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## **The role of the SEA in planning and programming processes**

**Abstract.** The current paper aims to outline the potential and most important aspects of the Strategic Environmental Assessment process (directive 2001/42/EC). First of all, the analysis considers the importance of evaluation instruments in decision-making processes and moves on to environmental assessment, focusing on the peculiarities of Strategic Environmental Assessment. Although SEA is an innovative instrument in favouring and promoting a democratic approach to the government and development of the territory, it nonetheless presents a series of problems. The latter regard aspects such as: its integration into planning and programming activities, its role within these processes, the methodologies applied, stakeholder involvement, the quality of the assessment process and the how the suggestions are perceived and acknowledged.

**Key words:** Strategic Environmental Assessment (SEA), evaluation, plans and programmes

## **Evaluation supports planning and programming processes**

The evaluation of policies, planning and programming processes is fundamental not only to optimize the available resources, but also to involve the larger numbers of people in understanding and agreeing on solutions for the problems.

Thus, evaluation becomes doubly important as a strategic instrument for decision makers: it furthers knowledge acquisition as well as establishing needs and identifying more effective and efficient methodology; it also encourages greater consensus concerning the solutions adopted.

The evaluation actually takes place in a political context where the policy makers are also the commissioners responsible for the evaluation; the evaluators and the results of the evaluation can be easily influenced.

This aspect is particularly relevant when the evaluation concerns aspects which are non-priority objectives of the plans and programmes examined (as often happens with environmental evaluation) and even more problematic if the evaluation occurs at the preliminary stages, when plans and programmes are still being defined and the effects of the strategies adopted are uncertain.

The evaluation of plans and programmes developed as an independent branch of knowledge acquisition in the USA during the sixties. It later spread to Europe and became common practice, particularly in those countries with strong ties with North America. The European Structural Funds programmes, concerning socio-economic development, (MEANS, 1999) greatly promoted this type of evaluation. Local traditions have influenced and channelled evaluation processes which have resulted in a variety of different approaches, ranging from highly democratic governance (as in Scandinavian countries), to a more conventional central government approach, while at regional level, the approach has

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remained both varied and dynamic (as in France). In many countries evaluation trends have reflected the political changes of the governments (as in the United Kingdom).

However, it is universally acknowledged that the introduction of evaluation processes in many States of Southern Europe is a direct result of the requirements imposed by the regulations of the European Structural Funds.

The development of evaluation within the various specialist sectors of the European Community is aimed at identifying issues which are relevant to the stakeholders. The objective is to reduce the range of knowledge uncertainty regarding the possible outcomes of the plans and programmes drawn up, which in turn will favourably influence both the choice of the strategy and its subsequent implementation. In short, evaluation aims to optimise the design of plans and programmes and to guarantee that they are effective and efficient by making available a variety of possible interventions and instruments which, in turn, provide a monitoring system for short, mid and long term results capable of verifying assumptions and rectifying errors. The evaluation system must therefore be an integral part of the policy/programme cycle.

Stakeholders are policy makers, professional and specialist interests, managing authorities and administrators, citizens and those affected by public action. The relevance of each different group of stakeholders depends on the initial purpose for which the evaluation is being carried out. If the purpose is ensuring that there is a justification for a policy/programme and that resources are efficiently deployed (planning/efficiency), it will mainly meet the needs of planners and policy makers; if the purpose of evaluation is demonstrating how far a programme has achieved its objectives and how well it has used its resources (accountability) it will mainly meet the needs of policy makers, programme sponsors and parliaments; if the purpose of evaluation is improving the performance of programmes and the effectiveness of how they are delivered and managed (implementation), it will mainly meet the needs of programme managers and the programme's main partners; if the purpose of evaluation is knowledge production, it will mainly meet the needs of policy makers and planners; if the purpose of evaluation is improving and developing capacity among programme participants and their networks and institutions (institutional strengthening), it will mainly meet the needs of programme partners and other programme stakeholders.

There is an overarching objective, into which all the other objectives noted above slot in. This overarching purpose concerns learning; evaluation from this perspective has as its purpose: to learn through systematic enquiry how to better design, implement and deliver public programmes and policies.

What, exactly, are the peculiarities of environmental evaluation in this context? Does the evaluation satisfy the needs which have been identified so far? Is the criteria the same or is it the environmental issue at hand which determines the differences?

## **Environmental evaluation as a key-factor for sustainable plans and programmes**

Environmental evaluation consists of a knowledge-process that examines the effects that human activities have on the environment and identifies ways of avoiding or minimizing any foreseeable negative impact.

We can ascertain that the objective of environmental evaluation is to act as an instrument for supporting and optimising decisions and interventions that regard the environment, and have the population's interest at heart.

It is therefore the community as a whole, and not simply the planners or investors, who determine the choices. The community, however, is a complex structure which comprises numerous, different stakeholders and as a consequence, the criteria for making decisions also vary. Bearing this in mind, environmental assessment is an important tool which can help avoid or solve possible conflicts and it allows for the democratic governance of all evaluation activities.

Furthermore, environmental assessment aims to integrate environmental, social and economic capital based on the sustainability of the plans and programmes while maintaining the technical standards of scientific research conducted on the environment from a chemical, physical, biological and ecological view point. This occurs because, in the majority of cases, the need to safeguard the environment is neither the main nor the sole objective of the evaluation, thus environmental protection must also consider the socio-economic objectives for which the plans and programmes have been drawn up.

In order to guarantee the sustainability of the plans and programmes, the assessment of the environment must occur during the content formulation phase. It is anticipatory research in that it identifies, estimates and evaluates the impact on the environmental system being considered, in the period prior to the actual implementation of the plan/programme. The approach has to deal with uncertainty concerning content and the lack of methodology, the heterogeneity of the variables in play and the subsequent difficulties of modelling the systems under scrutiny. The latter do not result in codifications or generalities which are truly scientific in nature and make it difficult to foresee possible scenarios.

Within the Community, the methodology for environmental evaluation of socio-economic development programmes are mainly aimed at outlining a concept and to proposing the general content. The base questions for the evaluation are identified; a specific model is proposed according to which analysis must take into account environmental, social, economic and human capital; a matrix is defined for evaluating the sustainability of the programme (the concept, on the other hand, may also apply at the planning stage and is divided into actions which are evaluated considering the various capitals, the financial resources and other interrelated themes).

The theory adopted, when specific environmental issues are concerned, is the DPSIR Model<sup>3</sup>, which is often ignored in evaluation practices.

On the whole, what is fundamental is understanding the extent to which integration is achieved regarding needs analysis, strategy, the management system, the choice of alternatives and the monitoring system. The latter is particularly important when evaluating the outcome of the actions chosen and should take place during the executive phase of the plan /programme., thus giving rise to a cycle of continuous evaluation, which is highly recommended in scientific contexts. Furthermore, it is the real key to "making the whole planning process coherent and geared towards sustainability (Enplan, 2005).

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<sup>3</sup> Driving force-Pressure-State-Impact-Response Model.

## **The peculiarities of the SEA compared with other environmental assessment instruments**

The Treaty establishing the European Community states that Community policy on the environment “shall be based on the precautionary principle and on the principles that preventive action should be taken, that environmental damage should as a priority be rectified at source” (art. 174, par. 2). The Sixth Environment Action Programme<sup>4</sup>, in force until 2010 states that interventions must be grounded on principles of prevention and precaution and must apply to all sectors. With reference to European policies for sustainable development adopted in 2001<sup>5</sup>, the European Council summit in Gothenburg also insists that environmental issues should be integrated into all European policy sectors.

Environmental assessment is an instrument which guarantees that the environmental principles sanctioned by the EU are observed. In the early eighties, Community legislative measures were initially oriented towards the policies of the member states and processes aimed at evaluating the possible effects on the environment of both public and private projects.

The well-known directive 85/337/EEC<sup>6</sup> on the assessment of the effects of certain public and private projects on the environment (s.c. EIA directive) aims to guarantee that member states adopt necessary measures so that projects that, due to their nature and position, will have a significant impact on the environment may be evaluated prior to issuing authorisation to proceed. The EIA directive, which still represents a milestone with regard to environmental assessment, is extensively applied within the EU, where methodologies and techniques are shared and consolidated by the public decision-makers.

Since the nineties the EU has shown marked interest in the issue of biodiversity. The well-known Rio de Janeiro Convention on biological diversity was held in 1992 and that same year, the Habitat Directive (92/43/EEC) on the conservation of natural habitats and of wild fauna and flora. The Gothenburg strategy drawn up by the Council of Europe in 2001, and the Johannesburg summit on sustainable development in 2002 both emphasised the need to halt the loss of biodiversity. With this in mind, the European Union drew up a new policy for the safeguard of natural and semi-natural habitats, flora and fauna, and which regards the creation of a European network of protected areas - the Natura 2000 Network. This includes the introduction of a new environmental assessment tool known as the assessment of environmental implications on Natura 2000 sites covered by article 6 of the Habitat Directive. Interest shown for the preventative assessment approach explicitly set out and defined in EIA has now shifted towards a wider range of plans and projects which are less codified, and a more precise environmental area which is that of Natura 2000.

Environmental impact assessment and the assessment of environmental implications on Natura 2000 sites were prodromic in the “Copernican-style revolution” of environmental assessment, namely the introduction of strategic environmental assessment (SEA), in accordance with Community Directive 2001/42/CE, on the assessment of the effects of certain plans and programmes on the environment. Environmental assessment no longer concerns specific project categories or specific areas which are of naturalistic interest, but

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<sup>4</sup> Environment 2010: our future, our choice.

<sup>5</sup> Updated by the European Council in 2006.

<sup>6</sup> Directive 97/11/CE introduced modifications, while legislation and procedures remain unchanged.

rather the much wider scope of the plans and programmes<sup>7</sup>. SEA consists of the preparation of an environmental report, followed by consultations, the provision of information on the decision, and controlling the environmental effects by a monitoring system. As far as its plans, requiring an assessment of the environmental impact on Natura 2000 sites, are concerned, it is necessary to define a common strategy with a view to avoiding the duplication of assessment procedures. The start up of the SEA in the early stages of available plans and programmes allows for a more effective integration of the environmental issues when drawing up the necessary documentation and guarantees that potential conflicts between development and environmental objectives will be addressed.

The SEA approach is radically different: the environment is no longer considered to be an external factor which requires corrective measures at the planning stage (which was the case with EIA), nor is it an assessment tool which is limited to selected areas such as Natura 2000 sites, in the case of assessment required under article 6 of Directive 92/43/EEC), but it becomes a determining component of the plan/programme.

The area undergoing evaluation is vast. Together with its traditional interpretation, the environment now has a further reaching interpretation and includes the air, water, soil, nature etc. It also extends to territorial components such as the landscape, or social contexts such as the population and health care. SEA extends beyond environmental aspects and encourages the evaluator to investigate the implications based on the social and economic sustainability of the plans and programmes. Basically, it is the main instrument for guaranteeing the sustainability at the planning and programming stages to allow for, as the 1987 Brundtland Report states, sustainable development which meets current day needs, without compromising the opportunities for the future generations to satisfy theirs.

## **SEA in the EU context**

Getting the member States to adopt Directive 2001/42/EC as part of their national legislation has been a long, arduous process, which has not yet been completed.

National regulations acknowledging the directive should have been adopted by, and no later than, 21 July 2004. Nonetheless, Italy, Austria, Belgium, Cyprus, Greece, Spain, Finland (more precisely the Province of Aland), Luxemburg, Malta, The Netherlands, Portugal and Slovakia did not comply. The European Commission opened breach proceedings and a written ultimatum dated 11 July 2005 was sent prior to referral to the European Court of Justice.

With regard to Poland, a local, strategic environmental assessment had already been requested in 1994 (Special Planning Act). SEA became compulsory at regional and national levels in 2001 with the Environmental Protection Act, Poland's most important document in the field of environmental protection, also known as "The Environmental Constitution". Subsequent to modifications introduced by the Environmental Protection Act of May 2005, Poland adopted the SEA directive in full.

Italy had still failed to comply within the deadline. Legislative decree 152/2006 (Environmental Consolidation Act) introduced SEA at a national level but it will not come into force until 1 August 2007, with a possible deferral to 1 January 2008.

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<sup>7</sup> Article 3 of the directive defines the area of application and the sectors subject to SEA.

## **Possible relationships between SEA and the planning / programming process**

The SEA directive does not discipline aspects concerning the position of the evaluation and the decisional procedures. It is the responsibility of the member states to regulate this aspect by passing laws which adopt the directive and which are obliged to take into account the methodologies, the attitudes, and cultural aspects of the plans and programmes peculiar to the member state. The issue concerning the positioning of the evaluation in relation to the process of defining the plans and programmes is of primary importance in view of the fact that the results of the evaluation are partly dependent on this. Article 8 of the Directive states that: "The environmental report prepared pursuant to Article 5, the opinions expressed pursuant to Article 6 and the results of any transboundary consultations entered into pursuant to Article 7 shall be taken into account during the preparation of the plan/programme and before its adoption or submission to the legislative procedure." The range of possible options comprises at least three alternatives which represent a sort of ascending climax: SEA as a fundamental phase for decisions to be made; SEA as an integral part of the decision-making process; SEA as a decision-making process. In the first case, SEA is carried out at a delimited, independent time which is similar to what happens in EIA procedures. The evaluator is usually an environmental expert who remains outside the planning and programming process. This (reductive) view of SEA lacks strategy, dialogue and the exchange of communication between planners and evaluators. In the second case, SEA is seen as an integral part of the planning and programming process. The predisposition of environmental reports is in tandem with the drawing up of the planning / programming document and allows for the evaluation of the various scenarios proposed. The constant exchange of information between the planner, the programmer and the evaluator means that the decision-making process is synergic and consequently more effective and efficient in terms of results and time required.

The third case, on the other hand, represents the optimum, though not always workable, situation. It presents SEA as a complete decision-making process which permeates all decisions concerning plans and programmes. Considering the current state of practice in force and the evaluation culture in each member state, it is an arduous objective to reach. This is due to the many factors that influence the choice plans and programmes and the fact that environmental sustainability does not play a key role.

## **Clear and shady areas concerning the implementation of SEA**

Given that Strategic Environmental Assessment is an innovative instrument which has only recently been put into practice, it still contains some aspects which are uncertain and subjective. The main problems regard: its integration into the planning and programming cycles; the definition of roles within this process; the methodology adopted; the involvement of the stakeholders; the quality of the evaluation and the criteria adopted for receiving the results of the assessment.

As previously mentioned, directive 2001/42/EC means that SEA should be an integral part of the drawing up process for plans and programmes; an interactive process which

favours the transfer of information between the evaluation results and the plans and programmes - and vice versa.

From the systematic viewpoint, SEA is extended to the executive phases of the plans/programmes; this approach allows for corrections and adjustments to be made should the plans/programmes reveal unexpected, negative effects. Should this be the case, the introduction of a monitoring system would be fundamental, but this is often ignored when carrying out SEA, despite being expressly included in the Directive.

SEA is frequently applied only when the contents of the plan/programme have already been defined (occasionally with the imprimatur of the authorities), leaving little margin to contribute to the drawing up of the plan/programme. This partly depends on the misinterpretation of SEA, which is seen as simply being the fulfilment of regulations on behalf of the planning/programming authorities, who often do not perceive the advantages. For this reason, pre-assessment should be enhanced and used to train the authorities responsible for planning/programming concerning the uses of evaluation and its development. Possible discrepancies between assessment and planning/programming processes also have a negative effect on the choice of available planning/programming alternatives, as well as on the introduction of offsetting measures<sup>8</sup>, and the effective usefulness of the assessment and consultations. If the latter are excessively behind schedule, important changes cannot be made to the plan/programme based on the considerations which emerge from the environmental report or the public opinion.

As far as the evaluator is concerned, it is necessary to establish whether he should remain independent from the planning/programming authorities in order to guarantee that his opinions remain autonomous and unconditioned by the limits imposed by the plan/programme, or whether closer ties with the authorities might be more effective in guaranteeing interaction between the various processes.

The decision depends on a number of factors: the degree of competence of the planning/programming authority with regard to environmental issues and assessment; the appropriate involvement of stakeholders which can adjust the risks which could arise from a point of view which is excessively subordinated to the plan/programme, (in the case of a SEA developed by the planning/programming authority). An independent evaluator on the other hand, could have an important role as a moderator between the different interests which are at stake; particularly when conflicts arise between the stakeholders and the planning/programming authorities (such as interventions on infrastructure) or among the stakeholders themselves.

Shared evaluation methodologies and sources of information are a key factor in reaching consensus. The topic is strongly linked to the general quality of the environmental reports which must satisfy the minimum standards guaranteed by the member state (article 12, 2, Directive 2001/42/EC). The many assessment tools and techniques proposed at Community level for the evaluation of the environment<sup>9</sup> are in fact not supported by official EU documentation concerning the specific analysis methodologies which should be applied when carrying out SEA. With regard to environmental analysis, the DPSIR model proposed by the European Environment Agency often makes it difficult to select appropriate indicators which allow for the complete application of SEA within the context

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<sup>8</sup> These aspects are often marginal or totally absent in environmental reports.

<sup>9</sup> Evaluability assessment; logic models; concept or issue mapping; social surveys; multicriteria analysis; use of secondary source data; cost effectiveness analysis; cost benefit analysis, etc.

and the time scale provided, and which concern the causal connections between human activity and the environment. The evaluator generally possesses more or less up to date information concerning the state of the environment. Data on drivers and pressures, however are often lacking and aggregated on a vast spatial scale, while data on impact and responses need to be compiled case by case. With regard to the classification of indicators, the use of descriptive indicators is common, while the use of performance and eco-efficiency indicators is rare. The evaluator hardly ever uses policy effectiveness indicators and total welfare indicators that target an overall view of the sustainability.

Another problem which needs to be mentioned, is that in several cases the amount of detail contained in the plan/programme is not sufficient to determine what the significant effects are.

The complexity of the cognitive processes makes it increasingly important to agree on the methodologies with the stakeholders during scoping. This, in turn, will allow for valid analysis and assessment will represent a common, shared basis for discussion. The Directive, however, states that during scoping is obligatory the involvement of the environmental authorities only, while deferring public opinion to the consultation phase.

In order to make discussion more effective, it is necessary to identify the different categories of stakeholders who show potential interest. This would make it easier to identify to what degree the stakeholders could be, or wish to be, involved during consultations with the environmental authorities and the general public. They must also be given sufficient and timely information in order to formulate and put forward their opinions. Recourse to specific methods aimed at consultation (steering group, focus group, advisory committee, etc.) could be strategic in encouraging dialogue and entente between the authorities and the citizens, especially in countries where evaluation practices are less established and where there is less public involvement at the definition stage of the plan/programme.

## **Conclusion**

We can confirm that SEA is based on a concept where the content and the assessment become significantly interdependent. The way the process is conducted determines the orientation of the content and the usefulness of the assessment; the progressive results stemming from the assessment make it possible to identify snags in the assessment process; the process allows for the resolution of conflicts and the establishment of common interests.

Objectives aim at integrating environmental and socio-economic sectors in a move towards sustainable development. The difficulty lies in integrating assessment and planning/programming, as well as getting those with vested interest to commit.

Experiences in Europe reveal that good practice and identification of possible difficulties depend on how deeply embedded the environmental culture actually is and the degree to which the authorities encourage it, as well as on the assessment and the involvement of society as a whole when public decisions are at stake.

From this viewpoint it is important that the planning/programming authorities commit to fully comprehending how SEA can contribute to the decision-making process, if it is applied as an instrument which aids problem solving, and not simply viewed as a need to comply with legislation. As a result it also enhances and increases democratic governance and the development of the territory.



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## **The small hydroelectric power stations as an element of the multifunctional development of rural areas**

**Abstract.** Poland's accession to the EU has caused a necessity of harmonising Polish with the union law also in the field of energy law. It also enforces achievement of 7,5% share of energy from alternative sources in the total energy consumption in 2010. Execution of this international commitment will require more economic and legal support from the state. The development of alternative sources of energy creates chances of development of rural areas where these kinds of installations are being mostly located. This article presents an analysis of the economic efficiency of energy production on an example of 5 small hydroelectric power stations. The analysis is based on a comparison of full unit costs and unit revenue from energy sale. Bigger stations proved economically efficient while for the smaller the break even point is associated with an average water flow of 153 million m<sup>3</sup>/year.

**Key words:** alternative source of energy, economic efficiency, electric power, small hydroelectric power stations

### **Renewable energy market**

One of the most essential aims of the Polish energy policy is to assure the reliability of fuel and energy deliveries, the increase of economic competitiveness as well as the reduction of a negative influence of the energy sector on the environment. The problem can be solved, among others, through increasing the renewable energy resources exploitation that will contribute to the reduction of national dependence on the imported energy carriers and also result in a reduction of harmful gas and dust emissions to the atmosphere [Obwieszczenie Ministra Gospodarki... 2006].

The rapid growth of exploitation of renewable energy resources, noticeable in Europe and the United States since the end of eighties in the last century, results from their utility for the local communities as well as for the national economy, which yields them significant benefits. To the most important benefits belong, among others, an increase of the level of energy security, creation of new workplaces and promotion of regional development, a decrease in emissions of greenhouse gases, especially sulphur (SO<sub>x</sub>) and nitrogen (NO<sub>x</sub>) oxides. The positive effects of the energy production from renewable sources, which include small hydroelectric power stations, apply mainly to rural areas, where these kinds of installations are being mostly located. One of the reasons why the Fundacja Wspomagania Wsi (Rural Development Foundation) worked out Program Odbudowy Małej Retencji (Programme for Reconstruction of Small

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Retention) was the positive influence of the small hydroelectric power stations on the water regime in rural areas. Investors (private entrepreneurs, companies or communes) within the framework of this programme could apply for funds to be spent on reconstruction of damaged mills and hydroelectric power stations. The value of a preferential loan could reach even 50% worth of the capital expenditure [Fundacja... 2007].

In Polish conditions the renewable energy sources play a crucial role in the energy balance in the area of some communes or even of some provinces. They can also contribute to an increase of the level of energy safety and, especially, to an improvement in the energy supply in the areas of a underdeveloped energy infrastructure. Agriculture could be probably the biggest consumer of electricity from renewable sources and then also housing and the public transport. Using these resources, especially in areas afflicted with unemployment, gives a chance of creation of new workplaces. Besides, boggy rural areas or the ones with strongly polluted soils which are not fit for cultivation of edible plants, can be designated for founding plantations of energetical plants.

A chance for the renewable energy development is provided by the European Parliament and Council directive of the 27<sup>th</sup> of September 2001 on promotion of electric energy from renewable sources in internal market [Directive... 2001]. This directive determines for the UE-15 countries a quantity aim of a 21 % share of the gross energy produced from renewable sources in the total energy consumption in 2010. The quantitative aim for Poland, defined in the Accession Treaty, is 7.5%. For realization this purpose production of energy from alternative carriers should grow till attainment of level defined in Directive in 2010 (table 1).

Table 1. Amounts and shares of energy from alternative sources in the total energy consumption in years 2005-2014

Year	Consumption of energy from alternative sources	
	[TWh]	[%]
2005	3,12	2,2
2006	3,72	2,6
2007	4,61	3,2
2008	5,80	4,0
2009	7,74	5,5
2010	11,10	7,5
2011	11,18	7,5
2012	11,33	7,5
2013	11,48	7,5
2014	11,63	7,5

Source: [Obwieszczenie Ministra Gospodarki i Pracy... 2005]

According to the guidelines set forth in the Polish energy policy for years up to 2025 the aim defined in the directive is to be realized especially on the basis of technologies that use the biomass (energetical plants, firewood, wood production and agricultural waste as well as biogas), water and wind. It is confirmed by the data juxtaposed in table 2 which show power

installed by particular technologies using alternative sources of energy in years 2002 through 2004.

Despite the new investments in the field of renewable energy leading to a growth of the installed power (from 2002 to 2004 this growth totaled 104.5 MW, i.e. 11.5%), the share of electric energy from renewable sources is lower than assumed. This is partly caused by the rapidly growing gross electricity consumption (from 138 810 GWh in 2001 to 144 831 GWh in 2004, i.e. 4.3% [Obwieszczenie Ministra Gospodarki... 2006]). Therefore the fulfilment of the international commitment will require more economic and legal support from the state.

Table 2. Power installed in power stations producing electric energy from renewable sources in Poland, MW

Installed power by source	Year		
	2002	2003	2004
Biogas (total)	15.0	18.0	22.0
agricultural biogas	n. a	1.0	2.0
landfill gas	15.0	15.0	17.0
sewage gas	n. a	2.0	3.0
Biomass (total)	1.1	16.6	51.9
industrial power stations and thermal-electric power stations	n. a.	15.5	50.5
other power stations	1.1	1.1	1.4
Hydroelectric power station (total)	840.0	873.0	881.0
installed power $\geq$ 10 MW	630.0	637.0	638.0
installed power <10 MW	210.0	236.0	243.0
Wind power stations	59.0	60.0	65.0
Total	915.1	967.0	1019.6

n. a. – data not available

Source: [Obwieszczenie Ministra Gospodarki ... 2006]

The basic act regulating energy market in Poland is the act from 10<sup>th</sup> April 1997 Prawo energetyczne (Energy Law) [Obwieszczenie Marszałka... 2003]. It includes, among others, provisions for promoting and supporting production of electricity from renewable and associated energy sources. This promotion is specific because it statutorily obliges the energy suppliers to purchase every offered to them amount of electricity derived from renewable sources and at the same time to purchase or to produce themselves from renewable sources at least a certain percentage of the total offer in consecutive years instead of introducing a system of granting by the state allowances and other incentives. The essential step taken with an object of supporting development of renewable sources was the introduction, with the act of 4<sup>th</sup> March

2005 [Ustawa... 2005], of a property law resulting from a testimony of the origin of electricity produced from renewable sources.

The most important and essential consequence of the regulations passed in this bill was dividing revenues from the sale of energy produced from renewable sources in two categories:

- revenues from the electricity sales that a producer gets for the sold energy; the price of energy produced from renewable sources is the same as that produced from a conventional carrier;
- revenues from the property law sales resulting from the testimony of a renewable origin; a renewable energy producer gets a payment from the power station that purchases the property law resulting from the testimony of origin.

The testimony of origin is a confirmation that a particular amount of electricity has been produced from a renewable energy source. The testimonies are registered in the producer's inventory account in the register of testimonies kept by the Energy Stock Exchange (ESE). The moment the testimony is registered in the producer's account, the property law resulting from that testimony comes to existence. However it is transferable. The turnover of the property laws to the testimony of origin takes place in the energy stock exchange market during and off session. All transactions, no matter during or off session, are registered by ESE. The first session of property law trading took place on 28<sup>th</sup> December 2005. The average prices of property laws traded in and off session transactions in 2006 and 2007 (registered by ESE) are shown in figure 1. The picture shows that the price of property laws between transactions sessions nos. VII and IX grew rapidly. It must have been caused by the increased demand in the end of the year because of the necessity of obligatory property law purchase. In December the price stabilized at a level slightly lower than the statutory charge for missing property law. The price of property laws in off-session transactions between January 2006 and April 2007 did not change a lot. The price grew in that period by 18.5 PLN (which is 9.6%). In April 2007 was the price of property laws in off-session transactions in session transactions by 27 PLN (11.4%) lower than price of property laws traded in session. That difference resulted from the fact that the prices were fixed on the basis of long-term contracts between the producers of energy from renewable sources and the big power stations. Producers are inclined to sign this kind of contracts because they give them a guarantee of stable incomes.

Total volume of renewable energy confirmed by a testimony of origin in 2006 was 3 579 132 MWh, while in first fourth months of 2007 it was 1 334 924 MWh.

To fulfill the statutory duty conventional power stations have to purchase or produce the energy from renewable sources in accordance with a prescribed percentage for a given year. The confirmation of the fulfillment of this duty is a purchase of the property laws to testimony of origin. The testimony of origin is written off the sum of obligation for a given year the moment an energy company buys the property law to it. Every entity participating in ESE can become an owner of the property law resulting from the testimony of origin without the obligation to purchase electricity confirmed by the testimony of origin (electricity and property laws could be purchased separately by two entities).

