

Original Article**The Evolution of Agricultural Systems in the Lenauheim Commune, Timiș County****NEACȘU Mihaela Elena*, Simona NIȚĂ***University of Agricultural Sciences and Veterinary Medicine from Banat "King Michael the Ist of Romania" Timișoara, Calea Aradului 119, 300645 Timișoara, Romania*Received 2 June 2017; received and revised form 25 August 2017; accepted 1 September 2017
Available online 30 September 2017

Abstract

The purpose of this scientific paper is to lay forth the evolution of agricultural systems in the Lenauheim locality, county Timiș, respectively the soil types and subtypes from the locality perimeter, crop structure, environmental factors influencing their state, but also the animal live stock. Throughout history, the agriculture in the Lenauheim locality went through many troubles. The paper presents its evolution, as well as that of connected industries, and of the people working in agriculture, starting with the first statistics and continuing to the present day. The objectives of this study were the description of the agricultural system practiced in the locality, as well as its improvement modalities. With regards to materials and research methods, we applied to documents and statistics which highlight the purpose and objectives of this paper.

Key words: agricultural system, soil, crops, animal breeding, historical evolution

1. Introduction

One feels a certain pride when travelling through this western corner of our country, while knowing its historical past, its people, producers of rich harvests, who today try to build a future. These are hard-working but happy people, who can sing, as well as work the land, people who can dance and make merry, but also fulfill their chores in a homestead [1].

The traveller that covers the wide Banat plain can not overlook the Lenauheim commune, be it surrounded by wheat and corn, or dressed in a white winter coat [2].

Looking for it in the vastness of the chernozem ocean, the writer Traian Coșovei finds it, at last: „How the train rustles when traversing this plain! As if each furrow wishes to stop you and tell you how fertile this soil is, and how young and fertile it may yet become. It is too much for a single peasant, for a single agriculturist, who may get lost here; there must be a river, a sea of peasants and agriculturists, of people in love with agricultural campaigns and harvests. One should set free streams of tractors and machines and unending herds. And plough, fertilise, and, with the greatest inspiration, cast the best and most miraculous seeds. Then harvest, until one feels he is but mountains of wheat and corn; share, gladden the world and protect it, feed it a luminous and unending bread, like the sun itself” [3].

* Corresponding author.
Tel: +40-256-277-009
Fax: +40-256-277-122
e-mail: miha_elena96@yahoo.com

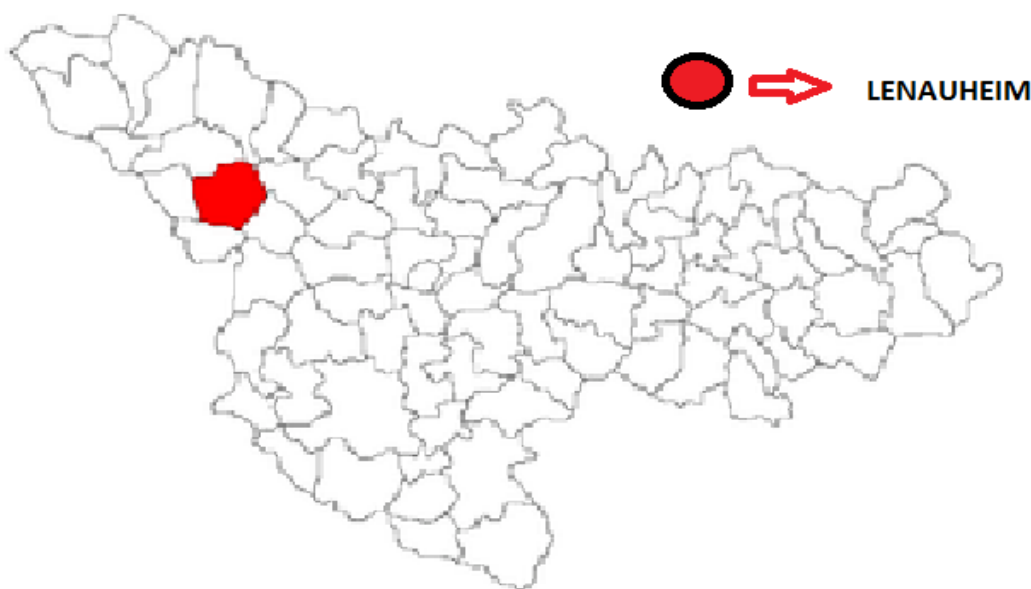


Figure 1. Placement of the Lenaueheim commune, in county Timiș

2. Material and Method

In order to write this paper, it was necessary to study defining elements of the field, as well as to identify from the multitude of possible sources the most credible and documented ones.

