TRENDS IN GREENHOUSE GAS EMISSION AND MITIGATION ACTIVITIES IN HUNGARY AND IN ROMANIA

Lazányi János

University of Debrecen Centre for Agricultural Sciences
4032 Debrecen Böszörményi út 138

Abstract

There are evidences that the climate is changing and the effects on agriculture and wildlife are discernible. Spring is occurring earlier and autumn later, with a consequent change in the growing period. Climate change is also predicted to result in more frequent droughts, increased flooding, all of which will impact upon agriculture and forestry. Climate change has physical effects on farming and farm based wildlife in the region. Agriculture need to adapt to climate change by exploring which crops and farming systems are are more suitable for the condition changed. Rural development requires strategic approach to competitiveness, job creation and improved governance in the coming years to mitigate climate change.

The Rural Development Programmes (RDP's) for Hungary and Romania are based on healthy functioning of the environment and economy. It is focused on the (i) environmental stewardship (enhancing the environment and countryside), (ii) making agriculture and forestry more competitive and sustainable, (iii) enhancing opportunity in rural areas – investing in skills, enterprise and innovation, targeting support to those in rural areas that need it most. Mitigation activities discussed in this paper are focused on the RDP's of Hungary and Romania (2007-2013) and aimed at reducing the effects of climate change in Bihar-Bihor region.

As a result of Common Agricultural Politics, many aspects of the environment, such as the quality of air and water are improving, but the challenge is to encourage production and consumption patterns to reduce environmental impacts and mitigate green house gases. This creates opportunities for less resource use, pollution and waste throughout the entire food chain and consequently increases competitiveness of farming and food businesses. This can be achieved through raising awareness of the economic and environmental opportunities, applying resource efficient techniques, making use of innovative technology, access to advice on resource efficiency, helping farmers and land managers understand the increasing need to protect soil organic matter.

Keywords: Greenhouse gas emission, Climate change, Rural development programme, Hungary, Romania

INTRODUCTION

Projected impacts of climate change in Bihar-Bihor region include extended periods of drought in summertime and loss of soil fertility and degradation as a result of increased precipitation in winter time, both of which will negatively impact on agriculture and food security. The two main sources of uncertainty of production are future climate projections and the impact of these changes on agriculture. Crop productivity and suitability are likely to decrease where precipitation decreases in Hungary and Romania similarly to the countries in Southern and South-eastern Europe (Olesen and Bindi, 2002 and Maracchi et al., 2005). This is particularly true for cereals, starch and bio-fuel crops. In this region, yields could decline by up to 30% by the 2050s, dependent on crop (Santos et al., 2002; Alcamo et al., 2003ab and Good et al. 2006). Grassland productivity is to be reduced by warming and precipitation changes. Livestock heat stress may also be frequent in the region. Increased yield variability and reduced yields are likely to result from projected increases in heat waves and droughts (Beniston et al., 2007; Jones et al., 2003; (Meehl and

Tebaldi, 2004; Schär et al., 2004; Trnka et al., 2004; Ramniceanu 2004; Alcamo et al. 2007).

Less information is available concerning the potential impacts of changes in extreme rainfall and flooding on the Hungarian and Romanian agriculture. Negative impacts could include nutrient leaching, reduced SOM content, and increased pest and disease pressures (Maracchi et al. 2006). The annual temperature increases may lead to a longer crop growing season and vegetative growth and cover, particularly in mountain region (Rosenzweig et al. 2004; Burke et al., 2006; IPCC, 2007ab). In recent decades, both the terrestrial and wetland ecosystems have been subjected to increasing degradation and destruction. Changes in future hydrology and water management practices will influence adaptation measures in agriculture, and alter the effectiveness of agricultural mitigation strategies. Water is one of several current and future critical issues facing in Bihar-Bihor region. Water supplies from rainfall and rivers are characterised by their unequal distribution and accessibility. Climate change has the potential to impose additional pressures on water availability, accessibility and unsustainable water use.

