

Annex II G: Germany; Country Report and Contributed Papers

Country Report Germany

The agricultural sector and its negative environmental impacts in Germany	2
Environmental Legislation and GFP in Germany	2
A: The legal background of Good Farming Practice in Germany	5
1 Use (storage) of fertilisers, slurry and manure	5
2 Pesticide Use	16
3 Water Use (Irrigation)	19
4 Soil Conservation	19
5 Animal housing / animal husbandry	21
6 Landscape and Biodiversity	21
7 "Farm Management" (e. g. farm management plans / nutrient plans etc.)	22
8 others	22
B: Monitoring, control and enforcement (Table B)	23
References	31

Contributed Papers

Assessment of Impacts of Selected Environmental Standards on Production Cost and Farm Profitability	
<i>Jesko Hirschfeld</i>	32
National administration's view: Co-ordination of the Länder in achieving the requirements of Reg. (EC) 1259/99 and Reg. (EC) 1257/99 in defining and controlling good farming practice (GFP)	
<i>Dr. Carlo Prinz</i>	42
Control of environmental law in general and in the framework of Reg. (EC) 1257/99: Procedures, Problems and perspectives	
<i>Dr. J.-A. Eisele</i>	51

Country Report Germany

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The agricultural sector and its negative environmental impacts in Germany

About 50 % of the German land surface is agricultural utilised area. A high share of the German pig and poultry production is concentrated in the north-west of Germany, where also dairy and beef production are intensive. This causes high regional nutrient surpluses with resulting environmental problems such as groundwater pollution and high ammonia emissions. In contrast animal numbers in the eastern federal states declined sharply after reunification of the two states of Germany, reaching today very low regional densities of livestock production.

The main negative environmental impacts ascribed to agriculture in Germany are:

- ground water pollution by nitrates and pesticides
- surface water pollution by nutrients and pesticides, as well as structural impacts of intensive land use adjacent to water streams and lakes
- air pollution by ammonia and greenhouse gas emissions
- decline of species and biotope variety and increasing uniformity of landscapes due to intensive agricultural land use and the elimination of landscape elements

In Germany, agriculture contributes to about 66 % of nitrogen and 56 % of phosphor immissions into the surface water (Böhm et al. 2002). About 90 % of ammonia emissions and 7-8 % of greenhouse gas emissions are caused by agricultural production (Baldock et. al. 2003).

Environmental Legislation and GFP in Germany

Legislative competence of the federation and the federal states

The German law consists of framework legislation as well as exclusive and competing legislation. The framework legislation describes the fundamentals of a law (i.e. Water Management Act, *Wasserhaushaltsgesetz*, Nature Protection Law, *Bundesnaturschutzgesetz*) which has to be enacted by the federal states (*Länder*) through specific laws (*Landeswassergesetze*, *Landesnaturschutzgesetze*). Exclusive legislation is a federal law legal

in the federal states without further specification at the *Länder*-level (Federal Fertiliser Act and Fertiliser Ordinance, *Düngeverordnung*). Competing legislation is enacted by the federal states when the federation does not use its legislative competence. This is the case with respect to some aspects of plant protection against diseases and varmint (Knickel et. al. 2001, p. 93).

The German law distinguishes between criminal acts and administrative offences. Criminal acts are severe torts like surface- and groundwater pollution or illegal waste disposal. Administrative offences are "lesser" torts like spreading manure during the winter month or spreading more than 170/210 kg N ha⁻¹ yr⁻¹ of livestock manure. The prosecution of administrative offences is carried out by the institutions in charge of the control (mainly Regional Offices and Regional District Offices). These Offices pronounce rulings (*Anordnungen*) admonishments, impose admonishment fines (*Verwarnungsgelder*) or administrative offence fines (*Bussgelder*) (fines are usually low¹ i.e. between 25 and 150 • in Baden-Württemberg if the field sprayer does not have an inspection certificate). If criminal acts are detected, the case is forwarded to the prosecuting authorities who accuse according to the Environmental criminal law.

Environmental legislation relevant for the agricultural sector

There is no single document combining all relevant agri-environmental regulations but a wide range of environmental and agricultural legislation which has or can have implications for GFP. A selection of the respective national laws and ordinances in Table 1 (for a more exhaustive list and description see: Betriebswirtschaftliche Mitteilungen 2001) shows the amplitude of legislation containing elements which contribute to the definition of GFP but also the restricted coverage with respect to the control of GFP.

Table 1: Environmental legislation relevant for agriculture

<u>Agricultural Production Facilities</u>		<u>GFP control</u>
Fertilisation	Fertiliser Law (<i>Düngemittelgesetz</i>)	
	Fertiliser Ordinance (<i>Düngemittelverordnung</i>)	
	Fertilisation Ordinance (<i>Düngeverordnung</i>)	✓
Plant Protection	Federal Plant Protection Act (<i>Pflanzenschutzgesetz</i>)	✓
	Pesticides Ordinance (<i>Pflanzenschutzmittelverordnung</i>)	✓
	Use of Pesticides Ordinance (<i>Pflanzenschutz-Anwendungsverordnung</i>)	✓
	Pesticides Training Ordinance (<i>Pflanzenschutz-Sachkundeverordnung</i>)	✓

¹ Although the Fertilisation Ordinance allows for fines up to 15.000 • (Barunke, 2002, p. 93)

