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# ECOTOURISM IN THE DANUBE DELTA

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**Abstract:** The Danube delta is a wetland of primordial importance for wildlife and humans alike. The former resources trigger a specific form of leisure for the latter, namely ecotourism whose manifestation is featured in the current research paper through an analysis of the foreign and domestic arrivals as well as a succinct presentation of its fauna resources. This primitive location, its seclusion and its unique resources invite the tourist to authenticity, immersion and self discovery, in other words a responsible type of tourism. The total tourist arrivals for the Danube delta amounted to 88000 in 2012, thus indicating its remoteness from mass tourism.

**Key words:** the Danube Delta, wetland, protect areas, ecoturism,

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## INTRODUCTION

The deltas, in their primordial state of creation, with all the life that swarms around the water and the marsh have always had a special attraction for geographers, writers and in general, for all those who love nature. This attractiveness is all the more astringent today in a world suffering from the invasion of the artificial, so that people turn to naturalness and authenticity. Descriptions of the Danube Delta have appeared since the earliest times in the writings of Herodotus, but also in the stories told by the Romanian writer of Jean Bart, pseudonym of Eugen Botez (1906) who describes the harmonious man-nature cohabitation, later on followed by the geographical approaches of Banu and Rudescu (1965), Panighiant, E (1967), Nitu (1982) to the

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more recent titles compiled in the book edited by Iordachi and Van Assche (2015), featuring a very realistic way to manage this area, as well as the cruise tourism studies of Irincu et al. (2015).

The landscape typology features a water-saturated area, either permanently or temporarily generating a specific ecosystem, thus framed it in the typology of humid land, or wetland (Mausbach and Parker, 2001). It is characterized by a hydric soil associated with wetlands and hydrophitic vegetation, or in other words it is the connection between the vegetation of the classical wetlands and the soils that support them.

The Danube Delta is the largest wetland area in Romania. There are several deltas across Europe (see figure 1). The Danube River crosses Europe over a distance of 2860 km, from which almost 1,000 km spreads over the territory of Romania in the south and flows into the Black Sea through three main channels, Sf Gheorghe, Sulina and Chilia.