Technological development could outweigh these effects resulting in combined wheat yield increases of 37–101% by the 2050s, dependent on scenario (Meizen-Dick et al. 2004; Schröter et al., 2005). Decreases in total agricultural land area are projected under all the IPCC Special Report on Emissions Scenarios (IPCC 2007ab). However, increases in productivity may not necessarily lead to overall increases in carbon storage, since climate change could also increase the length of growing season, when respiration occurs (Várallyay 2005). Comprehensive climate models in agriculture should allow more robust quantification of the past, current and future impacts of agriculture on climate and vice versa. Agriculture is particularly sensitive to climate, including climate variability (Láng 2005, 2006). The contribution of agriculture to GDP is decreasing, but the sector may still support the living standards of very large sections of the population. Any reduction in output will have impacts on poverty and food security. Danger is associated with the narrowing of adaptation options to expected impacts of climate change, under the uncertainty of potential climate-driven physical impacts.

MATERIAL AND METHODS

Agriculture and forestry sector is unique in having the ability to produce and to sequester greenhouse gases (GHG), as well as to provide biomass-derived renewable energy. In this paper the mitigation of greenhouse gases is considered on the bases of the Rural Development Programmes of Hungary and Romania (NHRDP (2007) and RDP (2007). Mitigation activities to reduce agricultural greenhouse gases emissions are focused on the following subjects:

- **CH_4 emissions from enteric fermentation in domestic livestock:** Methane is produced as a by-product of enteric fermentation, a digestive process by which carbohydrates are broken down by micro-organisms into simple molecules. Both ruminant and some non-ruminant animals produce methane, but ruminants are the most important source since they are able to digest cellulose, due to the presence of specific micro-organisms in their digestive tracts. The amount of CH_4 released depends on the type, age and weight of the animal, the quality and quantity of the feed and the energy expenditure of the animal.

- **CH_4 emissions from manure management**: CH_4 is produced from the decomposition of manure under anaerobic conditions. These conditions often occur where large numbers of animals are managed (dairy farms, beef feedlots, swine and poultry farms), and manure is stored in large piles or disposed of in lagoons.
- **N_2O emissions from manure management**: During storage of manure, some manure nitrogen is converted to N_2O. Emissions of N_2O related to manure handling are included in this source category. Manure-related N_2O emissions from soils are considered as agricultural soil emissions.
- **CH_4 emissions from rice cultivation**: Anaerobic decomposition of organic material in flooded rice fields produces methane. The amount CH_4 emitted is a function of soil type, temperature, irrigation practices and fertiliser use. The integrated CH_4 flux depends upon the input of organic carbon, water regimes, soil type, time and duration of drainage.
- **CH_4, CO, N_2O, and NO_X emissions from the burning of agricultural residues:** The burning of crop residues is a significant source of emissions of methane, carbon monoxide, nitrous oxide, and nitrogen oxides.
- **CH_4, CO_2, and N_2O emissions from agricultural soils**: Emissions of N_2O from agricultural soils are primarily due to the microbial processes of denitrification. Direct soil emissions may result from the following nitrogen input to soils: (1) synthetic fertilisers, (2) nitrogen from animal waste, (3) biological nitrogen fixation, (4) reutilised nitrogen from crop residues, and (5) sewage sludge application. Soil cultivations also increase soil organic matter mineralisation and N_2O emissions. Increased amount of nitrogen added to the soil generally result in higher N_2O emissions. Direct soil emissions of N_2O from grazing animals and indirect N_2O emissions take place after nitrogen is lost from the field as NO_x, NH_3 and after leaching or runoff. Agricultural soils may also emit or remove CO_2 and/or CH_4 when peat compost is used as a soil amendment. Carbon dioxide emissions from limed soils are also important.
- **CO_2 and N_2O emissions from land use change:** Most important land-use changes that result in GHG emissions and removals are (i) changes in forest and other woody biomass stocks, (ii) forest and grassland conversion, (iii) abandonment of croplands, pastures, plantation forests, or other managed lands and (iv) changes in soil carbon.

