A network on High Nature Value farming
Learning, Innovation, Knowledge

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Learning Area *Dealurile Clujului Est, Romania*
The baseline assessment

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Dealurile Clujului Est

HNV farming under market pressures. Where to go?

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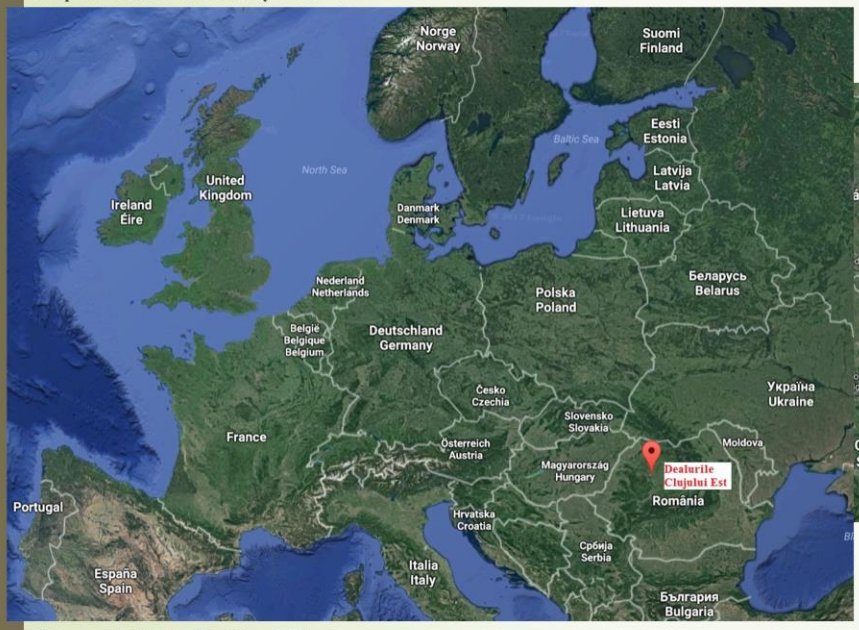
Limits and key characteristics

Map 1. Location of the study area in the EU



Source: Modified after Google Maps;

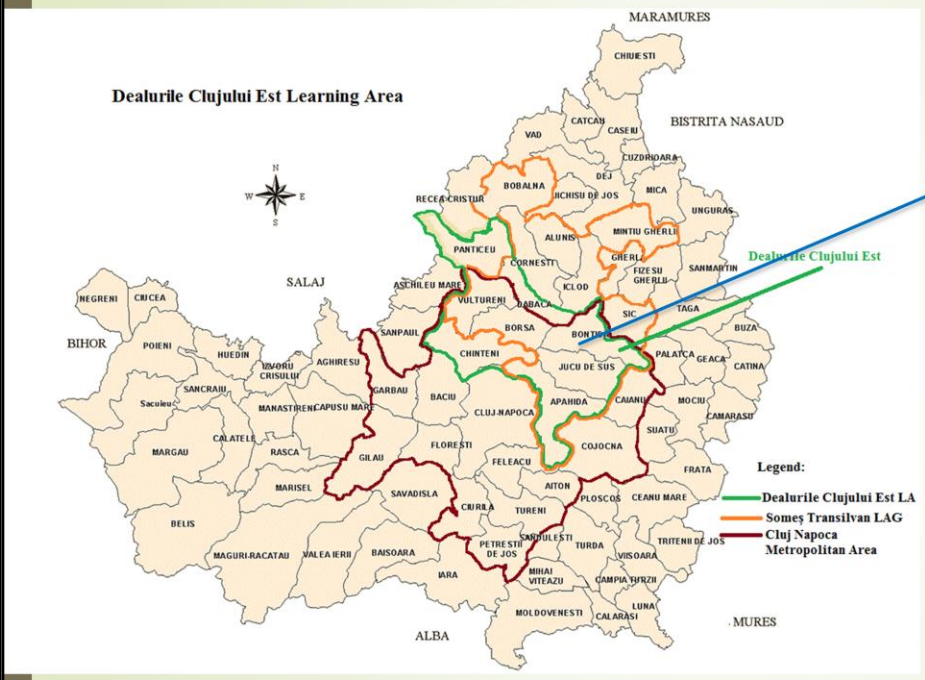
Map 2. Location of the study area in Romania

Source: Modified after Google Maps;

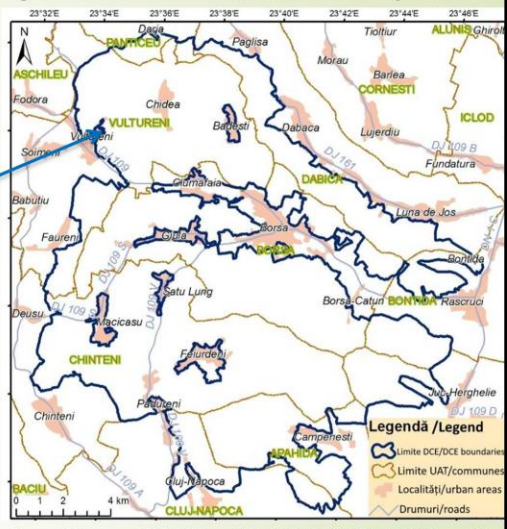
Dealurile Clujului Est learning area (LA) is located in the North-Western Romanian Development region (Map 1). The site is situated in the middle of the Romanian historical region of Transylvania that borders to the North-East with Ukraine and to the West with Hungary (Map 2).

Limits and key characteristics

Map 3. Administrative limits in the learning area



Map 4. Limits of Natura 2000 area in Dealurile Clujului Est LA



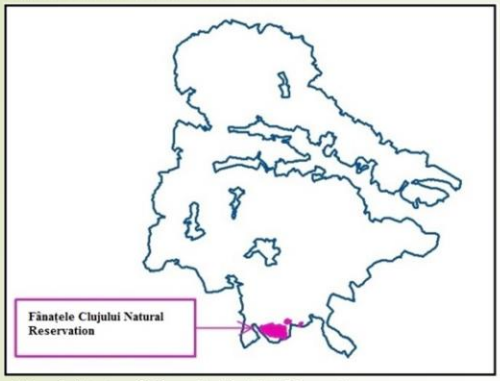
Source: Management Plan Natura 2000 site Dealurile Clujului Est (map .4.)

Administratively, the study area is divided into eight communes (Apahida, Bonțida, Borșa, Chinteni, Dăbâca, Jucu, Panticeu and Vultureni) that are located in the peri-urban area of Cluj - Napoca city (321.687 inhabitants in 2016). It is the biggest Transylvanian city in terms of population and GDP per capita (Map 3). A Natura 2000 site is the core of the LA, and has the same name (Map 4). The LA boundaries were set to capture the Natura 2000 site plus surrounding farmland with similar nature values.

The study area also belongs to several local administrative associations. With the exception of two communes (Panticeu and Chinteni), the territory appertains to the Local Action Group (LAG) Someș Transilvan. Panticeu commune is member of Leader Cluj LAG and Chinteni commune currently belongs to no LAG (Map 3). This situation brings inconsistences in terms of good area management. All administrative units, with the exception of Panticeu, belong to the Cluj-Napoca Metropolitan Area. Its strategy acknowledged agriculture as a key objective. Also, it is previewed that the rural areas around Cluj-Napoca can be developed by **promoting local brands** to the urban consumers and by creating **ecotourism facilities** (Cluj-Napoca Metropolitan Area Strategy, 2016). The assessment shows that future HNV innovative programmes have to be incorporated in all these local associative initiatives.

Limits and key characteristics

Map 5. Natural reserve in the Natura 2000 site



Map 6. Limits of Fânațele Clujului Natural reserve

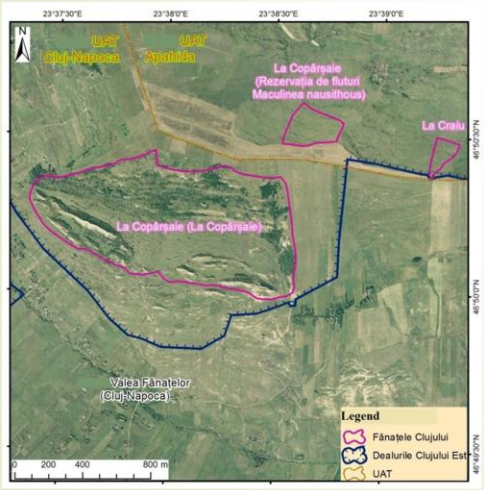


Fig. 1.a. The area in Natura 2000 site in different communes (2011)

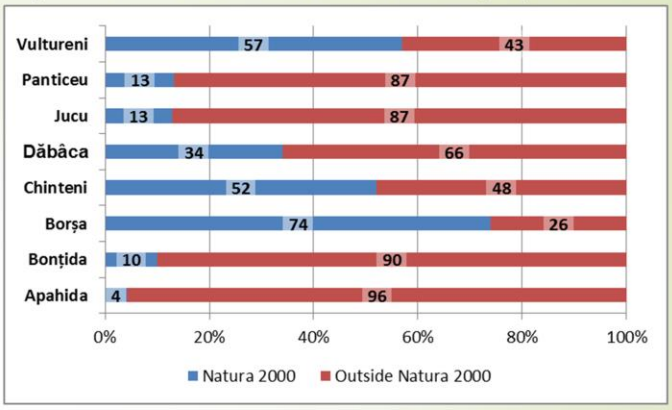
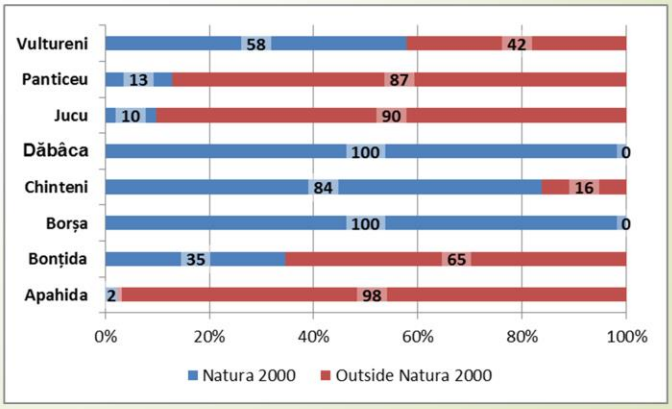


Fig. 1.b. The population share in Natura 2000 site in different communes (2011)



Source: Management Plan Natura 2000 site Dealurile Clujului Est (Map 5, 6. and data Fig 1, 2).

The study area is recognised for its rich biodiversity. 18,889 ha of the territory formed a Natura 2000 site with the name Dealurile Clujului Est (ROSCI0295) (Ministerial Ordonnance 1864/2007). The Natura 2000 site covers around one third of the territory and population of the communes. The ones with the most important shares of territory under the Natura 2000 commitments are Borșa, Chinteni, Dăbâca and Vultureni (Figure 1.a and 1.b).

The area also incorporates two natural reserves Fânațele Clujului “La Copârșaie” and “La Craiu’’ (Map 5). The first one was created in 1932 by the Ministerial Decision no 1149. It increased from 1.5 ha in 1994 to 97 ha in 2004 through the Governmental Decision 2151. Now it covers two protected reservations “La Copârşaie” and “Butterflies *Maculinea nausithous* reservation” (Map 6). “La Copârşaie" is a natural reservation important for botanical, fauna, landscape and geomorphology conservation. It was created to preserve the vegetation elements specific for continental steppe flora. “La Craiu” natural reservation has 2.2 ha and it was created to protect one of the main Romanian plant populations of *Bulbocodium vernum* (Law 5/2000 and Governmental Decision no 2151/2004).

Limits and key characteristics

Fig. 2.a.

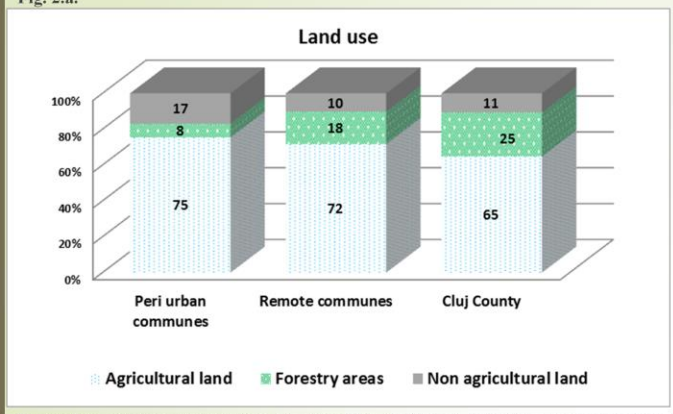
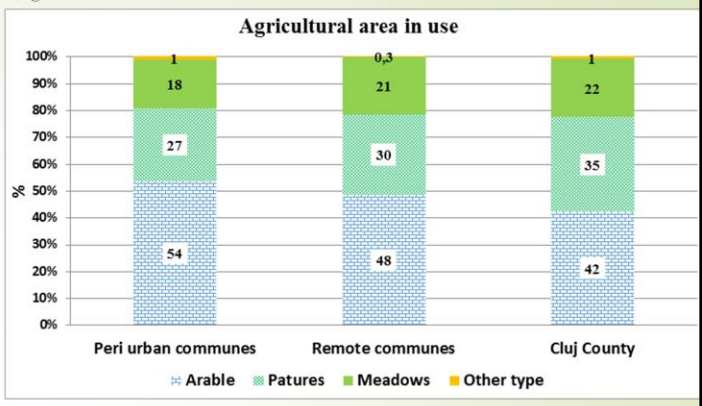


Fig. 2.b.



Peri-urban communes: Apahida; Bonţida; Chinteni; Jucu. Remote communes: Borşa; Dăbâca; Panticeu and Vultureni.

Source: Land use (2014). Romanian National Institute for Statistics (TempoOnline Data Bases).

Tab. 1. Reasons for setting the LA limits

Criteria	
Rural consistency	- rural communities located in the peri-urban area of Cluj-Napoca (biggest Transylvanian city in terms of population and GDP per capita); - similar rural life style, traditions, history etc;
Agro-ecological consistency	- low intensive farming techniques created very important habitats for biodiversity conservation: all 4 *Maculinea buterflies – nausithous, teleius, arion* and *alcon* are present in the same place which is unique in the EU (Rákosy & Vodă 2008); xero-mesophilic meadows on basic substrate holding the world record for the number of species per unit area (Wilson et al 2012); - traditional land use created a mosaic habitat structure - favourable for several protected EU species;
Institutional consistency	- area partially covered by the Somes Transilvan LAG (Apahida, Borşa, Bonţida, Dăbâca, Jucu and Vultureni); - environmental recognised sites: Dealurile Clujului East ROSCI0295 Natura 2000; Fânaţele Clujului "La Copârşaie" and "La Craiu" natural reservations;

Agriculture plays an **important role** in the entire LA. The communities located immediately near Cluj–Napoca city (Apahida, Bonţida, Chinteni and Jucu) have more agricultural land resources because they belong to the Someş River Plain area (Figure 2.a). In the same communes there are important roads or constructions sites. On the other side, the remote communes (Borşa, Dăbâca, Panticeu and Vultureni) have more forestry and permanent meadows and pastures areas and less arable land resources (Figure 2.b). The **difference in land use** is explained by the **presence of different altitude layers**. The communes located more than 30 km from Cluj-Napoca, have high altitude hilly shares in the total land area (between 500 and 700 m altitude).

The reasons for setting the LA research limits to the above mentioned administrative units were grouped in several criteria like **rural** or the **agro-ecological consistency** (Table 1). The learning area has at its core a Natura 2000 site with the same name. So, the LA limits, is supported also by the **institutional consistency**.

Landscape and transect

Picture 1.a Traditional land use in Păglișa Village, Dabâca Commune

@ spring 2017

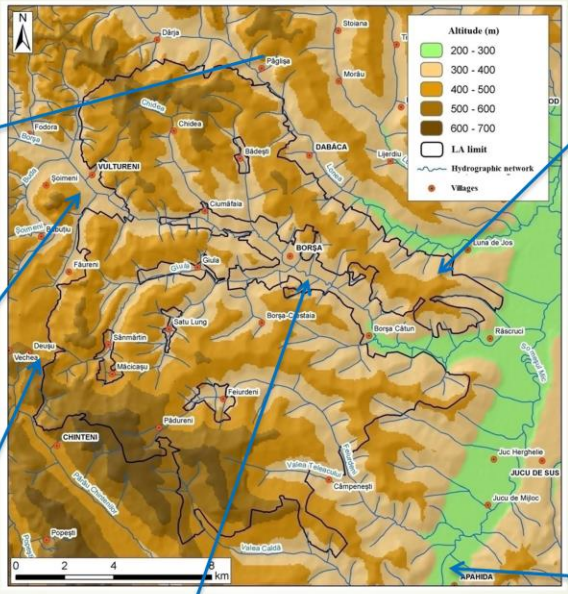
Picture 1.c Traditional land use in Vultureni Commune

@ spring 2017

Picture 1.e Landscape in Chinteni Commune

@ spring 2017

Map 7. LA – Altitude map in Dealurile Clujului Est Natura 2000 site



Source: https://fluturomania.files.wordpress.com/2014/04/slr-work-and-mututal-support-to-improve-butterfly-conservation-in-romania-andrei-crisan.pdf

Picture 1.g Traditional landscape in Borșa Commune

Picture 1.b Traditional land use in Luna de Jos, Dabâca Commune (2014)

Source: @ Roșian George; Report prepared by Lepidoptera Association as a subcontractor in HNVLink project

Picture 1.d Corn monoculture in Dăbâca Commune (2014)

Picture 1.f Crop monoculture in Apahida Commune

Source: @ Roșian George; Report prepared by Lepidoptera Association as a subcontractor in HNVLink project

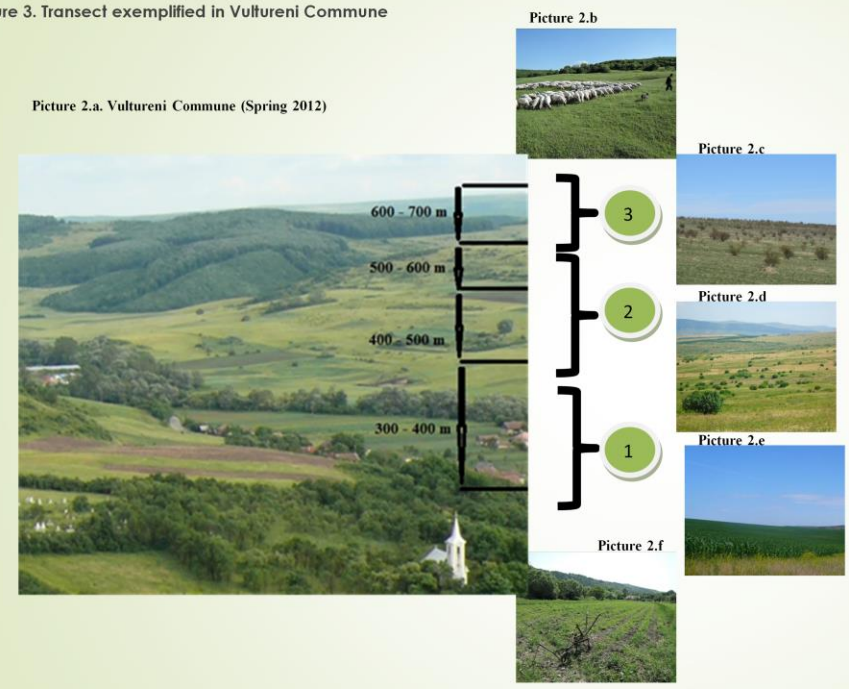
The landscape is shaped by **geography** and **farming techniques**. There is a network of rivers that flows from North-West to South-East into the Someș River (Map 7). These small rivers formed a string of consecutive valleys that edge the hills no higher than 700 m altitude.

