Agroenvironmental management system – a technique for increasing the natural value of agroecosystems

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Abstract: Agriculture in the Czech Republic plays an important role in the degradation of individual components of the environment. Reduction of soil fertility, contamination of surface- and groundwater, reduction of biodiversity and damage caused by it are proven. The agrarian landscape does not provide the appropriate ecosystem functions. It is not attractive for life of the inhabitants of rural areas, and the permeable landscape attractive for investors. It is also not permeable and attractive for investors. The farmers are offered applicable and functional techniques, technologies and procedures. These are not used and exploited in an appropriate rate. Based on the analysis of business environment, there was found that the reason is the absence of the agroenvironmental management system in operative management of agricultural subjects. For the need of the possible implementation of the appropriate system into practice, there was developed a branch standard and subsequently a methodology for the application of agro-environmental management system on the basis of a general tool for environmental management. The methodology was developed, then implemented and tested under the conditions of a concrete farm. Before the implementation of requirements, there were established environmental indicators which were evaluated before and after the introduction of the proposed system. The results of the subsequent monitoring of the chosen environmental indicators of environmental status confirmed the functionality and accuracy of the developed management tool that can also be seen as the best available technique for the implementation of the current and prepared agricultural policy.

Key words: agroenvironmental management, agroecosystem, biodiversity, wind and water erosion, best available technique

At present, social demand is distinguished by an increasing interest in nature and landscape. The increased interest follows from the fact that a healthy nature and an unimpaired landscape are the basis for the health of the inhabitants, the prerequisite and reason for investments and also for an attractive, valuable and sustainable rural life. Landscape is also felt as a part of the identity of local inhabitants. It is the base of their satisfied and harmonic life (Miko and Zaunbergerová 2009). Rural inhabitants still more realize that life does not finish in the urban development but it continues in the agriculture, forestry and in another way of the cultivated locality. The object of interest is still more often the biodiversity and in relation to that, the number of plants and animals. At present, there is increasing the importance of ecosystem functions which provide the desired service for the public (Marada et al. 2010). The most important and the most required services are:

– retention of the torrential precipitation;
– protection against natural disasters – primarily against flood and deluge;
– providing of pure water – return of valuable fish species into the watercourse and clean atmosphere;
– natural regulation of pests – space for the biological predators of pests;
– support of biodiversity;
– protection and creation of the soil fund (protection against water and wind erosion);
– space for the pollinators of crops;
– production of safe food, biomass for the production of energy, herbs for the traditional medicine;

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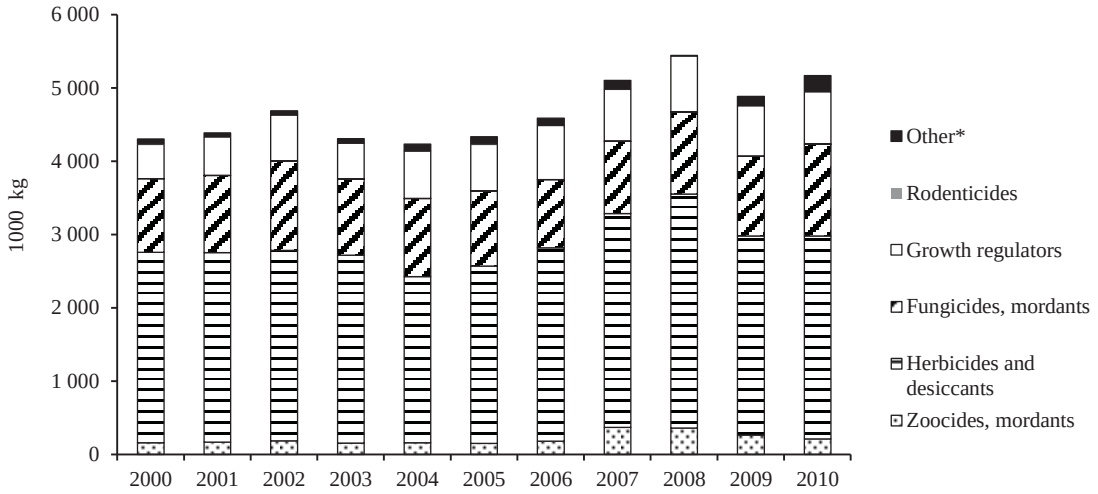

Figure 1. Application of plant protection products, the Czech Republic (kg of active substance/ha of agricultural land)

*adjuvants, repellents, mineral oil, etc.