Construction	Bee Protection Ordinance (<i>Bienenschutzverordnung</i>) ✓
	Regional Development Law (<i>Raumordnungsgesetz</i>)
	Construction Codes (<i>Baugesetzbuch</i>)
	Law on Environmental Impact Assessment (<i>Gesetz über die Umweltverträglichkeitsprüfung</i>)
Environmental goods	
Air Quality	Law on Immission Protection (<i>Bundesimmissionsschutzgesetz - BImSchG</i>)
	Ordinances on Immission Protection 1, 4, 11 (<i>Bundesimmissionsschutzverordnung - BImSchV</i>)
	Technical instructions on air-pollution prevention (<i>Technische Anleitung zur Reinhaltung der Luft - TA-Luft</i>)
Water Quality and Use	Groundwater Ordinance (<i>Grundwasserverordnung</i>)
	Drinking Water Ordinance (<i>Trinkwasserverordnung</i>)
	Water Supply Law (<i>Wasserhaushaltsgesetz</i>)
Recycling and Waste Management	Recycling Management and Waste Law (<i>Kreislaufwirtschafts- und Abfallgesetz</i>)
	Sewage Sludge Ordinance (<i>Klärschlammverordnung</i>)
	Ordinance on Biowastes (<i>Bioabfallverordnung</i>)
Soil Protection	Soil Protection Law § 17 (<i>Bundesbodenschutzgesetz</i>)
	Soil Protection and Legacy Ordinance (<i>Bundesbodenschutz- und Altlastenverordnung</i>)
Nature Protection	Nature Protection Law (<i>Bundesnaturschutzgesetz</i>)
	Protection of Species Ordinance (<i>Bundesartenschutzverordnung</i>)

Definition, Implementation and Control of GFP in Germany

In Germany codes of good farming practice are defined for agriculture in general but also for specific activities (plant protection, fertilisation) or media (soil protection). Codes of GFP can be set up by the state (BMVEL 1998) or its agencies (Bundesamt für Naturschutz 2001) the federal states or by advisory services, research agencies (BBA 1999) as well as farmers- (Deutscher Bauernverband 2000) or environmental lobby (NABU 1999). They can either be legally binding or formulated as recommendations or requirements (even if published by the national government). There is thus a wide range of codes of "Good Farming Practices" which are not necessarily legally binding for the farmer.

The definition of GFP in the „Annual Reports“ according to Reg. (EC) 963/2001 for the implementation of Reg. (EC) 1259/1999 is based on the legislation on the use of fertilisers and pesticides. The relevant legislation is the Federal Fertiliser Act 1989 and subsequent Ordinance on Fertilisation 1996 and the Regulation on Plant Protection Products and Plant Protection Equipment 1998 and subsequent Pesticides Ordinances (Use of Pesticides Ordinance, Pesticides Training Ordinance and Bee Protection Ordinance). For

these eight standard indicators at farm level are selected² and used for control of compliance.

In the definitions of GFP in the Rural Development Plans according to Reg. (EC) 1257/1999 each federal state can present its own selection of criteria. Some *Länder* stick to the GFP aspects of fertilisation and plant protection (i.e. NRW) while others start on a broader base and include aspects of soil and nature conservation (i.e. Bavaria). In contrast to this variety in the definition of GFP the control of its implementation is generally carried out using a set of six indicators on which the federal states have agreed.

In the following paragraphs the environmental legislation relevant for the definition of GFP criteria on EU, national and if relevant at the federal state level as well as the respective indicators for the control are described in more detail.

A: The legal background of Good Farming Practice in Germany

1 Use (storage) of fertilisers, slurry and manure

EU and National Law

The most important EU legislation with respect to the use and storage of fertilisers, slurry and manure is the Nitrate Directive³ In implementing the Nitrate Directive Germany has

² Out of a set of 15 Indicators used for on farm controls of the compliance with the environmental legislation in Germany (*Fachrechtskontrolle*).

³ Regulation on waste management in the EU is provided by the Waste Framework Directive (75/442/EWG). The German application is the 'Law concerning Recycling and Waste' (*Kreislaufwirtschafts- und Abfallgesetz*) and several edicts as well as specified laws of the federal states. The purpose of the 'Law Concerning Recycling and Waste' is the support of recycling to protect natural resources and the security of ecologically harmless disposal of wastes. The agricultural utilisation of organic wastes is important in terms of recycling nutrients but this law also regulates - in combination

opted for 100% Nitrate Vulnerable Zone designation. Thus the relevant codes of GFP and additional measures are mandatory across the whole territory.

Additionally Water Protection Areas exist in all federal states and are subject to additional environmental legislation. Using the example of Schleswig-Holstein the main provisions of this legislation are described. Outside the requirements of good agricultural practice within the environmental legislation there are also systems of co-operative agreements between farmers and water suppliers. The agreements are usually between a number of farmers and an individual water supply companies (Baldock et. al. 2003). Because of their site-specific design they will not be included in this report.

with the 'Sewage Sludge Ordinance' (*Klärschlammverordnung*) - the protection of the soil against harmful substances (Baldock et. al. 2003).

1.1 Nitrate (+ general rules of fertilisation) - Implementation of the Nitrate Directive in Germany

EU-LAW	NATIONAL LAW	WATER PROTECTION AREAS (EXAMPLE) – REGIONAL LAW	NATIONAL CONTROL (FINED)	REG. 1259/1999	REG. 1257/1999
<p>Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrate from agricultural sources ("Nitrate Directive") including Annex II and III of the Directive</p> <p>Member states may either implement action programmes in designated vulnerable zones for or throughout the national territory</p> <p>Member States shall:</p> <ul style="list-style-type: none"> – establish a code or codes of good agricultural practice, to be implemented by farmers on a voluntary basis, which should contain provisions covering at least the items mentioned in Annex II – establish action programmes which shall consist of: <ul style="list-style-type: none"> – the measures in Annex III; – those measures which have been prescribed in the code(s) of good agricultural practice except those which have been superseded by the measures in Annex III. 	<p>Fertilisation Ordinance: Regulation on the principles of good farming practice of fertilisation ("Düngerverordnung")</p> <p>The regulation is valid throughout the national territory and serves as "action programme"</p> <p>The main aim of the regulation is to ensure that fertiliser is applied:</p> <ul style="list-style-type: none"> • such as the plant can use the nutrients • nutrient losses to the environment are minimised <p>The regulation covers nutrient supply with nitrates, phosphorous and potassium</p>	<p>Wasserhaushaltsgesetz §19, Landeswassergesetz § 4 (i.e. Schleswig-Holstein)</p> <p>The respective regulations of the Länder are valid in water protection areas</p> <p>Water protection areas have three zones (I, II, III) with different degrees of restrictions for agricultural use (in zone I farming is not allowed)</p>			