The main strategic objectives under which rural development activities are supported in Hungary and in Romania during the period 2007 -2013 are given below:

- <u>Axis 1</u>: Improving the competitiveness of the agricultural and forestry sector, which includes setting up of young farmers, early retirement of farmers and farm workers, modernisation of agricultural holdings, improving the economic value of forests, supporting producer groups and promotion activities for products under food quality schemes.
- <u>Axis 2</u>: Improving the environment and the countryside. This includes agri-environment and Natura 2000 payments, restoring forestry potential and introducing prevention actions and support for non-productive investments.
- <u>Axis 3</u>: The quality of life in rural areas and diversification of the rural economy, which includes diversification into non-agricultural activities, encouragement of tourism activities, basic services for the economy and rural population, village renewal and development, training and information/ skills acquisition measures.
- <u>Axis 4</u>: Leader, which is used for the delivery of the other three axes through, for example area based local development strategies, local public-private partnerships, implementation of innovative approaches, implementation of cooperation projects, and networking of local partnerships.

RESULTS

Hungary: Carbon dioxide is the main GHG gas, produced largely by combustion of fossil fuels (Figure 1 and 2). Emissions of carbon dioxide are from direct energy use, such as fuel and gas. Agriculture and forestry currently account for about 10-11% of total greenhouse gas emissions. Agriculture is responsible for a very small share of CO_2 emissions (Table 1) and the sector can help to mitigate CO_2 emissions through carbon sequestration in soils and timber by land use, land use change and forestry (LULUCF). Agricultural practices are more significant sources of other gasses, including methane, and nitrous oxide, which significantly contribute to climate change. Agriculture contributes to emissions of greenhouse gases through a variety of different processes. The size of the animal husbandry is the most important factor influencing green-house gas emissions from agriculture in Hungary, where the importance of agriculture within the national economy has decreased since 1985. The loss of importance occurred not only in comparison to other economic branches, but also in terms of the absolute input-output values.

Table 1:

GHG emissions (in million tons CO_2 equivalent) and changes in GHG emissions between 1985 and 2006 in Hungary (Base years (100%) = Mean 1985-1987)

Sources	GHG emissions				Changes (%)		
	CO2	CH4	N2O	Total	CO2	CH4	N2O
1. Energy	80.0	3.1	0.9	84.1	-29.3	-21.5	-10.8
A. Fuel combustion	79.8	0.6	0.9	81.3	-29.2	-36.0	-10.8
A1. Energy industries	27.0	0.0	0.2	27.2	-28.8	-19.1	-12.9
A2. Manufacturing and construction	20.9	0.2	0.4	21.4	-58.5	-61.5	-61.0
A3. Transport	7.6	0.0	0.1	7.8	61.0	-37.9	247.1
A4. Other sectors	24.3	0.4	0.3	25.0	-32.8	-25.7	-52.7
B. Fugitive emissions from fuels	0.2	2.5			-59.7	-17.9	
B1. Solid fuels	0.0	0.9			-100.0	-97.5	
B2. Oil and natural gas	0.2	1.6			-59.0	27.9	
II. Industrial processes	5.9	0.0	4.5	10.5	-42.8	85.6	-64.1
A. Mineral products	3.3				-28.6		
B. Chemical industry	2.0	0.0	4.5	6.5	-61.3	85.6	-64.1
C. Metal production	0.6				-58.0		
III. Solvent and other product use	0.1	0.0	0.3	0.4	-55.9		12.8
IV. Agriculture	0.0	4.2	13.3	17.5		-56.9	-50.4
A. Enteric fermentation	0.0	3.2	0.0	3.2		-56.4	
B. Manure management	0.0	0.9	2.4	3.3		-55.1	-54.7
C. Rice cultivation	0.0	0.1	0.0	0.1		-80.0	
D. Agricultural soils	0.0		10.9				-49.4
F. Field burning of agricultural residues	0.0	0.0	0.0	0.1			
V. LULUCF	-4.1	0.0	0.0	-4.1	43.6	-13.3	-13.9
A. Forest land	-3.3	0.0	0.0	-3.2	43.4	-13.3	-13.9
B. Cropland	-0.9				44.6		
VI. Waste	0.1	2.8	0.2	3.1	291.2	26.7	9.8
A. Solid waste disposal on land		1.9	0.0		0.0	51.3	
B. Waste-water handling	0.0	0.8	0.2	1.1		-28.8	0.6
C. Waste incineration	0.1		0.0		291.2		533.5