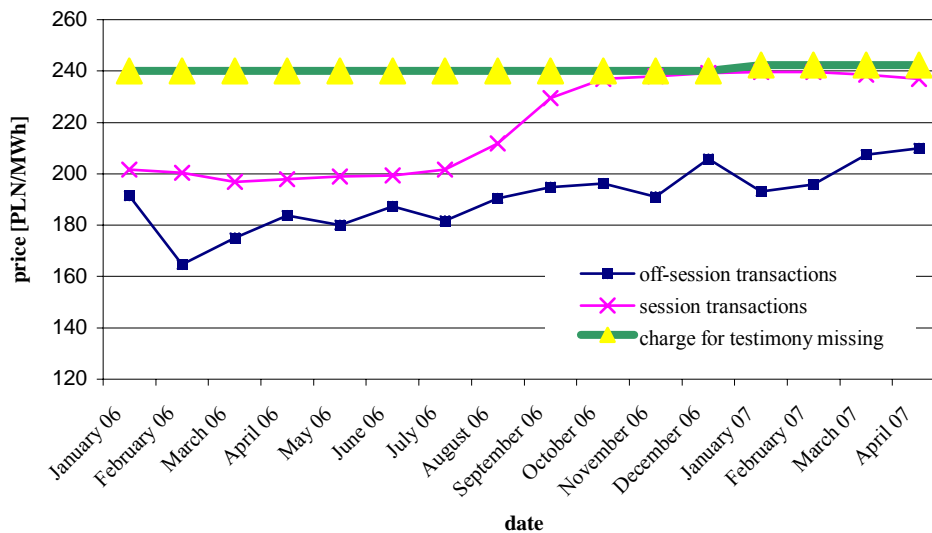


Figure 1. Weighted average price of property laws traded in and off session, registered in months between January 2006 and April 2007.

Source: own research based on [Towarowa... 2007]

Energy companies which do not buy nor produce themselves required amount of renewable energy property rights are statutorily obliged by the end of March next year to pay a surcharge adequate to the amount of the missing testimonies of origin. This surcharge is a part of revenues of the National Fund of Environmental Protection and Water Economy.

The payment is determined by multiplying a unit surcharge of 240 PLN/MWh (in 2006; in the following years updated on the basis of the consumer price index in the previous year; according to an announcement of the chairman of the Office of Energy Regulations the unit surcharge in 2007 is 242.40 PLN/MWh) by the amount of the missing testimonies. The surcharge is supposed to be higher than the market price of testimony of origin and can be treated as a maximum price practicable.

The system of tradable testimonies of origin contributed to a considerable economic revival in the market of renewable energy. The consequence of this mechanism is a higher price (because of the cost of purchased testimonies of origin) of energy from renewable sources than the price of energy from conventional sources. Increased costs of power stations are being transferred to final consumers, that is to general public. This mechanism is justified economically only when the social benefits from replacing traditional energy carriers (among others reducing emission of harmful gases and dust to the atmosphere as well as the amount of ashes to store) are higher than the social costs.

## Costs and revenues of small hydropower plants

The aim of the research was to determine the relation between the hydraulic and engineering parameters of investigated hydropower stations (average stream flow, installed power), the level of full unit costs and the unit revenue from the sale of electricity. The data basis have been the book entries in a company operating five cascaded power stations located in the northern-central part of Poland. All of the analyzed objects are situated in the same river basin and belong to one owner (a limited liability company). Table 3 shows the technical parameters of the analyzed stations. Four of these stations can be classified as small hydroelectric power stations (with installed power <5 MW); only the station no. 2 exceeded this limitation.

Table 3. The technical parameters of the analyzed objects

Parameter	Unit	Station				
		I	II	III	IV	V
installed power	kW	2294	6669	2410	872	781
average water head	m	13.8	44.8	13.9	4.5	4.21
average flow	m <sup>3</sup> /s	5.4	5.5	5.8	5.4	5.5
lowest flow	m <sup>3</sup> /s	2.36	2.42	1.97	2.03	0.5
highest flow	m <sup>3</sup> /s	12.07	12.43	13.49	12.61	36.85
average annual energy production	MWh	3980	15000	5000	1570	1340

Source: own research

The analysis covers a period from V 2003 (date of establishment of the company) to VII 2006. The research was based on the information about:

- monthly flows, amount of produced energy, amount of energy used for internal needs and work time;
- annual total costs and revenues from energy sale.

First of all a relation between the installed power and the unit revenue from energy sale has been determined (figure 2). The average of annual revenues in 2004 and 2005 has been used in the analysis. Data from 2006 have been excluded because of the changes in the system of accounts between the renewable energy producer and the buyers, which occurred in 2006 (the previously mentioned mechanism of tradable property laws). In that period (2004 and 2005) the company was paid 0.23 PLN for 1 kWh. After the changes of 2006 a new contract was signed with the energy receiver, according to which the company gets 0.12 PLN for each kWh as a revenue from electricity sale and 0.20 PLN/kWh as a revenue from the property laws sale. The testimony of origin price is stabilized and independent of stock exchange quotations. This practice is very common because it guarantees that the producer has a stable (independent of the

stock exchange price fluctuations) revenue and a warranty of quick sale of the testimonies. A dependence of the unit revenue from the installed power capacity on the installed power has been observed in the analyzed period. It can be described by equation:

$$P = 0,0281M + 422,7$$

where:

P – unit revenue from electricity sale per 1 W of installed power (price level 2004/2005), PLN/year/W,

M – installed power, kW.

Linear correlation coefficient for these variables  $R = 0,884$

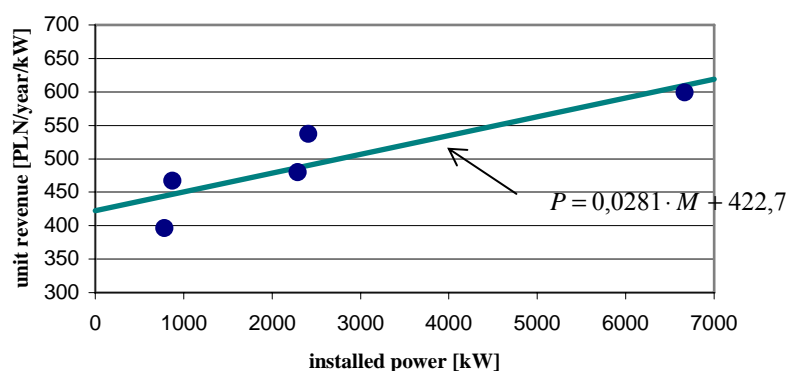


Figure 2. Relation between the unit revenue from installed power and the installed power  
Source: own research

In order to determine the influence of stream flow on the revenue from the energy sales all three years 2004, 2005 and 2006 have been analysed. The revenue obtained by the company in 2006 has been included but uniformly counted at the 2005 prices. The results are shown in figure 3. It has been investigated whether the revenue from a unit flow depended on the flow volume.

It can be observed that the unit revenue is practically independent of the flow volume. Whereas the factor that strongly influences the unit revenue is the water head level. In the case of power stations with low water head  $h=4\div 4,5$  m the relation between P [PLN/m<sup>3</sup>/year] and the average flow Q [m<sup>3</sup>/s] can be described as a linear equation in form of  $P=0,50Q+1804$ . However, in the case of objects where  $h=14$  m the same relation has a form of  $P=0,93Q+5912$ . The value of regression coefficient can be treated as a unit average annual revenue from 1 million m<sup>3</sup>/year of average water flow.

The next step was to analyze the relation between the installed power (M) and the annual cost (the average annual cost in 2004-2006)  $K_c$  per unit of installed power [PLN/yr/kW] (figure 4). In this case the linear correlation coefficient was  $R=-0,790$ . From the analysis illustrated by



the chart in figure 4 it follows that with an increase of the installed power the unit cost decreases. It is an example of the so called economy of scale.

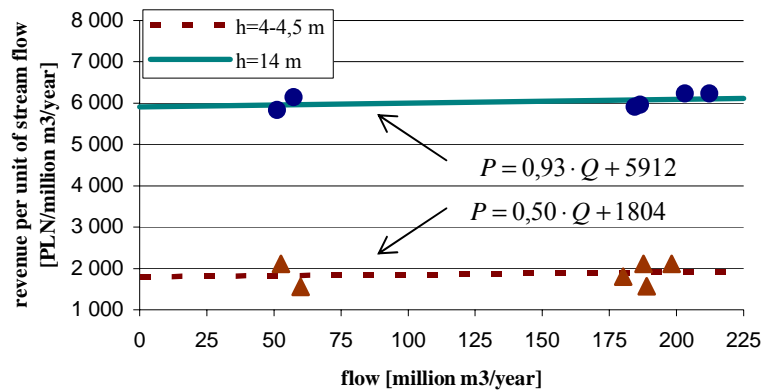


Figure 3. Relation between unit revenue from energy sale and the average stream flow and water head  
Source: own research

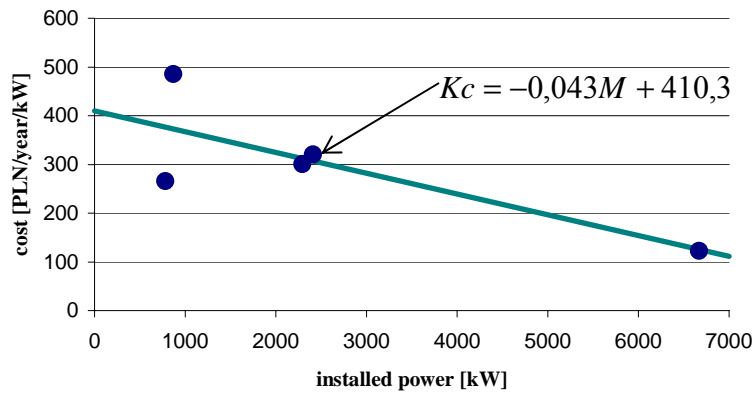


Figure 4. Relation between the unit annual cost per 1 W of installed power and the installed power  
Source: own research

In the last stage of research was the influence of the average stream flow and water head on the unit cost investigated (figure 5). In this case also declining curves have been obtained. Their shape is much dependent on the water head level. In the case of smaller objects this

dependence can be described by equation  $K_c = -5,8 \cdot Q + 2770$ , whereas for the bigger ones it becomes  $K_c = -4,7 \cdot Q + 4932$ , where  $K_c$  stands for an annual cost (price level 2004/2005) in PLN/million  $m^3$ /year and  $Q$  stands for flow in million  $m^3$ /year.

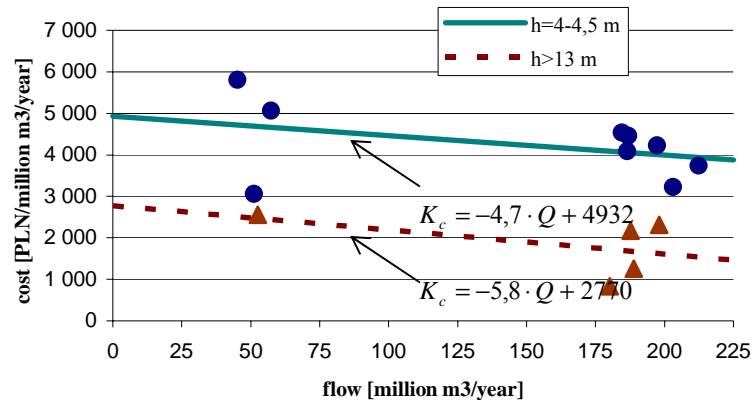


Figure 5. Relation between the unit annual cost per million  $m^3$ /year of water flow and the unit stream flow as well as the water head  
Source: own research

Those results of research indicate that there is a considerable influence of the installed power on the economic efficiency obtained by a particular power station. In the case of smaller objects (below 100 kW) the revenue per unit coming from the energy sale exceeds slightly the costs (the benefit/cost factor  $\approx 1$ ). Together with the growth of installed power the revenues per unit of installed power grow as well, while the costs diminish. Consecutively in the case of the biggest of analyzed objects the benefit/cost factor is 5.5.

The research results indicate that the objects with water head of more than 13 m (objects I-III) are distinguished by a substantial economic efficiency. In the case of those stations the unit costs per million  $m^3$ /year are always lower than the unit revenue obtained from the sale of energy. The difference between those two values is growing with the increase of stream flow which is caused by a decreasing tendency of the unit cost function and the constant (or even a little growing) unit revenue function. In the case of smaller objects, with water head within the range of 4-4.5 m, the break even point for costs and revenues comes with the flow volume of 153 million  $m^3$ /year. This flow level indicates that in dry years the small hydroelectric power stations with low water head could prove to be economically inefficient. It should be remembered that in the calculation only the revenues from the energy sale have been taken into consideration without counting the revenues from the sale of property laws to the testimonies of origin. If we take into account the second source of revenue it will cause the profitability frontier in the case of the power stations with lower water head move to the direction of lower flows. Moreover, when evaluating this kind of investments from the social viewpoint it is

necessary to take into consideration the social benefits resulting from the replacement of hard coal with natural sources in the energy production.

To the most important benefits belong:

- reduction of the harmful gaseous and dusty emissions to the atmosphere
- creation of additional workplaces
- increase of tourist attractiveness of rural areas
- possible improvement of water regimes
- reduction of necessity of building high voltage electricity supply lines which visually pollute the landscape and give rise to electromagnetic fields of high capacity.

Taking into consideration those social benefits can considerably influence the estimate of macroeconomic efficiency of energy production from renewable sources.

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## **Productive needs and demand for protection: the complex issue of vulnerable areas**

**Abstract.** This paper aims to analyse, at a European level, the extent to which dispositions contained in Council Directive 91/676/CEE have been applied. The Directive aims to decrease water pollution directly or indirectly caused by nitrates from agricultural sources, and to prevent other similar pollution. The analysis considers the main pressure factors within the Member States, the state of their implementation at a European level and also puts forward suggestions which bear in mind the fact that Europe cannot give up its agricultural sector and that water is a limited resource which is necessary for human survival.

**Keywords:** water resources; nitrate directive; vulnerable areas

### **Introduction**

The complex link between the use of water resources and the agricultural sector is well known. The availability of water is, in fact, at the origin of agricultural activities: where it is abundant agriculture has high yields and is efficient. Among the productive sectors, agriculture is the highest consumer of water: at least a third of the world's agricultural production is obtained thanks to irrigated surfaces. The quantity and the quality of the waters are a crucial issue for the sector: on the one hand it is one of the principle causes of water pollution, on the other it suffers the consequences of pollution generated by other subjects (i.e. domestic and industrial waste).

The concentration of nitrates in the water tables is a direct consequence of the changes observed in agricultural systems. Pollution issues arising from the mid 1980s, have not yet been curbed. More specifically, if the use of nitrogen fertilisers is decreasing also thanks to recent Community regulations (i.e. cross compliance measures), other factors such as those regarding irrigation systems, the changes in mechanisation processes and the different breeding methods, have contributed and continue to add to the pollution of the water tables in more developed agriculture areas.

After a brief overall look at the most relevant pressure factors in Europe, the paper aims to analyse how the commitments laid out in the Directive have been implemented fifteen years on. It concludes by suggesting operational interventions with a view to improving the general situation.

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## Pressure factors

There are more than fifteen million holdings<sup>3</sup> in Europe. The highest number are in Romania (30% of the total), followed by Poland (14.5%), Italy (13.1%), Spain (7.6%), Greece (5.5%), Hungary (5.1%) and Bulgaria (4.4%). However, with the exception of Spain, these States are characterized by small-sized holdings, with an average Utilized Agricultural Area (UAA) which ranges from 3.1 ha in Romania to 6.7 ha in Italy. The States with the biggest holdings are the Czech Republic ( 79.3 ha Average UAA), the United Kingdom (57.4 ha), Denmark (54.7 ha), France (45.3 ha) and Sweden (46.1 ha).

Table 1. Farms (number of holdings, total area, utilized agricultural area)

Country, community	Number of holdings (/000)	Holdings (% on EU27 total)	Total area (Ha/000)	ATA <sup>4</sup> (Ha)	UAA <sup>5</sup> (Ha)	AUAA <sup>6</sup> (/000Ha)
UE27	15,021	100.0	216,433	14.4	172,867	11.5
UE25	9,872	65.7	197,353	20.0	156,033	15.8
UE15	6,239	41.5	157,547	25.3	126,055	20.2
Italy	1,964	13.1	18,233	9.3	13,116	6.7
Poland	2,172	14.5	17,032	7.8	14,426	6.6

Source: processing Eurostat data, 2003

Table 2. Holdings with livestock

Country, community	Number (/000) of holdings with livestock	Holdings with livestock (% on EU27 total)	Number (/000) of holdings with cattle	Number (/000) of holdings with sheep	Number (/000) of holdings with goats	Number (/000) of holding with pigs	Number (/000) of holding with poultry
UE27	9,466	100.0	4,210	1,593	933	5,125	7,172
UE25	5,290	55.9	2,637	716	429	2,197	3,325
UE15	4,171	44.1	2,228	665	368	1,432	2,465
Italy	355	3.8	148	79	31	124	142
Poland	1,452	15.3	935	18	68	761	1,128

Source: processing Eurostat data, 2003

The European farms are concentrated mainly in the plains and in hilly areas (only 11% of the holdings and 12.8% of the UUA are situated in mountain areas)<sup>7</sup>. Holdings in the mountains are more frequent in Austria and in Finland with 57.2% and 57.3% respectively of the total holdings. In the remaining cases, the holdings in mountain areas, are fewer and, on average, are smaller than other holdings. In Europe there are almost 9.5 million holdings (about 63% of the total), concentrated above all in Romania (38% of the UE27 holdings

<sup>3</sup> Eurostat, 2003.

<sup>4</sup> Average Total Area.

<sup>5</sup> Utilised Agricultural Area.

<sup>6</sup> Average Utilised Agricultural Area.

<sup>7</sup> Eurostat, 2003.

with livestock) and in Poland (15% of the European holdings with livestock), follow a long way behind by Bulgaria (6.3%), Hungary (6.0%), Greece (4.3%) and France (4.3%).

At a European level, poultry farming is the most widespread, followed by pigs and cattle breeding. Poultry is also leads in terms of numbers and density per holding, followed by pigs and sheep. Differences among the Member States are significant. The average density of cattle in Cyprus (190 head per holding), Luxemburg (117 head per holding), Netherlands (111 head per holding) and the United Kingdom (94 head per holding) is clearly higher than the UE27 average density (21.2 head per holding). As far as sheep are concerned, the United Kingdom (421 head per holding), Spain (217 head per holding), Ireland (178 head per holding) and Cyprus (147 head per holding) have an average density which is higher than the UE27 figure (67 head per holding). Finally, of specific interest are the figures concerning the pig population whose average density reaches maximum values in Denmark (1,165 per breeding) followed by Ireland (1,543 heads) and Belgium (756 heads), while the European average stands at 29 heads with regard to breeding.

The consumption of nitrogen fertilisers in Europe (EU27) amounts to over eleven million tons<sup>8</sup>, equal to about 66 kg per hectare of the utilised agricultural area. The Netherlands (144 kg/ha) have the biggest share of nitrogen fertilisers per hectare of utilised agriculture land, followed by Belgium (118 kg/ha) and Germany (105 kg/ha) and, at a considerable distance behind, France (86 kg/ha), the Czech Republic (85,6 kg/ha) and Ireland (80,7 kg/ha). They all have values which are above the average European quantities. Below the European average are Romania (19.3 kg/ha), Latvia (24.7 kg/ha), Portugal (59.9 kg/ha), Estonia (35.6 kg/ha), Austria (38.7 kg/ha) and Slovakia (3.4 kg/ha).

Table 3. Quantity of commercial nitrogen (N) consumed in agriculture

Country, community	Commercial nitrogen consumed in agriculture (/000 metric ton)	Commercial nitrogen / UAA (kg)
UE27	11,347	65,7
UE25	10,928	70,1
UE15	9,234	73,3
Italy	826	63,0
Poland	864	59,9

Source: processing Eurostat data, 2001

### Legislative context: the Nitrates Directive

The Council Directive 91/676/CEE (hereafter referred to as the Nitrates Directive) aims to reduce the amount of water pollution directly or indirectly caused by nitrates emissions from agricultural sources and to prevent other pollution of a similar type.

<sup>8</sup> Eurostat, 2001.

The European Union<sup>9</sup> has been addressing the issue of nitrates pollution since the adoption of the fourth Framework Programme. The latter includes specific environmental RDT programmes and emphasises the need for a Council Directive to tackle the problem of water pollution caused by nitrates. Since the end of the eighties, the concentration of nitrates in underground waters has reached record highs due to the growing use of nitrogen fertilisers in the agricultural sector and the intensification of agricultural and livestock farming. This trend is emphasised by other changes such as the reduction of permanent pastures, manure storage methods and the elimination of many marshy areas.

The Nitrates Directive introduces the necessity to identify land which can be classified as a vulnerable zone: territorial areas that discharge nitrogen compounds, directly or indirectly, into waters that are already polluted or that could become so<sup>10</sup>.

The identification of vulnerable zones by the Member States must take into consideration the physical and environmental characteristics of both land and water. Within the two years subsequent to the publication of the Council Directive, the list of areas identified must be submitted to the European Commission and must then be reanalysed on a four yearly basis, and if necessary, checked, completed and modified based on water monitoring carried out over a minimum period of at least twelve months.

The Member States are obliged to establish one or more agricultural codes of good practice, within two years following notification to the Council Directive, which are to be applied to the vulnerable zones (application to the remaining territory is optional)<sup>11</sup>.

Within a period of two years from the initial definition of the vulnerable zones - or one year from designations pursuant to their identification - each Member State must elaborate

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<sup>9</sup> Directive 75/440/EEC, concerning the quality required of surface water intended for the abstraction for drinking water in the Member States; Decision 77/795/EEC, establishing a common procedure for the exchange of information on the quality of surface fresh water in the Community; Directive 79/869/EEC, concerning the methods of measurement and frequency of sampling and analysis of surface water intended for the abstraction of drinking water in the Member States; Directive 80/778/EEC, relating to the quality of water intended for human consumption. These disposals establish the maximum concentration of nitrates in waters, the sampling methods used and the frequency with which said checks are carried out.

<sup>10</sup> The Annex I outlines the criteria for identifying waters affected by pollution and waters which could be affected by pollution. The following fall into this category:

- whether surface freshwaters, in particular those used or intended for the abstraction of drinking water, contain or could contain, if action pursuant to Article 5 is not taken, more than the concentration of nitrates laid down in accordance with Directive 75/440/EEC;
- whether groundwaters contain more than 50 mg/l nitrates or could contain more than 50 mg/l nitrates if action pursuant to Article 5 is not taken;
- whether natural freshwater lakes, other freshwater bodies, estuaries, coastal waters and marine waters are found to be eutrophic or in the near future may become eutrophic if action pursuant to Article 5 is not taken.

<sup>11</sup> Annex II establishes the contents of the codes of good agriculture practice. In particular, measures covering the following should be present:

- periods when the addition of fertilizer to the land is inappropriate;
- the application of fertilizer to steeply sloping ground;
- the application of fertilizer to water-saturated, flooded, frozen or snow-covered ground;
- the conditions for land application of fertilizer near water courses;
- the capacity and construction of storage vessels for livestock manures, including measures to prevent water pollution by run-off and seepage into the groundwater and surface water of liquids containing livestock manures and effluents from stored plant materials such as silage;
- procedures for the land application, including rate and uniformity of spreading, of both chemical fertilizer and livestock manure, that will maintain nutrient losses to water at an acceptable level.

appropriate Action Programmes. Annex III of the Council Directive specifies the measures to be included in the programmes.

The holdings with livestock must agree to observe minimum levels of effluent per hectare, fixed at 170 kg per hectare (210 Kg per hectare in the first two years).

At the end of the first four years from the implementation of the Council Directive and each subsequent year, the Member State, is obliged to present the European Commission with a summary report on the interventions carried out.

### **The state of implementation in Europe**

Article 10 of the Nitrates Directive establishes that the Member States shall submit a report to the Commission on a four yearly basis containing information related to what extent the Directive has been implemented. The Commission has recently published its third report concerning the application of Council Directive 91/676/EEC<sup>12</sup>, based on the information submitted by the UE15 Member States for the period 2000-2003. The report shows a clear improvement in the quality of monitoring and reporting. The monitoring network has, in fact, been extended. A total of approximately 20 thousand groundwater monitoring stations were operational between 2000-2003 compared with 16 thousand between 1996-1999, while surface water monitoring stations increased in the same period from 14 to 22 thousand. The water quality survey revealed that 17% of EU monitoring stations had nitrate concentrations that exceeded 50 mg NO<sub>3</sub>/l by 13; 7% were in the 40 to 50 mg NO<sub>3</sub>/l range; 15% were in the 25-40 mg NO<sub>3</sub>/l range and approximately 61% of the groundwater stations had concentrations below 25 mg NO<sub>3</sub>/l. Comparison with the data of the previous reporting period (1996-1999) revealed that, at EU 15 level, stable and/or decreasing trends prevail.

With reference to surface waters, only 2.5% of EU monitoring stations revealed nitrate concentrations in excess of 50 mg NO<sub>3</sub>/l and 4% recorded values ranging from 40 to 50 mg NO<sub>3</sub>/l. The most problematic situations are in the United Kingdom, France and the Netherlands. The period 1996 – 1999 also revealed a negative trend in the number of surface water stations (55%) while the number of stable stations was at 31%.

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<sup>12</sup>[Report... 2007].

<sup>13</sup> Average values.



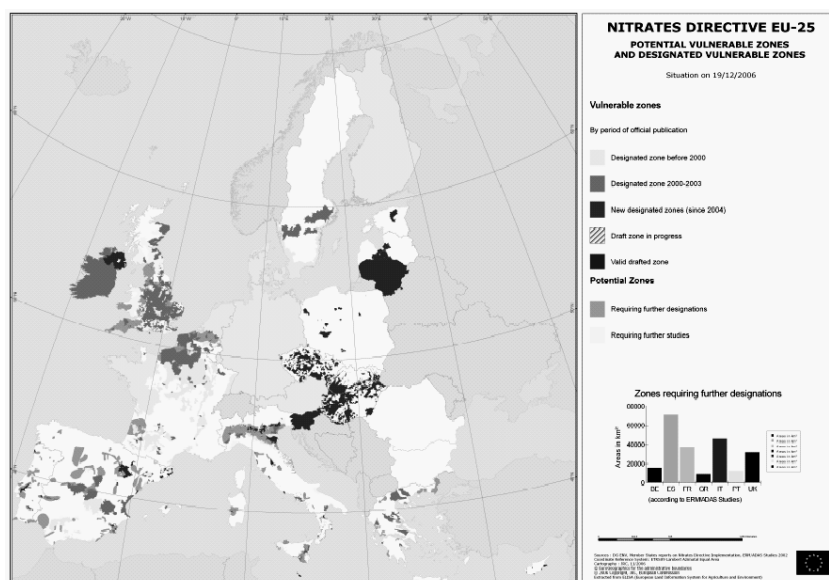


Figure 1. Nitrate Vulnerable Zone designation EU 25 (year 2006) and area requiring designation according to Commission assessment

Source: [Report... 2007].

Significant progress has been made in nitrate vulnerable zone designation. The Member States, in fact, reviewed and, in several cases, added to the quantity of nitrate vulnerable zones: The United Kingdom (from 2.4% to 32,8% of the territory), Spain (from 5% to 11%), Italy (from 2% to 6%), Sweden (from 9% to 15%), Belgium (from 5.8% to 24%).

All Member States have established one or more action programmes on their territory, however, some critical aspects remain. In several cases, for example, Member States failed to impose compliance with the standards for manure nitrogen application (since 20.12.2002, 170 kg N/ha).

With reference to new Member States, the implementation of the Nitrates Directive is still underway. According to the commitments made during the negotiation for accession, new Member States fulfilled their obligation by ensuring transposition, having a functioning water monitoring network in place and the designation of nitrate vulnerable zones. All the new Member States have set up action programmes. The Commission is currently analysing the designation of nitrate vulnerable zones and the action programmes in order to assess their compliance with the Nitrates Directive. Three out of ten new Member States (Malta, Slovenia and Lithuania) decided to apply their action programme to the whole territory. Seven Member States designated a percentage of the territory ranging from 2.5% (Poland) to 48% (Hungary) as nitrate vulnerable zones.

## Concluding remarks

Analysis of water resource requirements is tri-directional: ecological (in short supply and vulnerable), social (needs to be faced with a participatory approach) and economic (resources to be efficiently allocated).

