

A DIACHRONIC APPROACH OF LANDSCAPE CHANGES. CASE STUDY: MORII LAKE AND ITS SURROUNDINGS

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Abstract. The objective of this study is to identify specific characteristics of urban development in the category of complex facilities within cities. The study aims to identify changes that took place in the urban landscape, near Morii Lake on Dâmbovița River, changes with a significant impact on the natural and anthropogenic environment. The analysis follows space functionality structure, whose evolution is basically modified. The communist period of the 80's, the one of great constructions, includes the design of Morii dam, based on the overall goal of protecting the capital from Dâmbovița's floods. The interpretation of the results is oriented towards a complete picture of the advantages and disadvantages of building a dam lake within an urban area. The changes that took place both during and after the construction of Morii Lake, led to impregnation of another aspect of the landscape in the area. Among the visible effects, as a result of demolitions and displacements from the adjacent area, blocks of flats and villas were built, some agricultural area from the past have been left without use, nowadays attempting the tourist development of the area. For a better understanding and visualization of the results, databases were represented using GIS techniques.

Key words: dams, effects, chaotic development, perception.

1. Introduction

The urban space reconfigures its identity and reaches for more involvement from people, but in urban development the individual purpose is often contrary to collective purpose and the private purpose is often different than the local purpose. Each period of time marks new changes and new trends in the urban planning by new ideas which explore new actions (Boștenaru Dan, 2004, 2013). The need to understand the opportunities and the potential of local resources in a context both local, as well as global, required a methodology based on analysis of several data types.

Concerns about new construction planning, the implication on sustainable development, availability resulting from changes, dynamic urban landscape, shaping, planning or restoration of already built areas, involves multidisciplinary research (constructions and architecture, urban planning, territorial planning, sociology), which deals with the study of human habitat (Petrișor, 2007, 2013). Urban planning involves social and human components about community issues like housing constructions, restoration, new roads and strengthening the existing ones, developing new services and so on. All

the above beg questions regarding topics such as: when urban restoration is necessary, if that resolves problems of road traffic or if it is desirable to change the appearance of landscape (Nițulescu, 2000, 2001). It is obvious that the construction of a dam implies a sustainable urban planning, modeling of surrounding districts being changed in the light of new perspectives.

Building a dam that allows forming the biggest lake from Bucharest, represents a landscape change with positive and negative aspects from local to national or even international levels. Beyond the physical and ecological consequences associated with hydroelectric projects, before projecting this element, debates about geographical distribution of water and electricity resources, decision making people policy, people's relocation, changes in social, cultural and economic life of affected communities by dam construction, will take place (Arvela *et al.*, 2012; Tilt *et al.*, 2009; Zhao *et al.*, 2012; Wijesundara and Dayawansa, 2011).

At that time, the project was controversial but the building of an anthropogenic lake and the dam to prevent floods was a necessity, furthermore, water surfaces are considerate important in human ecosystem for their role in urban air purification (Ioja, 2009). The building location can be explained through many reasons such as outskirts position of the point where Dâmbovița River enter in Bucharest, use of barren land, removal of waste sites and ponds.

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was at the end of the urban area, at the periphery, some specific landscape elements were removed. Beside relocation of people, one church and the cemetery were destroyed. Such things brought amongst people a negative perception about the new construction. Redefining the Bucharest's periphery near the lake with the purpose of creating a sustainable link between territory and the neighborhoods, three key elements were needed according to Capelle, 2012: a relationship between water and the city, territory - nature - city and a relationship between different urban networks (territory - nature - city).

Among other ideas, the article answers to some questions:

- How much does the construction of a dam affects the geographical reality of an area?
- Which are the main reasons upon one may decide the implementation of a large hydrologic project that involves major changes in a current urban landscape?
- Is the construction of new residential projects in the immediate proximity of Morii Lake suitable from the economic or social security point of view?

1.1. Study area

Morii Lake is the largest lake in the capital Bucharest occupying a total area of 220 hectares, according to Marchidanu *et al.*, 1988, it is surrounded by longitudinal dykes, being situated at the entrance of the Dâmbovița River in the Romanian capital, just before Ciurel bridge. "Ciurel" toponym was used in ancient times to define the area, and then, to define the lake which is now called Morii Lake; the ancient toponym appears starting with the year of 1791, on the Specht Colonel's map and it is still being

used by people today, especially by those who lived in the vicinity of the studied area.

According to the administrative units of the capital, the lake is located entirely in the 6th District (it is also part of Roșu Village), between the neighborhoods of Politehnica (in the East), Crângași (in the North), Giulești, Roșu Village (Chiajna Commune) and Dâmbovița Lake (to the West) and Militari (to the South). Morii Lake Alley follows the circumference of the lake. Fig. 1 shows the relationship between Morii Lake's location and the country, counties and Bucharest. A 500 meter buffer zone was created around the lake, which is being considered a sufficient area of chronological observation for the landscape changes.

The building of the lake took place between 1985 - 1987, with the main purpose of flood protection but also for the establishment of the necessary framework for rational water management in the dry and rainy periods, thereby providing

drinking water flows, industrial water or other different uses (irrigation, recreation, fishing and so on).

In 1985, it was decided to start the work scheme in the capital for Dâmbovița River (Fig. 2) and for the adjacent rivers, Argeș and Colentina (Popescu and Lăzărescu, 1988). The dam lake is bounded on the downstream and on the left side by a strong soil dam (Marchidanu *et al.*, 1988). Upstream of the Roșu's bridge, the reservoir is bounded by dams that aimed Dâmbovița's riverbed near Chiajna.

In the downstream part of the accumulation, the location of the concrete dam's barrier provides transit flows which are needed for acclimation, water scour of the Dâmbovița River, releasing the flows and clearing the lake. The location of the concrete dam's barrier overlapped partially over the site of the old mill Ciurel (Popescu *et al.*, 1988). The Morii Dam is equipped with a spill closed structure and it has two galleries to empty the tank (Croitoru and Tontici, 2000).

