Analysis of agri-environmental measures in Hungary – a regional perspective

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Abstract

The hypothesis behind this paper is that agri-environmental measures (AEMs) in Hungary, and probably in the other EU New Member States, are not merely substitutes for traditional agricultural subsidies, but measures which could support rural development and encourage environmentally sustainable agricultural production. The first part of this paper examines concepts closely related to AEMs, as well as the place of AEMs in regional, rural, and agricultural development policy. The second part shows how agri-environmental measures have gained ground in Hungary. The third part presents the results of an analysis of the Hungarian AEMs' database. Finally, based on the literature and analysis findings, it is suggested that, for sustainable development, one needs to economically evaluate natural resources in agriculture.

Keywords

agri-environmental measures, Hungarian agriculture, multifunctional agriculture, sustainable development

1. Introduction

Currently there is a debate surrounding agri-environmental measures (AEMs), as to whether they are only repackaged covert price supports and production subsidies designed to gain access to the "Green Box"[2] category or whether they actually encourage environmentally sustainable production and rural development (Baylis et al., 2006; Claassen – Morehart 2006). This paper seeks to help to answer this question by analysing the Hungarian AEMs' results from 2005 and by emphasising the importance of sustainable development and multifunctional agriculture within regional development.

As natural resources form part of national wealth, it is pertinent to answer Gáthy's (2007) question: "how much land do we need, can we occupy from nature," and what form should it assume, especially related to energy crops' increasing demand for territory and also to climate change?

1.1. Sustainable development and multifunctional agriculture

As a primary sector activity, agriculture is strongly linked to natural resources. Examining AEMs requires a proper understanding of definitions for sustainable development and multifunctional agriculture. Nowadays these concepts are frequently used, but often in a broader context than they should be. Van Huylenbroeck et al.'s 2007 study on agricultural

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[2] In World Trade Organisation terminology, subsidies in general are identified by "boxes" which are given the colours of traffic lights: green (permitted), amber (slow down - i.e. be reduced), red (forbidden). The Agriculture Agreement has no red box, although domestic support exceeding the reduction commitment levels in the amber box is prohibited; and there is a blue box for subsidies that are tied to programmes that limit production. Green box subsidies must not distort trade, or at most should cause minimal distortion. They have to be government-funded (not by charging consumers higher prices) and must not involve price support (WTO, without year).

multifunctionality provides the author of this paper with a good basis for clarifying the term.

The dilemma surrounding the definition of sustainable development is often transferred to different problems such as food supply for the increasing world population, or to bioenergy production to alleviate the depletion of non-renewable energy resources and so on. For the author of this paper, whose opinion is also backed by the literature (e.g. WCED, 1988; Láng, 2001; Meadows et al., 2005; Gáthy et al., 2006), sustainable development means development in harmony with nature. This is supported by the fact that the definition was created as a tool to manage environmental problems. Agriculture is one of the economy's primary sectors and its principal resource is natural capital. Van Huylenbroeck et al. (2007) states that "multifunctional agriculture" became an international issue as early as 1992 at the Rio Earth Summit. In the author's opinion the term surfaced in Rio because from a sectoral viewpoint sustainable development can only be achieved if agriculture is multifunctional.

The concept of multifunctionality has been closely related to the Common Agricultural Policy (CAP) since its second reform in 1999, when rural development became the second pillar of the CAP and formed an integrated part of it.

To clarify the definition multifunctional agriculture, the author agrees with Van Huylenbroeck et al. (2007:8) that "as an analytical concept, multifunctionality refers to the fact that one activity can have different outputs. It is thus related to an economic activity, while diversification means that different economic activities (e.g. food production and tourism) are combined within the same unit. Pluri-activity refers to the fact that one person or group of persons are involved in different activities (e.g. farming or non-farming)."

The working definition for multifunctionality, which is used by the OECD (2003), associates multifunctionality with particular characteristics of agricultural production and its outputs, namely:

- the existence of multiple commodity and non-commodity outputs that are jointly produced by agriculture,
- some of the non-commodity outputs may exhibit the characteristics of externalities or public goods, such that markets for these goods function poorly or are non-existent.