In short, increasingly affected by human activities, water is the most vulnerable factor that immediately shows the signs of degradation caused by the mismanagement of natural resources. In particular, in places where the nitrates have reached unsustainable values, it means that the agricultural exploitation being carried out is not in keeping with the potential of the land. The European Union, however, cannot be deprived of its agriculture or animal breeding activities. It does not yet have economically sustainable methodology which will allow for the removal of nitrates from the water. To make the situation worse, there are other contributing factors: the state of the water infrastructures (by typology of network, maintenance and technology of the systems) are generally poor and there is a lack of planning concerning the regulation of water usage. Based on these premises, what methods should ultimately be adopted in order to qualitatively and quantitatively preserve this resource which is fundamental for human life? The medium term CAP reform has introduced the principle of cross compliance (which is now compulsory) as a condition for benefiting from market support concerning the well being of the environment, the general public, the flora and fauna and animal welfare). The beneficiaries are, in fact, obliged to maintain all surfaces in good condition, bearing in mind both agricultural and environmental aspects (regulation (CE) 1698/2005). Only after many years of good agricultural practices will it be possible to reduce nitrate concentration in the waters. Other major interventions are required such as: the protection and the improvement of the water table (reduction of polluting processes and monitoring of the water table); a reduction of the surface area dedicated to farming and crops which have a strong impact on the environment; the promotion of sustainable practices (organic farming, introduction of intercalary cultures, good agricultural practice, crop rotation, conversion of agricultural land into woodland and forest); efficient methodologies to encourage a reduction in the amount of irrigation water used; a review of Community policies in order to give aid to and favour those crops that require more limited amounts of fertilisers and water. Action must be taken to train and inform key agricultural players of the issues at hand and of the possible solutions which constitute and promote good agricultural practices

It will take many years of constant good practice, before we can hope to see a decrease in nitrate levels and the amount of waste. Cost-efficiency studies regarding other preventative measures should be encouraged in order to identify which are the most efficient. Surely we must not waste any more time. Discussions concerning the nitrates issue have been going on since the mid 1980s. The Council Directive is fifteen years old and its application is still far from satisfactory.

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## **Depreciation constituent of the investment system in the Republic of Belarus<sup>1</sup>**

**Abstract.** The article is devoted to the processes of the depreciation charges and its usage in enterprises, the present day complexity and the necessity of forming a realistic macro level depreciation concept. Some aspects of forming depreciation policy of an enterprise and its influence on the economic and financial activities of an enterprise as well as the primary features of the naturalistic concept and the international experience of the depreciation charges policy are examined in the article.

**Key words:** depreciation, depreciation costs, depreciation policy, depreciation concept

Depreciation (as an objective process of transmission of costs of assets to the costs of products) is considered the most important source of investments in fixed assets of an enterprise. However, it is contrary to fact very often.

It is well known that since January 1, 2003 all the agent of management of the Republic of Belarus according to the government regulation “About ratification of regulation about the procedure of depreciation of fixed and fictitious assets charge” from 11.12.2001. № 8/7522 [Об утверждении... 2001; О внесении ... 2004] turned to the new depreciation policy. Five years later we can ascertain, that the general growth of the sums of the added amortization is observed these years, that essentially exceeded their ratio in the general input to production.

The sum of the added depreciation of the basic means has grown in 2003 in comparison with 2002 on 42.6 % at growth of expenses for manufacture on 32.7 %. Relative density of depreciation in expenses of manufacture as a whole on a national economy has made 7.1 % (in the industry it has made 4.8 %, and in an agriculture – 10.5 %).

In the further result of introduction of new depreciation policy was essential growth of the sums of the added depreciation that has led to growth of its relative density in 2006 up to 7.4 % (in the industry – 5.2 %, and in an agriculture – 12.6 %).

Relative density of depreciation of a fixed capital in relation to their initial cost rises also. If in 2002 it made 49.8 %, in 2006 – 57.1 % (in the industry – 58.9 and 64.4 %, and in an agriculture - 56,6 and 60,96 % accordingly) [Воложинец 2004].

The depreciation fund is losing its positions in terms of one of the most important source of financing of updating of actives being used less than on 60%.

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<sup>1</sup> Editor’s note: this text except for the abstract and the reference list has been left in its original form which, in spite of the reviewer’s remarks, still exceeds the editor’s comprehension. Some basic truths about the depreciation accounting seem to be presented in a obscure manner.

In modern conditions, the depreciation is interpreted too simplistically, more likely, within the limits of the "naturalistic" concept for which the reproduction of the fixed assets in natural form is characteristic, orientation to corresponding physical and functional factors, to deterioration. However, physical and moral deterioration are taken into account when defining the term of effective usage of an object, but it is impossible to measure the sum of physical and moral deterioration. Moreover, the depreciation period of an object can differ from term of technical maintenance and in many cases is defined subjectively by managerial control. It is possible that this concept has some reason but now enterprises have need for guaranteed sources of investments. Importance of depreciation is overestimated.

The depreciation mechanism does not function properly. The given process can be divided into two basic stages: charge of depreciation and accumulation of these charges in the monetary form on accounts of the depreciation fund as the first stage; and use of the saved up means for purchase of new means of work as the second. The infringement of the depreciation mechanism is shown in default even one of two obligatory stages. As practice shows, the means that have been saved up at the first stage, it is not enough for realization of the second. In other words, the charge of depreciation occurs, but actually, there are no means for renovation.

It is not a secret that the depreciation mechanism is influenced by the inflationary processes, which are inherent in transitive economy. Accumulation of means on accounts of a depreciation fund occurs during a number of years and by the moment of purchase of new means of work, the cost of a depreciation fund considerably decreases due to the inflation. Called to solve the given problem the periodic revaluation of the fixed assets and, hence, depreciation charges do not solve the given problem. First, initially, decisions on carrying out of revaluation are accepted not by agents of managing but go down from government in the form of regulations of the Ministry of statistics and analysis of the Republic of Belarus, and they are not synchronized with dynamics of prices increase. Secondly, the process of carrying out of revaluation demands additional expenses from the enterprises. They often have to involve experts for these purposes.

Liberalized national depreciation policy is not capable to show all potential within the limits of the irrelevant "naturalistic" approach. Transition to the qualitatively new concept of depreciation is necessary.

In modern conditions, the appeal of target use of means of a depreciation fund has a dual value. On the one hand, it is conditional value of depreciation as the main source of investments into the fixed assets and as consequence it is stressed the value of renovation as basic function of depreciation. On the other, obviously excludes great sums of depreciation charges from a turn.

Depreciation should be treated not only as a liability source (depreciation fund), but also as a cash flow of which it is possible to serve a turn of the capital. Cash assets should multiply cash assets, return.

In the legislation of many foreign countries there are documents claiming, that depreciation charges should be spent for the primary purposes only during an initial stage (one - three years). Then they can be used for any industrial needs. The purpose defines by administration. This fact stimulates the use of nonlinear methods of charge of the depreciation that allow compensating a significant part of means of work value in an initial stage of their use.

Moreover, having legalized independent movement of depreciation means, it is possible to allow low profitable enterprises with the help of these means to overcome temporal difficulties. In France, for example, in such cases depreciation vacations are used. There is a depreciation delay, which is used by the enterprise that has some complexities. It can subtract from the taxable income the sum of depreciation using them of the current financing and include them in depreciation later.

It is necessary to note, that those enterprises which do not form sufficient assignment on depreciation, artificially increase their profits and create illusion of financial and economic prosperity that threatens with serious losses in the future. And on the contrary, overestimating of amortization increases expenses and reduces the taxable basis.

This implies forming of depreciation policy at every enterprise according to the effective depreciation concept is required. The choice of depreciation policy of an enterprise occurs in a wide range of opportunities for maneuver. Enterprises have different opportunities such as to go through "hard times" for low profitable enterprises, and – "to avoid" the excessive taxation - for highly remunerative.

As depreciation charges join in the cost price of production that directly influence size of profit and, hence, taxable base at calculation of the profit tax. The depreciation policy of the enterprise as a whole and its such tool as carrying out of reassessment of the basic means directly influence size of regenerative cost of the basic means which in turn acts as taxable base at calculation of the tax to the real estate.

However during the grounding the depreciation policy of an enterprise, which is based on the increase of cash inflow due to depreciation charges, there is a possibility of observing deterioration of primary financial and economic activities (when profit and the cost price of production are used to calculate these parameters). Dual influence of amortization is shown. In Russia the same influence, they have resolved using dual system of the accounting. One is given to tax inspectorate, and the other – to the persons interested in the valid financial condition of the enterprise: to shareholders, creditors, investors, etc., i.e. then the accounting carries out the informational function. In the latter case item of depreciation charges is excluded from the structure of the cost price and is treated as cash inflow of means.

Moreover, the majority of the enterprises of the Republic of Belarus do not use nonlinear methods of charge of depreciation. Dominating is a linear modus here. As a result the connection of charged amortization volumes with yield is broken during the life cycle of fixed assets. There are high expenses and complexities with market entry of the new production during the initial stage. Repair bills and operating costs are growing constantly and sales volumes are falling during the final phase of the cycle. But norms of depreciation are equal for each phase.

Brown [1952], Wakeman [1980] have shown that if the tax rate is flat and if taxable income is non-negative in all periods for all available depreciation methods, the accelerated depreciation method is most preferable for tax purposes. This is a consequence of the fact that a more accelerated method typically shifts taxable income to later periods, and when future money is discounted, paying taxes later is preferable to paying them now.

Thus, depreciation should be treated broader than the invention is provided with the Byelorussian traditional concept. Necessity of formation and introduction of depreciation policy of an enterprise is obvious. Depreciation can be very flexible and in many respects depends on what purpose the enterprise is persecuting. Especially, if to treat depreciation as an opportunity to write off business charges on costs, which are connected with purchasing

of a certain capital asset. In other words, it is necessary to work out modern and actual concept of depreciation, allowing perceiving depreciation charges as cash inflow. Means of a depreciation fund should be used effectively; they should reduce negative influence of inflationary processes on it.

However, when forming depreciation policy of an enterprise within the limits of the new "realistic" concept they should not forget that depreciation carries out a number of concrete functions and the main of these functions is renovation. It is impossible to ignore it in order to prevent infringement of the system organization of the processes proceeding at the enterprises of the Republic of Belarus. It is necessary to go further, to use the sums of depreciation charges as a cash flow which should bring additional benefits to an enterprise. If to take into account modern rates of scientific and technical progress, it is necessary to turn from simple reproduction of an asset to qualitative and extended. It is also necessary to study the international experience of depreciation and effective usage of depreciation charges.

Unfortunately we have not found data about the Polish enterprises. Therefore we could not compare a situation in Belarus and Poland. Such comparison would be very interesting.

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## **Fruit and vegetable promotion programs in the European Union**

**Abstract.** Promoting fruit and vegetable consumption is one of the main objectives of food and nutrition policy interventions worldwide. Public institutions, non-governmental organizations, research and health agencies together with market stakeholders undertake integrated initiatives to inform consumers about the health benefits of everyday fruit and vegetable intake. In the European Union several campaigns aimed at increasing produce demand have been launched in the nineties to improve the dietary patterns of the general population or specific consumer groups, such as children. However statistics show that fruit and vegetable intake in most EU states including new members is much below the recommended level. School-aged children, women and employees are currently the main target groups of “5 a day” information and promotion activities aimed at increasing f&v consumption. In order to secure long-term effectiveness of such programs the main determinants of consumer choice in the food market should be monitored. Broad public-private partnerships, including producers and distributors seem to be the key to strengthening the efforts at “pushing” market demand. Some of the campaigns developed and implemented in the European Union countries can be described as “5 a day” best practices. The involvement of fruit and vegetable chain participants, cooperation and evaluation of undertaken interventions are further needed in order for the programs to become more efficient and widespread.

**Key words:** fruit and vegetable market, consumption, promotion, 5 a day

### **Introduction**

According to the World Health Organization up to 2.7 million lives could be saved annually with sufficient fruit and vegetable consumption. In the World Health Report 2002, low fruit and vegetable consumption was described as one of the top ten risk factors for global mortality. The recommended daily amount is 400 g (about 150 kg per year/person), excluding potatoes and other starchy tubers, for the prevention of chronic diseases such as heart disease, cancer and diabetes [World... 2002]. Statistical calculations show that, when taking into account the loss from ‘farm to fork’, the availability of fruits and vegetables at global level is estimated at 115 kg per person/year, amounting to 75% of the amounts required [Fruit... 2003].

In order to ensure integrated and sustainable promotion of the consumption of these products WHO formed a partnership with FAO ‘WHO/FAO Fruit and vegetable Promotion Initiative’. The main goals of this joint action include promoting production and consumption of fruit and vegetables and advancing science on the areas of production, distribution and f&v benefits for health [Fruit... 2003]. In September 2004 experts from the fields of nutrition and horticulture participated in the first Joint WHO/FAO Workshop on Fruit and Vegetables for Health. General principles and examples of possible interventions

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in various consumer groups were discussed. Since 2005 WHO facilitates the implementation of this framework through regional training workshops.

The Global Strategy on Diet, Physical Activity and Health, endorsed by the 57<sup>th</sup> World Health Assembly in May 2004, actively promotes an increase in fruit and vegetable intake for populations. Such changes were also identified as one of EU priorities in the field of health, published in May 2007 in the EU Commission's White Paper on Nutrition. The global 'institutional' willpower and strong scientific evidence creates a positive background for the development of actions aimed at increasing production and consumption in the framework of EU agricultural, research and health policies.

### **Fruit and vegetable market organization in the EU**

The economic weight of the sector of fruit and vegetable products represents an average of about 17% of total agricultural production in the EU-25. Its significance is particularly high in Greece, Spain, Portugal, Italy as well as Belgium, Hungary, Poland and the Netherlands [Analysis... 2004]. With the enlargement to 27 member states production levels surpassed 65 million tons for vegetables and 40 million tons for fruit.

The fruit and vegetable common market organization (CMO) is since 1996 concentrating partly on providing support to producers on the basis of the quantity of produce delivered to the processing industry, on aiding directly the processors and on aiding the producers via producer organizations (PO). The yearly budget for POs is currently around €700 million. Crises management tools in the f&v market include green harvesting/non-harvesting, promotion and communication tools in times of crisis, training, harvest insurance, and financing of the administrative costs of setting up mutual funds [SPEECH... 2007].

In August 2004 the European Commission presented to the Council and the European Parliament its report on the simplification of the common market organization. Among the reform's proposals were:

- abolition of processing aids and export refunds,
- increased flexibility of producer organizations (PO) rules,
- additional support (60 percent Community co-financing rather than of 50 percent) in areas where production marketed via POs is less than 20 percent, and in the new Member States, to encourage the creation of POs,
- extra support for mergers of POs and associations of POs,
- continued extra support to POs' operating in a trans-national or in an inter-branch scheme.

It is very important to underline that according to the reformed CMO, which will enter into force in 2008, POs will be able to include promotion of fruits and vegetables consumption in their operational programs. Community co-financing will be increased to 60 percent if the promotion of f&v is targeted towards school-age children and adolescents. As in previous years, market withdrawals in case of oversupply can be distributed for free to charitable organizations, schools and children's holiday camps. For this purpose a budget of 48 million euro over a six-year period will be provided.

Overall the reformed CMO will improve the competitiveness and market orientation of the f&v sector, reduce income fluctuations resulting from crises, promote consumption and thus contribute to improved public health, and enhance environmental protection.

Ms. Marian Fisher Boel, member of the European Commission responsible for Agriculture and Rural Development, admitted during her speech at a meeting of the Agricultural Committee at the European Parliament in January 2007 that in the case of the f&v market 'we are confronted with a strange kind of market failure'. According to Fisher Boel 'there is plentiful production in the European Union. And there is plentiful need for the product. But many people simply don't buy and eat as much fruit and vegetables as they need – as their waistlines and medical bills bear witness' [SPEECH... 2007].

It seems clear that as the reform of the CMO for fruit and vegetables aims to move support away from market intervention to better marketing actions of producer groups a better understanding of the consumer behavior determinants is a must.

### **Specific aspects of fruit and vegetables consumption**

According to scientific studies fruit and vegetables are major contributors to the intake of vitamin C, folic acid and potassium. About half of the daily dietary fiber intake comes from these products, which are also one of the best sources of antioxidants and may play a significant role in the fight against obesity.

FAO balance sheet data, adequate for international comparisons, show that the consumption of fruit and vegetables varies significantly in different EU-countries. It is lowest in five new Member states: Poland, Slovakia, Lithuania, Latvia and Hungary. In the case of these countries the yearly per capita supply of fruit (fresh and processed) is below 70 kg. In comparison fruit consumption is highest in Slovenia, Denmark, Greece and the Netherlands and exceeds 140 kg. The average consumption of vegetables based on FAO balance-sheet data oscillates between 100 and 120 kg/year in the EU member states. In Poland in the years 1992-2002 the highest vegetable supply level was 137 kg, lowest 98 kg.

Due to methodological issues the recommended level of total f&v consumption (per capita supply) based on balance sheet data is 220 kg. Balance sheet data calculated with the use of national production, processing, export and import indexes imply losses in the food chain. Consumption on household and individual level is about 1/3 lower.

Representative data on fruit and vegetable consumption, based on primary, questionnaire-based research is scarce. However it is essential to investigate and understand the determinants of choice of specific population groups and the factors influencing market behavior changes. Social psychological models suggest that behavior is in general determined by behavioral intention. The conceptual model for factors influencing food choice implies that food consumed by individuals depends on food supply, physiological factors and food preferences, cognitions and attitudes [Krebs-Smith and Kantor 2001]. Studies carried out in the Dutch population showed significant differences between objective and subjective estimation of intake in the case of fruit and vegetables. This indicates that because consumers often misjudge their consumption level and so are not aware that they eat too little fruit and vegetable, so education alone might not be effective.

It must be underlined that fruits and vegetables are the group of food products where consumption inequalities are at the highest level. Low income consumers tend to consume much less fruits and vegetables than higher-income ones [Combris 2007].

Analysis of the monthly Polish household budget data points also to considerable differences between the level of fruit consumption in rural and urban households [Rejman et al. 2004]. In 2002 households of workers acquired 90% of fresh and processed fruit

through purchase. In farmers' households 59% of fruit was obtained from own production (self-supply), and only 41% from the market. The identified inhibitors of consumption increase in the fruit and vegetable market in Poland are: high price margins of retailers (influencing market prices especially in the off-season months) and insufficient information on the nutritional role of fruit and vegetables [Halicka and Matyga 2006].

## **Development of '5 a day' type programs**

The '5 a day' type programs are regional, national or international multi-stakeholder initiatives aimed at increasing the consumption of fruit and vegetables to at least 5 servings per day. One serving (portion) is 80 g, i.e. one middle-sized fruit such as apple, 2 small-sized fruits (plums, kiwi), half a glass of berries, 1 tablespoon of raisins, 1/2 glass of cabbage, spinach, broccoli, cauliflower and 1/3 glass of peas, sweet corn or paprika, 1 medium tomato, 7 cherry tomatoes.

These programs, focused on whole populations or on specific target subgroups, were introduced on a larger scale in the EU in the beginning of the nineties. In the same time the American '5 a day' campaign was launched (1991) by the 'For Better Health' Foundation in cooperation with the National Cancer Institute, American Cancer Society and American Heart Association ([www.5aDay.gov](http://www.5aDay.gov)). Today the US program promotes the message that 'Fruits and veggies – more matters'. It is interesting to note, that the oldest program '5 to 10 a day – are you getting enough?' was implemented in Canada in 1972. Since 1999 it is directed to women and the communication messages relate to low cost and convenience of preparing meals with fruits and vegetables [Stables et al. 2002].

In the European Union one of the best known programs is the Danish '6 om dagen'. It is carried out by a public-private partnership with representatives from government agencies, non-governmental health organizations and the fruit and vegetable industry ([www.6omdagen.dk](http://www.6omdagen.dk)). Its partners are the Danish Veterinary and Food Administration National Board of Health, Danish Fitness and Nutrition Council, Danish Cancer Society, Danish Heart Foundation and Danish Fruit, Vegetable and Potato Board. The program was launched in 1999 as a 5-year project focusing on vegetable availability and accessibility.

It should be noticed that in the case of Denmark interventions related to promoting fruits and vegetables were tested and carried out in several settings: schools, worksite canteens and food-service industry. The worksite canteen was shown to be a promising area for promoting increased consumption of fruits and vegetables. In an intervention model personnel and management were involved in defining the scope of activities and implementation [Thorsen et al. 2005].

Currently the Danish generic action focuses mainly on school children. In 2007 a nationwide pilot of a school fruit and vegetable program called 'Frugtkvarter' was implemented. The pilot will test a new model that combines a two-month introduction period with class or school based subscription, which in a small scale pilot version showed promising results. The Ministry for Foods, Fisheries and Agriculture appropriated 8 million DKK (approx. 1 M €) for a free introduction period. This means that almost 15 % of all school aged children will receive fruit for two months starting in September 2007.

In 2006 WHO granted a best practice award to the 'Food Dudes' program implemented in Ireland. The program was developed by the Bangor Food and Activity Research Unit (BFARU) based at the University of Wales and is designed for use in primary schools. Its aim is to increase the quantity and range of fruit and vegetables that children (aged 4-12) consume as part of their diet. It incorporates three key behavior principles: repeated tasting, peer-modelling and rewards. The rewards (stickers, notebooks, pencils) were to ensure that the children begin to taste the foods.

The Food Dude Healthy Eating Program has been developed on the basis of established psychological principles and is an exciting advance in helping children to improve their diets. The program comprises video adventures featuring hero figures, called the 'Food Dudes', who like fruit and vegetables and provide effective social models for the children to imitate. The pilot scheme was so successful that the program will be introduced in 2007 to all 3300 Irish primary school with a budget of 28 million euro ([www.fooddudes.co.uk](http://www.fooddudes.co.uk)). The initiative is a EU co-financed agricultural promotion project aimed at boosting healthy eating. It is also one of the commitments made by the Commission's Platform for Action on Diet, Physical Activity and Health.

According to collected data '5 a day' type programs were also introduced in other EU countries, such as Germany, France, Hungary, Norway, Netherlands, Poland. The gained experience in Europe and other regions shows that the elements needed to develop a successful '5 a day' program include:

- governmental nutrition policy based on accepted scientific research,
- strong public/private partnerships, including a credible governmental or public entity and a committed network of food industry interests and resources,
- a simple, specific message,
- a clearly defined target audience,
- a plan for program evaluation [Stables et al. 2002].

Some of the EU initiatives seem to have strengthened in the last years, after the creation of the EU Platform for Action on Diet, Physical Activity and Health in 2005. The Platform, coordinated by the EC Health and Consumer Protection Directorate encourages and monitors such public-private partnership approaches. One of the commitments to the EU Platform for Action on Diet, Physical Activity and Health is the German '5 am Tag' program. It is aimed at the general population, but particularly children, youth and young mothers and was initiated in June 2000 by the German Cancer Society.

In Hungary the '3 x naponta az egeszseget!' program was launched by the Hungarian Fruit and Vegetable Board, a non-profit organization with more than 6,500 members. Its goal was to increase public awareness about the role of fruits and vegetables in health, encourage people to eat more produce [Stables et al. 2002].

The Norwegian 'Fruits and Veggies against cancer campaign' and Dutch 'Everyday 2+2' and 'Schoolgruiten' campaigns are also aimed at the general population, however include increased availability in chosen settings, especially schools. The Polish '5 razy dziennie owoce i warzywa' is conducted since 1996 by the 'Health Promotion' Foundation. According to data collected by the Cancer Center and Institute of Oncology in Warsaw only 5% of Poles ate the recommended 5 or more portions of fruit and vegetables daily [Janik and Zatoński 2005].

## **Perspectives of fruit and vegetable promotion programs**

The specificities of fruit and vegetables consumption, including seasonality, subjective overestimation of intake, income elasticity of demand and territorial diversity are important elements of the promotion program preparation process. However the key aspect remains long-term financing. An opportunity for fund raising lies in one of the CAP mechanisms, introduced in 2000 (Council Regulation EC Nr. 2826/2000 of 19 December 2000 on information and promotion actions for agricultural products). In the framework of the Common Agricultural Policy activities aimed at promoting food products can be financially supported by the EU. These include measures that consist of public relations, promotional or publicity actions, especially in terms of quality, hygiene, food safety, nutrition, labelling, animal welfare or environment-friendliness of their production. The EU finances 50% of the cost of these measures, the remainder being met by the professional/inter-branch organizations which proposed them and/or by the Member States concerned. Since 2001 the European Commission has approved such 23 programs, of which only a few function on the fruit and vegetable market. The biggest f&v market action in which EC's contribution was almost 5 million euro is a three-year program, prepared by Interfel (France). The budget goes to communication activities such as advertising ('10 par jour' campaign), actions at distribution points, f&v consumer services and internet sites. In Poland an information program promoting frozen food (including fruits and vegetables) prepared by the Frozen Food Association (Stowarzyszenie mrożonej żywności) received support of 195 thousand euro.

In the reformed fruit and vegetable common market organization there will be an additional €6 million under the general promotion regulation for the promotion of f&v targeted at children in educational establishments. There will be also an €8 million budget for free distribution of f&v to schools, hospitals and charitable bodies, which will be 100 percent financed by the Community up to a limit of 5 percent of the quantity marketed by a PO. The Council asked the Commission to carry out a feasibility study into the creation of a school fruit and vegetable scheme. This work will begin as soon as possible [SPEECH IP... 2007].

Further research is needed to evaluate the f&v market situation and the development of 'health in all policies' EU priority as well as the effectiveness of the interventions aimed at increasing consumption in specific consumer groups.

An important role in this field may be played by IFAVA (International Fruit and Vegetable Alliance) which enables its members to share their experiences, whether initiating or strengthening fruit and vegetable promotion programs within their own countries. Members have access to the latest scientific findings and current information on communication, strategy and policy of increasing fruit and vegetable consumption ensure the practical implementation of this science.

One of IFAVA's roles is to supply leadership to organizations that are involved in the non-commercial marketing and promotion of vegetables and fruit with a '5 a day' type programs operating at a national or multi national level, including but not limited to Trade Corporations, Health Units, governmental and quasi-governmental organizations, non-governmental organizations and registered not-for-profit organizations. Its role is also to serve as liaison with the World Health Organization (WHO) and with other international offices of organizations such as World Heart Federation and International Union against Cancer. IFAVA also pursues a range of financial management models, including:

- self-funding: through a yearly membership support and activities,
- grant writing,

- fundraising modeling: pursuing approaches to sponsorship and other non-dues sources of funding to build long-term program sustainability,
- economic impact modeling: sharing information that demonstrates return on investment of ‘5 a day’ type campaigns, for both the public and private sectors (www.ifava.org).

## Conclusions

European Union institutions have acknowledged the health promoting role of fruit and vegetables and the importance of adequate consumption in reducing chronic disease risk. To persuade consumers to ‘choose a diet with plenty of vegetables and fruits’ is now a challenge not only faced by public health nutritionists, but also economists and policymakers.

Implementing public-private activities aimed at nutrition education and promotion of fruit and vegetables is seen as a method to successfully increase demand, especially among children. Such interventions should improve the present food patterns and consequently the health indicators of the population. However traditional health education strategies have often failed to create sustainable changes in diet behaviour. Studies in the EU countries (Denmark, France, the United Kingdom, Italy) have shown that increasing availability at the workplace and in schools can lead to immediate, positive changes in fruit and vegetable intake. In order to achieve significant changes in dietary behaviour, it has been recognized that provision of information is not enough [Eertmans et al. 2001]. In some cases health promoting initiatives need systematic economic intervention to lower the cost of fresh produce through subsidies, reduced taxes or increased budgets for promotion. They may also include strategies to improve availability and access to fruits and vegetables through broader distribution channels, improved marketing and fiscal incentives for retailers, especially in low income areas [Drewnowski 2007].

Although the European Commission has in previous years granted financial support for the dissemination of nutritional knowledge [Fruit... 2002], a more systematic and coordinated approach is needed. Bringing together all relevant players active at the European level and strengthening health-oriented interventions in the food market is the goal of the EU Platform for Action, created in 2005. It seems that in many countries the Platform has stimulated the creation of cooperative attitudes between producers and other partners, such as non-governmental organizations, regional governments, public institutions (schools, universities) and the media. The effectiveness of commitments undertaken in the EU Platform’s framework and impact of promotion activities on consumer behavior will have to be further monitored.

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## **Financing of distance learning in rural areas by the European Social Fund**

**Abstract.** The paper is an attempt at evaluating the degree of accuracy of realization of the project: distance learning centres in rural areas financed from the European Social Fund in the frame of the priority II: Development of knowledge-based society, action 2.1.: Broadening the access to education – promotion of lifelong learning; scheme a: decreasing educational inequalities between urban and rural areas. The aims of the project in question include:

1. Creation and equipment with computers and internet connection, of at least 250 distance learning centres in rural areas (in order to enable the final beneficiaries to use the available distance learning programs)
2. Employment in the centres of qualified staff whose task would be to help using the centre's resources.
3. Creation by the draughtsman, of a countrywide network of distance learning centres using the existing IT infrastructure with units running distance learning.
4. Enabling the final beneficiaries to complement or increase the level of education in the form of distance learning especially at the post-gymnasium level.

