



WATER POLLUTION SOURCES AND ENVIRONMENTAL MONITORING



Common knowledge

Diffuse pollution from agriculture, and especially from animal husbandry, causes considerable environmental hazard. Improper manure management creates conditions for urine to leak and pollute surface and groundwater.

In 1999 Lithuanian Republic Environmental Minister approved Environmental requirements for manure and sewage handling on livestock-farms (LAND 33-99), which legalised rules that should be followed by all agricultural economic entities in their work.

This normative document explains how to store, transport and spread manure, and also how to perform an environmental monitoring (the systematic observation of the state of the environment and its components and changes thereof). Many valuable recommendations about manure management can be found in the 'Code of Good Agricultural Practices for Lithuania'. LAND 33-99 points out how and where should be observed, evaluated and forecasted pollution sources and their physical, chemical and biological impact (on surface and ground water, on crop quality, soil and atmosphere). Already at present the environmental monitoring is compulsory on the big farms of capacity more than 1000 animal units (AU) and in some cases on other farms if it is prescribed in their Licences for the Use of Natural Resources. Environmental monitoring programmes (observation parameters, periodicity etc.) shall be established by the Environmental Ministry (Regional Environmental Protection Departments). According to the Law on Environmental Monitoring economic entities shall fund the environmental monitoring with their own funds. The economic entities shall be responsible for reliability of the monitoring data according to the order established by legislation. The environmental monitoring may be performed by the laboratories that have licences to perform laboratory measurements of environment and its pollution sources; the licenses are issued by the Environmental Ministry authorised institution.

Monitoring parameters

The environmental monitoring is composed of two parts – observation of pollution sources and of their impact on environment. When performing the monitoring the following data (parameters) shall be determined:

- the amount and quality of the water used;
- the output and composition (pH, nutrients (NPK), dry matter (DM)) of manure and liquid manure;
- the amount and composition of the surface effluent from slaughter and meat processing, compost sites, enterprise territory;
- the area and location of the fields for manure spreading and spreading technologies;
- field soils' main agrochemical characteristics: pH, humus, mobile phosphorus and potassium;
- annual and single fields fertilisation (NP) and spreading norms and fertilisation routine;

- additionally used mineral fertilisers, chemical substances, their amount and application terms for fertilisation of fields;
- crop structure and productivity;
- the amount and pollution of tile drainage and surface water flowing from the territory of the enterprise. pH, BOD₇, SM, N, P, K, Cl, oil products shall be determined;
- the amount and pollution (pH, SM, N, P, K, and Cl) of tile drainage and surface water flowing from the fertilised areas. Background concentrations of the controlled parameters shall be determined before fertilisation season.

Monitoring conditions

Performance of the monitoring is determined in the Licence for the Use of Natural Resources. An economic entity prepares the monitoring programme, coordinated with the regional environmental protection departments and submits together with the claim to receive the Licence for the Use of Natural Resources.

Needed conditions to perform the monitoring of water pollution sources and impact on environment:

- possibility to measure water flow in the tile drainage systems, which drain livestock-farms and liquid manure watering fields and to take water samples;
- possibility to sample groundwater;
- possibility to sample the surface water flowing from the territory of the enterprise;

It is very important to select the sampling places, coordinate them with the district environmental protection agencies and to foresee and install needed measures.

The best way to measure the amount of water discharged in the tile drainage systems is in specially installed measuring posts where continuous data on water flow are received with help of a water level recorder.

For observation of groundwater a borehole network shall be installed considering local conditions. Specialists of the hydrogeological survey will help to lay out the boreholes, to choose depth and to install them. The economic entity is responsible for the arrangement of required sampling places, posts and boreholes.

An example of the monitoring programme

An example of the monitoring programme of water pollution sources and their impact on environment is given in the table.

The picture below shows the territory of an enterprise that encompasses livestock barns, manure storage, urine reservoir and tile drainage systems draining this territory.

Two 5 meters depth boreholes are installed at the manure storage and the urine reservoir according to land surface slope. Boreholes water quality analysis will help to evaluate effectiveness of the manure storage and the reservoir.

