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**AGRO-GEOGRAPHICAL DIFFERENTIATIONS IN THE ROMANIAN REGION OF THE DANUBE VALLEY**

Le travail se propose à souligner les changements intervenus dans les fonctions économiques de la vallée du Danube, grâce au développement industriel des viller-ports, grâce au changement de la physionomie du lit majeur par les travaux hydroamélioratifs exécutés pendant les deux dernières dizaines d'années, grâce également à la valorisation des ressources naturelles et à l'utilisation de la force de travail.

Ces changements seront plus évidents si l'on aura en vue les travaux du système hydroénergétique et de navigation des Portes-de-Fer, exécutés par la Roumanie et la Yougoslavie, de même que d'autres travaux en cours d'exécution en aval de Tr. Severin, dans le but de la valorisation intensive des terrains utilisés pour l'agriculture, pour la production du roseau et pour des buts piscicoles.

Les travaux des Portes-de-Fer, commencés en septembre 1964 et se trouvant, à présent, dans la phase finale, constituent un exemple de collaboration entre les deux pays socialistes voisins.

L'analyse des catégories d'utilisation des terrains, de certains indicateurs statistiques et économiques (la production marchandise et la production globale) a permis la différenciation de trois régions de la vallée du Danube, à savoir: *le défilé du Danube*, où l'agriculture occupe une place secondaire, étant partiquée seulement dans les petits bassins; *la plaine danubienne à terrasses* (Tr. Severin — Isacea), où les cultures prédominantes sont lest céréales et les plantes industrielles et où on a réalisé des vastes travaux d'aménagement; *le delta du Danube*, qui représente le domaine des roseaux et de la pêche; l'agriculture n'est pratiquée que sur les cordons fluviatiles.

The Danube Valley is of a particular significance within the Romanian economy for hydro-power resources, fluvial traffic, agriculture and pisciculture, along the 1,705 km it crosses between Bazias and Sulina (Delta), on the country's border or in its interior. After it crosses about 144 km, its longest defile (the Danube defile at the Iron Gates), the Danube displays an unsymmetrical valley downstream from Turnu Severin till Brăila, having a higher southern slope as against the northern one, which is formed by a broad waterside extending as we advance towards its mouth (reaching 12 km near the town of Călărăși), and numerous terraces (maximum 8 in

the terrace plain of Oltenia, where they develop on about 50 km). At its mouth it forms a great delta, which is an important reed-fish breeding realm.

During the last two decades radical changes took place in the revaluation mode of the Danube Valley, structure of landuse categories, as well as other changes within progress now, due to the hydropower and navigation operations carried out in co-operation with Yugoslavia at the »Portile de Fier«<sup>1</sup>), and extension of irrigations and piscicultural-agricultural-forest plannings.

### I. Evolution of land-use.

Based on the topographical maps of 1791, 1857 and of about 1900, as against present data, the following evolution of land-use can be delineated in the Romanian region of the Danube Valley.

At the end of the 18<sup>th</sup> century, natural pastures and hayfields were prevailing not only in the floodable waterside of the Danube and the watersides of its tributary rivers (Jiu, Olt Argeş, etc.), but also on the major part of the terraces. On the Danube plain of the Oltenia terrace, tillable lands covered the most extended areas on the upper terraces. Vineyards were less extended in South-West Oltenia, however, they formed a massif on the Burnaz Plain front (Băneasa — Greaca — Chirnoji).

From this map it also results, that arable lands had their largest extent on teh area behind the main Danube fords.

After six and a half decades, the map of 1857 records significant changes in the land-use. These refer especially to forests and natural pastures, which due to the expansion of arable lands, greatly reduced their area. Natural pastures are still covering a large surface of the Danube waterside, while vineyards hold the same area. Moving of flocks into the Danube marsh, which reached its highest prosperity during the 18<sup>th</sup> century and at the beginning of the 19<sup>th</sup> century, is still preserved to a large extent from Oltenia down to the Delta, yet beginning to be disturbed by tilling for cereals.

The increase of arable surfaces in the first half of the 19<sup>th</sup> century is in close relation with the increase of cereal demands on the world market. During this period the price of wheat was doubled, determining the big landowners to extend the wheat areas, to obtain higher profits.