The villages are located on the bottom of the valleys being usually surrounded by arable land situated between 300 to 500 m altitude (Picture 1.d; 1.g; 1.f). The next layer (between 500 to 600 m) is a mixture of arable land with permanent natural pastures and meadows (Picture 1.a). Above 600 m altitude is the area covered with meadows and in some areas with forests (Picture 1.e). **The maximum altitude** is 667 m (Nucului Hill and Peak) in the South- Western part (Chinteni commune) while the **minimum altitude** of 290 m is in the South– Eastern part of the region in the small basin of Someşul Mic river (Bonţida commune). 50% of the area is situated between 300 and 400m altitude.

The specific landscape of the permanent meadows and pastures is probably unique in nowadays Europe (Picture 1.a; 1.b). It is a **mosaic of parcels** that are farmed using different agricultural techniques and in different times of the year. Some parcels are still manually mowed and others are used only for summer grazing.

Landscape and transect

Figure 3. Transect exemplified in Vultureni Commune



Source: https://ssl.panoramio.com/photo/78568057 (Vultureni; Spring 2012)

600 – 670 m: Forestry areas;
Natural meadows
- used mainly for summer grazing;
- some of them lacking minimal maintenance works;
- mainly for sheep and goat grazing;

600 m: natural meadows used mainly for summer grazing;
500 – 600 m: natural pastures;
Winter fodder production (using manual mowing or machineries) Summer grazing on the abandoned natural pastures:
400 – 500 m: arable land for fodder production;

290 – 400 m: a mix between traditional small scale and intensive arable farming using mono-cropping.

The landscape is also shaped by the farming techniques (Figure 3):
- **low level altitude** (between 290 and 400 m altitude) is a mix of traditional small-scale (Picture 2.f) and intensive arable farming developed on the land arable resources (Picture 2.e). **Small – scale farming** is using low-intensive traditional techniques that yield mainly for subsistence purposes (specific for the family gardens located immediately near villages). The **intensive arable farming** has developed in the last years after the EU accession. It uses intensive mono-cropping arable farming.
- medium level altitude (400 to 600 m) is a **mosaic farming type**. The **arable land** from the lower parts (400 – 500 m) usually concentrated **in average size farms** that are using rather intensive farming practices (Picture 2.e). Some of the arable land is used for fodder production. Small size **natural pastures** areas are still used for **fodder production** using manual or mechanical mowing (Picture 2.d). There is an **abandonment phenomenon** of the low-intensive tradition farming techniques. These types of areas are usually a mixture of grass and shrubs (Picture 2.c).
- **high level altitude** (higher than 600 m) is a mix between permanent natural meadows and forestry areas. Meadows are used for sheep grazing (Picture 2.c). In the last years were noticed a **phenomenon of intensification** (increasing the animal index per hectare) and changes in the flock type (cows were substituted by sheep).

Climate and vegetation

Fig. 4.a. Annual Mean Temperature in Cluj-Napoca (°C) (period 1970-2012)

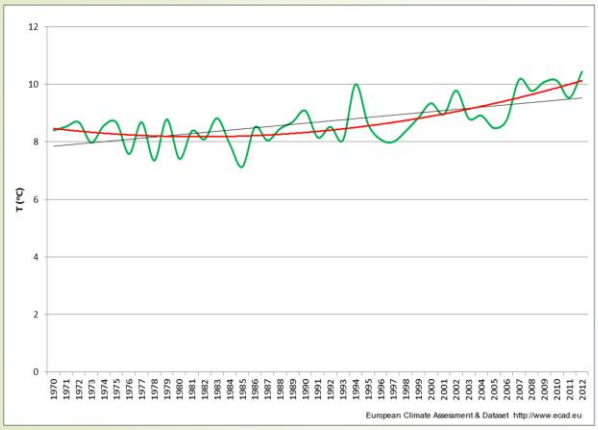


Fig. 4.b. Yearly precipitation in Borșa commune, Cluj county (mm) (period 1970-2008)

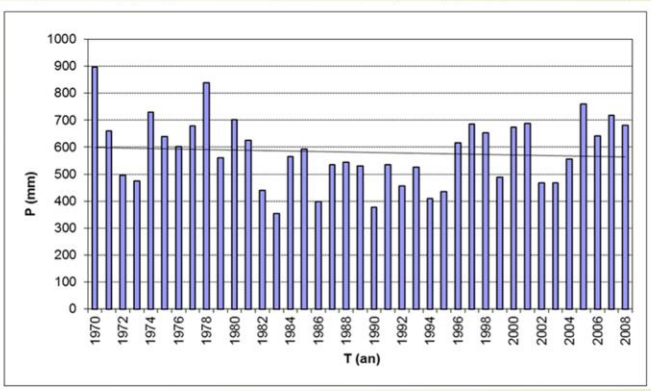
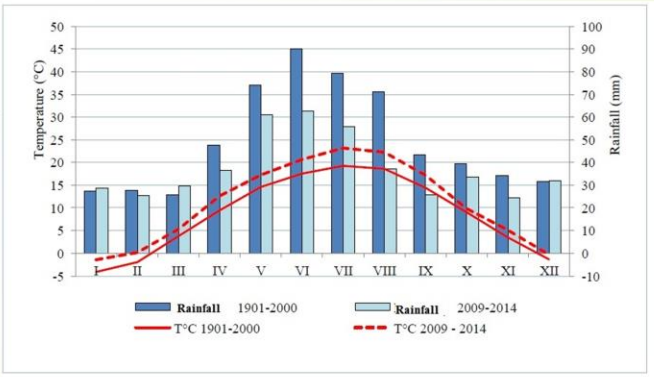


Fig. 4.c. Average ombro-thermical diagram for the Transilvania Plain area (Bonțida and Jucu)



Source: Management Plan Natura 2000 site Dealurile Clujului Est (Figure .3.a ad 3.b); Dinu (2015). Phd Thesis (Figure 3.c.)

Climate in Dealurile Clujului Est is **moderate-continental**, being influenced by the Apuseni Mountains located in the South-Western part of the department. The transition from winter to summer is usually in late April, and from autumn to winter in November. Summers are hot and winters usually cold without heavy storms. The average air annual temperature is around 8.5°C.

Climate directly influences vegetation and farming. There exist the need to **produce** and **store forages** for the winter period. **Grazing** the permanent meadows and pastures is possible only in the summer time.

There can be noticed **a steady average temperature increase** over the past years to 9.5°C (Figure 4.a). The average annual rainfall fluctuates around 600 mm/year (Figure 4.b). The **fluctuations** around the average expected rainfall have been **more pronounced** over the last year. The **trend** shows **an increase in the incidence of the draught years** (Figure 4.c)**.**

Climate and vegetation

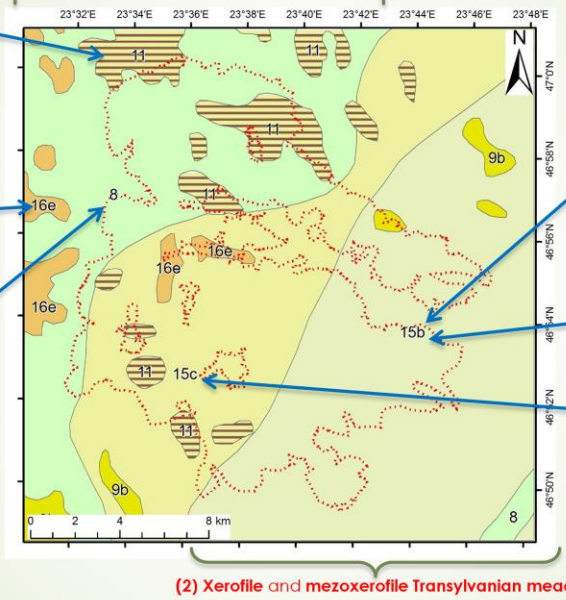
Picture 3.a *Quercus petraea*

Picture 3.b *Carpinus betulus*

Picture 3.c *Agrostis capillaris*

Map 8. LA vegetation map

(1) Mesophilic grasslands



(2) Xerofile and mezoxerofile Transylvanian meadows

Picture 3.d *Carex humilis*

Picture 3.e *Stipa* sp

Picture 3.f *Festuca rupicola*

Source: (after Doniță and Roman 1979); Report prepared by Lepidoptera Association as subcontractor in the HNVLink project; Pictures Wikipedia;
15b-Xerophilous and meso-xerophilous grasslands with *Carex humilis*, *Festuca rupicola* and *Stipa* sp.
15c-Meso-xerophilous and mesophilous grasslands with *Festuca rupicola*, *Agrostis capillaris* and *Brachypodium pinnatum*
8-Mesophilous grasslands with *Festuca rubra* and *Agrostis capillaris*
11-Forests with and *Q. Cerris*
16e-Forests with *Quercus cerris* and *Carpinus betulus*
9b- Forests with *Quercus petraea* and *Carpinus betulus*

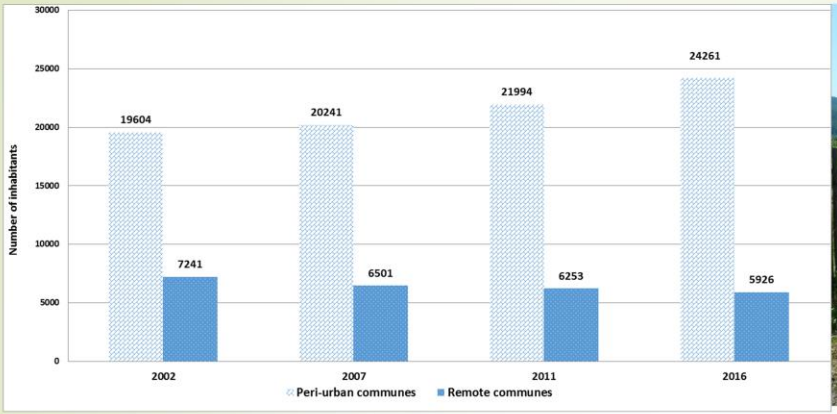
Source: Management Plan Natura 2000 site Dealurile Clujului Est (Map 7. and Wiki for picture 3.a to 3.f).

Local botanical studies (Bădărău, 1979) showed that two important ecological areas meet in the area. They separate the grassland habitats into several categories from West to East, depending on the average yearly rainfall that decreases in the same direction because of the relief. The average rainfall is around 650 – 700 mm in the Western hilly area sides and between 600 – 650 mm in the Eastern plain areas (Bonțida, Apahida and Jucu).

Thus, the prevailing Western third site is dominated by **mesophilic grasslands** with *Festuca rubra* and *Agrostis capillaris* (*Festuco rubrae - Agrostietum capiilaris;* Horvat, 1951) (See 1 on the Map 8). In the middle third site of the area predominate mesoxerofile and mesophilic meadows with *Festuca rupicola*, *Agrostis capillaris* and *Brachypodium pinnatum*. In the Eastern part, there are **xerofile** and **mezoxerofile Transylvanian** typical meadows with *Festuca rupicola* and *Stipa* species that corresponds to the priority European habitat 6240 subpanonice steppe meadows (See 2 on Map 8). The area located above 700 m altitude is covered by forest mainly with *Quercus petraea* and *Carpinus betulus*.

Human geography

Fig. 5. Population in the LA (by residence) (2002- 2016)



Source: Romanian Institute of Statistics , 2017.

Picture 4. Traditions in the area

Source: http://www.dejeanul.ro/content/traditia-cluj, 2015

- The number of inhabitants decreased especially in the communes located more remote from Cluj-Napoca city: Borșa, Dăbâca, Panticeu, Vultureni (communes with high HNV resources).
- Aging population is more intense in these communes.
- **Public transportation is not available in the remote area communes (only private mini-buses).**

In four communes out of eight (Borșa -34 km, Dăbâca-39 km, Vultureni- 31 km, Panticeu- 53 km from Cluj-Napoca) located relatively far from Cluj-Napoca city there was an important decreasing trend for the number of total inhabitants. In the other four communes the inhabitants number increase is explained by **the dormitory function** of the communes for the active population that work in Cluj-Napoca (Apahida – 10 km, Chinteni – 10 km), as well as their **positioning near the industrial parks** and the National Road DN1 (Jucu – 20 km, Bonţida – 30km) (Figure 5).

Nevertheless some of the population still preserves the outstanding traditions especially during the most important religious holidays (Picture 4). Traditions are kept mostly by the elder persons. There is also a traditional dance formation in the region.

Human geography – demographic momentum

Fig. 6.a. Natural growth in the LA area (1990 – 2015)

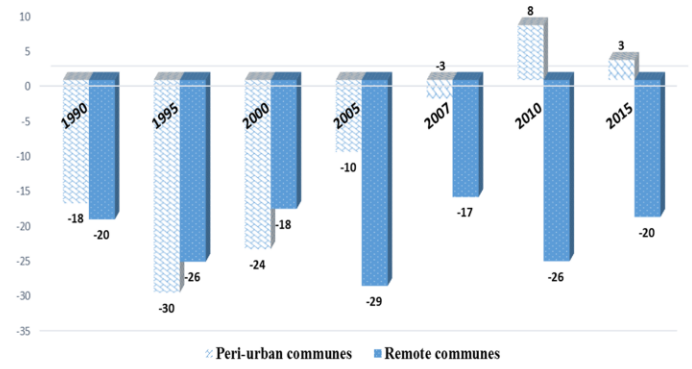
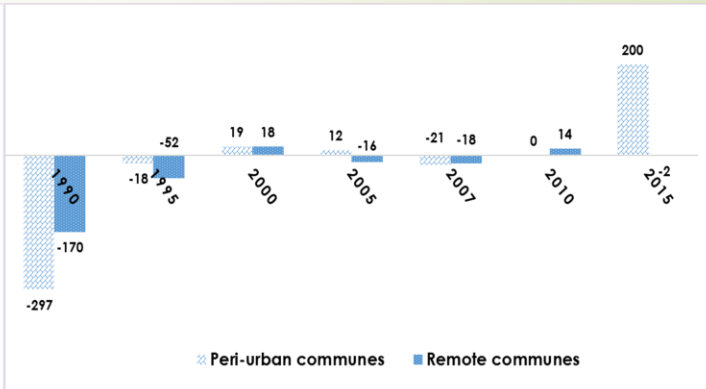


Fig. 6.b. Migration rate in the LA area (1990 – 2015)



Source: Romanian Institute of Statistics , 2017

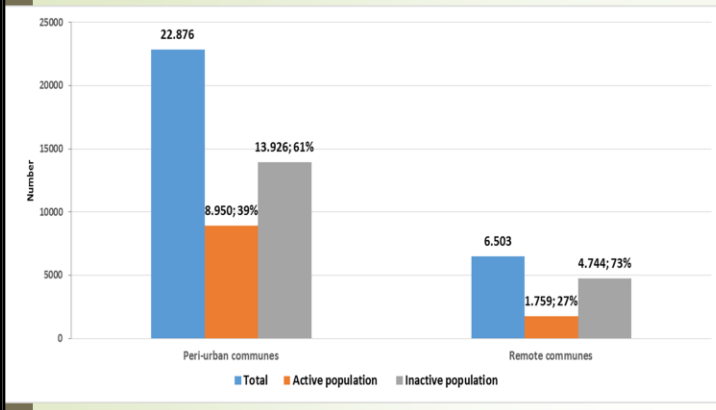
- Natural growth is negative in all communes, (except Apahida), as a consequence of the aging population;
- Only Panticeu (-24) and Vultureni (-2) have had negative migration rates over the past years.

The **main human geographic characteristics are aging population, cultural and ethnic diversity**. Perspectives are not very optimistic after analysing the evolution of natural growth. Thus, the communes from the peri-urban area registered positive natural growth rates in the last years (mainly Apahida commune). All other communes recorded **negative increases in population growth** (Figure 6.a). The Apahida exception is explained by the fact that a lot of young active population working in Cluj-Napoca moved in that area due to low real estate prices.

External migration from rural areas is still difficult to quantify. Official statistical data only provide information on registered emigration, however the amplitude of the phenomenon is likely to exceed these official data. For the 1990-2000 period, internal migration presents a predominantly **rural-urban trend** (Figure 6.b). Over the past recent years, the trend has diametrically changed in **urban-rural direction**. Only for the remote communes the migration rate still has negative values.

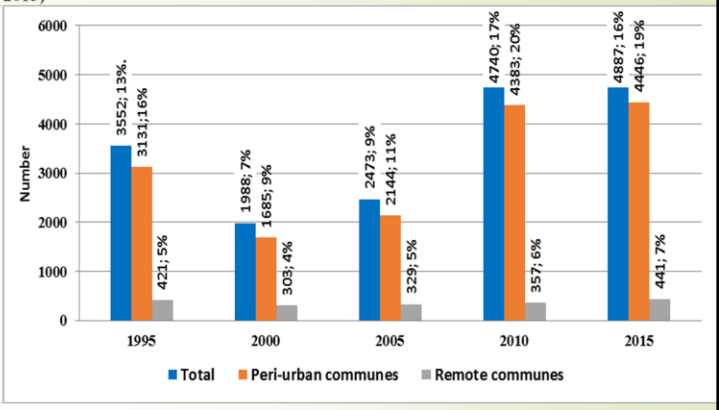
Human geography – economic and demographic momentum

Fig.7.a. Active and inactive population in the LA (2011)



Source: Romanian Population and Housing Census, 2011

Fig.7.b The comparative situation of the number of persons employed in the area (1995 - 2015)



Source: Romanian Institute of Statistics (TempoOnline Data Bases).