**Key words:** structural funds, lifelong learning, rural areas

### **Introduction**

Membership in the EU obliges Poland to obey the EU laws. In the area of Common Agricultural Policy the following laws are in force:

- 1) since 1/01/05 the directives: Environment protection embracing:
  - wild birds
  - groundwater
  - soil affected by agricultural nitrates
  - environmental pods and wild fauna and flora.
- 2) since 01/01/2006 the directives: Public health, animal health and plant health concerning:
  - the market circulation of plant protection measures
  - prohibition of application of some compounds that have hormonal effects,
  - food security
  - fighting and control of animals' diseases.
- 3) Since 01/01/2007 the directives: Animal well-being embracing the protection of:
  - calves
  - pigs
  - farm animals.

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The non-compliance with the EU directives may result in the reduction or exclusion from EU funds.<sup>2</sup> In order to counteract this, a special farmer-oriented system of lifelong learning<sup>3</sup> could be established (courses, trainings). This system should also embrace the other habitants of rural areas, for whom the basic income does not and will not come from the work in a farm.

The relatively lower level of education in rural areas in comparison to cities causes inequalities between village and cities. Because the low education level constitutes a barrier to economic growth and employment promotion, steps have been taken aiming at facilitating the habitants of rural areas the access to education. For the education offer access in rural areas is significantly decreased due to geographical (the distance to establishments pursuing lifelong learning) and economic barriers. According to the Ministry of National Education (MEN) this aim could be reached by rendering accessible to the inhabitants of rural areas the opportunities of lifelong learning. The equipment of rural households with computers with internet access largely diverges from analogous indicators for urban areas and therefore, according to MEN, an effective mode of accelerating the creation of a lifelong learning system in rural areas could become distance learning centres.

<sup>4</sup> The undertaking is to be realised in the frames of the competition published in December 2006, and concerning the accomplishment of the project: Distance learning in rural areas (CKNO). The competition was published basing on the provisions of the Complement to the Operational Program Human Resources Development<sup>5</sup> in the frames of priority II: Development of knowledge-based society, action 2.1.: Broadening the access to education – promotion of lifelong learning; scheme a: decreasing educational inequalities between urban and rural areas. For the realisation of the project in the frames of the competition, 49 356 320,00 PLN was directed, including the financial support from:

- 1) the European Union<sup>7</sup> European Social Fund (EFS): 37 012 304,37 PLN (74,99%),
- 2) the state budget: 12 344 015,63 PLN (25,01%).

In-house contribution was not required.

This paper makes an attempt at evaluating the degree of accuracy of realization of the 4 aims the project was set to accomplish:

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<sup>2</sup> These are the consequences according to cross-compliance whose legal base constitutes the Council Regulation No. 1698/2005.

<sup>3</sup> In the light of paragraph 3, point 17 of the Education System Act of September 7th, 1991 (Dz. U. 2004, No. 256, item 2572, with amendments), lifelong learning is understood as education in schools for adults, as well as gaining and complementing general knowledge, capabilities and professional qualifications in extramural forms by individuals who have obeyed the obligation of education.

<sup>4</sup> A distance learning centre, as understood by MEN, would be a centre with educational and cultural functions, equipped with computers connected to the internet, providing the beneficiaries the possibility for lifelong learning online aiming at complementing or increasing the level of education.

<sup>5</sup> The ruling of the Minister of Regional Development, as of January 30th, 2006, amending the ruling concerning the adoption of the Complement to the Sectoral Operational Program Human Resources Development 2004-2006, Dz. U. No. 29, item 206 with amendments.

## **Aim 1 – Enabling the final beneficiaries the completion of or increase in the level of education in the form of distance learning especially at the post-secondary school level**

Research on the diagnosis of educational needs of rural areas inhabitants should go far ahead of the CKNO idea realization agenda. This means that this stage of the project should be excluded from the competition and constitute an independent commission. The research should focus households with various sources of main income. It would be recommended that the respondents answer the following questions:

- 1) What form of education would they prefer to participate in (school or extramural)?
- 2) What are the substantive areas of knowledge and qualifications they would like to improve?
- 3) How much time would they be ready to devote for distance learning?
- 4) What inconveniences connected with distance learning could cause the lack of interest in this form of education?

Only in the light of the obtained research results it would be possible to consciously take the decision concerning the need to finance centres of distance learning from the EFS. Otherwise, the idea of CKNO can be thwarted by the impossibility of adjusting the supply (online offer) to the demand (final beneficiary profile). Unfortunately, the experiences drawn from the first period of programming and the trainings organised, indicate quite often that there is a problem of the scarcity of people interested in this form of education. The initial results of the research conducted by the author – in the form of interviewing the directors of Lifelong Learning Centres (CKU), and Vocational Training Centres (CKP) of the Lublin Region<sup>6</sup> imply that the inhabitants of rural areas are not especially interested in participating neither in the free of charge forms of school lifelong learning, nor even more so, the paid extramural forms.

## **Aim 2 – Creation and equipment with computers<sup>7</sup> and internet connections of at least 250 distance learning centres in rural areas**

Distance learning centres should be proportionally located covering rural areas communes in all country, where no such cultural-educational centres exist. To the extent it is possible, the centres should be placed equally in all the country, according to the documented regional needs. It is worth noting here that in the frames of priority II of the Sectoral Operational Program Human Resources Development, action 2.2. – scheme a: Increasing the usage of computer and communication technologies in the process of education, counselling, and vocational advice, and modernization of educational equipment, computer labs had already been purchased earlier for the CKU and CKP in all the country. The average number of these labs per county is presented in table 1.

One can note that in six regions there is less than a half of computer lab per district at a CKU or a CKP. It does not mean however that CKNO should most of all be located in

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<sup>6</sup> Research funded in the frames of the research grant of the Ministry of Science and Higher Education No. N11200532/0208.

<sup>7</sup> The computer equipment together with the necessary software should be characterised with parameters that enable using the available distance learning programs, tools and methods of distance learning.

these six regions in order to equalise the numbers. For the equalizing numbers thesis is not always proved right. It should rather be checked to what extent is the currently working equipment at CKU and CKP used for distance learning. For if the research would show that the equipment is not fully used in the establishments whose statutory aim is the organization of lifelong learning, then the aggravated expenses of computer equipment would end up as a misfit allocation of the EU funds.

Table 1. CKU and CKP that got the EFS funding for computer labs in every region

Region	Number of districts in the region	Number of CKU, that were provided for computer labs	Number of CKP that were provided for computer labs	Average number of computer labs (in CKU and CKP) per district
Lower Silesia	29	3	5	0,3
Pomerania-Kujawy	23	10	11	0,9
Lublin Voivodship	24	6	7	0,5
Lubusz Land	14	4	4	0,6
Lodz Region	24	10	7	0,7
Smaller Poland	22	5	4	0,4
Mazovia	42	18	19	0,9
Opole Region	69	7	4	0,2
Subcarpathian Region	25	12	16	1.12
Podlaskie Voivodeship	17	5	7	0,7
Pomerania	64	10	7	0,3
Silesia	65	15	12	0,4
The Holy Cross Land	14	1	4	0,4
Warmia & Mazury	21	5	7	0,6
Greater Poland	35	9	12	0,6
Westpomeranian Region	21	5	8	0,6

Source: Author's research, basing on the data obtained in 2006 at the Information Systems Department of the Ministry of Science and Higher Education and the Ministry of Internal Affairs and Administration.

The competition documentation implies that the creation of distance learning centres should be pursued using the existing and available infrastructure of communes (e.g. buildings of school to be closed or other public utility buildings). In case of schools to be close it is important to remember that they are closed with the end of a school year (i.e. in August), whereas the localization and equipment of CKNO should be completed in March 2008 at the latest (i.e. before the school year ends). In case of other public utility buildings one should pay attention at least to two issues:

- the regulation of the legal claim to the building expected to be the seat of a CKNO (especially important while applying for EU funds for technical infrastructure),
- establishing the division of expenses of the premises' exploitation by a few subjects in the same building (especially important while drafting the system of CKNO's financing).

### **Aim 3 – Employment of qualified staff whose task will be to help using the centre's resources**

These persons should be able to prove qualified in the knowledge of sources of available distance learning programs and should be fluent in computer skills (e.g. MS Office, e-mail, internet).

Finding qualified staff should not be problematic because at least for three years various forms of professional development in this field have been organized. Concurrently even to the project in question, free of charge graduate studies are financed by the EFS, in the frames of action 2.2. of the Sectoral Operational Program Human Resources Development: 'Vocational education of staff to run the centres of lifelong distance learning'. Participation is restricted to persons who:

- 1) Have a university degree.
- 2) Have pedagogical qualifications.
- 3) Have computer skills in managing operational systems (Windows or Linux), and office software.
- 4) Are able to use e-mail and web browser.
- 5) Are employed at:
  - public schools and establishments of lifelong learning (e.g. CKU, CKP),
  - school inspectorates,
  - public schools and educational establishments (e.g. of teachers' professional development).

The course embraces 360 hours in stationary mode (lectures, demonstrations, seminars, and workshops in computer labs), and in extramural mode (online). The program of studies includes: introduction to distance learning (30 hours), psychology of distance education (50hours), computers and networks (50 hours), multimedia facilities creation (60), information technology education tools (60), web design of didactic websites (30), organization of distance learning process (20 hours), didactic measure, and evaluation in distance learning (30 hours), copyright law and distance learning (10 hours), graduate seminar (30 hours). There are six universities engaged in organizing the postgraduate studies:

- 1) Warsaw University (candidates from the regions: Mazovia, Podlaskie, and Lodz);
- 2) Jagiellonian University (candidates from the regions: Smaller Poland, Holy Cross Land, Silesia);
- 3) Marie Curie-Sklodowska University (candidates from the regions: Lublin, Subcarpathian);
- 4) Nicolaus Copernicus University (candidates from the regions: Warmia & Mazury, Pomerania-Kujawy, and Pomerania);
- 5) Adam Mickiewicz University (candidates from the regions: Greater Poland, Lubusz, and West Pomerania);
- 6) University of Wroclaw (candidates from the regions: Lower Silesia, and Opole).

The staff should be employed in the centres on March 31<sup>st</sup> at the latest (CKNO's project deadline), so before the planned date of the postgraduate students promotion. In spite of the fact that the cadre has been educated for some years now, the task of hiring it in the centres may turn out problematic. Firstly, the issue of employing this kind of specialists is not regulated by the law on distance learning. It is not clear whether the employment

should be based on labour law or for example, the Education System Act. Each of these legal bases determines different minimum remuneration. The minimum remuneration in turn determines the aggravated expenses of the project connected to staff. Secondly, it is not determined which documents proving professional qualification will be recognized (postgraduate studies certificate equally treated as trainings?). Thirdly, the program of studies does not include a track shaping the capabilities of online education promotion depending on the final beneficiary's profile (e.g. a farmer). It was quite optimistic on the side of the program's authors to assume that a teacher in CKNO will be comfortably waiting for students highly motivated to make use of services offered in this kind of establishments.

#### **Aim 4 – Creation of a countrywide network of distance learning centres using the existing IT infrastructure in cooperation with units already operating distance learning schemes**

Accepting the optimistic approach that excludes competition in the field of distance learning services in Poland one could assume that until March 2008 the aim cited above will be reached. It is nevertheless worth underlining that currently the market of services providing distance learning is dominated by big units such as public and private universities. It is then difficult to expect that – without appropriate legal regulations – these units will risk their up to date achievements in this field for the sake of an inchoate form of constant contact and cooperation with the created distance learning centres.

#### **Conclusions**

In the conclusions I would like to once more underline the doubts concerning the functioning of distance learning centres in the context of the financial responsibility for their maintenance. If CKNO should be financed from the districts' income, then amendments to the public finances bill, and the local self-government units' income bill, should be considered in order to guarantee increased funds inflow for these units. If, in turn, the possibility to use the CKNO offer would be conditioned to some extent by the participation of the students themselves, one should maybe concurrently consider the introduction of individual education accounts concept. Invariably however, the most important issue remains the problem of inciting the needs to use the services offered by CKNO among the beneficiaries in general. And maybe – given the current state of knowledge about the role of education in people's lives – what is necessary is to introduce some legal measures that would force individuals to change their attitudes into the direction desired.

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## **Comparing development sustainability in Belarus, Poland and Ukraine with special respect to rural areas**

**Abstract.** A comparison of environmental sustainability in Belarus, Poland and Ukraine using the Environmental Sustainability Index calculated by the Centre for Environmental Law and Policy of Yale University shows a significant advantage of Belarus over Poland and Ukraine while a slight advantage of Poland over Ukraine. Belarus with ESI score of 52.8 points ranked 47, Ukraine with 44.7 points ranked 108 while Poland with 45.0 points ranked 102 among the 146 classified countries of the world. The state of natural environment in Belarus and Ukraine seems to be much better, while Poland has a distinctive advantage with respect to the institutional issues in environmental management. All three countries have roughly similar impact on global environment, of a predominantly negative nature, with Belarus qualifying somewhat better in this respect.

**Key words:** Environmental Sustainability Index, Belarus, Poland, Ukraine

### **Introduction**

The Centre for Environmental Law and Policy of the renowned Yale University in the USA has recently published a new edition of its calculations of the Environmental Sustainability Index (ESI) which cover 146 countries in the world [2005 ESI... 2006]. The index is supposed to represent an aggregate measure of the sustainability of the country's economic and social development with respect to the environmental quality, stability and perspectives for the future.

At the base level values of 76 variables have been estimated for each country. They are then aggregated into 21 indicators which in turn are summarized into 5 components and finally into one synthetic index.

The comparison between our neighbouring states had in view checking to what extent the ESI indicators confirm the widespread concept of the retardation rent in the environmental impact of economy. A detailed comparison would take much more space than the allowed dimensions, so only the generalized features are discussed.

### **Comparison**

Table 1 presents a comparison between Belarus, Poland and Ukraine with respect to the 76 basic variables, table 2 with respect to the 21 indicators and table 3 with respect to the 5 components.

Values in table 2 are averages of the constituent variables after their normalisation. Variables have been normalised into the form of  $z$  score which means that the mean has

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been deducted from the original values and the residual has been divided by the standard deviation. In this way 0 means the mean value and, for example, -2 means two standard deviations below the mean while + 0.5 means half standard deviation above the mean. The values in table 3 are percentiles and 100% means the highest possible score in the aggregate index.

## Discussion

Out of innumerable concepts of sustainable development its meaning as a social progress combined with economic growth not entailing a rise in entropy of the natural environment can be accepted. In order to measure and compare sustainability of various regions and countries a number of indices have been constructed. Besides ESI the widely used ISEW (*Index of Sustainable Economic Welfare*), EF (*Ecological Footprint*) have been recently calculated for Poland [Wasiak & Lewociuk 2005; Śleszyński 2002]. ISEW has also been separately calculated for an eastern Polish, mostly agricultural, voivodeship (province) of Podlasie. The indices seem to point out to a rather unsustainable development of Poland which is illustrated by the generally falling ISEW numbers in the last decades both for the whole of Poland and the mentioned voivodeship. It is still more visible in the case of a predominantly rural Podlasie voivodeship. Falling ISEW numbers are being observed also in other European countries [Śleszyński 2002].

ISEW, PLN/capita/year

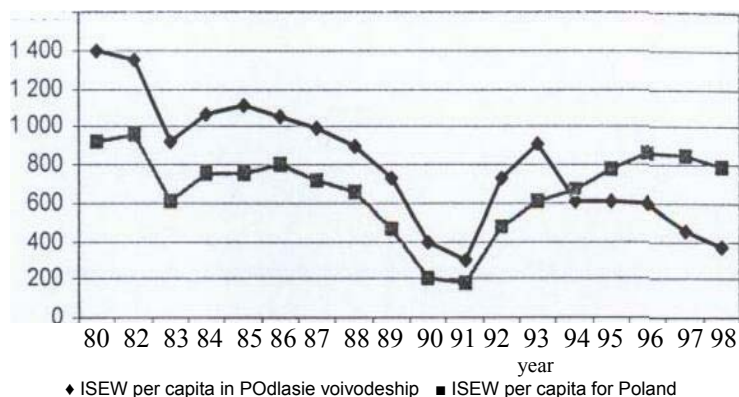


Fig.1 ISEW for Podlasie voivodeship and Poland after Wasiak & Lewociuk [2005].

An upsetting regressive tendency can be observed in Poland with regard to the social welfare and fairness. While in 1996 only 4.3% of the total population got the income below the subsistence level, in 2004 income below this level received 12% of the population [Warunki... 2005]. It applies first of all to the village inhabitants, of whom 18.5% had in 2004 to live upon an income below this level. Income below the social minimum was received in 1996 by 47.9% of the country population and in 2004 this percentage reached 57% [Instytut... 2005]. So the zero percentage for the undernourished population in Poland (variable UND\_NO in table 1) is surely false. There have been estimates that 40% of children in the rural areas come to school hungry.



Table 1. Values of variables included by the Centre of Environmental Law and Policy in the indicator estimations for Belarus, Poland and Ukraine

code	Variable description	Units	Belarus	Poland	Ukraine	146 countries	
						mean	median
NO2	Urban population weighted NO <sub>2</sub> concentration in the air	µg/m <sup>3</sup>	42.6	8.2	0.04	39.22	35.56
SO <sub>2</sub>	Urban population weighted SO <sub>2</sub> concentration in the air	µg/m <sup>3</sup>	0.01	20.56	0.06	19.35	.32
TSP	Urban population weighted Total Suspended Solids concentration in the air	µg/m <sup>3</sup>	18.40	40.85	0.15	80.76	42.92
INDOOR	Indoor air pollution from solid fuel use, adjusted for ventilation (percentage of households using solid fuels)	%	2.0	7.0	11.0	45.17	40.0
ECORISK	Percentage of country's territory in threatened ecoregions	%	100	100	100	43.62	36.09
PRTBRD	Threatened bird species as percentage of known breeding bird species in the country	%	1.36	1.76	3.04	4.6	2.62
PRTMAM	Threatened mammal species as percentage of known mammal species in the country	%	9.46	16.67	14.81	14.91	11.19
PRTAMPH	Threatened amphibian species as percentage of known amphibian species in the country	%	0.0	0.0	0.0	13.08	4.22
NBI	National biodiversity index	score 0 to 1	0.37	0.37	0.42	0.55	0.55
ANTH10	Percentage of area (including inland waters) having very low (less than 9 points in 58-point Human Impact Index scale) anthropogenic impact	%	0.01	0.03	0.36	20.56	3.51
ANTH40	Percentage of total land area (including inland waters) having very high (more than 36 points in 58-point Human Impact Index scale) anthropogenic impact	%	4.43	9.22	6.64	8.38	1.53
WQ_DO	Dissolved oxygen concentration in surface waters	µg/l	6.81	10.12	6.78	8.67	9.17
WQ_EC	Electrical conductivity of surface waters	µSiemens/cm	547.8	969.12	1190.9	573.1	457.1
WQ_PH	Phosphorus concentration in surface waters	µg/l	0.12	0.24	0.12	0.16	0.12
WQ_SS	Suspended solids in surface waters	µg/l	not av.	3.33	not av.	3.74	3.92
WATAVL	Freshwater availability per capita (surface runoff and groundwater recharge)	thous. m <sup>3</sup> /person/year	4.81	1.75	1.93	26.99	7.51
GRDAVL	Internal groundwater availability per capita	thousand m <sup>3</sup> /person	1.84	0.33	0.42	4.24	0.82
COALKM	Coal energy consumption per populated land area (at 5 or more persons per square km)	TJ/km <sup>2</sup>	0.00	6.89	2.97	2.43	0.0
NOXKM	Anthropogenic NO <sub>x</sub> emissions per populated land area (at 5 or more persons per km <sup>2</sup> )	tons/km <sup>2</sup>	0.20	2.69	0.36	3.32	0.56
SO2KM	Anthropogenic SO <sub>2</sub> emissions per populated land area (at 5 or more persons per km <sup>2</sup> )	tons/km <sup>2</sup>	0.95	4.85	2.06	56.18	0.64

table 1. continued

code	Variable description	Units	Belarus	Poland	Ukraine	146 countries	
						mean	median
VOCKM	Anthropogenic VOC (volatile organic compounds) emissions per populated land area (at 5 or more persons per km <sup>2</sup> )	tons/km <sup>2</sup>	1.24	1.92	2.04	5.0	1.65
CARSKM	Vehicles in use per populated area (at 5 or more persons per km <sup>2</sup> , excluding motorcycles)	number /km <sup>2</sup>	7.08	40.35	9.03	86.22	8.49
FOREST	Annual average forest cover change rate from 1990 to 2000	%	3.20	0.20	0.30	-0.11	0.0
ACEXC	Acidification over critical exceedance from anthropogenic sulphur deposition	% of surface at risk	4.91	53.45	0.0	4.6	0.0
GR2050	Percentage change in projected population 2004 – 2050	% increase to 2050	-13.0	-15.0	-19.0	58.58	42
TFR	Total Fertility Rate	births/woman	1.23	1.25	1.17	3.19	2.65
EFPC	Ecological footprint per capita (required biologically productive land)	hectares per capita	3.17	3.40	3.53	2.55	1.73
RECYCLE	Waste recycle rates (excluding internal recycling within enterprise)	%	0.0	17.20	not av.	20.12	8,0
HAZWST	Generation of hazardous waste	tons/year	1387	10293	25445	2245	325
BODWAT	Industrial organic water pollutant (BOD) emissions per available freshwater	tons BOD/km <sup>3</sup> /day	1.18	5.76	5.03	-2.51	0.62
FERTHA	Fertilizer consumption per hectare of agricultural land	kg/hectare	127.2	111.42	14.56	152.7	56.9
PESTHA	Pesticide consumption per hectare of agricultural land	kg/hectare	0.74	0.78	1.90	3.12	1.10
WATSTR	Percentage of country area under water stress (consumption over 40% of available water)	% of area	0.0	0.98	16.88	25.18	5.13
OVRFSH	Sea productivity overfishing	score 1 to 7	not appl.	6.0	5.0	3.89	4.0
FORCERT	Percentage of total forest area that is certified for sustainable management	% of forest area	1.13	68.45	2.12	4.92	0.0
WEFSUB	World Economic Forum Survey on Subsidies (the higher score, the more agreed the subsidies to firms are widely practiced)	score from 1 to 7	0.0	4.07	3.36	4.18	4.15
IRRSAL	Salinized area due to irrigation as percentage of total agricultural land	% of area	0.0	0.0	not av.	3.54	0
AGSUB	Agricultural subsidies level (0.0 means data missing)	scale from 1 to 8	0.0	2	0.0	0.67	0
DISINT	Death rate from intestinal infectious diseases per 100000 population and year	deaths/ year	.71	0.12	0.80	9.86	1.2
DISRES	Child death rate from respiratory diseases per 100000 population aged 0 – 14	deaths/ year	5.30	0.01	7.86	11.54	0.58

table 1. continued

code	Variable description	Units	Belarus	Poland	Ukraine	146 countries	
						mean	median
U5MORT	Children under five mortality rate per 1000 live births	deaths/ 1000 births	20.0	7.50	20.0	62.25	29.5
UND_NO	Percentage of undernourished in total population	%	3.0	0.0	4.0	16.93	11.0
WATSUP	Percentage of population with access to improved drinking water source	%	100.0	102.2	98.0	81.42	86.0
DISCAS	Average number of deaths per million inhabitants from floods, tropical cyclones and droughts	deaths/ million people/ year	0.01	0.08	0.06	39.11	0.24
DISEXP	Environmental Hazard Exposure Index	scale from 0 to 4	0.01	0.18	0.05	0.59	0.51
GASPR	Ratio of gasoline price to world average	ratio	0.82	1.36	0.77	1	0.95
GRAFT	Corruption measure (high scores correspond to effective control of corruption)	standardized (z) score	-0.78	0.39	-0.96	0.01	-0.25
GOVEFF	Government effectiveness (aggregate index created by World Bank; high scores correspond to high level of effectiveness)	standardized (z) score	-1.03	0.61	-0.743	0.0	-0.2
PRAREA	Percentage of total country area under protected status	% of country area	6.40	23.50	3.30	10.91	7.1
WEFGOV	World Economic Forum survey on environmental governance	aggregate score	31.55	38.51	32.52	37.72	35.76
LAW	Rule of law (aggregate index created by World Bank)	standardized (z) score	-1.12	0.65	-0.79	0.0	-0.27
AGENDA 21	Local Agenda 21 initiatives per million people	initiatives/ million people	not avail.	1.81	0.18	6.37	0.58
CIVLIB	Civil and political liberties (aggregate index; low scores correspond to high level of liberties)	scale from 0 to 7	6.0	1.50	4.0	3.35	3.0
CSDMIS	Percentage of variables missing from the CGSDI Rio to Joburg Dashboard (in table of 60 indicators describing country progress in 10 years between two world summits)	% of missing information variables	32.61	15.22	23.91	28.68	26.09
IUCN	IUCN (World Conservation Union) member organizations per million population	number/ million people	0.0	0.23	0.06	1.63	0.18
KNWLDG	Knowledge creation in environmental science, technology and policy (aggregate score; low scores correspond to above average performance)	scale from 0 to 78	47.0	47.33	48.33	39.5	42.67
POLITY	Democracy measure (in scale invented by university of Maryland, USA)	scale from -10 to +10	-1.12	9.80	7.70	2.79	5.2

table 1. continued

code	Variable description	Units	Belarus	Poland	Ukraine	146 countries	
						mean	median
ENEF	Energy efficiency (energy consumption per million dollars GDP adjusted for dollar purchasing power parity)	Terajoules/ million \$ GDP (PPP)	19.93	7.77	26.19	8.17	5.91
RENPC	Hydropower and renewable energy production as a percentage of total energy consumption	% share	0.02	0.90	1.58	12.84	3.63
DJSGI	Dow Jones Sustainability Group Index (ratio of market capitalisation of firms included in the index to capitalisation of firms eligible)	ratio	not avail.	not av.	not av.	0.28	0.18
ECOVAL	Average Innovest Eco Value rating of firms headquartered in a country (measure of environmental performance at firm level, versus the neutral score of 0 in the global peer group of firms)	score weighted by capital- isation of firms	not avail.	-0.34	not av.	0.18	0.0
ISO14	Number of ISO14001 certified companies per billion US dollars GDP (adjusted for dollar local purchasing power parity)	number/ billion \$ GDP (PPP)	0.04	1.06	0.02	0.85	0.03
WBPR1	World Economic Forum survey on private sector environmental innovation	aggregate score	9.84	10.28	8.82	10.78	10.61
RESCARE	Participation in the Responsible Care Program of the Chemical Manufacturer's Association	score from 0 to 4	0.0	4.0	0.0	0.77	0.0
INNOV	Innovation index (capacity measured by aggregate index including investment in R&D and number of new US patents)	score from 0 to 7	2.47	3.20	2.79	2.71	2.33
DAI	Digital Access Index (aggregate index measuring access to internet and schooling)	score from 0 to 1	0.49	0.59	0.43	0.42	0.43
PERCR	Female primary education completion rate (percentage of women completing primary education)	%	100	98.0	100	91.43	100.0
ENROL	Gross tertiary enrollment rate (percentage of pupils enrolled at tertiary level of schooling)	%	55.95	55.54	43.30	25.44	22.22
RESEARCH	Number of researchers in per million inhabitants	number/ million	1004	1473.0	2117.6	1629	1258
EIONUM	Number of memberships in environmental inter-governmental organizations (in selected 100 organizations)	number	4	11	7	7.1	6
FUNDING	Contribution to international and bilateral funding of environmental projects and development aid (both donors and recipients, higher score means bigger participation)	score from 0 to 100	15.38	23.72	4.49	50.96	50.96
PARTICIP	Participation in international environmental agreements (in selected 7, adjusted for activity and compliance)	score from 0 to 1	0.54	0.82	0.63	0.52	0.57
CO2GDP	Carbon emissions per million US dollars GDP (constant 1995 prices)	tons/ million \$ GDP	850.8	578.54	2147.4	364.0	187.8

table 1. continued

code	Variable description	Units	Belarus	Poland	Ukraine	146 countries	
						mean	median
CO2PC	Carbon emissions per capita per year	tons per capita/year	5.90	8.22	6.23	5.14	2.59
SO2PC	SO <sub>2</sub> exports (transboundary emissions)	Gg SO <sub>2</sub> /year	150.7	1564.0	1029.0	305.5	85.24
POLEXP	Import of polluting goods and raw materials as percentage of total import of goods and services	%	23.10	33.32	20.19	23.85	23.15

Source: [2005 ESI... 2006], modified.

