

ECOLOGICAL IMPACT OF SETTING UP AGROINDUSTRIAL FARMS IN PRUT RIVER MEADOW

IMPACTUL ECOLOGIC AL ÎNFIINȚĂRII UNOR FERME AGROINDUSTRIALE ÎN LUNCA PRUTULUI

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Abstract. *On a land placed in location Moreni, commune Prisecani, two investors proposed a design to erect a complex for production of mushrooms, Agaricus bisporus for population consumption at a national level as well as for export. The production capacity, on which the extent of the construction works is based, is 1500 tons/year mushrooms, in 8 production cycles. The site is on the right bank of Prut River at one hundred meter distance from NATURA Site, code ROSCIO213. The estimation of the potential impact of the project on the zone was carried out by considering the activities involved by the project as well as the extent these activities should generate migrating emissions of pollutants, noise, destructions or modifications of the landscape directly or indirectly affecting the environment factors, population health state, terrestrial or aquatic flora and fauna in the implementation area of the project.*

Key words: mushrooms, farm, pollutants, landscape, flora, fauna

Rezumat. *Pe un teren situat în localitatea Moreni, comuna Prisacani, doi investitori propun un proiect în vederea execuției unui obiectiv complex pentru producția de ciuperci Agaricus Bisporus pentru consumul populației la nivel national, dar și pentru export. Capacitatea de producție, funcție de care se dimensionează lucrările de construcție, este de 1500 tone/an ciuperci, în 8 cicluri de fabricație. Amplasamentul se află pe malul drept al râului Prut, la o sută de metri distanță de Situl NATURA 2000, cod ROSCIO213. Evaluarea impactului potențial al proiectului asupra zonei s-a realizat luând în considerare activitățile promovate prin proiect și măsura în care aceste activități prin emisii de poluanți, producere de zgomot, distrugere sau modificare de peisaj, pot genera prin migrarea emisiilor sau în alte moduri un impact direct sau indirect asupra factorilor de mediu, sănătății populației, faunei și florei terestre sau acvatice din zona de implementare a proiectului.*

Cuvinte cheie: ciuperci, fermă, poluanți, mediu, floră, faună

INTRODUCTION

The aim of the investment objective is to provide mushroom production, the valuation of some waste – fowl/horse dejections - by their processing within the complex, their storing and direct transport after sorting to the beneficiary. The developments provided in the project should ensure sanitary and environment protection terms in compliance with national and European legislation (C. Ciobănașu, 2010).

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MATERIAL AND METHOD

The two farms should be erected on a total surface area of 7.8 ha on a land located at DC 33/1 limit at about 100 m from NATURA SITE 2000, developed on the bank of Prut River and from the flood control dam for overflowing water of Prut River. The NATURA SITE framed within NATURA 2000, CODE ROSCIO213 from Prut river meadow represents 16% of the land administrated by Prisecani commune.

Sensitive habitats

Coordinates of NATURA 2000 SITE are:

Latitude 47° 12'53" N, longitude 27° 47'1" E

The coordinates of the land allotted to the mushroom production complex are:

Latitude 47° 06'40-65" N, longitude 27° 49' 57-91" E

The site NATURA 2000 CODE ROSCIO213 and the connection with the neighboring sites have the role of protecting the area located downstream Stâncă Costești Lake, on the watercourse of Prut River whose riverbed is closed within the flood control dams.

The project will abide the European Legislation regarding this subject:

92/43/EEC DIRECTIVE FOR BIODIVERSITY PRESERVATION

76/464/EEC DIRECTIVE FOR DANGEROUS SUBSTANCES

75/440/EEC DIRECTIVE FOR SURFACE WATERS

RESULTS AND DISCUSSIONS

A potential source of significant impact is the processing/removing of exhausted soil bed resulting at the end of the mushroom production cycles. The soil bed is formed of the exhausted compost (the exhausted compost after mushroom harvesting can be reintegrated in natural circuit by keeping under control of pollution risk for final agricultural usage or other usage by exploiting the nutritive or organic value) which is a fertilizer for agriculture lands having favorable characteristics of using it in arable soil rehabilitation. The contained dry and volatile substances as well as the 40-60% dry substances, the lack of toxic and inhibiting substances, make the compost an admitted material for land fertilization (C. Ciobanasu, 2010).