- The highest shares of inactive population are recorded in the communes located relatively in remote areas (Panticeu: 76%; Vultureni: 76% and Dăbâca:74%).
- The active population does not exceed 50% of the total population in any of these localities. This is primarily due to the large share of retired persons.

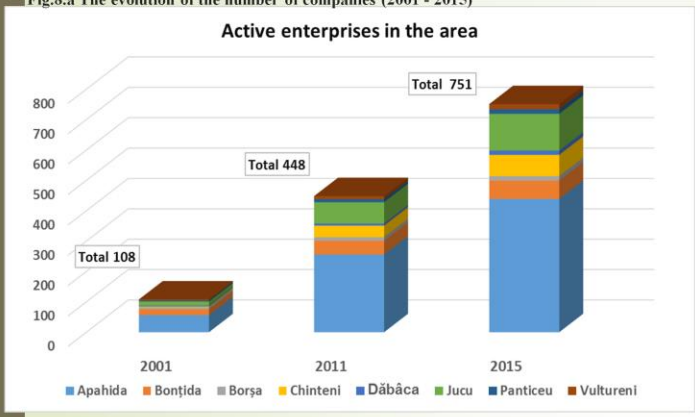
The **occupancy rate** shows that an important population share is represented by the **inactive group**. The highest shares are recorded in the communes located relatively far from cities. This is primarily due to the large share of retired persons (Figure 7.a).

The economy is in different development stages and has experienced different evolutions over time. The highest degree of development is shared by Apahida and Jucu communes (peri-urban communes), that have more than 1500 employees each (Figure 7.b). These two communes host two important Industrial Parks for Cluj County where people from the whole area could find a job (Tetarom III Industrial Park and Nervia Industrial Park). Within these facilities operate multinational companies (De'Longhi SRL, Robert Bosch SRL, Karl Heinz Dietrich International Exped SRL, Imperial SRL, Star Storage SRL, Henschel Romania SRL, IL Caffe Servexim SRL, Contrast Import Export SRL etc) specializing in the production of household appliances, automotive production, general mechanics operations, logistics or IT data centers.

By contrast, the **economic situation** in Borşa, Panticeu and Vultureni **is precarious**. There is a small number of employees who earn incomes from a paid job. **These are also the areas that have the most important HNV farming areas.** Moreover, the share of the employed persons in the total population is very small especially in the communes located far from cities (Figure 7.b).

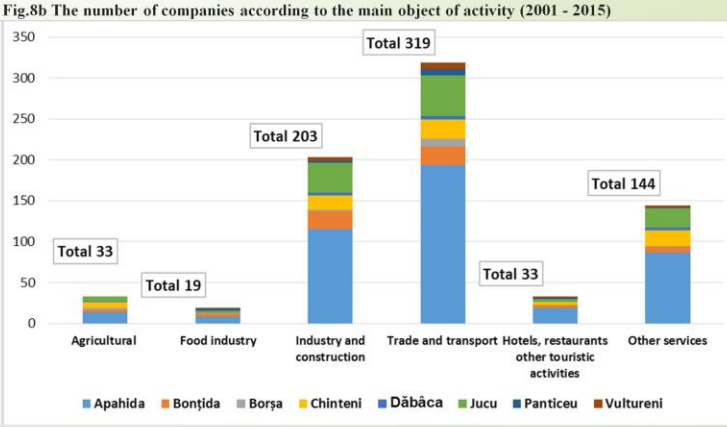
Human geography – economic and demographic momentum

Fig.8.a The evolution of the number of companies (2001 - 2015)



Source: Romanian Institute for Statistics (TempoOnline Data Bases).

Fig.8b The number of companies according to the main object of activity (2001 - 2015)



Source: Romanian Institute for Statistics (TempoOnline Data Bases).

The number of companies multiplied by 7 among 2001 and 2015 (Figure 8.a). The most important number lies near the Cluj-Napoca city (in Apahida and Chinteni) and near the big infrastructure roads (Bonțida and Jucu). Poor entrepreneurial activities are present in the remote HNV area of Vultureni, Panticeu, Dăbâca and Borșa.

The analysis of the number corresponding to the registered companies according to their main object of activity shows **low entrepreneurial results especially for Agriculture and Food Industry** (Figure 8b). In this area farmers mainly operate as individual persons being included in the Register of Agricultural Holdings. They have rather low obligations for sanitary-veterinary authorization comparing with the commercial companies. These demands are even more challenging when authorizing a food processing company. This is the main impediment for the development of small food processing industry.

Human geography - "users" of learning area

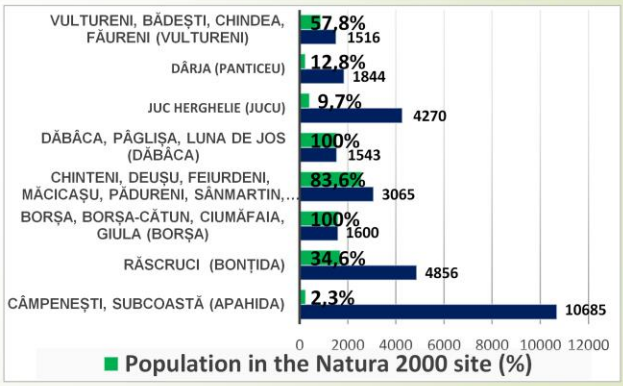
- **The inhabitants from Apahida, Bonțida, Borșa, Chinteni, Dăbâca, Jucu, Panticeu, Vultureni**; The Natura 2000 site covers around one third of the territory and population.
- **Farmers or other people outside the communes owning or renting land in LA;**
- **People working in the area or having a business in the LA;**
- **Tourists or visitors in the learning area;**
- **Researchers and students from various fields of study: environment, biology, agriculture, history, economics etc.**

Picture 5.a. Farmers – the users of the area

Picture 6.b. Researchers – the users of the area

Source: http://www.lepidoptera.ro/evenimente.htm

Fig. 9. Population in the Natura 2000 Site Dealurile Clujului Est



Source: Romanian Institute for Statistics , 2017

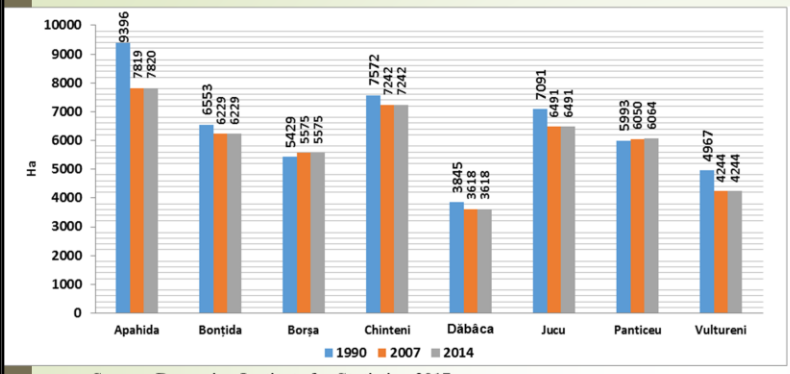
Other main users of the area are:

- The Natura 2000 site covers around one third of the territory and population (Figure 9). They, together with the other local inhabitants, are the main users of the learning area.
- Small subsistence household or specialised farmers working the land;
- Other people outside the communes owning or renting land in LA, people working in the area or having a business in the LA.
- Researchers and students from various fields of study: environment, biology, agriculture, history, economics etc.
- Local business;

The studied area, unlike other areas in the country, does not have a **tradition in tourism**. Activities that may be included in the notion of tourism are: fishing, hunting or horse races organized by nobility on their fields, attending saltwater ponds whose existence and source of recreation and treatment had been known since Roman domination times (Loşonţi et al., 2014, p. 192). Events (not many) organized after 2000 year: folk dances, concerts, theatre, presentations of old historical films, exhibitions of old, traditional objects (machines, agricultural tools etc.), which represent a few small steps in the field of tourism development in the area of Dealurile Clujului Est.

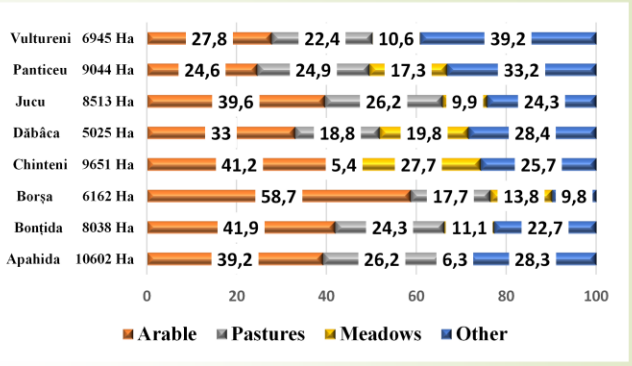
Agriculture: key facts

Fig. 10.a. Agricultural land area in the LA (in Ha)



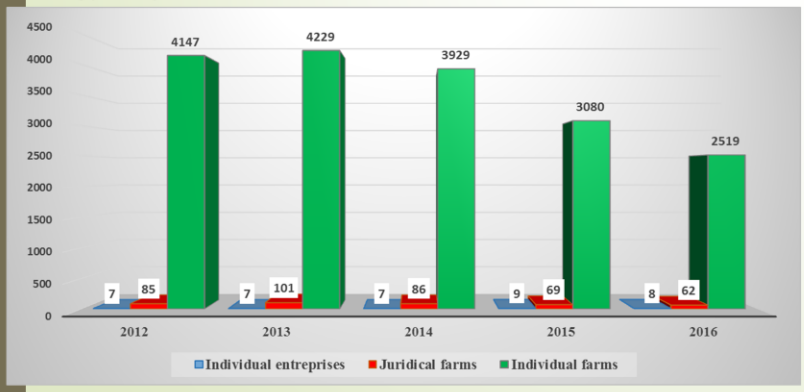
Source: Romanian Institute for Statistics, 2017.

Fig. 10.c. Land use distribution in 2014, (%)



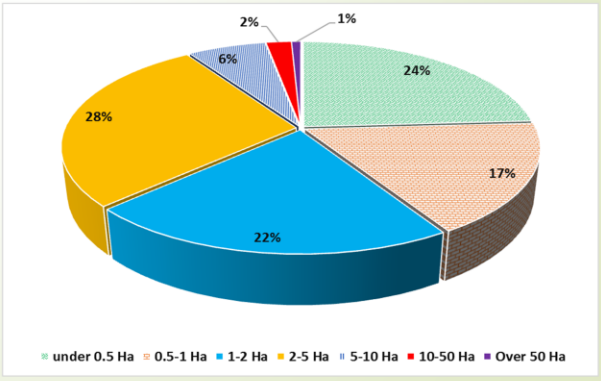
Source: Romanian Institute for Statistics, 2017.

Fig 10.b. Farm number and ownership structure in the LA, number of farms CAP beneficiaries accordingly to the juridical status



Source: APIA Cluj, November 2016.

Fig 10.c. The distribution of farm number in different size classes (2010)



Source: Cluj Institue for Statistcis, 2017.

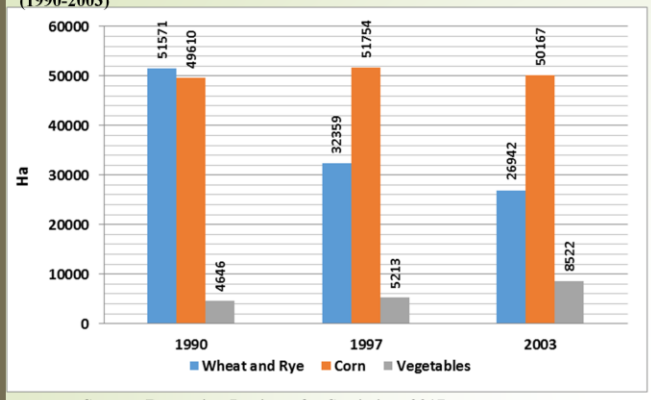
Comparing with 1990 data, the agricultural land in the Learning Area has gradually decreased with 7% due to a reduced interest of small owners to work the land. The most affected communes are Apahida (-17%) and Vultureni (-15%) (Figure 10.a). However, in recent 15 years, the trend changed. The most significant increases compared to 2000, were registered in Panticeu (+16%) and Borșa (+9%).

Individual farms represent the main land users. 2519 individual farms benefited from CAP subsidies in 2016, while only 62 farms with legal status received such subsidies (Figure 10.b). 50% of farms had less than 1 ha in 2010 being not eligible for CAP subsidies (Figure 10.c). A large part of these individual farms practice subsistence or semi-subsistence agriculture on small areas, with the most rudimentary techniques, often for the benefit of their own household consumption.

There are no official statistical data available to the researchers regarding the size of individual farms. While, according to the Ministry of Agriculture, the average size of a Romanian farm was 3.7 ha in 2016, the research conducted by Paulini et al. in 2011, in the municipalities of Borșa and Dăbâca revealed that the average size of individual farms was approximately 6.5 hectares, with an average number of 9 plots/farm.

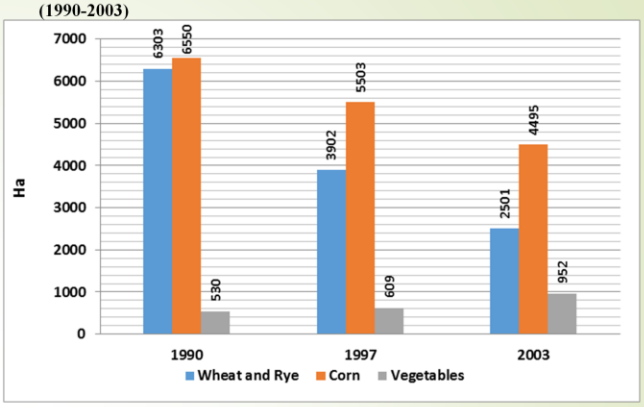
Agriculture: production, productivity and markets

Fig. 11.a. Evolution of the main areas cultivated with crops in Cluj department (1990-2003)



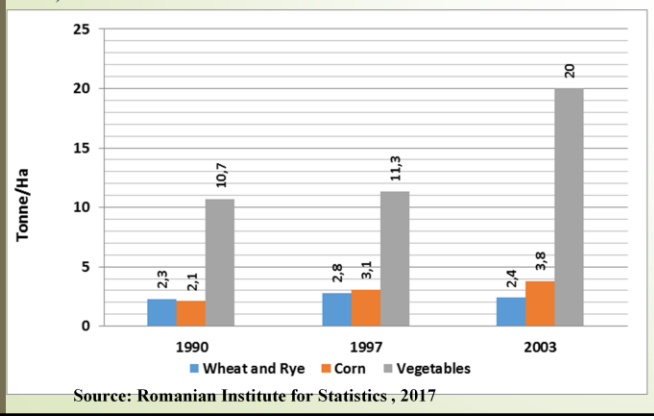
Source: Romanian Institute for Statistics , 2017

Fig. 11.b. Evolution of the main areas cultivated with crops in the Learning Area (1990-2003)



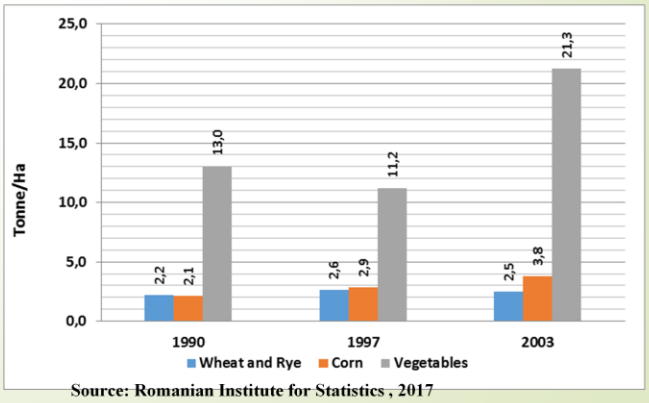
Source: Romanian Institute for Statistics , 2017

Fig. 11.c. Evolution of average yields of the main crops in Cluj department (1990-2003)



Source: Romanian Institute for Statistics , 2017

Fig. 11.d. Evolution of average yields of the main crops in the Learning Area

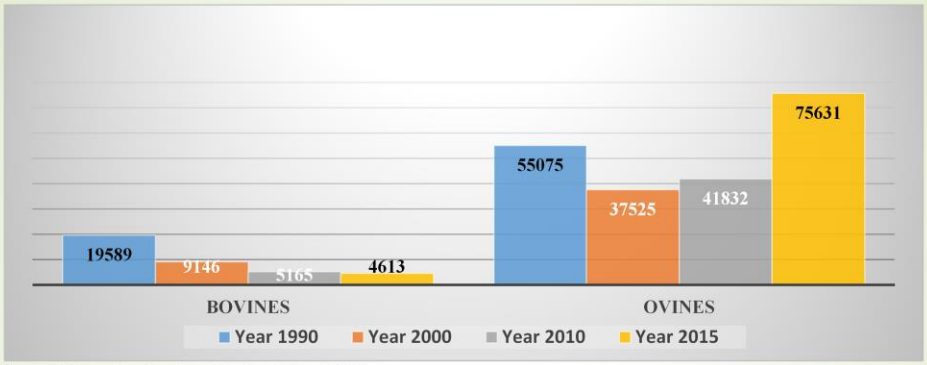


Source: Romanian Institute for Statistics , 2017

The **main crop productions** are wheat, maize, fodder plants and other crops. During 1990-2003, the cultivated area has decreased, with the exception of the vegetables both in the LA but also at the departmental level (Figure 11 a and b). There are no important differences in terms of average yields per hectare in the LA compared with the average departmental figures (Figure 11.c and b). Nevertheless, the average yields are extremely low as compared with the EU average figures (e.g. around 6 tonnes per hectare in the EU in 2016).