Table 2. Indicators of sustainability for Belarus Poland and Ukraine calculated by the Centre of Environmental Law and Policy

no	name	Indicator constituent variables	Belarus		Poland		Ukraine	
			rank	value	rank	value	rank	value
1	Air quality	NO <sub>2</sub> , SO <sub>2</sub> , TSP, INDOOR	4	1.46	40	0.4	2	1.87
2	Biodiversity	ECORISK, PRTBRD, PRTMAM, PRTAMPH, NBI	106	-0.15	126	-0.36	119	-0.32
3	Land	ANTH10, ANTH40	106	-0.41	123	-0.78	117	-0.58
4	Water quality	WQ_DO, WQ_EC, WQ_PH, WQ_SS	76	-0.03	78	-0.06	118	-0.53
5	Water quantity	WATAVL, GRDAVL	64	-0.14	119	-0.81	113	-0.73
6	Reducing air pollution	COALKM, NOXKM, SO2KM, VOCKM, CARSKM	70	0.21	130	-1.05	27	0.38
7	Reducing ecosystem stress	FOREST, ACEXC	7	1.12	140	-1.43	7	1.12
8	Reducing population pressure	GR2050, TFR	15	1.09	13	1.10	7	1.15
9	Reducing waste and consumption pressure	EFPC, RECYCLE, HAZWST	128	-0.49	115	-0.25	135	-0.62
10	Reducing water stress	BODWAT, FERTHA, PESTHA, WATSTR	69	0.09	108	-0.41	98	-0.33
11	Natural resources management	OVRFISH, FORCERT, WEFSUB, IRRSAL, AGSUB	29	0.38	28	0.39	36	0.33
12	Environmental health	DISINT, DISRES, U5MORT	49	0.56	16	0.92	55	0.49
13	Basic human sustenance	UND_NO, WATSUP	7	0.91	1	1.0	37	0.82
14	Reducing environment related natural disaster vulnerability	DISCAS, DISEXP	8	0.75	34	0.53	20	0.69
15	Environmental governance	GASPR, GRAFT, GOVEFF, PRAREA, WEFGOV, LAW, AGENDA21, CIVLIB, CSDMIS, IUCN, KNWLDG, POLITY	124	-0.72	29	0.67	91	-0.34
16	Eco-efficiency	ENEFF, RENPC	137	-1.22	104	-0.33	143	-1.62
17	Private sector responsiveness	DJSGI, ECOVAL, ISO14, WEPRI, RESCARE	89	-0.54	35	0.37	127	-0.80
18	Science and technology	INNOV, DAI, PECR, ENROL, RESEARCH	35	0.51	27	0.78	32	0.57

table 2. continued

no	name	Indicator constituent variables	Belarus		Poland		Ukraine	
			rank	value	rank	value	rank	value
19	Participation in international collaborative efforts	EIONUM, FUNDING, PARTICIP	139	-1.05	71	-0.01	131	-0.83
20	Greenhouse gas emissions	CO2GDP, CO2PC	132	-1.05	128	-0.94	143	-1.49
21	Reducing transboundary environmental pressures	SO2EXP, POLEXP	67	0.21	143	-2.25	110	-0.48

Source: [2005 ESI... 2006], modified.

Table 3. Components of the Environmental Sustainability Index for Belarus, Poland and Ukraine calculated by the Centre of Environmental Law and Policy

Component	Numbers of constituent detailed indicators	Belarus		Poland		Ukraine	
		rank	value	rank	value	rank	value
Environmental systems	1 ÷ 5	44	55.8	111	37.5	74	47.7
Reducing environmental stresses (anthropogenic)	6 ÷ 11	7	65.6	125	39.2	62	53.6
Reducing human vulnerability (to environmental threats)	2 ÷ 14	18	77.0	8	79.3	18	77.0
Social and institutional capacity	15 ÷ 18	119	31.2	33	64.6	126	29.2
Global stewardship (environmental)	19 ÷ 21	125	26.4	143	14.3	139	17.5

Source: [2005 ESI... 2006], modified.

A comparison between Belarus, Poland and Ukraine based on ESI calculation indicates a roughly equal but slightly better position of Poland than Ukraine and a decisively better position of Belarus than the other two countries with respect to the environmental sustainability. In the global ESI ranking compiled for 2005 Belarus with 52.8 points ranked 47, Ukraine with 44.7 points ranked 108 while Poland with 45.0 points ranked 102 among the 146 classified countries of the world. Theoretically the range spreads between 0 and 100 points. The extreme results were 75.1 points for Finland and 29.2 points for North Korea.

Poland has the 21st, penultimate, place among the 22 classified EU member states while Belarus the 6th and Ukraine the 12th among the 15 newly independent states which emerged from the former Soviet Union.

Out of 5 components constituting the aggregate ESI index Belarus approximately equals Poland and Ukraine in what is called Reducing Human Vulnerability (77.0 versus 79.3 and 77 points, table 3) but Poland has a significant advantage over Belarus and Ukraine, which are about equal, in what is called Social and Institutional Capacity (64.6, 31.2 and 29.2 points respectively), while Ukraine has a slight and Belarus a significant advantage over Poland with respect to what is called Global Stewardship (17.5, 26.4 and 14.3 points) and there are distinctive differences in favour of Belarus and then Ukraine versus Poland in the quality of Environmental Systems (55.8, 47.7 and 37.5 points) as well as in Reducing Environmental Stresses (65.6 and 53.6 versus 39.2 points). These results can be summarized as a rather high and equalized in all countries human safety with regard to environmental dangers, moderate, but more efficient institutional activity in the field of environmental protection in Poland, much smaller anthropogenic pressure on natural environment in Belarus, then Ukraine with Poland far behind and much cleaner environment in the first two countries, with Belarus leading in this respect. Also the service provided by the Byelorussian environment to the global environment is higher than the Ukrainian and the Polish counterparts, although all countries do not contribute much in comparison to the other countries in the world. The last two countries have about the same impact on the global environment, of a predominantly negative nature.

A popular view has it that the state of the natural environment deteriorates with the population density and the intensity of the economic activity in the country. The last prevails up to a certain turning point where the level of economic development sort of enforces pro-environmental prophylactic and protection activities which reverse the negative impact of population density and economic development on the state of nature.

In year 2001, close to the ESI 2005 investigations period, Belarus had 48, Poland 122 and Ukraine 81 inhabitants per square kilometer and they had respectively 8365, 10309 and 4155 GDP per capita counted in USD adjusted for their purchasing power [Rocznik... 2003]. The correlation with the component Environmental systems (table 3) with population density is in the case of the three countries easily visible, although not so much with regard to the economic development measured by GDP per capita. The population factor seems to have stronger impact on the environment than the economic development. When the aggregate ESI index is considered, the proportions between countries seem to indicate that Poland has already passed over the turning point and the protection policy measures taken (component social and institutional capacity in table 3) have hopefully reversed the deteriorating trend in the state of environment, while the other two countries have not reached it yet. However the existence of the retardation rent seems to be confirmed. The falling ISEW represented in figure 1 are most probably due to the growing

social income differentiation and not to the environmental deterioration.

The ESI as an aggregate indicator compiled by using the method of averaging an arbitrarily selected set of variables can be reckoned as a subjective measure of sustainability. Some concepts in the selection and the relative weight of various phenomena could be probably strongly questioned. A rather long list of probable computing mistakes could be set up after a careful screening of the results<sup>2</sup>. However it encompasses a wide range of aspects of the basic problem of sustainability in the present economic and social development. ESI should also not be disregarded, since it is endorsed by a renowned institution, it is widely popular and has a worldwide circulation. The American and consequently the world opinion is strongly influenced by its estimates and to a great extent it is through this prism that the particular countries are perceived. It applies specifically to the viewpoint of important global decision makers, including the World Bank.

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<sup>2</sup> Some of them are: the improbable relations between values of the HAZWST variable, the very high mean value of the SO2KM variable, much higher than any of the values specific for the countries and accompanied by a low median, over 100% water availability in Poland (WATSUP variable), improbable values of the KNOWLDG variable for which the USA have a poorer score than e.g. Equador, negative mean value of the BODWAT variable etc.



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## **Problems of Meat Products Trading Between Poland and Belarus**

**Abstract.** In the article the state of foreign trade in meat products between Belarus and Poland is analyzed. Our countries for long years have been partners in this trade, first of all in pork products. However since March 2007 Belarus has ceased import purchases of Polish meat. In the article problems which have arisen recently are studied. Also the analysis conducted in this article discovers the reasons of the problems and ways of their solution are offered.

**Key words:** meat, production, meat products, stockbreeding, export, import, trading, Belarus, Poland, Russia

### **Introduction**

Polish entering into the European community in 2004 enabled management of free trade in its territory. The markets of CIS (Coomonwealth of Independent States) countries, first of all Belarussian and the Russian markets, are the most prospective with regard to the realization of trade in surpluses of food stuffs in the countries of Community. Rules of trade of EU are established by the common agricultural policy. Polish farmers have more opportunities for meat exports to the Byelorussian and Russian markets thanks to the low transport costs, long experience and getting 123 euro of export payments for one ton of meat.

Till March 2007 Poland has been actively selling meat products to Belarus, but now export deliveries have completely stopped. Why such a sharp change of this situation has been caused?

### **Methods of research**

Authors, on the basis of statistical data, analyzed results of activity of organizations in producing meat products in Belarus, and the export and import opportunities. Results of foreign

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trade with Poland and Russia were investigated. The completed research has allowed to reveal problems of the trade in meat products and the planned ways of rectifying the given situation .

## Results of research

The agriculture of Belarus is traditionally specialized in animal production, thus production of meat and meat products is its major component.

In 1990 domestic production of meat and meat products in Belarus amounted to 1.2 million tons and import only 15 000 tons. During the same period the domestic consumption in the republic amounted to 773 000 tons and export of production 348 000 tones. In the next years production of meat began to decrease sharply and the minimum of it was in 1996. It was 623 000 tons which was 52.8 % of the 1990 level. Then there was a small increase and nowadays (in 2005) production of meat and meat products reached 630 000 tons or 53.3 % of the 1990 level. This has happened because of the reduction in the livestock numbers (Table 1). Thus production of meat per head was reduced to 64 kg/year.

In Poland, where the basic investment in production of meat are being done in the sector of pig-breeding, there was an insignificant reduction of livestock of pigs. However production of meat per head has on the contrary increased about to 77 kg in 1990 and up to 85 kg in 2004.

Table 1. Parameters of meat sector in Poland and Belarus

Country	Year						
	1990	1995	2000	2001	2002	2003	2004
Production of meat per head, kg							
Belarus	116	64	60	63	62	61	64
Poland	77	71	75	75	81	89	85
Pig stock, million heads							
Belarus	5.1	3.9	3.4	3.4	3.3	3.3	3.4
Poland	19.5	20.4	17.1	17.1	18.7	18.6	18.1

Source: [Belarus... 2005, pp. 192-193]

Also a negative situation is observed in the foreign trade in meat products in Belarus. As already has been noted above in 1990 a positive balance in the trade of meat products reached 333 000 tons. Thus almost a third part of meat produced in the republic was exported. Later on exports of meat began to fall sharply, and imports began to increase (Table 2 and 3).

Now Belarus witnesses an annual deficit close to 100 000 tons of meat. Belarus basically purchases abroad poultry meat and pork. Thus of 85 % of pork until recently has been purchased in Poland. From the CIS countries imports Belarus basically the imports meat products.

Volumes of export of meat and meat products in 2004 in comparison with 2000 grew by 67.8 % and amounted to 71.4 thousand tons. All production was exported to the CIS countries, of which 95.5 % to Russia (Table 3).

Table 2. Import of the basic kinds of meat and meat products in Belarus, thousand tons

Products	All imports			From the far abroad countries						From the CIS countries		
				Total			Poland					
	2002	2003	2004	2002	2003	2004	2002	2003	2004	2002	2003	2004
Frozen beef	2.0	1.1	2.2	1.8	0.9	2.1	1.8	0.8	1.9	0.2	0.2	0.1
Pork	7.5	33.8	35.8	7.2	33.6	35.7	4.5	32.2	30.3	0.3	0.2	0.1
Poultry meet	16.2	20.4	15.5	15.9	20.0	15.0	3.8	6.4	2.6	0.3	0.4	0.5
Meet products	2.8	7.3	8.2	0.2	0.1	0.1	0.1	0.1	0.1	2.6	7.2	8.1

Source: [Selskoe... 2006]

Table 3. Export of the basic kinds of meat and meat products from Belarus, thousand tons

Products	All exports			CIS countries		
	2002	2003	2004	2002	2003	2004
Frozen beef	23.8	32.1	43.5	23.8	32.1	43.5
Pork	16.9	13.6	14.7	16.9	13.6	14.7
Poultry meet	7.6	15.7	13.2	7.6	15.7	13.2

Source: [Selskoe... 2006]

Such geography of export is connected with the necessity of paying in many cases for the republic's imports in the last years by barter with the cattle breeding products. First of all it has been done in the trade with Russia for the imported energy carriers in the form of gas and petroleum. That has created preconditions for increase in export potential.

Since autumn 2005 Russia has imposed embargo on imports of Polish meat because of the infringement of veterinary requirements. From then the trade in meat products between Poland and Russia has stopped.

In the end of 2006 and the beginning of 2007 commercial disputes concerning deliveries of agricultural production (first of all sugar and meat) have inflamed between Russia and Belarus. Russia has forbidden import of Belarussian meat, and accused Belarus that it was purchasing Polish meat and under the cover of own production reselling it to Russia. The main condition of resumption of deliveries is a refusal of importing raw meat material from third countries (first of all Poland) and admission of inspection of Belarussian meat factories by the Russian experts.

Since March 17<sup>th</sup>, 2007 a prohibition of importation of meat raw material has been in force in Belarus. Thus the interdiction extends not only on the Polish raw material, but also on meat from other countries, including Russia and Ukraine. Corresponding letters have been directed by Ministry of Agriculture, Food Production and Veterinary Service to the boundary customs

posts according to the protocol signed by the government. Meanwhile corresponding official decision of the government, fixed in the form of a decree, has not been enacted yet.

The greatest burden of this interdiction has been put on the meat factories and foreign enterprises engaged in processing of imported meat raw material. Majority of them are residents of the free economic areas, have a number of tax concessions and deliver large part of production to export.

Such meet-processing enterprises can buy raw material in the home market. The cost of offered Belarussian meat raw material is 20-30% higher than imported meat from Russia, Ukraine or from Europe. In this connection the processed products of these enterprises become noncompetitive in price in the Russian and Ukrainian markets where about 95 % of the volume of export was traditionally delivered.

Situation in these enterprises has developed critically. Preservation of interdiction on importation of raw material will lead to a loss of foreign markets, so there will be a decrease in production volumes and in numbers of employment in the enterprises and an increase of social tension in a number of meet-processing enterprises which have appeared in such position.

Besides, a reorientation of deliveries from foreign enterprises to the home market will lead to an increased competition with local meat processing factories and a loss for them, as residents of the Free Economic Areas, of the tax concessions. This will be negatively apprehended by foreign investors who have expected stable work conditions in Belarus.

So in connection with the developed situation the foreign enterprise "Inko-Food" (a resident of the Free Economic area 'Brest'), because of a sharp decrease in the processed volume of up to 10 % less than the traditional volume of processing, has been forced to send for an indefinite leave without support nearly 650 person.

Also there was an uncertain situation under which de iure the prohibition of importation of meat is absent, and de facto it exists for a uncertain term. In this sense the Brest regional executive committee has made a decision of appealing for an import license for poultry meat from Ukraine and for the subsequent delivery of products there, but a corresponding consent from veterinary services is lacking.

At the same time a negative situation has developed in the basic large meat processing factories of Ministry of Agriculture and Food Production. While residents of the Free Economic Area have been faced with a shortage of raw material, other meat factories have to work 'on warehouse'.

So till recently in the 'Grodno Meat Factory Inc.' the structure of deliveries of production measured by the total sum of sales has been as follows:

- home market of Belarus 84.1 % of all production,
- markets of neighboring foreign countries 15.5 %;
- markets of far abroad countries 0.4 %.

Outside of Belarus meat and fats are sold in Russia and in the far abroad countries skins and intestines of cattle are sold. In particular the factory delivers to Poland intestines and skins of cattle and horn-hoof raw material. Raw slaughter products are sold in the Baltic countries. Skins are exported to Italy. After introduction of prohibition of exports the enterprise has practically ceased export deliveries to Russia.

Meat processing factories cannot refuse purchase of domestic raw material. Belarussian meat factories have associated with raw material supply zones and agricultural enterprises from which they should purchase cattle in time periods determined by the technology of animal production, instead by the demand in Russian market.

Russia in March 2007 conducted the inspections. As a result of these inspections only 3 meat processing factories received the right to deliver meat to Russia. Later on June 5th 2007 another 13 subjects including 3 meat processing factories located in the Free Economic Area and the joint venture 'Santa Bremor' have received the licence. At the same time about 20 large meat processing factories cannot deliver production to Russia and are forced to work only for the home market.

It is necessary to notice that the own production of meat per person is in Russia more than 3 times lower than the medical dietary norm. Basic source of meat intake are the import deliveries. It is not realistic to expect an increase of production in the short run, so Russia can not do without deliveries of imported meat and will be forced to search for suppliers in the third countries.

## Conclusions

Administrative restrictions in mutual trade always prevent economic development and entail other negative effects. So Poland has lost the Russian seller's market of meat products. Belarus lives through hard times in the meat processing enterprises. Russia is losing image of a reliable trading partner and experiences a political tension in relations with EU.

The forthcoming introduction of Russia into WTO demands removal of a unilateral embargo on imports of meat products. Accordingly there will be preconditions for resumption of mutual trade. But till this moment it is necessary to settle the key issues in the conflicts between Belarus, Russia and Poland. If we do not do that there will be no stability in the meat market.

Big defect of the Belarussian meat market is its narrow export orientation for Russia. It is necessary for Belarussian meat factories to search for new seller's markets, first of all in the neighboring countries.

The second major step is the cost reduction of own meat raw material whose supplier are basically the agricultural enterprises and an increase in volumes of their production.

The third direction is a modernization of production technology in the meat processing factories and widening of assortment of production to compete in the internal and foreign markets both in price and in quality.

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## **Impact of agricultural development on economic and financial situation of cooperative banks in Poland**

**Abstract.** The paper examines the impact of development of agricultural sector on performance of the cooperative banks in Poland in years 1997-2004. The levels of the agricultural development and the economic/financial situation of the banks were assessed by using country-level and regional-level aggregate indicators based on the factor analysis. The research results show that the type of region (i.e. voivodeship and macro-region) has a statistically significant impact both on the aggregate indicator of agricultural development and the aggregate indicator of banks' performance. As for the relationship between the agricultural development level and the economic/financial situation of banks, statistically significant correlations were found only for four out of sixteen voivodeships.

**Key words:** cooperative banks, agriculture, regional development, economic and financial situation, aggregate indicator

### **Introduction**

In recent times, much attention has been paid to the significant role that co-operative banks can play in the development of rural areas. Internationally, cooperative banks are seen as essential to meeting the agricultural and rural credit needs, allowing for the provisioning of finance at relatively low interest rate, and the financing of start-up activities or employment creating activities such as the development of the agricultural sector and rural areas [Chopra 1998, Alexopoulos 2006].

While most of the relevant literature has tends to concentrate upon the role of the cooperative banks, as local financial intermediaries, in economic development, this paper attempts to focus on role of agricultural sector development in influencing financial and economic performance of those banks in case of Poland.

Determinants of economic and financial situation of the cooperative banks in Poland can be divided into internal and external factors. In this paper, the regional development of agriculture is assumed to be significant external factor influencing the economic and financial results of the banks operating in selected regions of Poland over the period of 1997-2004.

### **Research aims, data and methodology**

The purpose of this paper was to determine:

- regional development of agriculture by applying an aggregate index;

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- economic and financial situation of the cooperative banks by applying an aggregate indicator;
- impact of regional development of agriculture on the economic and financial performance of cooperative banks in Poland.

Research is based on individual bank data from 1997 to 2004 collected from 949 cooperative banks all over the country. These data include key annual financial statements of the banks used to assess their economic and financial situation. Additionally, macroeconomic data drawn from the Central Statistical Office of Poland was used to assess the level of agricultural development.

Table 1 contains selected macroeconomic variables explaining differences in the agricultural economic performance of the regions whereas Table 5 is related to variables used to construct an aggregate indicator of economic and financial situation of the sampled banks.

In order to distinguish features exerting the greatest impact on development of agricultural sector and on the economic/financial results of cooperative banks, a factor analysis was presented [Jajuga 1993, Dobosz 2001]. For dropping the least important factors from the analysis, the Kaiser criterion and ‘Scree plot’ were used. Only factors which gained an eigenvalue in excess of 1 were retained [Aczel 2000].

The estimators of principal components, the estimators of aggregate indicators of agricultural development and of economic/financial performance of cooperative banks were calculated according to the following mathematical formulas:

$$\mathbf{U}_k = \mathbf{a}_{1k}\mathbf{x}_1 + \mathbf{a}_{2k}\mathbf{x}_2 + \mathbf{a}_{3k}\mathbf{x}_3 + \dots + \mathbf{a}_{nk}\mathbf{x}_n \quad (1)$$

where:

$\mathbf{U}_k$  – estimate for  $k$ -principal component,  $k = 1, 2, \dots, t$ ,

$\mathbf{a}_{ik}$  – estimated weights of  $i$ -contributions for  $k$ -principal component,

$\mathbf{x}_i$  – value of  $i$ -contributions,  $i = 1, 2, \dots, n$ .

$$\mathbf{W}_s = \mathbf{b}_1\mathbf{U}_1 + \mathbf{b}_2\mathbf{U}_2 + \mathbf{b}_3\mathbf{U}_3 + \dots + \mathbf{b}_t\mathbf{U}_t \quad (2)$$

where:

$\mathbf{W}_s$  – aggregate indicator of agricultural development or aggregate indicator of economic-financial situation of cooperative banks,

$\mathbf{b}_k$  – estimated weights of  $k$ -principal component,  $k = 1, 2, \dots, t$ ,

$\mathbf{U}_k$  – value of  $k$ - principal component,  $k = 1, 2, \dots, t$ .

Furthermore, one-factor ANOVA (analysis of variance) procedure was applied to uncover an impact of voivodeship and macro-region on the level of agricultural development and on the economic-financial results of cooperative banks. Least significant difference (LSD) test was used for determining differences between means for groups of each factor [Stanisz 2000, Borkowski et. al 2004]. The strength and direction of a linear relationship between variables describing the economic/financial performance of cooperative banks and the development of agriculture was measured by applying Pearson correlation coefficient. The t-Student test was used to establish if the correlation coefficients were significantly different from zero, and, hence that there was an evidence of an association between variables [Stanisz 2000]. Moreover, regression analysis was used for the investigation of the relationships between the variables of interest (i.e. describing the economic/financial situation of cooperative banks and the regional development of agriculture). The regression model was selected according to the goodness-of fit statistic



(R-squared). A simple linear regression model was chosen as it gave a higher adjusted R-square value. The model helped to identify relationships between dependent or explained variable ('economic/financial situation of cooperative banks') and independent or explanatory variable ('regional development of agriculture'). Significance of individual regression coefficients was tested with the t-Student test [Rao 1982, Dobosz 2001].

## Results and discussion

### Regional development of agriculture in Poland

The most important factors influencing the development of agriculture are given in Table 1. Records show that factors 1, 2 and 3 had the strongest impact on the agricultural development level; altogether the three explained 89% of the variability. For the first factor, average farm area (UAA, ha) and employment in agriculture exhibited the strongest impact on agricultural development. In the case of the second factor and the third factor the same was true for GVA in agriculture per person employed and agricultural production per 1 hectare UAA.

Table 1. Factors determining the regional differences in development of agriculture in Poland, 1997-2004

Variables	Aggregate factors, 89.54% of the variability			
	Factor 1	Factor 2	Factor 3	R <sup>2</sup>
Share in the variability (%)	50.89	20.45	18.20	
1. Gross Value Added in agriculture per employee ['000 PLN]	0.1521	0.9825	0.1072	0.7905
2. Farm area [UAA, ha]	0.8687	0.1230	0.1459	1.0000
3. Employment in agriculture [%]	0.8681	0.1139	0.1548	0.7911
4. Agricultural production per 1 ha UAA ['000 PLN]	0.1998	0.1100	0.9736	1.0000

Notes: R<sup>2</sup> – the square of coefficient of multi-way correlation between variable X<sub>i</sub> and main factors U<sub>1</sub>-U<sub>3</sub>; X<sub>i</sub> – value of *i*-primary variable, *i* = 1,2,..4; U<sub>k</sub> – value of *k*-main factor, *k* = 1, 2, 3.

Source: own research

Development of agriculture was considered according to such criteria as voivodeship and macro-region of the cooperative bank's activity. One-factor ANOVA showed that all selected factors had a statistically significant impact on agricultural development level (Table 2).

Table 2. Impact of selected factors on the level of aggregate indicator of agricultural development in Poland, 1997-2004

Specification	Impact of selected factors	
	Voivodeship	Macro-region
Aggregate indicator	109.51 <sup>x</sup>	125.95 <sup>x</sup>

Note: value F - Fisher-Snedecor test; x – statistically significant factor's impact on explained variable at  $p \leq 0,05$ .

Source: own research

Table 3 presents agricultural development indicators calculated by author for 16 voivodeships of Poland. In the ranking, the top three voivodeships were: Warminko-Mazurskie (1.69), Zachodniopomorskie (1.38) and Wielkopolskie (1.03) and the bottom

three were respectively Śląskie (-1.31), Małopolskie (-1.27), Świętokrzyskie (-1.16).

Table 3. The level of aggregate indicator of agricultural development of Polish voivodeships, 1997-2004

Voivodeship	Aggregate indicator of development of agriculture			
	n	$\bar{X}$	$s\bar{x}$	
Dolnośląskie	56	0.53	e	0.09
Kujawsko-Pomorskie	37	0.98	fgh	0.12
Lubelskie	87	-0.09	d	0.08
Lubuskie	39	1.01	gh	0.11
Łódzkie	72	-0.52	c	0.08
Mazowieckie	160	-0.22	d	0.06
Małopolskie	64	-1.27	ab	0.09
Opolskie	26	0.82	efg	0.14
Podlaskie	56	0.84	fg	0.09
Podkarpackie	44	-1.02	b	0.11
Pomorskie	32	0.67	ef	0.12
Śląskie	85	-1.31	a	0.08
Świętokrzyskie	53	-1.16	ab	0.10
Wielkopolskie	66	1.03	gh	0.09
Warmińsko-mazurskie	55	1.69	i	0.09
Zachodniopomorskie	17	1.38	hi	0.17
Poland	949	4.29E-08		–

Notes: n – number of investigated banks,  $\bar{X}$ - average level of aggregate indicator. An occurrence at least one identical letter in two compared groups indicates no significant difference between them at  $p \leq 0.05$ ;  $s\bar{x}$  – standard error of the average.

Source: own research

Table 4 displays the differences in agricultural development between macro-regions. The most progressive were: north-eastern (1.20), central-western (1.08) and north-western (0.79) macro-regions, the least respectively south-eastern (-1.16) and southern (-0.88).

### Economic and financial performance of cooperative banks in Poland

Indicator variables were selected on the basis of theory and factor analysis. In this analysis seven main factors were chosen and these are set out in Table 5. They, altogether, explained 79.4% of the total variance in economic and financial situation of cooperative banks, and particularly:

- the first explained 20.4% of the total variance and was the most strongly correlated with such financial indicators as: interest margin, the administrative costs as a proportion of total assets, the personnel costs as a proportion of total assets, the net interest income as a proportion of total assets;
- the second, explaining 15.8% of the total variance in bank's performance was the most strongly correlated with assets profitability ratio ROA and work profitability ratio ROW (net financial results per worker);

- the third explained almost 11% of the total variability on its own and was most strongly associated with the net loans' share in total assets and net loans' share in liabilities;
- the fourth explaining 10% of the total variance was most correlated with: gross profit margin, net profit margin and costs level;
- the fifth explaining 8.3% of the total variance was most strongly correlated with the capital adequacy ratio (solvency ratio), the fixed assets and capital investments to total assets ratio as well as the working capital to total assets ratio;

Table 4. The level of aggregate indicator of development of agriculture in macro-regions of Poland, 1997-2004

Macro-region	Aggregate indicator on development of agriculture		
	n	$\bar{X}$	$s_{\bar{X}}$
Southern	129	-0.88 b	0.07
South-eastern	151	-1.16 a	0.06
South-western	8	0.16 de	0.28
Northern	32	0.75 ef	0.14
North-eastern	105	1.20 g	0.08
North-western	98	0.79 f	0.08
Central	96	-0.44 c	0.08
Central-eastern	76	0.00 d	0.09
Central-western	118	1.08 g	0.07
Capital	136	-0.19 d	0.07
Poland	949	4.29E-08	

Notes: as in Table 3.  
Source: own research.