EU-LAW	NATIONAL LAW	WATER PROTECTION AREAS (EXAMPLE) – REGIONAL LAW	NATIONAL CONTROL (FINED)	REG. 1259/1999	REG. 1257/1999
CODE(S) OF GOOD AGRICULTURAL PRACTICE (ANNEX II):					
1. periods when the land application of fertiliser is inappropriate;	-				
2. the land application of fertiliser to steeply sloping ground;	-		Control of prevention of direct entry of fertiliser into water-courses or avulsion to neighbouring fields	Control of prevention of direct entry of fertiliser into water-courses.	
3. the land application of fertiliser to water-saturated, flooded, frozen or snow-covered ground;	AP (in the action programme)				
4. the conditions for application of fertiliser near water courses;	Adequate distance to the watercourse has to be kept.				
5. the capacity and construction of storage vessels for livestock manures and effluents from stored plant materials such as silage;					
6. procedures for the application, including rate and uniformity of spreading, of both chemical fertiliser and livestock manure	<ul style="list-style-type: none"> • Equipment for spreading fertiliser and livestock manure has to comply to the acknowledged rules of technology. • spreading "close to the soil" ("<i>bo-dennahe Ausbringung</i>") of livestock manure • immediate incorporation of livestock manure 		Control of immediate incorporation of livestock manure and liquid sewage sludge on uncultivated arable land		Control of immediate incorporation of livestock manure and liquid sewage sludge on uncultivated arable land.

EU-LAW	NATIONAL LAW	WATER PROTECTION AREAS (EXAMPLE) – REGIONAL LAW	NATIONAL CONTROL (FINED)	REG. 1259/1999	REG. 1257/1999
7. land use management, including the use of crop rotation systems and the proportion of the land area devoted to permanent crops relative to annual fallow crops;	If no arable crop is sown in autumn, the nitrogen in the soil should be used by intermediate (cover) crops				
8. the maintenance of a minimum quantity of vegetation cover during (rainy) periods	<i>(regulated in the Germany through the soil protection act- Bundesbodenschutzgesetz)</i>				
9. the establishment of fertiliser plans on a farm-by-farm basis and the keeping of records on fertiliser use;	Calculation of fertiliser plans for each crop and yearly farmgate-balance	Records on the use of fertiliser for each field.	Control of the documentation of examinations and estimates used, fertiliser plans, nutrient balances	Control of the documentation of examinations and estimates used, fertiliser plans, nutrient balances.	Control of the documentation of examinations and estimates used, fertiliser plans, nutrient balances.
	Records, including soil tests have to be retained for 9 years		Control of compliance with the retaining period of the records.		
10. the prevention of water pollution from run-off and the downward water movement in irrigation systems.	-				

EU-LAW	NATIONAL LAW	WATER PROTECTION AREAS (EXAMPLE) – REGIONAL LAW	NATIONAL CONTROL (FINED)	REG. 1259/1999	REG. 1257/1999
MEASURES TO BE INCLUDED IN ACTION PROGRAMMES (ANNEX III)					
1. periods when the application of certain types of fertiliser is prohibited;	15. 11.-15.1.	15.09. - 31.01. no application of nitrogen fertiliser (dung 15.09 - 30.11) 01.07. - 31.01 no application of nitrogen fertiliser on moorsoil	Control of the compliance with the periods when the application of manure is prohibited	Control of the compliance with the periods when the application of manure is prohibited	
	Fertiliser can only be applied after the expected times of flooding to agricultural land frequently flooded or at risk of flooding.				
2. specification of the capacity of storage vessels for livestock manure ,					

⁴ this capacity must exceed that required for storage throughout the longest period during which application is prohibited except where it can be demonstrated to the competent authority that any quantity of manure in excess of the actual storage capacity will be disposed of in a manner which will not cause harm to the environment;

EU-LAW	NATIONAL LAW	WATER PROTECTION AREAS (EXAMPLE) – REGIONAL LAW	NATIONAL CONTROL (FINED)	REG. 1259/1999	REG. 1257/1999
3. limitation of the application of fertilisers taking into account:					
(a) soil conditions, soil type and slope;	Fertiliser may only be applied when the soil is absorptive. The soil is not absorptive if watersaturated, deepfrozen or snowcovered.		Control of application to absorptive soil.		
(b) climatic conditions, rainfall and irrigation;	To avoid ammonia emissions from animal manure and sewage sludge during application temperature and insolation should be taken into account.				
(c) land use and agricultural practices, including crop rotation systems; and to be balanced on a balance between:					
(i) the foreseeable nitrogen requirements of the crops, and	The nitrogen requirements of the crops for the expected harvested quantity and quality.				
(ii) the nitrogen supply to the crops from the soil and from fertilisation corresponding to:					

EU-LAW	NATIONAL LAW	WATER PROTECTION AREAS (EXAMPLE) – REGIONAL LAW	NATIONAL CONTROL (FINED)	REG. 1259/1999	REG. 1257/1999
<ul style="list-style-type: none"> - the amount of nitrogen present in the soil at the moment when the crop starts to use it to a significant degree (outstanding amounts at the end of winter), - the supply of nitrogen through the net mineralization of the reserves of organic nitrogen in the soil, - additions of nitrogen compounds from livestock manure, 	<p>Soil tests on mineral nitrogen have to be carried out on a yearly basis, the respective information can be substituted by recommendations of local advisory services.</p>		<p>Control of the soil tests or the local recommendations.</p>	<p>Control of the soil tests or the local recommendations.</p>	<p>Control of the soil tests or the local recommendations.</p>
<ul style="list-style-type: none"> - additions of nitrogen compounds from livestock manure, 	<p>The quantity of nitrogen in livestock manure has to be determined either through testing or calculated using recognised recommendations of an official agency (ammonia losses of 10 % for liquid manure and 25 % for dung during storage and 20 % during spreading can be subtracted from manure for the calculation of the nitrogen content of livestock manure)⁵.</p>		<p>Control of determination of the quantity of nitrogen in livestock manure.</p>		
<ul style="list-style-type: none"> - additions of nitrogen compounds from chemical and other fertilisers. 	<p>✓</p>				

⁵ these nitrogen losses were considered too high by the European Commission, Germany will have to correct the accountable "potential losses"

