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## INTERFUNCTIONALITY OF NATURAL, SOCIAL AND ECONOMIC FACTORS IN THE ROMANIAN RURAL COMMUNITY – CASE STUDY: CLOPOTIVA VILLAGE

### ABSTRACT

The systemic conceptual pattern of the investigated rural community – Clopotiva village – is the result of a functional rural system structured by three main components: the physical (natural) subsystem, the social subsystem and the economic subsystem. As regards the existing relationships between these subsystems, a dense and complex network is established, including both the links between the components of the same rural system, and the links between the components of other rural systems.

The paper investigates Clopotiva rural system in the period 1935–2009, under the influence of the anthropic factor that led to deep changes in the component subsystems: natural, social and economic.

The methodology used in the scientific approach of the paper consists of: documentation from literature; quantitative analysis of the natural, social and economic phenomena in the Romanian rural area and the diagnosis analysis of the rural system from Clopotiva. The main work instrument is the SPSS software for processing the official data extracted from the Agricultural Registry of the local authority from Râu de Mori commune.

**Key words:** rural area, rural system, sustainable development.

**JEL Classification:** Q01, Q 12, Q32.

### 1. INTRODUCTION

For an integrating approach of the countryside, there is an obvious need “to see beyond the village in the rural area, to look for something more diverse than the agricultural economy intends to tell us, the non-agricultural activities or the structures of the tertiary sector (both production and services activities)” (Velcea, I., 2006, p. 23).

The simultaneous coexistence of the physical phenomena and (support) structures, social (habitat and population), and economic (agricultural economy and non-agricultural economy), connected by mutual relations, determines the need to reveal the structure and functionality of the whole rural system. The paper intends to make an analysis of Clopotiva overall rural system from a systemic perspective, i.e. the conceptualization of the rural reality of a given territory into an aggregate of parts, mutually linked by relations that intermediate material, energy and information flows.

The village Clopotiva was the object of a complex monograph study *Clopotiva. A village from Hațeg*, written by the sociologist and geographer Ion Cornea, the material being collected in the years 1934–1935 by the royal student team that worked in Clopotiva village. Since that time up to the present moment, Clopotiva rural system has been subject to deep structural changes, similar to those in the entire Romanian rural area.

## 2. STATE OF KNOWLEDGE

The rural area can be approached as a complex system (Bontkes, 1993; Vanclay *et al.*, 2003a; Vanclay *et al.*, 2003b; Jamal *et al.*, 2004; Johnson *et al.*, 2008); this approach is based on the general hypotheses of the systems, on the system theory and dynamics (von Bertalanffy, 1968; Forrester, 1961).

These approaches start from the hypothesis that the systems are modelled by static entities connected by linear relationships, that these relationships are defined by flows and stocks, underlining the quantities of flows and the fact that there are systems in equilibrium, thus denying the need to examine the dynamic interactions under change. According to Cumming (2005), the system components can be considered as parts interacting in a dynamic way.

In order to face the disturbing factors, the rural systems must develop a defense system, which refers to the capacity of a system to absorb disturbances and to get re-organized, in time, so as to maintain the same function, structure, identity and reactions (Walker *et al.*, 2004).

The approach to the village Clopotiva, from a systemic perspective, reveals the need for this rural system to operate in relation to the dynamic equilibrium state, in which both the relations between the components and those between them and the external systems maintain the evolution of the whole aggregate to corresponding parameters, far from jumps and thresholds which, depending on their intensity, can change its structure, sometimes irreversibly.

The approaches to the sustainable rural development reveal, in their multitude, the different aspects of this equilibrium, thoroughly investigating certain elements (such as: agriculture, industry, tourism, with its special forms etc., within the economic subsystem). By any direction of approaching the sustainable rural development, the result should be the same: maintaining the rural system in equilibrium.

Thus, the sustainable rural development will take into consideration a set of basic principles of the ecological sustainability, namely: “economic efficiency (efficiency, growth, stability), social equity (equity between generations, poverty alleviation and even poverty liquidation, stability of social and cultural systems), the protection of diversity and natural resources (maintaining the elasticity and dynamic capacity)” (Velcea, I., 2006).

### 3. MATERIAL AND METHOD

The methodology used in the scientific approach of the paper resides in: documentation from literature; quantitative analysis of the natural, social and economic phenomena in the Romanian countryside and the diagnosis analysis of Clopotiva rural system.

