E1054
Serbia Danube River Enterprise Pollution Reduction Project (DREPR)¹

ENVIRONMENTAL IMPACT ASSESSMENT (EIA) and ENVIRONMENTAL MANAGEMENT PLAN (EMP)*

1. Country background

After political riot and armed conflict in the early 1990s within the former Socialistic Federal Republic of Yugoslavia (SFRY) and independence declaration of its, until then constituent republics, Bosnia and Herzegovina, Croatia, Macedonia and Slovenia, remaining republics Serbia and Montenegro declared their independence also and formed Federal Republic of Yugoslavia on 27 April 1992. Since March 2003 after the Constitutional Charter has been signed by representatives of the European Union and the both republics, its official name of State Union Serbia and Montenegro (S&M). State Union also includes two provinces Kosovo and Metohija and Vojvodina. It occupies 102,173 square kilometers on the shore of the Adriatic Sea, and borders with Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Hungary, Macedonia and Romania. Its population is estimated to be around 10.4 million people (62 % Serbs, 16 % Albanians, 5 % Montenegrin, 3 % Hungarian, and 14% other numerous nationalities). Almost two thirds of the total population are Orthodox, nearly one fifth are Muslims, with small number of Roman Catholic and very small number of Protestant.

As to the S&M environment, the fast collapse of the former state and very destructive warfare even aggravated previous environmental problems – air and water pollution, soil contamination and waste accumulation and biodiversity degradation, which were among highest in Europe before the war.

S&M is significant contributor of the nitrogen (N) and phosphorus (P) pollution of the Danube River, with annual discharges estimated within a range of 45.000 to 72.000 t N/year, and of 7.000 to 14.000 t P/year. The largest portion of this pollution load belongs to municipal waste waters (around 45 %), and organic pollution dominating industrial waste waters mostly from agro processing and large pig farms (around 40%). Also, there are inorganic dominating industrial waste waters (around 15%), mostly originating from fertilizers production.

2. Project Summary

Serbia is among the largest nutrient polluters of the Danube River and enterprises, notably agro-processing and large scale livestock breeding farms are major sources of pollution. The *global environment objective* of the Reduction of Enterprise Nutrient Discharges Project would be to reduce nutrient pollution from hotspot enterprises located in the Republic of Serbia. This would also help the country of Serbia and Montenegro (S&M, the union of the Republic of Serbia and the


Republic of Montenegro) meet its international commitments under the Danube River Convention. The development objective would be to reduce the negative public health, economic and amenity impact associated with water and soil pollution from enterprise pollutant discharges. The proposed project would consist of four components:

- **Component 1**: Regulatory Reform and Capacity Building;
- **Component 2**: Investment in Industrial Nutrient Reduction (incl. slaughterhouses, agro-processors, and large-scale livestock farms);
- **Component 3**: Awareness Raising and Replicability Strategy; and
- **Component 4**: Project Management and Monitoring.

According to the World Bank’s project categorization (OP 4.0 requirements) DREPR project belong to the PDF-B category.

**ENVIRONMENTAL IMPACT ASSESSMENT (EIA)**

Environmental impact assessment (EIA) is an instrument to identify and assess the potential environmental impacts of a proposed project, evaluate alternatives, and design appropriate mitigation, management, and monitoring measures.

**FORESEEN ACTIVITIES**

**Component 1: Support to policy and regulatory reform.**
This Component will not include any of the activities directly related to design, execution or operation of civil construction work. As such, there will be no environmental impact.

**Component 2: Investment in Nutrient Reduction and Monitoring.**
This component will provide investment into approximately 8 livestock farms located in municipalities of Novi Sad, Vrbas, Sabac and Pozarevac as well as into approximately 8 slaughterhouses located throughout Serbia. The component will also provide funds for upgrade of the cattle and pig farm facilities and slaughterhouse of the Institute for Animal Husbandry in Zemun – Belgrade. This component will provide partial funding for up to 240 individual livestock farms located in municipalities of Novi Sad, Vrbas, Sabac and Pozarevac as well as fund program of soil and water quality monitoring around selected farms.

The construction works under this component will be individually tailored upon needs of each particular farm/ slaughterhouse, upon completion of a comprehensive selection procedure.

