VIEWS ON THE ANISOTROPIC NATURE OF ILVA VALLEY REGION

GABRIELA-ALINA MUREŞAN[1], MĂRIOARA PALAGICA CONSTANTIN[2]

ABSTRACT – There are two concepts important for the authors of this article: anisotropic region and anisotropic space. Anisotropic region is defined by A. Dauphiné, the geographer (-mathematician), as a territorial unit whose structure results from the organisation of space along one or more axes. From the point of view of a territorial system, this type of region has some characteristics which differentiate it both from the homogeneous region and from the polarised one. These specificities have been analysed for Ilva Valley. The region of Ilva Valley is formed along the morphological axis represented by the Ilva River. The aim is to identify these specificities or their absence within this region. In this way we can determine whether this region is an anisotropic one or just an anisotropic space, namely whether it can be considered as evolving towards an anisotropic region, not yet complying with all characteristics of anisotropic regions.

Keywords: anisotropic region, anisotropic space, structuring axis, mass and energy flows, self-regulated territorial system, polarised subsystems

THE CONCEPT OF ANISOTROPIC REGION AND ITS MAIN CHARACTERISTICS

The concept of anisotropic region was introduced in the geographical semantics by the French geographer A. Dauphiné in his study *Espace, région, système* (1979) in order to "understand and explain regional spaces that are neither homogenous nor polarised" (Dauphiné, 1979, p. 127). According to the definition developed by the author, an anisotropic region is a region that has a structure resulting from the organisation of space along one or more axis. The French geographer clearly specifies that this definition is based on a certain spatial structure (therefore it is based on the structural and physiognomic criteria). Nevertheless, he warns that only such a structure is not enough for defining a region as being anisotropic. It is necessary that the spatial structure to result from a certain functionality, namely to exist a concordance between the spatial structure and the functional one in that region.

Consequently, in the same paper, the author emphasises the differences between *falsely anisotropic regions* (defined as "anomalies of the homogenous and polarised regions" [id. Ibidem, 129]), for which anisotropy is only spatial, from the *real anisotropic regions*. The latter are characterised precisely by this concordance between their spatial structure and their functional one. The functionality of such a region can be imprinted both by anthropic activities and by the presence of some natural elements (for example a hydrographic artery, an estuary, a morphological corridor, etc.)

In A. Dauphiné's opinion, the prototype of these regions is represented by Lorraine region, structured by the hydrographic axis of Moselle, along which the road network, the railroad one and partially the urban network have been established. Thus, not only an anisotropic spatial structure has been imprinted to the whole regional complex, but also a similar functional one.

One can conclude that, in this way, the main axis, along which the whole regional space is organised, must absolutely have functionality and become an axis for development, the central element of that region.

---

[1] Lecturer, Ph. D., Babeş-Bolyai University, Faculty of Geography, 5-7 Clinicilor Street, Cluj-Napoca, Romania. E-mail: amuresan@geografie.ubbcluj.ro

[2] Master student, Babeş-Bolyai University, Faculty of Geography, 5-7 Clinicilor Street, Cluj-Napoca, Romania. E-mail: marioara_27@yahoo.com

A. Dauphiné lists some basic characteristics for such regional territorial systems:

1.   the presence of a structuring axis along which major flows circulate;

2.   a continuous exchange of mass, energy and information with its surroundings (he calls it "the environment of the region");

3.   the relationships between the region and its environment are unequal, being more numerous and more intense from the environment towards the region than the other way around. In other words, the inputs in the system are much higher than the outputs.

4.   the flows of mass, energy and information within the region are dissymmetrical, generating functional inequalities and therefore significant spatial disparities evident in the opposition central space – peripheral space;

5.   due to these flows, the anisotropic region is in a dynamic equilibrium, which gives it a certain stability. Thus the anisotropic spatial structure is an irreversible one, as compared to the functional one, which can change under the pressure of the external environment;

6.   the region functions as a self-regulated system, being characterised by positive self-regulatory loops (for example the existence of a natural axis will draw a road axis, a railway one or a fluvial one, followed by other types of activities, etc.). The overlapping of axes will result in an accumulation of functions that strengthen both the spatial structure and the functional one, of anisotropic type;

7.   any territorial system of this type is formed out of several subsystems, the most important ones being located along the structuring axis. These are polarized by centres of lower rank, yet the whole region is not polarised by only one centre;

8.   the inter-relations among the polarised subsystems are always compulsory connected in series (the outputs of a subsystem represent inputs for the following subsystem);

9.   there are also peripheral spatial subsystems, located on each side of the central axis which often represent only pure aggregates (there are few or none inter-relations among them). Nevertheless, they are integrated into the regional space through the relations they have with the structuring axis (connection in parallel, two or more subsystems have the same inputs that come from the main axis).