The Lenaueheim commune is located in the western part of the Timiș County, at a 45 km distance from the city of Timișoara and 14 km from the closest town, Jimbolia [4].

Through the Decision of the Council of Ministers from the 27th of May 1968, this new commune was established, as a result of the country's administrative-territorial division, with a total surface of 123 km².

The territory of the Lenaueheim commune is located at the following coordinates:

- 45° 52' 30" north latitude;
- 20° 48' 45" east longitude.

The territory on which it lies, is a vast plane, slightly sloping toward south-west and south with an average altitude of 85-90 m.

The Lenaueheim commune area falls under a transitional continental climate, with pronounced Mediterranean, especially Adriatic, influence. The annual average temperature is of 10.8°C, with a variation ranging between 9.2 – 12.6°C [5].

The atmospheric precipitation average is of 570 mm annually, with a variation ranging between 321.4 – 749.9 mm. The Lenaueheim commune is situated in a steppe area bordering a silvosteppe area, which largely facilitates the development of grassy vegetation [6].

The Lenaueheim commune soil is infested with weed seeds, of which, during rainy years, all kinds of weeds evolve, on cultivated surfaces, and even more pronounced on not cultivated surfaces [8].

Against them, come spring and until late autumn, a continual battle is fought, using chemical and mechanical methods. The most frequent weeds are: couch grass (*Agropyrum repens*), creeping thistle (*Cirsium arvense*), milk weed (*Euphorbia cyparissias*), red poppy (*Papaver rhoeas*), chicory (*Cichorium intybus*), convolvulus (*Convolvulus arvensis*), red root pigweed (*Amaranthus retroflexus* L), shepherd's purse (*Capsella bursa pastoris*), bristly foxtail (*Setaria verticillata*).

3. Results and Discussions

The characteristic soils pertain to the chernozem soil range, humid and phreatic, the humid phreatic chernozem being the predominant one. One must mention the fact that, in these soils, the underground water level is close to the surface, creating mooring conditions in low areas [5].

It was established that this soil represents an intermediary genetic type between the brown and dark brown chernozem. The soil observes a brown to dark brown surface colour.

Three horizons are distinguished within the soil: A, B and C.

The A horizon is 40-55 cm thick, brown, dark brown and even blackish. On the first portion of 10-15 cm from the surface, the colour is slightly lighter.

The mechanic horizon analysis led to the following results:

- up to 20 cm:
 - a) coarse sand 0.65%
 - b) finesand 39.50%
 - c) mudclay 59.85%
- from 20 – 40 cm:
 - a) coarse sand 0.45%

- b) finesand 39.65%
- c) mudclay 59.90%

According to these data, the soil presents an argillaceous-clayey texture and is part of the average to heavy soil category. It is appreciated that the soil is permeable, aired, with sufficient depositing and infiltration water preservation capacity.

Table 1. Structural analysis of the A horizon in the Lenaueheim locality

| Aggregate size | Depth 0 – 20 cm | Depth 20 – 40 cm |
|----------------|-----------------|------------------|
| 4 mm | 3.50% | 15.35% |
| 4 – 3 mm | 2.83% | 10.85% |
| 3 – 2 mm | 4.10% | 10.50% |
| 2 – 1 mm | 4.10% | 6.33% |
| 1 – 0.50 mm | 8.28% | 5.10% |
| 0.50 – 0.25 mm | 4.25% | 5.50% |
| 0.25 mm | 72.94% | 46.37% |

Aggregates established up to 1 mm occur in a 14.53% percentage up to a 20 cm depth and in a 43.03% percentage at 20 – 40 cm.

This leads to the conclusion that the A surface horizon completely lacks structure.