The construction activities that may be undertaken under this component will be limited to some of the listed items:

- **(A) For pig farms:**
  - Construction of slurry lagoons for pig farms
  - Construction of circular above-ground waste store for pig farms
  - Provision and installation of slurry pumps
  - Provision and installation of slurry agitators for slurry lagoons and slurry store

- **(B) For cattle farms:**
  - Construction of farmyard manure store for solid waste for cattle farms
  - Construction of a liquid waste storage tanks for cattle farms

- **(C) For slaughterhouses:**
  - Repair to existing drains, sediment and fat traps at slaughterhouses
• Installation of treatment and screening facilities and separation equipment (screen size 6 mm)
• Installation of dissolved air flotation and separation tanks
• Provision and installation of treatment facilities for “red water” and blood treatment
• Installation of sludge storage tanks

(D) For demonstration farms and slaughterhouses:
• Installation of piezometers at nine selected sites for groundwater monitoring

IMPACT DURING CONSTRUCTION (PROJECT IMPLEMENTATION PHASE)

(A) Pig farms
The standard construction works associated with the component include outdoor activities such as:
• removal of fertile top-soil,
• excavation for new lagoon or excavation for foundations for above-ground tank,
• lining of lagoon with concrete or erecting concrete foundations,
• construction of connecting facilities for pumps,
• construction of gutters,
• installation or placement of above-ground tanks,
• construction of housing facilities for pumps and slurry agitators etc.

The adverse effects that may occur during the construction phase are:
• dust from excavation processes,
• exhaust emission and noise & vibrations from construction equipment and vehicles,
• disturbance of surrounding vegetation,
• soil pollution caused oil and grease leakage and improper solid waste disposal.

The main potential adverse environmental impact is likely to manifest itself by increased dust and noise emission. However, its negative impact will be felt only in close vicinity to location of future structure, and is estimated to be of a low intensity and temporary.

The construction company or other entity/person responsible for execution of such works has the responsibility to provide all necessary measures in order to mitigate the environmental impact during the construction phase.

These activities should include, among others:
• fencing of the construction area, use of dust-absorbing screens to protect surrounding vegetation,
• implementation of measures to reduce surface run-off and erosion in site,
• observance of the legal requirements related to workers health and safety,
• compliance with construction work regulations,
• setting up of a construction waste management system, and
• maintenance of vehicles and construction equipment in special places only.

Costs of these measures should be included in the project costs.

(B) Cattle farms
Nature of the construction activities is the same as for pig farms. Consequently, the impact and mitigation measures that should be undertaken are the same as noted above.

(C) Slaughterhouses
The infrastructure works will typically include:
• clearing of drains and traps by removal of sediment and sludge,
• excavation for foundations,
• placing a foundations and execution of general civil works to house the screening and treatment facilities,
• installation of treatment facilities for “red water” and blood treatment
• separation tanks and sludge storage tanks.

The adverse effects that may occur during the construction phase are:
• dust from excavation processes,
• exhaust emission and noise & vibrations from construction equipment and vehicles,
• disturbance of surrounding vegetation,
• soil pollution caused by oil and grease leakage,
• soil and water pollution by improper handling of removed sediment and sludge, as well as,
• soil pollution by inadequate construction waste management and disposal.

The main potential adverse environmental impact is likely to manifest itself by increased dust and noise emission. Significant negative effect may be felt upon soil and water quality in case of inappropriate sludge and construction waste management, which could also have negative impact on human health (on local population and construction workers alike). The negative impacts will in most cases be felt only in close vicinity to construction works, and are estimated to be of a low intensity and limited duration. However, impact related to sludge and sediment management could be more serious, both in number of affected persons as well as in its significance and duration.

The construction company or other entity/person responsible for execution of such works has the responsibility to provide all necessary measures in order to mitigate the environmental impact during the construction phase. These activities should include, among others:
• fencing of the construction area,
• use of dust-absorbing screens to protect surrounding vegetation,
• implementation of measures to reduce surface run-off and erosion in site,
• observance of the legal requirements related to workers health and safety,
• compliance with construction work regulations,
• design and strict observance of the sludge handling and management procedures,
• strict enforcement of use of the personal protective equipment for persons handling the sediment and sludge,
• setting up of a construction waste management system, and
• maintenance of vehicles and construction equipment in special places only.

Costs of above-noted measures should be included in the overall project costs.

(D) Demonstration farms and slaughterhouses
The construction of piezometers will involve only minimal excavation/ drilling that will not result in any significant environmental impact. Noise and dust reduction measures should be considered in case the location is close to residential areas.

Finally is worth mentioning that permanent loss of productive land for support structure placement is not foreseen or recognized during execution of any activity during construction (implementation phase) under the project component 2.

Impact during operation
The objective of the component is to fund works that will lead to increased prevalence of environmentally friendly practices and sustainable production among eligible enterprises and corresponding reduction in nutrient pollution of the Danube River.