Source: MZe (2011) – State Phytosanitary Administration

– possibility of the spiritual enriching, recreation and esthetical experience;
– securing of numerous species of free living animals (from the gamekeeper point of view)

These functions and services are characteristic for stable and properly functioning ecosystems. The landscape is damaged by the impacts of human activities, primarily by agriculture. The nature infrastructure is damaged by the excessive using of chemicals for plant protection and artificial fertilizers (Figure 1; Table 1) and the subsequent degradation and contamination of natural sources which leads to the loss of biodiversity (EEA 2010; Perkins 2011) and a general instability and non-functionality of the ecosystem (Marada et al. 2011). The influence of the currently used agricultural technology, market seed procedures realized

Table 1. Consumption of plant protection products, the CR (kg of active substance/year)

Year	Zoocides, mordants	Herbicides and desiccants	Fungicides, mordants	Growth regulators	Rodenticides	Other*	Total
1996	109 096	2 408 824	1 121 806	212 055	917	55 304	3 908 002
1997	102 854	2 546 802	907 024	280 807	6 619	44 940	3 889 046
1998	127 463	2 664 060	887 081	377 022	33 233	47 121	4 135 980
1999	121 765	2 540 840	906 476	568 736	6 424	52 905	4 197 146
2000	158 398	2 598 852	1 006 855	465 173	8 178	65 530	4 302 986
2001	169 467	2 584 384	1 052 425	523 554	7 849	50 653	4 388 332
2002	184 928	2 601 909	1 217 130	626 198	3 360	55 254	4 688 779
2003	153 516	2 563 516	1 040 002	489 857	53	60 799	4 307 743
2004	160 081	2 265 894	1 064 399	650 426	1 668	93 510	4 235 978
2005	152 084	2 418 441	1 020 532	638 141	10 149	95 926	4 335 273
2006	181 860	2 638 904	927 616	741 131	2 863	96 918	4 589 292
2007	368 179	2 919 123	986 831	706 298	4 628	120 175	5 105 234
2008	359 385	3 195 422	1 118 463	763 007	4 202	1 285	5 441 764
2009	264 847	2 715 232	1 086 989	690 254	1 013	126 509	4 884 844
2010	211 823	2 768 226	1 256 277	711 872	5 922	22 293	4 976 413

*adjuvants, repellents, mineral oil, etc.

Source: MZe (2011) – State Phytosanitary Administration

on disproportionately large fields, the application of agrochemistry which is warranted by the economic dictate of important suppliers and primarily indiscipline, ignorance and irresponsibility of people who damage the nature and landscape, have a very important impact on the mentioned values (Kolektiv 2010).

The results of the advisory, consulting and auditor practice (Marada 2006) show that the non-acceptance and non-performing of the requirements of the Common Agricultural Policy in the field of the protection of environment are caused by the incompetent staff and primarily by the absence of the agroenvironmental management system in the management of the individual activities with a negative impact of agriculture on the nature and landscape.

Managements of legal and physical persons who are doing business in agriculture are not able to perform activities which ensure the foreknowledge, understanding and primarily application of the clearly stated rules of agricultural policy for the field of nature and landscape protection. Agricultural businessman (except several tens of subjects which have established requirements of the norms ISO 9000, ISO 14000 or ISO 22000 or implemented requirements of standard GLOBALG.A.P.)

– do not perform the standard evaluation of ecosystem within the farm;
– do not create their own agroenvironmental policy;
– do not establish the components of activities, products and services which have an important effect on environment;
– do not perform the controlled identification and management of environmental legal requirements;
– demonstrably do not plan in the field of reaching environmental goals;
– do not have the system to reach the appropriate qualification of their staff;
– do not perform systematically the management of activities with a significant effect on environment;
– do not perform the monitoring and auditing of important services and activities in agriculture which influence the individual parts of environment.

On the basis of these facts with respect to the future of sustainable agriculture, it is necessary to develop the methodology (standard) for agricultural management which should provide a systematic overview of the control activities which are necessary to be included into the performing processes for effective agriculture with a minimal negative effect on environment. Activities, that were being developed, must be compatible with the activities (processes, services etc.) for the purpose of achieving quality, safety, health safety and profitability.

The aim of this study was to develop the standard which includes the requirements for activities that help agricultural companies to achieve the planed intention in the field of environmental protection in accordance with the current legal demand. The purpose of this study is the establishment of requirements on the management and activities accepting the relevant and right way for the evaluation of ecosystem which will acknowledge the present population of game, animals and other members of flora and fauna. The application of these requirements seems to be an ideal solution for the prevention and optimization of the magnitude of negative impacts on environment. The basis of this document will be the "standardization" of agroenvironmental techniques in accordance with the rules of proper agricultural practices that will lead to the fulfilment of the principles sustainable development and the maintenance of the renewable nature abundance represented by the population of free living animal species including the preservation and development of the appropriate biodiversity.

