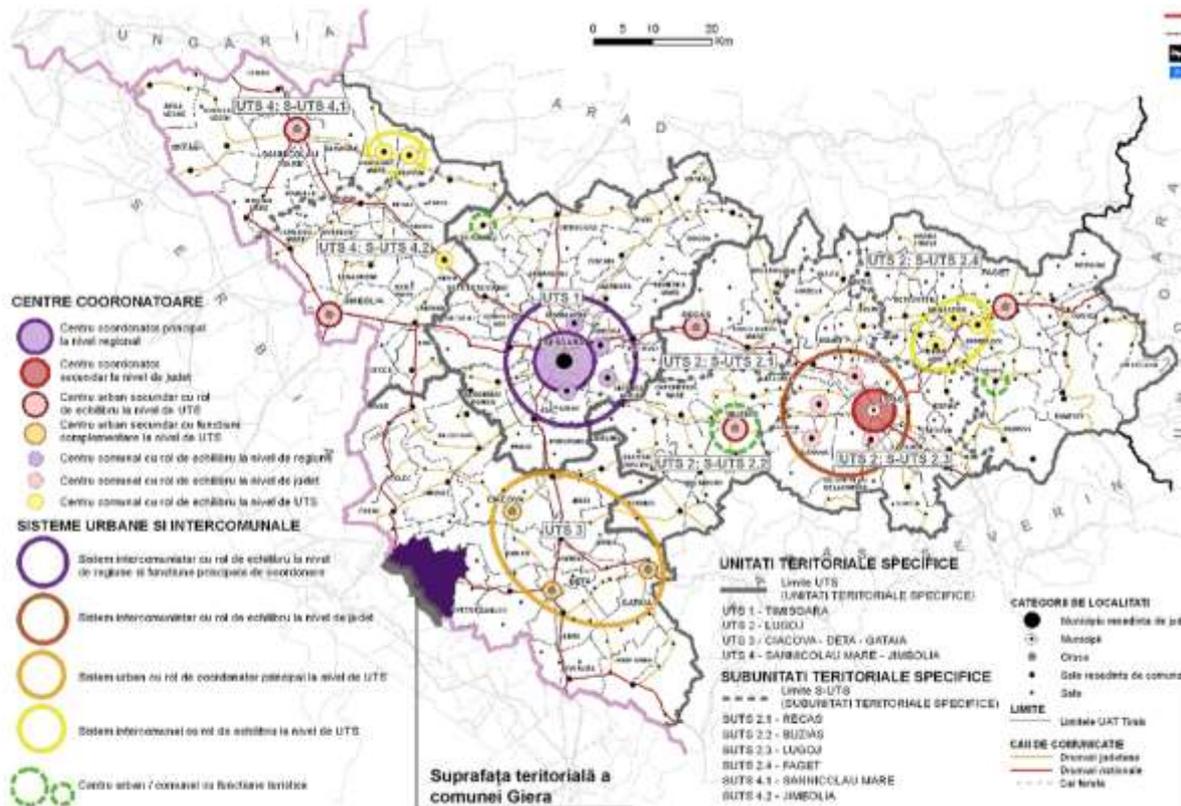


Fig.9. Administrative territorial units

5. Case Study - Giera commune

The commune of Giera is located in the western part of Timiș County, on the border with Serbia, having in the south the territory of Banloc commune, but from an administrative and functional point of view it has a peripheral position relative to the adjacent territorial units. Component localities: GIERA - the commune residence, TOAGER, GRANICERI, with a total population of 1256 inhabitants today.

In 1778 the Banat Province is divided into counties and in 1779 it is incorporated in Hungary. The towns of Giera (Gyr) and Graniceri (Csavosi) were occupied by predominantly German and Hungarian nationalities, Toager having a predominantly Romanian population. Against the backdrop of extensive agriculture development, the floodplain lands are growing, with all the precarious conditions of life, the western area of Banat becomes a reservoir of agricultural and animal products for the empire.

After 1900, with the technological development and importance of the agro-zootechnical sector, the productions grow and the localities become stable and relatively prosperous. This situation persists until 1940, (including the recession created by World War I). By joining with the Romanian Principalities in 1920, there are no notable changes in the structure of the traditional way of existence. After 1946, the area is collectivized, and the population suffers a decline, which has increased since the 1960s by urban industrial development. In the following period, and especially in the decade 8-9, the population of German and Hungarian nationality is drastically reduced by emigration, being partially replaced by populations from other parts of the country. After 1989 the population reaches the lowest level in history due to the lack of rural economic support and marginalization of localities in the territory.

At present, there is a tendency for stabilization, and the population growth for Giera is estimated in the next 10 years at approx. 5 -10%, - the growth indices of the communes situated in the polarization range of the urban centers in the western part of Timiș County. Old buildings in the constituent localities are mostly degraded as a result of the overlapping of the effects caused by the deformations related to the poor structural structure, the foundation at insufficient depths and repeated seismic demands.

The commune is on the route Belgrade - Budapest - Vienna, which was in the past a main road traffic axis, and had a secondary importance due to the new borders after 1918. With the modernization of the national border road - it is necessary to have in view the elaboration of the general urban plans of the affiliated communes, the bypass routes of the localities, respectively the establishment of some corridors that will allow the future of the detouring belts.



Locality	Existing urban space	Proposed urban space	Increase
GIERA	71,5257	53,7	58 %
TOAGER	81,2586	46,45	63 %
GRANICERI	52,63	24,85	68 %
TOTAL	205,42	125,0	62 %

Fig.10.left, Territory of Giera commune, Table 2: Urban space in Giera commune.

6. Conclusions

Earth, despite its ephemeral character, continues to leave its mark on the rural environment.