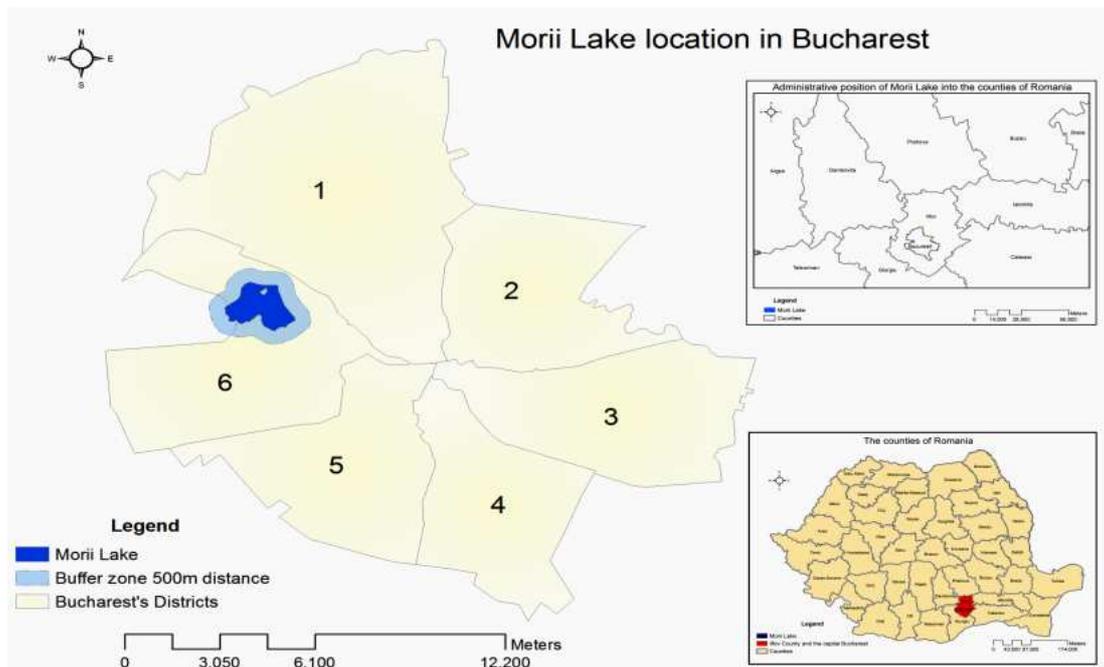


Fig. 1. Reference area

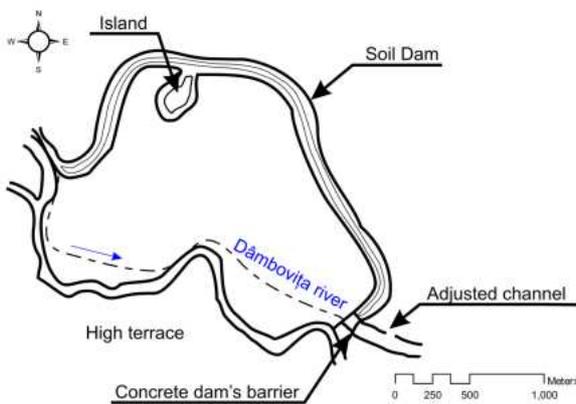


Fig. 2. Schematic plan of the lake and of the dam

Dams have a profound and varied impact on the rivers on which there are built. Sediments are usually trapped in the reservoir above the dam. Downstream sediments may decrease or may accumulate depending on the distance from the dam, the material brought from tributaries and the difference between pre-dam flows and dam discharges (Collier and Webb, 1996).

2. Methods

In compiling the current project, was used the following research methods have been used to help in exposing the points of interest:

- The method of observation and analysis allows understanding the urban environment as a complex system influenced by the surrounding reality and the way the consequences appear and evolve, more or less appropriate to the relations established between the existing situation and the needs of society; all of them are based on the method of interpretative description which presents the characteristics and the problems of the analyzed area.
- The comparative method compares the cartographic material (achieved through

methods such as the signs, areas, points, etc.) and the photographic material (photos were taken personally in the year 2012), to determine the evolution of the entire urban complex and to demonstrate the evidence of certain necessities.

- The selection and synthesis of the data taken from the bibliography, in accordance with the local horizon, provides accuracy and relevance, being helpful in analyzing the less known informations.

For this study the following data were used as support materials:

- raster data/images: topographic map 1:25.000, sheet L-35-125-C-a, elaborated in 1978, the original land edition in 1977 (the map has been downloaded from The Educational Project OpenGis - www.opengis.unibuc.ro - with the open source software uDig); orthophotomap 1:5.000, year 2008; Landsat satellite multitemporal imagery (years 1984 and 2002), resolution 30 m; personal photos from 2012;
- vectorial data: administrative limits units taken from the geo-spatial.org; database set Corine Landcover 2000 and 2006;
- online maps and applications: Google Maps, OpenStreetMap.

Stages of research in the field have been combined with stages of documentation and analysis of the material held. The methodology for the space analysis of the raster data/images was based on the classical processes, in particular on the modern methods of Geographical Information Systems technology. Graphic

materials have been carried out using GIS specialised software (in particular ArcGis). Landsat images have been sources for the analysis of area changes at multitemporal level, at a difference of 18 years. They were processed in the program Envi 4.7 and enhanced by a number of different corrections and filters.

The orthorectified aerial image (the orthophotoplan from ANCPI, realized in 2008, raster format) has been the most recent source of extraction of the data; this was georeferenced in projection Stereo 70, datum Dealul Piscului, EPSG code: 31700. Using GIS, the material result is precise and can be used in many situations, it depends on what is required (for example the vectorised elements, saved in *.shp extension, may be added as a layer in addition to any type of thematic map made with GIS techniques).

The resulted vector data base has been supplemented by vector data on use of the land, namely Corine Landcover, from the years 2000 and 2006. European Environment Agency has taken over the Corine data bases from the European Union, which has initiated the program in 1985. One of the Corine programs is an inventory of the coverage of land in 44 classes, presented as a cartographic product, on a scale of 1:100 000 (European Environment Agency, 1995), model from which there were extracted the survey data for the purpose of this research. Data accumulated from the two years of references, 2000 and 2006, overlapped and no changes were noted in coverage of land area, due to the fact that they were on a rather small scale detail. Changes which have occurred may have been observed only at a large scale, as for example by using orthophotoplans.

3. Results

From the point of view of a diachronic analysis, in order to disseminate the elements that have been changed or removed on the way, informations have been structured from before building the dam, as done at methodology, and placed against elements as new as possible, to show a real feasible correlation past - present.

In the 1940-1960 period, the land in the area of analysis was not very affected by spring floods of the Dâmbovița River, and for this reason it began to be occupied by individual houses made of half-timber and unburnt brick, of some poor families (from here the toponym Crângași has started to be used for the neighborhood, from the "grove", consisting of a few households). In that period, Crângași form along with what we now know to be the neighboring area of Giulești, a large village called Voivode Mihai. From 1960 they began to build the first blocks in the area, P+3E, and subsequently those with four floors on Constructorilor Boulevard for workers in metallurgy. After 1970, Dâmbovița has begun to cause problems, two large floods having taken place which have destroyed parts of the current Crângași neighborhood, determining its subsequent planning.