Table 2. Results deriving from the chemical analysis of the A horizon in the Lenaueheim locality

| Indices | Depth 0-20 cm | Depth 20 – 40 cm |
|-------------------|---------------|------------------|
| pH | 7.2% | 7% |
| carbonate content | 3.0% | 4.35% |
| humus content | 5.84% | 5.83% |

The data lead to the conclusion that the soil is slightly alkali up to a 20 cm depth and neutral at a depth of 20 – 40 cm. The soil is rich in carbonates up to 20 cm and very rich between 20 – 40 cm. The analysis also shows that the soil is rich in humus.

The B horizon is slightly differentiated, with a reduced depth, brown with a slightly reddish tint, and an almost prismatic structure.

The C horizon occurs suddenly, and reaches a 130 cm depth. It is very rich in calcium carbonate.

Up to a 70 m depth, an alluvionary layer occurs at every meter, of a different colour, displaying a different texture, as the drilling of a fountain in the middle of the commune shows.

It is observed, that the degree, in which soils are supplied with fertilising elements all over the commune surface, yields large harvests every year.

Average productions in corn were acquired in years with frequent precipitations as well as in years lacking precipitations at former socialist units.

Table 3. Results of production average upon the climatic differences

| Village | Soc. unit | Soil type | Rainy years | | | Dry years | | | Aver. gain/prod. kg/ha |
|------------|-----------|-----------|-------------|------|-------|-----------|------|-------|------------------------|
| | | | 1959 | 1960 | media | 1961 | 1962 | media | |
| Lenaueheim | CAP | Chernozem | 3478 | 3961 | 3719 | 4873 | 4751 | 4812 | 1093 |
| Bulgăruș | CAP | Chernozem | 2386 | 3500 | 2943 | 4569 | 8240 | 6404 | 3461 |
| Grabaț | CAP | Chernozem | 2943 | 4617 | 3780 | 5584 | 5503 | 5543 | 1763 |

Of the total surface, 93.1% represent the agricultural surface, 0.4% water, 0.8% non-productive land and 5.7% other usage categories.

From the agricultural surface of the commune, the tillable surface represents 90.4%, vineyards 0.2%, orchards 0.2% and pastures 2.3%.

Vineyards and orchards cover reduced surfaces and were mostly dissolved, the land coming back to the agricultural circuit.

Thus one can conclude that the predominant economic branch is agriculture, covering 11,459 ha or 93.1% of the 12,311 ha total pertaining to the commune.

Economic development after 1848/1849

The revolution from 1848/49 opened the door to capitalist development. During the 7 de-

cades elapsed from the historical event which took place in Alba-Iulia on the 1st of December 1918, the Ceatad (today's Lenauheim) locality experienced a significant growth.

During the period dealt with in this paper, agriculture continues to constitute the main occupation of the Ceatad population. This phenomenon is also due to the favourable land configuration which, according to the agricultural census from 1895, was distributed as follows:

Table 4. Land distribution depending on crop branches

| Denomination | Cad. Yoke |
|------------------------------|--------------|
| Tillable | 6,300 |
| Gardens | 41 |
| Hayland | - |
| Productive vineyard | 81 |
| Fallow or dissolved vineyard | 16 |
| Pasture | 412 |
| Forest | - |
| Unproductive | 268 |
| TOTAL | 7,118 |

These data suggest the possibility of a production based on a wide range of food plants, fodder or even industrial plants, and intensive truck farming.

For the most part, vineyards seem to be out of danger of phylloxera, and the lack of hayland, as well as the small amount of pastures, points towards animal breeding based on intensive foddering.

The lack of number data in this sense, as well as those referring to crop rotations, soil fertilising with natural fertilisers – the chemical ones are not used yet, hectare production, etc., commend important research tasks for the future.

The equipment present in the 492 agricultural homesteads registered in 1895 was constituted by

horse teams exclusively, in relatively good shape. According to the census data, the following table can be drawn:

Teams with:

| | |
|--------|---|
| -1 | |
| horse | 8 |
| -2 | |
| horses | 8 |
| -3 | |
| horses | 0 |
| -4 | |
| horses | |

Buffalo, mule, donkey and cow teams are virtually nonexistent.