The main work instrument is the software SPSS (a software instrument dedicated to the quantitative analysis) used in processing the official data extracted from the Agricultural Registry of the local authority from Râu de Mori commune. The main SPSS functions used in the paper were the following: data editing (building up the databases, transformations of variables); statistical data processing (descriptive statistics, significance tests); presentation of results, under numerical or graphic form; development of own processing procedures or for the standard SPSS procedure modification.

### 4. RESULTS AND DISCUSSIONS

#### 4.1. Analysis and diagnosis of the rural system – Clopotiva village

Clopotiva village represents a genuine functional system, deeply rooted in space and time, being attested by documents since 1360. Clopotiva rural area is a system consisting of three subsystems, namely: the natural subsystem, the social subsystem, and the economic subsystem; each system has several components. Thus, within the natural component of Clopotiva rural system, we can notice the following subcomponents: geologic substratum, relief, climate, hydrographic network, vegetation, fauna and soils; within the social component: the rural population and rural habitat; within the economic component: natural resources, agriculture, rural industry, transports, trade and rural tourism. As regards the relationships between the subsystems, between the different components of the subsystems respectively, a dense and complex network is formed. The components of the subsystems are part of a structure of interrelations and connections that ensure the system operation, as well as its evolution towards different states of equilibrium.

The static analysis of the systemic components that operate together in time and space in a dynamic way, creates an overall image of the investigated rural system. The analysis of Clopotiva rural system will focus on the identification of its main characteristics as well as on its subsequent evolution trends.

The diagnosis of Clopotiva rural system presupposes the analysis of the system structure and dynamics, focusing on the system components and operation. Each subsystem is structured, in its turn, by several subcomponents under the form of a tree with linkages and connections that intermedate the matter, energy and information flows, between different subcomponents and of different intensities.

#### *4.1.1. The natural subsystem*

Clopotiva natural subsystem has the following subcomponents: relief, weather conditions, soils, hydrographic network, and vegetation. In time, most subcomponents of the natural subsystem suffered modifications. The anthropic factor has had the greatest impact upon the natural environment.

In the period 1935–2009, the natural landscape of the rural settlement Clopotiva suffered significant modifications, the only constants being the following:

- the village positioning from the geographic point of view, “at the foot of the Mountain” (p. 16, Clopotiva, Gusti), at the entrance on the valley of the river Râul Mare, “the village lies at the mouth of this river Râul Mare, (c. 550 m.alt.)”;
- Clopotiva territory is mainly located in the mountain region, the commune being located at an altitude ranging from 500 to 600 meters.

The hydrographic network also suffered modifications, which are mainly related to building up the hydro-electric power station on the river Râul Mare; the construction of this unit began in the year 1975. In the period 1981–1990, the harnessing of Râul Mare river, between Clopotiva and Hațeg, was materialized by putting into function the three hydro-power units with storage barrage. This brought about modifications of the water courses on the territory of the Clopotiva village, and not only, and implicitly the disappearance of the 7 mills of the village located on a deviation of Râul Mare river, on a length of 3 km (Cornea, I., p. 398).

At present, as in the year 1935, Clopotiva is a compact settlement, as a result of its evolution in time from a dispersed village consisting of four localities (Săcel, Cocaceni, Cioreni, Lătureni) which, in time, merged to form a compact village.

The anthropic factor has had a great influence in the modifications of the natural environment from Clopotiva village; thus, even the farming practice in the investigated area has a defining influence in the change of the natural landscape. Thus, the fact that the farming practice developed after 1989 is no longer at its level before 1989, has influenced the image of the rural landscape from Clopotiva by the presence of uncultivated arable land areas, non-maintained hayfield areas that were covered by forest vegetation.

#### *4.1.2. The social subsystem*

The social subsystem represents a special framework of material, energy, information transfer, this component of the system being the engine of the relations between the components and subcomponents of the rural system.

The analysis of the social subsystem of Clopotiva village will approach the two elements of the social component, i.e. the rural population and the rural habitat, maintaining the connection and the systemic relations that link them to the rest of the whole aggregate.

The population represents the most important resource of Clopotiva rural system, by the influence it has in the development of the economic activities, of the

agricultural activities implicitly. The importance of the human resources results from the capacity of the labour force to get things moving, through the creation and continuous improvement of both production means and applied technologies.

The population represents the driving force in Clopotiva rural area; reaching the sustainable rural development desideratum, i.e. the rural system equilibrium in the investigated area, depends on the population quantity (number, structure) and quality (educational level and vocational training).

In the period 1935–2009, the population of the village experienced a strong decreasing trend, i.e. a 28.48% decline. The structure by genders is quite balanced, regardless of the period we refer to.

