Preliminary results of the project “Best available techniques for intensive livestock farming in Russia” within the German Advisory Assistance Program for environmental protection of the Federal Ministry for the Environment, Nature Conservation, Building an Nuclear Safety

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Implementing organizations:

- DöhlerAgrar, Germany
- German Environment Agency (UBA),
- “Institute for Engineering and Environmental Problems in Agricultural Production” IEEP, the Russian Federation

This project (no. 43086) was financed by the German Federal Environment Ministry’s Advisory Assistance Programme (AAP) for environmental protection in the countries of Central and Eastern Europe, the Caucasus and Central Asia and other countries neighbouring the European Union. It was supervised by the German Environment Agency (UBA).
The reforming of the Russian environmental legislation is currently in progress. Application of BAT criteria is one of the harmonization elements of Russian and European environmental policies.


It is planned to use the European experience in BATs introduction.

The release of the Russian reference books on BAT “Intensive rearing of pigs” and “Intensive rearing of poultry” is scheduled for 2017.

At present, the integration of BATs system in Russia’s agricultural production is at an initial stage. There is a problem of different understanding of BAT idea, principles and methods by the specialists at all levels. For that reason all practical, methodical, research and technical aspects of BATs application in Europe are of the utmost interest.
The overall objective of this project is to develop an information exchange on the integrated and specific methodology for the classification of livestock housing systems, and of storage, treatment and spreading of manure produced, in terms of “Best Available Techniques (BAT)” (which has been developed during the IED information exchange in Central Europe).

The specific objective of the project is to draft proposals on introduction of BATs for intensive livestock farming in the Russian Federation based on the relevant European experience.
The following tasks were completed:

a) to acquire and analyze the information on the European procedure of identification, selection and implementation of Best Available Techniques for the intensive rearing of livestock;

b) to identify (an existing) or develop (a new) scheme for the assessment of IRPP BAT suitable for the Russian Federation;

c) to disseminate information on suitable for Russia BATs for intensive livestock farming among scientists, advisors, farm managers, politicians and administration;

d) to make proposals for BAT introduction system in the intensive livestock farming sector in Russia.
Types of animals under consideration:
Pigs (fattening, farrowing, weaners), laying hens, milking cows

The technologies (processes) under consideration:
feeding and housing of livestock; storing and processing of manure, organic fertilizer application.

Project duration: from 20.08.2014 to 30.04.2016

The work was done for the conditions of the North-West of Russia.

The project outcomes and deliverables should be available for EECCA countries and will support these countries in the possible ratification of the Gothenburg Protocol of the UNECE-CLRTAP and application of provisions of EU Industrial Emission Directive – IED.
Work Packages of the project

WS1 Project management

WS2
BAT-Process in EU and Russia
Legislative Base and Regulatory Framework

EU BAT Legislative base Regulatory

RU BAT Legislative base Regulatory Framework

RU regulatory framework on pig, cattle and poultry farms.

WS3
Methodology development for BAT identification

Criteria for BAT identification

Key environmental issues of on-farm

Documentation system

Assessment system

WS4
Data collation

Collection data through inquiry farm, experts, literature

Data Collation

Description of technique

WS5
Assessment of Techniques and identification of BAT

Assessment of techniques – feeding, housing, storage, spreading of animal manure

Comparison Russian and EU BAT candidates

Recommended BATs for intensive livestock farming of Russia

Recommendations and requirements how to identify the BATs for intensive livestock farming

WS 6 Dissemination of project targets and outcomes to scientists, advisors, farm managers, politicians and administration by setting up a Webpage and publication and conference contributions

WS 7 Workshop with EECCA countries representatives and reporting to relevant Russian and German ministries
Identification of BAT

Identification of relevant techniques for IRPP & Cattle

Feeding/Housing/ Treatment exhaust air/ Storage manure/Treatment manure/ utilization residues on farmland

List of desirable data

Data collation

Uniform description format

Analysis of BAT Assessment Methodologies

Selection / development of Methodology

Technique Assessment Data / Experts

Alignment with EU-BAT

Identification of BAT
Government of the Russian Federation adopted a number of decrees and orders concerning implementation of a uniform transition system to BAT in various sectors. In general, the suggested system is an analogue of the current BAT system in EU countries.

Review of the relevant Russian legal, regulatory and guideline documents, showed that they include the basic BAT principles from the EU BREF but these principles are scattered in various documents – federal laws, construction rules and regulations, sanitary rules and standards, managerial directives and others.

One of the tasks in transition to the new rate setting system is to integrate current relevant regulatory documents in a single system, which would provide technical and technological modernization of production with consequent reduction of the impact on environment.
To compare the technologies the following indicators were used:

Atmospheric emissions (ammonia/odour, PM (PM10), methane, nitrous oxide, dust and other (noise, CO$_2$, NOx));

resources (energy demand, water demand);

animal health;

animal welfare;

cost (capital, operating, labour, additional);

practical experience;

technical reliability;

worker safety
### Assessment of technological elements in terms of BAT criteria

<table>
<thead>
<tr>
<th>Key assessment indicators</th>
<th>LIVESTOCK FACILITY</th>
<th>ANIMAL/POULTRY MANURE STORAGE</th>
<th>ANIMAL/POULTRY MANURE PROCESSING</th>
<th>FIELD APPLICATION OF PROCESSED ANIMAL/POULTRY MANURE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Housing system</td>
<td>Ventilation system</td>
<td>Feeding system</td>
<td>Drinking system</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>Manure removal system</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Medication lighting, etc.</td>
</tr>
<tr>
<td>Emissions to atmosphere</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Ammonia / odour</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>- PM (PM10)</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>- Methane</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>- Nitrogen oxide</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>- Other (noise, CO2, NOx,)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>- Dust</td>
<td>X</td>
<td>X</td>
<td>-</td>
<td>X</td>
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<tr>
<td>- Risk of N and P access to soil</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
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<tr>
<td>Resources:</td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Power inputs</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>- Water consumption</td>
<td>-</td>
<td>-</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Animal health</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
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<tr>
<td>Animal comfort</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Economic indicators</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Operating experience</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
</tbody>
</table>