As two tile drainage systems drain the shown territory, the monitoring post is installed at the place where both systems are brought together.

WATER POLLUTION SOURCES AND ENVIRONMENTAL MONITORING PROGRAMME

ŽŪB Bariūnai, Bariūnų village, Joniškio r.

(Name, address of economic entity)

R.Jonaitienė; executive manager

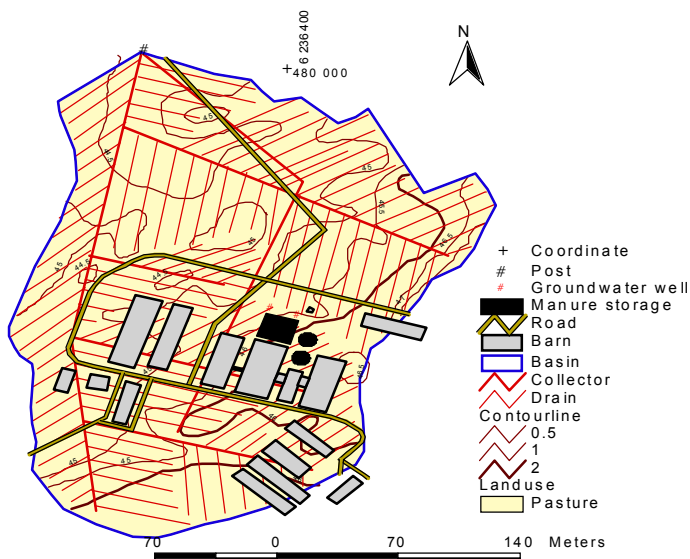
(responsible for water management)

Wastewater type, treatment method, wastewater treatment plant code	Wastewater collector (distance of discharger to collector-river mouth)	Sampling frequency and duration	Sampling, discharge measuring place, Nr. in water management scheme	Sample type, sampling and discharge measuring method, means	Determined parameters	Laboratory, permission Nr., date
NT B 311 Discharger Nr.1	Audruvė 35311 33,00	Once a quarter	Discharger Nr.1 according to the scheme (after biological treatment) before entering Audruvė river	Daily discharge is calculated according to the amount of water used	pH, smell, colour, BOD ₇ , SM, bichromate oxidation, permanganate oxidation	UAB "Joniškio vandenys"
LD Discharger Nr.2 (old tile drainage system)	Audruvė 35311 32,00	Once a quarter	Discharger Nr.2 according to the scheme	Average, manual; discharge – with help of limnigraph	Discharge, pH, BOD ₇ , SM, total P, total N, Cl, K	Institute of Water Management
LD Discharger Nr.3 (new tile drainage system)	Audruvė 35311 32,00	Once a quarter	Discharger Nr.3 according to the scheme	Average, manual; discharge – with help of limnigraph	Discharge, pH, BOD ₇ , SM, total P, total N, Cl, K	Institute of Water Management
LD Discharger at crop rotation field	Ašvynė 6,50	Once before fertilisation (background level), once a month during fertilisation	Discharger Nr.4 according to the scheme	Average, manual; discharge – with help of limnigraph	Discharge, pH, BOD ₇ , SM, total P, total N, Cl, K	Institute of Water Management
Groundwater borehole	Audruvė basin 35311 32,00	Twice a year	From boreholes		According to the programme prepared by the Institute of Water Management	Institute of Water Management

The monitoring post – it is a reinforced concrete well of 1.5 m diameter, installed across collector by making appropriate height difference between both parts of the collector. In the well there is a discharge measuring box (in this case – two separate ones) and water level recorder, float thereof is inside of the discharge measuring box. Water level recorder registers changes of water level in the discharge measuring box. Water flow is calculated according to the water level. Water samples are taken here too.

If there is a possibility, water measuring post should be installed in the liquid manure watering fields and if possible – boreholes for water sampling as well.

Monitoring data allows not only detecting changes in the state of the water sources and tendencies of quality changes, but also searching for ways and measures to reduce the pollution.



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