In the period 1956–1958 and 2007–2009, the average age of the population in Clopotiva village increased from 39 years to 46 years, which reveals a strong ageing process. Clopotiva village experienced an increasing trend of the population's ageing process mainly in the case of the female population. The old population's pressure upon the young population generates serious long-term consequences at social level.

By age categories, a decrease of the young population under 20 years of age was noticed, from 24.4% in the period 1956–1958 to 15.2% in the period 2007–2009, and an increase of the share of old population, over 60 years, respectively, from 17.8% to 28.2%, which reveals the demographic decline of Clopotiva rural system (Table 1). From the point of view of the structure by genders, the decline of the young population, the increase of the old population respectively, is stronger in the case of the female population.

*Table 1*  
Share of population by age categories in Clopotiva rural system, %

	<b>1956–1958</b>	<b>2007–2009</b>
<b>Total</b>		
Under 20	24.4	15.2
20–60 years	57.7	56.6
Over 60	17.8	28.2
<b>Males</b>		
Under 20	24.95	16.41
20–60 years	58.28	58.85
Over 60	16.77	24.74
<b>Females</b>		
Under 20	24.02	13.80
20–60 years	57.28	53.91
Over 60	18.70	31.51

*Source:* Own calculations based on the data collected from the *Agricultural Registries* 1956–1958, 2007–2009.

If we look at the households evolution, we could say that their number increased; yet we must have in view the impact of the collectivization process, by

which the peasant, in exchange for his property that passed into the state's ownership, received into ownership only the house for living and 250 square meters of garden (Table 2). Thus, the households had to get divided into two or several parts, depending on the number of families that were living on the household, and the collectivization process had not ended yet in 1956–1958.

*Table 2*  
Evolution of population and households in Clopotiva rural system, number

	1935	1956–1958	2007–2009
Number of inhabitants	1218	1114	871
Number of households	250	297	275
Average number of household members	4.87	3.75	3.23
Average number of families on household	*	1.43	1.41

Source: *Agricultural Registries 1956–1958, 2007–2009*, Ion Cornea *Clopotiva. Un sat din Hațeg*.

In the periods 1956–1958 and 2007–2009, some other phenomena also took place, which influenced the evolution of the number of households, among which the most important are: the population's migration from the rural area to towns as an effect of the strong industrialization process in the county Hunedoara; attraction of labour force from the whole country for building up the hydro-power station on Râul Mare river, part of these workers settled up in the area and established a family there.

#### *4.1.3. The economic subsystem*

The land represents the main element of the agricultural capital, being an essential resource in the agricultural activity of the rural economies. The more developed a rural community is, the more the land becomes a more valuable resource, as the land has several utilities (it has a social function, a role in the non-agricultural activities, a recreational role; a function in the environment protection, it increases the importance of sustainable rural development, which needs main concerns for the preservation of the natural capital and the preservation of resources for the next generations).

***Land resources under the impact of the land reforms – the land reform of 1945.*** After 1935 up to the present moment, the land resources of Clopotiva village have suffered great modifications, both from point of view of the ownership form and of land use, as a result of the land reforms from 1945 and 1990.

The collectivization process started in the year 1945, by Law 187, which represented a massive shift of the agricultural land into the state ownership. A series of completions and modifications of the law followed. In the year 1962, the collectivization process of the Romanian agriculture was completed, its result being the abusively passing of an area of 1.78 mil. ha into the state ownership and of an area of 9.5 million ha into collective ownership.

The main consequences of the Land Reform in 1945 were the following: the liquidation of private ownership; destruction of the economic base of the peasants; simultaneous establishment or development of the following institutions: agricultural tractors and machinery stations, state farms, all kinds of cooperatives (production, supply, selling and consumption).

**The land reform of 1991.** The year 1989 marked the end of the period of the centrally planned economy in Romania, but the land reform did not take into account the economic criteria, but only the social objective fulfilled by the ownership right constitution and reconstitution, by Law 18/1991; as a result, over 4 million persons appeared in Romania, who own two hectares of land on the average, divided into several parcels.

**The agricultural land structure – Clopotiva rural system.** The structure of the land use categories, in the rural area, should first take into consideration the natural conditions specific to each area (soil, relief, climate, hydrography etc.) and secondly the market requirements (the needs of the national economy and of the agriculture) and last but not least, the environment protection needs.