EU-LAW	NATIONAL LAW	WATER PROTECTION AREAS (EXAMPLE) – REGIONAL LAW	NATIONAL CONTROL (FINED)	REG. 1259/1999	REG. 1257/1999
These measures will ensure that the amount of livestock manure applied shall not exceed 170 kg N per hectare. ⁶	170 kg N/ha on arable crops 210 kg N/ha on grassland A maximum of 40 kg NH ₄ -N/ha or 80 kg N/ha in liquid fertiliser or manure is to be applied in autumn after harvest.	Maximum amounts of nitrogen fertilizer: 140 kg N on grassland 100 kg N/ha on moor-grassland For arable crops a special restrictive calculation of the nitrogen requirements is used.	Control of the maximum amount of livestock manure applied to arable land and grassland Control of the maximum N allowed in autumn after harvest with liquid fertilizer or manure		

⁶ However:

- (a) for the first four years action programme Member States may allow an amount of manure containing up to 210 kg N;
- (b) Member States may fix different amounts from those referred to above. These amounts must be justified on the basis of objectives criteria, for example:
 - long growing seasons,
 - crops with high nitrogen uptake,
 - high net precipitation in the vulnerable zone,
 - soils with exceptionally high denitrification capacity.

EU-LAW	NATIONAL LAW	WATER PROTECTION AREAS (EXAMPLE) – REGIONAL LAW	NATIONAL CONTROL (FINED)	REG. 1259/1999	REG. 1257/1999
		Storage of fertiliser and manure only in closed, leak-proof buildings (zone III) Storage of mineral fertiliser not allo- wed (zone II)			
		Animal grazing not allowed (zone II)			
		No fertilisation allowed (zone I)			

The Fertiliser Ordinance does not provide for specifications of the capacity of storage vessels for livestock manure. Indirectly these can be deduced from the period when the application of manure is prohibited (three month). Livestock farms above a certain size, which need a building construction under the terms of the 'National Immission Protection Law' (*Bundesimmissionsschutzgesetz - BImSchG*) (i.e. with 250 or more cows or 1500 fattening pigs or 15000 laying hens) are according to the 'technical instructions on air-pollution prevention' (*TA-Luft*⁷) required to have a storage volume for manure or slurry of 6 month.

While manure e.g. from German turkeys, imported from another farm, is in terms of national law a recognised fertiliser, imported manure is hazardous waste according the definition of the Basel Convention. It is legal to use it as fertiliser but the storage on agricultural land is prohibited because of the definition as 'hazardous waste'. Solid manure can be stored for short time in the farm area without exact prescription in the water law (Baldock et. al. 2003).

1.2 Potassium and Phosphate

No European legislation covers codes of GFP with respect to Phosphate and Potassium fertilisation. In Germany most aspects of GFP with respect to Potassium and Phosphate fertilisation are covered at the national level by the fertilisation ordinance described in detail in paragraph X. Additionally the Water Protection Areas and the co-operative agreements between farmers and water suppliers can also be of relevance.

⁷ Technische Anleitung zur Reinhaltung der Luft vom 24. Juli 2002
(<http://www.bmu.de/download/dateien/taluft.pdf>)

NATIONAL LAW	NATIONAL CONTROL (FINED)	REG. 1259/1999	REG. 1257/1999
Fertilisation Ordinance: Regulation on the principles of good farming practice of fertilisation ("Düngeverordnung")			
see above			
Soil test for Potassium and Phosphate have to be carried out once in every crop rotation but at minimum every 6 years. On extensive permanent grassland every 9 years	Control of the soil tests.	Control of the soil tests	Control of the soil tests
The quantity of phosphate and potassium in livestock manure has to be determined (either through testing or calculated using recognised recommendations of an official agency).	Control of determination of the quantity of phosphate and potassium in livestock manure.		
Calculation of fertiliser plans and farmgate-balances every 3 years.	Control of the documentation of examinations and estimates used, fertiliser plans, nutrient balances and their results	Control of the documentation of examinations and estimates used, fertiliser plans, nutrient balances and their results	Control of fertiliser plans and nutrient balances
Reduced fertilisation at the level of plant withdrawal is required if the soil has high P and K contents ⁸ .	Control of restricted application of animal manure on soil with high P and K contents		

2 Pesticide Use

In the European Union codes of GFP with regard to pesticide use at the farm level are set at Member State level. Binding standards on the accreditation of pesticides (Directive 91/414), maximum acceptable concentrations of pesticides in drinking water (Directive 98/83), maximum recommended levels of pesticide residues in food and animal feed and bans on certain highly toxic ingredients (Directive 79/117) are determined at EU level (Eaton, 2003).

⁸ Until the year 2004 exemptions to the rule can be accepted if no harm to water quality can be expected and if the farm would suffer "unreasonable hardship"

According to the Federal Plant Protection Act, pesticides have to be used in conformity with the principles of GFP (BMVEL 1998). These principles are abundant but for most parts not binding. General codes of GFP are for instance:

- all plant protection measures are to be carried out site-, plant- and situation-specific and the use of pesticides limited to the necessary extent
- established non-chemical measures are to be used
- preventative measures should be applied

The codes of GFP also include the consideration of the principles of integrated plant protection (i.e. assessment and evaluation of infestation and damage, choice of suitable control measures, application of non-chemical measures, efficiency reviews and documentation of measures) as well as the protection of surface- and groundwater (i.e. washing of pesticide sprayers and tanks on the farm yards is not allowed because it is an important source of surface water pollution with pesticides).

Most of the more specific aspects of GFP are included in the accreditation process. I.e. for some pesticides a 10 m wide plant-covered strip to surface water is required when spraying slopes steeper than 2 % (Bach et. al. 1999, p. 34). Accreditation for a pesticide is since June 2001 only given for one or several specified agricultural crops (*Indikationszulassung*). Some pesticides are accredited under the condition that a specific distance has to be maintained to watercourses and non-target areas and/or that driftage reducing equipment is used. Distances vary not only according to the pesticide and the equipment used but also with respect to the regional endowment with landscape elements⁹ (hedges etc.) the character (path, street, biotope) and size (> 3 m width) of the non-target area.

⁹ If a region has a lot of landscape elements the spraying distance is less than in regions where there are very little elements.