MATERIAL AND METHODS

The standard was developed in accordance with the current legal demands, respected and used norms, proper practice and the newest knowledge in the field of agroenvironmental management. There were used primarily:

– Methodical instruction for normalization (MPN1) "Structure, classification and adaptation of Czech technical norms (Český normalizační isntitut 2006), Instruction CEN/CENELEC 17: 2010, Regulation for writing of norms that correspond with needs of micro, small and middle-sized companies (CEN 2010) and the notification of the NAZV to the definition of the type of result "N" applied certificated methodology and the procedure for its acceptance in 2009 (Národní agentura pro zemědělský výzkum 2009).
– Regulation of the European Parliament and Council (ES) No. 1221/2009 from 25th November 2009 about the voluntary attendance of organisations in the system Eco-Management and Audit Scheme (EMAS) and about the cancelation of the regulation of the Council (ES) No. 761/2001, resolution of Commission 2001/681/ES and 2006/193/ES; from standard ČSN EN ISO 14001:2005, ČSN EN ISO 9001:2009, specification GLOBALGAP, version V3.0-2_září 2007,
– System of forest certification – the Programme for the Endorsement of Forest Certification PEFC

(CFCS 1001:2006) and the system of the certification of the consumer chain of forest products (C-o-C).

During the development of the standard, there was used the methodology specified in the paragraph 7.3 Proposal and development of the standard ČSN EN ISO 9001:2009 Quality management systems – Requirements.

There were also taken into consideration the works of the ME and MA on the preparation of the certification system of biofuel and materials for their consumption which are imported in the individual members of the EU on the basis of regulations 2001/77/ES and 2003/30/ES and also the regulation 2009/30/ES which amends the regulation 98/70/ES in the framework of the specification of petrol and diesel. A new system for the users of hunting ground (The Wildlife Estates Label) was also respected. The substance of this system is the sustainable gamekeeper farming and landscape management (ELO 2010; Vaca 2011).

The following implementation of the standard consisted in the realisation of the individual processes and activities, in the development of control documentation and records which are requested by the individual requirements of standard. Standard requirements were then used in management conditions of Petr Marada's ecofarm (Figure 2). This farmer farms in the framework of the land registry area Šardice, Nenkovice, Želetice and Násedlovice. The land registry area of the village Šardice, where the company address of Petr Marada's ecofarm is and where he farms, were chosen for the purpose of the evaluation of the effect and effectiveness of the developed standard. There was chosen a representative part of that area where there is performed an intensive primary agricultural production and where there was then performed an important spectrum of agroenvironmental actions of the landscape systems of ecological stability by the ecofarmer.

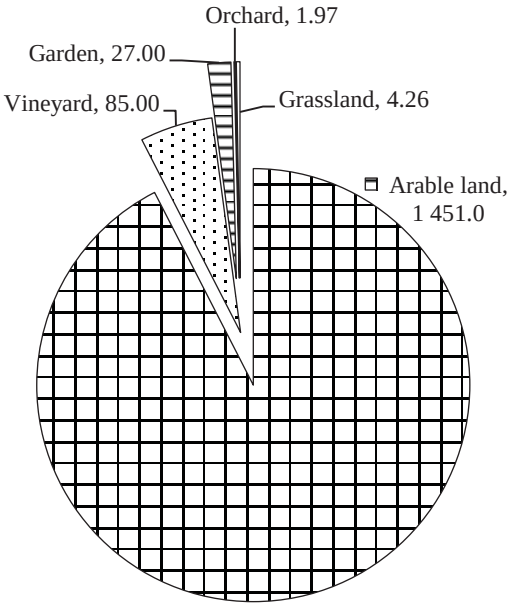

Figure 2. Use of agricultural land before the implementation of the agroenvironmental management in 2007 (in ha)

Source: Land Registry

The functionality of the developed tool was assessed by the evaluation of important environmental indicators before the implementation and after the implementation of the requirements of the agroenvironmental management. Selected environmental indicators were evaluated for the land registry area of the village Šardice. These were:

– the coefficient of ecological stability (Míchal 1994);
– evaluation of the erosion hazard of the interest area (Wischmeier and Smith 1978);
– game management, animal biodiversity (farming with game in the chosen land registry area of Šardice was evaluated on the basis of evaluation of data about the number of the hunted game before the application (2007) and after the application (2010) of the standard egroenvironmental management. There was analysed alpha diversity – the lowest space level of the species diversity. There was made the list of species with respect to the knowledge of ecology of the individual selected animal species;
– to provide ecological services (there were marked ecological functions that are useful for humankind).

RESULTS AND DISSCUSION

There was developed a methodical tool for all agricultural businessmen who want to farm in the sustainable way with the aim to maintain and improve biodiversity, to carefully use agricultural soil and to protect other parts of the environment. Moreover, it is developed as a tool for agricultural consultants who are focused on agriculture and the protection of nature and landscape and who provide consultancy in this subfield. It also can be used for educational purposes.

The methodology contains requirements for the managements (leaders) of agricultural organisations in order that the care for nature becomes perspective, not neglected, and as another option for agricultural business. The methodology enables companies to determine a long-term intention – the policy of agricultural business in the field of the protection of nature and landscape which enables the identification and control of environmental aspects of activities, products and providing of services, to establish partial

objective and related programs (projects), to provide suitable sources (human sources, infrastructure etc.), to control the legal demand and documentation including records. This methodology contains the operation management, monitoring and measurement of key environmental indicators, the evaluation of the accordance of activities with legal demands, performing of audits and regular inspections including the methodology dealing with discovered incentives for improvement. A special emphasis is put on the communication with all involved parts of the concrete environmental profile. Requirements noted in this methodology are specified for the implementation into the management of an agricultural organisation. The scope of the requirements application depends on the factors as the purpose of the organisation, the character of the organisation activities and services, farming locality and other conditions. Each individual requirement (*written in italics*) is supplemented by the manual for its realization with an accent on the access which ensures the required maintenance of landscape and preservation of the appropriate environment.