The agricultural area used by the households from Clopotiva village, in the periods 1956–1958 and 2007–2009, experienced a significant decrease compared to the year 1935. Thus, the agricultural land area decreased by 62.86% in 2007–2009 as against 1935 (the area diminished by 1208.92 ha). All the categories of agricultural land experienced significant decrease, but the most important decrease was in the case of pastures, which decreased by 563.38 ha, i.e. pastures contributed to the diminution of agricultural area by 46.60% (Table 3).

The categories of land use radically changed compared to those in the year 1935, when a balanced structure existed among the categories arable, pastures, and hayfields. In the period before cooperativization and after land restitution to former owners, the agricultural land structure by categories of use is quite similar, the arable land and hayfields prevailing.

Table 3  
Agricultural area by categories of use (1935–2009), ha

	1935	1956–1958	2007–2009
Agricultural	1923	964.47	714.08
Hayfields	686	458.15	344.72
Pastures	576	0.28	12.62
Arable	575	454.13	345.70
Orchards	86	51.88	3.04
Vineyards	*	0.03	8

Source: *Agricultural Registries 1956–1958, 2007–2009*, Ion Cornea *Clopotiva. Un sat din Hațeg*.

The diminution of agricultural land areas owned by the rural households reveals a strong land fragmentation process, which determined the diminution of the role of agriculture on the households. The arable land in Clopotiva, even

though it has a significant share in the agricultural area, is constrained by the small size per household and the soil quality, as it lies at the foot of the mountain and the soil quality is a factor that limits productivity. The share of agricultural households without arable land increased from 6.00% in the year 1935 to 12.79% in 1956–1957 and to 14.55% in the period 2007–2009.

The arable land distribution in Clopotiva village, regardless of the time period we refer to, reveals a high land ownership fragmentation, so that the share of households with up to 3 ha arable land into ownership represented 78.18% in 2007–2009, about the same as in the year 1935 (83.60%) and in the period 1956–1958 (77.78%) respectively (Table 4).

*Table 4*  
Arable land distribution by size categories, number of households

	<b>1935</b>	<b>1956–1958</b>	<b>2007–2009</b>
0 ha	15	38	40
0–1 ha	79	73	88
1–2 ha	93	101	85
2–3 ha	37	57	42
3–4 ha	12	20	9
4–5 ha	8	5	6
5–6 ha	5	2	4
6–7 ha	1	1	1
Total	250	297	275

*Source: Agricultural Registries 1956–1958, 2007–2009, Ion Cornea Clopotiva. Un sat din Hațeg.*

The average number of arable land parcels increased from around 4 parcels per household in the year 1935 to 5 parcels per household in the period 2007–2009. In year 1935, the maximum number of parcels was 8, while in the period 2007–2009 it reached 15. The excessive parcelling of arable land was and still is a phenomenon that constrains the farming activity, which limits the crop productivity.

## **4.2. Agriculture practiced in Clopotiva rural system**

In the year 1935, “land cultivation and cattle raising were the two main occupations of the inhabitants in Clopotiva” while “wood cutting in the forest was a secondary occupation” (p. 307, Cornea, I.). Nowadays, Clopotiva is a village with mixed functions, yet agriculture is the main function.

### *4.2.1. Crop structure*

In the year 1935, the main crops were: cereals (maize, rye, wheat, barley, and oats); food crops (potatoes, beans, pumpkins); textile crops: hemp. The first place was taken by maize, which was cultivated on half of the arable land area, the other half being under cereals, food crops and hemp.

Even though, in principle, at present about the same crop categories are cultivated, their importance in the crop structure is modified. In the period 1956–1957, the main crops were the cereals (rye 40.64%, maize 25.45%, wheat 21.41%), while in the period 2007–2009, the cereal crops were on the first place in the crop mix (wheat 46.31%, maize 31.77%) followed by potatoes 16.98% (Table 5).

*Table 5*  
*Evolution of the crop structure (1956–1957 and 2007–2009) in Clopotiva rural system, %*

	1956	1957	2007	2008	2009
Wheat	19.39	21.41	40.05	46.31	47.14
Rye	39.81	40.64	0.06	0.15	1.10
Barley	0.20	0.26	0.40	0.12	0.22
Oats	2.68	2.72	0.51	0.77	0.73
Maize	25.53	25.45	26.26	31.77	30.81
Other cereals	*	*	*	*	0.79
Coriander /medicinal and aromatic herbs	0.54	*	0.13	0.15	0.07
Potatoes	9.19	6.98	28.84	16.98	15.82
Vegetables	1.99	1.94	1.07	1.24	1.19
Hemp	0.67	0.61	*	*	*
Fodder crops	*	*	2.67	2.50	2.13

*Source:* Own calculations on the basis of data collected from the *Agricultural Registries* 1956–1958, 2007–2009, Ion Cornea *Clopotiva. Un sat din Hațeg*.