During the 80's, the end of the communist regime in Romania, shows at political level a new ideology, that of national-communism, being something different than the beginning and the middle of that era. The early period starts with taking the power in 1947 until the second half of the 60's where there is a total political, administrative and ideological dependence from the Russian power, Bucharest trying to become a copy of Moscow. In the middle period (1960-1970) there was a

programmatic removal from Moscow, a so-called "independence", when blocks of flats and exponential buildings like Intercontinental Hotel, Television Centre and Otopeni Airport are being built, all of them trying to demonstrate the strong and durable character of the regime and its evolution. The end of this communist period is strongly marked by Nicolae Ceaușescu's options, whether it's about the megalomaniac buildings influenced by his travels in Communist Asian states, either by the destruction of some historical places like the Old Centre. Besides the demolition of entire neighborhoods, monuments have been destroyed, especially religious ones, or moved, in order to be hidden between the blocks. Such destructions took place also in the studied area, but all of them had a positive goal, to stop Dâmbovița's floods in the capital. The design of Morii Dam, the third one on Dâmbovița River, was also linked to the discussions generated by Ceaușescu's initiatives who intervened increasingly more in the technical solutions.

The oldest cartographic information collected in the current analysis, I have processed from topographical map 1:25.000, sheet L-35-125-C-a, elaborated in 1978, the original land edition dates from 1977. This submits the area situation before fitting the lake (its scheme was carried out in July 1985 as remembered above). Processing is done with a buffer of 500 m distance from the current location of the accumulation. It was chosen this area of influence of 500m because here you can notice the most changes influenced by the new construction. In fact, the whole capital was constantly changing in this period, but the direct action of accumulation is not specific all over it.

In the context where the lake's construction had to be done in 1986, the

attempts to not affect Crângași neighborhood by abolishing 400 households on the Agnita Crivina, Nucșoara, Saidac and Căpitan Margarit streets, two schools, the Church of St. Nicholas, and even the exhumation of a cemetery, and its movement in Giulești Sârbi neighborhood, could not be avoided (Fig. 3 and Fig. 4).

At the topographic map level we can notice landscape elements that have been destroyed by construction build-up, but also those elements which are present today in the adjacent area. In the central-northern area there were easy access swamps, of 0.4 - 0.5 meters deep, passing them through an embankment. Crângași Street was crossed the area to the west, in Roșu village, nowadays turning to the right until reaches Mehadia street. Virtuții Street is symbolized on the map, with an embankment for Dâmbovița passage, where now is the dam. Opposite the dam, where nowadays you find Dâmbovița Swimming pool, there were two side streets, isolated and industrial buildings, all of which were abolished.

Being a suburbs area, there were many crop layers, more specifically sparse vegetation (meadows, rows of trees, isolated trees, isolated shrubs). Buildings from east side of the lake were knocked down, they were poor houses from the old neighborhood, people from here being relocated in Giulești neighborhood blocks, in particular. Also in the east, there were a church and a cemetery, at an altitude of 80.7 meters according to the topographic point, all the bodies from there being moved to Giulești Sârbi cemetery, as being the closest.

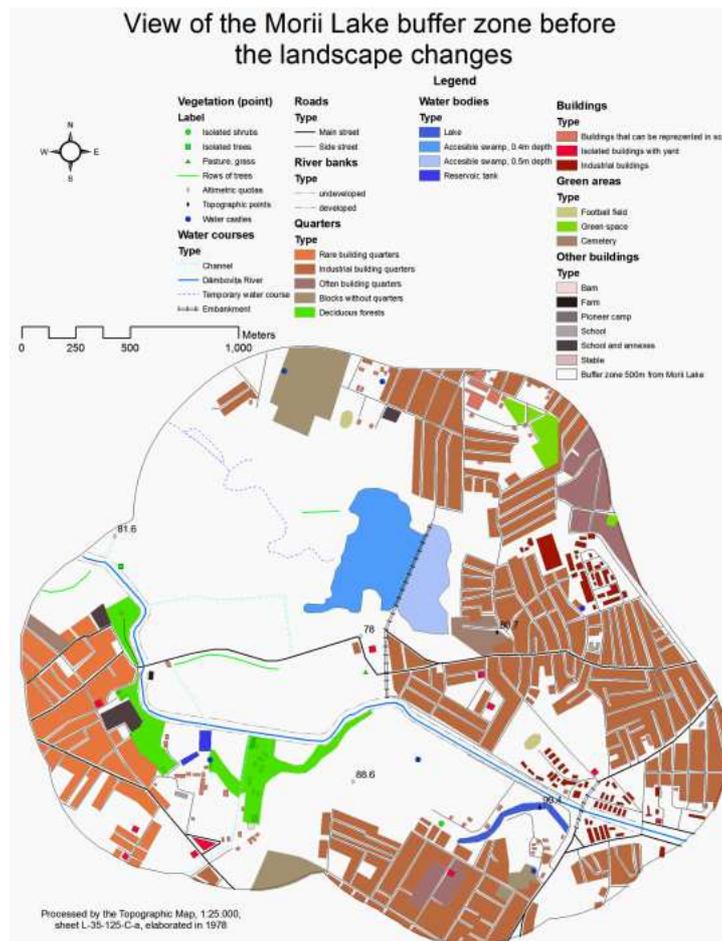


Fig. 3. View of the Morii Lake according to topographic map 1:25.000, year 1978 (full image)

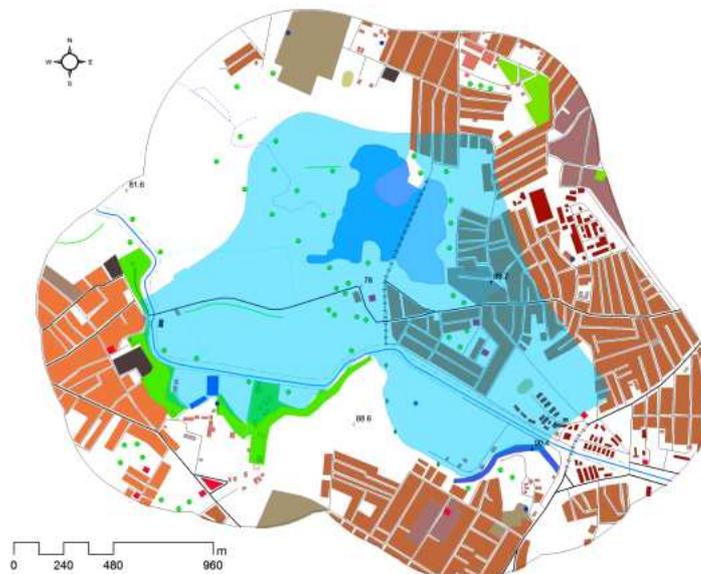


Fig. 4. View of the Morii Lake according to topographic map 1:25.000, year 1978 - (zoomed area)

Of the remaining elements still present in the same form as in this cartographic representation we can mention the Pasteur Institute in the North and Roșu Cemetery in the West. Thus, it is

Industrial Platform (even if some of it is now is rented for offices), the Pasteur Institute in the North and Roșu Cemetery in the West. Thus, it is

noticed that they chose this place for the location of the dam for not being forced to demolish a lot of buildings, even if looking at the communist era demolition of the old and building of new blocks was a main purpose. Constructions from around the Morii Lake in the immediate period following the dam construction, were made just to resolve the relative absence of the types of individual and collective constructions in the area, research and design institutes, as well as of recreation land, like Crângași Park.