(A) Pig farms + (B) Cattle farms

By providing the slurry lagoons, waste and manure store tanks and associated equipment the proposed project will demonstrate cost-effective techniques to reduce river and groundwater pollution from livestock farms and slaughterhouses. Execution of the designed measures will have positive impact in both the water and soil quality. No negative effects are foreseen if the structures are maintained properly and used according to standard operating practices. This positive impact will have direct consequences to improving the situation relevant to local public health.

By providing required facilities and equipment the component will also contribute:
- to sustainable agricultural production
- to solving the issue of farmyard waste by introducing relevant management and utilization techniques (spreading to the land).

This measure will have positive impact on soil fertility and groundwater quality.

Some potential adverse environmental impact could be felt in close proximity to manure storage structures only due to odor. This impact will be felt particularly during unfavorable climate conditions (high temperatures, high air pressure, or wind). However, selection of the appropriate location for such structures in design/construction phase would in most cases reduce this impact to the minimum.

(C) Slaughterhouses

Similarly to above, the provision of screening, separation and treatment facilities for slaughterhouses will have positive impact by reducing pollution of river and groundwater sources, which will be felt through improved water and groundwater quality. No negative effects, if compared to the existing situation are foreseen if the structures are maintained properly and used according to standard operating practices.

Operation of treatment facilities will have direct positive impact to health of the local population. However, strict adherence to legal requirements in respect to use of personal health and safety equipment will be required in order to avoid potential negative impact of the works to operating staff.

During the operation potential negative effect can be felt (mostly related to human and animal health) if adequate sludge/waste management techniques are not designed and/or applied. Design of the sludge and waste management techniques should be based upon following criteria:
- separation of hazardous and non-hazardous waste at source,
- prevention of non-edible parts of animals from entering the main flow of waste system,
- management of hazardous waste according to positive legal requirements and Animal By-
  Product Directive 2002/1774/RRC,
- spreading of non hazardous animal by products to land used for growth of crops only.

Some potential adverse environmental impact could also be felt in close proximity to fat traps, treatment and screening facilities and sludge storage tanks due to emission of odor. This impact will be felt particularly during unfavorable climate conditions (high temperature, high air pressure, or wind). However, selection of the appropriate location for such structures in design/construction phase would in most cases reduce this impact to the minimum.
**(D) Demonstration farms and slaughterhouses**

Operation of piezometers at nine selected sites for groundwater monitoring will not have any impact on the surrounding environment.

**Component 3: Awareness Raising and Replicability Strategy**

This Component will not include any of the activities directly related to design, execution or operation of civil construction work. As such, there will be no environmental impact.

**Component 4: Project Management and Monitoring**

This Component will not include any of the activities directly related to design, execution or operation of civil construction work. As such, there will be no environmental impact.

**MONITORING**

The planned monitoring program has four main elements:

1. Monitoring surface water quality at four selected project areas (Novi Sad, Vrbas, Požarevac and Šabac).
2. Monitoring groundwater quality by the use of a piezometers network which will be installed.
3. Monitoring treated wastewater discharges on nitrogen and phosphorus from the selected animal slaughterhouses, after either the existing wastewater treatment systems have been redesigned and reconstructed, or the new one-s installed, the both satisfying EU requirements for handling this kind of wastewater.
4. Monitoring the changes in soil quality at four selected project demonstration sites (Novi Sad, Vrbas, Požarevac and Šabac) and 240 farms in selected areas.

Monitoring will be performed by the selected authorized laboratories: Hydro-meteorological Institute – Republic of Serbia, Institute for Soil Science - Republic of Serbia and local soil laboratories in the selected area.

**ENVIRONMENTAL MANAGEMENT PLAN (EMP)**

An environmental management plan (EMP) was developed consisting of a set of mitigation, monitoring, and institutional measures to be taken during project implementation in order to eliminate, offset or reduce the respective environmental or social impacts to acceptable levels.

**Introductory remarks**

According to the EIA only component 2 of the DREPR project requires the EMP.

Project Component 2 will undertake activities that involve construction works that are listed in the table below.

<table>
<thead>
<tr>
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• Provision and installation of treatment facilities for “red water” and blood treatment
• Construction of farmyard manure store for solid waste for cattle farms
• Construction of a liquid waste storage tanks for cattle farms
• Repair to existing drains, sediment and fat traps at slaughterhouses
• Installation of treatment and screening facilities and separation equipment (screen size 6 mm)
• Installation of dissolved air flotation and separation tanks
• Installation of sludge storage tanks
• Installation of piezometers at 9 selected sites for groundwater monitoring
• Purchase of manure loading and spreading equipment

It is, as well, very important to point out what is not going to be done under the DREPR Project Component 2, which is listed in the table below.