The standard contains the newest information about the possibilities, effective methods and procedures that can be used in the framework of the agroenvironmental management system. During the development of the document, the authors proceeded from the Concept of Agrarian Policy of the Czech Republic for the Period Following the Accession into the EU (2004–2013), the Proposal of Regulation of European Government and Council 20011/0282 (COD) about the support of rural development from the European Agricultural Fund for Rural Development (EAFRD), the Regulation of European Parliament and Council (ES) No. 1221/2009 from 25th November 2009 about the voluntary attendance of organisations into the system Eco-Management and Audit Scheme (EMAS) and about the cancelation of regulation of the Council (ES) No. 761/2001, resolution of Commission 2001/681/ES and 2006/193/ES. They also proceeded from the general standard ČSN EN ISO 14001:2005 Systems of Environmental Management – Requirements with manual for using, from document Standards for right agroenvironmental farming focused on prevention damages made by the game and on the game (Marada et al., 2007) and from the specific document EUREPGAP (2005): Integrated Agricultural Companies, EUREPGAP c/o FoodPLUS GmbH, version 2.0, published in March 2005 and from the document GLOBALG.A.P (EUREPGAP) (see http://www.globalgap-cr.cz/file.php?nid=8312&oid=1661552) and the valid legal regulations. These general principles are supplemented by the newest knowledge of research in the field of the application of the agroenvironmental management in agriculture.

The standard contains these main parts:
– Preface, introduction, object of the standard.
– Definition of main terms, list of used abbreviations.
– Compatibility of the agroenvironmental management standard with other requirements.
– Requirements on the agroenvironmental management and farming of agricultural company.
– Procedure during the implementation in farm conditions.

Graphical illustration of the system including fundamental requirements on agroenvironmental management is showed in the Figure 3.

The methodology can be applied:
– in all agricultural organisations which want to determine, implement, maintain and improve processes that will minimize the negative impact of their activities on environment,
– in the framework of the agricultural consulting system
– in the process of education.

The agroenvironmental management seems to be very perspective as a supported action in the newly developing agricultural subsidy policy, primarily as a tool for the control of risks and providing products quality (activities, services etc.). The methodology is rightly offered as a concrete field specification that can be used for the enlightenment, implementation and the following verification of the general standards for the environmental management systems (payment agencies, certificational or accreditation authorities) (Figure 3).

Individual requirements of the developing standard were continuously implemented in the conditions of the chosen ecofarm from 2007. In this farm, there were performed primarily these activities:
– Evaluation of ecosystem – the introductory agroenvironmental analysis;
– Forming of the agroenvironmental policy of the ecofarm;
– Determination of the processes and the related envrironmental aspects;
– Identification of the legal and other requirements;
– Development of the agroenvironmental farm programs for the realisation of the individual landscape-forming actions;
– Determination of responsibility for the individual activities;
– Providing of education and practice;
– Identification, acquiring, operation and maintenance of the appropriate infrastructure and agricultural land;