Table 5. Factors determining differences in the economic and financial performance of the cooperative banks in Poland, 1997-2004

Economic and financial indicators [%]	Aggregate factors - 79.43% of variability							R <sup>2</sup>
	U <sub>1</sub> Factor 1	U <sub>2</sub> Factor 2	U <sub>3</sub> Factor 3	U <sub>4</sub> Factor 4	U <sub>5</sub> Factor 5	U <sub>6</sub> Factor 6	U <sub>7</sub> Factor 7	
Share in variability (%)	20.37	15.78	10.93	10.08	8.28	7.63	6.35	0.7207
X <sub>1</sub> . Growth rate of total assets	-0.0135	-0.0148	-0.0443	-0.0481	-0.0884	0.9462	0.0231	0.3064
X <sub>2</sub> . Growth rate of working assets	-0.0844	-0.0093	-0.0276	-0.0563	-0.0886	0.9616	0.0220	0.6166
X <sub>3</sub> . Growth rate of net loans	-0.1188	-0.0530	0.0397	-0.0044	0.0608	0.6017	0.0235	0.6093
X <sub>4</sub> . Profitability of total assets ROA	0.0934	0.8071	0.0006	0.1657	0.1461	-0.0002	0.1082	0.4616
X <sub>5</sub> . Profitability of own funds ROE	0.0782	0.4713	-0.0752	0.0961	-0.1985	0.0815	0.1315	0.8492
X <sub>6</sub> . Gross profit margin ratio	0.0377	0.1508	-0.0262	0.8810	0.0739	-0.0271	0.0311	0.2569
X <sub>7</sub> . Net profit margin ratio	-0.0101	0.1458	-0.0204	0.8865	0.0816	-0.0348	0.0146	0.3002
X <sub>8</sub> . Revenue/costs ratio	0.0476	0.0228	-0.0068	0.5234	-0.0171	-0.0134	0.0390	0.2078
X <sub>9</sub> . Interest margin ratio	0.7770	0.2597	0.1034	0.0605	0.1430	-0.0931	0.1126	0.3597
X <sub>10</sub> . Net financial result/worker (ROW) ['000 PLN]	-0.2850	0.7614	-0.0249	0.2001	0.2018	-0.0530	0.1042	0.9084
X <sub>11</sub> . Costs ratio	0.0023	-0.0976	0.0233	-0.7716	0.0448	0.0178	-0.0566	0.9442
X <sub>12</sub> . Solvency ratio	0.0332	-0.0524	-0.0879	0.0308	0.7676	-0.0668	0.1018	0.3849
X <sub>13</sub> . Own funds/total assets ratio	0.0724	0.0597	0.2136	0.0106	0.7383	-0.0809	-0.0556	0.5850
X <sub>14</sub> . Fixed assets and capital investments /total assets ratio	0.0808	-0.0648	0.0570	-0.1079	-0.0768	-0.0281	-0.6552	0.9343
X <sub>15</sub> . Working capital/total assets ratio	0.1703	0.1503	0.0756	0.0803	0.6843	0.0559	0.5603	0.9186
X <sub>16</sub> . Cash/total assets ratio	0.4739	-0.0876	-0.1170	0.0645	-0.0547	0.0061	-0.0614	0.1435
X <sub>17</sub> . Total liquidity ratio	0.4001	-0.2154	-0.2980	0.0010	0.0121	0.0049	0.0687	0.0167
X <sub>18</sub> . Current assets/current deposits	-0.2440	-0.0585	-0.3338	-0.0438	0.0975	0.0298	0.1454	0.9179
X <sub>19</sub> . Working assets/total assets ratio	-0.5830	-0.1904	0.2920	-0.0549	0.2193	0.0738	0.2591	0.7082
X <sub>20</sub> . Net loans/total assets ratio	0.0266	-0.0456	0.9634	-0.0238	0.0430	-0.0207	-0.0249	0.8491
X <sub>21</sub> . Deposits/total assets ratio	-0.3484	-0.3933	-0.0869	0.0098	-0.2628	-0.0319	0.0770	0.2193
X <sub>22</sub> . Net loans/deposits ratio	0.1135	0.0726	0.9375	-0.0065	0.1289	-0.0116	-0.0694	0.8287
X <sub>23</sub> . Irregular loans/gross total loans	-0.0724	0.2531	-0.0101	0.0866	-0.1826	-0.0597	-0.1724	0.8059
X <sub>24</sub> . Specific provisions/irregular loans ratio	0.0867	0.0130	0.0810	-0.0233	0.0119	0.0081	0.0415	0.4077
X <sub>25</sub> . Interest income/total assets ratio	0.6954	0.1608	0.2379	0.0286	-0.1638	-0.1963	0.5345	0.3226
X <sub>26</sub> . Interest expense/total assets ratio	0.3230	-0.0269	-0.0006	-0.0261	-0.5014	-0.1716	0.5671	0.5404
X <sub>27</sub> . Net interest income/total assets	0.7144	0.2801	0.3491	0.0674	0.2814	-0.1145	0.2039	0.5146
X <sub>28</sub> . Non-interest income/total assets ratio	-0.1444	-0.2122	0.2864	-0.1860	0.1388	0.1086	-0.0760	0.7274
X <sub>29</sub> . Administrative expenses/total assets ratio	0.7449	-0.3169	0.3207	-0.0303	0.1286	-0.1357	-0.1863	0.7559
X <sub>30</sub> . Personnel costs/total assets ratio	0.7120	-0.3818	0.3006	-0.0189	0.2003	-0.0997	-0.1117	0.8082
X <sub>31</sub> . Depreciation costs/total assets ratio	0.2819	-0.0484	0.2421	-0.0663	-0.0416	-0.0897	-0.5031	0.8158
X <sub>32</sub> . Charges to provisions/total assets ratio	-0.1700	0.3991	0.2137	-0.0001	-0.0400	-0.1450	-0.2573	0.2788
X <sub>33</sub> . Released provisions/total assets ratio	-0.0593	0.5555	0.0634	-0.0134	-0.2028	-0.1092	-0.4136	0.6110
X <sub>34</sub> . Encumbrances of financial result/total assets ratio	0.1757	0.5514	0.0593	0.1117	0.2291	-0.0250	0.3326	0.7207

R<sup>2</sup> – the square of coefficient of multi-way correlation between variable X<sub>i</sub> and main factors U<sub>1</sub>-U<sub>7</sub>; X<sub>i</sub> – value of i-primary variable, i = 1, 2, ..., 34; U<sub>k</sub> – value of k-main factor, k = 1, 2, 3.

Source: own research

- the sixth explained 7.6% of the total variability and was mostly correlated with the rates of change in total assets, working assets and net loans
- the seventh explained 6.35% of the total variability and was most correlated with such primary variables as the fixed assets and capital investments to total assets ratio, the interest revenues to total assets ratio and the interest costs to total assets ratio.

Aggregate performance indicators obtained for the cooperative banks were subsequently compared between regions of their activities. It was found that both in voivodeships and macro-regions, selected factors had a statistically significant impact on the level of aggregate indicator of financial/economic performance of banks, as Table 6 shows.

Table 6. Impact of selected factors on the level of aggregate indicator of economic/financial performance of cooperative banks in Poland in 1997-2004

Specification	Impact of	
	Voivodeship	Macroregion
Aggregate indicator	F = 1.99 <sup>x</sup>	F = 3.81 <sup>x</sup>

Notes: as in Table 2.

Source: own research

Table 7. The level of aggregate indicator of economic/financial situation of cooperative banks in Poland by voivodeship, 1997-2004

Voivodeship	Aggregate indicator of economic and financial situation of cooperative banks			
	n	$\bar{X}$		$s_{\bar{X}}$
Dolnośląskie	33	-0.29	abc	0.25
Kujawsko-Pomorskie	31	0.37	cd	0.26
Lubelskie	50	0.26	bcd	0.20
Lubuskie	21	0.09	abcd	0.31
Łódzkie	45	-0.32	ab	0.21
Mazowieckie	109	-0.14	abc	0.14
Małopolskie	37	-0.28	abc	0.24
Opolskie	12	0.39	bcd	0.41
Podlaskie	30	-0.02	abcd	0.26
Podkarpackie	32	-0.69	a	0.25
Pomorskie	28	-0.16	abc	0.27
Śląskie	49	0.61	d	0.20
Świętokrzyskie	42	0.24	bcd	0.22
Wielkopolskie	53	0.04	bc	0.20
Warmińsko-mazurskie	38	0.21	bcd	0.23
Zachodniopomorskie	17	-0.28	abc	0.35
Poland	627	-1.51E-08		–

Notes: as in Table 3.

Source: own research

The aggregate performance indicators presented in Table 7 suggest that banks

located in Śląskie (0.61), Opolskie (0.39) and Kujawsko-pomorskie (0.37) voivodeships performed the best. The worst results were achieved by banks in Podkarpackie (-0.69), Łódzkie (-0.32) and Dolnośląskie voivodeships.

As illustrated in Table 8, there were also macro-regional differences in bank's financial results. The best performance, as measured by the indicator, was experienced by the banks in southern macro-region (0.55). Their counterparts in north-western (-0.35), south-eastern (-0.22) and central macro-regions experienced the worst financial situation.

Table 8. The level of aggregate indicator of economic/financial situation of cooperative banks in Poland by macro-region, 1997-2004

Macroregion	Aggregate indicator on economic and financial situation of the cooperative banks		
	n	$\bar{X}$	$s_{\bar{x}}$
Southern	71	0.55 c	0.17
South-eastern	102	-0.22 a	0.14
South-western	5	0.32 d	0.64
Northern	30	-0.18 ab	0.26
North-eastern	61	0.14 abc	0.18
North-western	62	-0.35 a	0.18
Central	65	-0.21 ab	0.18
Central-eastern	51	0.14 abc	0.20
Central-western	91	0.19 bc	0.15
Capital	89	-0.22 ab	0.15
Poland	627	-1,51E-08	

Notes: as in Table 3.

Source: own research

### Impact of agricultural development on the economic/financial situation of the cooperative banks in Poland

Computed correlation coefficients suggest that at national level there was a positive but weak interrelation ( $r = 0.08$ ) between banks' economic/financial results and agricultural development in years 1997-2004. However, the values of the correlation coefficients differed between voivodeships (Table 9).

Improvement of the agricultural development indicator resulted in better economic and financial situation of cooperative banks in the following voivodeships: Dolnośląskie, Mazowieckie and Śląskie. A negative impact was found out for Świętokrzyskie voivodeship. In the remaining voivodeships those variables were associated either positively or negatively but study showed statistically insignificant correlation between them

Table 9. Impact of regional agricultural development on the economic and financial situation of cooperative banks by voivodeship in Poland, 1997-2004

Voivodeship		Aggregate indicator of economic and financial situation of cooperative banks	
		r	b
Aggregate indicator of agricultural development	Dolnośląskie	0.64 <sup>x</sup>	7.27 <sup>x</sup>
	Kujawsko-Pomorskie	-0.47	-0.75
	Lubelskie	0.24	0.85
	Lubuskie	0.19	0.37
	Łódzkie	-0.20	-0.48
	Mazowieckie	0.39 <sup>x</sup>	0.70 <sup>x</sup>
	Małopolskie	0.00	-0.00
	Opolskie	-0.02	-0.20
	Podlaskie	-0.30	-0.62
	Podkarpackie	0.17	0.76
	Pomorskie	0.06	0.10
	Śląskie	0.50 <sup>x</sup>	7.88 <sup>x</sup>
	Świętokrzyskie	-0.62 <sup>x</sup>	-7.82 <sup>x</sup>
	Wielkopolskie	0.24	0.23
	Warmińsko-mazurskie	-0.15	-1.99
	Zachodniopomorskie	0.30	1.03
Poland		0.08	0.05

Note: x - correlation coefficient r and regression coefficient b statistically significant at  $p \leq 0.05$ .

Source: own research

Furthermore, an analysis of relationship between development of agriculture and economic/financial performance of the banks across the selected macro-regions of Poland uncovered that as the values of the first variable increased, the values of the second variable also increased in central-eastern ( $r = 0.42$ ) and central ( $r = 0.30$ ) macro-regions. Relevant information compiled in Table 10 also shows that in the case of other macro-regions this relationship was statistically insignificant.

Table 10. Impact of regional agricultural development on the economic/financial situation of cooperative banks in Poland, 1997-2004

Macro-region		Aggregate indicator of economic and financial situation of cooperative banks	
		r	b
Aggregate indicator on agricultural development	Southern	-0.05	-0.09
	South-eastern	0.10	0.64
	South-western	0.38	3.26
	Northern	0.04	0.07
	North-eastern	-0.26	-0.52
	North-eastern	0.34	0.75
	Central	0.28	0.78
	Central-eastern	0.42 <sup>x</sup>	1.58 <sup>x</sup>
	Central-western	0.10	0.11
	Capital	0.30 <sup>x</sup>	0.48 <sup>x</sup>
	Poland	0.08	0.10

Notes: as in Table 9.

Source: own research

## Concluding remarks

1. The study based on factor analysis suggests that the level of regional development of agriculture in Poland was strongest influenced by an average farm area and employment in agriculture, whereas the level of economic/financial performance of cooperative banks respectively by the interest/margin ratio, the net interest income to total assets ratio, and the interest costs to total assets ratio. All the above mentioned variables were positive stimuli for both development of agriculture and performance of cooperative banks.
2. The type of region (i.e. voivodeship and macro-region) had statistically significant impact both on the aggregate indicator of agricultural development and the aggregate indicator of economic/financial situation of cooperative banks.
3. The assessed level of agricultural development was highest in Wielkopolskie, Zachodniopomorskie and Warminsko-mazurskie voivodeships and correspondingly in the north-eastern as well as the central-western macro-regions. The lowest values were calculated for Małopolskie, Podkarpackie, Śląskie, Świętokrzyskie voivodsips and for the southern and south-eastern macro-regions.
4. The assessed level of economic and financial situation of cooperative banks was highest in Śląskie, Opolskie, Kujawsko-pomorskie voivodeships and in the southern macro-region. Worst-performing banks were situated in Podkarpackie, Łódzkie and Dolnośląskie voivodsips and in the north-eastern and south-eastern macrorregions.
5. Analysis based on Pearson correlation coefficients suggests a positive correlation



between the agricultural development level and the economic/financial situation of banks in Dolnośląskie, Mazowieckie, Śląskie voivodeships and respectively negative correlation in Świętokrzyskie voivodeship. In the case of other voivodeships the coefficients were statistically insignificant. Positive correlation between variables of interest was also in the central-eastern and central macro-regions. For other macro-regions those coefficients were statistically insignificant.

6. With regard to the practical implications of the research the findings support a suggestion for the professionals and the policy makers to calculate the composite index of agricultural development as well as the financial and economic situation of business entities as a tool for decision-making.

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## How to improve landscape sustainability?

**Abstract.** Almost every professional sector has embarked on the move toward sustainability. European landscapes are facing rapid changes in land use, where understanding and management of this process is essential. Sustainability has become a widely acknowledged dimension of human actions, but still little stress is put on education in sustainability. This paper identifies focus of education, gives suggestions for improvements and presents a new tool for education and training in sustainable land use – “Route Planner”. As results, it provides all users with new interesting facts on sustainability in the European Union and additional materials related to sustainable land use and Sustainability Impact Assessments (SIA). Users got the access to updated information regarding approximately 3000 courses on offer in this topic area throughout the European Union as well as case studies to compare sustainability practices in these countries in comparison to other parts of the world. Furthermore the end result of the information chain also leads the user to a collection of links such as interesting websites and further reading in the topic area.

**Key words:** sustainability, land use, Route Planner, sources, information

## Introduction

The fundamental principle of sustainable development is well established and widely accepted – economic growth can, and should, be made compatible with stewardship of the planet for future generations. At EU and Member State levels, and within individual cities and regions, most policy-makers now appreciate the need to reconcile the triple objectives of wealth creation, social cohesion and environmental protection (Environmental Research themes - Sustainable Development Tools 2007). Many even understand that win-win solutions are possible. But how can they find these solutions? What combination of policies, support measures and technologies will optimise benefits in all three domains? And how should their decisions respond to the often-conflicting views of residents, businesses, public authorities and landowners? Without sophisticated decision-support tools, successfully implementing genuinely sustainable policies is virtually impossible.

At the present moment rapid land use change is occurring in the whole of Europe – it is not exaggerated to say that land use (the way in which land is used, especially in farming and city planning) is an increasingly dynamic characteristic of the European environment.. Management of this change is necessary but the education and training provision in sustainability for land use planning is fragmented and thus causes a major barrier to reach the EU sustainable development goal [A Sustainable... 2001; Proposal... 2004].

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Nevertheless, education has the most essential role in promoting sustainable development. Sustainability education involves studies of a variety of systems social, political, and economic in relation to real-life issues. Integrating sustainability in all levels of activity needs communication and cooperation between and involvement of different actors related to land use. Everybody should have a stake in the condition and future management of the environment. Sustainability ethic and values may be most successfully developed through education, awareness raising and training. It is important to have control over the processes of change in order to sustain and protect the quality of the environment and landscape. Without knowledge and information there is no sustainable management.

Sustainability and sustainable development, often used as synonyms, are widely used terms throughout the world. Brundtland's Commission (1987) defined sustainable development as development that "meets the needs of the present generation without compromising the ability of future generations to meet their needs". Sustainability relates to the continuity of economic, social and ecological aspects of human society and the environment. There is unlikely unanimity over the meaning of sustainable development [Filho 2000] but rather there are many different definitions depending on the approach used.

Urbanisation, EU common agricultural policy, pressures from global economic trends and climate change influence the land use development [A Sustainable... 2001]. Also the changing social perceptions of landscape (i.e. the ways people view nature and landscape) have a landscape altering effect. It is worthwhile to notice that the images of nature and landscape have changed throughout time and will continue to change, and thus so will also landscape [Buijs et al. 2006]. Sustainability of land use has been discussed broadly but a focused European policy approach has not been achieved yet. Reason to this lays in the complex nature of land use dynamics [A Sustainable... 2001].

It is important, and a clear EU challenge, to develop methodology to integrate sustainability aspects in profitable land use. Moreover, the need for the design of educational programs meeting the challenges posed by sustainability is confirmed by wider international initiatives (e.g. UNESCO Decade for sustainable education of 2003). Major efforts and investments under EU are now being directed at developing structured approaches to assess the sustainability of land use change (such as the EC Integrated Projects IP SENSOR and IP SEAMLESS). Nonetheless, education and training possibilities, especially for policy makers and practitioners, are scattered around Europe and are additionally largely uncoordinated [Proposal... 2004]. Coherent proficiency within European landscape and sustainable land use is needed to attain.

Multifunctional land use is an essential basis of the management of European landscapes. Involvement of diverse sectors, interaction as well as integration of many scientific disciplines into interdisciplinary research groups interacting with various supplemental methodological approaches are vital dimensions to enforce before multifunctional landscape can be fully achieved [Proposal... 2004].

## **Material and methods**

Aims of the study based on "ATLAS project were to assess the status of educational and training provision in the area of land use, in order to develop an on-line data base for training possibilities and subsequently the 'Route Planner' as an interactive web-based

training tool for sustainability impact assessment primarily aimed at policy makers” [Proposal... 2004].

Understanding the meaning of sustainability is still problematic, and educators and others struggle with vague and inconsistent definitions. The question is how these constraints in teaching sustainability could be tackled? The first aim was to assess current educational and training possibilities with the perspective in the actual educational needs. Results formed the basis for SWOT Analysis. The amount of courses, location and availability to different users (such as policy makers, practitioners, professionals, and students) were examined in the areas of sustainability, sustainable land-use, and different assessment tools. Through this clarification was possible to make an analysis of the adequacy of present educational provision (see Table I) in the current fields, and identify the differences, gaps, weak points and opportunities between different countries. Finally, suggestions for improvements have been given.

SWOT analysis was introduced as a tool for business management in the 1970s. Nowadays, SWOT is widely spread and is often used as a qualitative tool to solve conflicts and identify features of the territory [Learning... 2004]. The SWOT analysis derives from the words ‘Strengths and Weaknesses, Opportunities and Threats’. Strengths and weaknesses are internal factors, whereas opportunities and threats are considered as external factors. According to SWOT analysis results, the new tool as *Route Planner* was designed.

## Results

The survey was undertaken in several EU countries (Denmark, Iceland, Norway, Sweden, Finland, Estonia, Latvia, Lithuania, Czech Republic, Slovenia, Slovakia, Hungary, Greece, Poland, Germany, Switzerland, Austria, Belgium, the Netherlands, the UK, Ireland, France, Luxemburg, Spain, Portugal, Italy, Cyprus, and Malta) surveying the country specific course supplies (offering institution, science field, level, teaching area, target groups).

The first objective was to assess the current user needs for training and education in sustainability and land use in Europe. The investigation was carried out through interviews with key persons in different organisations (universities, polytechnics, professional training organisations) and on different levels (students, academics, policy-makers, government official, practitioners and NGOs/business) throughout Europe. The results showed that more training is needed concerning impact assessment tools (EIA, SEA, SA and IA); information and guidelines are needed, as well as clearing out the terms and methodology, and general guidance in implementation. The relation between different assessment tools was found unclear and clarification to this was desired.

In Poland, despite a substantial rural-urban migration, 38.1 percent of the population still lives in the countryside. At present the rural population is increasing and the rate of natural increase (though falling) is higher than in the towns though the productive age group is smaller. However, these human resources are not being properly used and the results can be seen in terms of economic inefficiency, low living standards and a high level of state support. Poverty among the rural population is evident through a collapse of house building and considerable domestic overcrowding. However, conditions vary considerably

across the country and this must be reflected in the economic and social policies drawn up for the new administrative regions [Górz and Kurek 2000].

Table 1. The average provision (%) in *sustainability* related issues in European Union (amount of courses in: Environmental economy, Sustainable development, Sustainable management, Social impact, Sustainable planning and land use (Land-use impact, Land-use planning, Landscape planning, Planning for sustainability, Sustainable management) and in *provision in interaction* (practical training, practical communication, participation, and internationality) [Kovanen *et al.* 2006].

Country	Provision in sustainability	Provision in interaction
Austria	22,2	17,5
Belgium	23,4	16,8
Czech Republic	6,3	3,4
Denmark	30,4	39,1
Estonia	4,1	6,8
Finland	5,7	10,1
France	27,3	23,8
Germany	6,2	9,1
Greece	13,9	19,4
Hungary	2,4	3,2
Iceland	20,8	4,7
Ireland	2,6	3,5
Italy	15,0	6,4
Latvia	18,8	14,1
Lithuania	7,1	3,1
The Netherlands	30,7	18,8
Norway	15,5	29,1
Poland	0,0	47,3
Portugal	13,5	11,5
Slovakia	3,2	6,9
Slovenia	4,1	11,4
Spain	6,5	8,9
Sweden	22,9	27,6
Switzerland	12,1	13,6
UK	6,4	4,0

In the process of conducting the interviews it became clear that many people, although they were all familiar with a range of impact assessment (IA) tools, they (with the exception of a few researchers) did not know the term SIA. It was apparent that SIA is a relatively new concept and the term has had little exposure. As a result of these trials, the focus was often directed to asking questions relating to Impact Assessment (IA) or Strategic

Environmental Assessment (SEA), terms which were considered to be more familiar to the targeted study groups.

Apparently Government supports none of these procedures. For example Poland has courses only in EIA and would be placed considerably higher in the evaluation of sustainability provision than the real situation is. Also nearly 50 % of the courses have practical training as a part of teaching. Sustainability related issues are not well covered. In five countries (Austria, Estonia, Greece, Poland and Slovakia) sustainability related issues are not covered at all. An integrated approach is often missing. On the other hand, when evaluating the state of participation, communication, practical training and internationality, the provision is the best in Poland.

In Norway, Sweden, Denmark, the Netherlands, Belgium, France and the UK the situation in sustainability teaching seems to be better than in the other countries. Thus, one could say that these countries form the core of educational provision. The new EU countries, Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovakia and Slovenia are still struggling with the different assessment tools and basic issues related to sustainable development. On the whole, practical work and training should be offered more. Teaching sustainability should be carried out in cooperation of different academic disciplines of by professionals that are aware of the aspects of sustainability in their fields.

The second step in investigations was implementation of SWOT analysis [Kovanen et al. 2006].

Based on SWOT analysis, the Interactive *Route Planner* was designed in such a manner as to assist users in obtaining information regarding Sustainable Impact Assessment and land use that is tailor-made for their respective needs. The unique interactive tool was developed with a step-by-step approach and makes use of colourful and exciting photos as well as interesting pieces of information on a series of web pages.

The main idea behind this approach was to cater for a wide range of users and to keep each of these users interested to continue on the route through the web pages by means of an interactive interface. This was accomplished by building intelligence into the system and asking the user for specific personal information in each step. Then analysing the input to provide custom-made information in the next step that will be helpful to each specific web user.

With the help of information input from user interviews as well as the SWOT analysis, potential users were grouped into four main categories according to their profiles and needs. The first user group consists of *scientific researchers and scholars* who have an academic interest in the topic area. The second group consists of *professionals and the business community* such as individuals working for commercial companies. This user group will take an interest in the socio-economic aspects of the topic area. *Policy and decision makers* make up the third user group and their interests will lay mainly with legislative and legal matters. *Individuals interested in the topic area in general aspects* such as current state or new developments forms the last group.

Each user group is guided through the interactive Route Planner in a distinctive manner and in each case the initial entry point into the website dictates the route to be taken. Each new user input further dictates the type of information to be gathered by the user on his way through the Route Planner. From an architectural outlook, the database is therefore constructed in such a way as to provide various search paths through the information chain in order to obtain an end result.

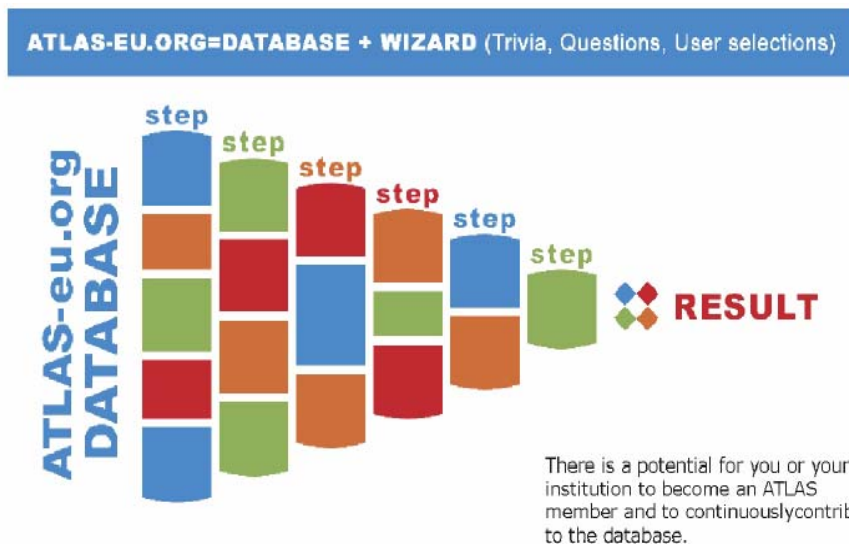


Figure 1. Route Planner Scheme

In this manner scientific researchers or scholars might enter the Route Planner by making choices about countries where- or languages in which they would like to study. Professionals and individuals with commercial backgrounds might wish to find information regarding case studies or shorter training programs such as new e-courses. Policy and decision makers could search for information regarding European legislation in the member countries while someone with an interest in ecology and sustainability could find new additional information on landscapes, land use change and Sustainability Impact Assessments (SIA).

### Users Benefit

As previously mentioned the user benefits are varied and tailor-made to suit individual user needs according to the user group categories. The main benefit is to provide all users with new interesting facts on sustainability in the European Union and additional materials related to Sustainability Impact Assessments (SIA). Users will have access to updated information regarding approximately 3000 courses on offer in this topic area throughout the European Union as well as case studies to compare sustainability practices in these countries in comparison to other parts of the world. Furthermore the end result of the information chain will also lead the user to a collection of links such as interesting websites and further reading in the topic area.