As a result of the Adrianopol agreement (1829), when the liberty of trade was granted, and when agricultural products, freed from the Turkish monopoly, were sold advantageous rates the arable surfaces were ever more extended, both on top of the terraces and in the Danube waterside, at the expense of commons and forests.

Simultaneously, the viticultural areas began also to be extended. In the middle of the 19<sup>th</sup> century the wine areas of Ianca, Potelu, and especially the wine massif »Golul Drincei« (South-Western Oltenia) were even better outlined. The activity performed to fasten the sands by acacia and vine plantations was also intensified. However, at the end of the 19<sup>th</sup> cen-

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<sup>1</sup> Between Tr. Severin and the new town of Orsova arhitectonic buildings of great amplitude have been erected, namely; a new railway, and a highway passing over 56 bridges and viaducts, 100 small bridges, tunnels, slope consolidations and walls of support.

tury, the phylloxera destroyed the renowned Romanian vine of »Golul Drincei«, with an effect in the rest of the country. Only in the sands the phylloxera could not exert its damaging effect. Here, the vineyards covering about 400—500 ha, began to recover only towards the end of the last century, yet on restricted and isolated areas, extending ever more in our days. During this period the sands near the locality of Dăbuleni were not yet revalued, showing that the viticultural massif here, is of a recent date.

At the end of the 19<sup>th</sup>, and during our century, cereals gain an ever larger ground, descending down to the marsh. The dammed in perimeters are increasing continuously, the piscicultural areas entering the agricultural circuit. In 1950, about 60,000 ha were protected against the Danube floods. Now, as land-use is becoming more and more rational, various economic potentials begin to appear ever more obvious in the use of resources in the lower Danube Valley.

## II. The present land use in the Danube Valley.

After 1962 an undertaking of a wide scope was the building of new dams in the floodable waterside of the Danube, fundamentally changing the structure of the land use categories.

The process of agricultural co-operativization solved here, like in the rest of the country, a series of basic problems, i. e.: a) reorganization of the land stock (field division), drawing up new fields, of regular shape of about 100—200 ha, permitting to use mechanical means on a wide scale, and application of crop rotations; simultaneously, instead of the old numerous and uneconomic fields ways, a new net of communication ways was set up, oriented according to the economic requirements; b) reorganization of the land stock, by introducing non-profitable categories into the agricultural circuit; c) the technical endowment of the agricultural economy, application of chemical fertilizers on a wide scale, and improvement of the staff. The new organization of the territory facilitated the clearing of hybrid vineyards existing on top of the terraces, fallowing of slightly efficient pastures, clearing of thickets, brambles, etc., to extend the arable lands.

Through the construction of 1,060 km of dams along the Danube, 17 big embanked enclosures were set up, amounting to a total surface of 400,000 ha. Along with this, draining operations were performed drawing and laying out more than 6,100 km of canals till 1968, clearing over 55,000 ha of acacia forest, poplars and other essences existing within the enclosures, reed was cleared on about 50,000 ha, and plantations of black-hybrid poplars and of selected willows were made on the dam-bank area. The activity of embankment continues also in the region of Calafat-Ciupereni, Dăbuleni-Potelu-Corabia, Islaz-Moldoveni, Isaccea-Somova.

»In the embanked units of the Danube waterside, the arable land covered about 77 per cent of the protected enclosures, at the end of 1964, and as draining is completed, it is going to be in a steady extension.«<sup>2</sup>

<sup>2</sup> N. Al. Radulescu, I. Velcea, N. Petrescu: »Geografia agriculturii României« (Agricultural Geography of Romania); Ed. Stiintifică, 1968, pp. 242.

<sup>3</sup> Irrigation is made especially by sprinkling.

The Danube waterside and terraces, including a surface of over 2 million ha (of which 1,062,750 ha only the Danube waterside and delta), displayed — from the viewpoint of land-use categories — the following structure in 1965: agricultural 60 % (arable 50.4 %, natural pastures and hayfields 7.3 %, vineyards 2 %, orchards 0.3 %), forest 12 %, other lands 28 %. This structure underwent changes due to the enhanced activity of embankment, draining and clearing of reed. Thus, especially the arable lands increased, while the other categories of land-use decreased. Significant changes occurred also in the structure of cultivated lands, through the extension of maize and sunflower cultures on the embanked enclosures, of wheat and maize, industrial plants (sunflower and sugar beet) and fodder plant cultures on the Danube terraces.