Fruit trees presented the following situation:

Table 5. Fruit tree situation

| Species | Number |
|--------------|-------------|
| Apple | 1629 |
| Pear | 401 |
| Cherry | 279 |
| Sour cherry | 489 |
| Peach | 374 |
| Mulberry | 1618 |
| Apricot | 243 |
| Plum | 251 |
| Walnut | 72 |
| Almond | 24 |
| Chestnut | 20 |
| Total | 5400 |

This situation explains the relative development of și dezvoltarea relativă a sericulture, inconceivable without a mulberry plantation. Public records indicate the fact that, from 1880-1895, sericulturists in Ceatad gained 2920 forint, a much higher sum than in other villages.

Aside from these branches, during 1849-1918, animal breeding also flourished. Comparable data based on the censuses in 1870, 1895, 1911, we can draw the following table

Table 6. Animal livestock development

| Species | Year 1870 | Year 1895 | Year 1911 |
|----------------|-----------|-----------|-----------|
| Bovine | 1182 | 1473 | 1198 |
| Equine | 1015 | 1044 | 837 |
| Donkeys, mules | - | - | - |
| Caprine | 4 | - | - |
| Swine | 1614 | 2472 | 5325 |
| Ovine | 855 | 823 | 1449 |
| Poultry | - | 13649 | - |
| Bee families | 103 | 275 | - |

The rhythmic growth of the swine livestock at the end of the 19th century and beginning of the 20th century is explained by the large outlets in Transylvania, but especially on the external markets in Vienna and Prague. The peak of the swine export was signalled after the First World War, when 15.000 – 20.000 fat pigs were delivered on the external market, sometimes in exchange for agricultural machines and tools.

Thus, one can explain, at large, the decrease in numbers of horses used in agriculture and the increase in tractor number. Sheep wool was

demand by the Transylvanian textile industry, but was delivered to industrial centers in Banat as well.

Aside from these numbers, we must mention the continual superior horse breeding, which remains well known.

A significant improvement can be observed in the field of bovine breeding, because the percentage of the Simmenthal breed starts to predominate, which involves a serious increase of milk and dairy production. Census from 1900 and 1910 highlight the undeniable fact most people were tied to agriculture in their occupation.

Table 7. Bovine situation

| | Year 1895 | Year 1911 |
|---------------------|-----------|-----------|
| TOTAL | 1473 | 1198 |
| Of which Simmenthal | 301 | 1198 |

Table 8. Active person situation

| Category | Year 1900 | Year 1910 |
|------------------------------|-----------|-----------|
| Agriculture and horticulture | 973 | 821 |
| Industry and crafts | 197 | 157 |
| Commerce, credit | 36 | 34 |
| Communication | 4 | 16 |
| Public services, freelance | 27 | 28 |
| Protection force | 6 | 2 |
| Daymen | 6 | 28 |
| Domestic service | 39 | 26 |
| Others and unknown | 107 | 190 |
| TOTAL | 1377 | 1302 |

The locality development after the Great Union

After the historical decision from Alba-Iulia from the first of December 1918 and the actual installation of Romanian authorities in 1919 after

the Yugoslav forces retreated over the established border, a new era arises for the entire Banat, as well as for Ceatad. In accordance with the population demands, in 1921, the locality's name was changed

to Lenaueim, in order to pay homage to the great poetborn in this commune, and who had earned his place in the world literature. In 1931, the memorial museum “Lenau” was founded.

According to datafound in the Communal popular council archives, in 1940 Lenaueim encompassed 7176 cad.yokeswhich were distributed as follows:

Table 9. Surface

| Surface | ha |
|----------|------|
| Tillable | 6298 |
| Garden | 135 |
| Pasture | 405 |
| Unusable | 338 |
| Total | 7176 |

On the other hand, some datamention the significant increase of production forces, especially due to the mechanization of agriculture, cattle breeding, and the increase of truck farming surfaces.