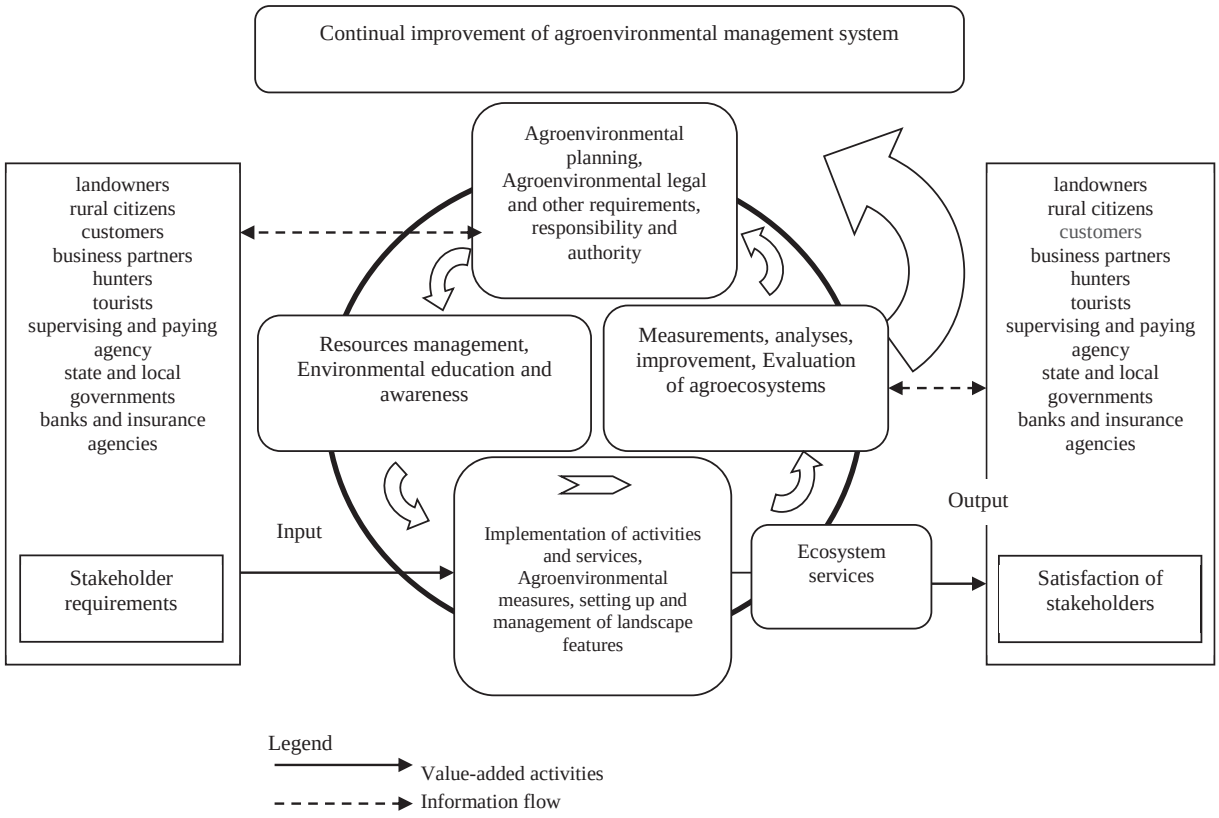

Figure 3. A simple model of the agroenvironmental management system (adapted from the ISO 9001:2008)

– Making of control documentation and records and subsequent management;
– Monitoring and measuring of the key characteristics of processes;
– Audit, consulting and evaluation of the accordance with legal demands;
– Solution of problems – the determination of corrections and preventive actions;
– Performing of meetings;
– Internal and external communication.

All activities were performed on the basis of the competence of the ecofarm staff, the related control documentation and the legal and other requirements. There are records and other objective proofs mentioned about the performance of those activities.

Ecological stability coefficient

In the selected interest area in the land registry area Šardice, there was determined the area of the individual land block and landscape elements through the geographical information system LPIS and the system of the Czech Geodetic and Land Registry Office. These regarded the area registered in 2007 and 2011. Subsequently, there was calculated the ecological stability coefficient for the selected areas in 2007 (KES_1 – in initial status).

$$KES = \frac{\sum Si}{\sum Ni}$$

$$KES = \frac{LP + VP + TTP + Pa + Mo + Sa + Vi + Biop + NPC + KP}{OP + AP + Ch}$$

KES_1 = stable ecosystem/unstable ecosystem

Abbreviations used for the calculation KES

S_i *Stable elements*
S_1 = LP – woodland
S_2 = KP – landscape elements
S_3 = TTP – permanent grassland
S_4 = Pa – pastures
S_4 = Mo – wetlands
S_5 = Sa – orchards
S_6 = Vi – vineyeard
S_7 = Biop – bio-belts
S_8 = NPC – unpaved country road
S_9 = VP – lakes and streams
N_i *Unstable elements*
N_1 = OP – arable land
N_2 = AP – land marked by human activity
N_3 = Ch – hop-garden

$KES_1 = 6.04/458.87 = 0.01316$

The value of this ecological stability coefficient shows that the area has a maximal damaged nature structure. The general ecological functions must be intensively and permanently replaced by technical interventions.

There was calculated the ecological stability coefficient for the selected areas in 2011 (KES_2 – after the realization) after the implementation of the agroenvironmental management system and the realization of the agroenvironmental and landscape-forming actions.

$KES_2 = 28.56/437.83 = 0.06523$

The value of this ecological stability coefficient shows that the area also has a maximal damaged nature structure. The general ecological functions must be intensively and permanently replaced by technical interventions.

These results show that the reduction of the area (initially 458 ha of arable soil) to 436 ha is still too small with respect to ecological stability. 22 ha of arable soil were intended for the biocorridor, the wetland ecosystem, an extensive orchard and a grassed arable soil. By this reason, the number of the original species of game (*Lepus europaeus*, *Perdix perdix*, *Phasianus colchicus*) did not significantly increase after 4 years. A minor reason of this status is also fencing of the woody plant planting and the minimal fertility of the young fructificating woody plants. The fundamental problem consists in a still bigger intensification in the neighbourhood of the cultivated land. In this landscape, there would not be grass in accordance with the prepared new agricultural policy (7% of the agricultural cultivated soil). From this point of view, it is not understandable why the Agrarian Chamber and some other agricultural organisations lobby for the reduction of the obligatory 7% of agricultural soil put into grassland in the context of obvious overproduction of cereals in the Czech Republic.