Dauphiné advances some undeveloped theories in which he explains the mechanisms of formation of anisotropic regions, identifying two big categories of regions from this point of view: *seaside systems* (the structuring axis is represented by the seaside) and *interior systems*, in the interior of the states. The latter are almost always generated along a major transportation axis, which has a double function: on the one hand, it determines the development of that region, yet favouring the centres (subsystems) located along the axis and, on the other hand, it allows the diffusion of this development. In this way, the transportation axis, which becomes the development axis, contributes to the emergence of spatial disparities between a central, privileged space and a peripheral, marginalised one.

P. Cocean (2010, p. 107) summarises the main structural and genetic characteristics of anisotropic regions in a sole definition: "entities of elongated form (strip, axis, corridor) [...]. They stand out through the existence of successive, in series, polarising centres located in the central part of the unit". They are generated by "the grouping of the habitats and activities on the seashore [...], along the rivers [...], transportation routes [...], in morphological corridors [...], at the contact between two landforms [...], in elongated depressions [...]".

Other researchers concerned with the issue of anisotropic regions (P. Cocean, C. N. Boţan, 2007) add to these characteristics the function of transit which many territorial entities of this type have (Siret Corridor, Upper Prahova Valley, Someşul Mare Valley). They start from the premise that the flows specific to the region are generated mainly from its exterior, by allochton polarising centres. In their opinion, "the nature of connection corridor of the anisotropic units is their main functional trait" (P. Cocean, C. N. Boţan, 2007, p. 11). We do agree that the function of transit is indeed a main trait of anisotropic regions, but not always the most important one. Thus, in the case of seaside regions with tourism function (as the Black Sea seaside or the French Riviera, which can be considered anisotropic regions) or even some interior regions that are dominated by tourism, the flows oriented towards and from the region prevail as value over the flows of transit, even though the latter exist. In

other regions, the flows that cross that territorial unit have a much higher intensity than those oriented towards or from the region to the exterior.

The same authors introduce a related concept, the one of anisotropic space, which, in their opinion, would represent an inferior form of evolution of a territorial system with such characteristics or, in other words, a developing anisotropic region. It is a territorial unit that does not comply with all criteria in order to be included wholly into the category of anisotropic regions. They even give some examples of regions and spaces with anisotropic character which can be found in Romania.

ILVA VALLEY. ANISOTROPIC REGION OR ANISOTROPIC SPACE

Ilva Valley[3], as a morphological and hydrographical unit, is part of the Bârgău Mountains. The Ilva River, along with its left tributary, the Leşu River, contributes to the fragmentation of this mountainous unit into several sections. The valley is formed out of alternation of gorges and small depression basins in which settlements were established (Figure 1).
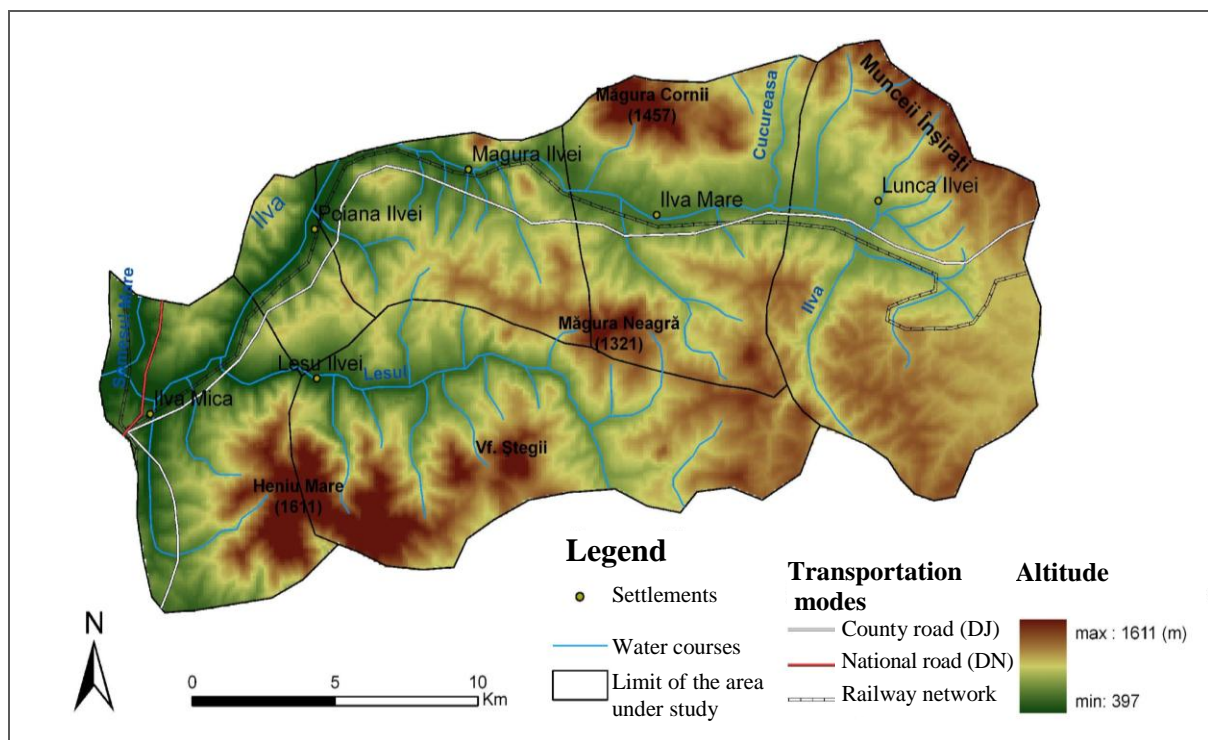

