# INVENTORY OF MEAT INDUSTRY POLLUTERS IN VOJVODINA REGION

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## ABSTRACT

Inventory of Polluters is the register of information and data on environmental polluters and represents a major starting point for identifying and monitoring of pollution sources. One of the objectives of the National project of the Ministry of Education and Science no 46009: Improvement and development of hygienic and technological procedures in production of animal originating foodstuffs with the aim of producing high-quality and safe products competitive on the global market, is to establish the Inventory of Polluters from the meat industry acquiring all the data required by the Serbian legislation. The meat industry sector emerges as one of the top two or three most significant contributors to the most serious environmental problems, at every scale from local to global. Inventory of Polluters will include the information and data from polluters identified on the territory of AP Vojvodina from the meat industry sector. According to the obtained results, the total number of potential water pollutants within this sector totals up to 94 legal entities.

**Keywords:** Inventory of Polluters, Meat industry, Water pollution

## INTRODUCTION

Cadaster represents the integral part of the environmental protection information system of the Republic of Serbia, managed by the Environmental Protection Agency in accordance with the legislation and it contains data on pollution of air, water and generation and management of waste from point sources and from settlements that represent diffuse source.
Cadaster contains data on sources, types, amounts, method and place of discharge of polluting substances into air and water, as well as on amounts, type, content and the method for treatment and disposal of waste.
Certain phrases have following meaning: **Polluter** is legal entity or natural person who through its activity or inactivity pollutes the environment; **Diffuse source** is pollution source emitting polluting substances without specifically determined discharge location; **Discharge spot** is the place for discharge of waste gases, waste water or disposal of generated waste from the plant into the environment; **Plant** is independent polluter or particular technological system within the polluter, located on geographically determined place with defined discharge spot of waste water, waste gases and generated waste; **Point source** is source of polluting substances with defined location from one discharge spot (chimney, cannel, drain, etc), several discharge spots connected on one common spot and the location of waste generation.
Cadaster is compiled based on the data submitted by the polluters in different industrial sectors. Besides these industrial polluters, especially for Cadaster following entities also submit required data:

1. Municipal, public utility companies – the quality of discharged water from sewage system for each discharge spot, before mixing with the water from the recipient;

2. Polluters generating hazardous waste in its plants, disregarding the type of industrial activities, capacities and average number of employers in the reporting year;
3. Medical and vet institutions – generated waste;
4. Municipal, public utility companies collecting the waste from the municipalities (municipal waste);
5. Companies and other legal entities collecting and transporting the waste, other than municipal waste;
6. Companies and other legal entities treating the waste;
7. Companies and other legal entities importing the waste for own needs for further trade, disregarding the type of industrial activities.

## MEAT INDUSTRY SECTOR

The meat industry sector emerges as one of the top two or three most significant contributors to the most serious environmental problems, at every scale from local to global. Meat industry is one of the major causes of the world's most pressing environmental problems, including global warming, land degradation, air and water pollution, and loss of biodiversity. Using a methodology that considers the entire commodity chain, it estimates that meat industry is responsible for 18 percent of greenhouse gas emissions. It accounts for nine percent of anthropogenic carbon dioxide emissions, most of it due to expansion of pastures and arable land for feed crops. It generates even bigger shares of emissions of other gases with greater potential to warm the atmosphere: as much as 37 percent of anthropogenic methane, mostly from enteric fermentation by ruminants, and 65 percent of anthropogenic nitrous oxide, mostly from manure.

The world is moving towards increasing problems of freshwater shortage, scarcity and depletion, with 64 percent of the world's population expected to live in water-stressed basins by 2025. The meat industry sector is a key player in increasing water use, accounting for over 8 percent of global human water use, mostly for the irrigation of feedcrops. It is probably the largest sectoral source of water pollution, contributing to eutrophication, "dead" zones in coastal areas, degradation of coral reefs, human health problems, emergence of antibiotic resistance and many others. The major sources of pollution are from animal wastes, antibiotics and hormones, chemicals from tanneries, fertilizers and pesticides used for feedcrops, and sediments from eroded pastures.