Game management

There was compiled a graph with the number of the hunted species from the information that is published by the municipalities (Hodonín, Kyjov, Veselí nad Moravou). Afterwards, there was done the evaluation of the number of the hunted game species.

The number of hunted pheasant game in the hunting ground Šardice is distorted by introducing the animals from the farm. In accordance with the observation of pheasants in the selected locality, we can note that the number of heads is mildly increasing (15 heads a year). The number of the hare game shows a permanent decrease in the district Hodonín. This decrease was also observed in the hunting ground Šardice. We can discuss the real number of game in the land registry Šardice because *Lepus europaeus* was not hunted in Šardice during two last years because of the decision of the members of the gamekeeper association in Šardice. Its number in the selected locality is at least on the level of 2007 and mildly increasing. *Sus scrofa* minimally reacts to the changes in the locality. There

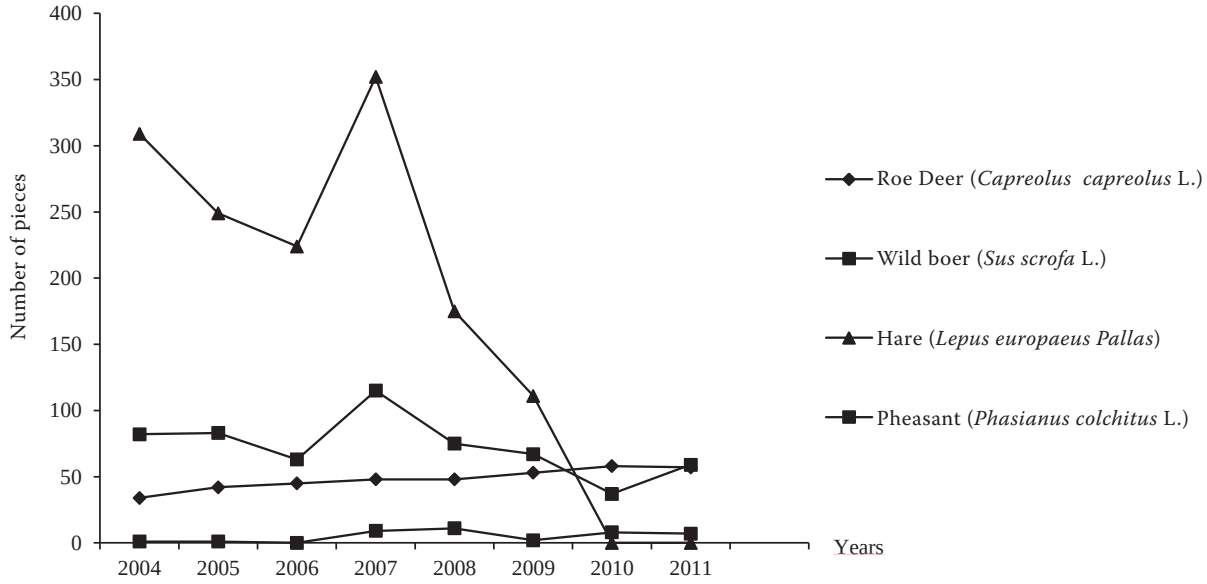

Figure 4. Number of the hunted game in the hunting ground MS "Hubert" Šardice in 2004–2011 (illegally hunted game is not calculated)

was no head of *Sus scrofa* hunted due to the change of the size of soil blocks and a bigger frequency of people and machines moving in the selected locality. Therefore, there was no problem with damages caused by the game. The number of roe deer game is minimally increasing. This is in accordance with the observation of hunting in the whole district Hodonín and in the hunting ground Šardice. The number of roe deer game is increasing in the selected locality with biobelts, the grassed arable soil and extensive orchard in accordance with the tracks and the continuous observation (Figure 4).

The analyses proved positive results in increasing of the number in species primarily of the small game. The size of the selected area is not optimal forth respectable assessment of the effect on the number of *Sus scrofa*. Findings about the absence of damages caused by this game are perspective. A longer time interval from the start to the end of observation is necessary for a more comprehensive and more exact analysis.

Biodiversity evaluation

There was analysed the alpha diversity. We made a list of species in 2007–2011 using the knowledge of the ecology of the individual species. We also analysed the biodiversity of amphibians, bigger species of mammals and birds. The evaluation was not focused on the number of the individual species but on biodiversity. There were newly identified 22 species of animals in accordance with the stated methodology (Table 2).

We can note that no observed species disappeared. O the other hand, endangered species are permanently occurring. The stability and number of the individual species are still significantly influenced by the intensity of cultivation and by using chemicals in the neighbourhood of agricultural cultivation. Unfortunately, the agroenvironmental actions and landscape-forming elements were not understood by the competing farmers with the exception of some private farmers.