To increase the agricultural production, great stress is laid on the extension of irrigations<sup>3</sup> (cereals, vegetable gardens, etc.). Special arrangements were made along almost the whole Danube Valley, and especially in the eastern part, and such operations are still in process on the Danube terraces. This fact allowed rice plantations to be extended also to about 18,000 ha, representing 80 % of the country's total. Areas laid out for rice plantations will be enlarged, especially on the embankments, in 1969. Within the embankment of Călmăuți-Gropeni (Brăila district) only, the laid out surface will amount to over 5,000 ha, while rice plantations of Oltenița are going to cover 1,500 ha.

Special emphasis has been put on agricultural-piscicultural arrangements, lately. Thus, in the eastern part of the Danube Valley, from Călărași to Galați, lacustrian units covered about 34,300 ha before the arrangement, while subsequently to it only 5,154 ha remained lacustrian, the rest being rendered to agriculture. In the central part agricultural-piscicultural arrangements were made within the lacustrian unit of Bistreț-Nedeia, and the Suhaia, Boianu-Sticleanu-Călrași marshes.<sup>4</sup>

### III. Agro-Geographical Differentiations

The analysis of land-use categories, some statistical-economic indexes (goods production, bulk production, etc.), the present degree of rendering valuable natural conditions, allowed to differentiate three geographical regions along the Danube, namely:

- 1 — The Danube defile
- 2 — The terrace plain of the Danube
- 3 — The Danube Delta.

1 — **The Danube defile.** The Romain region of the Danube defile, enjoying a special picturesque, is of great significance to the national economy for its hydropower resources and fluvial traffic. Agriculture holds a secondary part versus other economic branches, due to particularities of the natural conditions. The quasi-horizontal surfaces, meant for agriculture, are very limited, generally corresponding to the terrace levels. Arable lands are rather restricted to grooves and the fairly narrow water-

<sup>4</sup> Boeru, S. »Cu privire la punerea în valoare a unor terenuri din lunca Dunării« (On the rendering valuable of some lands in the Danube waterside), rev. Probleme agricole, No. 9, 1968.

side of the Danube Valley. Maize represents the main culture. Spurs extending down from the mountains are covered by natural pastures and forests, and here and there by vine. Of significance to agriculture are also the dejection cones developed at the contact between the Locvei-Almăj Mountains and the Danube terraces, being cultivated with cereals, orchards and hybrid vine. Due to the development of the industrial centre of Moldova Nouă, especially after the discovery of complex ores, a vegetable area was set up in the Danube waterside, and plantations of noble vine were made within the perimeter of this town, to meet the supply demands of the inhabitants. Here, the vine, extended today on about 100 ha, is developing in good conditions, owing to the high calcium carbonate content of the ground.

Thus, in the basin of Boşneag (north of the town of Moldova Nouă) a series of brooks, coming from the limestone area of the Cărbunari platform, are being drained; consequently, the calcium carbonate percentage in the piedmont deposits, formed at the contact between the Cărbunari steep and the Danube waterside level, is high, exerting a favourable influence on the development of vine.

The lands within this region are going to be affected by the bringing into existence of the accumulation lake. Owing to the construction of the barrage at the Portile de Fier, the Danube water level is going to rise by 33 m, bringing into existence an accumulation lake to be developed on about 150 km. As a result, the town of Orşova was already moved into the Cerna Valley, to Jupalnic, while the present rural settlements along the Danube, from Eşelnita to Drencova are going to change their precincts, moving to the periphery of the new lake.<sup>5</sup>

## 2 — The Terrace Plain of the Danube (Turnu Severin-Isaccea)

Delineated in the area, where the waterside and terraces have their maximum extension, this region is clearly specialized in cereal and industrial plants culture and animal breeding for meat and milk. It is a part of the large agricultural unit of the Romanian Plain, having the same specialization. The great extension of the terrace tops and recovered lands in the floodable waterside of the Danube, fertile soils (forest chestnut-brown and chernozems of different kinds), the forest-steppe and insular steppe climate, the presence of some big food industry enterprises, in the immediate vicinity (sugar and oil at Podari-Craiova) sugar at Giurgiu, oil at Roşiorii de Vede, etc.), and especially in the city of Bucharest, Craiova, Galati, etc. account for the large extension of wheat and maize (2/3 of the cultivated surface), sugar beet, sunflower, vegetables and greens.