If, in 1918, the tractor could be considered a singular item in Lenaueim, in 1940 the situation is as follows:

Table10. Agricultural machines

| Denomination | Pieces |
|------------------|--------|
| Tractors | 22 |
| Seeding machines | 101 |
| Mowing machines | 89 |

With regard to animal breeding, the new facilitations created an extraordinaryoutlet, not just in the country, but abroad as well. The number of fat pigs delivered annually in 1940 was of cca. 14-15.000 heads. Due to this situation, the local corn production became insufficient, leading to the annual purchase of an at least equal amount from other communes.The development of the milk production leads in 1928 to the founding of capitalizing cooperative, and in 1930, of a cheese factory. Taurine breeding experiences a continual growth and leads in 1932 to the foundation of an association for the breeding and seclcting of Simmenthal animals, and in 1942, to building a communal model stable, amounting to 2,500,800 de lei.The capitalization of vegetables, cereals, animals and animal productsbrought important material incomes to the rich inhabitants of Lenaueim.

On 5.01.1944, the agriculturein Lenaueim observed a rich material base, which encompassed:

- 328 ploughswith 1-3 furows;

- 135 seeding machines;
- 34 corn seeding machines;
- 14 ploughsand corn harvesting machines;
- 131 fanners;
- 224 manual corn threshers;
- 12 mechanical grinders;
- 156 beat and potato chopper;
- 10 threshing machines;
- 41 tractors (their number increasing ulteriorly).

The post-December agriculture

At the moment, in Lenaueim, people buy potatoesfrom PolandandYugoslavia, onionfrom Germany, tomatoesandcabbagefromHolland, fruitfrom Italyand Spain, grafted fruit trees from Yugoslavia andHungary. This is happening in the western Banat area, which used to export hundreds of waggons with ecologic vegetables and fruit yearly, on all Western European markets.

Table 11. Agricultural cropsin Lenaueim

| Crop | Surface (ha) | | |
|-----------|--------------|---------|---------|
| | 2013 | 2014 | 2015 |
| Wheat | 383.8 | 999.2 | 2032.24 |
| Corn | 24814.19 | 2207.35 | 3252.85 |
| Raps | 0.0 | 0.0 | 108.91 |
| Sunflower | 12.5 | 4 | 426.74 |
| Soy | 0.0 | 0.0 | 121.64 |

Table 12. Animal categories in Lenaueheim

| Species | Heads (number) | | |
|---------|----------------|------|------|
| | 2013 | 2011 | 2014 |
| Ovine | 7641 | 7921 | 7710 |
| Bovine | 67 | 81 | 73 |
| Porcine | 505 | 612 | 627 |

Technologic park in Lenaueheim:

- Tractors - 108 buc;
- Croppers - 35 buc;
- Tows - 60 buc;
- Ploughs - 108 buc;
- Disks - 95 buc;
- Seeders - 100 buc.

Although it is not a fruit tree area, still, numerous fruit tree species can be encountered here: apple, pear, quince, early apricot, apricot, mirabelle plum, plum, peach, walnut, sour cherry, cherry, and, among the Mediterranean species, fig and almond. The fruit tree longevity is, generally, short, largely due to the surface underground water. Thus, the peach and cherry dry out after 5–10 years, while the quince, pear and apricot reach 10–15 years, and only the apple, plum and walnut reach over 15 years.

In the vegetable sector of agricultural associations, as well as in people's gardens, various vegetables are cultivated, among which we remind: potatoes, beans, tomatoes, eggplants, carrots, parsley, celery, parsnip, peppers, cucumbers, pumpkins, onion, garlic, cabbage, cauliflower, kohlrabi, and to a smaller degree green and yellow melon, okra, lentils and asparagus.

4. Conclusions

In conclusion, one can observe that the soil largely determines the vegetal production, to which favourable climate and precipitation conditions are added. By using a rational agri-technique, by judiciously and optimally organising the territory and by introducing some highly productive varieties, in the future, even higher productions than at the moment can be yielded.

The data presented above shows that the predominant economic branch is agriculture, covering 11,459 ha or 93.1% of the total 12.11 ha pertaining to the commune.

By observing climatic data in the region where the Lenaueheim commune is located, the following characteristics can be highlighted: the region climate is generally temperate, with Mediterranean nuances, with optimal

precipitations distributed inequally. Summers are moderate warm, while winters are relatively long, although not too cold. The transition from spring to summer happens faster, while that from autumn to winter slower. The climate is favourable especially for autumn crops but also for corn and sugar beet.