Agriculture: Production, productivity and markets

Fig 12. Main livestock resources (1990 to 2015)



Source: Romanian Institute for Statistics , 2017

Picture 6.a. Local markets and events

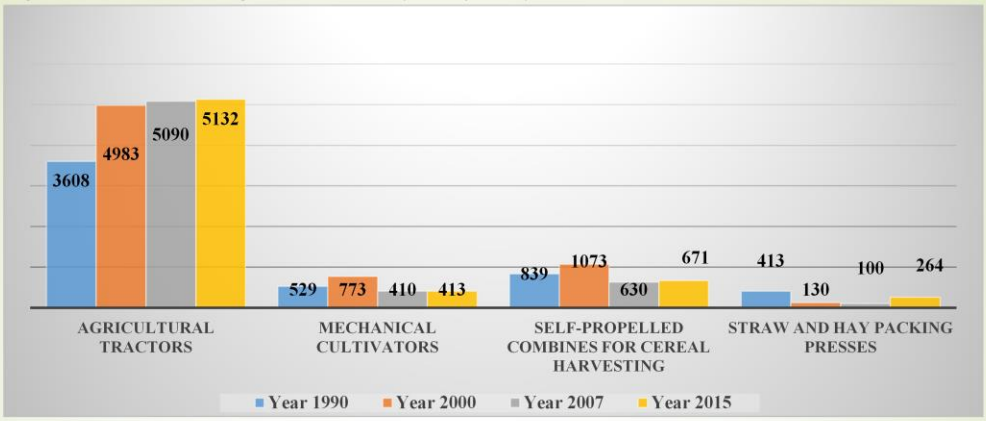
Picture 6.b. Local fairs

Given the structure of farmland and the specific traditions, **sheep breeding** was and will remain one of the basic activities. There is an important increase for the sheep number (37% between 1990 and 2015) (Figure 12). This is explained by the **changes in the technical farming process**. The sheep flock is now kept almost all year long on the permanent meadows and pastures for grazing. Forages are provided only around the parturition period. Cows breeding became more expensive because winter stabling is a must. An increased number of sheep livestock can potentially harm the HNV area due to overgrazing and erosion phenomena. The quantity of both crop and animal **household production sold on the market is very small**. There are the following options:

- direct sell in food markets and fairs – there are few markets and fairs in most of the communes; the important fairs are in the cities – the cost of transportation is a barrier for small farmers;
- supermarkets - the price obtained is very low, the quantities required are important;
- selling to industrial processors - very few processors in the area; they prefer to import cheaper and often poor quality products;
- through small shops- there are no such shops with local products in most of the areas, there is a lack of local brands which can attract new consumers.

Agriculture: Main production factors used

Fig 13. Park of tractors and agricultural machinery in Cluj County



Picture 7.a. Production factors

Source: National Official Statistics, 2017

Picture 7.b. Țurcana local breed

Picture 7.c. Bălțată Românească local breed

Compared with 1990's data, in the last 15 years, there has been an increase with 42% for the number of tractors that exit in the entire department (Figure 13). There are no official data about the number of machineries in the LA region. After a qualitative assessment in the LA region it was found that in the last years, due to the second CAP pillar programs, some of the farmers invested in new farming techniques. Thus, especially the **commercial farms** are now equipped with all necessary farming equipment. On the other side, the **individual farms** that could not apply for CAP investment programs due to their low size level are still using **low intensive farming techniques**. Some of mechanical works from the individual farms are provided by rented equipment. The local individual producers are using mainly local breeds as "țurcana" sheep and "bălțata românească" cow breed.

Agriculure– farming system

Picture 8.a. Relatively intensive crop farming practicies

Photo: Crop production in Panticeu village, 2017 @ Mihai Valentin

Picture 8.b. Traditional sheep breeding farming practicies

Photo: Sheep breeding in Chinteni village, 2017 @ Mihai Valentin

Picture 8.c. Traditional crop farming practicies

Photo: Traditional crop farming practicies in Dăbâca commune, 2016 @ Mihai Valentin

Picture 8.d. Relatively intensive breeding farming practicies

Photo: Dăbâca commune, 2016

- The economic activity in most of the analysed communes is focused around agricultural practices.
- Only in the communes in the proximity of Cluj-Napoca city and on the National road DN1C (Apahida, Chinteni, Jucu, Bonțida) - a wider range of non-agricultural activities can be identified (Industrial Park Tetarom from Jucu; Industrial Park from Apahida)

The **farming system** can be divided in two groups. The **individual small size households** (below one hectare of land and less than two mother cows or 25 sheep) are producing mainly for their own consumption. Low-intensive mix farming activities are present in almost all households from the region. After a qualitative assessment, such activities are applied nowadays only on about 20 to 25% of the entire agricultural land. The young generation is migrating to cities or to other EU countries. Such practices are based on extensive labour forces and they produce rich biodiversity habitats (due to manual mowing and low grazing indexes) (Picture 8.b and 8.c).

Commercial farming is developed by several households that had access to information and funding (from commercial banks or from EU CAP programs) or by newcomers. In the early 2000 years, large areas of permanent meadows and pastures but also some of the arable areas were abandoned by their landowners due to the capital lacks. After implementing the CAP subsidies system (especially the payments coupled per flock head) some of the common land was grabbed by newcomers. They created big size sheep farms that are using the permanent meadows and pastures for grazing all around the year. There is a special agri-environment payment to support low intensive farming practices (from the second CAP pillar) but its support level and also the environmental demands are considered to be less attractive comparing to the direct coupled payment system (around 10 Euro per sheep

head). Overgrazing and erosion are the main negative effects of such new systems that might affect the biodiversity resources. On the other hand, the crop production intensified applying now highly intensive technologies (mono-cropping) (Picture 8.a). Finally some of the commercial farms are applying a mixt between the intensive and low-intensive techniques (Picture 8.d).

The High Nature Value of the area

Picture 9.a. *Serratula lycopifolia*

It is a plant species that characterised the well preserved meadow-steppe grasslands. It is very sensitive to overgrazing (Badarau, 2017).

Source:
http://www.floraofromania.transsilvanica.net

Picture 9.b *Crambe tataria*

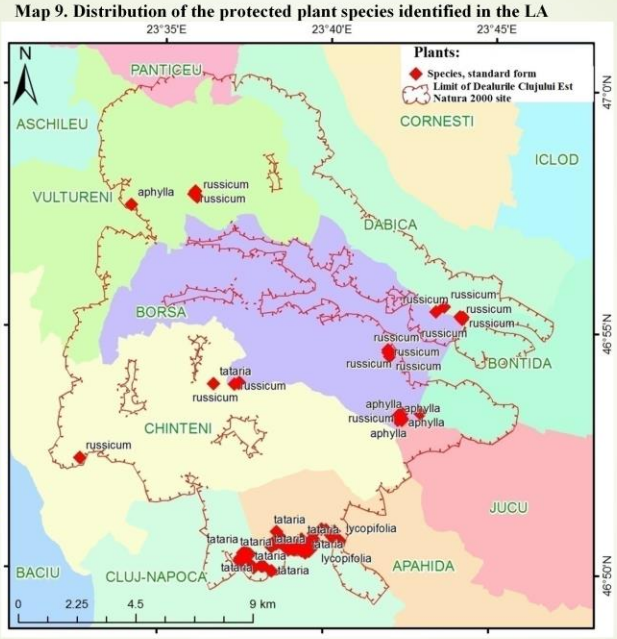
The species is protected by law in Czechia, Slovakia, Hungary, Serbia and Romania. The leaves are eaten as a vegetable, the root has a taste similar to horseradish.

Source:
http://www.floraofromania.transsilvanica.net

Picture 9.c *Pulsatilla patens*

Is a rare plant species that manifest a special preference for the top area of the high hills

Map 9. Distribution of the protected plant species identified in the LA



Source: Management Plan Natura 2000 site Dealurile Clujului Est

Picture 9.d *Echium Russicum*

Its presence show a good conservation status of natural permanent meadows . *Echium russicum* is not tolerant to overgrazing and intensive use of fertilizers (Badarau, 2017).

Source:
http://www.floraofromania.transsilvanica.net

Picture 9.e *Iris Aphylla*

Is listed on many red data books and plant lists in Europe

Source: Wikipedia

The region is recognised for its rich biodiversity on the permanent natural meadows and pastures. The outstanding biodiversity is explained by the low – intensive traditional farming techniques applied from generation to generation. They presume the use of extensive labour force in all farming activities, with no chemical inputs as fertilisers and pesticides.

Several botanical studies showed the existence of **282 different vascular plants** that characterise the spontaneous flora of the permanent natural meadows and pastures (Management Plan, 2016). Some of them are listed among the **priority species** under the EU "Habitats" Directive (Council Directive 92/43/EEC/1992). More precisely, five plant species are listed in the annexes of the EU Habitat Directive being considered endangered species in Romania:

- *Serratula lycopifolia* (Picture 9.a) is located mainly in the South– Eastern part of the LA in the recognised natural reservation “La Copărșaie” (Map 9). It is a plant species that characterises the well preserved meadow-steppe grasslands. It is very sensitive to overgrazing (Badarau, 2017).
- *Crambe tataria* (Picture 9.b) is protected by law in Czech Republic, Slovakia, Hungary, Serbia and Romania. The leaves are eaten as a vegetable and the root has a taste similar to horseradish (Hoskovec, 2014).
- *Echium Russicum* (Picture 9.c) is presented on extended areas on the permanent meadows and pastures from the centre part of the study area. It is also an indicator for well-preserved natural meadows;
- *Pulsatilla patens* (Picture 9.d) is a rare plant species that manifests a special preference for the top area of the high hills.
- *Iris aphylla* (Picture 9.e) is listed on many red data books and plant lists in Europe

The High Nature Value of the area

Picture 10.a *Pseudophilotes bavius*

It occurs in small isolated populations on flower-rich, dry grassland, on dry, stony slopes and on open patches in shrub and in vineyards on calcareous soil.

Source: Wikipedia

Picture 10.b *Maculinea teleius*

The larva first feeds on *Sanguisorba officinalis* (great burnet), then moves onto ant nests and is a predator of the ant brood. Researches indicates that grazing is necessary for maintaining the present distribution and abundance of these butterflies

Source: Wikipedia

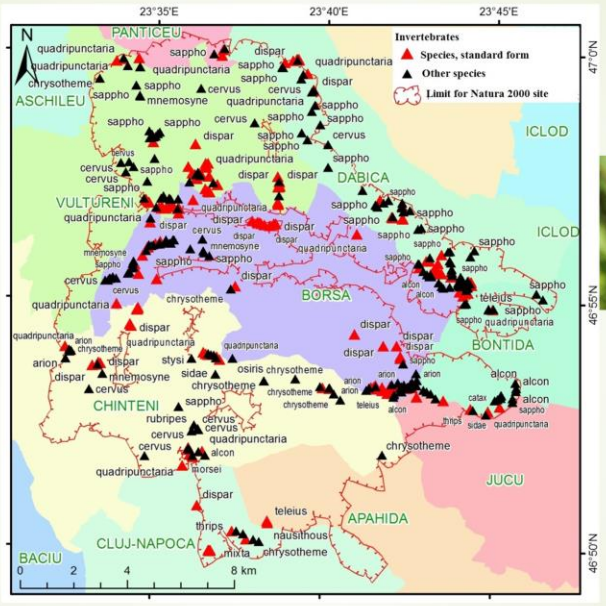
Picture 10.c *Maculinea alcon*

The larval (caterpillar) stage of P. alcon depends on support by certain ants;

Picture 10.d *Pyrocleptria cora*

It has a very scattered distribution in Europe.

Map 10. Distribution of the protected invertebrates identified in the LA



Source: Management Plan Natura 2000 site Dealurile Clujului Est

Picture 10.e *Maculinea arion*

The large blue is classified as "near threatened" on the IUCN Red List of Threatened Species.

Source: Wikipedia

Picture 10.f *Euplagia quadripunctaria*

It occurs in small isolated populations on flower-rich, dry grassland, on dry, stony slopes and on open patches in shrub and in vineyards on calcareous soil.

Source: Wikipedia

Picture 10.g *Lycaena dispar*

L. dispar is in severe decline in northwest Europe, but expanding in central and northern Europe.

Source: Wikipedia

Picture 10.h *Maculinea nausithous*

The life cycle of this species is strongly related to the herbaceous plant *Sanguisorba officinalis* (great burnet)

Source: Wikipedia

Systematic **lepidopterological research** has been carried out in the area since the early '60s. In 1997, a list of macrolepidopters identified in the Natural Reservation Fanatele Clujului area was compiled and published based on all available information (literature and researchers' collections). The list includes no less than 608 species (including nocturnal species), some of which are rare and/ or endemic (Rákosy and Lászlóffy, 1997). Ten of them are listed in the annexes of the EU Habitat Directive: *Lycaena dispar; Cucullia mixta; Callimorpha qadripunctaria* – priority species ; *Catopta thrips; Nymphalis vaualbum* – priority species; *Pseudophilotes bavius; Leptidea morsei; Maculinea nausithous; Maculinea teleius. Coleopter: Pilemia tigrina*;

This **rich biodiversity** is primary due to the **floristic diversity** that characterises the permanent meadows and pastures. The floristic diversity was reached by generations and generations of farmers that applied low intensive farming techniques (no chemical inputs and extensive labour force). So there was a fine equilibrium between the farming techniques and environment preservation.

The High Nature Value of the area

Picture 11.a. *Emys orbicularis*

Emys orbicularis turtles prefer to live in wetlands surrounded by a large proportion of natural, wooded, landscape.

Picture 11.b. Vipera ursinii

It is considered to be a Vulnerable species on the IUCN Red List of Threatened Species, due to habitat destruction caused by changes in agricultural practices and climate change and to collection for the pet trade

Source: http://herpetolife.ro

Picture 11.c. Triturus vulgaris

All species of newts are protected in Europe. Laws prohibit the killing, destruction, and the selling of newts.

Source: Wikipedia

Map 11. Distribution of the protected amphibians and reptiles identified in the LA

Source: Management Plan Natura 2000 site Dealurile Clujului Est

Picture 11.d. Sicista subtilis

The Hungarian subspecies (S. subtilis trizona) is critically endangered and strictly protected. The first living specimen was captured after a 70-year-long hiatus in 2006.

Source: Wikipedia

Picture 11.e Rhinolophus ferrumequinum

It is the largest of the European horseshoe bats and is thus easily distinguished from other species.

Source: Wikipedia

Picture 11.f. Bombina variegata

In its replacement habitats in human civilization, it is still dependent on temporary small bodies of water on loamy ground, such as tractor trails, puddles, and small ditches.

Source: Wikipedia

Two mammals (*Sicista subtilis*; *Rhinolophus ferrumequinum)* and **6 amphibians and reptiles** (*Vipera ursinii rakosiensis* - priority species; *Bombina variegata*; *Triturus vulgaris ampelensis*; *Triturus cristatus*; *Bombina bombina*; *Emys orbicularis*) are also among the protected species listed in the Habitat Directive.

The High Nature Value of the area

6430 Hydrophilous tall herb fringe communities of plains and of the montane to alpine levels

In the site area these habitats have been identified together with habitat 6510 along water courses with excess humidity, but also on the slopes of the valleys, especially those with north or north-east exhibition: Borşa, Dăbâca, Vultureni.

6410 Molinia meadows on calcareous, peaty or clayey-silt-laden soils (Molinion caeruleae)

Local distribution Dăbâca, Borşa, Vultureni

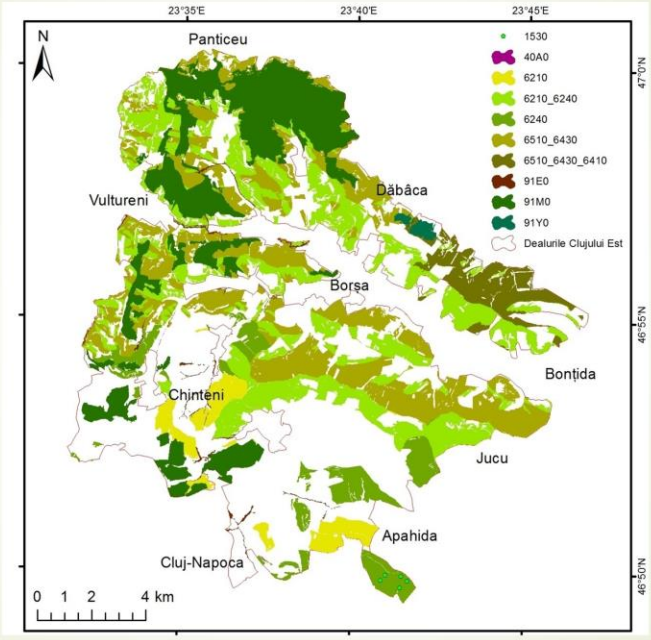
91E0 Alluvial forests with Alnus glutinosa and Fraxinus excelsior (Alno-Padion, Alnion incanae, Salicion albae)

Approximatively 96ha
Their surface is quite small in the site. The habitat is dominated by *Salix species*. The most significant areas are found in the catchment area of the Ciepega and Borşa valleys: Borşa, Vultureni, Dabâca, Chinteni

91M0 Pannonian-Balkanic turkey oak – sessile oak forests

Approximatively 2778 ha
All forests in the western third site. Over 95% of the area occupied by forest ecosystems in the site, belong to this habitat type in Chinteni, Borşa, Vultureni, Dăbâca, Panticău

Map 12. Distribution of the HNV habitats identified in the LA



Source: Management Plan Natura 2000 site Dealurile Clujului Est

1530. Pannonic salt steppes and salt marshes

No typical habitat identified. Only some small islands with a series of specific elements.

40A0 Subcontinental peri-Pannonic scrub

About 0.7 ha in the site.
Site distribution: small islands, especially in Cluj-Napoca area.

6210 Semi-natural dry grasslands (Festuco-Brometalia)

About 972 ha in the site.
Can be seen as small islands on most sunny slopes: Apahida, Chinteni, Cluj-Napoca.

6240 Sub-Pannonic steppic grasslands

About 4000 ha in the site.
Sunny slopes: from Apahida, Chinteni, Cluj-Napoca.

6510 Lowland hay meadows (Alopecurus pratensis, Sanguisorba officinalis)

About 3955ha in the site.
Borşa, Vultureni, Dabâca, Panticeu, Bonţida.

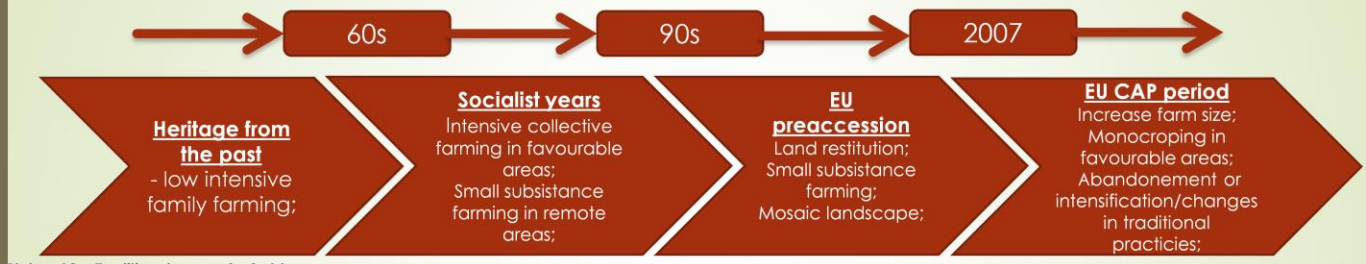
91Y0 Dacian oak & hornbeam forests

About 68,5ha in the site.
Only Dabaca commune.