This paper analyses multifunctionality of agriculture in terms of green functions, in relation to groupings designated by Van Huylenbroeck et al. (2007:7): "In the broadest sense, multifunctionality includes four kinds of functions provided by agricultural enterprises. The green functions consist, amongst others, of landscape management and the upkeep of landscape amenities, wildlife management, the creation of wildlife habitat and animal welfare, the maintenance of biodiversity, improvement of nutrient recycling and limitation of carbon sinks. Other public benefits that can be created by agriculture are the blue services and contain water management, improvement of water quality, flood control, water harvesting and creation of (wind-) energy. A third kind are called yellow services and refer to the role of farming for rural cohesion and vitality, ambience and development, exploiting cultural and historical heritages, creating a regional identity and offering hunting, agro-tourism and agro-entertainment. Finally, many authors acknowledge the white functions produced by agriculture, such as food security and safety."

The new Rural Development Regulation (EC, 2005) constructs a rural development policy along four axes, which are as follows:

Axis 1: Improving the competitiveness of the agricultural and forestry sector
Axis 2: Improving the environment and the countryside
Axis 3: Quality of life in rural areas and diversification of the rural economy
Axis 4: Leader

There are instruments – particularly related to Axes 2, 3 and 4 – which are budgetary sources available for financing the production of non-commodity outputs. The Regulation stipulates that a minimum of 10 % of the total fund has to be allocated to Axis 1, 25% to Axis 2, 10 % to Axis 3 and 2.5-5% to Axis 4. As far as the breakdown of National Rural Development Strategic Plans are concerned Forgács (2007) states that " no clear relationship can be recognised between the farm structure and budget allocation structure of the CEECs" .

For example, according to the European Commission (EC, 2007), the 2007-2013 Axis 2 share provided from the European Agricultural Fund towards rural development for the following countries' Rural Development Programmes is: 55% in the Czech Republic, 50% in Slovakia, 38% in Lithuania, 33% in Hungary and 32% in Poland.

Lichtenberg (2002:1255) states that: "even when explicit markets for environmental quality are lacking, implicit linkages between agricultural productivity and environmental quality may give farmers incentives to provide some environmental protection. Policy discussions have traditionally referred to these incentives under the rubric of stewardship" .

Agri-environmental measures could be interpreted as an instrument of multifunctional agriculture, meaning payments for mostly non-commodity outputs produced by farming when environmentally sound practice is carried out over the markets stewardship regarding farmers.

1.2. Territorial cohesion and agri-environmental measures

Besides its production function, agriculture's environmental and social functions depend on regional characteristics (Popp, 2003; Ángyán et al., 2007). Social function differs among EU-27 regions because farm structure differs among EU member states. Compared to the EU-15, the number of agricultural holdings under one European Size Unit (ESU)[3] is much higher in those countries which joined the EU in 2004 and 2007. For example, in terms of utilised agricultural area, farms under 1 ESU constitute 25.6% of the total in Romania, 11 % in Poland, and 5.2 of Hungary. If we examine the proportion of these farms regarding regular labour force, the percentage is much higher (Figure 1).

Ángyán (2005) divided regional land use systems into three basic groups endowed with the following characteristics: 1. where the main function is production; 2. duality, where both production and environmental functions exist; and 3. where the main function is environmental management. Ángyán further contends that regional land use traits should determine the farmer's primary source of income. The earnings for the first group derive mainly from selling commodities and getting direct payments. In the second group, where production and

[3] For each activity on a holding, or farm, a standard gross margin (SGM) is estimated, based on the area (or the number of heads) and a regional coefficient. The sum of all margins, for all activities of a given farm, is referred to as the economic size of that farm. The economic size is expressed in European Size Units (ESU), 1 ESU being equal to EUR 1200 of SGM.

environmental functions exist, the proportion of rural development payments increases. And in the third, meaning environmentally designated regions, rural development payments play the most important role.

In the United States of America there is also a similar statement pertaining to farms. Claassen and Morehart (2006) point out that there are striking differences in the distribution of commodity and conservation payments across farm types and regions. Most income support payments go to large commercial farms, while most conservation payments go to rural residence farms[4].