Multitemporal Landsat Images, which perform analyzing using software Envi 4.7, added a plus of observation, make reference to the year 1984 (it is to be noted on the image the start of Casa Poporului construction after demolition of some monasteries and leveling of the Uranus Hill, when the dam construction was not even at the design stage) and to the year 2002 when the anthropic element is now well framed into the landscape. The changes to occur starting from the end of year 2002 up at present, are taking place at economical level, either residential areas with commercial areas or joint ventures, or appearance of new buildings around the lake. Images have been downloaded free of charge from the website Earth Explorer of United States Geological Survey (<http://earthexplorer.usgs.gov/>), from the same months, but from separate years. The level of processing is Level 1, meaning that the association was made between georeference and orthorectification points, points on the ground, latitude, longitude, altitude, orbit, line, more exactly the image is processed and restored radiometrically. Archives images from 1984 are taken by the sensor Landsat 4-5 TM, this does

not include the band 8 Panchromatic (they are formed of 7 records representing each spectral band: blue, green, red, near infrared, IR medium, IR thermal, another interval from IR medium). The band 8 is found in the 2002 file taken over by the Landsat 7 ETM+ (scanning system SLC-on quality of images appropriate), with a spectral resolution of 15m, as compared to 30m of the other bands (thermal band 6 has a resolution of 60 m).

As a way of analyzing and processing satellite images, there was chosen a combination of three spectral bands as RGB to be able to see clearer images and to look at the overall changes in both of them, from different years. In existing Landsat images, combinations of spectral bands 457 (Fig. 5 and Fig. 6), made up of the two middle infra-red bands and a band of near infrared, were used. Buildings show shades of blue-light blue, with dark orange are represented forests of broadleaves (beech tree is predominant), here could be exemplified Dudu forest in the West area, which remained the same through the mentioned period; light orange for secondary green meadows, like the ones in the North-West, arable land and pastures; green-blue for arable land, greenish-gray in the case of land with excess moisture, or groundwater near the surface, situated directly on the surface where the lake has been built, but also in the North-West and West, between meadows. In the 18 years period between the two satellite images, we can see an urban development accelerated by the growth of areas constructed, like in the East side, the development of Rosu, Chiajna and Dudu towns, improvement of infrastructure (many streets are being paved and main avenues like Iuliu

Maniu and Drumul Taberei have already been paved), reuse of the land taken out of use in the past, like swamps and other pieces of land where the lake has been set. It can be seen very clearly in the second image, from 2002, that the Dâmbovița River is dammed, the Independence Street follows the water course.

The lacustrine basin, well evidenced, cover the land that in 1984 was inhabited in the East and it was represented by wetlands in the center with lawns or farmland. Although the spatial resolution of Landsat images is 30 meters, it is enough to discuss about changes at the macro level, the new dam lake area being the largest in Bucharest.

With the help of Corine Landcover data 2006 a land cover distribution was

carried out in the area of the Morii Lake buffer zone (Fig. 7). Here there is a large share of the discontinuous urban space (according to the chart in proportion of 35%), which were normally part of north-western part of the capital city, with a large degree of anthropisation (Fig. 8). Hydrography represented by the Dâmbovița water course and Morii Lake occupies 37% of the analyzed surface. A high percentage of 18% is occupied by green spaces, here being included Crângași Park, areas of deforestation or with scattered trees and so on. Other categories of land cover, as total percentage of 10 %, are represented by swamps and non-irrigated arable land or commercial and industrial establishments (designations in accordance with the legend of Corine Landcover carried out by the European Environment Agency).

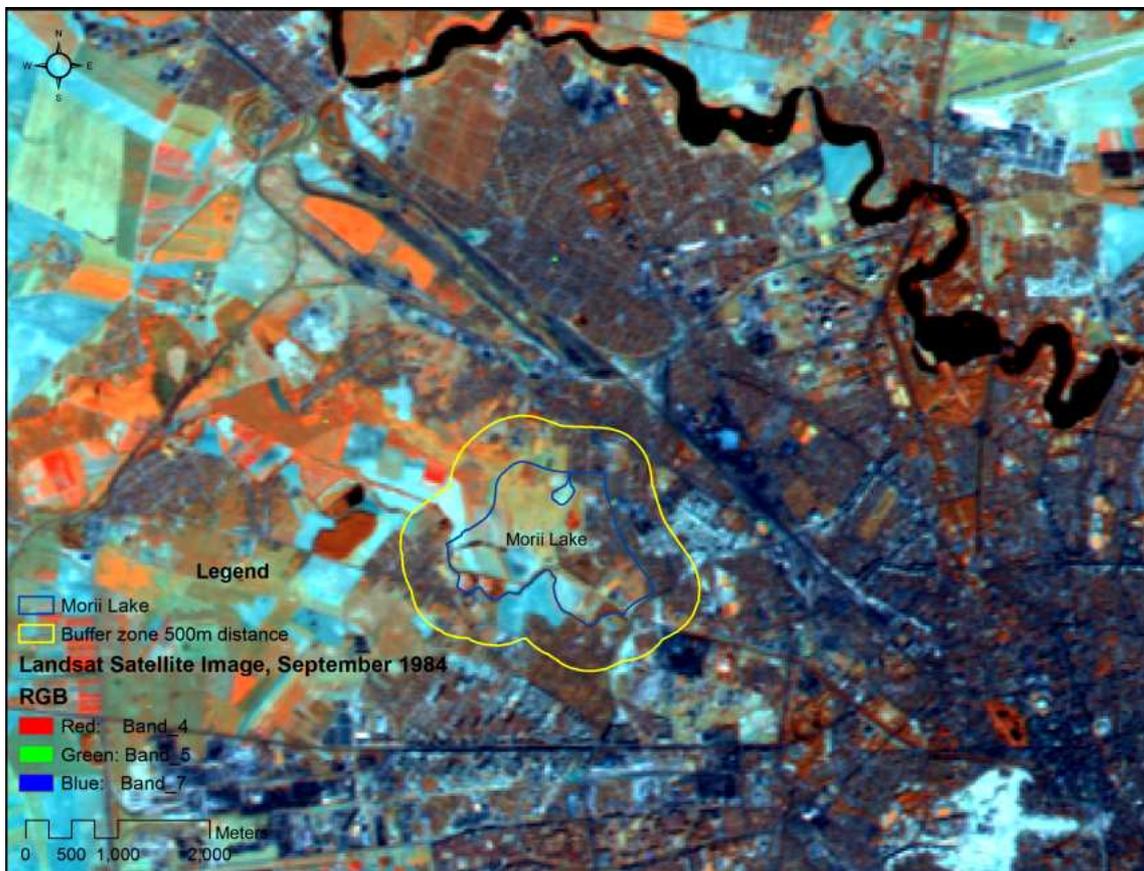


Fig. 5. Landsat 4-5 TM Satellite Image, September 1984 (data source: USGS)