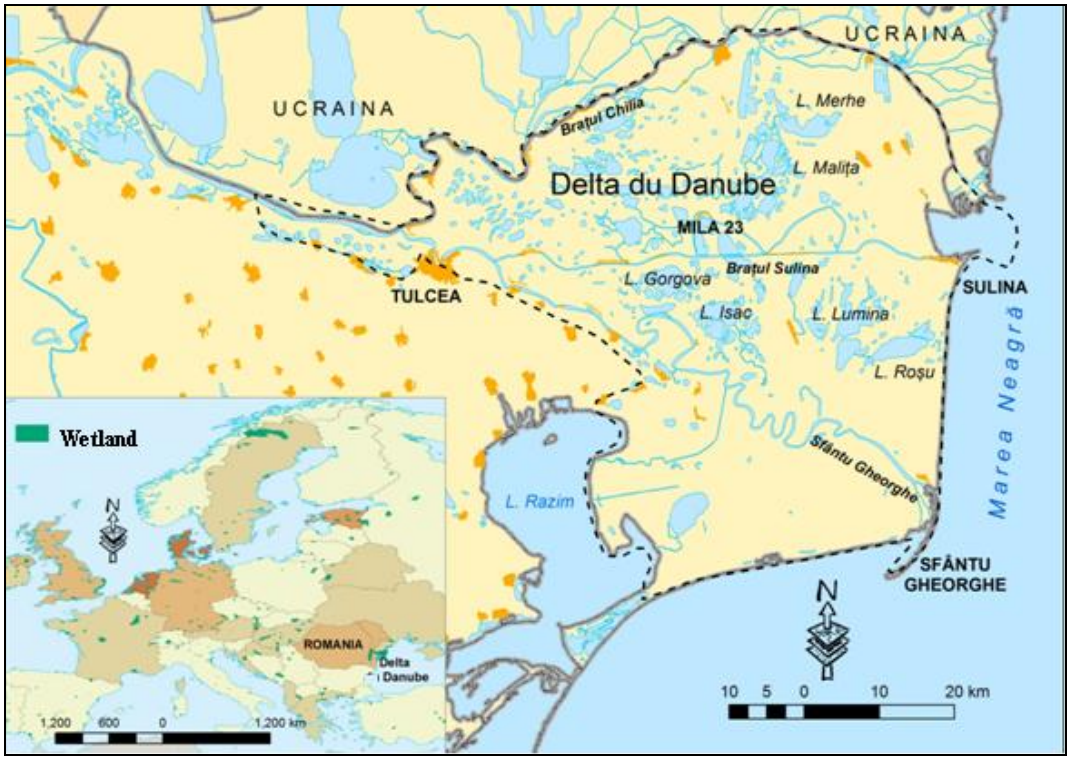


**Figure 1.** Wetlands of Europe. Location of the Danube Delta on the Romanian territory

The Danube River crosses or touches the borders of ten countries, such as Romania, Hungary, Serbia, Austria, Germany, Bulgaria, Slovakia, Croatia, Ukraine and Moldavia across 2,872 km of which 1075 km on the territory of Romania, before it flows into the Black Sea. The Danube describes an immense arch that opens into a wonderful fan while creating a unique territory by its picturesque and original landscape - the delta (Nitu, 1982). The Danube Delta is located in the eastern part of Romania and overlaps the three Danube outflow channels into the Black Sea (Chilia, Sulina and Sf. Gheorghe) as well as over the great Lake Razim-Sinoe (crossed by the 45 ° latitude North parallel and the 29 ° meridian, east of Greenwich). The Danube Delta is bordered to the north by the plateau of Bugeac, to the west by the plateau of Tulcea and to the east and to the south-east by the Black Sea, under whose waters it extends as a submersed platform. It extends over 434,000 ha (Banu and Rudescu, 1965; Nitu, 1982) from the river flow of Chilia to the Black Sea, being the second largest of Europe, after that of Volga.

It is included in the territorial boundaries of the department of Tulcea where one can find a beautiful contrast, on one side the Macin Mountains which are the oldest hercinic hills of Europe, and the newest land of the country of the Romania, the delta, which is neither land, for it is rather a marsh, nor is it water for the lakes are covered with vegetation, and the reed forests are segmented by narrow channels, which give the possibility for the boats to navigate through (Niţu, 1982). These attributes make it a wildlife paradise, favored by climatic, soil, hydrographic and topographical conditions that have allowed the development of more than 30 ecosystems scarcely apparent at first sight but which provide optimum life conditions for more than 1600 species of plants and almost 3500 species of animals. The Danube Delta was compared with Noah's Ark with more than 325 species of birds from all over the world for shelter, food, rest and nesting.

The Danube Delta is located on the road of the great bird migrations, at the mid-distance between the North Pole and the equator and half way between the Atlantic Ocean and the Ural Mountains. The eagle, mute swans and the great cormorants come from Asia; from the south, from the African continent come the Dalmatian and common pelican; from the Arctic region come the red-necked goose or the black-headed duck. The biodiversity of the planet represents an important natural heritage, on which depends the life quality of people. In this context, the Danube Delta was declared a wetland of international importance in 1990 (in accordance with the Ramsar Convention - Iran, 1971) and a Biosphere Reserve (promulgated by Law No. 82/1993) due to the presence of streams, garle, japse, lakes and ghioluri and specific ecosystems. At a world level it is on the 22$^{nd}$ place and on the 2$^{nd}$ place in Europe. Almost 50% of its territory is under water, especially during spring time, 45% is permanently covered by water and only 5% (big banks - called grinduri in Romanian literature) represents firm never flooded land (Murariu et Andreescu, 2012).

## RESEARCH AND METHODOLOGY

The current study analyzes the natural potential of the delta as well as the specific demand and tourism supply, namely a relatively intangible and fascinating tourist product given by isolated human settlements in the heart of the delta, accessible by the only means of transport: the boat (.iee Mila 23, Crisan, Letea). The statistical indicators of the tourist frequency of the region indicate the current stage of tourism in a large biosphere reserve in its entirety, thus included in the list of the Unesco World Heritage in 1991 for the variety of its ecosystems and its biodiversity. The maps were produced using Arc GIS software and the secondary statistical data were collected from the statistical yearbooks from the National Statistical Institute of 2010, 2013 and from the consulted reference.

## GENESIS AND DEBATES

As for the age of the delta, there are several hypotheses, but Banu and Rudescu (1965) trace it in the era of the Wurm I when overburdened with alluviums, the sea level rose more than 10 m above the current level. Therefore the flow slope of the Danube river has shrinked so much that it has not been able to transport not even the finest alluviums. These spread over extended areas which formed a marrow which gradually extended upstream while downstream it was conquered by the sea which rose and transgressed on the lower zones, creating the current delta.

The importance of the Danube river, known as Istros to the Greeks, and Danubius to the Romans, was also economic, as it represented an important commercial route for the transport of seeds, animals, honey, wax, wood and fish that were needed for the Mediterranean territories. The reference to the delta is also present in the descriptions of Herodotus, which refers to it under the name of Istrios, and according to whom, during his life time (5th century before Christ) the Danube flowed into the sea by five arms (versus three currently), it was quite developed since it took two days for Darius' ships to reach the point where the arms separated. The mouth of the Danube Delta presented itself as a gulf which encountered the sea. The delta was smaller in size because the outflow slope of the Danube was larger and pushed the alluviums far into the sea,

creating dangerous bars for navigation. At the mouths of the delta more islands were formed, among which the most famous was that of Peuce, or the southernmost one, the current Sf. Gheorghe (Banu and Rudescu, 1965).