<table>
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<td>• Developing or executing of any activity that is not foreseen during project preparation phase</td>
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<tr>
<td>• Developing or executing of any activity in environmentally or culturally sensitive areas</td>
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Environmental impact assessment has identified the potential adverse impacts of various project components of DREPR project. An overview of these effects during construction (for projects that imply civil works) and operation is presented below.

Project components 1, 3 and 4 do not require any construction work, and hence will leave no environmental impact on the ground.

Project component 2 component include outdoor construction works, for which the main adverse environmental impacts will be connected to dust and noise emission. As the construction areas are relatively small and the duration of construction activities short, the impacts of those activities will be felt only locally and characterized by low intensity and limited duration. The executing/construction company has the responsibility to take the necessary mitigation measures that would in most cases include only compliance to the existing construction standard procedures for outdoor and indoor works as well as workers health and safety regulation. In some cases the sludge/waste management plans will have to be designed and enforced. The appropriate management practices will be determined depending upon the sludge/waste composition. Costs for these measures should be included in the project costs.

During operation, the use and handling of sludge/waste and possible bio-hazardous materials (animal by products) may have adverse impacts on both human health & safety and environment. The necessary mitigation measures can be summarized as follows:
1. Use of environmentally friendly design of the civil works to be implemented in order to ensure the protection of soil, water and air against pollution.
2. Use of safe engineering practices in order to ensure minimal negative environmental impact during the construction phase.
3. Issues of the existing sludge/waste and bio-hazardous waste management have to be addressed as part of the each specific project design and ensuing operation program.
4. Compliance with positive environmental legislation and regulations in force should be monitored and reported where necessary.
5. Monitoring of soil, water and groundwater quality should be performed according to designed plan and results reported to relevant state institutions.

Responsibilities for the implementation of environmental mitigation measures belong to national authorities, institutions and partners which are the beneficiaries of DREPR project. Those are:
- Ministry of Agriculture, Forestry and Water Management;
- Ministry of Science and Environmental Protection – Directorate for Environmental Protection;
- Republic Hydro-Meteorological Service;
- Directorate for Water of MAFWM;
- Environmental Protection Agency.

Due to the insignificant or low negative environmental impact during construction, no specific monitoring actions are necessary other than the usual ones taken by the environmental authorities. After the construction and commissioning stage the external water, groundwater and soil monitoring program will be carried out by the Project, according to detailed specifications provided under the project Component 2. Additionally, each activity operator/owner will have to confirm to legal requirements as specified by various environmental authorities and other authorities with legal inspection attributions (MAFWM, MSE, Directorate for Water, Directorate for Environment, Vojvodina provincial secretariats and municipal inspection services).

There are no requirements for additional measures that focus on institutional development or staff training other than those already included as part of each component of DREPR Project.

**Project Objectives**

The DREPR project has two main objectives: reduction of nutrient pollution from some 240 livestock farms and a dozen slaughterhouses in the Republic of Serbia and reduction of its negative public health, economic and amenity impact, as well. Among them approximately 8 livestock farms and 8 slaughterhouses will be treated in the first – demonstration phase.

The both objectives will be attained by taking all necessary mitigating measures and an adequate monitoring process throughout all three project phases, planning/design, construction and operation. Basically, the improved manure management consists in liquid slurry and solid manure six months storage in a covered tank (lagoon) for the purpose of its anaerobic stabilization and its spreading over the farmland afterwards. As to the slaughterhouse wastes, the treatment process is based on their segregation and their adequate separate treatment, with the rest wastewater treatment by the one of several process options, before its ultimate disposal into the recipient.

**Mitigation Plan**

Livestock manures and slaughter wastes have very significant environmental impact on soil, water, air, public health, livestock health, and farm and slaughterhouse staff health and food quality.
The environmental impact on soil includes problems from excess nutrients (N, P, K), organic matter, heavy metals, manure salt content and others. The main problems with animal manure water pollution are nitrate leaching, nutrients runoff, free ammonia and organic matter, while air emissions related to livestock manures are emissions of ammonia and greenhouse gases. Finally, related to animal manures are some nuisance issues and visual impact, also. The main environmental impact of the slaughterhouse and meat processing is excess nutrients introduction in surface and groundwater also, although most of the mentioned environmental impacts of the animal manure are characteristic to them as well.

In order to reduce and/or eliminate these problems the following mitigation measures should be taken:

1. Better housekeeping practice within the farms and slaughterhouses (wastes segregation, recycling, ventilation),

2. More rational water usage and diversion of the rain water directly to the recipient,

3. Design, construction and operation of an efficient, cost effective and replicable manure treatment and land disposal method, eliminating or radically reducing its environmental impacts mentioned before. An optional water disposal method via a dirty water irrigation system should be considered.