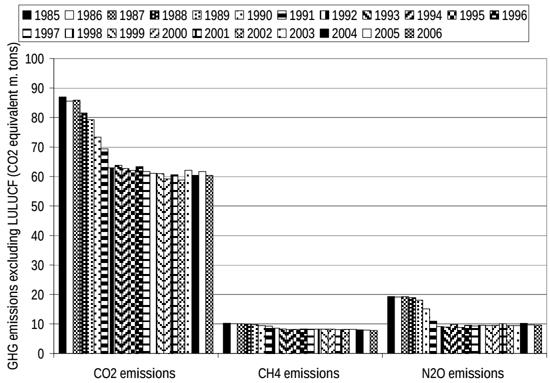

Fig. 1: GHG emissions in Hungary excluding LULUCF (CO_2 equivalent million tons)

Agriculture and forestry currently account for about 10% of total greenhouse gas emissions, but account for 36% of methane emissions and 67% of nitrous oxide emissions. About 86% of this methane comes from enteric fermentation in the digestive system of animals and 14% from manure management. Total emissions of methane have declined considerably over the last 20 years. Emissions from agriculture had increased until the mid 1980s, then stabilised. Emissions have declined by about 40% over the past 20 years, mainly as a result of reduced livestock numbers. The nitrous oxide emissions arise from manures and artificial fertiliser. Agricultural emissions of nitrous oxide (N_2O) have fallen slightly since 1985-87, due to reductions in fertiliser use.

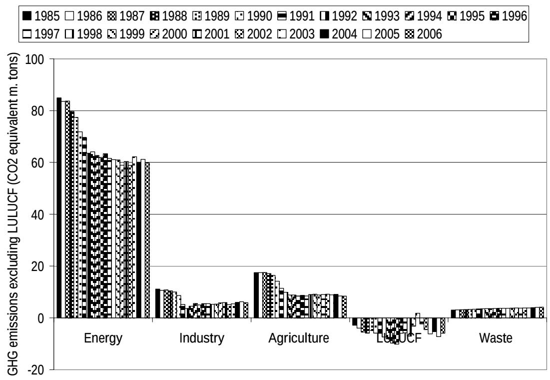

Fig. 2: GHG emissions in Hungary excluding LULUCF (CO_2 equivalent million tons)

Emissions of carbon dioxide are from direct energy use, such as diesel in tractors, gas to heat greenhouses, and electricity in livestock buildings (UNFCCC 2006). Although agriculture is directly responsible for only 1% of CO2 emissions, the sector can help to mitigate CO_2 emissions through carbon sequestration in soils and timber, and by producing energy crops to replace fossil fuels. In terms of climate change mitigation, the agriculture and forestry sector is unique in having the ability to produce and to sequester greenhouse gases, as well as to provide biomass-derived renewable energy.

Statistical data*[1] show that emissions of GHG during the last 30-year period (1985–2005) were lower relative to basic year emissions (Table 1). GHG emissions per capita are 7.8 t

*[1] http://www.eea.europa.eu/themes/climate/ghg-country-profiles/

CO_2-eq./cap/year, while GHG per GDP at current prices is 873.2 g CO_2-eq/euro. In 2006, emissions were 32 % lower than the base-year level, well below its Kyoto target of -8 % for the period 2008–2012. Emission in agriculture has been decreased by 41 % since 1985 and represents 10.7 % of total greenhouse gas emissions, which do not include emissions and removals from LULUCF and emissions from international bunkers. Emission in transport has been increased by 23 % since 1990 and represents 16.1 % of total greenhouse gas emissions. Energy supply and use is responsible for 60.0 % and shows a slightly decreasing tendency.