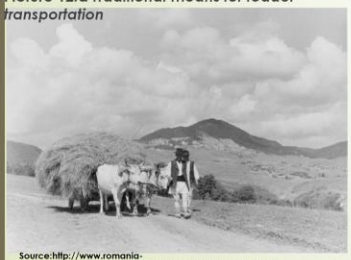
The time line

Explaining the present with the past

An overview of the time line



Picture 12.a *Traditional means for fodder transportation*



Source:http://www.romania-actualitati.ro/taranul_roman_in_perioada_interbelica-81578

Picture 12.b *Land exploitation within state farms*

Source:http://www.tvr.ro/viata-la-tara-in-comunism-un-nou-documentar-marca-adevaruri-despre-trecut_12606.html#view

Picture 12.c *Mosaic family farming in Dăbâca commune*

Source:https://upload.wikimedia.org/wikipedia/commons/d/d0/RO_CJ_Dabaca_(9).JPG

Picture 12.d *Intensification/changes in traditional farming practicies*

Source: @ Mihai Valentin Deușu Village, Chinteni Commune (Autumn 2016)

Source: @ Mlugurel Jitea Sucoasta Vilage, Apahida Commune (Spring 2017)

The human life in the learning area has been confirmed since the Neolithic period. In the 20thcentury, three main political changes shaped the socio-economic realities:

- the **Austro-Hungarian period** at the beginning of the 20th century (from the beginning of the century and until the Union with Romania on December 1st, 1918). The communes belonged to the Gheorghe Bánffy noble family, the former Transylvania's governor (Pintilie and Pintilie, 2001);
- the **interwar period** (1918 to the end of 1960's) when the nobleman land was given to farmers;
- the **socialist years** (end of 60's to 1989) when the most important parts of the land were expropriated by the state in order to create big state owned agricultural holdings;

To them, in the current century, other two politico-economic periods shaped the current status of the region. They are:

- the EU pre accession time (1989 to 2007) when Romania introduced several reforms based on integrum land restitution such as to adopt all the regulations needed for the EU accession;
- the EU Common Agriculture Policy (CAP) period (2007 – to present) when Romania applies all the CAP regulations.

Heritage from the past

The pre-modern legacy

The rural society : Villages, road, economy

Picture 13. Traditional household in Borsa Commune (1920)

Source: http://romaniainterbelica.memoria.ro/judete/cluj/

The family represented the basic social unit. The peasant family included, as a rule, the father, mother, children, grandparents and collaterals. All of them were preoccupied to produce food and clothing.

Map. 13. Road infrastructure in Cluj County in between two wars periods

Sourcehttps://ro.wikipedia.org/wiki/

Rural infrastructure: only basic roads along valleys; NO other types of infrastructure (electricity, water etc)
Relatively close to two national roads Cluj – Dej – Şomcuta, Cluj-Zalau and the railway Turda – Cluj – Huedin.

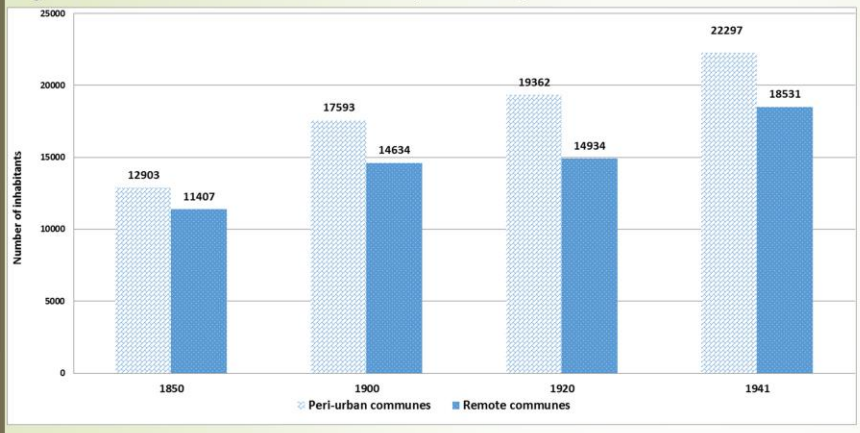
Economy: agriculture the main income source in the region;
Animal breeding the most important agricultural activity (cows; sheep and goat).

The region has a long history that can be traced from the Neolithic period (Pintilie, 2001 p 25). During the Roman Empire several Romanic settlements existed in the region (Loşonţi et al. 2014 p. 78). Between the XIIth and the XIXth centuries the region was part of the Hungarian and then of the Austro-Hungarian Empire. In the 1st December 1918 Transylvania was united with Romania. In 1921 it was implemented a land reform that presumed: land nationalization from big nobility farms; family farms ownership with small land plots (max 4 ha per household). Thus, prior to 1945 the region became dominated by small scale farms that used extensive labour force (90% of the farms smaller than 3 ha; they used around 53% of UAA in Transylvania).

Village life gravitated around family farms subsistence agriculture, that was the main income source. Each household had some arable plots located immediately near the household. The family, usually composed of three generations (children, parents and grandparents), worked the land using extensive labour force to produce what was needed for the family subsistence. Out of the village there were some private plots (arable land, orchards, pastures, forests etc.) that were managed under individual or collective use.

Farming: men and women, farms, products and markets

Fig. 14. Evolution of the number of inhabitants (1850 – 1941)



Source: Romanian Institute of Statistics, 2017.

Tab. 2. Number of households in the region

Commune	1785	1850	1895	1930
Apahida	na	730	896	969
Bonțida	458	511	692	1123
Borșa	na	na	na	na
Chinteni	na	895	1146	1308
Dăbâca	186	358	442	na
Jucu	224	466	596	na
Panticeu	na	766	1051	1076
Vultureni	na	na	na	na

Subsistence farming; Average farm size below 3 Ha;
Traditional products sell on the local market in Cluj city;
Population and household numbers increase.

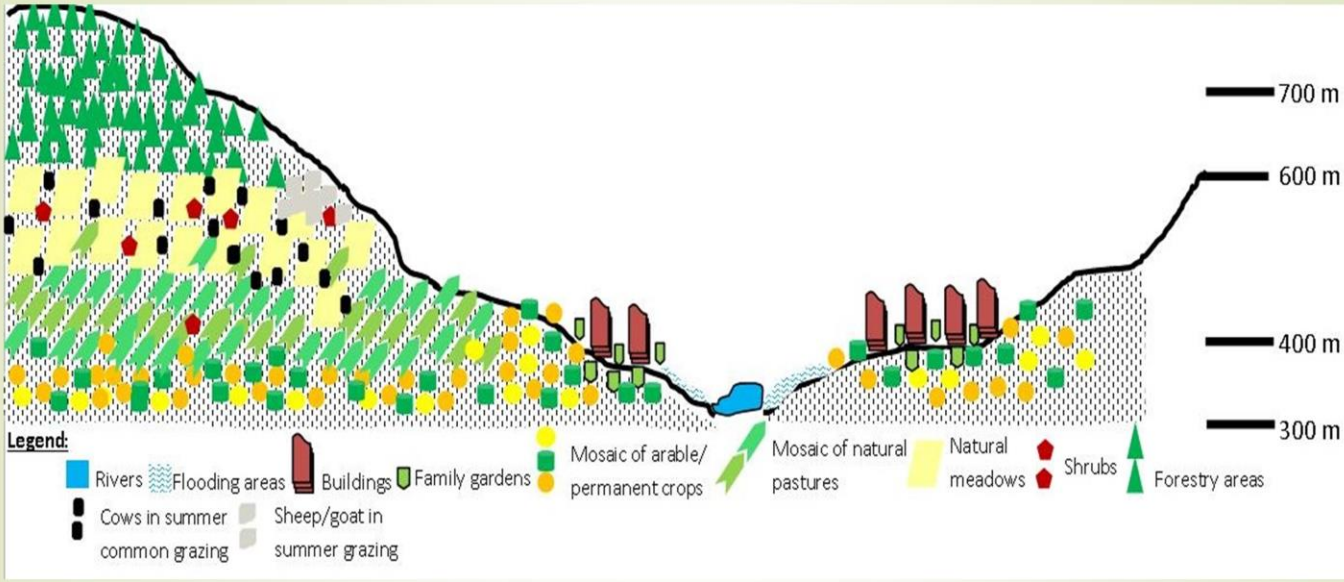
Generally, the household was created around two main areas: **the yard** (dwelling house, stables and other buildings); and the **garden** (field for cultivation of vegetables, bushes, orchards, vineyards etc). **The family** represented the basic social unit. The peasant family included, as a rule, the father, mother and children, and the grandparents together with collaterals. Roles were well delimited. The male was the physical, rational, supportive, and dynamic force of the family. The woman was linked to the function of mother, responsible for keeping the traditions and the natural flow of life in the family. The children constantly update their family responsibilities. They inherited along generations the traditions related to the organization of the house, courtyard and farming techniques (Loșonți et al., 2014).

Between 1850 and 1941, the number of population living in the area has constantly increased reaching in 1941 the level of 40,828 persons. It was a mixed ethnic group formed by Romanians (the vast majority), Hungarians and Rromas with different traditions, culture and religion.

They **applied subsistence family farming** (average farm below 3 ha) using low intensive techniques. The main share of the **crop products** was used for their **own consumption** (wheat, corn, potatoes etc). Some of the animal breeding products (fresh milk, meat, cheeses etc) and horticultural products (vegetables, tree growing etc) were **directly sold** on the Cluj-Napoca city markets. The urban area located near these villages helped them have an income source. The **agriculture was the main income source** but some inhabitants worked **in construction** to build local national infrastructure (roads; railways etc) or in industrial facilities located nearby (Cluj-Napoca and Gherla cities).

Landscapes and environmental value

Fig. 15. Landscape transect prior to 1945 in Dealurile Clujului Est



In the middle of the XIXth century, the low land areas were constantly flooded by the rivers that had had high groundwater levels. In some areas there were some marshes areas formed on the clay bases soil. At the beginning of the XXth century the groundwater started to decrease and the land became the most fertile one used mainly for crop production. The farming techniques were specific for different altitude layers (Figure 15):

- **low level altitude** (between 290 and 400 m altitude) it was a mosaic of traditional small-scale arable farming developed on the land arable resources. **Small – scale farming** used **low-intensive traditional techniques** that yield mainly for subsistence purposes. Near the household each family usually had a family garden where it yielded all vegetables needed for family consumption;
- **medium level altitude** (400 to 600 m) was **mosaic of farming types**. The **arable land** from the lower parts (400 – 500 m) usually was used for crop production. Some of **natural pastures** areas were used for hay **fodder production** applying manual mowing. In the upper parts, there were usually situated the permanent natural meadows used for **summer grazing**. It was a form of common land exploitation. Animals collected from the village were grazed together on this land. Cows usually dominated over the number of sheep.
- around 1918 on the **high level altitude** (upper than 600 m) there was a mixture between permanent natural meadows and forestry areas. Prior to that, at the end of the XIXth century, that part was dominated by forest areas that were cut to build the Cluj-Napoca – Dej railway.

In conclusion, the region was characterised by a rich biodiversity explained by the small scale-agricultural production and low intensive techniques. Moreover, the hay-pastures were manually mowed in different annual time periods. Sometimes, the mowing period was established at the end of the year (mid-August and September) as a way to increase the average hay production. These techniques created special habitats

for *Maculinea Sp.* butterflies and the vascular plants listed now in the Habitat Directive annexe.

Period 1. The socialists years

60's to 1989.

The socialists years (1947-1989) correspond to the historic Romanian Communist Period when the country was known under the official names of the People's Republic of Romania, and the Socialist Republic of Romania (after 1980's) (Georgescu, 1992).

In agriculture, the Romanian Communist Party carried out during the 1949-1962 period the process of **land collectivization**, which consisted in confiscating almost all private agricultural properties and their management into state-run agricultural farms. The collectivization process was similar to that carried out in the USSR by including the agricultural land that could be gathered in a collective farm. This process ended in 1962. Many peasants were opposed to this action. They became witnesses of violent repressions, murders, deportations, imprisonment and confiscation of all the entire wealth.

In mountain areas and in some remote agricultural areas such as our learning area (especially in the high altitude level layers) there were many non-cooperative remaining plots (Kligman and Verdery, 2012).

Agricultural development in the period

Tab. 3. Number of state farms, total households and land ownership (1989)

		Apahida	Bonțida	Borșa	Chinteni	Dăbâca	Jucu	Panticeu	Vultureni	Total
I.	Number of socialist farms total									48
1	State farms	1	1	0	0	0	0	0	0	2
2	Farms from state agricultural enterprises	8	8	0	0	0	0	0	0	16
3	Mechanization farms	1	1	0	0	0	0	0	1	3
4	Agricultural cooperative units (CAP)	3	3	2	6	4	2	3	2	25
5	Other type	0	1	0	0	0	1	0	0	2
II.	Total households	2588	1623	846	1409	795	1484	945	936	2588
	Individual households	1138	387	0	0	14	119	53	71	1782

Source: Romanian Institute of Statistics, 2017.

Fig. 15.a Arable land ownership in 1989

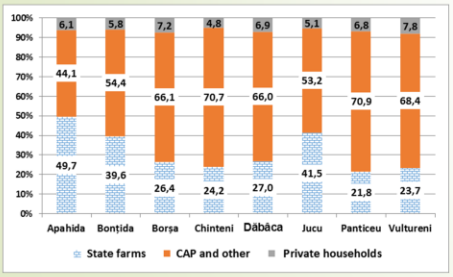


Fig. 15.b Meadows land ownership in 1989

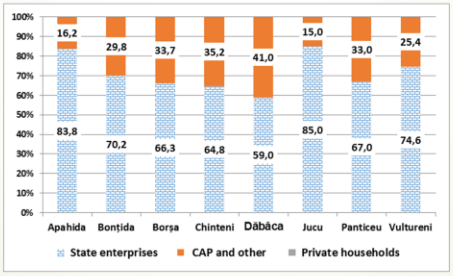
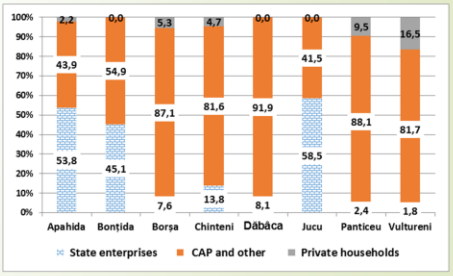


Fig. 15.c Pastures land ownership in 1989



Source: Romanian Institute of Statistics, 2017.

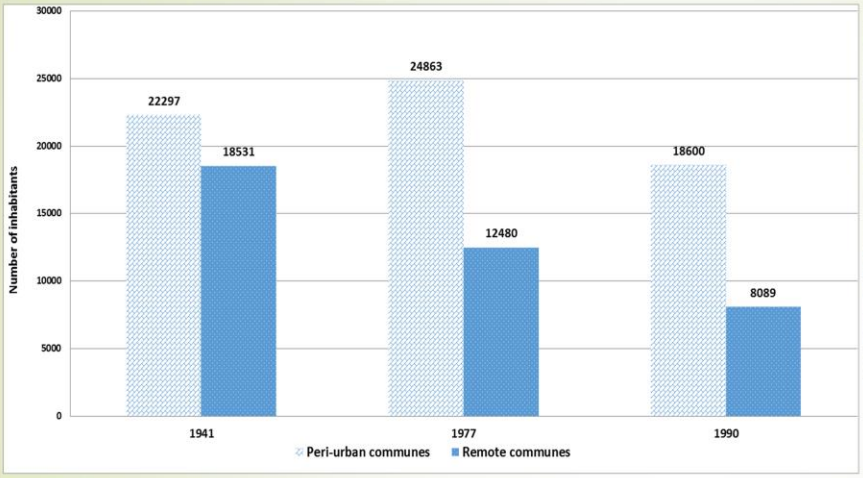
The area was affected by the **collectivization process**. In total there were 48 different socialist farms (Table 3). On one hand, the state farms developed for working the state owned land obtained after expropriation. On the other hand, the agricultural cooperative units worked the common property of all cooperative members. They represented the most important part of the former small size households that were forced to bring the land into such companies. Some of them could work their land individually, especially near households and in remote areas (arable and pastures) (Figure 15a, 15b, 15c).

The incentive for small subsistence agriculture was explained by **food storage** that existed in the cities areas. The most important food products (meat; milk etc) were missing as a consequence of the Government decision to pay the entire foreign debt using food exports (it worsened after the 70's). Because these households couldn't have had the political possibility to buy any kind of machineries, they still applied the traditional farming techniques (public property was not allowed).

In 1989 around 1700 individual households used approximatively 6% of arable resources. The shares of the private pastures from the total remain high in the remote communes and for high altitude layers. On that plots the individual farms used traditional farming techniques (manual mowing). That area is recognised today between **the most important HNV landscapes in the region**.

Changes in the rural and social context

Fig. 16. Evolution of the number of inhabitants (1941 – 1990)



Source: Romanian Institute of Statistics, 2017.

Picture 14. Image for state farms

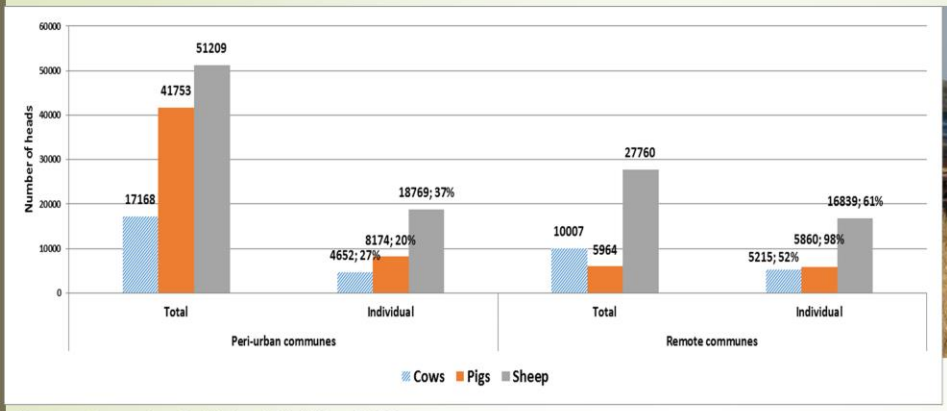
Source: http://www.gaben.ro/2010/10/14/cap-urile-democratiei//

- The village life was directly influenced by the political decisions: land collectivization; urbanization etc.
- The young generation moved into cities to work as employees in the state industrial companies;
- A dissolution of the traditional rural family;
- The number of inhabitants reduced especially in remote area communes (Borșa, Dăbâca, Panticeu and Vultureni);

In the socialist years the number of inhabitants decreased in all communes due to land collectivization and the policy of urbanization (Figure 16). The urbanization policy created a lot of industrial companies in the cities located in the proximity (Cluj-Napoca, Gherla and Dej). Especially the young generation moved there to work as employees. The traditional rural family was destroyed by these policies. The aged population and those that did not have the skills required in the urban area remained to work the land of the state farms (Picture 14).