NATIONAL LAW	NATIONAL CONTROL (FINED)	REG. 1259/1999	REG. 1257/1999
Federal Plant Protection Act (<i>Pflanzenschutzgesetz</i>)	Control of the compliance with the interdiction of the application of pesticides on areas not used for agriculture, forest or gardening or in direct vicinity to watercourses		
Pesticides Ordinances (<i>Pflanzenschutzmittelverordnung</i>)	Control of the inspection certificate of field sprayers	Control of the inspection certificate of field sprayers	Control of the inspection certificate of field sprayers
Ordinance on the Use of Pesticides (<i>Pflanzenschutz-Anwendungsverordnung</i>)	Control of the compliance with the restrictions and interdictions for the application of certain pesticide ingredients and for specific sites (including the provisions of the Bee Protection Ordinance)	Control of the compliance with the restrictions and interdictions for the application of certain pesticide ingredients and for specific sites (including the provisions of the Bee Protection Ordinance)	
Pesticides Training Ordinance (<i>Pflanzenschutz-Sachkundeverordnung</i>)	Control of plant protection expert knowledge certificate (<i>Sachkundennachweis</i>)	Control of plant protection expert knowledge certificate (<i>Sachkundennachweis</i>)	Control of plant protection expert knowledge certificate (<i>Sachkundennachweis</i>)
Bee Protection Ordinance (<i>Bienenschutzverordnung</i>)	see above	see above	

Many changes have been initiated to the GFP of plant protection in the last years. In 1999 the distance rules have been revised 5 times, 2001 brought the *Indikationszulassung* and the special rule with respect to the regional endowment with landscape elements and flexible distance rules have been introduced for watercourses in 2002 (Habermeyer 2003). While acceptance is high with respect to the equipment, the frequent modifications are

seen to be one reason for the low acceptability when it comes to maintaining the required distances (BBA, ed.2002, p. 62).

3 Water Use (Irrigation)

Environmental legislation at EU level does not provide for regulations of water use. In Germany the extraction of water (i.e. for irrigation) from watercourses or groundwater require a permission according to the Water Supply Law (*Wasserhaushaltsgesetz*) which is implemented through the Water Laws of the federal states (*Landeswassergesetze*).

4 Soil Conservation

4.1 Soil cover, tillage and cropping patterns

See. 4.3

4.2 Use (storage) of sewage sludge and compost (see also 1)

On the EU level use and storage of sewage sludge and compost are subject of Directive 86/278/EEC. In Germany the Directive is implemented by the Sewage Sludge Ordinance (*Klärschlammverordnung*) and the Ordinance on Biowastes - (*Bioabfallverordnung - BioAbfV*) and the respective regulations of the federal states. These do not use the term GFP explicitly but do contain equivalent criteria.

In case of the Sewage Sludge Ordinance these include

- provisions for the maximum nutrient content (for Phosphorous, Potassium, Nitrate and Magnesium) and maximum heavy metal content of the soil on which sewage sludge can be applied,
- max. heavymetal content of sewage sludge limited
- crops on which the application is banned (vegetables),
- the total amount of biowastes (dry matter) applied per hectare within a period of three years shall not exceed 5 tonnes
- rules of documentation

In the Ordinance on Biowastes the main requirements concern:

- the total amount of biowastes (dry matter) applied per hectare within a period of three years which shall not exceed 20 tonnes

- **biowastes applied on forage or vegetable crops which shall be worked into the surface prior to the commencement of cropping**
- the interdiction to apply biowaste on the same plot of land as sewage sludge;
- rules of documentation

Non compliance is an administrative offence.

4.3 Others (erosion, compaction, salinisation etc.)

Codes of GFP with regard to erosion and compaction are set at Member State level in the European Union. In Germany the Soil Protection Law (*Bundesbodenschutzgesetz*) defines principles of GFP. These have been substantiated by a common working group of representatives at the national and federal states level (BMVEL 2001). No quantitative criteria have been set up, no indicators for control have been defined nor any penalties laid down.

GFP to avoid compaction comprises:

- use and development of technical solutions
 - regulation of the tire compression
 - enlargement of the 'foodprint' of tyres"
- adaptation of working methods, i.e.:
 - "onland" tilling
 - merging of working processes (i.e. land management and sowing)
- improvement of the carrying capacity of the soil
 - conservation tillage
 - continuous soil cover
- limitation of the mechanical strain on the soil

GFP to avoid erosion comprises:

- continuous soil cover
- lanes parallel to the slope
- avoid or eliminate compaction which inhibits water infiltration
- promote biological activity (stabilises soil aggregates)
- conservation tillage
- strips of grass or hedges parallel to the slope

5 Animal housing / animal husbandry (e.g. in farms with large stock of animals; regional planning and immission oriented law)

see 1.1

6 Landscape and Biodiversity (e.g. regarding the conversion of grassland into arable land, conversion of habitats into farm land, drainage of wetlands)

On the European level the Habitats Directive (92/43/EEC on the conservation of natural habitats and of wild flora and fauna) requires that the favourable conservation status of sites designated for habitats and species is achieved and maintained. The objectives for Natura 2000 sites take priority over the more general objectives of the water protection legislation. Whatever action is necessary to protect such sites from diffuse agricultural pollution should be undertaken in implementing the habitats and birds (79/409/EEC on the conservation of wild birds) Directives (Eaton, 2003).

The new Nature Protection Law (*Bundesnaturschutzgesetz*) has been adopted as a framework law in March 2002 and has to be implemented in the legislation of the federal states within a period of three years. It provides for a series of principles of GFP, some of which are characterised by a lack of preciseness:

- farming has to happen in consideration of the location and safeguard the sustainable fertility of the soil and lasting usability of the acreage
- Avoidable adverse effects on existing biotopes are to be omitted
- Animal production has to be in due proportion to plant production and adverse effects on the environment to be avoided
- The natural endowment of the farmland (soil, water, flora, fauna) may not be impaired more than necessary to obtain a sustainable harvest

More guidance is given by criteria such as:

- Landscape elements essential for linking-up biotopes are to be maintained and if possible increased
- On slopes which are susceptible to erosion, in flood plains, on moors and sites with a high groundwater level it is not allowed to convert grassland into arable land
- Documentation on plant protection measures and fertiliser use has to be carried out for each plot according to the respective agri-environmental laws (*Fachrecht*)

At the moment the federal nature protection laws (*Landesnaturschutzgesetze*) based on the national Nature Protection Law (amended in 1998) are still in force. In this version of

the law the agricultural land use is in general not considered as being in conflict with the goals of nature protection if carried out according to the codes of GFP as laid down in the special agricultural law (*Fachrecht*). The destruction of biotopes or specific landscape elements (i.e. *Knicks*-typical hedgerows in Schleswig Holstein) is usually fined (*Landesnaturschutzgesetz Schleswig-Holstein*) but the respective controls are not carried out in the framework of GFP.