For large-scale and non-polluting mushroom production there are of utmost importance the technological phases of a polluting potential as well the provision of equipment and endowment and measures for emission control and material loss. The following aspects may be rendered:

- ✓ The transport, handling and process entering of compost;
- ✓ Initial wetting of compost, periodical wetting (irrigation with spraying nozzles and water dosing for spraying);
- ✓ Ventilation of spaces of mushroom cultivation tunnels;
- ✓ Mushroom harvesting, integral collection of waste;
- ✓ Collection of exhausted compost, transport to the platform;
- ✓ Storing of used compost on the specially arranged platform;
- ✓ Valuing the nutritive potential of compost by fertilizing the agriculture lands;
- ✓ Technological process monitoring - temperature, air quality within the mushroom cultivation space – by CO₂ and CO sensors

Description of potential impact determined by project implementation

Estimation of potential impact of the project on the zone was carried out by considering the activities promoted by the project and the extent to which these activities through emission migration or in other ways, generate a direct or indirect impact on environment factors, on population health state, on terrestrial or aquatic flora and fauna in the area of project implementation (Virginia Catrina, 2010).

Downstream the storing lake Stâncă Costești on the Prut River there were preserved the habitat and numerous bird species migrating to North in Prut River corridor that needs protection to the would be impact by this economic development, mostly by building in the vicinity of site area that could determine the landscape modification as well as changes of habitat quality that may affect the protected fauna and flora.

Measures of avoiding, reducing/improving the potential impact

The project covers, within the development works of the investment objective, technological measures and preventing measures of environment pollution in the location area and its surroundings by an efficient use of energy (using the newest techniques in the respective field, endowment with heat pumps etc), strictly directed handling of compost at entry and exit out of the system, storage and valuation of exhausted compost, treatment installations of used household waters and installations of collection and recirculation of technological waters (Virginia Catrina, 2010).

The vicinity to NATURA SITE 2000 on the right bank of Prut River determined the analysis of SITE affecting potential starting from the present conditions of the site, a land destined to agricultural use, pastures. The construction on the land with POT of 6.7% and CUT of 0.07 and development on ground floor level determines the reduction of potential impact that the project implementation should have on biodiversity with an emphasis on habitats and species that were based on the Natura 2000 site designation on the right bank of Prut River – site that is located at the limit of the habitat specified in the project.

A special chapter of the project is dedicated to recommendations and measures of reduction of impact on biodiversity.

In the present context, the sustainable development strategy represents the main objective of the EU countries determining taking measures within each project of social and economic development, measures for damage prevention, protection and improvement of ecosystem state, reduction and integral control of pollution.

The project contains these measures and provides the harmonious implementation in the landscape not prejudicing the NATURA 2000 SITE on the right bank of Prut River.

The opportunity of investment objective is determined by including the activity in the agriculture potential of the area by optimal valuation of existing resources and valuation of fowl dejections that are used in compost production (the compost production is provided by BIO COMPOST SRL company on the same location). In the location area, the objective represents an opportunity for development being provided the conditions for valuation of mushroom production potential and valuation on local and external level as natural ecologic products.

Technological measures for limiting the impact included in the project

The technology is based on maximal reduction of raw material losses and harvesting product losses. The technological control of the process, the competitive equipment provides running of minimum impact phases, including here the high pressure pendular system for cleaning the belts.

The complete cleaning of the mushroom cultivation tunnel, in its entire width, is carried out with water at a pressure of 80-100 bars. It should be procured a high pressure based cleaning device of about 100 bars with a capacity of 600 liters per hour such as KARCHER HD895 or PLATZMC135SD products.

The technological measures provided in the project facilitate the charge of depollution, waste waters and waste management.

Protection of water quality

In the technological process, the water is used according to the described phases. The technological measures diminish the engagement into used waters of compost or mushroom remains resulting from processing.

The used waters from the processing procedure should be in compliance with the admitted limits for content in pollutants of biological treated water in independent or city water treatment plants.