Romania: Carbon dioxide is the main climate change gas, produced largely by combustion of fossil fuels (Figure 3 and 4). Emissions of carbon dioxide are also from direct energy use of fuel and gas. Agriculture and forestry currently account for about 10-11% of total greenhouse gas emissions. Agriculture is responsible for a very small share of CO_2 emissions and the sector can help to mitigate CO_2 emissions from other sources through carbon sequestration in soils and timber by land use, land use change and forestry (LUCUF). Agricultural practices are more significant sources of other gasses, including methane, and nitrous oxide, which significantly contribute to climate change. In 2007, energy sector accounted for just over 70% of CO_2 emissions. Since 1985, emissions from energy, industrial processes and agriculture have fallen continually, while those from waste management have risen, as shown in Figure 4.

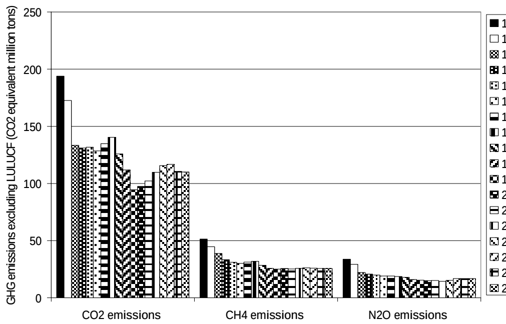

Fig. 3: GHG emissions in Romania excluding LULUCF (CO_2 equivalent million tons)

Emissions of methane and nitrous oxide from agriculture have declined substantially in the early 1990s, largely because of a reduction in livestock numbers and fertiliser use (Figure 4). In 2007, agriculture produced 33% of the total CH_4 emissions. Emissions of methane fell by 48% between 1985 and 2006. About 86% of this methane comes from enteric fermentation and 14% from manure management. Nitrous oxide emissions also fell by 40 per cent between 1985 and 2006 and agriculture is the main source, accounting for about two thirds of N_2O emissions. This originates mainly from agricultural soils. The nitrous oxide emissions arise from manures and artificial fertilisers. Methane and nitrous oxide have global warming potentials that are greater than carbon dioxide by 21 and 310 times respectively.

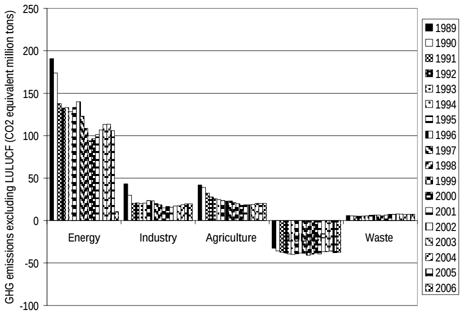

Fig. 4: GHG emissions in Romania excluding LULUCF (CO2 equivalent million tons)

Statistical data* show that emissions of GHG during the last 5-year period (2002–2006) were decreased by 44.3% relative to basic year emissions. GHG emissions per capita are 7.3 t CO_2-eq./cap/year, while GHG per GDP at current prices is 1 603.4 g CO_2-eq/euro. In 2006, emissions were 44 % lower than the base-year level, well below its Kyoto target of -8 % for the period 2008–2012. According to projections, with the existing policies and measures, emissions will increase to reach by 2010 a level 31 % below base-year emissions. The implementation of additional measures could reduce emissions to a level 35 % below base-year emissions.

Emission in agriculture has been decreased by 46 % since 1990 and represents 12.9 % of total greenhouse gas emissions, which do not include emissions and removals from LULUCF and emissions from international bunkers. Emission in transport has been increased by 61 % since 1990 and represents 7.9 % of total greenhouse gas emissions. Energy supply and use is responsible for 59.4 % and shows a slightly decreasing tendency.