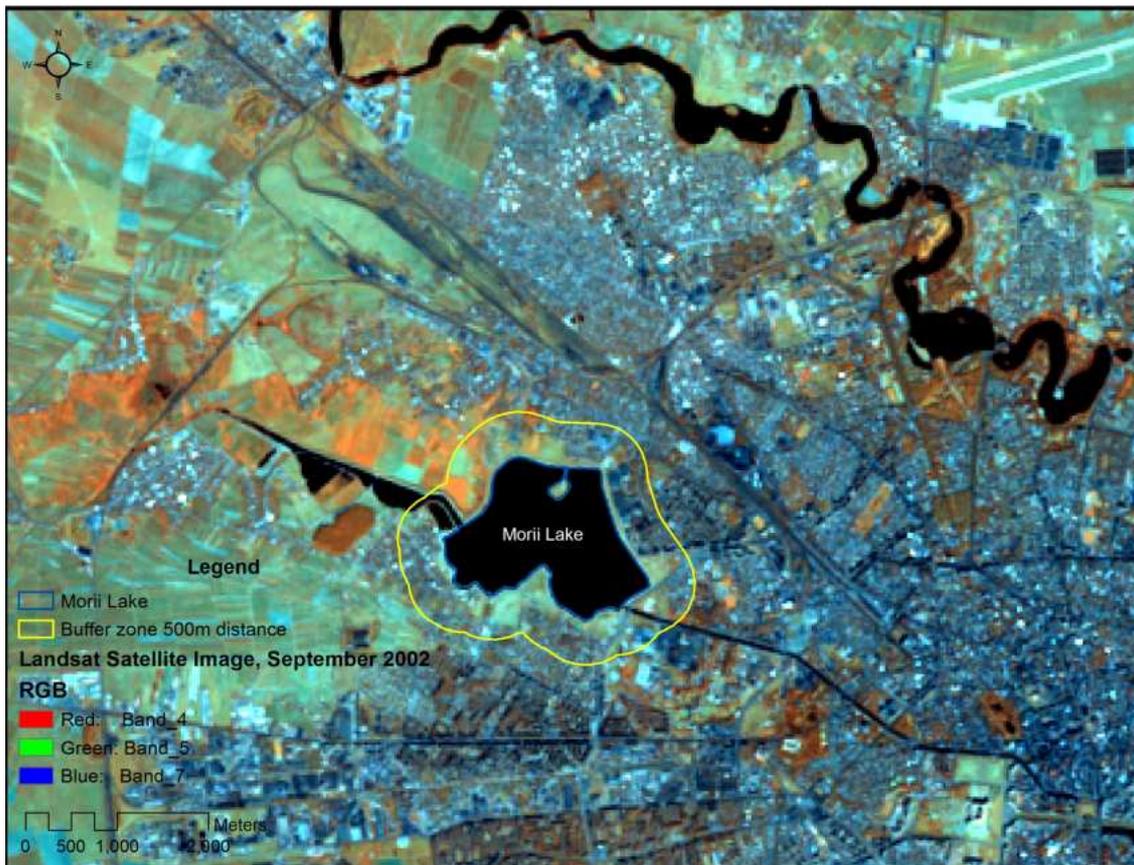


Fig. 6. Landsat 4-5 TM Satellite Image, September 2002 (data source: USGS)

Around the anthropic lake there is a woven fabric of discontinuous urban residential districts (Giulești, Crângași, Virtuții), with streets and main boulevards, with predominant functional spaces, with space for urban green areas and areas of craft. Buildings with social functions are also included; commercial and industrial in the south-east, non-irrigated arable land in the west and north-west, inland swamps in the central-west (Fig. 9).

From 2008, commercial spaces have presented an extension observed in the field, for example, in Crângași neighborhood was opened the upgraded Crângași Market and Grant Shopping Center, close to the subway station and speed tram 41, where you can find the representative of the electronic shop "Emag".

There are still houses from the 60's amongst block of flats of 4 floors found on Constructorilor Boulevard, which have started being raised in 1957 for metallurgy workers. Most eight floored block of flats were constructed and completed around 1982; at present a part have been rehabilitated or are in the process of rehabilitation. Individual residential spaces are made up of old houses without upper floors and new villas with one-two floors, especially in the Roșu village. The collective residential space is dominated by blocks with 4 or 8 stories high, the highest being present only adjacent to the main streets. Most of the blocks that are located on the main road of the analyzed surface area (in Calea Crângași Street) have on the ground floor small commercial spaces, offices or banks, bars, restaurants and a few pharmacies and private medical centers. Due to

neighborhood infrastructure and easy access towards the centre of town, real estate markets have developed rapidly; residential assemblies like Virtuții Residence (2008), Crângăși Apartments, West Park Lake Towers, Sema Park (near the Petrache Poenaru underground station, close to the open swimming pools Dâmbovița), and so forth, were constructed nearby. All these new buildings are important to populate the area and make it more dynamic, but the condition is they don't have to be too close to the dam structure. The blocks of flats, built with approvals have no problems with distance from the lake, compared to many individual houses, like the villas in Rosu, which they dig too close to the dam foundation.

Although the work of modernization and even the statement which were put to the base of this dam were delayed for 20 years, the new strategy for the development of the capital city has made Morii Lake a priority. In Fig. 10 there are

a few photos of last year, 2012, which include some constructions near the lake, the wharf, a view on the lake surface and dam, and of the concrete that is around it.

The relentless anthropical pressure which occurred in the past few years as a generating factor of the environmental impact has also influenced the area which is under review, by means of an economical development of the area which is more or less correct with respect to the protection and to the amelioration of the environment. Certain environmental disfunctionalities can be noticed in the areas which are adjacent to the lake, due to a series of reasons. For example, in the Northern part, towards Giulești, at the proximity of the industrial area, there are blocks of flats for non-family individuals which are inhabited by Romani people who have also improvised some establishments in the surrounding area; this area is insalubrious, a great number of wastes being disposed in the close proximity of the lake.