As a direct effect of the fact that very many areas under hayfields are not cultivated, the drastic diminution of animal herds, the long distance to hayfields, etc., are only some of the reasons for the establishment of fodder crops.

In the period from 1956–1957 to 2007–2009, the cultivated area decreased by 44.77%, the only crops where an increase was noticed being wheat (it increased by 19.49%) and potatoes (increase by 34.33%). The crops with a diminishing cultivated area are the following: rye (-99.79%), oats (-84.39%), barley (-75.00%), vegetables (-64.58%) and maize (-31.03%).

In the year 1957, the average cultivated area on in the agricultural households from the rural system Clopotiva was 1.84 ha, to reach 1.40 ha in 2009. If we refer to the intensive agricultural land use index (the shares of industrial crops, food crops and fodder crops), the situation of the crops in the years 2007–2009 presents a significant improvement, increasing from 12.38% in 1956 to 32.71% in 2007, to decrease to 19.21% in 2009. The explanation is the increase of the areas cultivated with potatoes in 2007, compared to 1956, as well as their diminution since 2007 until 2009.

#### 4.2.2. The livestock herds

Having in view the characteristics of the natural system (location, position, and land of Clopotiva rural system), besides the agricultural crops, animal raising is a basic activity for the inhabitants in the conditions when the livestock herds drastically decreased, in the investigated period.

Poultry represents the only category of animals that experienced an increase in number (+102.98%), while all the other species of animals experienced a decrease in number ranging from 8.12% in the case of pigs to 93.85% in the case of sheep (Table 6). The decreased sheep number, from 3872 heads, in 1935, to only 238 heads, in 2009, led to the liquidation of sheepfolds, only one being functional at present, in collaboration with other villages/communes. The only category of animals that has not at its basis the diminution of the agricultural activity (crop/livestock production), in the village Clopotiva, is represented by horses, their place being taken by the introduction of tractors in the production processes from agriculture.

*Table 6*

Evolution of the livestock herds, in the period 1935–2009, in Clopotiva rural system

- number of animals -

	<b>Horses</b>	<b>Bovines</b>	<b>Pigs</b>	<b>Sheep</b>	<b>Goats</b>	<b>Poultry</b>
1935	231	1060	234	3872	548	1915
1957	209	604	120	1939	568	1225
1958	231	604	120	1939	568	1225
2007	25	217	250	394	210	3281
2008	26	137	206	333	195	3399
2009	19	107	215	238	183	3887

*Source: Agricultural Registries 1956–1958, 2007–2009, Ion Cornea Clopotiva. Un sat din Hațeg.*

The change of options with regard to the orientation towards certain animal species is determined by the subsistence character of the agricultural activities developed after 1990, situation that is characteristic to most households from this rural system, the animals being raised mainly for self-consumption.

## 5. CONCLUSIONS

Although the changes in the agricultural activities from Clopotiva rural system had a wide scope, they overlap to a certain extent the trends experienced at national level, which makes us believe that the main reason is the change of the political regime in our country, of the ownership system respectively. This has generated effects in all the components of Clopotiva rural system, such as:

– in the natural system: the change of the natural landscape by building up the hydro-power station on Râul Mare river, the works being effected during the communist period;

– in the social system: the communist regime determined the change of the occupational orientations of a part of inhabitants from Clopotiva towards the non-farm sectors, mainly industry; after 1990, the decline of industry determined the return of an already aged population to the rural areas;

– in the economic system: agriculture decline is not compensated by the diversification of adequate non-farm activities (processing of agricultural products, tourism activities etc.).

Thus, in relation to the specific natural conditions, the social structure, and the economic specificity of Clopotiva village, in the investigated period, the village turned from a pastoral-cereal growing village to a village with mixed functions (pastoral agro-tourism village; tourism village – starting point for mountain climbing activities; support-village for an area of dispersed vacation houses), yet its prevailing function remains the agricultural activity.

Clopotiva rural system has functioned and still functions under the influence of endogenous and exogenous factors, actions/efforts being necessary for reaching the sustainable development desideratum, following three fundamental axes: maintaining the natural system at adequate parameters, quantitative and qualitative improvement of the demographic component and adjustment of the rural economies to the rural development needs.

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