ANNEX W. PRINCIPLES OF THE CODE OF GOOD AGRICULTURAL PRACTICE FOR IMPLEMENTATION OF ACTION PLANS IN NITRATE VULNERABLE ZONES

Introduction

The Code of Good Agricultural Practices (CGAP) is the set of rules and recommendations in respect of the management of the farm in the manner allowing for reduction of pollution and environmental degradation. The CGAP has been developed according to the current Polish legislation in the field of environmental protection, and water protection in particular and was approved by Ministers of Agriculture and Environment in June 2002. This document is adressed to all farmers in order to increase awareness and it is designed to be utilised only on a voluntary basis. CGAP has been created in order to fulfill the EU requirements expressed in Nitrate Directive. The CGAP consists of relevant entries, ordered with regard to the issues listed in the 2nd (parts A and B) and 3rd Annexes to the Nitrate Directive.
In the introduction, basic terms concerning water protection and fertilisers used in the code were defined:

- From hydrological point of view water can be classified as rainfall water, surface water or groundwater. Surface waters include all basins, such as ponds, lakes and seas, as well as watercourses, such as streams and large rivers. Groundwaters are classified into shallow groundwaters and deep (artesian) groundwaters. Drilled wells reach down to the level of artesian water, and dug wells take water from shallow groundwaters. The type of waters mentioned remain in strict connection as we deal with constant water circulation in the surrounding environment.
- Determining water purity is based on a number of physical and chemical factors examined in laboratories. One of the basic criteria for evaluation of suitability of water for drinking purposes is nitrate content. Nitrate content in drinking water must not exceed 10 mg of nitrate nitrogen (N-NO3) per 1 litre of water. Research shows that over 50% of dug wells in agricultural farms provide water containing nitrate content that exceeds the set limit.
- The sources of water pollution are grouped into non-agricultural and agricultural. Agricultural sources of pollution are then grouped into point source and surface-source. Point sources of pollution include farmyard and sometimes the whole village in a, so-called, compact settlement. Agricultural point sources of pollution may also include village rubbish dumps, leaking sanitary systems, storages of solid and liquid animal excrements. Due to the high number of such sources in Poland (approximately 2 million farmyards, over 40 thousand villages) point sources are often called “point-diffuse”. Surface sources of pollution include arable lands, especially plough lands and orchards.
- One of the basic sources of water pollution is plant nutrients, mostly nitrates and phosphates. These nutrients cause decrease in drinking water quality, excessive development of plankton in surface waters and so-called water blooming. The source of mineral nutrients are usually fertilisers applied improperly or in excessive doses.
- Fertilisers are substances that provide plants with nutrients and increase soil fertility. They are categorized into four groups: mineral, natural (manure), organic and organic-mineral. Natural (farmyard) fertilisers are animal excrements, farmyard manure, liquid manure and slurry meant for agricultural usage. Organic fertilisers are various organic substances and mixtures of such, including composts containing plant nutrients. These fertilisers can be produced within a farm or outside a farm as so called industrial

composts. Sewage and sludge are not included as fertilisers, although they may be used in agriculture if they meet certain requirements.

Periods not recommended for application of fertilisers.

- Fertilisers should not be applied in periods and under conditions when there is a possibility that nutrients they contain, especially nitrogen compounds, may leach to groundwaters or be washed out to surface waters. This applies mainly to the winter period, but losses of nutrients may also occur in other periods, depending on soil type, precipitation intensity and soil cover.
- During winter period the weather can significantly vary from warm and humid to frosty and dry, depending on temperature and precipitations. The weather conditions can be highly variable, therefore fertilisers should not be applied if soil is frozen and covered with snow – even during temporary temperature raises.
- Regardless of the weather conditions and the state of soil during the winter period, application of both solid and liquid natural fertilisers, as well as organic fertilisers including composts, is not admissible.
- During other periods fertilisers should not be applied when soil is not under plant cover or development of plants is not yet advanced and, at the same time, high precipitation is expected. This applies mainly to light soils and light soils of high permeability, especially if they are very moist.
- In case of plants for direct consumption by people, application of liquid natural fertilisers (slurry, liquid manure) is not admissible during the whole vegetation season. Application of nitrogen fertilisers should be avoided at the late stage of plant development, as the excess of such fertilisers remaining in soil may leach to groundwater. So called late doses of nitrogen fertilisers are justified only for cultivation of plants with special technical demands.
- Periods of application of fertilisers are least limited on permanent grasslands and on arable lands where perennials are cultivated. When cultivating plants under roofs fertilisers may be applied at any time depending on the specific crop characteristics.