Table 2

GHG emissions (in million tons CO2 equivalent) and changes in GHG emissions between 1989 and 2006 in Romania (Base years (100%) = Data 1989

Sources	GHG emissions				Changes (%)		
	CO2	CH4	N2O	Total	CO2	CH4	N2O
1. Energy	160.8	29.7	0.4	190.9	-41.4	-61.8	0.5
A. Fuel combustion	160.8	0.4	0.4	161.6	-41.4	123.6	0.5
A1. Energy industries	106.0	0.0	0.3	106.3	-56.4	-57.0	-44.0
A2. Manufacturing industries and construction	37.3	0.1	0.1	37.5	-32.1	-17.5	-7.0
A3. Transport	7.3	0.0	0.0	7.3	64.2	127.2	55.5
A4. Other sectors	10.2	0.3	0.1	10.5	4.7	175.1	203.2
B. Fugitive emissions from fuels		29.3				-64.3	
B1. Solid fuels		6.4				-60.9	
B2. Oil and natural gas		22.9				-65.3	
2. Industrial processes	32.4	0.0	7.4	39.8	-50.9	-46.4	-57.3
A. Mineral products	10.9				-46.3		
B. Chemical industry	5.1	0.0	7.4	12.6	-52.5	-46.4	-57.3
C. Metal production	16.3				-53.3		
3. Solvent and other product use	0.6	0.0			-58.2		
4. Agriculture	0.0	16.6	25.3	41.9		-53.5	-50.3
A. Enteric fermentation	0.0	11.8	0.0	11.8		-53.1	
B. Manure management	0.0	4.4	3.1	7.5		-53.9	-53.8
C. Rice cultivation	0.0	0.2	0.0	0.2		-92.1	
D. Agricultural soils	0.0		22.2				-49.9
F. Field burning of agricultural residues	0.0	0.1	0.0	0.1		-10.2	-6.5
5. LULUCF	-32.6	0.0	0.0	-32.6	14.6	128.0	128.0
6. Waste	0.1	5.0	0.7	5.8	4.7	32.6	-6.6
A. Solid waste disposal on land		2.6	0.0			97.7	
B. Waste-water handling	0.0	2.4	0.7	3.1		-36.1	-6.6
C. Waste incineration	0.1				4.7		

Climate change mitigation in Bihar-Bihor region
Specific attention is given for measures to improve manure storage and spreading techniques to reduce nitrate loss and CH4 emission. Efficient management of solid and liquid manure is essential for the reduction of methane emissions, originating from biological fermentation in livestock manure management. Manure management and septic pits are good examples of investments, similarly to equipment for precision farming and spreader for better application of mineral fertilisers and organic manure. One of the objectives of the RDP based on National Agri-Environmental Programme (NAEP) is to support the development of organic farming as an environmentally-friendly method of production in both countries. The objective is to ensure adequate levels of technical and economic knowledge, skills in management and sustainable management of natural resources including the requirements of cross compliance, renewable energy sources and organic production. Climate change mitigation benefits are likely as the global warming potential of organic and integrated farming systems is considerably lower, than, that of conventional. RDP's also promote the use of environmental planning in farm management practices, such as nutrient management and crop rotation planning. Soil and water protection scheme provides support for nutrient management, including storage and application of livestock manures.

Measures support the development of environmentally-friendly production method with economic potential. In this respect, important objectives of the RDP's are to conserve soil and water resources, including those areas affected by erosion and risk of nutrient losses. Soil and water protection scheme provides support for the introduction of sustainable crop rotations, intercropping, green cover and legumes such as peas, beans, lupine, soybean, alfalfa and clover. Purchase and installation of new equipment also improves energy efficiency.

RDP's intend to restore traditional agricultural landscape features, which have cultural, scenic and environmental value. A corresponding activity is the maintenance of high natural value grasslands and livestock management. Measures involve the maintenance of a maximum density of livestock in order to assure a good ecological state for the meadows and pastures and to keep permanent grass cover. The extensive grassland scheme promotes grassland management based on animal husbandry. Extensive pastures management, diversification of grass species and reduced fertilisation help to increase soil organic levels and climate change mitigation objectives.

Conversion of agricultural land into forest and conversion of arable land to permanent pastures are connected to soil erosion control and has an effect on GHG mitigation. Ensuring adequate levels of technical and economic skills in management and business, new technologies, product quality and safety, sustainable management of natural resources, renewable energy use and organic production are the most important operational objectives. Development of new technologies and processes, forestation of non-agricultural land will also contribute to climate change mitigation and enhance biodiversity in Hungary.