The aspect of the delta changes perpetually as water and soil form and deform it by creating firm or floating islands of reed, new lakes, canals, thus with perpetual processes of clogging or erosion. The name of the delta comes from the Greeks who saw the resemblance of that part of Egypt included between the arms of the Nile from the discharge zone into the Mediterranean Sea with the fourth capital letter of their alphabet.

**TOURIST PREMISES**

The beauty of the delta is firstly given by secluded area and its silence, far from the hustle and bustle. There are over 300 species of fish from Asia, Africa and Europe. This region represents a refuge for migratory birds, besides the well known ones from Europe such as France (Camargue), Spain (Guadalquivir) and Austria (Neusiedlersee). Some of these birds are strictly protected such as the pelican. The fish fauna is also very valued such as carp, perch, catfish, rudd, sturgeon, mackerel (Panaghiant, 1967). The uniqueness of the delta is also given by the floating islands of vegetation (plauri), formed of reed and other associated plants that cover more than 200 $km^2$, islands that rise and lower in relation to the water level of the delta. On a small surface there are several forms of relief, such as the sand dunes of Cararorman, forests with tropical characteristics, such as that of Letea; ancient hill-like mountains, such as those of Betespe or Babadag; freshwater lakes, saltwater lakes, marine littoral, canals, the arms of the Danube etc.

In the delta there are more than 38 human settlements occupying the firm land islands (grind) formed by the deposition of alluvial deposits along the delta. In the western part of the delta's arms, these firm lands can be as high as 4 m, diminishing as they approach the coast of the sea. The natural potential of the delta is given by, besides willow trees, poplars and xerophilic plants on the fluvio-maritime shores, the river ecosystems, and the channels with plankton and various fish species (carp, perch, catfish, sturgeon, mackerel), the stagnant water ecosystem is present in lakes with a wide variety of submersed and floating water plants (water lilies) and a varied fish fauna (carp, bream, the Prussian carp, wels catfish), the floodplains and marshes ecosystem, dominated by reeds, sedges, bulrushes and willows with birds including ducks, geese, cormorants, egrets, pelicans, swans as well as fish and mammals such as wild boar, fox, otter, viverine dogs (Ielenics and Comanescu, 2006). A peculiarity of the delta landscape is the veritable vegetation beds, a favorable environment for wild boars, but at the same time an obstacle for navigation and for fishing for the locals (Assche et al., 2015). The birdlife counts more than 300 species of which than 80 nest in the Danube delta.

**WILDLIFE**

The great white pelican (*Pelecanus onocrotalus*) and the Dalmatian pelican (*Pelecanus cripus*) can get to more than 1,9 m. They spend the winter in the Nile Delta and the Gulf of Persia area. Pelicans return to the Romanian delta to rebuild or replace their old nests on the islands of vegetation, in reed forests and even on firm land. Although they are major consumers of fish, they also act as doctors because they catch sick fish thus preventing the expansion of hydrophyseal diseases (Murariu et Andreescu, 2012).

The swans that can be encountered are: the mute swan (*Cygnus olor*) and the whooper swan (*Cygnus cygnus*). The mute swan arrives in the delta in the warm season for nesting. It passes the winter in the south of the Caspian Sea in the Nile delta and in the east of the Mediterranean Sea (Murariu et Andreescu, 2012).

The two types of cormorants (*Phalacrocorax aristotelis* and *Phalacrocorax pygamaeus*) are but two species of the thirty found worldwide, rare colonial species which migrate during winter time to the south of the Black Sea and on the seashores of the Mediterranean Sea, the big one (*Phalacrocorax carbo*) usually remains in the delta except for the very cold harsh winters.

The common spoonbill (*Platalea leucorodia*) is a species that usually prefers humid areas with reeds and feeds on invertebrates. It is a species whose number of individuals has decreased much this is why efforts are made to preserve their natural habitats.

The grey heron (*Ardea cinerea*) and the purple heron (*Ardea purpurea*) are some of the 200 encountered worldwide, they resemble the swans, they migrate to the south-west of Europe and to the north-east of Africa during winter (Murariu et Andreescu, 2012).