The region is also remarked by the fact that here were performed the most significant land improvements, especially extending arable lands. The attention of experts is, however, called for to follow up areas subjected to the danger of becoming salty and mudded up, especially within the embankments.

Due to the favourable thermal conditions (during 3 months of the year the average temperature exceeds + 22° C), there can be cultivated, with

<sup>5</sup> The settlements on the Ada-Kaleh island will also disappear. Its historical vestiges (the stronghold walls of the XV-th century, the mosque of the XVII-th century, etc.) and some public and private buildings, have been started to be transported to the Simian island, downstream of Tr. Severin.

very good results, two cultures a year in the Danube waterside (barley and grain — maize; wheat and fodder maize); exceptional crops record also cultures exacting warmth, especially rice.<sup>6</sup>

As local variations of the agro-geographical region, »the terrace plain of the Danube«, three microregions have been distinguished<sup>7</sup>, i. e.:

a) *The terrace plain of the Danube in Oltenia*. Within this, the culture of cereals and industrial plants, supplemented by animal breeding for meat and milk, form the main branches of the agricultural economy. In the southern part of the microregion, hence in the waterside and lower terrace of the Danube, a dune relief is prevailing, influencing the structure and division of the agricultural lands. Here, best adapted among the cultures is vine, being planted on top of the dunes, where the soil texture is sandy-clayey; planting, however, goes down to a depth of 3—5 m to resist excessive droughts during the summer. Tobacco, rye mellon and some fodder plant cultures also obtained good results, occupying with preference the space between the dunes, where the phreatic level is shallower. In the central and northern part of the microregion, on the middle and upper terrace tops, the culture of cereals and technical plants is prevailing.

b) *The Olt Valley — Argeş Valley*. This microregion is remarked for its taking part in the goods production value, by joining cultures of cereals with lasting, high economic efficiency cultures of vine and fruit-trees. Embankments and drainages have greatly changed the structure of field cultures during the last years, extending the surfaces reserved to industrial plants, vegetables and greens and rice plantations. Cereals cover 70—75 % of the cultivated surface, of which maize and wheat hold almost equal parts.

The fields of vegetables and greens were much extended, setting up significant vegetable basins around the towns of Giurgiu and Oltenia. The production is mostly meant for Bucharest, namely the food industry units and population, as well as for the tinned vegetables and fruit factory of Valea Roşie (to the north of Olteniţa).

As to viticulture, a powerful viticultural massif is delineated here — Greaca-Căscioarele-Chirnovi — specialized in noble vine, a viticultural area around the town of Tg. Măgurele, with grafted, domestic and hybrid vine. Terracing operations were also carried out in this region, on slopes (surfaces, to a large extent covered by poorly productive pastures and partly by aged hybrid vine), in the periphery of the communes: Cioara, Vinători, Căscioarele, Prundu, Greaca, and planted with noble vine and fruit trees (apricot and peach trees, mainly).

Until recently, pisciculture developed in the marshes of Greaca, etc., while today, as a result of a more rational use of the waterside, it is practised to a larger extent in the Danube and not as much in the Olt and Argeş rivers.

c) *The Argeş Valley — Isaccea*. The territory between the Argeş Valley and the locality of Isaccea is marked by a great morpho-hydrogra-

<sup>6</sup> N. Al. Rădulescu, »Modifications dans le paysage géographique de la République Socialiste de Roumanie«, in the work »Mélanges de Géographie-physique, humaine, économique, appliquée — offerts à M. Omer Tulippe, vol. I, Gembloux, Belgique, 1967.