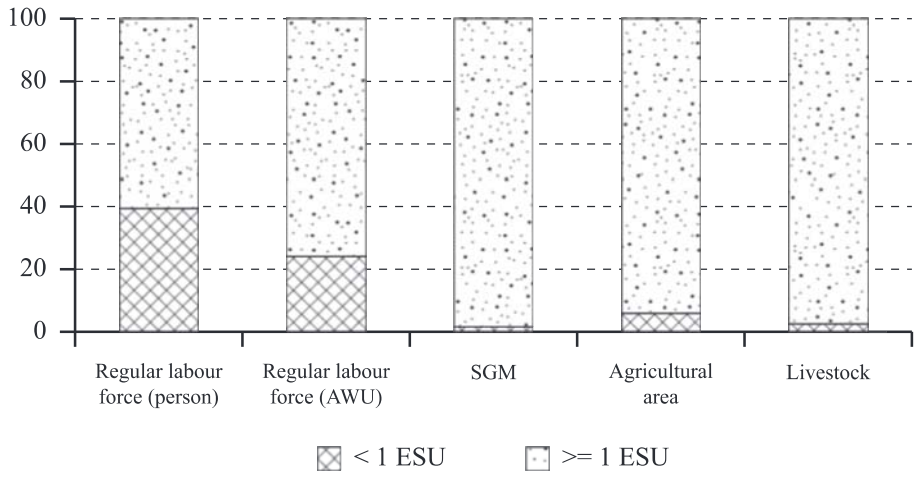


Figure 1: **Results of the farm structure survey, 2005, EU-27**
Source: Eurostat, 2007

Referring to other studies, Van Huylenbroeck et al. (2007) also states that farms that are less cost oriented seem to be more inclined to switch their farming system and to incorporate other functions into their activities.

This territorial nature of agricultural production also underlines the importance of the shift from sectoral to territorial development. It also means that it is important to identify the best guideline for interconnecting regional, rural and agricultural development, especially with respect to protecting the environment.

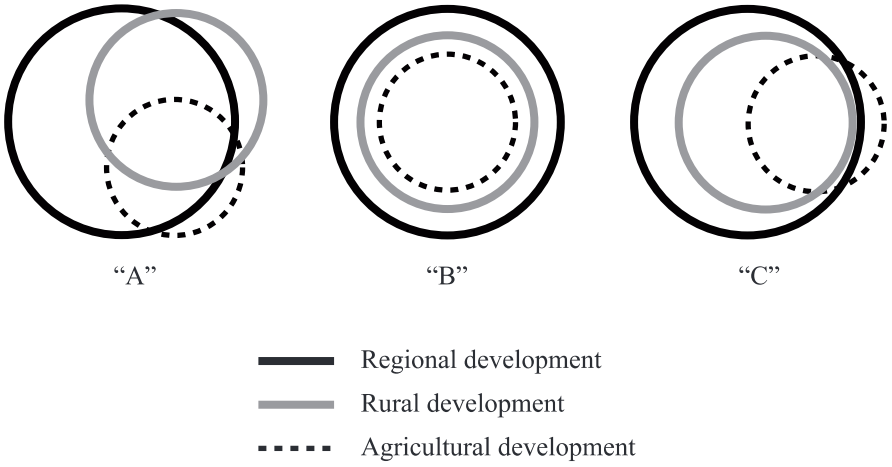
The relationship between these policies is viewed differently by the various players and there is no commonly accepted formula. In a workshop recently organised by the Cross-Border Centre of Expertise in Rural Development (HVTK) in Debrecen, three forms were identified (Figure 2). A slight majority of the participants believed that, although there was considerable overlap among the three, each also had some unique aspects (version A). A smaller number believed that agricultural development fell entirely within rural development, which in turn fell entirely within regional development (version B). The least favoured

[4] Commercial farms are large family farms with sales above USD 250,000 and some non-family farms organised as cooperatives or non-family corporations. Intermediate farms have sales below USD 250,000 and the operator reports farming as his or her major occupation. Rural residence farms have gross sales below USD 250,000 where farming is considered to be a secondary activity both in terms of resources invested in the farm and the amount of income it contributes to the farm household. (Eurostat, 2007).

option (version C) was that rural development fell entirely within regional development but that agricultural development had some unique aspects (Fieldsend and Katona-Kovács, 2007).

Although all three versions agree that rural development is a broader category than agricultural development, in the EU rural development policy falls under agricultural policy, and regional policy tends to be urban focused. This is especially a problem for those territories with an environmental determinate.

To achieve the aims of AEMs examined in this paper, those AEMs integrated into both agricultural and rural development policy should also be considered in terms of regional development policy. Shucksmith et al. (2005:202) states that: "the integrated development of land use, linkage to other local sectors and the creative development of region-specific



programmes are necessary to enhance the cohesion aspects of the CAP".

Figure 2: **Perceptions of participants in an HVTK workshop on the relationship between regional, rural and agricultural development**

Source: Fieldsend - Katona-Kovács, 2007

1.3. Agri- Environmental Measures in Hungary

Financial resources for measures similar to AEMs first became available in Hungary in 1997 and this was when farmers wanting to begin organic farming on their land could apply for payments. Between 1997 and 2001 about EUR 2 million was made available for this purpose.