Fertilisation of sloped fields

- Application of fertilisers in sloping fields, especially if the slope exceeds 10% (60), requires special care as mineral nutrients from fertilisers are at risk of being washed off by rain. These nutrients may access surface water together with soil particles and thus cause pollution.
- The extent of run-off depends on the slope, soil texture, soil tillage, precipitation intensity and type of plant cover. All these factors, especially plant cover type, must be considered when scheduling dates and methods of fertiliser application in areas exposed to water erosion.
- Liquid natural fertilisers and mineral nitrogen fertilisers may not be applied in fields without plant cover which have slopes of more than 10% (60).
- Good structure of soils located on slopes should be maintained, with special regard paid to prevention against compaction and crusting. Excessively compacted soils, including those with plough pan or crusted surface, have much lower water permeability and capacity and are especially subject to erosion. Surface run-off of

water is always associated with losses of mineral nutrients and translocation of such nutrients to surface water.

- The extent of run-off of water and mineral nutrients, especially nitrogen, is greatly determined by the direction and method of tillage. All treatment on arable slopes should be performed crosswise. Ploughing should be done with the use of rotary or pendulous plough, laying furrows up the slope.
- When cultivating land on slopes it is a good idea to apply no-ploughing style of cultivation. Then, a cultivator with wide blades (grubber) is used to till soil, whereas in pre-sowing cultivation – passive sets consisting of harrow or cultivator and string shaft or ring roller.
- Additionally, it is advisable to deep chisel soils which are strongly threatened by erosion. Soil is deeply indented and subsoil loosened, which increases water capacity of soil and facilitates percolating into its deeper layers. The process is performed with a special tool – chisel plough - demanding high tractor power.
- Rainwater run-offs should be grassed and should be mown at least twice during the vegetation period. It is recommended to maintain scarps with grass and protective belts of trees and bushes which intercept and accumulate mineral nutrients washed from slopes subject to erosion.
- In sloped arable lands liquid natural fertilizes should be preferably introduced under the soil surface, and solid fertilisers should be mixed with soil directly after application. In permanent grasslands natural fertilisers should be spread on the whole surface assigned for fertilisation – they should not be left in piles or heaps.
- Using well-adjusted fertiliser spreaders and distributors assures even distribution of fertilisers on the whole of the application surface. Application of fertilisers and pesticides in areas exposed to erosion should be avoided, even if instructions for use of such allow it.
- Mineral nutrients usually accumulate at the foot of hills, which should be taken into account when planning the fertilisation of such sites.

Application of fertilisers on waterlogged, frozen and snow-covered soils

- It is not permitted to apply any fertiliser on areas that are flooded, covered with snow or frozen. In those areas high and uncontrolled losses of mineral nutrients from fertilisers occur.
- During thaws fertilisers may eventually be applied to soils with frozen surface, if such activity is justified by organizational or agro-technical reasons. This particularly applies to the first, spring dose of nitrogen fertilisers on cultivations of winter crops.
- Application of fertilisers on soils of high groundwater level (less than 1,2 m below ground level) requires special skills and care. It is not recommended to apply liquid natural fertilisers in these conditions, and nitrogen fertilisers should be applied in the periods of maximum plant demand for nitrogen.
- Soils with high groundwater level usually function as grasslands (pastures and meadows). Mineral fertilisers, especially those containing nitrogen, should be applied here in rational manner, after each cut (grazing). It reduces the risk of leaching of nutrients to groundwater and excessive accumulation of those nutrients in plants.
- When determining fertiliser doses for pastures, amounts of nutrients left by animals in their excrements should be taken into account. Pastures require prevention or removal of the results of excessive concentration of excrements in certain places (relocation of troughs, pasturing time etc.)

- Arable lands with groundwater level less than 1.2 m and grasslands with water level less than 1 m are excluded from fertilisation with sewage and sludge.