Agricultural development in the period

Fig. 17 Animal breeding acording to ownership structure (in 1989) (for Bonțida x10 heads for pigs)



Source: Romanian Institute of Statistics, 2017.

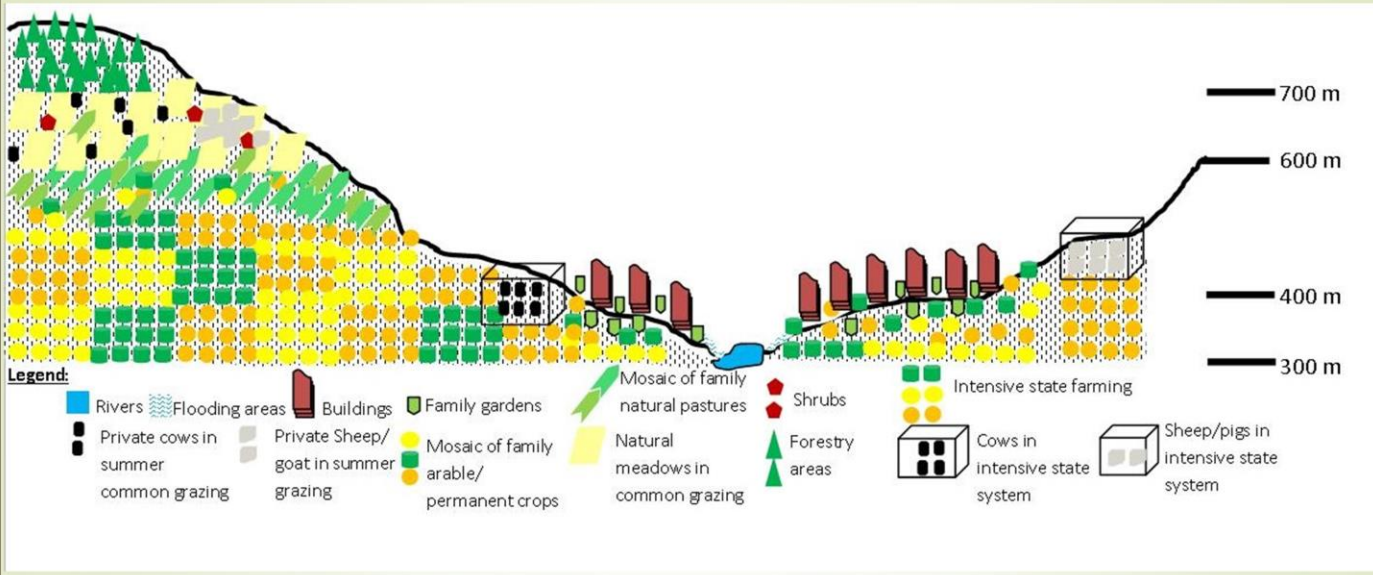
Picture 15. Images from state farms

http://agroromania.manager.ro/tags/cooperativa%20agricola%20de%20productie/

The number of livestock increased a lot during the socialist years. In Bonțida and Jucu there were two state farms specialized in pig breeding with around 180,000 heads in 1989 (Figure 17). There was a relatively balanced situation between the number of the sheep and cows in the region. The individual holders kept important number of animals in private property. The summer grazing was still accepted in several commune grazing meadow areas. The winter forages for the individual holders were produced mainly by manual mowing on the permanent pastures areas. The farming technologies from the state farms intensified based on the inputs produced on a large scale by the domestic market (Picture 15).

Consequences of land use and biodiversity

Fig. 18. Landscape transect in the socialist years (1960 – 1989)



The farming situation was different according to the land ownership and altitude layers:

- 300– 500 m: arable land mainly exploited in intensive state farms; several big state facilities (stabling houses; warehouses etc) were built in the area to keep an increasing livestock number; some small plots of arable land and family gardens still exploited using low intensive techniques near the households;
- 500– 700 m: forestry areas slowly started to increase in their size; permanent pastures still farmed by applying traditional techniques; permanent meadows sometimes overgrazed;

The **key HNV habitats** survived in remote agricultural areas (high altitude layers) and where low intensive farming techniques were applied, mainly by individual farmers (around 10% of the territory).

Period 2. The EU pre accession time

1989 to 2007

Changes in the rural and social context

Fig. 19.a Evolution of the number of inhabitants (1990 – 2007)

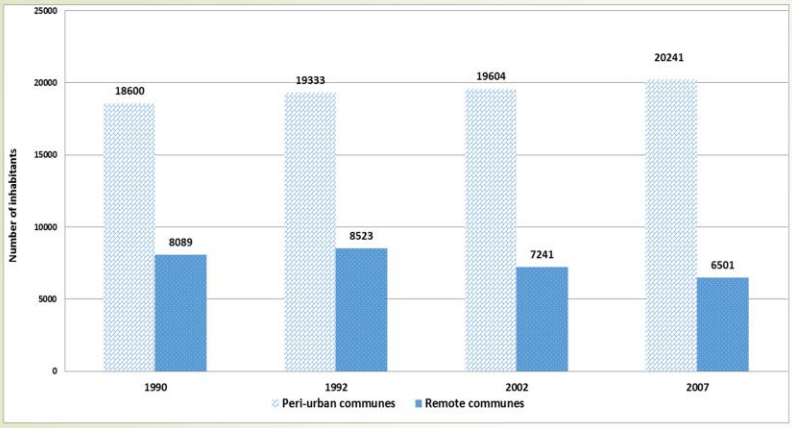


Fig. 19.b .Population structure by age groups in 1992

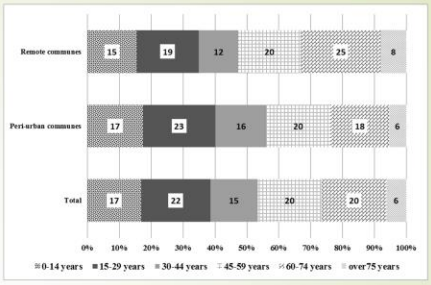


Fig. 19.c Population structure by age groups in 2007

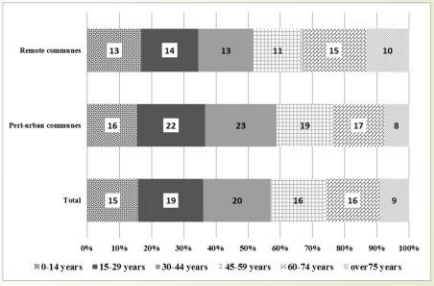
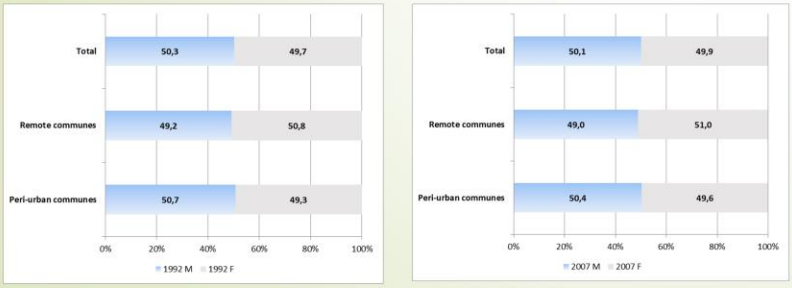
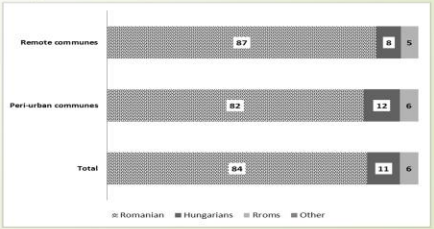


Fig. 19.d. Population structure by gender (1992 versus 2007)



Source: Romanian Institute for Statistics, 2017.

Fig. 19.e. Ethnic structure in 1992



After 1989, Romania has encountered an important political shift from a centralized state economy to one dominated by the market forces. This process allowed starting the negotiations process with the EU for the Romanian accession. The formal EU accession was achieved at the beginning of 2007. It was a challenging period in which almost all state companies activating in the industry collapsed and finally got bankrupted. That explains the increasing number for the population living in the study area from 1990 to 1992. Between 1992 and 2007 the number of inhabitants increased in the peri-urban communes that started to have a residential function for the persons working in Cluj-Napoca. The number of inhabitants strongly decreased in the remote area communes (Figure 19.a).

The population remained relatively balanced in terms of gender structure, **although the female population share started to increase** (Figure 19.d) due to higher gender expectation life. The population became more aged during the same period due to low birth rate (Figure 19b and c). The shares of the population with an age more than 75 years reached 15% or 14% in Dabaca and Vultureni. There are the communes that have the most important HNV areas.

Agricultural development in the period

Fig. 20.a Animal breeding acording to ownership structure (in 1990) (for Bonțida x10 heads for pigs)

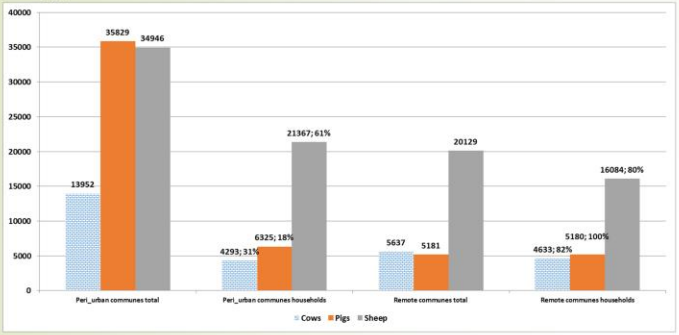
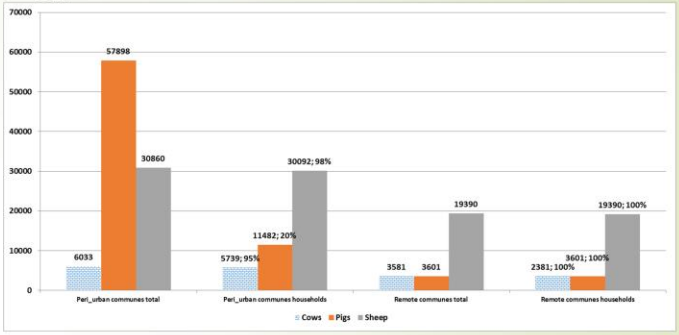


Fig. 20.b Animal breeding acording to ownership structure (in 2003) (for Bonțida x10 heads for pigs)



Source: Romanian Institute for Statistics, 2017.

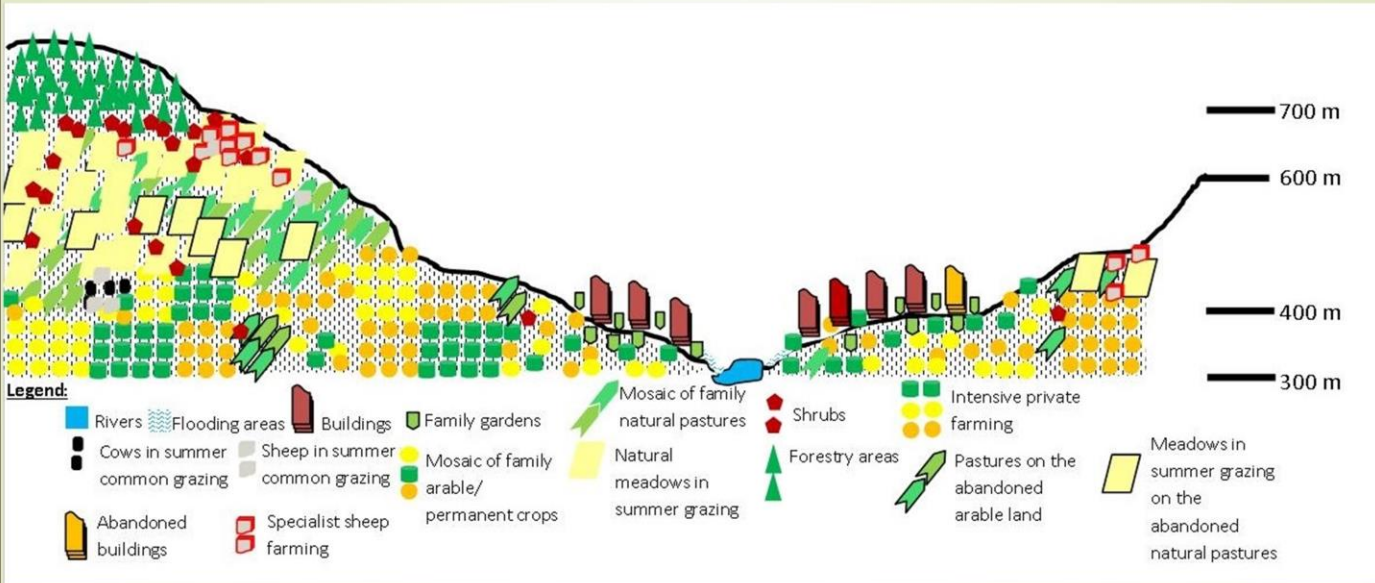
Picture 16. Collapsed state farms

http://http://www.cvlpress.ro

The **livestock structure changed** between 1990 and 2003. The **private households sector started to dominate the number of livestock** (Figure 20 a and b). Also, it can be noticed that **the absolute number of all types of livestock sharply decreased** in comparison with the 1990's data. This phenomenon was extremely intense for cows and pigs breeding (because they required forages that could not be provide after land restitution by the state farms) and less important for sheep sector that started to dominate the area. The state farms collapsed because there were several land reforming measures that presumed to give back the land to the former owners (Picture 16). After that process, there were created around 4.2 million individual farms with an average of 2.8 Ha in Romania (mostly subsistence and semi –subsistence ones).

Consequences on land use and biodiversity

Fig. 21. Landscape transect in the EU preaccesion period (1989 – 2007)



In the 1989 - 2007 period :

- 300– 500 m: arable land mainly exploited in subsistence and semi-subsistence family households recovering their land; on the most fertile areas emerged the first private farms organized as enterprises and not based on family labour; some arable land areas were not farmed anymore and became pastures;
- 500– 700 m : forestry areas slowly started to increase in their size; permanent pastures were farmed by applying traditional techniques; permanent meadows remained under grazed at the beginning of the period; Shrubs number increased on the permanent meadows and pastures;

The key HNV habitats increased a lot in the early years (1989 -2000) due to low intensive techniques.

Period 3. The EU Common Agriculture Policy (CAP) period

2007 to present

The Common Agriculture Policy and the agri-environment payments

Tab. 4. Financial support received in the first CAP pillar (2007 – 2014)

Description of payment	U.M.	2007	2008	2009	2010	2011	2012	2013
SAPS	Eur/ha	50.55	60.75	71.12	80.36	101.88	122.26	142.64
National complementary payments (decoupled crop)	Eur/ha	47.00	46.71	44.64	50.64	50.64	50.64	50.64
Payments for energy crops	Eur/ha	45.00	45.00	45.00	45.00	45.00	45.00	45.00
Separate sugar payment scheme	Eur/ha	77.20	111.24	165.89	189.62	189.62	189.62	189.62
Complementary National Payments Cattle	lei/head	490	495	571	410	410	410	410
Complementary National Payments sheep and goats	lei/head	35	43.9	44	40	40	40	40

Source: selective Romanian legislative framework;

Tab. 5. Financial support received in the agri-environment measures (2007 – 2014)

Description of payment	U.M.	5 year period
HNV meadows	Eur/ha	124
Traditional practicies	Eur/ha	58
HNV important for birds conservation	Eur/ha	209
Green productions	Eur/ha	130

Source: selective Romanian legislative framework;

According to the legislative framework, Romania adopted in the first three years after accession a **simplified direct payment system** – SAPS, that was extended until the end of 2014. In **the crop sector**, the amount of financial support was established per eligible hectare and it was a flat payment calculated annually by dividing the national financial envelope to the eligible area in use. To be entitled to SAPS, a farm had to meet several eligible criteria (Governmental Ordinance 125 /2006): apply specific crop (arable land, permanent grassland, permanent crops and households gardens; the minimum size of the farm was set to at least one hectare and the minimum plot size had to be at least 0.3 hectares). To the SAPS payment a farmers could also add national complementary payments conditioned by the crop type (Agricultural Ministry Decision 704/2007): **complementary national direct payments** calculated as a fixed amount per hectare for cereals, protein crops, industrial crops, root crops, potatoes, vegetables etc; **complementary national direct payments** for crop, hemp, tobacco and hops sector; **complementary national payments** for sugar beet and a separate payment for sugar. **The complementary direct** payments in the livestock sector were calculated annually per livestock head according to several eligible criteria (minimum animal numbers e.g. at least 3 mother cows and 25 sheep).

Also there were implemented four agri-environment measures for specific designed eligible areas (Table 5).

The minimum eligible size criteria penalised from the start the small households (smaller than 1 ha) that started to disappear. In the same time, high areas of arable land but also common pastures were used by the newcomers that applied new farming techniques.