The Food and Agriculture Organization of the United Nations (FAO) report recommends a range of measures to mitigate meat industry's threats to the environment: **Land degradation**: Restore damaged land through soil conservation, silvopastoralism, better management of grazing systems and protection of sensitive areas; **Greenhouse gas emissions**: Sustainable intensification of meat industry and feed crop production to reduce carbon dioxide emissions from deforestation and pasture degradation, improved animal nutrition and manure management to cut methane and nitrogen emissions; **Water pollution**: Better management of animal waste in industrial production units, better diets to improve nutrient absorption, improved manure management and better use of processed manure on croplands; **Biodiversity loss**: As well as implementing the measures above, improve protection of wild areas, maintain connectivity among protected areas, and integrate livestock production and producers into landscape management.

## MEAT INDUSTRY CADASTER

Within the National project of the Ministry of Education and Science: Improvement and development of hygienic and technological procedures in production of animal originating

foodstuffs with the aim of producing high-quality and safe products competitive on the global market, managed by the Institute of Meat Hygiene and Technology in Belgrade, Serbia, preparation of the Meat Industry Cadaster is the main activity of the initial phase of the project. Researchers from the Department of Environmental Engineering and Occupational Safety and Health, Faculty of Technical Sciences, University of Novi Sad are in charge of the compilation of Inventory of potential polluters from the meat industry within the territory of the Autonomous Province of Vojvodina. Researchers have been divided in three regions: Srem, Banat and Backa. The first phase of the investigation consisted of identification of all legal entities from the meat industry sector in each region of AP Vojvodina. According to the obtained results, the total number of potential water pollutants within this sector totals up to 94 legal entities. The regional division of the polluters is presented in Figure 1.

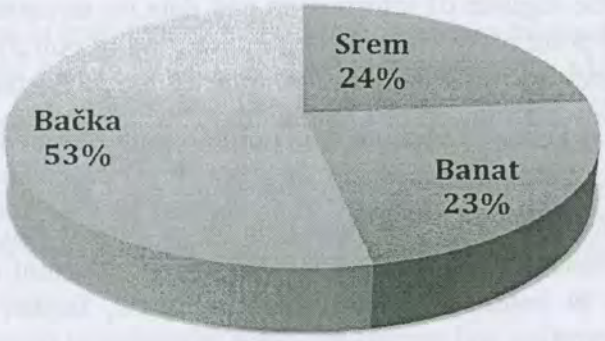


Figure 1. Regional Division of the Meat Industry Polluters in AP Vojvodina

The following phases include collection and processing of data set in the Questionnaire, identification of GPS location of all potential polluters and field visits including locating waste water discharge points.

The main drawback in collection of the information is refusal to cooperate with the researchers by some of the potential polluters, due to the general ignorance in the importance of environmental issues and disregarding of the legislative requirements.

## QUESTIONNAIRE EXAMPLE

The Questionnaire on meat industry polluters has been prepared and distributed to the people in charge of the environmental issues in the companies from the meat industry sector. The questionnaire example for the waste water in Meat Industry consists of following inquires:

1. The name of the legal entity
2. Address
3. Contact person
4. Slaughterhouse (Yes/No)
5. Meat production (Yes/No)
6. Slaughterhouse capacity (kg/day; kg/week)
7. Foodstuff production (Yes/No)
8. Production capacity (kg/day; kg/week)
9. Waste water discharge spot
10. Class of the water of the recipient
11. The amount of discharged water from the plant
12. Used method for evaluation or calculation of the discharged water flow (measuring, calculation, engineering evaluation, other)

13. Type of waste water flows (sanitary, technological, cooling, other)
14. Quality control of the waste water before treatment (Yes/No)
15. Monitored parameters in waste water before treatment
16. Waste water treatment (Yes/No)
17. Type of used waste water treatment
18. Quality control of the waste water after treatment (Yes/No)
19. Monitored parameters in waste water after treatment

## CONCLUSION

It is important to point out that this type of research and preparation of integral cadaster of polluters in the meat industry has been conducted for the first time in Republic of Serbia.
Inventory of Polluters is the register of information and data on environmental polluters and represents a major starting point for identifying and monitoring of pollution sources.
The meat processing industry generates a large amount of waste water which represents a serious problem due to their high levels of organic matter which demands effective and high cost treatments.
Expected results should have significant contribution to the field of environmental protection. The research should be focused towards intensification of production processes and more adequate use of natural resources potential of AP Vojvodina. Current research in this field was limited, mostly due to economic difficulties. Therefore, further research should be directed on reduction of investing and operational costs of treatment plants.
Inventory of Polluters will include the information and data from polluters identified on the territory of AP Vojvodina from the meat industry sector. According to the obtained results, the total number of potential water pollutants within this sector totals up to 94 legal entities.

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