Fertilisation of areas in the vicinity of watercourses and water protection areas.

- In areas located in direct vicinity of surface water (water basins and courses) and drinking water intakes (water protection areas) special principles regarding application of fertilisers apply. They concern doses, type and form of fertiliser, fertilisation equipment and even the weather conditions during fertiliser distribution.
- Natural fertilisers may not be applied within the distance of 20 m from surface water, water protection areas and the marine coastline, whereas mineral fertilisers should be applied manually.
- Equipment for application of fertilisers in such areas should be in good technical condition and carefully adjusted. Fertilisation treatment should be performed when wind direction prevents drifting of fertiliser drops and particles onto the surface of water or protection area.
- Fertiliser distributors and sprayers may not be washed near surface water or water protection areas. Washings should be evenly distributed on the whole surface assigned for fertilisation, at least 20 m away from banks of water basins and courses.
- Pastures located in direct vicinity of the shoreline should not be overloaded with excessive numbers of animals. Watering places should not be situated directly in the water basin or watercourse.

Capacity of tanks / plates for storing natural fertilisers and silage

- All liquid and solid manure and wastes produced in a farm should be stored in special, leak-proof tanks or on plates located at the proper distance from farm buildings and farmyard borders, according to regulations of building law, and first of all away from any well which is the source of water for people and animals.
- Farmyard manure may be gathered, stored and fermented only in farm buildings (deep cowsheds) or on manure plates with sidewalls. Manure plates and floors of farm buildings should be impermeable and equipped with installations for diverting the outflows to watertight tanks used for liquid manure and slurry.
- Manure plate capacity should allow for gathering and storage of manure for at least 6 months. Manure plate capacity depends on the height of manure heap. In practice, the manure plate surface, with a 2 m high manure heap and alcove animal maintenance system, should be of approximately 3.5m2/LU. The surface is reduced in proportion to the time that animals spend in pastures.
- Storing FYM in heaps in the field is not admissible as it may lead to the contamination of groundwater with nitrogen and phosphorus compounds and to excessive fertilisation of soil surface under the heap.
- Capacity of liquid manure and slurry tanks must allow for storing the fertiliser for at least 6 months. In reality 10m3 of slurry tank capacity should correspond to 1 LU of animals in grate-type cowshed, and 2,5m3 of liquid manure tank capacity should correspond to 1 LU of animals in a shallow cowshed.
- Tanks for liquid animal excrements and tanks without drainage should have impermeable base and walls and a tight cover fitted with entrance and ventilating hole. Tanks for slurry may be equipped with floating roofs.

- Substances from domestic sanitary equipment should not be discharged to the slurry tank.
- All silage produced in a farm should be stored in special containers (silos) or on plates located within proper distance from farm buildings and the farmyard. The distance is required by building law regulations and is specified in the building permit obtained for construction of certain installations.
- The amount of silage effluent produced is about 0,2 m3 per 1 tonne of fresh, green matter. Silage effluents should be discharged into wells which are integral parts of tower and flat silos. Regardless of the wells it is advised to apply a layer of cut straw on the bottom of a flat silo for accumulation of silage effluents. One tonne of cut straw can accumulate up to 2.5m3 of effluent.
- Silage effluents contain high amount of mineral compounds, including nitrogen compounds. Silage effluent from 25 tonnes of silage contains up to 14 kg of nitrogen. Outflow of effluents to surface water causes pollution and oxygen depletion. Effluent accumulated in wells should be discharged onto fields and meadows where silage biomass had been gathered.
- It is not advisable to locate silage heaps directly on the ground as silage effluents penetrate to groundwater and pollute soil under the heap. The recommended way to preserve fodder is to prepare hay-silage which hardly generates any effluents. Hay-silage packs may be stored anywhere, even in open space.