4. Design, construction and operation of an efficient and cost effective slaughterhouse wastewater treatment and disposal process, replicable for other plants of this kind, with the maximum possible use of the existing equipment. The process has several options, using necessary holding and treatment tanks for segregated wastes and the appropriate combination of unit processes (screening, filtration, flocculation and dissolved air flotation, biological aerobic treatment with nitrification and denitrification, composting and incineration).

5. Appropriate relation between nutrients content in soil and the quantity of the manure used for fertilization, to avoid that surplus, which could not be taken by the plant, is released in surface or ground waters.

**Monitoring Plan**

The main objective of the water and soil quality monitoring program will be the assessment of the improved nutrient and animal waste management practices that will be implemented at selected farms/sites and that will demonstrate how the leaching of nitrogen and phosphorus to local surface and groundwater sources can be reduced and water and soil quality improved by the use of good agricultural management practices.

The planned monitoring program has four main elements:

1. Monitoring surface water quality at nine selected project areas.

2. Monitoring groundwater quality by the use of a piezometers network which will be installed.

3. Monitoring treated wastewater discharges on nitrogen and phosphorus from the three selected animal slaughterhouses, after either the existing wastewater treatment systems have
been redesigned and reconstructed, or the new one-s installed, the both satisfying EU requirements for handling this kind of wastewater.

4. Monitoring the changes in soil quality at nine selected project demonstration sites and 240 farms in four areas (Novi Sad, Vrbas, Požarevac and Šabac).

The entire surface and groundwater monitoring program will be carried out by the Hydro-meteorological Service of Serbia.
Soil and manure samples, collected from 60 farms before fertilizer and manure application have been made, will be analyzed in four selected regional laboratories, one in each of the four project areas.
All soil samples, collected from the Institute of Animal Husbandry Belgrade Farm and one hectare demonstration plots in the project area, will be analyzed at Soil Science Institute of Belgrade. The set of soil samples, collected from a total of about 240 farms, will be analyzed at the four selected regional laboratories.

**Surface Water Quality Monitoring**

The DREPR project will establish a detailed mechanism for collection water samples for nutrient analysis and monitor the quality of local surface waters at nine project areas (two or more monitoring points at each of them), in order to quantify the nitrogen and phosphorus loads reduction to the local streams and rivers, discharging them into the Danube River and its tributaries in Serbia. At each of these sampling points samples will be collected monthly from March to November and more frequently during rainy months of April and May.
Surface runoff water samples will be collected from 36, one hectare in size demonstration plots, established for testing good agricultural practices at the Animal Husbandry Institute near Belgrade.

**Groundwater Quality Monitoring**

This monitoring part will be done by the use of newly installed piezometer network of about 10-12 piezometers and 1-2 existing water wells at each of nine project areas. The network will be installed under the supervision of Hydro-meteorological of Serbia according to the “international standard design” and approved by the international consultant. All these piezometers and wells will be sampled at least twice a year and analyzed for nutrients, in order to determine the transport of nitrogen and phosphorus along the groundwater gradient into the shallow aquifer systems.
Before determining piezometer locations a hydro-geological map of the site will be obtained and groundwater flow direction will be determined. The number of piezometers to be installed at each of these sites depends on numerous local factors to be determined. A preliminary hydro-geologic survey of the area for all eight sites and the Animal Husbandry Institute Farm is needed prior to the implementation of the project in order to define current status of groundwater quality and before the introduction of improved nutrient management practices.
At each of the piezometer sites, during their installation, soil samples will be collected for nitrate, phosphorus and potassium analysis.

**Soil Quality Monitoring**

The soil monitoring program will have two main objectives. First, it will be an integral part of the process for developing farm nutrient management plans for about 240 farms as it ensures that
farmers apply fertilizers or manure to their fields in appropriate amounts on the basis of the current nutrient status of the upper 30 cm of soil profile and to meet the nutrient uptake requirements of the crops. This allows maximizing the nutrient uptake efficiency of plants and avoiding the risk of excessive leaching of nitrogen and phosphorus to groundwater systems and possibly to surface water sources with runoff water. Second, regular soil quality monitoring (especially before planting and after the harvesting) is useful in determining the transfer of nutrients to the groundwater through leaching as well as the contamination of the soil by the accumulation compounds such as phosphorus, potassium and organic nitrogen from manure applications.

Collecting soil samples for nutrient analyses will be responsibility of Local Implementation Units (LIU’s) and coordinators of demonstration sites. LIU’s will work with farmers in collecting the soil samples from those farm areas that will enter into DREPR project goals. These soil samples then will be analyzed for N, P and K in local soil testing laboratories. The manure samples will be analyzed for total N, total K, also. On the basis of these soil and manure test results LIU’s will make fertilizer or manure application recommendations to farmers.