Erosion evaluation

A fundamental part of agricultural cultivated land was threatened by erosion in the interest area before the implementation of agroenvironmental actions. The observed levels of erosion in the interest area are shown in the Figure 5. The data were analysed for the value R of the factor 20 for the selected soil blocks. An allowable loss of soil by water erosion is 10 t/ha/year in the land registry Šardice.

In accordance with the mentioned methodology, there was calculated the erosion wash in the selected locality of interest area. It was proved, that in almost all soil blocks, there was a loss of soil caused by water erosion over the allowable level before the imple-

Table 2. Identified species of animals in the context of the interest area agroecosystem

Species – the population of newly identified	Occurrence		Location
	2007	2011	
Anas platyrhynchos	No occurrence	+	wetland
Calidris alpina		+	wetland
Limosa limosa		+	wetland
Crex crex		+	extensive orchard
Coturnix coturnix		+	biocorridor
Egretta alba		+	whole area of interest
Ciconia ciconia		+	wetland
Acrocephalus palustris		+	wetland
Lanius excubitor		+	biocorridor
Lacerta agilis		+	wetland
Bufo viridis		+	wetland
Rana esculenta		+	wetland
Rana dalmatina		+	extensive orchard
Hyla arborea		+	wetland
Passer montanus, Emberiza citrinela, Carduelis carduelis, Fringilla coelebs, Parus major, Turdus pilaris, Carduelis chloris, Merops apiaster		+	biobelts

mentation of the agroenvironmental management system. Only the South-Eastern part of the interest area (near the land registry Hovorany) contains less threatened soils because it is a less sloping area. Figure 5 shows the current status of the interest area. The average annual level of the erosion wash was slightly decreased due to the agroenvironmental actions and the realization of the landscape-forming elements. In this area, there locally appeared a permanent grass cover established on arable soil, the extensive orchard, the biocorridor, the wetland ecosystem and the biobelts.

For the evaluation of the effectivity of the suggested protective actions, there was performed the calculation of the average annual levels of the erosion wash for the individual soil blocks in accordance with the system LPIS (Table 3). In this table, there are 6 selected soil blocks in which there was documented the reduction of the soil loss caused by erosion after the implementation of the agroenvironmental management system (calculation for R20).

The application of agroenvironmental management strongly helps the protection of agricultural soil on the area of Petr Marada's ecofarm. It is necessary to