Changes in the rural and social context

Fig. 21.a Evolution of the number of inhabitants (2002 – 2016)

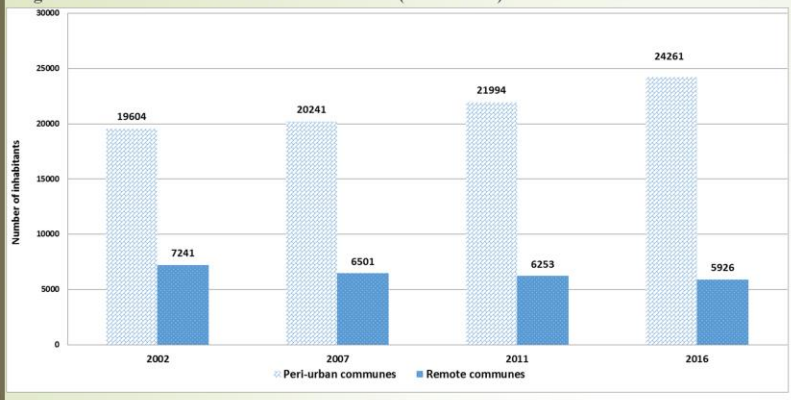


Fig. 21.b Population structure by age groups in 2007

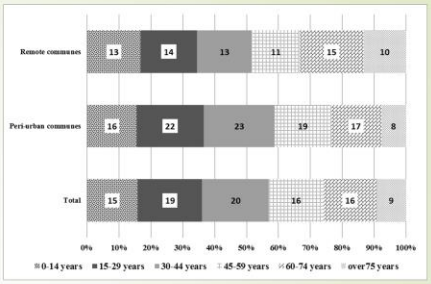


Fig. 21.c Population structure by age groups in 2016

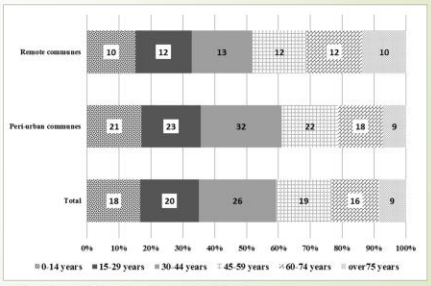


Fig. 21.d Population structure by gender (2011 versus 2016)

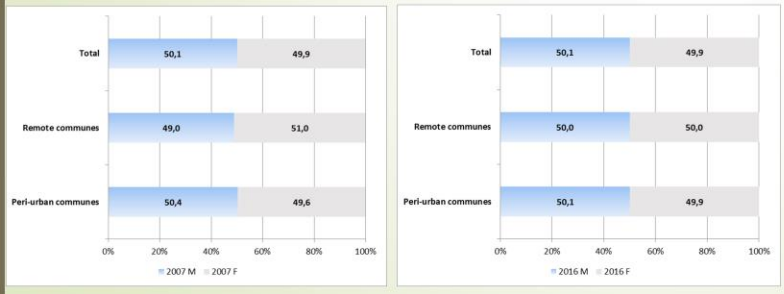
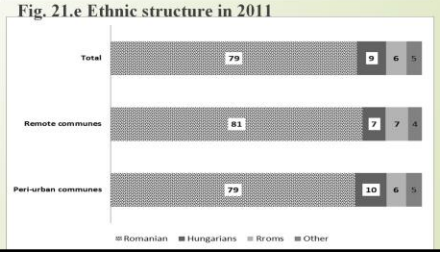


Fig. 21.e Ethnic structure in 2011



Source: Romanian Institute for Statistics, 2017.

In four communes out of eight (Borşa -34 km, Dăbâca-39 km, Vultureni- 31 km, Panticeu- 53 km) located relatively far from Cluj-Napoca city there was an important **decreasing trend for the number of total inhabitants**. In the other four communes the inhabitants number increase is explained by **the dormitory function** of the communes for the active population that works in Cluj-Napoca (Apahida – 10 km, Chinteni – 10 km), as well as their **positioning near the industrial parks** and the National Road DN1 (Jucu – 20 km, Bonţida – 30km) (Figure 21.a).

The population remained relatively balanced in terms of gender structure, **although the female population share became the most important one** (Figure 21d). The population became more aged during the same period especially for the remote HNV areas (Figure 21.b and c) and the number of Hungarian speaking population decreased together with the increase of the Rroma population share (Figure 21.e).

Agricultural development in the period

Fig. 22.a. Animal breeding in 2010

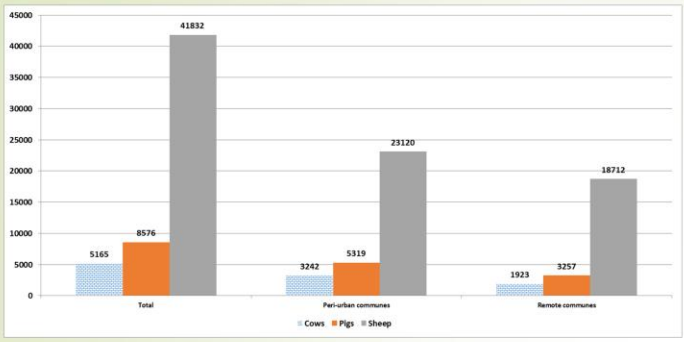
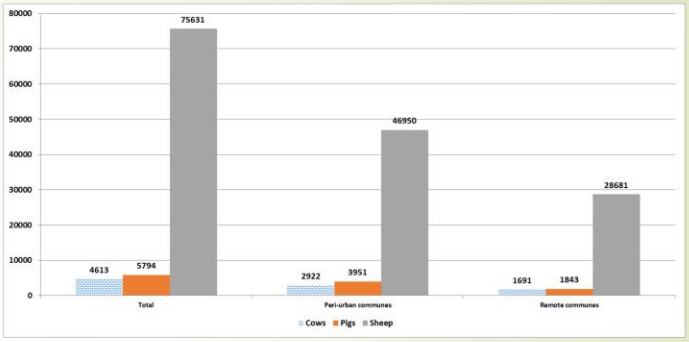


Fig. 22.b Animal breeding in 2015



Source: Romanian Institute for Statistics, 2017.

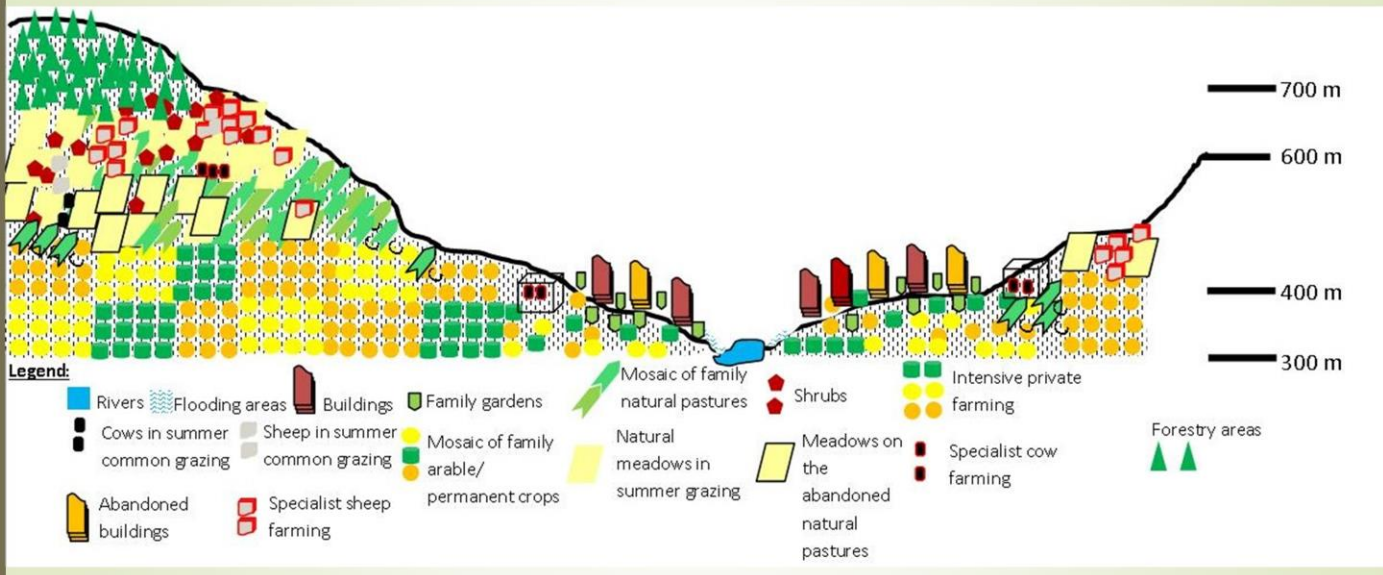
Picture 17. Household livestock grazing the common land

Commong grazing in Dăcâca commune @ May 2017.

The number of sheep almost **doubled** in some communes between 2010 and 2015 (Figure 22.a and b). They reached levels compared with the 1989 data. In the same period, the farmers changed the breeding techniques: the local mixed breeds were crossed with imported meat breeds; the main products changed from milk/cheese into lamb meat exported to the Middle East countries; the flock was kept in free stabling all year long. All these farming changes started to alter the natural value of several permanent meadows. Also, some natural pastures were abandoned due to the high labour demands. A lot of young people emigrated to EU countries to search better income sources. In several areas, the land was grabbed by persons coming from outside the commune and the **common grazing became an exception** (e.g. in Pâglișa village the flock number from the households severely decreased to only 15 cows in 2017 comparing to 50 heads in 2010) (Picture 17).

Consequences on land use and biodiversity

Fig. 23. Landscape transect in the EU CAP period (2007 – to present)



In the period 2007 - present:

- 300– 500 m: arable land mainly exploited in private farms organized as enterprises and not based on family labour; some arable lands still farmed in small family plots near the villages;
- 500– 700 m : forestry areas increased in terms of size; the area corresponding to the **permanent pastures manually mowed sharply decreased**; permanent meadows and some parts of the pasture areas started to be used by specialized sheep farms;

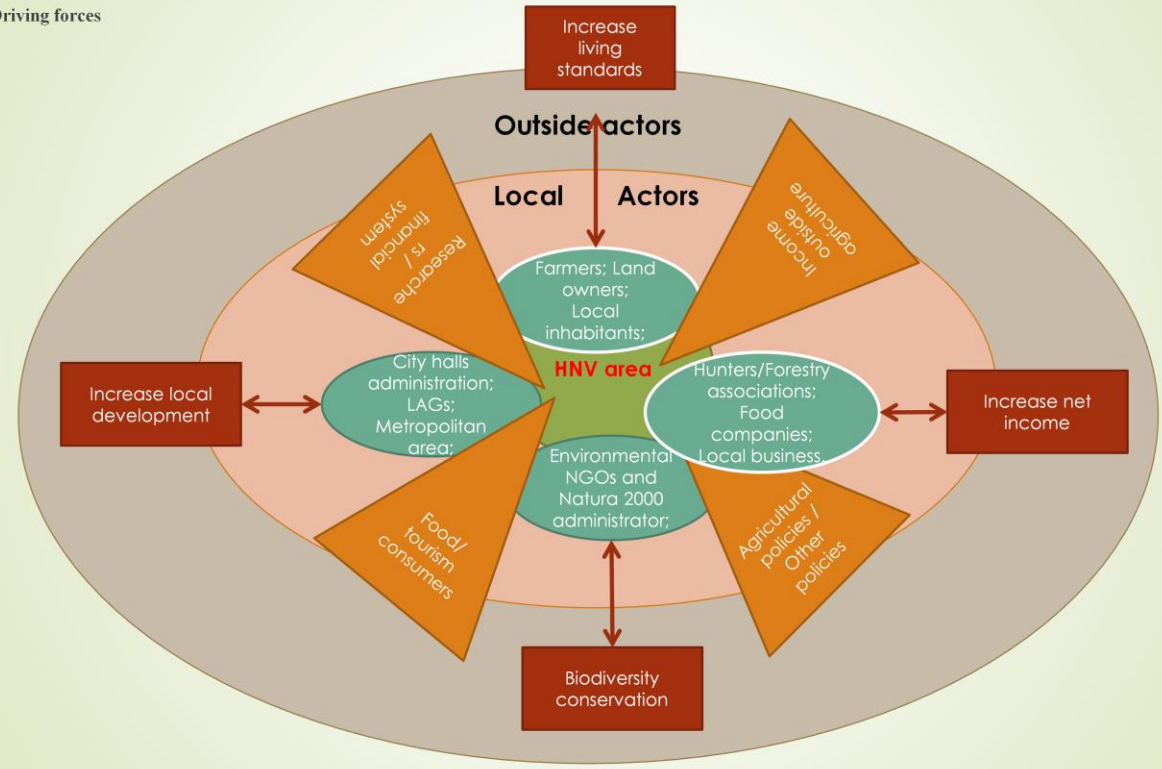
The key **HNV habitats areas decreased**. The acreage is still higher than 1989 data. The common EU market and common labour force **almost destroyed the household traditional farming practices**.

The business as usual scenario

Where do we go in 2030 in the current situation?

The rural development and social driving forces

Fig. 24. Driving forces



The management of the HNV area is influenced by different actors (Figure 24). The local actors have different interests and expectations from the HNV area.

The farmers that used the land, but also the **local inhabitants** and land owners want to obtain higher incomes. In an open European market, it is hard for the young generation to wait for an economical development in the areas until they will obtain comparable revenues to those from the other EU member states. This is the reason why, in the last years, they emigrated in large numbers to urban areas or other EU countries.

Environmental NGOs and the Natura 2000 site administrator (Lepidopera Association) mainly want to protect the vulnerable habitats. They created a management plan for the Natura 2000 site that has to be followed up by the local inhabitants. The outcomes are conditioned by the acceptance and understanding degree obtained in different population and farmer types.

The local administrative units (city halls; city's councils; county's councils) created different development strategies. Some of them recognized the HNV area as an asset that deserves to be better valorised. There are opposite views across these actors about how to use the HNV resources – promoting only tourism or a mix between the development of local products and agri-tourism.

The outside actors that influence the HNV areas are:

- Food/ tourism consumers. In the last years, the share of domestic consumers of high qualitative local food increased. Also more and more Romanians are visiting the agro-touristic facilities. The trend is an opportunity that can be valorised by the small households that still apply traditional techniques;
- Agricultural policies/ other policies. Romania applies the Common Agriculture Policy measures. In the second pillar there are different measures that can help to invest in rural areas. The HNV farming has different agri-environment packages. The farmers lack real information about these measures and the administrative burden is considered to be too big for them;
- Researchers could bring ideas about how to valorise the HNV characteristics in a sustainable way;

The economic driving forces: market food chain

Fig. 25.a. Ways of selling the agricultural production/products (field study results)

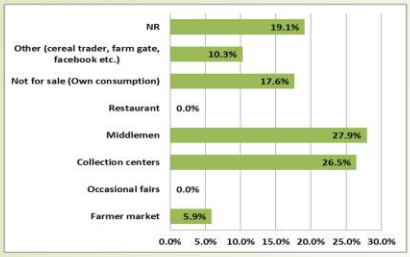


Figure 25.b. Market food chain

HNV area products

Supermarkets

Food processors

Farmer associations/ cooperatives

Export of living animals

Direct sales on local markets/ fairs

No product differentiation; Low prices; Bad business conditions;

No cow/sheep breed local associations; One cooperative and an agro cluster but low access for small size farms;

No product differentiation; Low prices; Bad business conditions;

No product differentiation; NO sanitary veterinary authorization

The marketing chain is different accordingly to the farm type. **The local households** use mainly their own inputs (seeds; manure; forages etc) and sell only low output quantities. The main products sold on the market are those obtained from small scale animal breeding (milk; cheese; and living animals). They mostly use the direct-selling channels (in our-door farmer markets) and milk collection centers. The latter refer to cooler cars own by local milk processors that periodically (once or twice a week) collect the milk from the entire commune. Only a small part of the households have refrigerator facilities to store the milk between the collecting days.

The commercial farms (predominant for the crop sector; specialized animal breeding farms – 60 to 80% from the land) buy inputs (seeds, fertilizer etc) from suppliers within the county or other regions or use their own inputs (e.g. seeds; forages). Depending on the scale of production, the farmer decides how to capitalize the production. Besides the own consumption (field study: 17.6%), four more paths were identified (Figure 25.a): (1) direct sales on local markets/fairs (field study: 5.9%, in-door farmer markets every day in big cities, out-door farmer markets from May to October in Cluj-Napoca only for small producers), (2) farmer association/cooperatives (field study:1.47%, e.g. Cooperative "Somes Aries"), (3) export of living animals, (4) food processors and supermarkets (field study: 27.9%).

There are a **small number of food processing companies** developed in the area due to lack

of capital and heavy administrative burden (sanitary-veterinary regulations). Also, there is **no authorized slaughterhouse** in the region. Farms mainly sell raw materials and no high value added products.

The policies and political driving forces

Map 14. Agri –environment packages in Romania and in LA (2014-2020).

Tab.6. Agri-environment measures in the second CAP pillar (2014 -2020)

Agri – environment package	Payment
M10 -P 1 – HNV meadows	93 €/ha/year
M10-P. 2 – Traditional farming (in combination with P.1)	-
M10-P. 2.1 – manual works	100 €/ha/year
M10-P. 2.2 – work with light machinery	21 €/ha/year
M10-P. 3 – meadows important for birds	-
M10-P. 3.1 – Crex crex	-
M10-P. 3.1.1 – manual works	261 €/ha/year
M10-P. 3.1.2 – work with light machinery	182 €/ha/year
M10-P. 3.2 – Lanius minor and falco vespertinus	-
M10-P. 3.2.1 – manual works	159 €/ha/year
M10-P. 3.2.2 – work with light machinery	80 €/ha/year
M10-P. 4 – green crops	128 €/ha/year
M10-P. 5 – adaptation to the effects of climate change	125 €/ha/year
M10-P. 6 – meadows important for butterflies(Maculinea sp.)	-
M10-P. 6.1 – manual works	361 €/ha/year
M10-P. 6.2 - work with light machinery	282 €/ha/year
M10-P. 7 – Branta ruficollis	250 €/ha/year
M10-P. 8– local breeds protection	-
Sheep	87 €/UVM/year
Goat	40 €/UVM/year
Bovines	200 €/UVM/year

Source: Romanian Rural Development Program 2014 2020.

Not the entire territory covered by the agri-environment packages
Borșa, Dăbâca, Bonțida, Panticeu: P6
Vultureni: P1+P2;
Chinteni, Apahida, Jucu No HNV package!!

Not clear information to farmers;
Refusal to apply for agri-environment measures due to control burden;
Land grabbing by specialized farms;

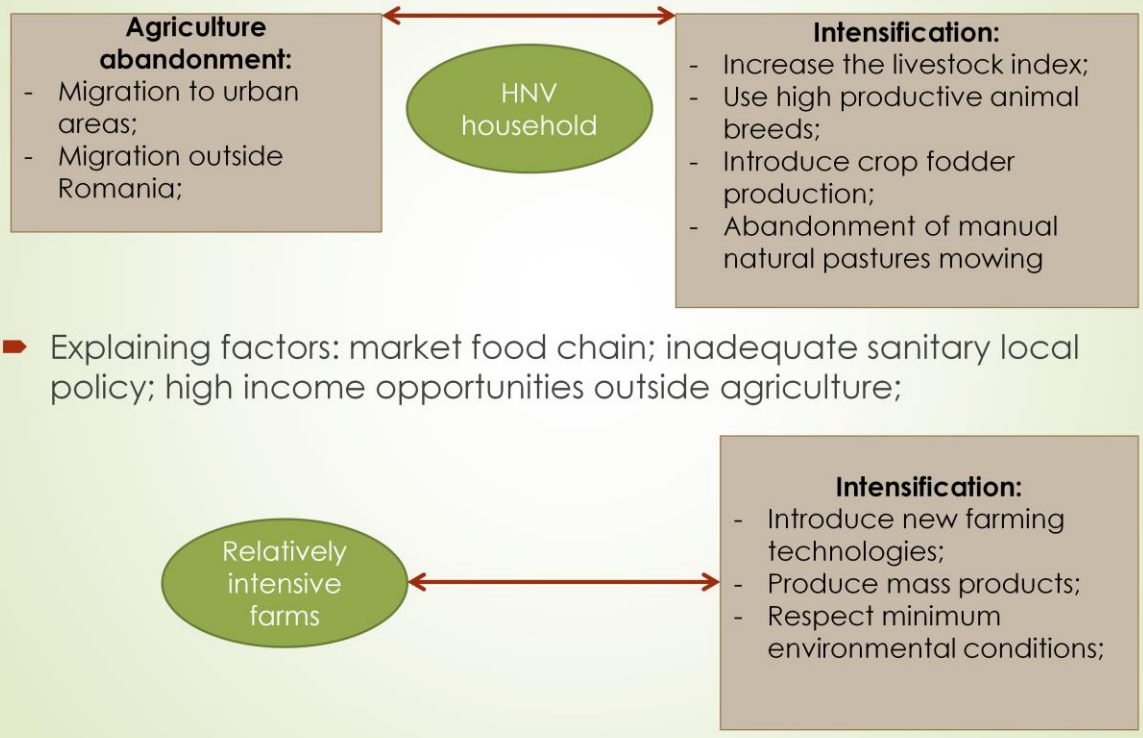
The agri-environment payments distribution shows **high inconsistences** between communes. Some of them are eligible for an **agri-environment package** designed to support the **conservation of *Maculinea* butterflies** (P6 in Borșa, Bonțida, Dăbâca and Panticeu). One commune is eligible only for HNV meadows packages (Vultureni) and the other only for green crops and ecological agriculture payments (Chinteni, Jucu, Apahida) (Map 14). The differences that exist in the agri-environment obligations (mowing allowed in package 6 only after mid-august; maximum breeding index per hectare) and the payment level can distort farming practices at the local level.