<sup>7</sup> In the joint work »Monografia geografică a Văii Dunării« (Geographical Monography of the Danube Valley) (Ed. Acad. R. S. R., 1969) these were considered as first order agricultural areas.

phical complexity. Thus, the alluvial plains, sand, silted marshes, lakes, abandoned arms, shallow phreatic levels, hydrophilous and hygrophilous vegetation, as well as soil conditions (alluvial soils) and climate, display particularities as against the adjacent regions. Here, land use categories showed a varied structure, extending from natural pastures and hayfields to forests and on some restricted areas also arable lands, etc. Worth mentioning is the fact that the arable lands were much more extended in the Ialomița marsh than in that of Brăila, where forests, pastures and hydrographical elements had a larger spreading. This region, however, was of a greater piscicultural significance.

Recently, in this part of the Danube Valley large embankments have been made, as well as drainages and reed clearing. This fact fundamentally altered the land use categories. Thus, the Călarasi and Boianul lakes disappeared as lacustrine units. Embankment operations were completed in the Ialomița marsh already at the end of 1964, and in the Brăila marsh at the end of 1965. After completing the ringlike dam in the Brăila marsh, the embanked surface amounted to over 72,000 ha, being the largest embanked unit in the country. In the precincts of Smîrdan — 23rd August, 12,000 ha have been embanked, thus revaluating lands of great importance to agriculture.

The Ialomița and Brăila marshes included between Călărași, Hirșova, Brăila and the Danube arms, until recently formed the realm of natural pastures. Sheep flocks of the Subcarpathian regions and of Transylvania grazed in this part of the country, where there were extensive and productive natural pastures, and where the shelter of the Dobrudja abrupt, and plenty of fodder in the Bărăgan provide good wintering conditions for sheep. Also, free breeding of pigs was practised, here, as well as of big cattle, and agriculture. The latter, however, covered only small areas. The two marshes had the best apiarian environment, not only in the country, but even in Europe, due to its rich and varied melliferous basis.

Within this microregion are included the widest surfaces laid out for irrigations, of the entire Danube Valley. The agricultural enterprise of Pietroiu alone, laid out irrigations on 3,700 ha in 1968, of which about 60% for grain maize, and the rest for the culture of rice, vegetables and greens.<sup>8</sup>

In view of a rational land use, the state agricultural enterprises took to reorganizing the agricultural production. In the first line this refers to the application of a specialized agriculture. Thus, the fodder basis being completely provided, the agricultural state units of the marshland specialized in the culture of maize, sunflower and animal breeding for fattening. Estimating after the value of the bulk production, it is noticed that 70—80% of its total value is incumbent on the vegetable production and only the rest on animal production.

The administration of a sufficient quantity of chemical fertilizers — superphosphate 300—500 kg/ha, ammonium nitrate 200—300 kg/ha and natural fertilizers, 25—30 t/ha, the presence of a shallow phreatic level and of alluvial soils (low-humic clay soil, semi-marshy, partially drained, etc.), allow to obtain high average productions/ha, 45,000 kg/ha respectively.

<sup>8</sup> The State Agricultural Enterprise of Pietroiu had in 1968 a livestock of 3,400 horned cattle fattened, and 10,000 sheep; grain-maize and technical plants have been cultivated on a surface of 9,000 ha.

On certain areas, however, where small salinized lakes prevail, the obtained productions are very small, imposing a series of special lay out operations. Where drainages were being performed, the average productions/ha are even lower, as on the former marshes the humus content is very high. In such conditions superphosphate is administered to raise the productivity.

Low productions are obtained also on sandy lands (about 300 ha at Stelnica, over 1,000 ha at Dudești), especially under drought conditions, when the phreatic level falls below 5 m.

Within the Ialomița marsh there are some small areas where the basement soils are formed by waterside chernozems — on carbonate alluvial depists, occurring on a higher relief (e.g. at Pietroiu), where very big crops are obtained.

### 3 — The Danube Delta (Isaccea-Sulina)

Upstream of Isaccea the major part is covered by reed.<sup>9</sup> Next follow natural pastures, arable lands and forests. This region is mostly superposing the Danube Delta, forming mainly a realm of water (the arms of the stream, marshes and rivulets), hence, fishing and reed. The little dry or emerged land (about 20%) is covered by acacia, poplar, oak forests and arable lands, more extended in the western part, where the sand banks are higher and smoother.