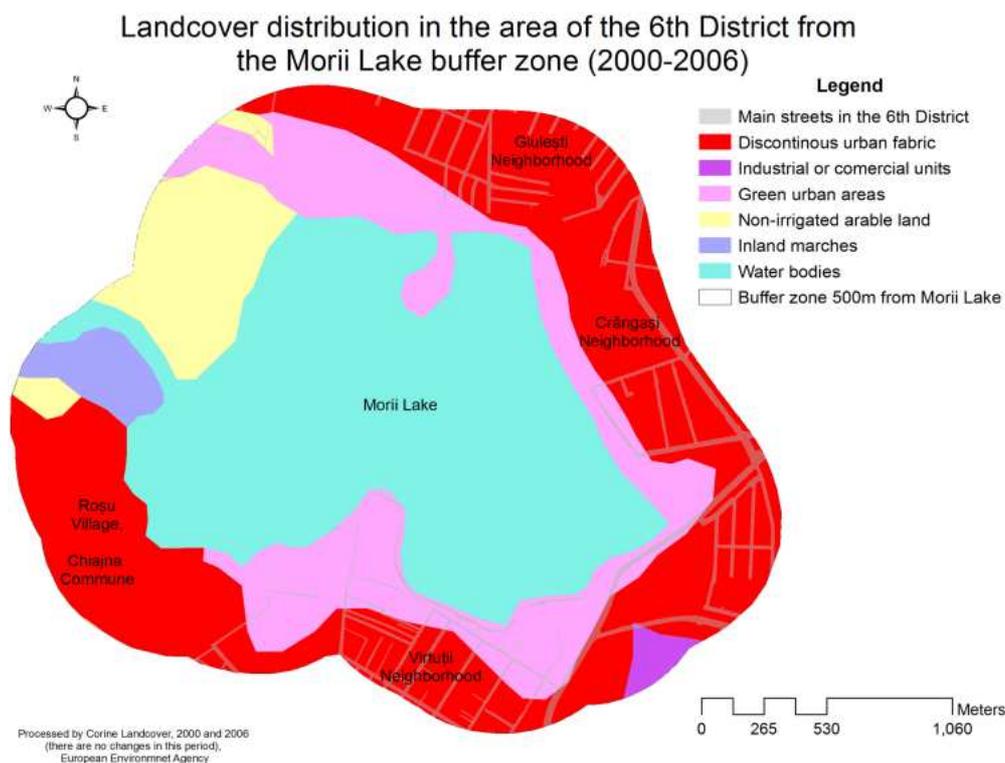


Fig. 7. Landcover distribution - map

Area distribution of landcover categories

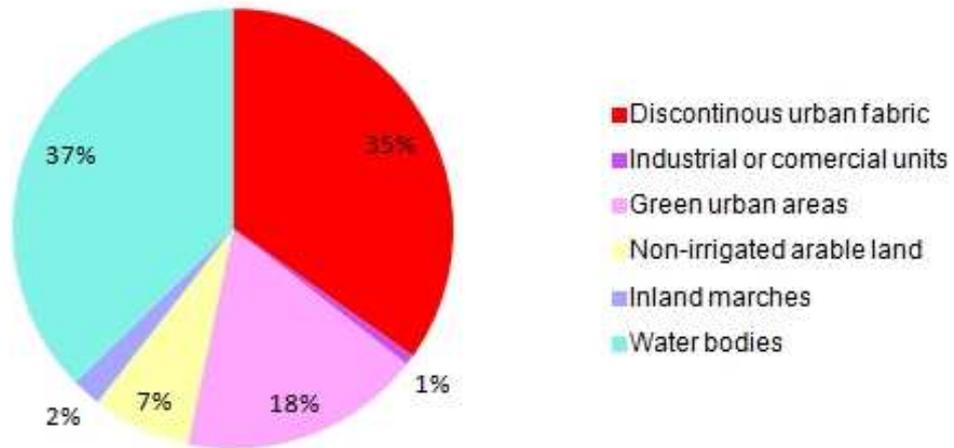


Fig. 8. Landcover distribution - diagram

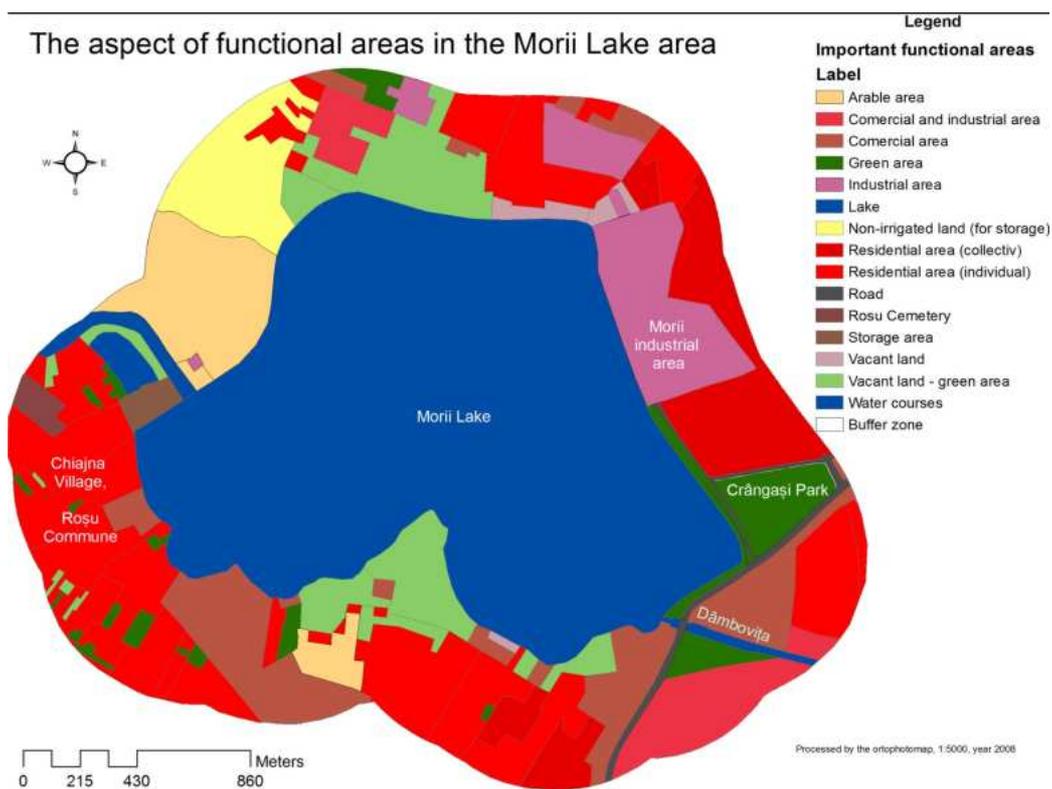


Fig. 9. Important functional area in the close proximity of the reservoir

In the Northern area there are also houses belonging to the Giulești district which have not yet been connected to the sewage system network. In this part there is also the Lacul Morii Island, on which several shows were performed some time

ago. This island was cleaned during time by teams of volunteers due to the fact that in many times it was filled with sanitary wastes generated from picnic or barbecue activities of people coming over by cars in large groups.