This scheme was followed by the National Agri-Environmental Protection Programme (NAPP), which Hungary initiated in 2002. It was based on Council Regulation (EEC) 2078/92 and was part of the National Environment Protection Programme. In 2003 the NAPP provided EUR 18 million in payments (nearly twice the EUR 10 million available in 2002) for agri-environment protection. From this total, EUR 2 million was spent on animal husbandry.

The programme comprised five horizontal and one zonal action programme. The nation-wide horizontal action programmes were:

- Basic programme for agri-environmental management
- Integrated plant cultivation
- Organic farming
- Pasture management
- Wetland areas

The zonal, regional programme targeted environmentally sensitive areas (ESAs).

In 2002 there were more than 5,000 applicants, and from these 2,691 were successful in obtaining funding (Szabó et al., 2003) while in 2003, out of 7,529, there were 5,114 successful applicants. Those farmers taking part in given action programmes were able to apply for complementary payments for animal husbandry and in 2003 around 900 applicants obtained this kind of payment. In 2003 successful NAPP applications covered around 240,000 ha, or 4% of Hungary's agricultural area. The amount of land designated by the Action Programmes was as follows:

- Pasture management - 38%
- Organic farming - 25%
- ESAs - 18%
- Wetland programme - 8%
- Basic programme - 6%
- Integrated programme - 5%

At the NUTS II level, the North Great Plain (NP) was placed first with a territory of 72,041 ha (30.5% of the total), North Hungary (NH) and the South Great Plain (SP) were second and third with 21.0% and 20.0% respectively. They were followed by Central-Transdanubia (CD) at 10.0%, South-Transdanubia (SD) at 8.0%, Central Hungary (CH) 5.5% and West Transdanubia (WD) at 5.0% (Katona-Kovács et al., 2005).

Although the SAPARD Programme[5] allowed the Central and Eastern European Countries (CEECs) to include AEMs in their implementation plans, the various countries did not view AEMs as a priority item. In general, countries intended to devote less than 5% of SAPARD funds to AEM schemes. For example, from their SAPARD budgets, Hungary planned to allocate 4.2%[6], Slovakia 3.5%, the Czech Republic 3%, Poland 2%, Estonia 1.4%, and Latvia 4%. Almost every country spent the majority of its SAPARD designated budget (around 60-70% of the budget) on restructuring the "classical" agricultural sector, for example on investments in agricultural holdings and processing/marketing (Zellei, 2001).

After EU accession, Hungary had to prepare a National Rural Development Plan (NRDP) that included Hungarian regulations for AEMs to meet funding requirements from the EAGGF Guarantee Section. The payments, which were linked to meeting certain designated specifications, were paid annually in terms of area (per hectare) to agricultural producers to compensate them for extra costs and revenue losses they assumed by meeting the specifications. NAPP linked AEMs were included in the NRDP and new AEMs were also introduced. These measures aroused farmers' interest. In 2004 around 30,000 applications

[5] The SAPARD Programme was prepared for the period 2000-2006. As a result of the accession to the EU funds from this programme were available until May 2004.

[6] Finally Hungary did not spend budget resources for AEMs from SAPARD.

covering about 1.8 million hectares were submitted but farmers were not informed of the results until February 2005. This meant that farmers wanting to implement NAPP linked AEMS did not receive a subsidy in 2004. However, in 2005 Hungarian area covered by AEMs increased six-fold, representing 25% of the nation's agricultural area, meaning around 1.5 million hectares. Farmers could also apply for animal husbandry payments and in this regard the NAPP received around 900 such applications. Farmers were able to receive funding for native livestock breeds. A very high percentage (in most cases over 50%) of native breeds such as the "racka Hortobágy sheep" was entirely absorbed into the Programme. However, this study does not analyse these data, only those related to territory.

The next AEM initiatives are illustrated in the New Hungarian Rural Development Programme (NHRDP). The initial schedule for AEMs is as follows: 2008: anti-erosion measures (wind and water erosion), changes in environmental land use and nature conservation schemes (grassland), and maintaining wetlands and creating wetland habitats In 2009, after current NRDP schemes are phased out, the other schemes will commence. As with the earlier programmes (NAPP, AEMs in the NRDP), NHRDP agri-environmental support measures are undertaken in terms of established plans and include area-based supports which are composed of horizontal and zonal elements. If one considers agriculture areas' various characteristics, and what it takes to implement high quality environmental management programmes, 22 different schemes have been defined within the given plan's framework, which are: nine for arable plant production, six for grassland management and planting, three for environmentally friendly management of plantations and four for managing wetlands. Based on trends in agricultural land use, the plan can be divided into four sub-measures: arable farming, grassland management, permanent crops (fruit and grape production) and wetland management. Potential measures between 2007 and 2013 will be as follows (MARD, 2007) (the measures in bold were also financed from the NRDP):