Other migrating species are the tufted duck (*Aythya*) and the gadwall (*Anas strepera*), the red breasted goose (*Branta ruficollis*), the common moorhen (*Gallinula chloropus*), the greylag goose (*Anser anser*), the common shelduck (*Tadorna tadorna*), the Mediterranean gull (*Larus melanocephalus*), common tern (*Sterna hirundo*), gull-billed tern (*Gelochelidon nilotica*), the black winged stilt (*Himantopus himantopus*), avocet (*Recurvirostra avosetta*), the great egret (*Egretta alba*), the little egret (*Egretta garzetta*), night and pond herons (*Nycticoras sp. et Ardeola*), the Eurasian penduline tit (*Remiz pendulinus*), the yellow hammer (*Emberiza citrinella*), the hoopoe (*Upupa epops*), the European bee-eater (*Merops apiaster*), the white tailed eagle (*Haliaeetus albicilla*); the latter being one of the biggest prey birds of Romania, one metre long with a wing opening of three metres, the rough-legged buzzard (*Buteo lagopus*) is another prey species whose body length reaches up to 60 cm and the wing opening up to 1,5 m. Among other existing species in the delta we refer to great crested grebe (*Podiceps crisatus*), the Mediterranean gull (*Larus melanocephalus*), the wood sandpiper (*Tringa glareola*), the European roller (*Coracias garrulus*) arrives here afer a long migration from Africa or north-western India, the glossy ibis (*Plegadis falcinellus*) migrates out of to the delta to the Nile valley for winter, the rough legged buzzard (*Buteo lagopus*), the common kingfisher (*Alcedo atthis*).

Among the mammals that can be encountered here are the marsh frog (*Rana ridibunda*), the European ground squirrel (*Spermophilus citellus*), the least weasel (*Mustela nivalis*), the muskrat (*Ondatra zibethicus*), the dice snake (*Natrix tasselata*), the European pond turtle (*Emys orbicularis*).

The vegetation of the delta contains large areas of bulrush, reeds and other psalmophile and steppe plants on the sand dunes. Among the canals of the delta there are alluvial deposits, very firm and fertile with spontaneous grass under the aspect of a sand dune. A very well-established island is that of Popina, at an altitude of 48 m whose herbarium vegetation offers a very good cache for many diverse non-vertebrates such as the black widow (*Latrodectes tredecimguttanus*), a poisonous spider.

The shores of Letea and Caraorman separate the fluvial delta from the maritime delta, where the groves can be encountered, the forest of Letea is home to old oaks, an intensely protected area, but the paradox is that in such a vulnerable zone where the trees grow from sand, impossible to renew it with broods there are over 400 horses set there for tourist reasons, i.e. one horse / hectare of forest that can pose a certain threat to this atypical deltaic vegetation (Murariu et Andreescu, 2012).

The activities of the delta peasants are limited to fishing (the delta is home to more than 155 fish species, among which more than 36 are of great economic value) mainly with the fishing net (vintir). Qite a few are the big fish stories of the delta such as the catfish fished from the delta longer than 5-6 m and weighing more than 300 kg versus those fished today of 0.5-1 m long. Excessive fishing decreased the numbers of perch, herring and eel. Approximately one half of the fishery production comes from the delta, some of which are migratory (shad and sturgeon) and others are sedentary (pike, catfish, perch, carp, etc.). Sturgeon fishing, which is a reminiscence of the ancient pontic lake (Nitu, 1982) of the dinosaur era is finally banned by law due to the decline of the species after a long period of hunting and fishing wildly and uncontrollably as it was in the decade after the revolution of the fall of communism in 1989.

The fishing tools have improved over time from the tip to the advanced trident. For the sturgeon the pointed hook was used. Among the tools encountered both in Indonesia and Brazil and also used in the delta, it is a net in the form of a circle strenghtened with lead (Murariu et Andreescu, 2012).

The other activities reside in the harvest of the reed spread over more than 250,000 ha and used for the roofs of houses, for warming, the feeding of animals and premium material for cellulose (Murariu et Andreescu, 2012).

**MODUS VIVENDI**

In this region there is a large community of inhabitants, larger than 15,000, with a population density of 22 inhabitants/km$^2$ compared to the country average of 73.6 inhabitants/km$^2$ (Panaghiant, 1967) whose activities have been strictly controlled since it was declared a Biosphere Reservation in 1990. The hosted community it is made up of Orthodox (lipoveni) or Ukrainian (hoholi) Russians who have withdrawn here due to past Russian religious persecutions. Besides this minority, Romanians came from all the historical provinces in search of seclusion from agglomerated areas. At present, given the limited opportunities for work, young people have left the delta, leaving an aged population (Vaidianu, 2013).

**Figure 2.** Fisherman in an old boat (lotca), upgraded with a motor

**Figure 3.** Traditional house with a fishing net, covered with reed of Mila 23

The adaptation to a perfect environment for animals, less favorable for people created a particular modus vivendi for the inhabitants of the delta, as described on the panels featured in the village Mila 23, whose existence is closely linked to boating and fishing (figure 3), always ready to jump into the boat (called lotca by the locals) when the thin slices of land that they inhabited would flood regularly, the diet made almost exclusively of fish, boat transport among a labyrinth of perfectly memorized canals, all on the background of a strong ecological confinement (figure 2). This gave rise to a close coexistence of men and animals, a closely knit man-nature symbiosis has developed and there were quite a few dramas or happy such encounters so beautifully described in the stories of Romanian writers such as Stefanescu (1970) and Jean Bart (1906).