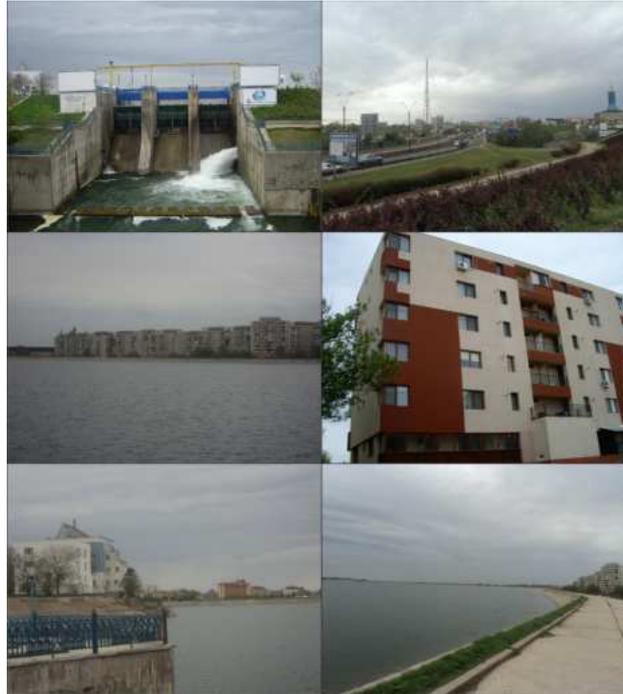


Fig. 10. Picture selection for the actual view of the lake, the dam, the new constructions (April 2012)

Continuing the walk on the longitudinal road beyond the last houses of the district there are free green areas, on which trees could be planted or a park could be developed, due to the fact that the space has a sad visual effect; in some of the areas sanitary wastes are even illegally stored, probably generated and deposited by the inhabitants. Still this area is not as negative as the Western part, on which a lot of wastes are disposed, and which have a severe impact especially upon the air quality. To the West there is a bridge with illumination piles, near the Roșu cemetery, over the water from the lake, most of it being part of the Argeș River, although the lake is formed on the Dâmbovița River. This area in which the water enters into the river is not so "visited" by inhabitants as compared to the South-Eastern dam, where, due to the crossing of the main traffic route in the area, to the park situated in the proximity, to the residential complexes; this area is much more visited by the fishermen or by the persons who walk by for a stroll. From this point, the flimsy stream which is almost inexistent of the

former Dâmbovița River as well as some neighboring fishing ponds can be noticed. The development of the Roșu locality was not quite beneficial for the Morii Lake, because of the fact that some constructions are built too close to the lake, some of them being endowed with water pools. In the Southern area of the lake, towards Virtuții Street, right near the building which houses the National Environmental Protection Agency, a Romano-Catholic church is located, and down-stream a fuel pumping station is also located; this issue generates negative impact and a certain incompatibility both from the church-fuel pumping station ratio point of view and from the fuel pumping station - dam - anthropic lake ratio point of view. To the South-eastern area there is a park; the visitors of the park are also the visitors of the lake. One of the most important problems which must be mentioned, which is also a major problem of Bucharest is represented by the communitarian dogs, which are present in a great number in this area too, especially in the area towards Giulești and towards Roșu.

As for assessing chemical aggressiveness of the surface water, studies have shown that the water from Dâmbovița River shows a weak carbon aggressiveness to the metal constructions and is not aggressive to concrete mixing plant (Popescu *et al.*, 1988) which is a positive fact and a determining factor because of that the construction build-up Morii Lake, is considered to be safe and adequate, until 2016, and is the most solid construction of Bucharest, after the Palatul Parlamentului (Palace of Parliament), according to data from the Bucharest 2035 Strategic Concept, 2012.

Fears about a hydrological hazard exist, having as feasible basis studies that submits the effects of the structure failure on the left bank, in Giulești Sârbi but also in the central part of the ground dam, from Virtuții Road (Drobot *et al.*, 2007). In the Bucharest 2035 Strategic Concept there are given professor Drobot's variants for the possible catastrophe caused by broken structure, as well as a scenario carried out by a team of researchers in Lyon who concentrated their attention on the three possible situations: flooding as a result of heavy rain of the neighboring districts in particular those without leak; also, due to heavy rain this could determine the exit of water in proportions, flooding city up to the fourth floor of the Municipal Hospital; the third situation referred to rodents which weaken the earth dam by digging ground galleries, resulting water infiltration.

4. Discussion

After the decay of the communist regime in 1989, starting from 1991, in Romania - which is a parliamentary republic up to present - a period of administrative decentralization, privatization, democratic political regime has

succeeded; this period was dominated by social dynamics and by environmental problems which generated the development of strategies and plans related to environmental protection issues which aimed to improve the society as a whole. By means of an open vision, the repositioning in an administrative and local context can be performed through strategic development actions, by the development of new projects and action plans, and by correlating these plans and projects with the institutional competencies. The urban planning in this periphery area of Bucharest has begun its development as a result of the dam's construction, the political regime being changed in a very short time after the works were finalized.

According to the opinions of residents and direct beneficiaries of the recreational potential exploitation created by Morii Lake, the most satisfactory improvement projects and the most feasible future arrangement plans of the dam, the island and the lake itself, they refers to the development of accomplishments such as: green spaces for picnics, sports, artificial beaches, bike lanes and roller skates, camping, summer theater, observatory, cafes, tea rooms, gardens and so on. Currently, at the edge of the ditch, in the area which is towards the Crangași Park, barbecue spaces are designed being free-of-charge for the use of the large public. The ditch was improved by means of lighting using solar panel systems, benches and litter bins on the area which connects the dam with the Mehadia street. As a step forward towards the accomplishments made so far, a guard company has been employed, employees being responsible for the Crangași Park area, whose development is taking place

concurrently with the space occupied by lake dikes. Playgrounds in the park were reconditioned; there are several synthetic football pitches, a place for renting cars for children, flower gardens, stage performances and a special space for dogs. All these improvements mentioned above have been achieved in recent years. The recreation field is represented by both, the Park and the Lake, many people who relax in the park also go up the dike's stairs for a short walk along the Lake.

Possible elements of the development of urban design in this area are punctuated by Capelle 2012, in an architecture study that allows a qualitative approach, of quantification of the visions and urban project. Strategies that took place before the construction, planning of budgets, projects and activities, and also those after the construction, as final calculations, evaluation of projects, determination of disruption at social, cultural and economic level, are designed by teams of specialists, but can also be influenced by important people, such as leader Nicolae Ceaușescu who has put his mark in the upcoming construction, as in many others of that time. These strategies are similar at theoretical level, numerous articles recalling the implications of the changes occurred after the initial project has been approved.