Figure 1. *Ilva Valley. Anisotropic spatial structure*

The region formed along the valley under analysis fulfils, at a first glance, the premise of a region or at least of a space characterised by anisotropy. The idea of interpreting this region as an anisotropic one started from the identification of a first specific feature of such a region: the presence of a major structuring axis along which there are important flows. The specific physiognomy derives from this, namely the elongated shape of corridor type, band or axis.

As a consequence, the area will be further analysed considering the specific traits of anisotropic regions (both structural and functional) in order to try to establish if it can be considered anisotropic.

---

[3] The name used for the morphological and hydrographical unit under analysis is *Ilva Valley*. Yet, all settlements along the Ilva Valley include "Ilva" in their name; therefore, the region could bear the name "*The Valley of the Ilvas*".

1. The spatial structure of Ilva Valley is imposed by the main river artery (Ilva River) along with its tributary, the Leşu River. Thus, the Ilva becomes the central axis of this territorial unit, along which the whole regional complex is structured. The settlements were established along the same longitudinal direction, given by the river network. The five main settlements are commune centres (Ilva Mică, Poiana Ilvei, Măgura Ilvei, Ilva Mare and Lunca Ilvei). Their precincts are located very near the main river artery. Leşu Ilvei commune adds up to the list, being located on the Leşu River. Rural settlements had been established since the 16th century (Ilva Mică), and continued in the following centuries. The last was Lunca Ilvei, which was established in 1956 as a division of Ilva Mare.

Important flows go along the major central axis. This is done through the railway and road routes that cross the region.

2. There is a continuous exchange of mass, energy, information between the region and its environment. The flows are oriented both from the exterior ("active environment", as Dauphiné calls it) towards the region, as well as the other way around, from the region towards the exterior ("passive environment"). Mainly energy, mass (represented by manufactured and agricultural goods, etc.), and information flows go towards Ilva Valley, along with flows of people and capital. The latter ones are mainly generated by tourism-related activities. They have been greatly developed in the last two decades, especially as agritourism. Significant flows of capital are coming towards the region also from the great number of natives that are gone (most of them temporary) to work abroad.

The other way around, the flows generated by the regional space and oriented towards the exterior are also significant. Such examples are agricultural products and manufactured ones coming from the manufacture of wood and wood products (there is a timber works in Lunca Ilvei and its products – timber, wooden chalets - are sold throughout Romania and even in the European Union and the Arabic countries), the manufacture of milk and milk products and the manufacture of building materials (quarry in Măgura Ilvei). People flows are, on the one hand, represented by a rather high number of students and commuters that go daily or weekly towards nearby towns (mainly Năsăud and Bistriţa, but also Vatra Dornei). They use the two roads that cross the region: DJ 172D, which links the settlements along the Ilva River and, additionally, DJ 172C, which connects Leşu Ilvei and Ilva Mică. The railroad is also used. On the other hand, there is a significant number of persons that have migrated abroad, temporarily or permanently, in order to find work.