Rates and methods of fertilisation

- Doses of mineral fertilisers should be set based on plants' fertilisation needs, which are determined by the amount of nutrients collected with a certain crop and the amount of nutrients that the soil supplies without reducing its fertility. This refers mainly to nitrogen which should be dosed as precisely as possible.
- The annual dose of manure per 1 ha of arable land must not exceed the amount that contains 170 kg of total nitrogen. If the calculated total nitrogen content in the manure produced on the farm exceeds 170kg of nitrogen per 1 ha, it is an indication of excessive number of livestock on a farm. A farmer should then either reduce the number of livestock or enter an agreement with neighbours to have them collect the surplus of manure.
- Doses of manure should be determined according to the so-called active nitrogen content. Active nitrogen has the same fertilisation effect as nitrogen in mineral fertilisers. Proper formula should be used for calculation of active nitrogen content on the basis of total nitrogen content in manure (see page 41).
- When determining doses of nitrogen for plants to be cultivated after leguminous fore-crops, the amount of biologically bound nitrogen present in post-harvest remains of those plants should be taken into account. The amount increases with the duration of using the leguminous plant and the size of the leguminous crop.
- Knowing the amount of mineral nitrogen content Nmin in soil allows for more precise planning of nitrogen fertilisation. However, soil analysis with regard to Nmin content should be conducted before the application of the first dose of fertilisers.
- Slurry and liquid manure should be applied to bare fields, preferably in early spring. It is permitted to apply these fertilisers on top of plants, with the exception of plants that are intended for direct consumption by people or are to be fed to animals within a short period of time. The annual dose of slurry should not exceed 45m3 (170 kg N) per ha.

- The optimum period for farmyard manure application is early spring. Farmyard manure may also be applied in late autumn, provided it is immediately ploughed-in. Application of farmyard manure in late summer or early autumn should be avoided due to possible losses of nitrogen resulting from evaporation (ammonia) and leaching to groundwater (nitrates). Top-dressing with organic fertilisers and manure is permitted only in grasslands and permanent crops. The annual dose of farmyard manure should not exceed 40 tonnes (170 kg N) per hectare.
- Manure and organic fertilisers must be covered or mixed with soil using agricultural tools, not later than one day after application. Slurry and liquid manure should be preferably applied directly into soil using trailing hoses connected to cultivator teeth. Top-dressing using these fertilisers may be conducted only using trailing hoses. Usage of splashing plates is permitted only in grasslands and permanent crops.
- Mineral nitrogen fertilisers should be applied in the periods directly before plants' maximum demand. It is admissible to divide the total dose of nitrogen fertilisers into smaller rates and apply them in the phase of vegetative growth, considering the state and look of the field.
- Fertilisers should be evenly distributed on the whole surface of the selected field or grassland. This requires using proper equipment and careful adjustment (verified during treatment) of fertiliser distributors and spreaders.

Land use and organization of production on arable lands

- Land use should be adjusted to natural conditions in which a farm is situated. Land planning should be based on groundwater level and location of the fields in topographic profile.
- Meadows should be located in the areas where depth to groundwater is in the range 40-60 cm. Areas where depth to groundwater is in the range 60-80 cm. could be alternately cut and used as pastures. Arable lands should be located in the areas where depth to groundwater is greater than 100 cm. Lands located in the areas of slope greater than 20% (12º) should be permanently planted with trees or grass.
- A part of agricultural land may be rotationally excluded from production and kept fallow. However, such areas must be permanently covered with plants (best of all with grass), which are cut at least once a year (except during the bird breeding season), leaving biomass as mulch. Cutting must not take place during fowl nesting seasons.
- Arable land should be divided into fields, if possible of similar size and agricultural suitability; the number of fields should correspond to the crop rotation planned. Grassland should be divided into sections. The size of sections should correspond to their planned usage, preferably as pastures and meadows (mowing land).
- The organization of plant production should be based on crop rotation. A reasonable crop rotation should include 3-4 plant species on light soils and 4-5 plant species on heavy soils.
- From the environmental point of view the organization of the crop rotation should be subordinated to the main goal, which is to reduce the amount of mineral nitrogen leached from soil during the autumn-winter period.
- Remains of perennial leguminous plants should be ploughed-in in late autumn. Such sites should be assigned for cultivation of spring crops with high nitrogen fertilisation demands, such as potatoes, beets, corn. Manure or organic fertilisers are of course not applied in this course of crop rotation.