Each of the nine demonstration sites will be provided with two sets of soil sampling probes. For developing fertilizer and manure management plans, the nutrient contents of manure and soil will be analyzed so that calculations can be made on how many tons of manure or kg. of fertilizer can be applied per hectare to achieve the desired application rates to meet the N and P uptake needs of the crop.

The monitored parameters for surface water, groundwater and soil quality will be as follows:

<table>
<thead>
<tr>
<th>Soil Quality Parameters</th>
<th>Surface and Ground Water Quality Parameters</th>
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<tbody>
<tr>
<td>Nonspecific</td>
<td>pH, Turbidity, Odor</td>
</tr>
<tr>
<td>Organic matter, pH, Color, Texture, Hydraulic conductivity</td>
<td>NO$_3$-N, Total P</td>
</tr>
<tr>
<td>Specific</td>
<td>NO$_3$-N, Total P, Optional: fecal coliforms &amp; total coliform bacteria, dissolved O$_2$ and BOD in surface water</td>
</tr>
<tr>
<td>Organic N, NO$_3$-N, Total P</td>
<td></td>
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<tr>
<td>Optional: Potassium</td>
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</tbody>
</table>

**Capacity Building for the Implementation of the Monitoring Program**

The following institutions will be provided equipment and other professional training to build their capacity and function at par with other international institutes:

i. Animal Husbandry Institute, Belgrade-Zemun,
ii. Soil Science Institute, Belgrade,
iii. Hydro-meteorological Service, Belgrade
iv. Local laboratories in four project areas.

**Training:** A total of up to 10 staff/scientists from laboratories and institutes will be sent for short-term training to overseas countries to update them on latest advances in the analytical procedures and new laboratories equipment. Also, one environmental/hydrologic engineer will be trained on the sue of SWAT or MIKE-SHE computer simulation model for watershed modeling and on developing QC/QA protocols required for various soil and water monitoring activities in this project.
**Equipment:** Project will purchase several pieces of laboratory equipment to strengthen their existing capacity for soil and water analyses in selected laboratories. In addition two stat-of-art equipment for nitrate analyses, such as Latchet, will be considered for purchase to strengthen their capacity as well to support the monitoring work. In addition to this equipment, laboratories will receive a lump sum amount for laboratories supplies and to help them to cover the cost of surface water monitoring program. Also, laboratories will have their staff scientists sent to the best Serbian laboratories and abroad for short-term training programs. In addition, the Animal Husbandry Institute and other eight demonstration sites will be provided with manure applicators (solid as well as for liquid injectors) for precise application of manure if needed. In addition, all nine demonstration sites should be provided with no-tillage planters as no-tillage will be one of the tillage practices tested for the good agricultural practice. All nine sites do not need to buy no-till planters but can share between themselves. Also, DREPR project need to buy chisel plows for the demonstrations farms as well to demonstrate the use of chisel plows.

**ANNEX A**

**ENVIRONMENTAL SCREENING CRITERIA FOR DECIDING THE PREPARATION OF AN ENVIRONMENTAL MANAGEMENT PLAN**

If any of the following factors are assessed to be significant by the PCU, an EMP will be required for the project of concern:

- Excess nutrients (N and P) introduction to surface and ground waters,
- Possible impact to public, livestock, farm and slaughterhouse employees’ health;
- Impact to produced food quality;
- Interference with local aesthetic characteristics (nuisance and visual impact);
- Environmental sensitive areas involved (protected area, sensitive ecosystems, etc.);
- Soil and water organic and heavy metals pollution;
- Permanent loss of productive land for support structure placement;
- Air pollution;
- Soil erosion;
- Culturally sensitive areas involved (structures/locations of historical or archeological significance).

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• Purchase of manure loading and spreading equipment

Negative Environmental screening list

• Building of new slaughterhouse
• Establishing new cattle or pig farms
• Making any interventions by the enterprises beyond cattle farms, pig farms and slaughterhouses
• Developing or executing of any activity that is not foreseen during project preparation phase
• Developing or executing of any activity in environmentally or culturally sensitive areas

DREPR Project Environmental reference for Cattle farms & Pig farms
- Constructing (project Implementation) phase -