A. ARABLE FARMING SCHEMES
A.1. Integrated arable crop production scheme
A.2. Management of traditional homestead scheme
A.3. Organic arable crop production scheme
A.4. Zonal schemes for nature conservation on arable land
A.5.Anti-erosion schemes
B. AGRI-ENVIRONMENTAL MEASURES PERTAINING TO GRASSLANDS
B.1. Extensive grassland management initiative
B.2. Organic grassland management scheme
B.3. Zonal initiatitves for nature conservation in grasslands
B.4. Initiatives for the conversion of arable land into grassland management
C. AGRI-ENVIRONMENTAL MEASURES FOR PERMANENT CROPS
C.1. Integrated fruit and grape production scheme
C.2. Organic fruit and grape production scheme
C.3. Traditional fruit production initiative
D. AGRI-ENVIRONMENTAL MEASURES FOR OTHER LAND USE
D.1. Reed management scheme
D.2. Scheme for the maintenance of natural wetlands, marshes, bogs
D.3. Scheme for the establishment **and management of wetlands**

Because of the great interest shown in NRDP linked AEMs, only those farmers who successfully applied for funds in the NRDP's first year (2004) were able to benefit. This means that until 2009 it is impossible to participate in current measures. Because of limited funds, some NRDP linked AEMs were not initiated, mainly those with higher environmental requirements (e.g. long-term environmental aspects, rare plant maintenance, wet grassland maintenance, bogs and marshland).

2. Methodology

In July 2003 the Hungarian national Agricultural and Rural Development Agency, (English name ARDA), was established. ARDA deals with funding agency activities. Its activities include receiving, assessing, and authorising applications. They also include support allocation, payment transfers, registration and accounting. This paper is based on ARDA's year 2005 database for AEMs.

Firstly, in order to analyse the importance of the various measures, data relating to the number of applications, territory, and funds were grouped according to the given AEMs. For the grouping pertaining to the Ministry of Agriculture and Rural Development's 150/2004 regulation (MARD, 2004b), territories were analysed according to how strict the measures were. In terms of regulatory strictness, AEMS were assigned a score from 1 to 4, and the higher the score, the more environmentally friendly the farming.

In the next step the database was analysed in terms of NUTS II regions. For measures related to rural development the territorial aspect is highly significant. In Hungary rural development programmes such as SAPARD, NRDP, NHRDP are prepared at the national level. However, rural areas and farms structures differ, and it is thus imperative to analyse the role of the different measures at the regional level. The results of an earlier study (Katona-Kovács, 2007) on the Single Area Payments Scheme (SAPS) showed that the structure of those farms receiving SAPS payments are more concentrated in western Hungary. The SAPS data also served as a basis for further research, indicating that the concentration of farms receiving SAPS payments were also linked to concentration of farms operating under AEMs at the NUTS II level. To determine if there is a link between farm structure and multifunctionality, analysis of a possible relationship between the AEMs'strictness and farm size was carried out.

Our question was whether or not AEMs are simply substitutes for traditional agricultural subsidies or measures which could support rural development and encourage environmentally sustainable agricultural production. To answer this question we endeavoured to determine if there was a correlation between natural protection and the NUTS III regions falling under the AEMs' umbrella and those regional areas defined as "Less Favoured" in regulation 137/2004 (MARD, 2004a).

Finally, following the method of an earlier study that researched NAPP (Szabó, et al. 2003), regional intensity indicators were calculated (applications were related to utilised agricultural area) and were correlated with those of NAPPs.

3. Results

Farmers were the most interested in the Arable stewardship scheme (ASS) (Annex 1). Presumably ASS criteria were the easiest for farmers to achieve. UAA is an abbreviation referring to the structure of utilised agricultural area, and in terms of UAA the ASS was viable for a wide range of Hungarian farmers. One of the ASS programme's major aims is achieving the correct nutrient balance in the soil.

The second most common scheme was the integrated crop management scheme, which is similar to the ASS programme, but has stricter criteria. Sharp interest in these measures caused a change in ranking regarding the measures compared to the NAPP where grassland management entailed the most territory, followed by organic farming and ESAs. In terms of AEM strictness, the NRDP's four regulatory categories (MARD, 2004b) ranked as follows: 69.8% of the territory lies in the first category, which specify the less normative, 19.5 % falls in the second category, 6.9% in the third, and 3.8% in the fourth (Figure 3).