7 "Farm Management" (e. g. farm management plans / nutrient plans etc.)

8 others

There is a wide range of EU legislation aimed at the protection of water from pollution such as the groundwater Directive (Dir 80/68/EC), freshwater for fish and shellfish Directives (Dir 78/659/EC and Dir 79/923/EC), bathing water Directive (Dir 76/160/EC) and the water framework Directive (Dir 2000/60/EC) but no specific requirements for farmers are laid down in these Directives. The legislation's primary aim is the maintenance of certain water quality targets for a range of pollutants while a considerable degree of flexibility is left to each Member State to decide how to achieve these standards (Eaton, 2003).

In Germany the Water Supply Law (*Wasserhaushaltsgesetz*) which is implemented through the Water Laws of the federal states (*Landeswassergesetze*) does not only provide for the legislative framework with respect to water use but also defines criteria for water quality. For agriculture especially the discharge of substances into surface and groundwater is of relevance (i.e. the cleaning water of the milking machines or pesticide sprays).

B: Monitoring, control and enforcement (Table B)

Area	Specific questions	
<p>Changes of the legal framework</p>	<p>Short description of changes of environmental legislation (<i>before and after</i> Agenda 2000)</p>	<p>The definition of GFP at the federal- and <i>Länder</i> level is based on the legislation on the use of fertilisers and pesticides which was in place before Agenda 2000 (the Federal Fertiliser Act of 1989 and subsequent Ordinance on Fertilisation 1996, the Regulation on Plant Protection Products and Plant Protection Equipment 1998 and subsequent Pesticides Ordinances: Use of Pesticides Ordinance, Pesticides Training Ordinance and Bee Protection Ordinance).</p> <p>The control of GFP has been increased due to the requirements of Reg. (EC) 1257/99 (control of 5 % of the beneficiaries) and communication and information fostered between the federal states in the preparation of a common report to the commission according to Reg. (EC) 963/2001 on the implementation of Reg. (EC) 1259/1999.</p>
<p>Monitoring and control: Institutions</p>	<p>Who is realising risk analysis, decision on and accomplishment of farm control (Departments involved: agricultural, environment, water ...), are there connections to technical advice and other functions?</p>	
	<p>Reg. (EC) 1259/1999 and national law</p>	<p>Generally the execution and control of the Fertiliser - and Plant Protection Law is carried out by institutions of the <i>Länder</i>.</p> <p>I.e. in Bavaria the execution of Plant Protection Law (<i>Pflanzenschutzrecht</i>) and Fertiliser Law (<i>Düngemittelrecht</i>) is carried out by:</p> <ul style="list-style-type: none"> • the Regional Office for Soil and Husbandry (<i>Bayerische Landesanstalt für Bodenkultur und Pflanzenbau</i>) • the Office for Agriculture and Nutrition (<i>Ämter für Landwirtschaft und Ernährung</i>)

	<p>Reg. (EC) 1257/1999 and Reg (EC) Nr. 1750/1999 or Reg (EC) Nr. 445/2002</p>	<ul style="list-style-type: none"> Rural District Office (<i>Landratsämter</i>) (only Plant Protection Law) <p>The control of GFP according to Reg. (EC) 1257/1999 is carried out in addition to the general control of the Fertiliser - and Plant Protection Law (<i>Fachrechtskontrolle</i>) by the IACS (Integrated Administration and Control System). IACS uses the Indicators which the federal states have agreed upon.</p> <p>If a violation is ascertained, the institutions mentioned above are contacted for an additional visit of the farm and an in depth control. While originally a premia-reduction would only be imposed after the <i>Fachrechtskontrolle</i> confirms the violation of GFP this procedure has been modified in Lower Saxony after the European Commission had criticised this procedure.</p>
<p>Procedures and Implementation</p>	<p><i>Reg. (EC) 1259/1999 and national law</i></p> <ol style="list-style-type: none"> Frequency of control / risk analysis Number of farms controlled, % of all farms Random sample inspections or inspections for specific reasons (e.g. due to suspicion or due to complaint) Indicators for control (which indicators, appropriate for control, possibility to detect breaching) Statistics on breaching and sanctions 	<p>There is no officially published statistic on controls of GFP and no national information available on the control of the <i>Fachrecht</i> as a whole.</p> <p>According to Reg. (EC) 963/2001 on the implementation of Reg. (EC) 1259/1999, the Member States are required to provide the European Commission with information on the control of GFP. To this aim the federal states have agreed on indicators for which they provide information on the number of farms/acreage controlled, the number of breaches the number of fines imposed and the average extend of the fine.</p> <ol style="list-style-type: none"> Controls under the <i>Fachrecht</i> are generally not carried out on a broad scale, in some federal states only due to suspicion or complaint. Some federal states additionally conduct random sample inspections for some indicators, others predetermine a control sample through risk assessment (for example North-Rhine-Westphalia [Eisele, 2003]). In the average of the years 2000-2002 the following numbers of controls were carried out in Germany: <ul style="list-style-type: none"> a) Control of prevention of direct entry of fertiliser into watercourses (1.414 farms) b) Control of the compliance with the periods when the application of manure is prohibited (981 farms) c) Control of the maximum amount of livestock manure applied to arable land and grassland (3.446 farms)