In livestock sector, to meet the requirements linked to the nitrate directives, significant investments are needed in manure storage and management. The storage and use of manure, including biogas production facilities are supported. Investments in equipment for better application of mineral fertilisers and manure are also detailed in the programme. Actions on energy-saving machinery involve strong emphasis on environmentally sound, cost-efficient and energy-saving equipment, but details are also important in respect of climate change mitigation.

Organic farming and grassland management schemes promote the adoption of environmental friendly management practices compliant with the rules and regulations of organic production in order to preserve grassland habitats of high natural value. Integrated crop production scheme, which involves sustainable nutrient management, integrated plant production, crop rotation and soil cultivation. Soil conservation techniques, such as reduced tillage, permanent green cover, catch crops, and stubble management are also integrated in the RDP's in order to improve quality of soil, surface and ground waters. The integrated crop production scheme promotes rational nutrient management. The anti-erosion scheme applies various methods at arable lands, including conversion of low fertility arable lands into forestry or grassland. In areas threatened by floods, erosion and on land near vulnerable water resources, supports are granted for the first forestation. This is in line with management of greenhouse gases.

Organic matter plays an important role in maintaining soil fertility and structural stability. Soils are a major reservoir of carbon. The lost soil carbon is likely to increase CO_2 concentration in the atmosphere, and exacerbating global warming. Loss of soil carbon also affects soil functioning, resulting in an increase of erosion and loss of soil biodiversity. Mitigation measures encompass the control of carbon losses from soils. Protection against erosion is a well defined climate change mitigation objectives similarly to the use of water reservoirs and livestock protection on semi-natural and natural grasslands. Extensive pastures management and protection of biotopes of semi-natural and natural grasslands totally excludes mineral fertilizers and liquid manure from protected area. This applies to land situated in a vulnerable zone delimited with the Directive 91/676/EEC and in less favoured areas. These measures are also in line with climate change mitigation objectives.

Agriculture can also be used to produce renewable energy, both as biomass and bio-fuels. Sources of energy include both residues and crops grown for energy. While the carbon savings from using perennial energy crops are significant, net carbon savings from annual food crops such as cereals and oil crops, which can be used to produce transport fuels, are much lower and have different environmental impacts. To meet both energy and environmental objectives the location, landscape characteristics, water availability, the size and arrangement of planted fields have to be considered. Important aims of RDP's are to address climate change objectives with increasing emphasis on resource protection for the benefits of society.

The drivers for increased energy efficiency are mainly economic. The contribution of resource efficiency can make to climate change mitigation are recognised in the RDP's of Hungary and Romania, as well as the benefits for soil, air and water quality. This suggests a need for public intervention in support of innovative technologies and resource management techniques. Anaerobic digestion (AD) is a renewable energy technology that has significant potential to contribute to climate change and wider environmental objectives. It helps reduce greenhouse gas emissions by capturing methane from the decomposition of organic materials, such as manure and slurry, food waste and sewage sludge. The biogas can then be used as a renewable energy source for heat, power or as a transport fuel. Public intervention is necessary to disseminate the technology and to help early adopters. Specialist advice and training help farmers adapt to the challenges of CAP reform and to the increasing emphasis on mitigating the effects of climate change.

Public intervention is necessary to disseminate results of R&D activities. RDP of Hungary and Romania help agriculture and forestry sector to play its full part in tackling climate change and exploring how environmental stewardship can contribute to achieving the climate change objectives. This includes promoting resource efficient farm management and developing a communicational strategy to raise awareness of climate change issues. Taking forward the non-food crops strategy to substitute fossil fuels with renewable products and measures under nitrates action plan, which also support climate change mitigation goals in Hungary. Trainings in agriculture and forestry include tasks related to renewable energy, such as production, utilization and primary processing of biomass for energetic purposes. Without this, the opportunity to bring the technology to market and achieve the public benefits might be lost. Support granted to farmers and forest holders to cover the utilization of professional advisory services, and increase awareness in the field of climate change mitigation to maintain good agricultural and environmental condition.

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