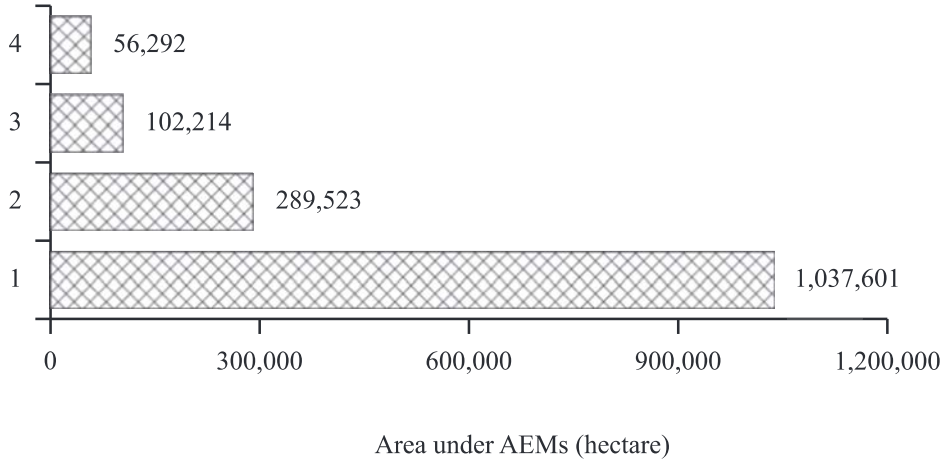


Figure 3: **Area under AEMs ranked in terms of the different measures' strictness.**
Source: Author's own calculation from the database

There is only a small change regarding NHRDP funds (2007:235-236) but special attention has been paid to the fact that the share of zonal schemes with higher environmental performance should increase in relation to NRDP data, and consequently, a major part of Hungarian agri-environmental resources should be directed (Table 1) toward solving area specific problems. Table 1 illustrates changes needed for directing subsidies toward farms representing the greatest environmental benefits.

Table 1

Percentage of zonal schemes in the NRDP and in the NHRDP

	Horizontal		Zonal	
	RDP	NHRDP	RDP	NHRDP
Share of area coverage	92	64	8	36
Share of allocated budget	88	61	12	39

Source: NHRDP, 2007:233.

The amount of support differs according to AEMs (Annex 2). The average funding per hectare is EUR 116, which is 1.6 times greater than the NAPP per hectare funding average. The average funding per application is around EUR 6,000, which is 1.8 times higher than the NAPP. The increase in funding differs between measures and is more pronounced when the regulation is stricter. For example, funding for the Grassland stewardship scheme increased by 80%, while funding for the HNVA increased by about 220%. Because funds differ between AEMs the territorial breakdown and funding somewhat vary from each other. As fruit and grape production schemes get the highest funds, 10% of total funds go to this group despite the small (3%) territory involved in the Integrated fruit and grape production scheme (IFGPS). As this programme has one of the smallest average farm sizes per application (Annex 2), the number of applications is the second highest. The average farm size per application was 46 ha for the NAPP and 51 ha for NRDP's AEMs. Possible reasons for the increase in farm size are:

- that the area under NRDP's AEMs in the western Hungarian NUTS II regions grew by a higher percentage (in the western regions the area under NRDP is ten times higher than for the NAPP, while in the eastern regions it is five times higher), this related to area under NAPP's AEMs (Annex 3), and
- that arable stewardship and integrated crop management cover the biggest area.

Table 2 contains the AEMs' breakdown between NUTS II regions. Although it can be seen that the AEMs' area growth was higher in the western NUTS II regions, those regions which are in eastern Hungary (in Table 2 and Annex 3 'E' means eastern and 'W' means western) still attract greater interest. The three NUTS II regions in the eastern part of the country entail 54.4% of the programme's total territory.

Table 2

Breakdown of AEMs by NUTS II regions as percentages (Hungary = 100%)

	NP * E**	SP E**	NH E**	CH	CD W**	SD W**	WD W**
Territory covered	20.6	20.6	13.2	8.0	12.4	15.0	10.1
Funding allocated	20.0	21.1	15.1	9.0	11.2	13.9	9.6
Number of applications	28.7	29.8	12.9	5.6	7.2	9.6	6.0

* North Great Plain (NP) South Great Plain (SP) North Hungary (NH) Central Hungary (CH) Central-Transdanubia (CD) South-Transdanubia (SD) West Transdanubia (WD)
** E- eastern, W-western part of Hungary
Source: Author's own calculation from the database

In examining the relationship between the programmes and environmental protection, the territory of NUTS III regions (counties) under natural protection, LFA, NAPP and NRDP was related to the total territory of the counties and correlated afterwards. Results show that estimating the correlation between the percentages of NAPP counties' areas to percentages of counties' areas under natural protection, the correlation coefficient value was r=0.55 (at the 0.05 level) which indicates a positive relationship, while for the NRDP it decreased and is zero. Results are the same for LFAs, where the correlation coefficient decreased from 0.67 to 0.22 (at the 0.05 level).