The technological waters collected from the mushroom production line should be in compliance with the NTPA 002/2005 provisions regarding observance of described technology and should be used by internal re-usage during compost production, wetting of lands etc.

According to the company's development strategy, improvements should be permanently provided in the run activities by introducing the environment integrated management for limiting the activity impact on the environment in the neighboring areas of the production and processing line and in the site areas of mushroom farms.

Air protection

Pollutant sources for air

The heating of indoor spaces should be carried out by using a system of heat pumps valuating the renewable geothermal energy of the earth. In this way, combustion gases are not produced as well as other pollutant elements specific to fuel combustion.

Protection against radiations – not measures are imposed

Protection of soil and subsoil – it is provided by impermeabilization of the used compost storage platform, tight execution of subterranean works, drainable basins, collecting-recycling tanks, sewage, waste storing in containers on the concrete platform.

Protection of terrestrial and aquatic ecosystems

Identification of sensitive habitats that can be affected by the project

At a distance of about 100 m of the site, delimited the communal road DC 33/1 and the flood control dam, there is NATURA 2000 site entitled PRUT RIVER.

The site is located in the *halt, reproduction and feeding* area for bird species protected by law in the floodable perimeter of Jijia River and of Prut River, migration corridor for some bird species migrating across the Prut valley to places of reproduction and feeding.

The site location is set by the following coordinates 27° 47' 7" E and 47° 12' 53" N under code **ROSCI0213 Prut River** placed at about 100 m from the site, covering surfaces located in eastern Romania, out of which the administrative territory of Prisecani commune covers 16% together with surfaces of the administrative territories of Iasi, Vaslui and Galati Counties.

ROSPA0042 K. Ponds of Jijia and Miletin Rivers

ROSPA0071 E. Lunca Prutului – Vladesti – Frumusita

The near by location of NATURA 2000 SITE requires the analysis of data regarding surface, landscape structure, types of species and habitats that can be affected by project implementation, biotic and abiotic factors with a role in long term preserving of protected species and habitats.

The quality of Prut River waters in the protected area is determined by storing of flood waves in Stânca-Costești Lake providing high quality water downstream the dam thus explaining the diversity and density of species. The pollution sources on the river banks in Romania and Republic of Moldova create a negative impact on the river that is permanently quantified by water management authorities of both riverside countries.

The site vulnerability is conferred by hydrotechnical works respectively by the development of the Stânca-Costești accumulation lake

and of downstream dams that, beginning with the 70s, subjected the entire habitat to strong anthropic pressures whose consequences were unforeseeable. Meadow forests were deforested that were replaced with agricultural cropping or poplar forests. More severe was the almost total drainage of the water slicks (streams) representing a characteristic of this habitat. The isolation of streams from the minor river bed determined the drain and colmatation of streams with aquatic vegetation. The destruction of Prut meadow had consequences also on fish production of Danube Delta by destroying the reproduction biotopes for numerous fish species, pike, carp, bream, crucian carps as well as for birds.

In order to save the fish fauna that resisted to anthropic pressure and modification of NATURA 2000 site habitats, THE PRUT RIVER requires a minute analysis of project development in the near vicinity of the site in order not to allow new anthropic pressures on the habitats. In this respect, the project and its provisions were analyzed from the building stage to the operation stage as well as the potential impact represented by all the running activities.

CONCLUSIONS

According to the technology and equipment provided in the project, described in the documentation, all the conditions for running an activity are provided not generating any impact on the environment. The basic data of the used technology are comparative with available technologies (BAT).

The environment management plan for the building stage sets up the complex of measures to prevent damages, to protect and improve the ecosystem state, to totally reduce and control pollution (C. Ciobanasu, 2010).

REFERENCES

1. **Catrina Virginia, 2010** - *Environmental permit documentation*.
2. **Ciobănașu C., 2010** - *Setting up mushroom farm in Prisacani commune*. Project no. 132/2010 – S.C. ARC DESIGN S.R.L. Iasi
3. **Ciobănașu C., 2010** - *Agaricus Bisporus complex for mushroom processing in Prisacani commune*. Project no. 131/2010 – S.C. ARC DESIGN S.R.L. Iasi