**PROTECTED AREA**

The status of protected area underwent several stages, notably in 1940 when the reservations of Letea and Rosca-Buhaiova were declared protected, to which three more were added in 1956 and later in 1990 the Danube Delta and the complex Lake Razelm-Sinoe were declared a Biosphere Reserve (576 216 ha) and a RAMSAR site, under the national decree no. 983/1990, whose universal value is recognized by Unesco's Man and Biosphere Program (Vaidianu, 2013), a measure which, although somewhat belated, has greatly reduced the negative impact upon fishing, excessive hunting and industrialization. Due to the latter situations, some species became extinct, such as the sturgeon. The detrimental intervention of man is also declaimed by Jaques-Yves Cousteau who, during a scientific visit declared his amazement of the survival instincts of the delta after the abusive interventions and pharaonic works when the Sulina

arm was channeled for the navigation of large ships in 1857, which rendered it much poorer from a biological diversity viewpoint.

These delta wounds, as well as proactive actions, are now managed by two institutions, i.e. The Danube Delta Biosphere Reserve Administration, based on scientific information from the National Institute of the Danube Delta for Research and Development who are putting up efforts to preserve this natural heritage, such as the partial restoration of part of the delta, regularization of fishing, retreat of development, return of some key species, etc. These are sustainable priorities sometimes declaimed by locals who threaten relocation as featured in the holistic approach to the phenomenon presented in detail and with all the involved actors by Assche and Iordachi (2015).

In order to maintain the delta as an important wild and ecotourism destination of Europe for future generations to enjoy, these measures are necessary. Its seclusion and its reduced accessibility makes it all the more attractive for tourism, which must also be organized in a sustainable way, away from mass tourism, in order to ensure that the future tourist's entry into the delta will be a smooth passage/dawdling through the canals with idyllic (Mihaiu, 2009) lacustrine areas, i.e. lakes Rosca-Buhaiova, Nubunu, Potcoava, etc. (figure 4).


**Figure 4.** Protected areas of the Danube delta

**ECOTOURISM**

A study of the tourism analysis of the Danube delta in Romania is carried out by Nitu (1982) who analyzed this phenomenon until the 1980s in terms of natural potential and its economic valorization, tourism facilities and the economic efficiency of tourism. A main issue was taken into consideration, notably the evolution of tourism in the delta, based on the data of the work mentioned below, supplemented by updated data from the National Institute of Statistics of Romania.

The arrivals in the delta during the 1980s reached a climax with a total of 261,519 tourists (Nitu, 1982), the evolution took place gradually, as at the beginning of the tourist flow in 1965 one could only count 18,243 tourists and in the contemporary period, especially in 2010 we can count 68,000 tourists (figure 5). It is interesting to notice that the number of foreign tourists in 1960 clearly outnumbered the national ones, whereas in 1965, of those 18,234 arrivals registered in the delta 5,600 were Romanians and 12,643 were foreigners, a trend which lasted until the years 1975, but after the 1980s the situation suddenly reversed. In the years 2010 the number of domestic tourism is higher, so that in the 2000s, of a total of 34,000 arrivals, only 5,000 were foreigners. In the years 2012 there is a slight increment of the tourists with 88,000 arrivals of which 31000 are foreigners (INS, 2013). Their average stay is 1.5 days, which indicates a minor revenue impact for the locals; in fact only 2% are engaged in tourism, with the remaining 62% engaged in fishing and agriculture (Vaideanu, 2013). Nevertheless, the delta is not designed for massive attendance, as in 2012 there are no more than 136 accommodation units of a total of almost 6,000 existing accommodation structures in Romania (INS, 2013). The seasonality of the phenomenon is also captured by the fact that the index of net accommodation use capacity does not exceed 20.8%. An expanding emerging niche of the delta with a constant evolution is cruise tourism which had 300,000 passengers in 2014 (Irincu et al., 2015).