- In lands susceptible to water erosion, anti-erosion crop rotations should be used, consisting of leguminous plants and mixtures of such with grass, as well as winter crops, so called “green fields”. Among winter crops, the most recommended species include rape, rye and triticale, which form compact plant cover already in autumn.
- It is recommended to cover the non-sown surfaces of arable land with all the materials available on the farm, such as straw, haulm and leaves. These materials also function as mulch and protect the soil from being damaged by rain, snow and reduce the influence of spring run-off.
- All treatments on arable slopes should be performed crosswise. Ploughing should be done with the use of rotary or pendulous plough, laying furrows up the slope.
- Among the most effective measures against erosion are creating and maintaining infield hedgerows and permanent grassed areas.
- The best way to manage grasslands is to use them rotationally for cut grass production and pasture.
- High nitrogen losses may occur on pastures from separate animal droppings. Reasonably used meadows create less risk of nitrogen excess.
- Cattle should not be grazed in the periods when soil is too moist and or later than the middle of October as nutrients contained in excrements are likely to leach to groundwater.
- Rotational grazing (either in sections or by fodder dosing) should be done during the grazing season. Number of sections depends on the period of sward regrowth and grazing time in single section:

Number of sections =(sward regrowth period (in days) /(grazing period in a section (in days)) + 1

- Permanent grasslands with degraded sward or sod should be restored. The basic method of restoring sward is under-sowing, including partial destruction of old sward if necessary, as well as improvement or change of management and fertilisation.
- Only under exceptional circumstances can the sward be ploughed and re-sown. If such an operation is done, the considerable amounts of nitrogen that are released may pollute groundwater, especially when its level is shallow. After sod is ploughed-in, it is advisable to cultivate for a period of one year fodder plants of high nitrogen fertilisation demands, such as green rye followed by corn as successor crop, making sure to sow grass in optimal time.
- Grassland should be converted into arable land only in exceptional cases. When including grassland into crop rotation system it should be fully taken into account that mineralisation of very high amounts of nitrogen will inevitably occur, with all negative environmental effects.
- Grasslands located near farm buildings should not be used as permanent yards for animals. High concentration of animals results in unavoidable losses of nitrogen in gaseous (ammonia) form and in form of nitrates polluting groundwater. Grass sward also becomes completely destroyed.

Minimum area of "green fields"

- Increasing the proportion of so-called "green fields" i.e. winter crops, perennial crops and all sorts of after-crops and intercrops in the crop rotation leads to a reduction in the amount of mineral nitrogen leaching to groundwater. Approximately 60% of

arable land in plain areas and 75% in areas threatened by erosion should be left under plant throughout the whole year (including winter).

- Intercrops (so-called cover plants) play a very important role in preventing nitrates from leaching in the following sequence of crop rotation: winter/spring crops - spring crops. Full protection activity of intercrops is shown in the spring when they are ploughed in.
- Mineral nitrogen may be prevented from leaching by ploughing-in straw of cereals, rape or corn. Each tonne of straw may, as a result of so-called immobilization, fix about 10 kg of mineral nitrogen from the soil. Straw of leguminous plants has much higher nitrogen content and does not immobilize mineral forms of nitrogen in soil.
- The protective function of straw is less than the protective function of a green field, but approximately 20% of the surface that should remain under plant cover during winter may be replaced by ploughing–in straw according to the following dependence:

1 ha of green field =1.60 ha of field with straw ploughed-in.