Due to existing inconsistency for the designation of the packages eligible area in comparison with the Natura 2000 site area and also due to the lack of information for farmers (proved in the field study) some of them became **reluctant to apply for such payments**. They are more attentive to the direct payments allocated per animal heads. The later type of payment (around 10 euro/ year/mother sheep) sustained the flock number increase that was observed in the last years for the commercial farms. For the **households**, the agri-environment packages, are **hard to be accessed** due to the existing **mandatory thresholds** (one hectare minimum farm size; 0.3 ha minimum plot size) and **bureaucratic burdens,** although such payments can substantially increase the annual net income. A Natura 2000 payment is not yet established for Romania though such subsidies can sustain the

application of the local management plans for such sites.

Resulting consequences on farm economy

Fig. 26. Consequences on farm economy

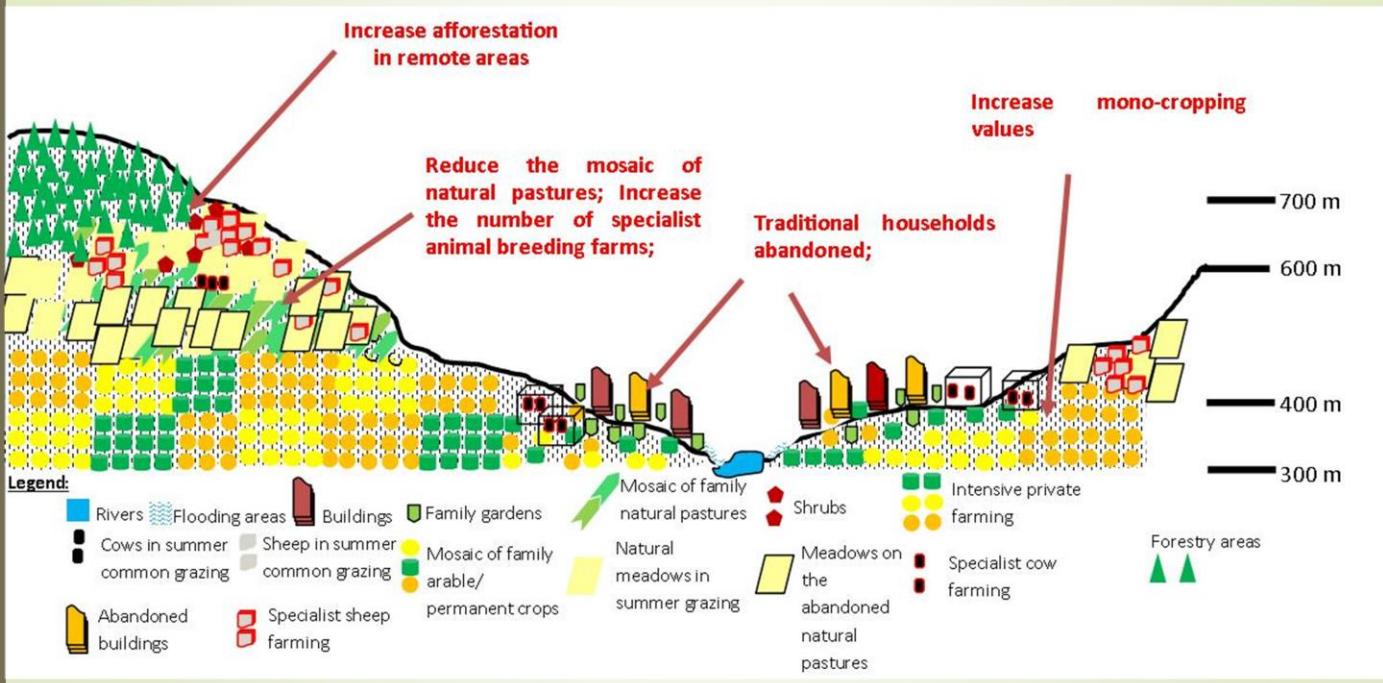


Based on the above mentioned driving forces, a **HNV household** is now in between two extreme decisions: one is to abandon land and to obtain incomes from other activities; or to intensify production such as to survive on the EU common market.

The **relatively highly intensive farms** (specialized in sheep and cow breeding and in crop production) are now undergoing an intensification process. Without offering alternative markets for high value added products the intensification process will intensify.

Resulting consequences on land-use and biodiversity

Fig. 27. Transect in the business as usual scenario (2030)



- 300– 500 m: consolidation of the intensification process; mono-cropping will dominate the landscape (wheat; rape seed; corn);
- 500– 700 m: increase of afforestation in the remote agricultural areas; Mosaic of natural pastures manually mowed only as exceptions in some protected areas. Meadows will increase in shares and they will be used especially for sheep summer grazing; the number of household flocks will decrease; increase the number of specialized animal breeding farms;

The **key HNV habitats will** survive only in some key protected areas.

The HNV vision

Managing biodiversity landscapes for a vivid society

Field study - questionnaire

Tab.7. Age of respondents

Age	No. resp	Mean	St.dev.	Min	Max
Peri-urban communes	32	41.74	11.95	24	62
Remote communes	84	43.08	15.32	18	78
Other	7	37.00	8.28	27	47
All communes	123	42.54	14.21	18	78

Overall:

- 75.8 % have knowledge about HNV farming concept;
- 68.2 % are aware of HNV farming in the communes;

In-person survey → 132 respondents (68 farmers + household members)

Fig. 28.a. Knowledge of HNV concept among respondents by communes

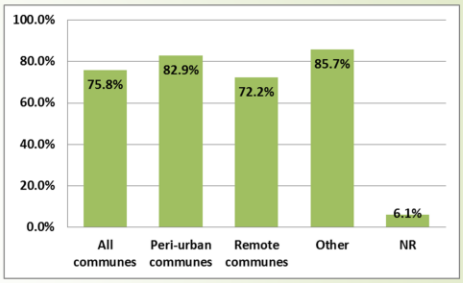
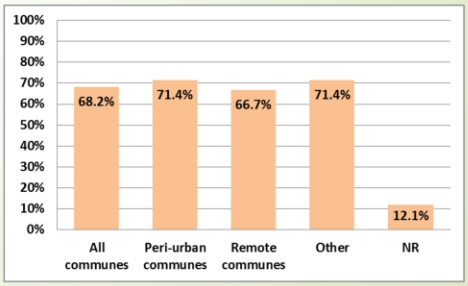


Fig. 28.b. Aware of HNV areas in communes among respondents by communes



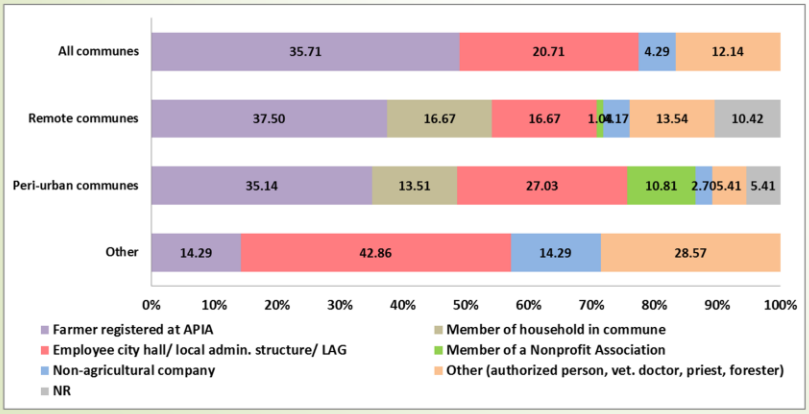


Fig. 28.c. Administrative category

A field study was conducted between January and May 2017 to better understand the level of knowledge and perception of HNV farming on 132 respondents. Even if the respondents are between 18 and 78 years old, a significant number (42.42%) is older than 42 years (Table 7). Respondents belong to different administrative categories (some respondents chose more than one category).

Overall, 75.8 % have knowledge about HNV farming with lower percentage in the remote communes that have the most important land shares in the Natura 2000 site (Fig 28.a). Even if overall, 68.2 % are aware of HNV farming in the communes, the distribution over the communes is different: the stakeholders from the peri-urban communes seem to be better aware (Fig 28.b).

Involvement of stakeholders is important in the area, especially of the employees of city hall/LAG which help farmers to apply for financial support from NRDP. It also shows the interests of each category in this particular subject and willingness to work together as a community (Fig 28.c). Other communes outside the LA are: Bobâlna, Aluniș, Cluj Napoca, Căianu and Sic.

Field study - questionnaire

Overall:
- 46.7 % HNV farming is weak capitalized;
- 43.3% Large surfaces will use new technologies that require mechanical mowing, a large no. of animals per hectare etc.
- 16.67% Large surfaces will be abandoned;
- 25.56% Pastures & grasslands used in same conditions;
- Main issues to be solved: better farmer association (38.9%), better environmental friendly techniques (28.9%), better marketing (21%);

Fig. 29.a. Perception about HMV farming in 20 years

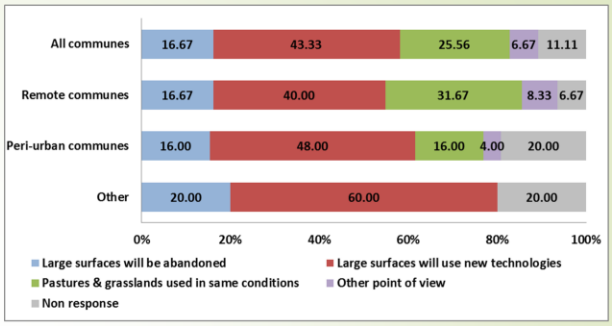


Fig. 29.c Level of appreciation regarding the current situation of HNV farming by communes

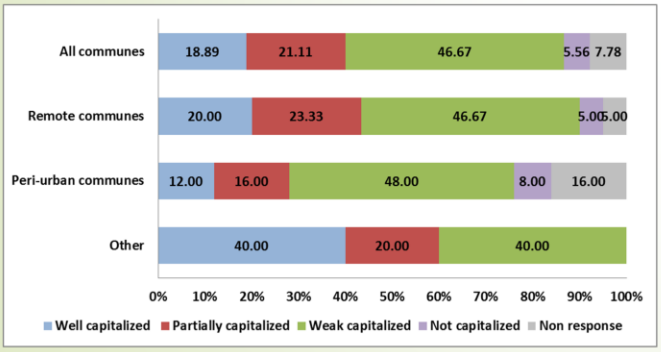
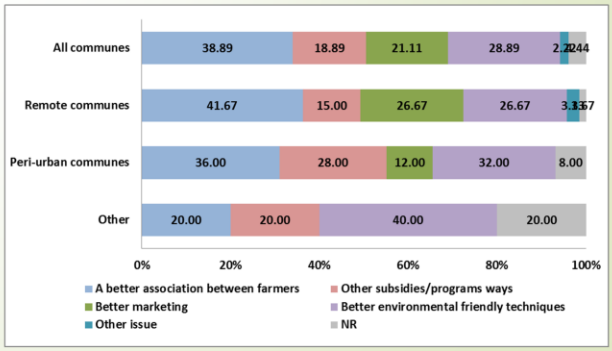


Fig. 29.b. Issues to be solved to maintain HNV farming

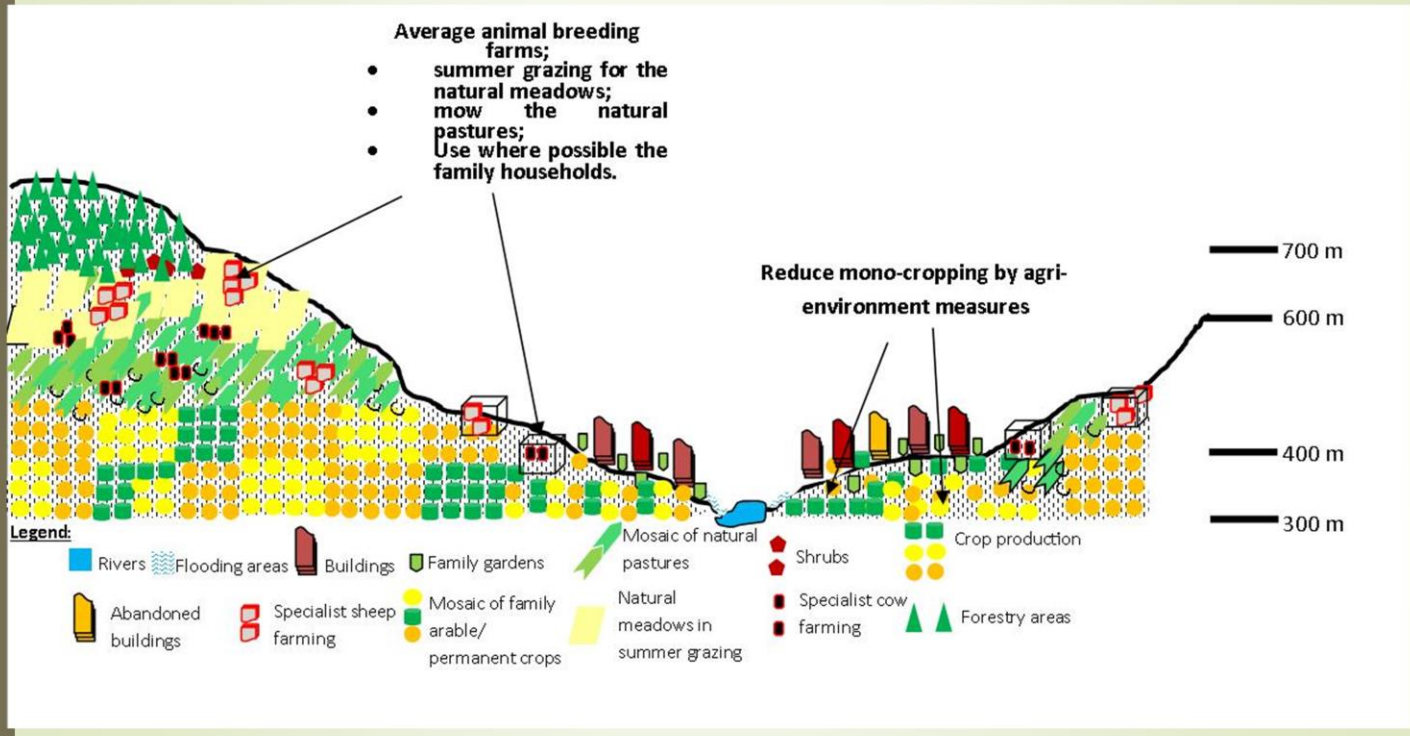


The vision of HNV farming as related to the statement of pastures & grasslands differ among the remote and peri-urban communes. Twice as many respondents from the remote communes are more optimistic about the preservation of pasture and grasslands, to be used in the same conditions (Fig 29.a). Regardless of the location of the communes, opinions about the abandonment phenomenon and the technological shifts are similar.

Opinions about the issues solving to maintain HNV farming differs: a better farmer cooperation and selling opportunities are more expected by people from the remote areas, which is expected in a way because people from peri-urban areas have easier access to the markets from the town of Cluj-Napoca (Fig 29.b). However, the peri-urban area expressed the need for more environmental friendly techniques which also assures a higher farm productivity.

Biodiversity-rich landscapes: how will they function in 2030?

Fig. 30. Transect in the vision scenario (2030)



Farming vision:

- 300– 500 m: arable land – reduce mono-cropping after applying green payments subsidies; consolidate the existing farms and provide public goods by production diversification;
- 500– 700 m: sustain average animal breeding farms by promoting an equilibrium between cows and sheep species; these farms should be mainly developed using family labour force; to use pastures areas alternatively for hay mowing;

The **key HNV habitats** protected on the permanent meadows and pastures.

Market vision:

- Create a local brand to promote high added value animal breeding products linked with their agri-environment function; All farmers from the region produce and sell under the same brand;

Problems that need addressing to achieve the HNV vision

Tab.8. Identified gaps to achieve the HNV vision

Dimension	Gaps
Good Governance	- land ownership structure (no clear ownership status); hunters/urban competition; - farm structure (small size households with small plots that dominated in terms of number; and big size farms that are predominant in terms of agricultural area in use); - lack of farmer's association; - access to CAP payments (pillar 1) and agri-environment packages for small farms; or for farms coming from specific communes; - lack of Natura 2000 special payments for farmers working inside of the protected area;
Technical	- poor conditions for common/private pastures (large shrubs areas; low productive factor); - hay production: low yields; extensive labour demands for manual mowing; high time consumption for hay production; - high agri-environmental demands specific for the agri-environment packages and in the Natura 2000 management plan; - high sanitary/veterinary mandatory regulation that act as barriers to on-farm processing and direct sales;
Economical / Marketing	- poor economic viability of HNV farming system (especially family households); - low outputs from the HNV households; sales mainly for no regulated market (direct sales); - no high value added products for the bigger commercial farms; lack of product differentiation; - marketing chains dominated by high multinational super markets; - no local food processors (milk; meat).
Social	- poor infrastructure and harsh farming and living conditions; - lack of information and entrepreneurial skills; - economic pressures outside LA to obtain better living standards; - people in old age;

Who are the actors to get involved in the process? How?

Farmers

Local politicians and NGOs

The LAG

Researchers

Private consultants

Food processing companies

Work together to introduce social, marketing and technological innovations!

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