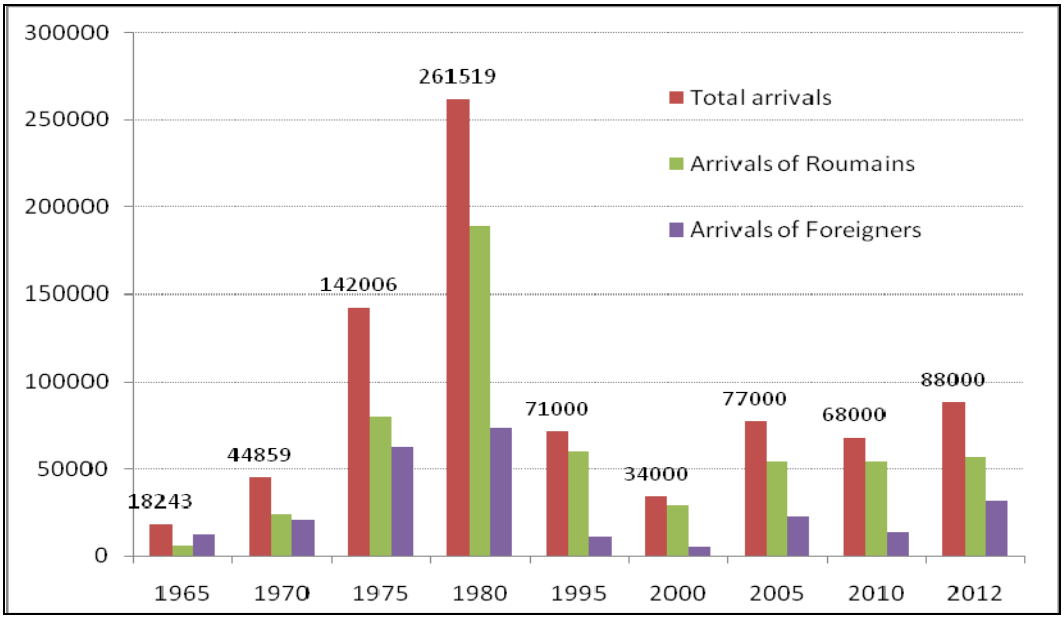


**Figure 5.** Tourist arrivals during 1965-2012
(Data source: Nitu,1982, INS)

The fragility of tourism in the delta is reported in the study of Vaideanu (2015), who highlighted the fact that tourists are calling for several oversights, but everything seems to turn to the lack of coordination of local, governmental and management actors and to an integrated management, a vital interconnection for the proper functioning of the entire system. According to the study, the interviewed tourists are concerned that there are no regulatory measures for fishing and in general over-exploitation of resources, that there are no information boards all of which create the favorable premises for an inadequate and unintentionally unlawful behavior. The fact that these issues are signaled by the respondents indicates the tourists visiting the delta are responsible. The accommodation structures have followed a rising trend, with 136 accommodation units in 2012, with a capacity of 4767 places (figure 8). The tourist accommodation supply is not

extensively represented by hotels (18 units), which are rather located in larger localities, such as Tulcea, Sf. Gheorghe, but by cozy tourist guesthouses with their own charm and individuality lining the Danube delta banks, such as Mila 23 (figure 7), Crisan, Jurilocva, etc. This supply is complemented by places of ships (figure 6), campsites, bungalows, holiday village.

**Figure 6.** Ship proving accommodation places

**Figure 7.** A floating pub terrace of Mila 23

There are few accommodation units in the delta, but the increment of accommodation places is positive, which heralds a growing interest in this lake landscape, despite the fact that the tourism capacity is more reduced by approximately 1% versus the full capacity of Romania (Constantin and Constantin, 2009).

There are good practices among service providers, such as the travel agencies of Tulcea, which do not exclude but involve the locals into the tourist industry, such as the young guides who lived there and know by heart the small canals behind the main stage of the delta, as well as the different species of birds that shelter them and the stories associated to them. Since the access to the delta is only possible by boat, these guides accompany and are almost indispensable to the tourists during their entire stay, except in situations where tourists have their own boat (but the risk of getting lost among the thousand winding canals will be very high). As highlighted by the study of Vaideanu (2013), tourists declaim an in situ lack of information on the delta, signs, information centers, rules of behavior, as the tourist of the delta is an educated one. It is ecotourism that can be a catalyst for a greater tourist development in a natural environment. Nevertheless the risk of development can be greater especially in ecological destinations. In fact, with the best intentions of the operators, it is shown that once the path of a massive economic development is open, it is very difficult to control the results (Blamey, 2001).

According to the general perception, ecotourism is based on the natural environment, but the question arises as to how close to nature must the tourism experience be to qualify as ecotourism (Weaver, 2001; Dincă et al., 2012). Specialized literature concludes that ecotourism is in fact a sub-segment of sustainable, nature-based tourism that juxtaposes with adventure, cultural and 3S tourism (Weaver, 2001). This holds true in the case of the Danube Delta, since tourism is also practiced in the Delta region of the Black Sea, the culture of the local population of the Russian and Ukrainian minorities is capitalized for tourism through dances and cuisine, bird watching experiences and boat trips among a natural environment of specific deltaic ecosystems (Weaver, 2001).