3. The relationships between the region and its environment are imbalanced, but it is difficult to establish which exchanges are more intense and have greater value. For example, people are transported on a bus and a microbus on the routes Lunca Ilvei – Bistriţa and Leşu Ilvei – Bistriţa. Others use their own car for this commuting. In the same way, manufactured, agricultural, commercial products reach Ilva Valley settlements or are delivered outside either through the railway or on the road. This makes the exact quantification of the flows difficult.

Even though A. Dauphiné does not deal with transit flows, that are not meant for the region of study and do not stop there, they are considered by P. Cocean and C. N. Boţan (2007) as generating the main functional trait of anisotropic regions, namely of a corridor for connection. From this point of view, Ilva Valley is such a region, due to the railway that crosses it. Ilva Mică - Vatra Dornei railroad connects Northern Transylvania to Bukovina and further, to Moldavia. It was put into use back in 1938 (Gr. P. Pop, 1984). It is a single-track electrified rail line, with great importance for both passenger and freight traffic. Since 2006, when the tickets started to be issued electronically, an easier quantification of the number of passengers that transit the region was facilitated. Thus, the number of passengers on Ilva Mică – Vatra Dornei route (in transit) was 434,783 in 2006 (both ways) and 426,872 in 2011, a value close to the 2006 one. This shows a relatively constant feature of the passengers in transit through the region and highlights the importance of the transit function the region has. In practice, people flow is greater, yet its value could not be established completely as the electronic system of issuing tickets was not introduced in all railroad stations along this route.

4. - 9. The following characteristics advanced by A. Dauphiné can be analysed together for Ilva Valley.

First, due to continuous exchanges between the region and its environment, the region under analysis functions as a territorial system, characterised by circuits of positive self-regulatory loops: the presence of the morphological axis represented by the Ilva River generated the establishment of transportation routes (railroad and road) which support other activities (agriculture, manufacture, transportation, tourism, and trade). The areas covered with woods on the nearby mountains helped the development of wood exploitation activities which, at their turn, triggered the development of the manufacture of wood and wood products (timber works in Lunca Ilvei). Even though the transportation axis (especially the railroad, then the road) was not transformed in a real development axis as in Dauphiné's model, which to boost the development of the settlements along it, the transportation axis represents, along with the river, the central element of this space, generating an anisotropic spatial structure. One can say that this spatial structure is irreversible. The flows go along the central axis, which determines an anisotropic functional structure to the analysed space. There is a concordance between the anisotropic spatial structure and the functional one for the moment. This allows us to place this territorial unit in the category of anisotropic territorial systems. Nevertheless, its functional structure is not irreversible. It is possible that, under the action of disruptive factors from the active environment of the region, this functionality to be changed. If people or even freight flows on Ilva Mică – Vatra Dornei route stopped (if, hypothetically, a new railroad were built in a more accessible region), the anisotropic functional structure would disappear, yet without changing the spatial structure.

Several centres (subsystems, in Dauphiné's opinion) have a polarising function. They are located along the main axis. These are represented by the five settlements spread along Ilva Valley, all commune centres: Ilva Mică, Poiana Ilvei, Măgura Ilvei, Ilva Mare, Lunca Ilvei, to which Leşu Ilvei is added. Even if Ilva Mică can be considered the main centre of the region (due to its demographic dimensions, its functions and facilities), its influence on the whole regional complex is only partial. The inter-relations among these polarising centres are done in series (the outputs from a system represent inputs for the following one).

Concerning the peripheral subsystems, located on each side of the main axis, they hardly exist within Ilva Valley. In reality, besides the commune centres, there are other three villages: Arşiţa (belonging to Măgura Ilvei commune), Ivăneasa (Ilva Mare), and Lunca Leşului (Leşu Ilvei). There are no inter-relations among these, but they are integrated into the regional space through the relations they have with the structuring axis (connected in parallel, in conformity with the model developed by Dauphiné). Consequently, there are no dissymmetrical flows of mass, energy and information within the region which to determine spatial disparities of central space (favoured by its location along the axis that structures it) – peripheral (marginalised) space type.

CONCLUSIONS

The analysis conducted on Ilva Valley, on the main characteristics that define an anisotropic region, make us state that this territorial unit has clear traits of anisotropy. Considering the fact that it does not have all the characteristics identified by Dauphiné for a typical anisotropic region, we can say Ilva Valley is an anisotropic space or a developing anisotropic region. It is true that at some point it can lose its functionality, but the anisotropic spatial structure, generated by the river artery on which the transportation routes have developed, will remain.