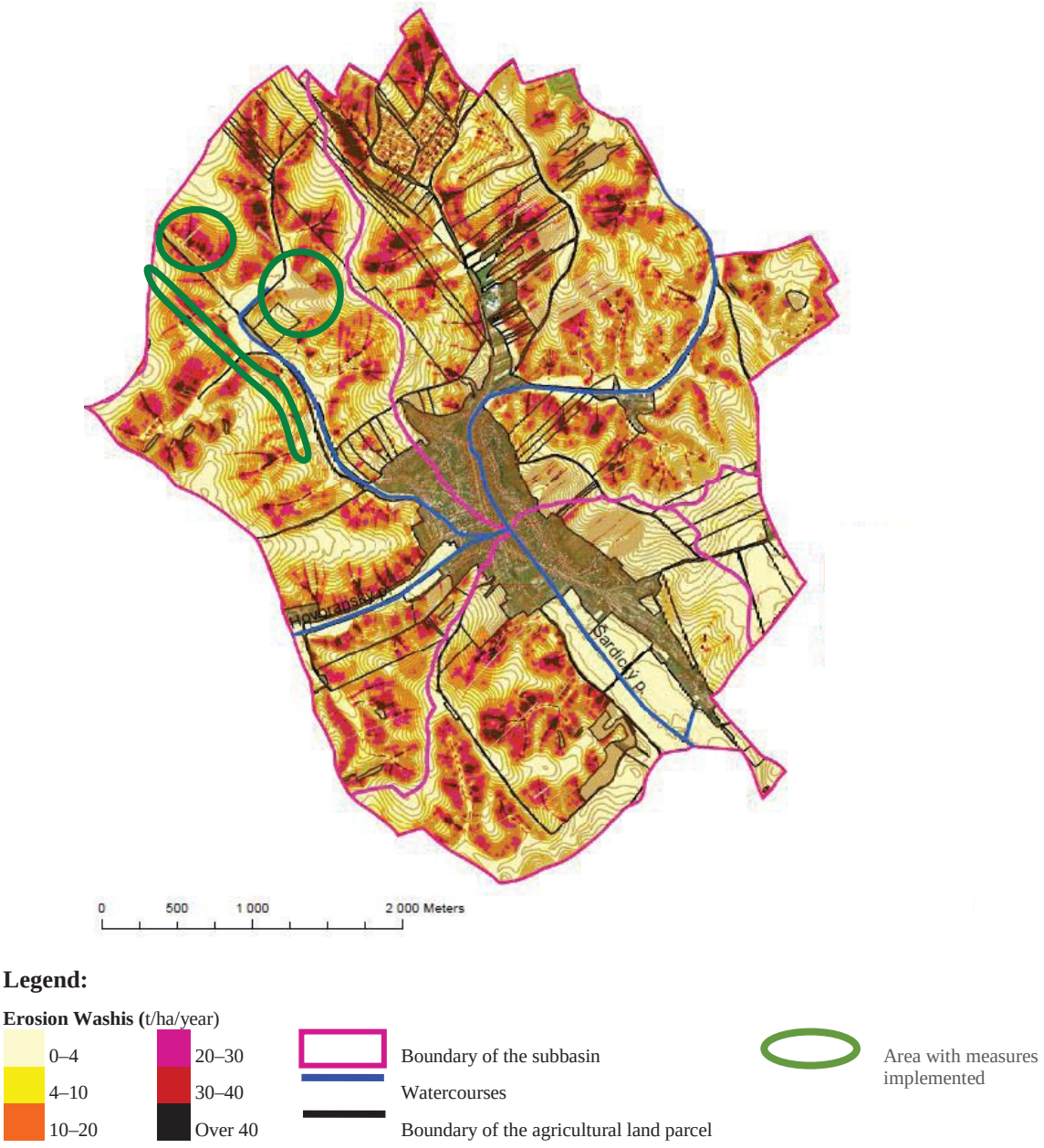

Figure 5. Erosion wash – 2011 – factor R20

Source: Maradová (2011)

Table 3. Calculate the level of erosion washes soil for the selected land block according to the LPIS – comparison of the situation before the implementation of the agroenvironmental measures and after the implementation of protective measures for R20

Designation of the land block	Land area (ha)	Loss of soil before the implementation of measures (t/ha/year)	Loss of soil after the implementation of measures (t/ha/year)	Reduction of soil loss after the implementation of measures (%)
1701/10	4.31	11.37	0.26	98
2801/2	1.02	16.23	1.76	89
2801/9	1.01	16.58	4.58	72
2801/3	1.30	10.66	3.20	70
2801/8	1.62	10.90	3.31	70
1804/2	1.01	6.31	2.09	67

fulfil the organizational, agrotechnical and selected technical antierosion actions for the protection of all interest area and the prevention of the depreciation of land in the whole land register area. For this purpose, it is necessary to use systematic actions as the agroenvironmental management.

From the individual actions, the best results were reached in minimizing of erosion using building of the biocenter which contains the wetland ecosystem, the extensive orchard which is grassed, and the biobelts which simultaneously serve as a buffer area between the conventional and ecological farming.

Ecosystem functions determination

There were analysed new agroenvironmental actions and landscape-forming elements with the goal to establish their important ecosystem functions. The effort was to define new functions which were not provided by the agroecosystem before the implementation of the agroenvironmental management. The analysis of the suggested, implemented and certified actions showed an indisputable benefit in the renewal of the needed ecosystem services.

The most important ecosystem functions are:
- Permeability of landscape.
- Attractive landscape for the game management and agrotourism.
- Increasing of the aesthetic value of landscape.
- Increasing of the biodiversity of plants and animals.
- Space for the pollinator and predators.
- Provision of the cover, peace, food and orientation needs for animals.
- Nesting of songbirds and lairs for game.
- Increasing soil fertility.
- Production of the biomass for the production of biogas, production of heat by burning.
- Antierosion functions.
- Absorbing functions – water retention in the nature and landscape.
- Filtration – cleaning of water from the neighbouring lands.
- Improving of microclimate.
- Land functioning for education and consulting in the ecosystem services.
- Space for attractive recreation, relaxation and sport.

The overview of providing ecosystem functions is not final. We can expect other possible ecosystem functions which will be recognized in the future. Although the ecosystem services can be evaluated and even traded (the country pays interesting payment to people who have decided to realize the ecosystem functions on their lands), in the interest land registry area, however, these services are not valued by the general public, on the contrary. Intensively farming farmers with the support of the Agrarian Chamber and the majority of the public present problems (problems with plant protection, an ineffective using of robust technology), an ineffective using of subsidies (taxes), spreading of weeds from the biobelts and other landscape-forming elements, an important decrease of arable soil for the production of food and feed. The benefit from the new ecosystem services completely exceed the mentioned negative aspects coming from the intensively farming farmers and the general public attitude.

CONCLUSION

There were developed the best available techniques for the management of agricultural organisations which want to actively prevent and minimize the negative impact of their activities on environment. These techniques are the best and simultaneously available

for an agricultural organisation from the point of view of the environment, technical and economical requirements. The applicability and functionality of this tool were confirmed by the results that were reached at the Petr Marada´s farm according to the evaluation of the monitored environmental indicators. This technique was applied and supported the successful process of the implementation and correct performance of the specified requirements. The developing standard was updated with the goal to reach the required quality factoring in future users. During the implementation of the standard, there was proved that it is necessary to have the knowledge from the related fields: rural sociology, hazard analysis and critical control points (HACCP) for the producers of food and feed, the certification system promoting the sustainable forest management (PEFC) and Wildlife Estates (WE) in conditions of the national and international agrarian organisations.

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