Fertilisation plan

- Management of mineral nutrients should be based on balance sheets. Balances should include inputs of nutrients from all sources and outputs of nutrients associated with harvested crops.
- In nitrogen balance sheet nitrogen from fertilisers (natural, organic and mineral) and ploughed-in plant by-products (cut grass, leaves), nitrogen biologically bound by leguminous plants and nitrogen from precipitation is included in the input. The only measurable item in the output is nitrogen contained in crops harvested from field (primary and secondary crops).
- A nitrogen balance sheet cannot be balanced due to the inevitable nitrogen losses resulting from evaporation of gaseous nitrogen compounds to atmosphere or leaching of nitrates to deeper soil layers and to groundwaters. It can be assumed in a simplified way that positive nitrogen balance of up to 30 kg of nitrogen (N) per 1 ha of arable land is safe for the environment.
- In lands with medium levels of available phosphorus and potassium (marked yellow on resource maps), the balance sheet of those nutrients could be balanced (input = output). In lands with very low and low levels of phosphorus and potassium content it is advised to use fertilisers with phosphorus and potassium content approximately 50% greater than in harvested crops. In the lands of high, and especially very high, level of phosphorus and potassium availability, the content of those nutrients in fertilisers can be reduced by approximately 50% in comparison to the amount of those nutrients in harvested crops.
- In phosphorus and potassium balance sheet, input includes nutrients in fertilisers (mineral, natural and organic), and output includes the amount of phosphorus and potassium present in crops harvested from field (primary and secondary crops).
- After balance sheets of nutrients are prepared, a fertilisation plan should be developed, based on proper distribution of organic, organic-mineral and mineral fertilisers to each plant of the crop rotation, with regard to their demand for the basic macro-elements (N, P, K) and amounts of nutrients available in soil.
- Keeping documentation charts of individual fields, on which all agro-technical treatments as well as obtained crops and harvests are reported, is useful for development of fertilisation plan.

ANNEX Z

DETAILED DESCRIPTION OF UNDERTAKINGS AND PAYMENT CALCULATION UNDER MEASURE 6 – MEETING THE EU STANDARDS

1. Furnishing farms with natural fertilizer storage facilities to the environmental protection EU standard.

The threat for the environment resulting from the animal wastes is mainly related to the nitrate leaching and losses. Migration of nitrates to the ground, and subsequently to the groundwater and inland surface water, has a negative impact on the water quality. In consequence this causes the decrease of the drinking water quality (for human and animal consumption), as well as for recreational purposes. In general groundwater resources in Poland due to hydro geological structure and to soils types are vulnerable to infiltration of pollution. In Poland groundwater is frequently present in sandy aquifers, which are highly vulnerable to impacts from different sources of pollution amongst other caused by improper storage of manure, liquid manure and slurry.

A significant problem strengthen by human activities is eutrophication caused by excessive input of nutrients. Eutrophication symptoms are amongst other algal blooms, oxygen depletion, adverse changes in species composition, (which means loss of biodiversity) and decrease of water visibility.

According to art. 4, (b) of the Water Framework Directive "(b) *for ground water*

(i) Member States shall implement the measures necessary to prevent or limit the input of pollutants into groundwater and to prevent the deterioration of the status of all bodies of groundwater, subject to the application of paragraphs 6 and 7 and without prejudice to paragraph 8 of this Article and subject to the application of Article 11(3)(j)."

Taking into account above obligations and the threats for the water resources that are related to the agriculture, a special attention shall be paid to the problem of animal excrements, as manure and slurry because the inadequate storage of organic fertilizers often leads to serious environment problems. Such statements are expressed also in other parts of the mentioned above Directive 2000/60/EC[1] (particularly Article 4 (i) and Annex 8 point 11 (link to Nitrate Directive), as well as transposed in subsequent Polish legislation: *The Water Law Act* (art. 47)[2] and *Act on fertilisers and fertilisation*. Therefore, it is necessary to reduce the risk of water pollution from agricultural sources and implement all efforts in order not to deteriorate the state of water resources in the entire country area. Poland is being actively implementing above mentioned standards, taking into account the state of inland surface water, as well as the state of the Baltic Sea (the same the HELCOM Convention is taken into account). The hot issue in relation to agricultural sources of pollution is the problem of the storage of manure, liquid manure and slurry. Polish legislation is in position to prevent water resources from this

[1] Directive 2000/60/EC[1] of the European Parliament and of the Council of 23 October 2000 establishing a framework for Community action in the field of water policy (Official Journal L 327 , 22/12/2000 P. 0001 – 0073)

[2] An Water Law Act 2001 Art. 47. 1. Agricultural production shall be carried out in the manner limiting and preventing pollution of waters with nitrogen compounds originating from farming, where nitrogen compounds are understood as any substances containing nitrogen, except for gaseous molecular nitrogen.

danger. The practical solutions are included in *Polish Act on fertlizers and fertilisation*. This piece of legislation includes some of measures mentioned in the Nitrate Directive.
According to the particular piece of legislation *(Act on fertilizers and fertilization - art. 18*) natural fertilisers have to be stored in farm buildings or on the impermeable slabs, that are resistant for leaching of natural liquids into the soil and equipped with the installation conducting the liquids to special impermeable tanks. Each construction connected with the animal waste management (including natural fertilisers) has to fulfill basic environmental and construction requirements, excluding the sources of pollution and their negative influence on human beings, animals and plants. This standard will be binding within Nitrate Vulnerable Zones on 1st May 2008, whilst outside NVZ's it will be – from 25 October 2008.