Damage can be prevented in the Danube delta if some key environmental principles (Blamey, 2001) are observed such as: act as a force for conservation; develop policies in all areas of tourism; install system to minimizing pollution; develop and implement sustainable transport policies; adhere to precautionary principle; research, establish and abide by the carrying capacity of a destination; respect the needs and rights of local people; respect the cultural and historical

heritage of peoples worldwide; carry out practices in ethical manner so as to avoid that a heavy tourist exposure results in a gradual erosion of the indigenous language and culture.

Ecotourism is meant to counterbalance mass tourism which over the years has triggered negative effects such as behaviour change, resource loss, pollution, litter, seasonal employment. Ecotourism on the other hand comes to the forefront as a viable alternative, a better tourism inviting to authenticity, immersion, self discovery, quality not quantity, unique experiences in primitive locations (Blamey, 2001), teeming with, in the case of the Danube delta, floating islands of vegetation, reed islands, rivulets and floodable and non-floodable canals.

At the level of Europe some policies meant to protect the natural heritage refer to the Nature 2000 network for the protection of birds and habitats in compliance with promoting activities compatible with site protection (Blangy and Vautier, 2001; Herman et al., 2016a; Herman et al., 2016b; Ilieş et al., 2015; Ilieş et al., 2017).

Therefore as it was claimed by tourists that there are not enough informative panels throughout the delta further environmental education is still needed such as presenting tourists with a code of ethics for their proper conduct into such a primitive and meanwhile fragile environment.

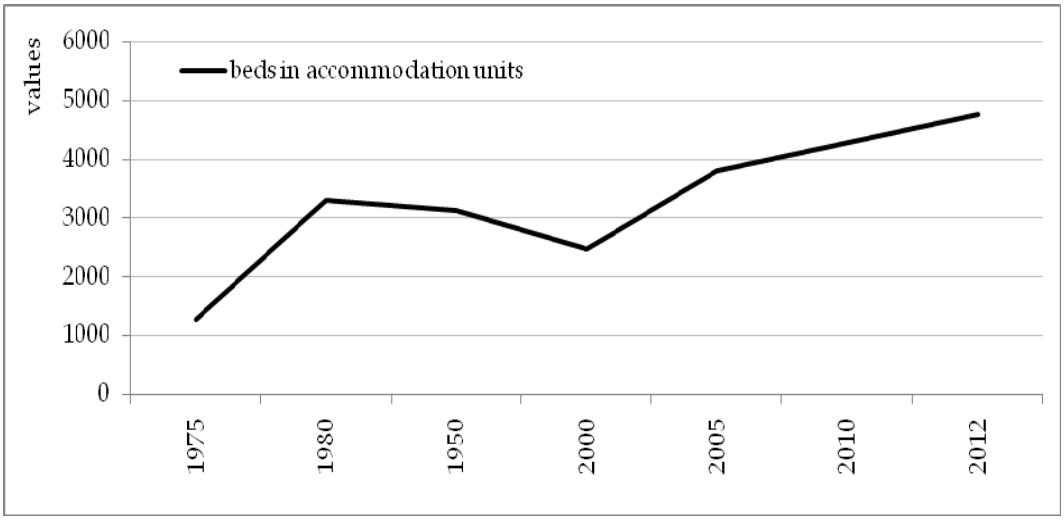


**Figure 8.** Beds in accommodation units during 1975-2010
(Data source: Nitu, 1982; INS, 2013; PATN, Tulcea)

**DELTA AT DANGER**

As revealed by the stuudies of Vespremeanu (2004) the future of the delta is not too encouraging because every 10-12 years there are great amplitude floodings that cleans the excess of organic substances and redistribute the alluvia which will give rise to an increased clogging of the Danube delta fringes' sectors, the channels are blocked, and the river system is simplified, so that the fluvial plain will spread, the vegetation will be transformed from the current great diversity into simple, monotonous reed marshes and it will eventually turn into a steppe vegetation and salty soils. After the 1950s there was a rise in sea level which affects the deltaic coast with significant losses of hectares of land through the erosion process. Apart from this, the delta is affected by slow movements of subsidence, to which is added the subsidence by the compaction of the decomposed deposits, the reduction of its capacity to renew itself by the extension of secondary deltas. Therefore an integrated management is required by the control of water flow to maintain the delta at desirable parameters.

The evolution on this trajectory can reduce the chances of seeing genesis at its home, words so beautiful expressed by the writer Eugene Botez (1906: 7) who said that *"It is only the marsh that charms me, the mountains are cold and rigid, the monotonous forests weigh heavy upon me, the sea's always changing, in whose mirror the sky reflects itself with other color tints each new time charms my eyes, but it is only the swamp that charms my feelings and intrigues my mind. It is the lacustrine landscapes, their rich and mysterious life which frets in this humidity that evokes the age of first eras, the beginnings of life on Earth, the impenetrable enigma of creation. When I found myself alone in this lake solitude for the first time, in the middle of this solemn and primitive nature in which you can't feel any human breath, it seemed to me that I entered a special world, remained as by witchery in its primordial state of creation; a fringe of land where a mysterious biblical perfume of the ancient history of the creation of the world in six days can still be inhaled".*

## REFERENCES


Iordachi C., Assche K. (2015), *The Bio-Politics of the Danube Delta - Nature*, History, Politics, Lexington Books, USA.