The Danube Delta, appearing a vast alluvial plain in formation, built up by fluvial lagoony and marine deposits, is of agricultural significance, especially in the fluvial region. This is formed by sand banks, alluvial plains and deltaic depressions. The maritime delta formed by moving or semi-fixed sands of marine origin — generally not floodable — is largely covered by natural pastures. However, from a quality viewpoint, the latter are poor, the soils having a different degree of salinity, as a result of the semi-arid steppe climate and hydrological conditions. Some pastures develop on sandy soils, with some accumulations of humus, due to the shallow phreatic level.

In the region of the fluvial delta, the loess field of Chilia — the most extended and highest part in this region — particular by its fertile light brown steppe soils and chestnut chernozems, and the presence of some great thermal variations — provides the most favourable development conditions for cereal culture and technical and fodder plants.

Due to floods, and mainly to the late retreat of the waters from floodable arable lands, and the existence of a surface or shallow phreatic water level, monoculture is widely practised — mainly maize. On the loess field Chilia, a non-floodable region, the structure of cultures is varied, consisting of cereals, technical and fodder plants, vegetables and greens.

The fluvial region is marked within the country trough its wide vegetable development. Actually, easy irrigation possibilities, high humidity degree, presence of fertile alluvial soils induced the extension of vegetable cultures.

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<sup>9</sup> Reed covers in the delta an area of 260,000 ha, forming the densest reed «massif» in the world.



On the fluvial sand bank orchards are developing, especially fruit-trees exacting to warmth (cherry, peach, quince trees, etc.)

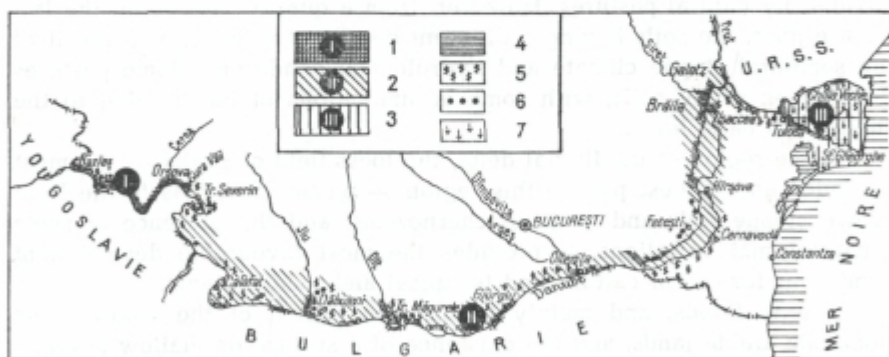
During the last and a half decade about 10,000 ha of the delta have entered into the agricultural use, as a result of the embankments and drainages performed on the Tătaru ait (400 ha); embankments carried out at Popina I — Periprava (about 5,000 ha), Tulcea-Nufărul (2500 ha), Bestepe-Mahmudia (600 ha); and the embankment system which was finished at Pardina-Chilia Veche, a region of a complex (agro-reed-piscicultural) function. In the region of moving and semi-fixed sands, in the eastern part of the delta (the maritime fields of Letea and Caraorman), were made plantations of soft essence (hybrid black poplar, common alder, etc.) and vine. On the marine sands of Letea, vine was experimentally planted in 1959, on a surface of 34 ha, and exceeding 110 ha at present. To ameliorate the sands, floating reed was used here as an organic fertilizer.

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Along with the enlargement of the agricultural technical-material basis, as a conclusion of the co-operativization process, wide revaluation possibilities were put forth for the big reserves of the Danube waterside and terraces to increase the agricultural surfaces.

The future designs of use of the Danube Valley, on a most rational scale, view its being used as an electric power source, navigable way, and main water supply source for irrigations.

Figure 1. Map of agro-geographical regions along the Danube Valley on the territory of the Socialist Republic of Romania.



1. The Danube delile (I); prevailing culture of maize, practised within small basins.
2. The plain of terraces of the Danube (II); prevailing cereals and industrial plants.
3. The Danube Delta (III); prevailing cultures of maize and vegetable tables, practised on littoral sand banks and alluvial plains.
4. Vegetable lands.
5. Vine.
6. Orchards.
7. Reed covered surfaces.