Objectives

Facilitating the adjustment of holdings to environment protection, public health, and animal health, and animal welfare EU standards.

Justification of the support level:

- Cost of the purchase (with the proper drawing/project) and establishment of the manure slab or the slurry and liquid manure tank with the necessary equipment.

Following expenditures shall be a subject of financing:

- impermeable manure storage facilities (plates);
- impermeable manure and liquid manure tanks, which allow storing manure for at least 4 months (in NVZ – for at least 6 months);

Calculation

1. Investment costs (100 %)

Manure storage facilities (size in m^2)	**Cost per m^2**	
	PLN	**EUR**
up to 35	217	46.1
above 35 up to 52,5	215	45.7
above 52,5 up to 70	204	43.4
above 70 up to 87,5	192	40.8
above 87,5 up to 105	177	37.6
above 105 up to 122,5	173	36.8
above 122,5 up to 140	170	36.1
above 140 up to 157,5	165	35.1
above 157,5 up to 175	162	34.4
above 175 up to 192	160	34.0
above 192	157	33.4

Impermeable liquid manure and slurry tanks underground, covered (size m^3)	Cost per m^3	
	PLN	EUR
up to 30	680	144.6
above 30 up to 45	667	141.8
above 45 up to 60	641	136.3
above 60 up to 75	605	128.6
above 75	574	122.1

Impermeable liquid manure tanks partly underground, opened (size m^3) with ground working	Cost per m^3	
	PLN	EUR
above 90 up to 110	308	65.5
above 110 up to 165	298	63.4
above 165 up to 220	249	52.9
above 220 up to 275	239	50.8
above 275 up to 330	227	48.2
above 330 up to 385	217	46.1
above 385 up to 440	201	42.7
above 440 up to 495	198	42.1
above 495 up to 550	193	41.0
above 550 up to 605	184	39.1
above 605	180	38.3

The detailed calculation on particular investment shall be done taking into account the type of breeding (bedding, non-bedding) and with the expertise of the qualified adviser.

2. Payments

Type of enterprise	Cost per unit	
Manure storage facilities (size in m^2)	Cost per m^2	
	PLN	EUR
up to 35	217	46.1
above 35 up to 52,5	215	45.7
above 52,5 up to 70	204	43.4
above 70 up to 87,5	192	40.8
above 87,5 up to 105	177	37.6
above 105 up to 122,5	173	36.8
above 122,5 up to 140	170	36.1
above 140 up to 157,5	165	35.1
above 157,5 do 175	162	34.4
above 175 up to 192	160	34.0
above 192	157	33.4

Impermeable liquid manure and slurry tanks underground, covered (size m^3)	Cost per m^3	
	PLN	EUR
up to 30	680	144.6
above 30 up to 45	667	141.8
above 45 up to 60	641	136.3
above 60 up to 75	605	128.6
above 75	574	122.1
Impermeable liquid manure tanks partly underground, opened (size m^3) with ground working	**Cost per m^3**	
	PLN	**EUR**
above 90 up to 110	308	65.5
above 110 up to 165	298	63.4
above 165 up to 220	249	52.9
above 220 up to 275	239	50.8
above 275 up to 330	227	48.2
above 330 up to 385	217	46.1
above 385 up to 440	201	42.7
above 440 up to 495	198	42.1
above 495 up to 550	193	41.0
above 550 up to 605	184	39.1
above 605	180	38.3

No operational costs are foreseen.