(“X” is relevant for the criterion, “-“ is not relevant for the criterion)
## Fragment of the list of recommended BAT

<table>
<thead>
<tr>
<th>Techniques for reducing emissions from the storage of solid manure</th>
<th>Store dried solid manure in a barn</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Store solid manure on solid impermeable floor equipped with a drainage system and a collection tank for the run-off</td>
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<tr>
<td></td>
<td>Select a storage facility with a sufficient capacity to hold the manure during periods in which the application to land is not possible</td>
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<tr>
<td></td>
<td>Store solid manure in field heaps placed away from surface and/or underground watercourses which liquid run-off might enter</td>
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<td></td>
<td>Reduce the ratio between the emitting surface area and volume of the manure heap</td>
</tr>
<tr>
<td></td>
<td>Cover solid manure heaps</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Techniques for reducing NH3 emissions from slurry store</th>
<th>Reduce the ratio between the emitting surface area and the volume of the slurry tank</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Reduce wind velocity and air exchange on the slurry surface by operating at a lower level of fill</td>
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<tr>
<td></td>
<td>Minimise stirring of slurry</td>
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<td></td>
<td>Natural crust</td>
</tr>
<tr>
<td></td>
<td>Use stores that are able to withstand mechanical, chemical and thermal influences</td>
</tr>
</tbody>
</table>
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1.1 Brief information on BAT system
1.2 The effective regulatory and legal framework to start livestock farms
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2.1 Technologies on the farms of intensive livestock rearing considered in terms of BAT
2.2 Assessment of the environmental impact of a livestock farm
2.3 List of criteria for BAT identification
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2.5 Economic efficiency of BAT introduction

3 Main stages in creation of BAT reference book
3.1 Data acquisition on the industry status
3.2 Situational analysis and description of available technologies
3.3 Procedure of BAT identification
3.4 Creation of assessment matrix of all the relevant factors for each group of techniques (machinery, technologies, processes);
3.5 Description of technologies in BAT format and BAT identification

4. Structure of BAT

5 Recommended BAT technologies and techniques to be included in the Russian BAT reference book on intensive livestock rearing

CONCLUSIONS

References

ANNEX A – Questionnaire (to collect the initial data for development of BAT Reference Document “Intensive rearing of pigs, poultry and cattle”) 
ANNEX B - Russian advanced livestock production technologies, Identification of BAT 
ANNEX C - Description of advanced Russian technologies in intensive livestock 
ANNEX D - Recommended BATs for the Russian intensive livestock farming 
ANNEX E – Assessment of economic efficiency of poultry manure processing technologies
Best available techniques (BAT) for intensive livestock farming.


Best Available Technique is a complex of production processes, equipment, engineering methods, techniques, procedures and tools, which are based on the latest achievements of science and technology, which have the best combination of indicators that environmental and economic efficiency objectives have been achieved, which feature technical applicability in production on the facilities that have an adverse impact on the environment.

Scheduled plan of transition to BAT.

2017 – development of Russian BAT reference book for intensive rearing of pigs
2017 – development of Russian BAT reference book for intensive rearing of poultry

By 1 January 2025, legal entities and individual entrepreneurs, who are engaged in economic and (or) other activity on the objects (facilities) scope of BATs application, are required to obtain an integrated environmental permit.

It allows to avoid the access of nutrients to the water bodies. Biogas installations allow to process manure and manure-bearing wastewater into organic fertilizers and to produce a heat-carrying agent. Subsoil application of organic fertilizers reduces atmospheric emission and eliminates the wash-off of organic fertilizers on open water bodies.

Implementing organizations

DonlenAgro,
German Environment Agency (UBA),
Federal State Budget Scientific Institution “Institute for Engineering and Environmental Problems in Agricultural Production – IEEP”

On behalf of:

Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety

of the Federal Republic of Germany
A workshop on BAT in intensive livestock farming was held on 16 February 2016, on the premises of IEEP

The main purpose of the workshop was dissemination of information obtained in the course of project work and discussion of elaborated Recommendations.

The workshop was attended by 54 specialists – scientists from relevant research institutes, lecturers from higher educational establishments, representatives of industry and administration, including 4 representatives of EECCA countries (Belarus, Kazakhstan, Moldova and Tajikistan).

The English-Russian and Russian-English simultaneous translation was provided.
Future work

The project outcomes show that the follow-up project may cover the following issues:

- Methodology for information acquisition concerning the available technologies with assessment of its reliability and completeness;
- Economic assessment in BAT identification;
- European experience in BAT introduction into agricultural practice. BAT introduction steps: BREF-national legislation- integrated permits - control;
- Assessment of technologies in place on the operating (pilot) livestock enterprise in terms of BAT requirements
Thank you for your attention!