Although it is not a fruit tree area, still, numerous fruit tree species can be encountered here: apple, pear, quince, early apricot, apricot, mirabelle plum, plum, peach, walnut, sour cherry, cherry, and, among the Mediterranean species, fig and almond. The fruit tree longevity is, generally, short, largely due to the surface underground water. Thus, the peach and cherry dry out after 5–10 years, while the quince, pear and apricot reach 10–15 years, and only the apple, plum and walnut reach over 15 years.

Crop plants truly represent the vegetal richness of this area. The rich chernozem which completely covers this commune's territory, the special climate conditions and the people's hard work leads to special yields for all crop plants. Among these, listed in the order of their importance and cultivated surface size, we remind: wheat, corn, sugar beet, hemp, barley, oat, soy, sunflower, peas, tobacco, raps, and among fodder plants: clover, alfalfa, mash, fodder beet, etc. Cotton cultivation was attempted, but since it was not profitable, it was abandoned.

In the vegetable sector of agricultural associations, as well as in people's gardens, various vegetables are cultivated, among which we remind: potatoes, beans, tomatoes, eggplants, carrots, parsley, celery, parsnip, peppers, cucumbers, pumpkins, onion, garlic, cabbage, cauliflower, kohlrabi, and to a smaller degree green and yellow melon, okra, lentils and asparagus.

The cereal specific for the area, where even the last surface is attempted to be seeded, does not hinder the development of numerous plants. Due to a special adaptation, a high number of wild plants still resist an intensive agriculture, where mechanization tends to become a fact with all crops and where chemicalization is more and more pronounced.

One should also remember that Lenauehimul is a gift of this fruitful and rich region. To let this fertile land go to waste would be a crime.

References

- [1] Groszler A.S., 2012, Spices. Agricultural English, Ed. Georgeta Rata. Cambridge Scholars Publishing, 215-222
- [2] Mihuț C., A. Okros, L. Niță, A. Duma Copcea, V. Mazăre, 2013, Suitability favorability soil and the city of perimeter Faget, Timis county for major crops agricultural and horticultural, Agronomy Series of Scientific Research/Lucrari Stiintifice Seria Agronomie, 56, 1,
- [3] Niță S., A. Okros, 2012, Sisteme de Agricultură [Agricultural Systems], Editura Eurobit Timișoara
- [4] Niță S., L.D. Niță, C. Mihuț, E. Kocis, L. Panaitescu, M. Lungu, 2014, The agricultural system of the Armeniș township, Caraș -Severin county, Review on Agriculture and rural development, Scientific Journal of the University of Szeged, 3(1), 344-349.
- [5] Niță S., L.D. Niță, C. Mihuț, E. Kocis, L. Panaitescu, M. Lungu, 2014, Ecologic and biologic agricultural systems, Review on Agriculture and rural development Scientific Journal of the University of Szeged, 3(1), 344-349.
- [6] Okros A., G. Pop, A. Lațo, A.S. Groszler, A. Berbecea, I. Radulov, C. Mihuț, L.D Niță, S. Niță, 2015, Designing an agricultural system in the Seleuș locality, Arad county, Research Journal of Agricultural, 47(1), 124-127.
- [7] Okros A., G. Pop, A. Lațo, A.S. Groszler, A. Berbecea, I. Radulov, C. Mihuț, L.D Niță, S. Niță, T. Florescu, 2015, The agricultural system in the Nițchidorf locality areal, Timiș county, Research Journal of Agricultural, 47 (1), 120-124,
- [8] Șmuleac L., S. Oncia, A. Ienciu, R. Bertici, A. Șmuleac, C. Pițiga, 2013, A study of the possibilities of using groundwater in rural communities in south-western Banat Plain, Research Journal of Agricultural Science, 45(2), 287-293
- [9] Șmuleac L., S. Oncia, A. Ienciu, R. Bertici, A. Șmuleac, V. Mihăiesc, 2014, Influence of anthropic activities on ground water in Boldur, Timis County, Romania, Research Journal of Agricultural Science, 46(1), 120-126.

"This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution and reproduction in any medium, provided the original author and source are credited."