Nevertheless, our opinion is that it is less likely that the anisotropic functional structure to disappear, even though anisotropic regions are vulnerable under the action of an active environment (A. Dauphiné). The flows (either the ones specific to the region or the transitory ones) might decrease in intensity or, on the contrary, increase. The main road that connects the settlements along the Ilva Valley is in a rather precarious state, being under construction; the railroad has not been rehabilitated for a long time. Railroad transportation has sections with speed restrictions; however, as it has been showed, train passenger traffic is relatively constant. Road transportation for persons and freight between Ilva Valley and Vatra Dornei is lacking at present as there is no road to facilitate it. There is the idea of a project to enable such a connection to Vatra Dornei, which would continue the present DJ

172D over Grădiniţa Pass. In this way, an alternative to DN 17 (which connects Transylvania to Moldavia, through Tihuţa Pass) would be made available, as the latter is very problematic during winter time. Under these conditions, the passenger and freight flows on Ilva Valley will surely increase considerably. An increase in these flows could be determined also by the promotion and development of agritourism, as there is already a basic infrastructure represented by the privately-owned chalets and guest houses, as well as the necessary natural and anthropogenic resources.

The region analysed in this paper based on its anisotropic nature can be also seen as a subsystem of a more extended territorial system. The latter is the anisotropic region of Someşul Mare. This was dealt by P. Cocean and C.N. Boţan in 2007. They consider the region as one of the most complex anisotropic entities in Romania, due to a phenomenon of "anisotropic bifurcation" (Cocean, Boţan, 2007, p. 11) determined by the presence of the Sălăuţa Valley, a tributary of the Someşul Mare River. Transportation routes have emerged along Sălăuţa Valley, as in the case of Ilva Valley. There is a road and a railroad that connect Transylvania with the historical Maramureş Region. The energy and mass flows that go along this axis are added to the ones organised along the Someşul Mare River. Consequently, the authors determine an anisotropic space of Sălăuţa Valley, inscribed in the anisotropic region of Someşul Mare. Considering this, a similar phenomenon of anisotropic bifurcation could be identified also in the case of Ilva Valley. The Ilva River, left tributary of the Someşul Mare, could include the bordering area into Someşul Mare anisotropic territorial system. As in the case of Sălăuţa Valley, Ilva Valley is followed by a transportation artery that facilitates the access to Eastern Romania. The flows which go along it complete, at their turn, the ones that go along Someşul Mare.

REFERENCES

BOŢAN, C. N., ILOVAN, OANA-RAMONA (2006), *Sălăuţa Valley Anisotropic Space – Structure and Functionality*, in: Lucrările Seminarului Geografic „Dimitrie Cantemir", no. 26, Edit. Universităţii „Al. I. Cuza", Iaşi, pp. 217-225.
COCEAN, P. (2010), *Geografie Regională* [Regional Geography], Presa Universitară Clujeană, Cluj-Napoca.
COCEAN, P., BOŢAN, C. N. (2007), *Regiunea anizotropă a Someşului Mare – structură şi funcţionalitate* [Someşul Mare Anisotropic Region – Structure and Functionality], in: Studia Universitatis Babeş – Bolyai, Geographia, LII, 2, pp. 7-14.
COCEAN, P., BOŢAN, C. N., ILOVAN, OANA-RAMONA (2011), *Judeţul Bistriţa – Năsăud* [Bistriţa – Năsăud County], Edit. Academiei Române, seria Judeţele României, Bucureşti.
DAUPHINÉ A. (1979), *Espace, région, système*, Edit. Economica, Paris.
POP P. GRIGOR (2006), *Carpaţii şi Subcarpaţii României* [The Romanian Carpathians and Sub-Carpathians], Presa Universitară Clujeană, Cluj-Napoca.
POP P. GRIGOR (1984), *România. Geografia circulaţiei* [Romania. Geography of Transportation], Edit. Ştiinţifică şi Enciclopedică, Bucureşti.
*** www.misgrup.ro/ro/, retrieved 23 May 2012.
*** http://www.cfr.ro/, retrieved 20 August 2012.
*** http://www.crainou.ro/, retrieved 3 July 2012.
*** http://www.ilvamica.ro/, retrieved 13 January 2012.
*** www.totalfirme.com/86421/ELIEZER_PROD_SRL, retrieved 23 May 2012.