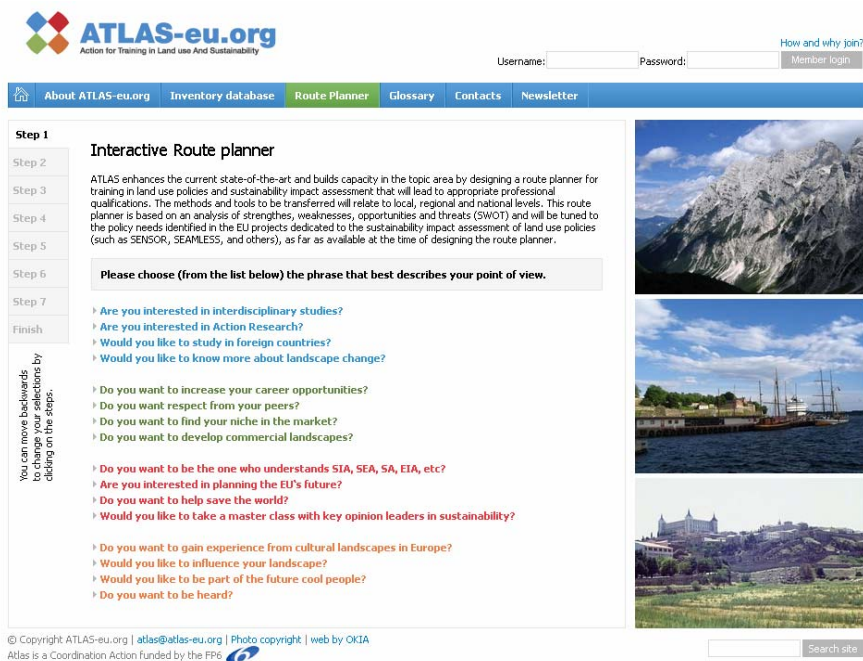


Figure 2. Print screen of the Route Planner interactive tool

## Summary

The study enhanced the current state-of-the-art and built capacity in the topic area by designing an online and user-interactive “Route Planner” for training in land use policies and sustainability impact assessment that will lead to appropriate professional qualifications. The methods and tools were related to local, regional and national levels. The Route Planner is based on an analysis of strengths, weaknesses, opportunities and threats (SWOT) in the available educational resources for sustainability and environmental impact assessments and is tuned to the policy needs identified in the EU projects dedicated to the sustainability impact assessment of land use policies. New tool is available at <http://www.atlas-eu.org/>.

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## **The innovation resources of enterprises in the dairy sector in Belarus**

**Abstract.** The modern stage of development of Byelorussian economy demands search of new solutions to old problems, especially with respect to agriculture. Despite of external well-being and measures taken for development of agriculture, the majority of enterprises can not effectively go on with production on their own. In many branches of production the state subsidies are granted. Various sorts of state grants. If to consider structure of profit of the agricultural organizations its greater part represents a. In article are considered problems of innovative development of agriculture of Belarus, in particular the enterprises of dairy sector.

**Keywords:** innovations, dairy sector, agriculture

### **Introduction**

Innovative activity is basing on the development of a scientific idea which often originates from practice and leads to change of scientific paradigms. Medvedeva [2007] ascertains that this change has no feedback with economy and scientific and technical progress, but nevertheless there is a change in technology. All innovations can be classified into different degrees of influence on various spheres of the social and economic life of a society: basic innovations and secondary innovations (or pseudo-innovations). The cyclically repeated periods of preference or counteraction to innovations are observed in history. Paradoxically the great demand for basic innovations is observed during the periods of economic recession, since owing to this factor it is possible to overcome the developed crisis situation. Secondary innovations are in demand during the economic growth periods. At this time technologies and workers with high qualification are necessary to the enterprises. Introduction of innovations would demand from them additional expenses. This fact counteracts basic changes in techniques and technology.

A national program of innovative development of the country for 2007-2010 is created in Belarus. According to this program a national innovative system should be constructed in the country. This system will allow generating, distributing and using knowledge to be embodied in new products, technologies, services. 61 new products and 177 technologies will be introduced in agriculture and processing of agricultural production. All this will demand a use of significant resources which many enterprises of agriculture have not enough of. For this reason creation of investment base (especially attraction of foreign investments) is required not only monetary in kind, but also in the form of imports of technologies, including management. The leading role in solving these problems is allocated to the state. Serious problems face the enterprises in dairy sector in Belarus today. They increase even more within the limits of the accepted Program of innovative

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development of the country. Who should develop innovative technologies? How to train the personnel in working with new machines and the equipment? How to define a correct strategy of development of the enterprise, its specialization? Where to take financial assets for all it? These and other questions arise with creation of a strategy of development in each agricultural enterprise. We shall try to find answers to these questions. We already considered structure of dairy sector in earlier works and marked, that all structural elements of the agricultural subcomplex are interconnected and interdependent. For this reason we shall consider the relevant conditions for each of its elements.

### **State of the agricultural science**

According to the Ministry of Agriculture nearly 25 million US dollar has been directed to financing of the branch science for the last three years. [Пысак 2007]. Actually it is not such a lot, as it seems at first sight. The material base of scientific institutes is becoming outdated in many respects. In the field of agriculture a whole network of scientific institutes is engaged in the scientific research. There are 4 centres of science extension service, 11 scientific research institutes, 2 skilled stations and besides research is done in the higher educational institutions (2 universities and 2 academies). The university science is represented by 100 doctors and more than 700 candidates of sciences. Every year scientists of agricultural high schools create about 100 scientific and technical new products (plant varieties, veterinary preparations, breeds of animals, machine and equipment specifications, scientific and methodical recommendations). In all agricultural high schools a professional training in the highest scientific qualifications is conducted in more than 30 specialities. Annual reception of more than 150 people for doctoral and postgraduate studies takes place in the agricultural high schools under various forms of training (daytime and correspondence).

But, as many scientists notice it, the scientific support for innovative development is not sufficient in Belarus. First of all it is caused by a low number of researchers. There is an outflow of young researchers from the scientific field of employment. The number of the scientific researchers is reduced annually by 3 %. The principal cause is a low level of salaries, and especially low in the sphere of agricultural science. Therefore many scientists and teachers from high schools migrate abroad and remain there to live and work (nearly 70 people annually).

Some research organizations are transformed into research-and-production units. Thus there is a reorientation of these establishments from the release of scientific and new technological products to the socially significant, but not high technology products. Scientific research practically is not done. Many scientists do not share the governmental optimism about fast and successful formation of the national innovative system. Growth in numbers of graduates from universities has had no systematic character. There are not enough experts with high education in natural science instead of production education. There is a need of about 7000 experts in the field of innovative management who are lacking in the country.

All aforesaid allows for a conclusion, that innovations existing abroad will be demanded in the near future in Belarus. Also the already invented technologies will have to be improved (secondary innovations).

## Condition of technical and technological base in the enterprises

Academician M. Severnev considers that the organization of any production begins with technology, and economy begins with production [Севернев 2007]. The economy will be in stagnant if nothing is changed in technology. It is difficult to disagree with it. The bulk of agricultural enterprises use traditional ‘know-how’ in milk production. However, the life has already proved their inefficiency. Those win who constantly improve their products.

For a long time it has been noticed that in Belarus favourable conditions for development of dairy cattle breeding are prevailing. The genetic potential of dairy cattle stays at a level of 7000-7500 kg of milk per cow and year. But it is used only on 43 %. The average annual productivity was 4019 kg in the past year. The factors determining dairy productivity are feeding in 70 %, breed in 20 %, conditions of maintenance in 10 %. It is necessary to feed cows with the high-grade balanced forages. However, it is not given due attention in the agricultural enterprises. As show data in table 1, annual actual charge of forages in Belarus exceeded a normative level. In what has it resulted? We have lost 12.14 dollars on 1 ton of milk in 2005. We shall get a number of 45300.2 thousand USD if we count losses for the whole volume of production. It is one of the reasons of low competitiveness of the dairy sector.

Table 1. The analysis of the expense of forage for production of 1 ton of milk

Parameter	Year				
	2001	2002	2003	2004	2005
Actual expense of forages, MJ	17.08	16.81	16.58	15.89	15.63
Standard allowance of forages, MJ	15.21	14.98	14.74	13.69	13.10
Excessive expense of forages, MJ	1.87	1.83	1.84	2.20	2.53
Cost of the excessive expense, US dollars	8.99	8.80	8.85	10.58	12.14

Source: [Гусаков and Бельский 2007] and own calculations

Excessive expenditure of forages occurs usually because of an imbalance of diet and forage poor quality. How to achieve improvement of this situation? Nowadays an effective ‘know-how’ of forages exists. For example, it is the technology of drying corn grain of the raised humidity, of using biological preservatives for storage silos, it is the technology of preparation and distribution of fodder mixes. Such technologies are in use in many agricultural enterprises. It has allowed to achieve good results and to raise efficiency in the use of forages.

Other problem of milk production is bad work on reproduction of herd. Now we receive 88-94 fertilized for 100 cows. Elimination of fruitless cows is low. Therefore regular work is required on their revealing and removal from herd. One of revolutionary innovations is the ultrasonic scanner for early diagnostics of pregnancy.

One more problem is the organization of process of milking. Usually cows are being milked in milk line by means of portable buckets. This process is very labour consuming. Milk has poor quality (a high degree of impurity). Innovation is milking parlours with a fast turnover of cows milked dry. The standard level of automation allows one person to milk dry 76-80 cows per hour. The sanitary rules are observed and the dairyman carries out labour operations without a pressure.

There is also a sharp problem of the input of power resources now. Among the accessible innovations there are changes in design of protecting structures which allow for adjusting the microclimate parameters in premises without additional expenses of thermal energy. There are possibilities of reduction in the expense of electric power on illumination with use of photo-electric converters and light-emitting diode fixtures.

The average duration of use of equipment and technologies is 20-30 years. More than half of them were developed in the days of Soviet Union. Relative share of the amortized capital exceeds 80 % of the initial cost of machines and equipment. Consumption of durable resources lasts twice longer than in the economically developed countries for this reason. The scientific and technical centres for grain harvesting and forage harvesting techniques on the basis of 'Gomselmash' factory and for production of tractors on the basis of 'Minsk tractor factory' are created for the purpose of scientific support for the process of production.

Production should be improved constantly. It is necessary to introduce intensive technologies, productive equipment and techniques. The 'Byelorussian agri-industrial week' takes place annually in Belarus. This exhibition gives access to all existing technologies in agricultural production and technical innovations. They are offered by Byelorussian and foreign firms. The exhibition 'Belagro' was held for 17 time in 2007. In the exhibition it was possible to see all new that is created in the world. Exhibitors from Austria, Hungary, Germany, Spain, France and Poland took part in it. It was possible to track logically the technological chain: cultivation and agricultural technique, animal husbandry, food processing, packing and storage of food stuffs. Visitors to the exhibition have come to conclusion during exchange of opinions that they were surprised by many technological innovations and techniques. They would search opportunities for introduction of novelties in production in the future.

Mutual relation between milk producers and processing enterprises in the dairy sector is full of problems. Considering this situation, some research was done in 2006 about the expediency of creation of economic groups which should be engaged in the production of milk, in its industrial processing, finishing of ready dairy products and delivering up to consumers. Dairy subcomplex is a multilevel system. That system demands a complex resolution of problems. Therefore we should recognize validity of offer of creation of a Center of Agricultural Economy in the National Academy of Science of Belarus. The offer means creation of a uniform coordination centre of the vertically-integrated formation under the control of the Centre of Agricultural Economy, the Ministry of Agriculture and Food and the Central Administrative Board of National Bank. As a matter of fact three centres should be created in this framework:

1. centre of development of raw material zones (agricultural enterprises)
2. centre of development of production (processing of milk)
3. centre of development of distribution (trade).

Such approach will allow carrying out a uniform policy in all structural elements of the subcomplex of agriculture and alimentation. All occurring changes will have complex character. The project of such formation is developed for the Minsk region. However we think that it is expedient to develop them for the other regions of Belarus.

## Personnel maintenance

In the last years an outflow of manpower occurs in the agricultural sector. The basic reason is the level of salaries considerably lower in this branch than in all others. The wages in agriculture exceed only by half the minimal consumer budget. It is necessary to mean, that each worker has a family, children.

Table 2. Data about change of the nominal added monthly average wages of workers on branches of economy

Branch	Monthly average wages of workers, January-April 2007		Parity of monthly average salary and the minimal consumer budget, April 2007, %
	thousand roubles	USD	
All employers	640.5	298.4	240.6
Industry	712.3	331.4	264.2
Agriculture	378.0	176.1	151.3
Forestry	611.7	285.0	235.1
Transportation	743.3	346.3	286.6
Trade	523.5	243.9	199.4
Education	522.5	243.4	193.1
Science	837.2	390.0	315.1
State administration	980.4	456.7	380.2

Source: Ministry of Labour and Social Protection of Byelorussia, own calculations

Nevertheless, superfluous employment is observed in agriculture. According to the statistical reports there are no seasonal workers in the agricultural enterprises. But the working day is reduced in winter time. In this way the overly employment becomes visible.

First of all managers and experts are necessary to solve problems of innovative development of agricultural enterprises. Unfortunately, the spirit of entrepreneurship, this most valuable quality, has been put out of their heads in the last years. Now all production is subordinated to the will of regional leaders. Enterprises are deprived of initiative. Out of 60 thousand managers and experts only 36 % have higher education. There are enterprises which are headed by people who are not having special agricultural education. Turnover of staff reaches 11 % annually at this level. Educational establishments let out more than 8000 specialists of various qualifications annually. But not all of them start to work as specialists (about 60 %). The principal cause for that are low salaries and absence of normal life conditions. The tendency of reduction in employee numbers is especially visible in agriculture. It is characteristic for the world agriculture and it forces to search for innovative solutions because the population should be provided with foodstuffs. On the other hand, the low level of working motivation leads to search for new decisions before there is nobody left in agriculture.

According to a long-term plan for 2006-2010, 127 postgraduate students and 15 doctoral students will be accepted for direction of agricultural production and in processing animal products industries.

## Finances of enterprises

The gross output has increased by 25 %; exports of agricultural products have grown twice in comparison with 2000. In total 7 unprofitable agricultural enterprises made 0.4 % of their aggregate number in 2006. The unprofitable enterprises are not present in the dairy industry. However not all so is good as it may seem. The tendency of growth of creditor debts is persisting. The sum profits is less than pending debts more than 18 times. The situation could look still worse if there was no state support for agriculture. As Minister of Agriculture has stated, more than 400 million roubles (about 200 thousand USD) go to the enterprises as a kind of stimulation for production of milk and a beef (and more likely for covering of mismanagement) in the form of extra charges to procurement prices. 15 % of the enterprises sell milk at a loss even with governmental grants. The loss ratio on production of milk was -0.8 % without taking into account extra charges. Profitability reached 13.4 % with extra charges. The extra charge to procurement prices of milk have been cancelled recently. What results will it bring we shall see in statistics.

The dairy industry in the country functions effectively enough. Dairy products are exported. But the analysis of data shows that the profitability of cream exports is negative (-29.4 %). Its sale is also unprofitable in the home market (-6.7 %). It is profitable to export casein, cheeses, dry skimmed milk and cottage cheese. Sale of these products is profitable at home market too. Competitiveness of dairy products has grown owing to modernization of dairy factories and introduction of systems of a quality management in production.

The enterprises of dairy sector will require the state support in the future. The reason is that they have not enough own financial resources.

## Investments

Already for a long time it has been noticed that there is a close interrelation between the growth of investments and the growth of gross domestic product. Investments in agriculture in 2005 grew 9.5 times since 2001.

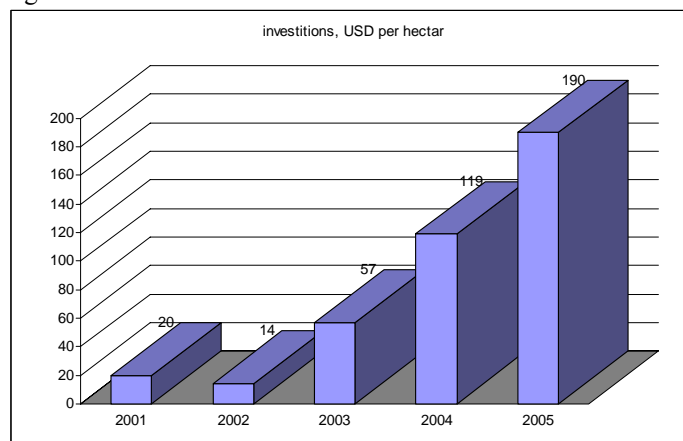


Figure 1. Investments in agriculture, USD per hectare

The structure of long-term investments in agriculture has undergone changes too. Possession of own means by the organizations caused that they began to borrow at a smaller relative density, 31.2 % of the investment worth. The fund of accumulation and fund of reproduction of non-material actives are not used as a sources of finfnance for investments. The greatest share in financing in 2005 belongs to the budgetary funds (34.4 %) and to the bank credits (30.1 %). 1.4 billion USD was received from the state budget and other appropriate funds in 2005. These means have been used on various purposes. 425 million USD was used in financing of capital investments. A significant part (11.3 %) has also been used on covering the losses of the agricultural organizations. 0.2 billion roubles (95 thousand USD) have been used in financing the scientific research works from budgetary grants in 2005. Therefore it is difficult to speak about an innovative development in the agricultural sector.

## **Innovations in the world agriculture**

In 2006 the International Bank of Reconstruction and Development has published a brochure 'Enhancing Agricultural Innovation: How to Go Beyond the Strengthening of Research Systems'. The existing approaches to innovative development in agriculture are discussed in this edition in detail. The system of innovative development is a certain association of the organizations, the enterprises and people which in common create knowledge and technology, rules and mechanisms by means of which they cooperate. The central role in innovative systems is allocated not only to the science, but also all other actors involved in system. It extends out of the limits of scientific research in order to capture all the factors that allow for using of new and existing knowledge in new and useful ways. Now the innovation is considered in the social and economic sense is not as simple as opening and the invention.

Pomareda and Hartwich [2006] coceive innovations as new knowledge and technologies in agricultural production, food-processing industry and marketing. As a result of such innovations farmers, manufacturers and dealers become more competitive, produce or sell better products of high quality and receive greater profit. Kaczmarek [2006] points out that in the economically developed countries a greater value is allocated to management of knowledge. In Germany the network of organizations supporting inventors is created. Germany spends for scientific research and development about 75 billion euro annually. In the context of our research of innovative system in Belarus we should note that we are at an initial stage of its creation. The concept of national innovative system should be expanded. As a criterion of efficiency of functioning of innovative system the competitiveness of all national economy and its separate elements should be taken. World experience has shown that investments into innovations pay back for themselves. Therefore a further growth of investments in creation and functioning of innovative system of Belarus is necessary.

## **Conclusions**

The logic of agricultural development demands a perfection of whole production in Belarus (and in dairy sector in particular). It is possible to attain only with being guided by innovation. It concerns an innovative development of science, techniques and 'know-how',



qualified personnel maintenance in science and production, growth of financial investments and their efficiency.

The agricultural enterprises have not enough financial resources for financing scientific research. Therefore in Belarus a steady demand for innovative solutions already existing abroad will be observed in the near future.

Creation of an integrated formation (including all organizations of the dairy subcomplex) is necessary for the steady innovative development of enterprises in the dairy sector.

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## **Unemployment and its problems in the Grodno Region**

**Abstract.** Article is devoted to studying of unemployment as a negative social and economic phenomenon in the life of a society. As the growth of the given parameter conducts to the shortage of produce. The structure of the unemployed according to the sex both in Grodno region, and across Belarus specifies prevalence of 'female' unemployment. A problem there is employment of youth. The disturbing tendency is traced at studying the structure of the age of the unemployed: the greatest share of the unemployed falls at the most productive age of 20-29 and 30-49 years. In the small regional centers the rate of unemployment is higher than in the large cities. This is connected with an absence of workplaces, backwardness of the real sector of economy, a weak level of development of social services. Therefore the state policy of employment aspires to provide equal opportunities to all physically fit citizens of Belarus, gives social guarantees and indemnifications to the unemployed, etc.

**Key words:** unemployment, employment

Unemployment is a social and economic problem touching tens of thousands of people. Unemployment is revealed in negative social consequences: falling of the social status of a person in a society; loss of vital prospect of a worker and his family, and sometimes also his will to live; decline of moral foundations and break of the family. In some cases, the person with high business qualities, mental abilities, but broken and suppressed by struggles of life, loses interest in struggling for career growth and survival. Unemployment is a complex social and economic phenomenon of public life whose consequences are expressed not only in private life, but also influences economy as a whole. The main 'price' of unemployment is the shortage of produce. Increase of the natural rate of unemployment by 1 % reduces the real Gross Domestic Product by 2.5% [The law... 2007].

Physically fit residents of the Republic of Belarus at the able-bodied age (women till 55 years, men till 60 years) who have no work, are not engaged in enterprise activity, are not full time students do not do military service and are registered in the public service of employment are considered the unemployed [The law... 2004].

Unemployment can be divided into two groups. The registered unemployed are those citizens who are registered in the service of employment. According to the institute of sociology, their share in an the total number of the unemployed makes one third. In the structure of this group the unemployed women make up two thirds and men - one third. The second group of the unemployed is the most various, it includes citizens unregistered in the bodies of employment concern, their share in the total number of the country makes two thirds the share of men being two thirds, and that of women one third. The latter group comprises:

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- those temporarily dismissed and temporarily unemployed, but who are ready to start new work and expect to take it no more than 30 days;
- people who are not included in labour force; they are those who have no work and do not meet the requirements of the search of work; it is supposed, that these people do not have orientation to the search of work in the labour market, they do not know ‘what they want’;
- people who really would like to work, but have for some reasons abandoned the search; they are so-called the despaired to find work.

Another category of people who are not employed are the people who are not included in the category of labour force [Bordacheva 2004].

The basic result of functioning of labour is employment. As an economic category it expresses relations of production concerning inclusion of an employee in a certain concrete labour activity with the purpose of meeting the labour demand. For the period of 1990 – 2005 in the Grodno area the branch structure of employment has essentially changed, especially in agriculture. So, with a decrease of the total number of employed by 4 %, the number employed in agriculture has been reduced by 28.4 % and unemployment only by 0.8 %. In the republic these data are as follows: 1.7%, 44.5% and 2.6% accordingly [A statistical... 2005 and 2006].

The statistics show that women prevail among the unemployed both in the republic as a whole, and in the Grodno area (table 1). It means that, first, Belarus unemployment has the ‘female face’ and in the region it is higher than on the average in the republic. During the analyzed period the unemployment has increased from 64.8% up to 74.0% [A statistical... 2006; Belarus... 2006].

Managers in some cases prefer to employ men because women ought to be given payed maternity leave and sick leave. The statistics testify that women trade and sexual slavery endangers, first of all, the unemployed who look for higher earnings and better life.

Table 1. Structure of the unemployed population by sex

Year	Structure, %				
	total	women		men	
		republic	Grodno region	republic	Grodno region
1995	100	64.3	65.4	35.7	34.6
1999	100	64.2	67.7	35.8	32.3
2000	100	60.7	65.5	39.3	34.5
2001	100	60.3	64.8	39.7	35.2
2002	100	63.3	68.5	36.7	31.5
2003	100	66.1	68.2	33.9	31.8
2005	100	69.3	74.0	30.7	26.0

Source: [A statistical... 2006]

The second feature of unemployment is its concentration among the youth. The most unprotected are the graduates of high schools, specialized secondary educational institutions and schools. The state spends huge money on training students of high schools, at the same time it can not provide them with work places after graduation from

educational institutions. It shows that planning of students training in higher and specialized secondary educational institutions does not meet the requirement for them (table 2).

In our opinion a high level of the unemployment among graduates of higher and secondary schools and special educational institutions is substantially connected with the absence of the service which would deal with problems of making a scientific forecast for preparation of future experts and defining the optimum ratio of the needs of economy to the quantity of applicants.

Table 2. Structure of the unemployed according to the age, %

Year	Total	Age (years)							
		16 – 20		20 – 29		30 – 39		50 and more (senior)	
		Republic	Grodno region	Republic	Grodno region	Republic	Grodno region	Republic	Grodno region
1995	100	14.3	13.8	35.7	37.9	44.0	42.9	6.0	5.8
1999	100	19.8	18.2	33.1	32.8	40.2	42.5	6.9	6.5
2000	100	22.0	20.8	31.9	31.0	38.5	41.6	7.6	7.1
2001	100	21.4	27.8	31.1	30.0	39.4	34.6	8.1	7.6
2002	100	18.1	17.5	30.4	29.6	41.7	44.0	9.8	9.1
2003	100	15.1	14.9	30.8	31.2	43.7	44.4	10.4	9.9
2005	100	16.2	16.4	30.2	29.2	40.3	42.7	10.6	11.5

Source: [A statistical... 2006]

The structure of the unemployed according to the age shows, first of all, that no essential differences in the rate of unemployment in the country as a whole and in the Grodno region exist; second, the greatest share of the unemployed falls at the most productive age of 20 – 29 and 30 – 49 years. Among the jobless of different educational levels for the analyzed period of 1995 – 2005 a well defined tendency of the change in unemployment structure is not traced. In 1995, during a period of economic growth in the country and in the region, the level of the unemployed with higher education made up 9.6% and 8.8 % accordingly. In 2005, during a period of steady economic growth, the share of the unemployed increased in comparison with 1995 and reached 10.3% in the republic and 9.9% in the Grodno region [A statistical... 2006; Belarus... 2006].

The analysis of the structure of the unemployment owed to a dismissal from work over the survey period shows that most of the unemployed were those dismissed from work at their own desire. Our investigations have shown that the main reason of dismissals at one's own will (up to 60 %) was the unsatisfactory wages. As for the other reasons the working conditions (15%) came in the first place. The rest of 25% refer to the unfriendliness of colleagues, the disappointment with work, the change of residence etc.

Now the problem of the unemployment is in the city more sharp than in the country. So, in 2004 in cities of the republic the rate of unemployment made up 1.9%, and in the countryside 1.6 %. In the modern conditions the system of employment has essentially changed as a result of influence of a scientific and technical progress, resources of the state, a development of business, changes in 'the human factor' itself. In the labour markets, both in the country on the whole and in the agrarian sector, the competition connected with general improvement of the economic situation in agriculture has become complicated due

to the occurrence of new trades, prestigious workplaces, an essential change of working conditions of work itself and of the 'old' trades.

In small regional centers the rate of unemployment is higher than in cities due to an absence of workplaces, a backwardness of the real sector of economy, a weak level of social services. Therefore the state policy of employment is based on the following principles [The law... 2004]:

- maintenance of equal opportunities to all physically fit citizens of Belarus irrespective of their race, sex, the attitude to religion, age, political convictions, nationality and social status in the realization of the right to work;
- giving social guarantees and payments to the unemployed;
- maintenance of the labour initiative of citizens;
- assistance and encouragement in the development of their productive and creative abilities;
- maintenance of the measures for prevention of unemployment;
- acceptance of additional measures in assisting in the employment of disabled citizens;
- maintenance of social protection in the field of employment, carrying out social actions of employment of citizens wishing to work;
- coordination of activity in the field of employment with the economic and social spheres;
- participation of trade unions, associations (unions) of businessmen, labour collectives and their formations in the development, realization and control over the fulfillment of measures in the employment maintenance in cooperation with the state bodies;
- international cooperation in the problems of employment, including professional activity of citizens of Belarus abroad and labour activity of foreign citizens in Belarus.

One of the forms of unemployment is latent. In his time Karl Marks observed a relative overpopulation in the countryside. The unemployed were the ruined peasants, who had no work, and those countrymen who had small lots of land which could not provide subsistence. The modern economic theory, besides of the agricultural overpopulation, includes into the reasons the excessive number of workers engaged in manufacturing, which now demands smaller number of workers. Workers who are not registered in bodies of employment are included into the latent form of unemployment too, being outside official statistics.

The basic source of assistance in the search of work and employment is the Service of Employment. Services given to the population by the Public Service of Employment are free of charge. The professional adviser should offer some possible and accessible variants of the most suitable trade choices with respect to the seeker's state of health and demands of the local labour market. After special testing the adviser will help to define professional suitability for this or that trade. In the Employment Center it is possible to receive information on free workplaces and vacancies of employees. After a loss of work and employment a person receives in the Employment Center a social support according to the Law of Belarus 'About employment of the population of Belarus' [The law... 2004]. If necessary the expert on the organizations of vocational training will inform on the opportunities and conditions of free-of-charge vocational training, retraining or other

chances of improvement of professional skills. The Center of Employment can provide an information on the opportunity of resettlement in the countryside and being granted work and residence, the order and conditions of receiving compensatory payments and compensation of the expenses for traveling. A consultation about the order and conditions of receiving the financial help in the form of grants and loans from the State Fund of Assistance of Employment for the establishment of an own business enterprise can be provided as well.

Consequences of unemployment are visible not only in the private life, but also influence the economy as a whole. The main 'price' of unemployment is a decrease of production and gross national product. An increase in the unemployment rate reduces the real volume of gross national product. An increase of the natural rate of unemployment by 1%, reduces the real gross national product by 2.5% in comparison to the potential gross national product (the volume of gross national product under conditions of full employment)[ The law... 2007].

Thus, today an overwhelming majority of unemployed is made up of women, youth, invalids and countrymen. A special feature of the Byelorussian employment program for 2007 is that it completely takes into account the structure of unemployment and is directed to the provision of job security to the above mentioned groups [Bestvitski 2007]. The program is directed to a stimulation of the employment policy concerning villages and small towns. Regional programs of employment should include specific proposals concerning the creation of new workplaces, the prospects of development in a given sphere, the volumes of investment resources, the opening of new production plants. The village has always remained and remains the true keeper of national traditions, the Belorussian culture and language. Therefore it is necessary to save up and keep the countryside as a source of revival of national crafts. And, first of all, it is necessary to interest the youth in the renewal and the development of national traditional crafts: embroidery, pottery and smithery .