2. Adjustment of milk farms to the public health EU standard.

Necessity of dairy farms modernisation results from a lack of adequately adjusted milking parlors, milking infrastructure and facilities for milk storage according to the hygienic requirements. The most serious threats are related to the conducting of milking at stands with bed, what may result in migration of bacteria, fungi, and viruses from bed into the milk. Another large threat for the milk hygiene is a manual milking, not in line with the hygiene standards. The storage of milk in can coolers may be also a danger for human health due to the material of what the cooler is made from (mainly aluminum). In relation to the above, it is necessary to equip farms in easily washable walls and floors, milking machinery and milk coolers. Requirements in this scope are expressed in the EU Council Directive 92/46/EEC of 16 June 1992 laying down the health rules for the production and placing on the market of raw milk, heat-treated milk and milk-based products. On the Polish ground the vital requirements were transposed in Regulation of The Minister of Agriculture and Rural Development of 5 July 2002 concerning detailed veterinary conditions required for the acquisition, processing, storage and transport of milk and milk-based products. Chapter 4 Veterinary conditions of farms, purchasing centre, normalization centre, heat treatment plants and dairies. This standard is also a subject of a transition period accorded to Poland in the Accession Treaty (Annex 12).

Detailed objectives

- Improvement and maintenance of hygiene conditions in tying or free ranged stalls, from the point of view of the public health and food quality;
- Introduction and promotion of actions leading to the improvement of the public health, from the point of view of agricultural production hygienic requirements.

Justification of the level of support

- Cost of construction or modernisation of tying or free ranged stalls.

Following expenditures, may be a subject of support, in order to increase (maintain) the public health:

- walls and floors in rooms where the milking is executed or at the milking stands (impermeable and easily washable surfaces);
- walls and floors in rooms where the raw milk is stored (smooth and easily washable surface);
- modern milking systems (pipe milking machines, milking rooms);
- milk coolers: open and closed;
- wash-basin with water heater;
- farm water intake.

Payment calculation

1. Investment costs

Cost calculation per 1 stand is based on standard investment costs for milk farms for 20 stands.

Investment cost for 20 stands (10 m x 20 m)

Undertakings	**Cost per unit in PLN**	**Pcs.**	**Cost in PLN**
direct – to - can milking machine	6 000	1	6 000
a milk cooler from 400 to 800 l	17 000	1	17 000
a milk cooler from 200 to 400 l	12 000	1	12 000
a milk cooler to 200 l	8 000	1	8 000
easily washable walls and floors	15/m^2	40	600
exterior sliding doors	3 000	2	6 000
inside doors	100	4	400
wash-basin with water heater	500	1	500
farm water intake	6 000	1	6000

2. Payments (100 %)

Purpose of EU standard – public health (hygienic demands)		
	PLN/stand	EUR/stand
Adjustment (modernisation) of a tying stall cowshed	350	74.42
	PLN/item	EUR/item
a milk cooler from 400 to 800 l	17 000	3614.79
a milk cooler from 200 to 400 l	12 000	2551.61
a milk cooler to 200 l	8 000	1701.07
a direct-to-can milking machine	6 000	1275.80
wash-basin with water heater	500	106.31
farm water intake	6 000	1275.80

No operational costs are foreseen.

3. Adjustment of egg-laying hen farms to the animal health and welfare EU standard.

Modernization of farms of laying hens, producing eggs, is a result of problems in the field of animals keeping in too small cages, with a specific technical parameters (sloppiness of the floor, height of the cage) that are less restrictive than binding animal welfare standards. The requirement is expressed in the EU law by means of the Council Directive 1999/74/EC of 19 July 1999 laying down minimum standards for the protection of laying hens and it is transposed to the Polish law into Regulation of The Minister of Agriculture and Rural Development of September 2, 2003 on the minimal conditions of keeping the particular species of farm animals. Chapter 7 Minimum standards for poultry, § 42 – 46 "egg-laying hens".

Detailed objectives:

- Improvement of animal welfare in terms of laying hens;
- Introduction and promotion of actions friendly for farm animals.

Justification of payment:

- Cost of purchase of new cages or modernization.

1. Investment cost

Type of enterprise	**Cost per unit**	
Purchasing of the boxes with equipment	16 PLN/box	3.4 EUR/box

2. Payments (100 %)

Type of undertaking	Cost per unit	
1. Purchase of the boxes with equipment	16 PLN/box	3.4 EUR/box

No operational costs are foreseen.

Sources of complementary data

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