		<p>d) Control of the soil tests or the local recommendations (10.258 farms)</p> <p>e) Control of the documentation of examinations and estimates used, fertiliser plans, nutrient balances (6.904 farms)</p> <p>f) Control of the compliance with the restrictions and interdictions for the application of certain pesticide ingredients and for specific sites (4.142 farms)</p> <p>g) Control of plant protection expert knowledge certificate (3.941 farms)</p> <p>h) Control of the inspection certificate of field sprayers (5.963 farms)</p> <p>2. The declaration on the control according to Reg. (EC) 963/2001 does not allow for a precise assessment of the total number of farms controlled. The number of farms controlled is given separately for the different criteria, as several criteria are likely to have been controlled on one farm, summing up these numbers (~ 37.000 in the average of the years 2000-2002) will result in an overestimation of all farms controlled. In any case, less than one percent of all farms in Germany (~ 454.000) have been subject to the controls of the GFP-indicators chosen for the report according to Reg. (EC) 963/2001 in the years 2000 and 2002.</p> <p>There is a high degree of variation between the <i>Länder</i> with respect to the frequency of controls (as a percentage of all farms). These differences can partly be attributed to variance in the number of controls (in the east German federal states with their large farms a much higher percentage of all farms is subject to controls than in those regions were small farms prevail¹⁰) but can also be due to diverse definitions of what is to be considered as a control. To achieve more comparable results working groups of representatives of the <i>Länder</i> have been established.</p> <p>3. see above</p> <p>4. The indicators for the control of the Fertilisation Ordinance follow the paragraphs of</p>
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¹⁰ Farms smaller than 10 ha are exempt of many rules of the Fertilisation Ordinance which reduces the need for control on these farms.

the Ordinance and can in general be considered as suitable for the control of GFP of fertilisation, as they cover important environmental aspects. The indicators used can be divided into two categories: indicators suitable for random samples (c, d, e) and indicators relevant mostly for controls due to suspicion or complaint (a, b).

With respect to plant protection the control of GFP is much more fragmentary. One main reason is that some aspects of plant protection law are nearly impossible to control although they are considered to be major sources of pollution (Bach et. al. 1999). Neither the distances which have to be kept to non target areas can be controlled, as they vary for different products, different regions and according to the environmental quality of the non-target area in question. Nor the cleaning of the sprayer which has to be carried out on the field and not on the farm. Control would be feasible if these aspects would be linked (or limited) to technical provisions such as drift minimising nozzles or extra cleaning water tanks installed on the sprayer.

The indicators for the control of GFP leave out important environmental aspects like biological diversity and soil protection. Also the possibility to detect breaches is low as less than 1 % of all farms are controlled.

5. Statistics on breaching:

Indicator	Breaches*	%
Control of prevention of direct entry of fertiliser into watercourses	37	3
Control of the compliance with the periods when the application of manure is prohibited	58	6
Control of the maximum amount of livestock manure applied to arable land and grassland	46	1
Control of the soil tests or the local recommendations	692	7
Control of the documentation of examinations and estimates used, fertiliser plans, nutrient balances	424	6
Control of the compliance with the restrictions and		

		<p>interdictions for the application of certain pesticide ingredients and for specific sites</p> <p>Control of plant protection expert knowledge certificate</p> <p>Control of the inspection certificate of field sprayers</p> <p>*:independent from the character of the procedure initiated (rulings, admonishments, admonishment fines or administrative offence fines)</p> <p>No statistics on the number of sanctions (fines) exists.</p>	<p>129</p> <p>95</p> <p>256</p> <p>3</p> <p>2</p> <p>4</p>
	<p><i>Reg. (EC) 1257/1999</i></p> <ol style="list-style-type: none"> 1. Frequency of control / risk analysis 2. Number of farms controlled, % of all farms 3. Random sample inspections or inspections for specific reasons (e.g. due to suspicion or due to complaint) 4. Indicators for control (which indicators, appropriate for control, possibility to detect breaching) 5. Statistics on breaching and sanc- 	<ol style="list-style-type: none"> 1. At least 5 % of the beneficiaries of a measure are controlled on a yearly basis (in cases of detected breaches this number can be increased). 2. In the German average 15 % (0 % to 32 %) of the utilised agricultural area (UAA) and 32 % of all farms received less favoured area (LFA) support in 2001¹¹. Under the assumption that 5 % of all LFA beneficiaries have been subject to IACS inspections, an average of 1,6 % of all German farms were controlled. In the same year, agricultural measures (AEM) were implemented on about 8 % (1 % to 35 %) of the UAA.¹² 3. Random sample inspections 4. Control of: <ul style="list-style-type: none"> • immediate incorporation of livestock manure and liquid sewage sludge on uncultivated arable land, • the documentation of examinations and estimates used, fertiliser plans, nutrient 	

¹¹ The city states of Berlin, Hamburg and Bremen are not included.

¹² As farms receiving less favoured area support can additionally implement AEI, summing up these surfaces would be misleading when calculating the average proportion of UAA subject to IACS controls.

	tions	<p>balances (N, P, K),</p> <ul style="list-style-type: none"> • the soil tests or the local recommendations, • the inspection certificate of field sprayers, • the plant protection expert knowledge certificate (<i>Sachkundenachweis</i>). <p>Just like the indicators for the control of GFP according to Reg. (EC) 1259/1999 and national law, important environmental aspects are omitted. The selected indicators are less adequate for the control of compliance with the codes of GFP as important aspects of fertilisation (i.e. the observance of the maximum amount of livestock manure to be applied) and plant protection are missing¹³.</p> <p>With a control frequency of at least 5 % of all beneficiaries, the potential risk of being caught when breaching codes of GFP is much higher than with respect to the control of GFP according to Reg. (EC) 1259/1999 and national law.</p> <p>5. No official statistic on breaching and sanctions is available in Germany. The European Commission only requires a report on all breaches registered by the IACS and sanctions imposed. The number of farms not respecting GFP is thus mixed with information on farmers declaring larger acreage etc.</p>
<p>Sanctions</p>	<p><i>Reg. (EC) 1259/1999 and national law</i></p> <ol style="list-style-type: none"> 1. Fines and reductions of premia for breaching mandatory requirements (amounts of money, share of premiums) 2. Other sanctions or consequences 3. higher probability of inspections 	<ol style="list-style-type: none"> 1. Fines are imposed according to the severity of the environmental damage ascertained or expected due to the breach. Most federal states do not dispose of a catalogue of administrative fines but leave it to the administration to fix the amount. In consequence, there is a high degree of variation from case to case and between the federal states (i.e. in cases where the inspection certificate of field sprayers was missing, fines between 25 to 1150 • have been imposed in the years 2000 to 2002). <p>No reduction of payments is realised as cross-compliance is not implemented in Germany.</p>