Local development strategies aim at increasing the capacity of planning and partnership. The most ambitious project wants to connect Splaiul Independenței with A1, being an alternative to Iuliu Maniu Boulevard, by creating a tunnel linking Morii Lake area with the exit to the highway, an

express way. The road route proposed through the Urban Area Plan (PUZ) District 6, 2010, traces the contour of the edge of Morii Lake (Morii Lake Alley) and it starts after the intersection with the axis crossing the Mehadia Street to Dâmbovița River. The paper provides seven road section of which only three are administratively part of District 6, the rest being part from Chiajna Commune.

The construction project for the artery connecting neighborhood Crângăși and the beltway sparked many discussions pros and cons. The pros are approving the realization of this work and consider it feasible, and the cons find it impossible to convert the road that starts from the narrow Mehadia Street into two lanes and they also take into account the fact that the lake is made for safety and not for recreation, so a high traffic road near the lake could lead to an eventual collapse.

On the other hand, the City Hall for District 6 wants on the Morii Lake's island the development for a recreation area, a wharf, an entertainment area, garden amphitheater for concerts and more, for all those they need approvals from Apele Române.

5. Conclusion

Designed and built for convenient use of water resources and support for certain human activities, dams have numerous and complex environmental effects, both positive and negative. Morii Lake's dam was especially built to stop floods from the Dâmbovița River, subsequently affecting from many points of view the communities, the landscape and the topography itself. The major changes during the study period are mainly represented by

converting the land use and the land cover, the typology of new constructions and the economic development in the area.

The two "atoms" indicates the most significant effects of the dam construction (Fig. 11). The green one contains examples of positive effects, like a source of clean renewable energy, more reliable water reserves, the increasing of minimum flows (it was one of the main reasons for conducting the Morii Lake), recreation and sport functions. The negative red atom refers to expropriation, resettlement to other places, stress, changes of the biotope, the ecosystem and the groundwater condition, thus are affecting public services and so on. The effects engage each other, no matter what type they are.

The chaotic development from the recent years haven't considered the suppression of buildings whose foundations are dug into the embankment, less than 10 meters off

the water surface, or the presence of a gas station on the dam's lip that could produce a real terrifying event, in the situation where the dam break would actually happen. But there are also positive parts of the development of the area, urbanization and economic growth being demonstrated by the redevelopment of the area: commercial and residential blocks have been built; attracting tourists by organizing fun spots for children and adults on the pier and in the park. Thus, it can be said that the construction of the dam was an important point in increasing the value of the area, which once was a swampy place with a few green parts and living areas. Important actions are being considered to improve the environmental quality of the area, especially in the North and West, to improve the water quality through continuous education of the population for not throwing anymore waste in the lake, these causing after all a lower quality of the air, along with the smells and emissions from the improvised and unsanitary houses.

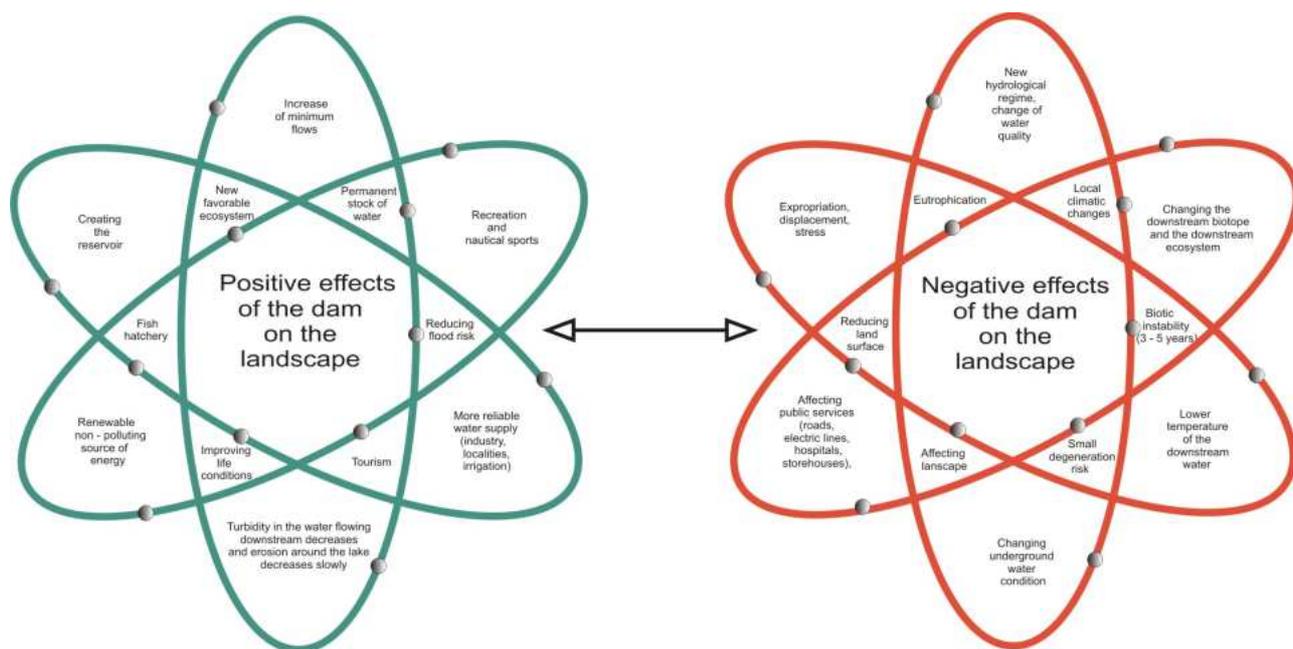


Fig. 11. Positive and negative effects of the dam on the landscape

Attraction of tourists on Morii Lake would be a benefit for the area but due to political reasons the process is slow. Even if this construction was partially interpreted in a negative way, especially by people who have suffered as a result of territorial shifting, over time has proved to be an element of hydrologic protection, of leisure for the locals, useful for different activities, such as fishing, cycling or jogging around the Lake, on the longitudinal dike made of cement.

Therefore, this analysis demonstrates and confirms the significant changes in the social, cultural and economic landscape of the studied area, from the dam construction, 1985, to the present time. The Morii Lake's dam project is either primarily responsible for these changes, or a preamble for the new amendments.

Aknowledgements

This work was supported by the strategic grant POSDRU/86/1.2/S/57462, Project Optimization of the insertion process on the labour market concerning the geography graduates cofinanced by the European Social Found within the Sectorial Operational Program Human Resources Development 2007 - 2013. Also, for the benefit of achieving this research there have been used elements of logistics and infrastructure of the University of Bucharest.

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Received: 9 March 2013 • **Revised:** 10 May 2013 • **Accepted:** 20 June 2013