<table>
<thead>
<tr>
<th>No</th>
<th>Possible problems</th>
<th>Possible negative impacts</th>
<th>Mitigations measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Increased dust and noise emission</td>
<td>Nuisance, negative impact on human health</td>
<td>Measures to minimize effects, observe the legal requirements</td>
</tr>
<tr>
<td>2</td>
<td>Inappropriate sludge and construction waste management</td>
<td>Odor, deterioration of the environment</td>
<td>Measures to minimize effects, observe the legal requirements</td>
</tr>
<tr>
<td>3</td>
<td>Soil erosion/silt runoff from construction operations</td>
<td>Soil erosion, damage to land values or structures</td>
<td>Proper measures to minimize soil erosion on site, resurfacing of affected areas</td>
</tr>
<tr>
<td>4</td>
<td>Construction hazard</td>
<td>Safety risk for workers</td>
<td>Appropriate safety measurements, use of protective and safety equipment</td>
</tr>
</tbody>
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DREPR Project Environmental reference for Cattle farms & Pig farms – Operation phase

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<th>Possible problems</th>
<th>Possible negative impacts</th>
<th>Mitigations measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Emission of odor</td>
<td>Nuisance</td>
<td>Observe usage instructions, perform optimal maintenance, observe the legal requirements</td>
</tr>
<tr>
<td>2</td>
<td>Inadequate water monitoring</td>
<td>Decrease of water quality, health risk</td>
<td>Proper monitoring planning, proper operation and maintenance, regular inspection</td>
</tr>
<tr>
<td>3</td>
<td>Inadequate operation and maintenance</td>
<td>Health risk, accidental discharges, decline in surface water quality</td>
<td>Proper planning and set of good operation and maintenance system, regular</td>
</tr>
<tr>
<td>No</td>
<td>Possible problems</td>
<td>Possible negative impacts</td>
<td>Mitigations measures</td>
</tr>
<tr>
<td>----</td>
<td>-------------------</td>
<td>--------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>1</td>
<td>Increased dust and noise emission</td>
<td>Nuisance, negative impact on human health</td>
<td>Measures to minimize effects, observe the legal requirements</td>
</tr>
<tr>
<td>2</td>
<td>Inappropriate sludge and construction waste management</td>
<td>Odor, deterioration of the environment</td>
<td>Measures to minimize effects, observe the legal requirements</td>
</tr>
<tr>
<td>3</td>
<td>Soil erosion/silt runoff from construction operations</td>
<td>Soil erosion, damage to land values or structures</td>
<td>Observe usage instructions, perform optimal maintenance, observe the legal requirements</td>
</tr>
<tr>
<td>4</td>
<td>Construction hazard</td>
<td>Safety risk for workers</td>
<td>Appropriate safety measurements, use of protective and safety equipment</td>
</tr>
</tbody>
</table>

**DREPR Project Environmental reference for Slaughterhouses – Construction (project Implementation) phase**

<table>
<thead>
<tr>
<th>No</th>
<th>Possible problems</th>
<th>Possible negative impacts</th>
<th>Mitigations measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Emission of odor</td>
<td>Nuisance</td>
<td>Observe usage instructions, perform optimal maintenance, observe the legal requirements</td>
</tr>
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<td>Proper planning and set of good operation and maintenance system, regular inspection</td>
</tr>
<tr>
<td>4</td>
<td>Inadequate waste water and animal by-products management</td>
<td>Additional unnecessary release of nutrients (N&amp;P) into water courses, water pollution</td>
<td>Proper waste water and animal by-products planning, set of good operation and maintenance</td>
</tr>
</tbody>
</table>
DREPR Project Environmental reference
- Monitoring parameters of surface water, groundwater and soil quality -

<table>
<thead>
<tr>
<th>Soil Quality Parameters</th>
<th>Surface and Ground Water Quality Parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonspecific</td>
<td>pH, Turbidity, Odor</td>
</tr>
<tr>
<td>Organic matter, pH, Color, Texture, Hydraulic conductivity</td>
<td>NO₃-N, Total P Optional: Potassium</td>
</tr>
<tr>
<td>Specific</td>
<td></td>
</tr>
<tr>
<td>Organic N, NO₃-N, Total P</td>
<td>NO₃-N, Total P Optional: fecal coliforms &amp; total coliform bacteria, dissolved O₂ and BOD in surface water</td>
</tr>
<tr>
<td>Optional: Potassium</td>
<td></td>
</tr>
</tbody>
</table>

PUBLIC DISCLOSURE

According to the World Bank’s procedure Directorate for environmental protection performed the following actions:

- we informed people and interested parties about DREPR EMP disclosure by mail and by advertising that in newspaper - Politika; it is read throughout whole Serbia, the advertisement appeared on November 17.
- Serbian text of DREPR EMP was disclosed on the DEP web-site together with appropriate info on DREPR project on Tuesday, November 16;
- Serbian text of DREPR EMP was disclosed in the Directorate as a hard copy of a document.
- We sent the same text to the selected municipalities (Šabas, Požarevac, Novi Sad & Vrbas), there it was disclosed on the bulletin boards of Municipality buildings and in Municipality libraries.
- We organized public meeting in the premises of the Institute for Protection of Nature of Serbia on November 22; this was also announced in the Politika;
- During the meeting "records of the meeting" has been made and all necessary and important issues rose on that meeting has been incorporated in the EIA/EMP report.