The possible solutions for the development of the high plain area of Banat are by enhancing the local specificity and raising awareness of the identity elements that define the area and represent important transformations from the social and administrative point of view.

An emphasis on the architectural style of these communities is proposed in which earth has remained the most widespread building, in various forms. The existing build environment is ultimately an historical proof of the transformation of the Banat province.

A way of preserving this traditional technique of earth construction is to include Banat's high plain area on the UNESCO World Heritage list, thus signaling its importance to the community. In this way, the built environment can be reconfigured as an important element in shaping a local identity.

The second option to conserve the built-up structure and the traditional constructive techniques would be to transform the area into a holiday retreat, thus minimizing the urban sprawl encountered in large cities. This option becomes sustainable in the idea of providing a practical infrastructure.

The study is to be complemented by establishing the life cycle of earth made dwellings, the impact of natural disasters - earthquakes and floods on the existing built environment, as well as options of restoration and consolidation.



Fig.11. Existing household in the high plain area of Banat

7. References

- [1] S. Stefanuca, *“Granita si Granicerii Banateni- O abordare socio-istorica”*, *“Studii si comunicari de etnologie”*, 2005, tomul XIX, Sibiu,
- [2] D.N. Buruleanu, I. Traian, *“DETA - Album monografic”*, 2012, Ava Studiu Timisoara,4
- [3] I.Munteanu, *“Emigrari din Banatul istoric la sfarsitul secolului al XIX-lea si inceputul secolului al XX-lea”*, *Analele Banatului, Arheologie Istorie, XII-XIII, 2004-2005*,
- [4] T. Ciobanu, *“Monografism Banatean. Istoria medievala a banatului reflectata in monografii alcatuite in a doua jumătate a secolului al XIX-lea si prima jumătate a secolului al XX-lea”*, 2008, Eurostampa Timisoara
- [5] I.V.Popescu, *“Casa Banateana – secolele XVIII-XX”*, Teză de doctorat, *Analele Universității de Vest, Timișoara*
- [6] Popescu, Ioan Viorel, *“Arhitectura casei bănațene: sec XVIII-XX”*, Editura Eurostampa, Timișoara,2009
- [7] I.V.Popescu, *“Evoluția așezărilor rurale din Banat”*, Ed. Waldpress, Timișoara, 2003;
- [8] Marin, I.; *“The formation and allegiance of the Romanian military elite originating from the Banat military border”*, Doctoral thesis, UCL (University College London), 2009
- [9] Rider, Jacques Le *“Europa Centrală sau paradoxul fragilității”*, Iassy: Polirom, 2001.

- M. Opreș, : “*Timișoara. Mică monografie urbanistică*”, Bukarest: Editura Tehnică, 1987
- [10] Mariana Brandl-Gherga “*Temeswar – „Klein Wien“*“. Eine Journalistische imagologie “,Annals of the Wesr Universitt of Timisoara, New Series: Philosophy and Communication Sciences Vol.XVIII, 2006,
- [11] R. Crețan , “*Banat Toponymy – A short View on the origins of settlements in the Eastern Part of Timișoara*”, Review of Historical Geography and Toponomastics, vol. II, no.3-4, 2007
- [12] Crețan, R. “*Aspects of the historical geography of eighteenth century settlements, Geographical Essays on the Romanian Banat Region*“ (D. Turnock Ed), vol. I: 143-150, University of Leicester, 1999,
- [13] A. Țintă, “*Colonizări habsburgice în Banat 1716-1740 (Habsburg colonisation in Banat 1716-1740)*“ Timișoara: Facla, 1972,
- [14] T. Simu “*Colonizarea șvabilor în Banat (The colonisation of the Germans in Banat)*“, Banatul, I: 8- 75, Timișoara, 1924
- [15] F. Kräuter, “ *Germanii din Banat (The Germans from Banat)* “, Transilvania, Banatul, Crișana Maramureșul, I : 639-648, București, 1929,
- [16] N. M. Pop, “ *Populația Banatului în timpul lui Iosif al II-lea (The population of Banat during the reign of Joseph II)* “, Lucrările Institutului de Geografie - Universitatea din Cluj, 1942,
- [17] A. Andea, “*Banatul cnezial până la înstăpânirea habsburgică*”, Reșița, 1996
- [18] A. Bejan; E. Pataky, “*Aspecte ale vieții cultural-științifi ce timișorene în a doua jumătate a secolului al XIX-lea și începutul secolului al XX-lea*”. Societatea de Istorie și Arheologie și Societatea de Științe Naturale, în „Banatica”, 13/ I, Reșița, 1995.
- [19] M.Bizerea, ”*Banatul ca unitate și individualitate istoricogeografi că în cadrul pământului locuit de români*”, în „Tibiscusetnografi e”, volum editat de Muzeul Banatului, Timișoara, 1975
- [20] N.Iorga,, ”*Observații și probleme bănățene*”, București, 1940,
- [21] T.Trâpcea, , ”*Aspecte privind starea economică, socială și politică a pașalâcului de la Timișoara*”, în „Studii de istorie a Banatului”, IV, Timișoara, 1976
- [22] N. Săracă, “*Arhitectura populară în Banat. Fondul tradițional*“, Teza de doctorat Universitatea de Vest,
- [23] T.CIOBANU, ”*Istoriografia romaneasca din secolul al XIX-lea si prima jumătate a secolului al XX-lea referitoare la Banatul Medieval*”, Editura Eurostampa,
- [24] T.O.Gheorghiu, ”*Locuire și neAșezare*”, Paideia, 2002
- [25] T.O.Gheorghiu, ”*Locuirea Traditionala rurala din zona Banat-Crisana*”, Timișoara,2009.