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## **The Distribution of Direct Payments of CAP to producers amongst EU Member States**

**Abstract.** The paper attempts to contribute to the discussion of the agricultural support distribution in the framework of Common Agricultural Policy of the European Union. Author used European Commission statistics of direct payments to explore the distribution patterns across farm holdings in EU Member States. The results show that distribution of direct payments is skewed towards a small number of very large holdings in a few Member States. Across the whole EU, 85% of direct payments funded from common budget went to the largest 19% of their recipients in 2005. In Poland, income from direct payments was also unfairly distributed.

**Key words:** direct payments, common agricultural policy, distribution, producers, European Union

### **Introduction**

An important objective of expenditure under the Common Agricultural Policy (CAP) is to redistribute income or wealth. Market and income measures of the CAP are those measures most closely linked to farming. Income support covers direct payments to producers which have been the major areas of CAP expenditure.

Income distribution as a problem of agriculture has attracted the interest of many researches [see for example Buckwell & Tangermann 1999, Zaniias 2002, Anders et al. 2004, A Bond... 2004, Martens 2005, Equity and Development ... 2005, Baldwin 2005, Schmid et al. 2006a.]

The current agricultural policy instrument of direct payments to producers might be seen very much as a form of social welfare rather than agricultural policy instrument.

However, for example, according to Baldwin [2005], the CAP is a dooH niboR scheme (that's Robin Hood spelled backwards). At least in England, the CAP pays peanuts to most farmers while handing impressive amounts to big landowners, with the financing for all this support pro rata among all EU Member States, rich and poor alike. The pattern is very similar everywhere the detailed data have been released<sup>2</sup>.

In this context, the paper focuses on the allocation of direct payments to European Union farms/producers comparing their distribution between aid categories of beneficiaries in 2005.

### **Aim, data and methodology**

The paper attempts to contribute to the discussion about agricultural support distribution in the framework of Common Agricultural Policy (CAP) of the European

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<sup>2</sup> Online database of European Union farm subsidy payments is available at <http://farmssubsidy.org>

Union (EU).

Data on direct payments of several EU Member States are used to present how the distribution among farm holdings and countries differs. The data were drawn from the European Commission reports [Report ... 2005, Report... 2006].

Pursuant to Commission Regulation (EC) No 2390/1999, the services of the Commission receive from the Member States, on an annual basis, data on the payments made to the beneficiaries of the EAGGF Guarantee Section. Commission Regulation (EC) No 419/2002 permits aggregation of these detailed records. Tables and figures presented in the paper have been created using these data.

The data cover the expenditure paid as direct aid according to Council Regulations (EC) No 1259/1999 and No 1782/2003 for financial year 2005 and are based on the total amounts aggregated by every individual beneficiary identification code. Part of the expenditure (ca 3.6%) has been excluded since missing information on the final beneficiary or because of the recognized cases of problems with the identification code. Numbers of beneficiaries less than 10 have been made invisible in the tables and figures (in order to protect the anonymity), although they appear in the totals.

The figures for the 2005 financial year are based on direct payments made to beneficiaries from 16 October 2004 until 15 October 2005. In order to compare the information across all Member States, all expenditure has been converted into euro.

## **Direct payments as a tool of the CAP**

Until 1992, market price support and supply control policies were the major instruments of the CAP. In 1992, the EU adopted a radical reform of the CAP (MacSharry reform) which began the process of decoupling income transfers from agricultural production. Within the context of agriculture, decoupling means gradual reduction of the support prices for the main agricultural products and the compensation of farmers for the consequent revenue loss in the form of direct payments [Decoupling... 2001].

As a result of 2003 CAP reform, "single farm payments" (income support) have been introduced as a substitute of direct payments from 2005 on. They are based upon past entitlements of the individual holding obtained during the reference period 2000-2002 or are averaged across a region (i.e. are equal for all producers in a certain area).

Direct payments made under the CAP have been extended to Central Europe. In most of the new Member States, including Poland, direct payments have been phased in through the transitional system of the Single Area Payment Scheme (SAPS)<sup>3</sup> which generally relates to a flat rate area-based payment, with the possibility of a Complementary National Direct Payment (CNDP)<sup>4</sup>. Under SAPS, financial aid for agricultural holdings is granted on a proportional basis to the area of agricultural land, regardless of the type of agricultural

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<sup>3</sup> Eight new Member States (except Slovenia and Malta) chose SAPS due to the fact that they were not prepared for the operation of the sophisticated system of the direct payments in the EU-15.

<sup>4</sup> In Poland, pursuant to the Act of 26 January 2007 on direct payments to agricultural land [Dz. U. of 2007 No 35, item 217], direct payment scheme is composed of two parts: SAPS and CNDP. Under SAPS, payments are granted where farmers have eligible hectares of agricultural land and forage area at their disposal. There is no obligation to cultivate this land except to keep it in good environmental/agricultural condition. Under CNDP, farmers receive support for having agricultural land with specific usage (e.g. cereals, oilseeds); payments do not depend on yields.



activity. As payments are coupled to land, they will be strongly reflected in land prices.

By 2011 at the latest, those states will apply the regional model of the Single Payment Scheme. The level of community direct payments in the new Member States will progressively increase from 25% of EU-15 level in 2004 to 100% in 2013 financial year at the latest. So, until 2013 farmers in the “East” and those in the “West” will be treated differently.

Direct payments have been the most important tool of the CAP and fiscal policy in the EU. Before the implementation of Agenda 2000 (i.e. in the 2000 financial year reflecting entitlements incurred in 1999) they amounted to 25.5 billions euros, representing 63% of the CAP expenditure under the Guarantee Section of the EAGGF. After the implementation of Agenda 2000 (the 2005 financial year) they reached 33.7 billions euros (69%). Considerable increase in direct payments between 2004 and 2005 resulted from the payments for SAPS in the new Member States (1.48 billions euros).

The 2003 CAP reform raised expectations about mitigating the income/agricultural support distribution highly skewed towards the largest, high-income farm units [Schmid et al. 2006b]. But it is unlikely that the distribution of payments by size of farm will be very different in the future than it was just since they are mainly based on the historical entitlements.

## **How did distribution of direct payments vary across states and producers?**

The breakdown of direct payments by Member State and size of payment for the 2005 financial year was presented in Table 1 and Figure 1.

In 2005, 6.945 million farm holdings in the EU-25 received direct payments amounting to 32.5 billion euros.

For the 2005 budget year, reflecting the first year after enlargement, comparison between the 25 Member States is somewhat problematical as for the new Member States (EU-10) direct payments were at their lowest level, only at 25% of the full amount.

Those countries accounted for around 19% of the agricultural area but in 2005 received 4.5% of direct payments in EU-25, relatively four times less. But it should be stressed that direct payments described in this paper only cover the support provided from EU budget and therefore do not comprise the complementary national direct payments allowed in the new Member States.

For the EU-25 direct payments from the EU budget were not equally distributed. This distribution was skewed towards larger units: 1.4% of the recipients got 29.5% of the transfers (Table 1). In 2003 the corresponding numbers were 1.5% and 27% respectively [Schmid et al. 2006a].

In EU-15, ca 20% of beneficiaries received around 80% of the direct payments. In EU-10, ca 11% of beneficiaries received around 39% of the direct payments.

Small but influential group of gigantic farms (1.06 thousand of farms receiving more than 500,000 euros) accounted for only 2 tenths of one percent of all EU farms; the average payment to these farms was 880,000 euros per year.

On the other end of the distribution, farms receiving below 5,000 euros (81.5% of the holdings) collected 15.4% of direct payments (Table 1). Among them the payment per farm averaged for all farms in this group was 884 euros per year.

Poland was the ninth largest recipient of EU direct payments, accounting for 0.7 billion euros in 2005. The distribution of direct payments, which are based on farm area, is causing uneven income distribution among farmers but this financial support of the EU and national government is a key reason behind the rise in Polish farmers' income. However, area-based payments continue to increase land values benefiting landowners not operators.

More detailed information from the Commission data sets is plotted in Figures 1 and 2 which give the comparison between distribution of beneficiaries in the EU-25 and Poland.

The data for Poland indicate that farms receiving less than 5,000 euros accounted for 99.4% of all beneficiaries and obtained 80.3% of total amount of payments. For those farms, the average payment per farm was 410 euros. About 94.4% of Polish farms received less than 1,250 euros in direct payments; the average annual direct payment per farm in this group amounted to 325 euros – an amount that is too low to make much difference in an increasingly competitive market.

In contrast, in 2005, less than one percent (0.54%) of Polish farmers received nearly 20% of total direct payments. The largest beneficiaries ( $\geq 500,000$  euros) obtained in total 2.33 million euros, however their number is uncovered (less than 10).

Right now, one can at least learn the names of all Polish farmers granted EU direct payments<sup>5</sup>. In 2006, the biggest beneficiaries of direct payments were large corporations, not individual farmers. There was only one farmer in the top ten. Large amounts of euros were pocketed by big landowners, some of them people active on the political scene [Naszkowska 2007, Trębski 2007].

The data for Poland displayed in Figure 3 show that the distribution of CAP payments was actually skewed towards the biggest farms.

The distribution of direct payments varies significantly within the EU as Table 1 and Figure 1 illustrate. The numbers for Hungary, Slovakia, Germany, and Czech Republic are far, far more skewed than the EU-25 numbers. In Hungary, 53.8% of total payments were received by 2.3% of beneficiaries, in Slovakia, 62.6% of all payments went to 4.3% of the beneficiaries, in Czech Republic 40% payments were obtained by 2.9% of beneficiaries and in Germany, 41.5% of all payments went to just 4.1% of the farms.

Countries with a relatively small variation of payments among recipients include Cyprus, Latvia, Lithuania, Malta, Slovenia and Poland.

The differences in distribution of direct payments inside the EU reflect: division between old and new Member States, the various past aid regimes for different supported products, the differences in agricultural product specialization between countries and in Common Market Organisations. Thus, this distribution between Member States generally reflects the allocation of agricultural area and of livestock between them. In consequence, producers of countries specialized in milk production, in horticulture, in pigs and poultry or in Mediterranean products obtained less direct payments.

According to Tangermann [2003, 2004] while decoupling had been a big step forward in overcoming the problems of past forms of agricultural support, the next major step in policy development is in targeting support to specific objectives (environmental objectives, biodiversity, rural poverty alleviation etc.).

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<sup>5</sup> In Poland, the list of all beneficiaries of direct payments and sugar payment (covered the year 2006) was released for the first time by Agency for Restructuring and Modernization of Agriculture in July 2007. Online database is available at <http://www.arimr.gov.pl>

Table 1. Distribution of direct payments between beneficiaries in Member States, 2005 financial year

Aid categories (‘000 €)	BE	CZ	DK	DE	EE	EL	ES	FR	IE	IT	CY	LV	LT
	Cumulative % of amount												
< 0	-0.03	0.00	-0.17	0.00	0.00	-0.01	0.00	0.00	0.00	-0.01	0.00	0.00	0.00
<0-1,25)	0.92	2.30	0.31	0.75	22.86	14.90	4.42	0.49	0.86	10.23	63.38	54.31	57.03
<1,25-2,0)	2.00	4.01	0.90	1.56	28.58	24.12	7.50	1.01	2.17	15.16	72.66	61.68	63.90
<2,0-5)	8.58	8.84	4.49	6.10	42.36	51.32	18.52	3.55	11.11	29.72	89.06	74.45	74.86
<5-10)	23.84	13.65	11.86	14.73	53.87	75.28	32.38	9.78	29.99	44.68	95.98	83.20	81,51
<10-20)	49.56	19.64	26.66	31.44	68.22	91.61	52.01	26.27	57.94	60.95	98.63	91.29	86,70
<20-50)	84.31	34.20	63.58	58.43	89.06	98.26	77.31	69.17	86.78	77.50	100.00	98.03	93,71
<50-100)	97.15	59.97	85.86	69.59	96.57	99.44	88.56	93.69	96.55	87.02	100.00	99.58	98,86
<100-200)	99.24	87.74	93.80	77.13	100.00	99.76	94.98	99.24	99.50	93.14	100.00	100.00	100,00
<200-300)	99.56	96.44	95.83	81.84	100.00	99.84	96.84	99.71	99.90	95.23	100.00	100.00	100,00
<300-500)	99.89	99.47	97.03	89.04	100.00	99.92	98.02	99.83	100.00	97.08	100.00	100.00	100,00
≥ 500	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100,00

Aid categories (‘000 €)	BE	CZ	DK	DE	EE	EL	ES	FR	IE	IT	CY	LV	LT
	Cumulative % of number of beneficiaries												
< 0	1.20	0.00	0.40	0.02	0.00	0.00	0.04	0.06	0.07	0.00	0.00	0.00	0.00
<0-1,25)	17.81	45.53	14.33	18.87	86.93	66.16	51.56	16.44	12.80	69.35	97.03	95.92	96.65
<1,25-2,0)	24.76	57.78	20.53	26.46	91.04	76.31	61.11	21.96	20.51	77.46	98.43	97.65	98.17
<2,0-5)	44.71	75.23	38.65	46.75	95.99	91.30	78.02	35.05	45.34	89.40	99.68	99.21	99.43
<5-10)	66.63	83.09	55.89	64.81	97.84	97.40	87.77	49.67	70.08	94.97	99.91	99.68	99.76
<10-20)	85.73	87.96	73.31	82.30	99.00	99.54	94.63	69.16	88.98	98.03	99.97	99.90	99.89
<20-50)	97.71	92.99	93.08	95.88	99.79	99.96	98.87	92.75	98.35	99.48	100.00	99.99	99.97
<50-100)	99.79	97.11	98.70	98.39	99.95	99.99	99.70	99.18	99.76	99.84	100.00	100.00	100.00
<100-200)	99.98	99.46	99.75	99.21	100.00	100.00	99.94	99.95	99.98	99.96	100.00	100.00	100.00
<200-300)	100.00	99.89	99.90	99.50	100.00	100.00	99.98	99.99	100.00	99.98	100.00	100.00	100.00
<300-500)	100.00	100.00	99.96	99.78	100.00	100.00	99.99	100.00	100.00	99.99	100.00	100.00	100.00
≥ 500	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Table 1. Continued from previous page

Aid categories ('000 €)	LU	HU	MT	NL	AT	PL	PT	SI	SK	FI	SE	UK	EU25
	Cumulative % of amount												
< 0	0.00	0.00	0.00	-0.09	-0.02	0.00	0.00	0.00	0.00	0.00	0.00	-0.01	-0.01
<0-1,25)	0.46	18.15	63.61	2.58	3.41	60.42	12.18	71.35	2.72	1.26	1.13	0.41	4.90
<1,25-2,0)	0.78	23.74	81.09	5.67	7.18	70.19	16.86	83.21	3.61	3.23	2.26	0.88	7.24
<2,0-5)	3.62	35.73	100.00	23.94	26.07	80.27	28.67	91.62	6.64	17.30	8.39	3.63	15.37
<5-10)	13.73	46.22	100.00	53.68	53.39	84.07	39.25	93.10	10.10	44.38	20.40	9.28	26.67
<10-20)	44.15	60.62	100.00	68.94	80.53	88.02	49.12	93.97	16.42	74.56	41.79	20.00	43.44
<20-50)	87.67	69.08	100.00	80.42	95.00	94.18	65.58	95.00	37.37	95.80	74.05	45.01	70.54
<50-100)	98.80	78.98	100.00	86.64	97.45	97.26	81.84	96.19	67.88	99.32	90.11	69.96	85.66
<100-200)	100.00	92.13	100.00	89.38	98.18	99.12	94.00	97.98	92.84	99.76	96.33	88.66	92.85
<200-300)	100.00	95.91	100.00	90.27	98.62	99.46	97.61	100.00	98.83	99.91	98.08	94.41	95.11
<300-500)	100.00	98.16	100.00	91.00	98.83	99.67	99.03	100.00	100.00	100.00	98.70	97.94	97.13
≥ 500	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Aid categories ('000 €)	LU	HU	MT	NL	AT	PL	PT	SI	SK	FI	SE	UK	EU25
	Cumulative % of number of beneficiaries												
< 0	0.00	0.00	0.00	0.48	0.20	0.00	0.04	0.00	0.00	0.01	0.00	0.17	0.04
<0-1,25)	13.20	83.72	98.74	25.74	28.41	94.44	77.57	95.21	75.36	13.49	21.47	15.33	62.80
<1,25-2,0)	16.24	89.30	99.58	36.43	39.98	97.66	84.33	98.54	79.09	22.12	29.24	21.57	69.72
<2,0-5)	27.41	95.31	100.00	66.35	68.09	99.44	92.90	99.84	85.41	51.56	49.44	39.06	81.46
<5-10)	46.70	97.65	100.00	90.75	87.32	99.72	96.40	99.95	88.65	78.60	67.97	55.76	88.92
<10-20)	76.65	99.18	100.00	97.18	97.16	99.87	98.02	99.98	91.57	94.18	84.76	71.74	94.45
<20-50)	97.46	99.60	100.00	99.33	99.77	99.97	99.22	100.00	95.71	99.57	96.70	88.54	98.61
<50-100)	100.00	99.81	100.00	99.86	99.95	99.99	99.75	100.00	98.62	99.97	99.38	96.25	99.66
<100-200)	100.00	99.96	100.00	99.97	99.98	100.00	99.95	100.00	99.84	100.00	99.90	99.23	99.92
<200-300)	100.00	99.99	100.00	99.99	99.99	100.00	99.99	100.00	100.00	100.00	99.98	99.74	99.96
<300-500)	100.00	100.00	100.00	100.00	99.99	100.00	100.00	100.00	100.00	100.00	100.00	99.94	99.98
≥ 500	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00

Notes: Aid categories reflect annual size of payment (in euro) per beneficiary; "Smaller than zero" category covers beneficiaries that in total had to reimburse money to the EAGGF (recoveries, corrections, etc.); BE = Belgium, CZ = Czech Republic, DK = Denmark, DE = Germany, EE = Estonia, EL = Greece, ES = Spain, FR = France, IE = Ireland, IT = Italy, CY = Cyprus, LV = Latvia, LT = Lithuania, LU = Luxembourg, HU = Hungary, MT = Malta, NL = Netherlands, AT = Austria, PL = Poland, PT = Portugal, SI = Slovenia, SK = Slovakia, FI = Finland, SE = Sweden, UK = United Kingdom; Numbers less than 10 are invisible in the table to protect the anonymity of beneficiaries.

Source: European Commission

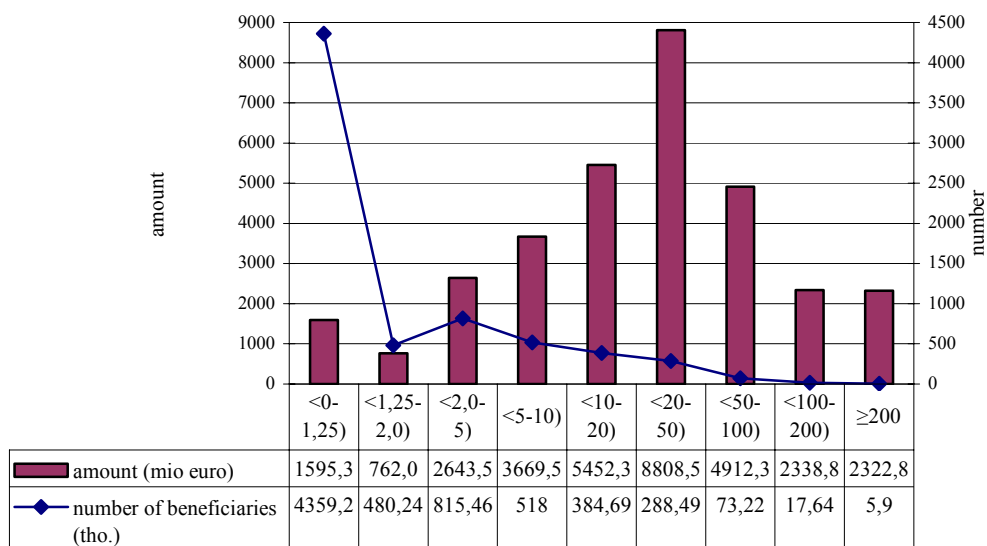


Figure 1. Distribution of beneficiaries and of direct payments in EU-25 by category of direct payments received (in thousands euros), 2005 Financial Year  
Source: Own compilation based on European Commission data.

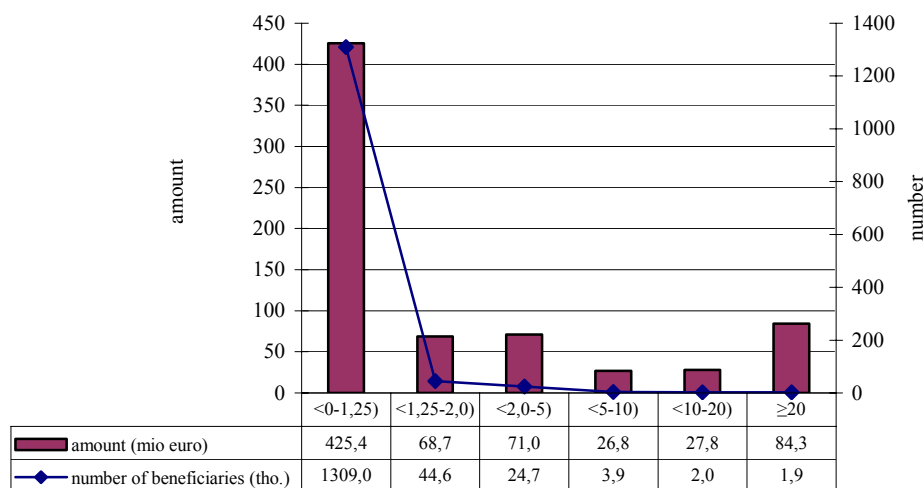


Figure 2. Distribution of beneficiaries and of direct payments in Poland by category of direct payments received (in thousands euros), 2005 Financial Year  
Source: Own compilation based on European Commission data.

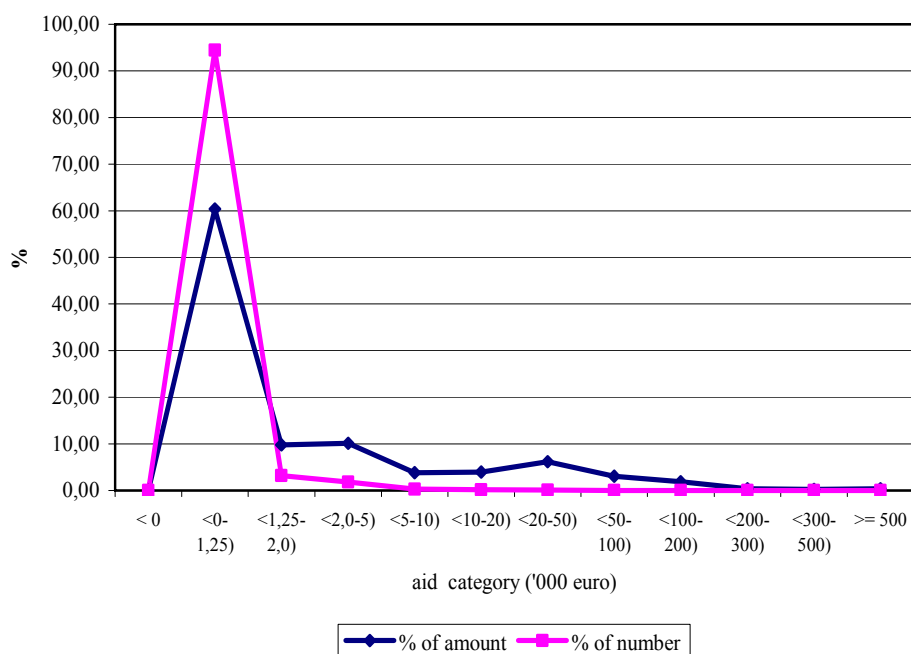


Figure 3. Distribution of direct payments between beneficiaries in Poland, 2005 Financial Year  
Source: Own compilation based on European Commission data.

## Tendencies in and expected developments of the distribution of direct payments

A comparison of the distribution of direct payments, in 2000 and 2005, reveals that the proportion of beneficiaries who collected a small amount was decreasing, as Table 2 illustrates. However, in 2005 this percentage increased compared to 2004.

Table 2. Tendency in distribution of direct payments in the EU-15, 2000-2005

Specification	2000		2004		2005	
	EU-14	EU-14	EU-14	EU-15	EU-14	EU-15
Average amount per beneficiary (euro)	5015	6708	5781	7268	6327	
Producers receiving 5 000 euros or less						
% direct payments	78.6	72.8	76.6	70.8	74.3	
% beneficiaries	17.8	11.6	12.6	15.0	13.5	

Notes: The EU-14 without Greece, as the distribution of beneficiaries in not available for this country in 2000.  
Source: Own calculations based on European Commission data [2005, 2006].

There are at least two explanations for this change:

- since on-going structural adjustment (abandonment of farm land and/or increase in size) the number of small holdings decreased;

- the implementation of Agenda 2000 has led to a rise in the level of direct payments collected by each beneficiary (with some beneficiaries changing aid category).

Highly unfair distribution of direct payments between small and large beneficiaries has regularly been questioned. One of the rationales for this questioning was that the CAP makes payments to farm owners, not to farmers (before enlargement about 40% of EU farmland was not farmed by its owner). The European Commission also has expressed on many occasions its concern with the method of distribution. In the 1992 reform, in Agenda 2000 and in the 2003 reform, the Commission proposed mechanisms to decrease or to limit the amount of direct payments of largest beneficiaries (ex. at 300,000 euros in single farm payments every year) but this proposal met with such a stiff opposition that it had to be withdrawn.

What are the expected developments of the distribution of direct payments in coming years?

According to European Commission [2006], this distribution is supposed to be affected by:

- The long-term structural development of the agricultural sector towards a reduction in the number of farms and an increase of their size.
- The model of implementation of the Single Payment Scheme (SPS) adopted by Member States. The system based on the historical payments (basic/historic system) is not expected to have a direct effect on the distribution of payments but the regional (flat rate) or the hybrid/mixed (being combination of the two) systems will generate some redistribution of direct payments between beneficiaries.
- The tradability of premium rights<sup>6</sup>, as well as its various implementing rules and conditions that may apply in each Member State.
- The introduction of the 5,000 euros “franchise” in the compulsory modulation (i.e. reduction in direct payments) mechanism; direct payments up to an amount of 5,000 euros per farm will remain free of reductions and will be exempted from financial discipline. Modulation for bigger farms started with a rate of 3% of direct payments in 2005, 4% in 2006 and will stay at 5% respectively from 2007 onwards until 2012. According to financial discipline, starting in 2007, a decline in direct payments will be proposed by Commission when forecasts indicate that the spending on CAP will be exceeded in a given budget year.
- In the new Member States, modulation and financial discipline will not apply until direct payments reach EU-15 levels (2013). The distribution of direct payments in those countries should reflect the structural changes in agriculture.

## Conclusions

1. The bulk of CAP payments come in the form of direct income support to farmers. The figures, which relate to the 2005 financial year, show that across the whole EU, 85% of direct payments go to the largest 19% of Europe’s farms (beneficiaries).

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<sup>6</sup> Single farm payment includes former arable payments, beef premia and milk premium etc. Premium rights (entitlements) can be transferred.

2. For the small farmers, the direct support does not exceed 5,000 euro a year. Such farmers constitute 81.5% of all beneficiaries.
3. While the direct payments to small farmers can, in the long run, be convincingly justified in terms of income policy or in terms of the socio-economic context, it is obvious that small number of rich farmers in Europe is placed at an unjustified competitive advantage. Moreover, the different levels of the direct payments between the EU-10 and EU-15 have not ensured a level playing field.
4. In the context of social welfare system, CAP income support is quite unlike any other; apart from the fact that payments principally benefit the biggest farms in the richest EU countries, they are not linked to the income levels in the rest of national society, there is no maximum value of claimed income support, nor any maximum time period for its eligibility.
5. From an economic point of view, the key question is whether and under what circumstances the EU should continue direct payments as a specific, sectoral income policy in the long run. Redefining direct payments as a social policy instrument is also necessary. They must have a different basis than at present so as to achieve sustainable objectives [see also Buckwell & Tangermann 1999].
6. The Single Payment Schemes cannot be considered a good basis for the future of EU agricultural policy given that they are the continuation or sometimes modification of past support to agriculture and have established a powerful interest group in favor of their continuation, despite their advantages or disadvantages [see also Thomson & Davidova 2007].

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