Assche K., Bell S., Teampau P. (2015), *Birds, Fish and the Traumatic Nature of the Swamp-Concepts of Nature in Regards to the Romanian Danube Delta*, in Iordachi C and Assche K. (Eds.) The Bio-Politics of the Danube Delta, Lexington Books, USA.

Banu A.C., Rudescu L. (1965), *Delta Dunarii*, Editura Ştiinţifică, Bucureşti.

Bart J., Botez E. (1906), *Povestiri din delta*, Tipografia Rasaritul, Bucureşti.

Blamey R. K. (2001), *Principles of Ecotourism*, in Weaver (Ed.) The Encyclopedia of Tourism, Cabi Publishing.

Blangy S., Vautier S. (2001), *Europe,* CABI Publishing.

Constantin D. L., Constantin M. (2009), *Cultural Tourism, Sustainability and Regional Development: Experiences from Romania,* in Girars and Nijkamp (Eds.), Ashgate.

Dincă I., Herman G.V., Sztankovics G. (2012), *Descoperire prin ecoturism si prin turism rural în Comuna Cetariu*, Editura Universităţii din Oradea, ISBN 978-606-10-0724-0, Oradea.

Herman G.V., Ilieş D.C., Baias Ş., Măduţa M. F., Ilieş A., Wendt J., Josan I. (2016a), *The tourist map, scientific tool that supports the exploration of protected areas, Bihor County, Romania*, GeoSport for Society, volume 4, no. 1/2016, pp. 24-32.

Herman G.V., Ilieş D.C., Măduţa M.F., Ilieş A., Gozner M., Buhaş R., Mihok-Geczi I-M-T. (2016b), *Approaches regarding the importance of Natura 2000 sites' settings pupil's education through geography. Case study:Valea Rose (Red Valley) Natura 2000, Bihor country, Romania*, Journal of Geography, Politics and Society, 6(4), 57–62.

Ielenics M., Comanescu L. (2006), *Romania-Potential turistic*, Editura Universitară, Bucureşti.

Ilies D. C., Baias S., Buhas R., Ilies A., Herman G., Gaceu O., Dumbrava R., Maduta F. (2017), *Environmental education in protected areas. Case study from Bihor County, Romania*, GeoJournal of Tourism and Geosites, vol. 19, no 1, pp.126-132.

Ilies D. C., Buhaş R., Ilieş A, Morar C., Herman G. V. (2015), *Nymphaea Lotus Var. Thermalis (Pârâul Peţea Nature Reserve), Brand Near Extinction of the Băile Felix - Băile 1 Mai (Romania) Spa Tourism System*, GeoJournal of Tourism and Geosites Year VIII, no. 1, vol. 15, May 2015, p.107-117.

Irincu E., Petrea R., Racz N., Bulzan A., Filimon L. (2015), *Cruise Ship Tourism in the Danube River. Case study-Capitalisation of Deltaic Tourism Potential*, Annals of the University of Oradea-Geography Series, vol XXV, no. 2, University of Oradea Press.

Mausbach M. J., Parker W. B. (2001), *Background and History of the Concept of Hydric Soils,* en Richardson J.L. et Vepraskas M.J. (Eds.) Wetland Soils – Genesis, Hydrology, Landscapes, and Classification, Lewis Publishers.

Mihaiu L. (2009), *Delta Dunării,* Revista National Geographic, nr 12.

Murariu et Andreescu (2012), *Romania – Delta Dunarii/ The Danube Delta/ Das Donaudelta*, Ad Libri.

Niţu M. (1982), *Turismul în Delta Dunării*, Editura Sport Turism, Bucureşti.

Panighiant E. (1967), *Delta Dunarii*, Editura Meridiane, Bucureşti.

Stefanescu T. (1970), *Lacrima delfinului*, Editura Ion Creanga, Bucureşti.

Vaidianu M. N. (2013), Fuzzy cognitive maps: diagnosis and scenarios for a better management process of visitors flows in Romanian Danube Delta Biosphere Reserve, Journal of Coastal Research, Special Issue, nr.65.

Vespremeanu E. (2004), *Geografia Marii Negre*, Editura Universităţii din Bucureşti.

Weaver D. B. (2001), *Introduction to Ecotourism*, Cabi Publishing.

*** (2013), INS, National Institute of Statistics of Romania, (Accessed date: May 11, 2013).



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