The average farm size per application is higher in western Hungary (Annex 3). An earlier study on the single area payment scheme (SAPS) (Katona-Kovács, 2007) also revealed that the farms in western Hungary are more concentrated. For communities where one application was submitted (representing 10% of the total number of the applications) 5% of the applications were over 300 hectares, covering 60% of the territory.

Upon evaluation of the various applications, it was observed that out of a maximum 100 points, 30 were related to regional agricultural employment. Along these lines, examining AEMs indicated a strong correlation between the number of applications per region and the number of persons employed in agriculture; Pearson Correlation is significant to 0.866 at the 0.05 level (2-tailed). Fehér's results (2005:132) for employment in the NP and NH regions indicate that the bigger the average size of a farm, the lower the number of employees. In eastern Hungary farms applying for NRDP funding are smaller, and this indicates that there employment plays a greater role in terms of the applications.

Examining the intensity indicators, the regional interest in AEMs (NRDP application/1000 hectares UAA) followed that for NAPP (NAPP applications/1000 ha UAA), Pearson Correlation is significant 0.826 at the 0.05 level (2-tailed).

4. Discussion

Agriculture and the environment are closely related. Agriculture externalities have both positive and negative effects on the environment and regulations should aim to lower the negative and increase the positive effects. This is very difficult as positive externalities are often agricultural non-commodity outputs. Liberalisation of world trade raises competition between farmers and this enhances intensive farming. Growing demand for energy crops (competition between feed, fodder and fuel for the UAA) as renewable resources also sparks intensive farming. Secchi and Babcock's (2007) results demonstrate that the environmental impact (sediment losses, nitrogen losses) increases dramatically as higher product prices cause more and more environmentally fragile land to enter into production. Meadows et al. (2005) emphasise the importance of choosing options with long-term costs and benefits.

The analysis results failed to support the hypothesis that NRDP's AEMs are not merely substitutes for traditional agricultural subsidies, but measures which could support rural development and encourage environmentally sustainable agricultural production This is because, for the NAPP, the results revealed a positive correlation between the proportion of counties areas involved in AEMs and the proportion of county areas under natural protection and LFAs. However, for the NRDP, the correlation was either low or non-existent. Thus, the NAPP served those aims better. One of the explanations for this negative change is the increase in area under arable stewardship measures in terms of those measures with a higher

strictness level. The increase in arable stewardship measures and integrated crop management also meant a higher average farm size. These two measures cover 60% of the area under AEMs in western Hungary, but under 50% in the eastern part of the country. There was a strong correlation between the average farm size per NUTS II region and the percentage of these two measures from the total area under AEMs.

Although there is a strong correlation between the number of applications per region and the number of persons employed in agriculture, the hypothesis, that "AEMs support rural development" requires further examination. One of the reasons for this is that a high proportion of payments related to AEMs (ASS, Integrated crop management, Grassland stewardship) goes to those farmers with arable land or pasture. Although these farms are less intensive than conventional farms, they do not need more labour.

To achieve sustainable development, negative externalities must firstly be decreased. This could be achieved through the "polluter pays" principle. The CAP tries to achieve this goal through cross-compliance, meaning for farmers not observing environmental regulations subsidies are limited or withheld. One of the most important ASS goals was establishing nutrient balance in the soil. Cross-compliance regulation is also an effective means of attaining this objective.

From 2009 onwards the NHRDP ASS measure will not be applied. This could mean that AEMs' measures will better encourage environmentally sustainable agricultural production and rural development. It is also important for farmers to permanently remain within the framework.

Results show that with SAPS there is a concentration in terms of farm size linked to AEMs. As funds are limited, following a 2002 Commission proposal, a ceiling of EUR 300,000 should be placed on payments for each farm. The NHRDP addresses the need for a ceiling with some AEMs as it states that the largest eligible monocrop parcel cannot exceed 75 ha 7 (MARD, 2007).