IMPORTANT NOTICE: There were no issues discussed during the public meeting on DREPR EMP, organized by Directorate for environmental protection, which caused any changes in the EMP. Beside comment and questions posed during the meeting, we had no comments received on e-mail, and nobody come to Directorate to take hard copy of a EMP document.
The public discussion of the DREPR Project "Environmental Management Plan" was held on November 22, 2004, from 13 to 15:30 in the Agency for Environmental Protection (the list of attendees is attached).

The public discussion was opened by Ms. Jasminka Randjelovic, Project Coordinator, who greeted the participants on behalf of the Directorate for Environmental Protection. Mr. Ivan Grzetic, Ph.D., the Project Preparation Unit Coordinator gave a brief presentation of the Project to brief the attendees about the Project. The introductory part was followed by the presentation of Mr. Luka Knezic, Ph.D., the consultant engaged for the preparation of the terms of reference for the Environmental Framework and Screening which was on the agenda of the public discussion "Chapter on Environmental Protection and Environmental Management Plan" (EIA & EMP).

Following the presentations, the attendees were encouraged to participate in the public discussion.

1) Mr. Zarko Lainovic, Mayor of Vrbas Municipality, raised three issues. The first referred to the timelines for the implementation of the project, the second to the inspection authorities controlling farm and slaughterhouse pollution, and the third to the implementation stage organizational structure.

Mr. Knezic, Mr. Grzetic and Ms. Randjelovic emphasized that a separate meeting would be organized with the representatives of the four municipalities selected in the project demonstration phase where they would be provided with detailed information on the project organization. Professor Grzetic underlined that the Project is currently in the preparation stage. The preparation stage would result in the drafting the operational manual that could be disseminated to the demonstration municipalities. Also, it was emphasized that active cooperation had been established with the inspection authorities within the Ministry of Science and Environmental Protection, the Ministry of Agriculture, Forestry and Water Management, provincial secretariats, etc.

2) Mr. Mileta Perisic, Ph.D., Geology Institute (Geoinstitut), is of the opinion that the data used for N and P pollution levels are not compatible with the ICPDR data. Also, he suggested that the regions in the vicinity of water reservoirs such as Gruza, Celije, Uzice, etc. should be included in the demonstration phase. With regard to that, professor Grzetic noted that within this Project, the World Bank was investing in the reduction of the farm and slaughterhouse pollution only, and that the problem of the settlements with no farms or slaughterhouses could not be addressed within this Project.

3) Mr. Branislav Simonovic, Ph.D., General Manager of the Institute for General and Physics Chemistry, asked why dairy factories were not included in the Project. Three years ago, the Institute for General and Physics was involved in a safe technologies project demonstrating that a whole range of nutrient pollutant whey and yeast products may be used commercial purposes.
In reply to that comment, professors Knezic and Grzetic noted that the Dutch donors showed interest in investing in dairies. A similar project had already been implemented in Poland, proceeding the farm nutrient pollution reduction project.

4) Mr. Miksa Jovanovic, Assistant General Manager of the Serbian Hydrometeorological Institute, raised the issue of possible borrowing for the preparation of the study on the hydrogeological structure of soil for soil monitoring purposes and the extent to which such a study would be developed.

The question was answered by Ms. Mirjana Zdravkovic, M.Sc., local consultant for soil, explaining that the maps used were the existing hydrogeological maps which were forwarded to Mr. Ramesh Kanwar, the World Bank consultant, who was mostly interested for the data on the water table, and watercourse flows and directions. The data submitted was satisfactory, and would be used as the basis for the installation of piesometers.

The second question by Mr. Miksa Jovanovic referred to optional parameters for water and soil quality monitoring. Professors Ivan Grzetic and Luka Knezic explained that the World Bank would invest in the monitoring of the N and P parameters, while the optional parameters would be financed by the Republic of Serbia, should the funds be provided.

Ms. Zdravkovic added, on the subject of good agricultural practice, that this Project would facilitate the demonstration of modern agrotechnical practices already used in the US (new tillage and composting practices) in the demonstration farms. In the process, new liquid manure injection technologies would be applied.

Considering there were no more questions raised by the interested public, Ms. Randjelovic thanked the participants for their interest and participation in the public discussion.

Minutes compiled by:

Ivan Grzetic, Ph.D.

Luka Knezic Ph.D.

Jasminka Randjelovic, M.Sc.

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