As regional, rural and agricultural development are tightly linked, it is vital that in practice different programmes, funds, and institutions for regional, rural, and agricultural development be associated with each other. In relation to CAP funds, tools have been used to develop information technology, and adequate availability of information[8]. This endeavour has made available a lot of data regarding the regions' territories (farm size, LFA, AEMs, Natura 2000). These data could constitute the supply side, providing a foundation for economic valuation for regional natural resources, which could prove useful when preparing the programme.

[7] Arises the question why 75 hectares?

[8] Buckwell (2007:13) also states that „a completely new administrative system had been set up across the whole EU involving the mapping of agricultural land".

Annex 1

Breakdown of AEMs according to the territory, applications and funds, 2005

Scheme	Strictness	AEM as a percentage of the total territory	AEM as a percentage of the total fund	AEM as a percentage of the total number of applications
Arable stewardship scheme	1	50.33	42.5	38.2
Integrated crop management	2	17.01	19.5	11.1
Integrated fruit and grape production scheme	1	3.00	10.0	20.9
Grassland stewardship scheme	1	13.92	7.1	15.0
Arable farming in High Nature Value Area	**4**	**3.46**	**6.9**	**3.5**
Alfalfa production for great bustard habitat development	**3**	**0.33**	**0.8**	**0.7**
Grassland development in HNVA	**3**	**4.27**	**4.7**	**3.1**
Organic farming scheme in conversion	3	1.14	1.7	1.4
Organic farming converted	3	1.46	1.6	1.2
Organic grassland management scheme	2	2.73	1.2	1.0
Organic fruit and grape production conversion	2	0.06	0.2	0.6
Organic fruit and grape production converted	2	0.04	0.1	0.4
Apiculture cropping	1	0.01	0.0	0.1
Tanya (homestead) farming system	1	0.21	0.3	1.5
Reed management	1	0.82	0.6	0.6
Extensive fishponds	1	1.56	2.7	0.6
Total		100.00	100.0	100.0

Source: Author's own calculation from the database

Annex 2

Average farm size and funds based on hectare for AEMs

Scheme	Hectares/ application	EUR/ hectare
Arable stewardship scheme	68	98 *173
Integrated crop management	78	133 *224
Integrated fruit and grape production scheme	7	388
Grassland stewardship scheme	48	59
Arable farming in High Nature Value Area	**50**	****from 204 to 251**
Alfalfa production for great bustard habitat development	**25**	**267**
Grassland development in High Nature Value Areas	**71**	****from 110 to 294**
Organic farming scheme in conversion	41	*177 326
Organic farming converted	60	*126 200
Organic grassland management scheme	119	59
Organic fruit and grape production conversion	6	396
Organic fruit and grape production converted	6	278
Apiculture cropping	4	75
Tanya (homestead) farming system	7	*145 216
Reed management	70	86
Extensive fishponds	139	204

* Higher subsidies are for vegetables.
** Amount of the subsidy depends on the kind of birds under protection.
Source: Amount of support per hectare from MARD, 2004b. The average farm size is author's own calculation on the basis of the data.

Indicators for NUTS II regions according to NAPP and NRDP

	NP E	SP E	NH E	CH	CD W	SD W	WD W	Total
**Number of applications in the AEM of the NAPP	1,854	1,053	851	212	440	320	272	5,002
Number of applications in the AEM of the NRDP	8,315	8,626	3,722	1,621	2,095	2,788	1,740	28,931
**Hectares under AEM of the NAPP	72,041	46,814	49,692	12,928	22,945	19,307	11,480	235,207
Hectares under AEM of the NRDP(1000 hectares)	306.6	306.5	196.4	119.1	184.3	223.0	149.8	1,485.6
Hectares/application of the NRDP	36.9	35.5	52.8	73.5	88.0	80.0	86.1	51.4
UAA (1000 hectares)*	1,269.6	1,324.5	751.5	397.6	642.3	835.7	649.2	5,870.4
***LFA 1000 hectares	331.7	274.8	91.4	23.5	76.4	10.5	70.2	878.6
NAPP applications/1000 hectares UAA	0.83	0.43	0.62	0.34	0.28	0.21	0.18	0.46
NRDP applications/1000 hectares UAA	6.5	6.5	5.0	4.1	3.3	3.3	2.7	4.9
Number of person employed in agriculture*	18,563	21,182	9,244	9,280	12,326	15,186	11,300	97,081
NRDP applications/person employed in agriculture	0.45	0.41	0.40	0.17	0.17	0.18	0.15	0.30

* HCSO, 2006,
** Katona-Kovács, 2006
*** Katona-Kovács et al. 2006
other data are result of own calculation based on the database of ARDA.

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