¹³ The choice of the indicators is determined by the qualifications of the inspectors. As the IACS inspections are not carried out by plant protection of fertilisation experts, the control indicators can only cover aspects easily verifiable for a layperson.

	after breaching	<p>2. -</p> <p>3. In federal states were inspections are not only carried out on suspicion or complaint but also following a risk analysis, farms that have been caught breaching the codes of GFP are preferentially inspected in the following year.</p>
<p><i>Reg. (EC) 1257/1999</i></p> <p>1. Fines and reductions of payments for breaching mandatory requirements (amounts of money, share of premiums)</p> <p>2. Other sanctions or consequences</p> <p>3. higher probability of inspections after breaching</p>	<p>1. The federal states apply different systems of sanctions ¹⁴ :</p> <p>Baden-Württemberg abatement at the amount of the administrative offence fine</p> <p>Bavaria percentage abatement according to the severity of the breaching (5 %, 10 %, 20 %)</p> <p>Berlin percentage abatement according to the severity of the breaching (5 %, 10 %, 20 %) (stage of affairs in 2002, Information from BMVEL 6/03)</p> <p>Brandenburg percentage abatement according to the severity of the breaching (5 %, 10 %, 20 %)</p> <p>Hamburg reclaim of the entire payment if an administrative fine is imposed (stage of affairs in 2002, Information from BMVEL 6/03)</p> <p>Hesse abatement amounting to the administrative offence fine but not less than 10% and not exceeding 50 % of the payment (Barunke 2002, p. 94)</p> <p>Mecklenburg-Western Pomerania percentage abatement of 10 % if an administrative fine is imposed</p> <p>Lower Saxony since 2003: percentage abatement according to the severity of the breaching (5 %, 10 %, 20 %)</p>	

¹⁴ If no further source is given, the information stems directly from the ministries of the federal states.

		<p>before 2003: abatement amounting to twice the administrative offence fine</p> <p>North Rhine-Westphalia abatement amounting to the administrative offence fine</p> <p>Rhineland-Palatinate abatement only in case of repeated breach, then total exclusion from the measure (Barunke 2002, p. 94)</p> <p>Saarland abatement amounting to the administrative offence fine plus the fine of admonishment (stage of affairs in 2002, Information from BMVEL 6/03)</p> <p>Saxony percentage abatement according to the severity of the breaching (5 %, 10 %, 20 %)</p> <p>Saxony-Anhalt percentage abatement of 10 % if an administrative fine is imposed (even if the fine has not yet become final)</p> <p>Schleswig-Holstein abatement amounting to the administrative offence fine (stage of affairs in 2002, Information from BMVEL 6/03)</p> <p>Thuringia reclaim of 5000 • but not exceeding 50 % of the payment</p> <p>1. No other sanctions or consequences (except for the fine which has to be paid)</p> <p>2. As the risk analysis carried out in some states for the IACS control is not based on environmental risk assessment but on criteria such as the financial volume the probability of inspections after breaching is not higher.</p>
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Assessment of Impacts of Selected Environmental Standards on Production Cost and Farm Profitability

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1. Abstract

The compliance to existing codes of Good Farming Practice and other legislation concerning the treatment of animals and environmental media such as soil, water and air imposes costs on the complying farmers – costs they would not have to bear if that environmental legislation was not in place. By implementing a linear optimisation model reflecting management options of a representative sample of German farms the present study tries to quantify these additional production costs and its consequences on farm profitability and competitiveness.¹⁵

2. Environmental legislation concerning the German Agricultural Sector

Nutrients

Intensification of agricultural practices in general as well as increasing regional concentration of animal production led to environmental problems that aggravated severely in the late 1970s and early 1980s.¹⁶ In 1986 several regional governments (Länder) reacted by issuing “Manure Ordinances” (Gülleverordnungen) limiting the amount of manure to a maximum of 3.0 “manure units” per hectare¹⁷ – these limits were later tightened by some Länder governments down to 2.5 or even 2.0 manure units. Additionally bans were issued

¹⁵ This paper presents preliminary results of an ongoing research project at the Institute for Agricultural Economics at the University of Göttingen within the framework of the Post-Graduate College “Agriculture and the Environment”, financed by the Deutsche Forschungsgemeinschaft (DFG). The author would like to express his gratitude for constructive discussions on this paper to Prof. Tangermann, Prof. Sautter and the colleagues at Göttingen University, to Dr. Weingarten from IAMO Halle and to Prof. Kleinhanss at FAL Braunschweig for more than only a few helpful comments.

¹⁶ See e.g. Weingarten (1996), English Summary.

¹⁷ The German manure units (Dungeinheiten) are roughly comparable to livestock units (lu).

on manure spreading during the period from November until February. In 1996 the Federal Government translated the EG Nitrate Directive into national law. The “Düngeverordnung” (Fertilizing Ordinance) restricted manure spreading to 170 kgN/ha on arable land and 210 kgN/ha on grassland. For some Länder this meant a loosening of the restrictions set up by the Manure Ordinances, since the federal Fertilizing Ordinance allows animal densities of 2.8 livestock units (lu) on arable land up to 3.4 lu/ha on grassland.

On soils already highly provided with phosphorus and potassium, manure spreading is allowed only up to the level of crop uptake – and only if detrimental effects on water resources are not to be expected. In regions with high pig and poultry density especially this restriction has become a sensible limit to formerly established farming practice. Farmers are forced to prove their excess manure to be spread on additionally rented land or by distributing it via so called “manure exchanges” (Güllebörsen) – institutions that arrange transport and spreading of manure on farm land not provided with manure so far. Further costs result from prescribed testing of soil samples as well as from preparing obligatory annual nutrient balance records for farms larger than 10 ha, for some special cultures already from a size of 1 ha.

Pesticides

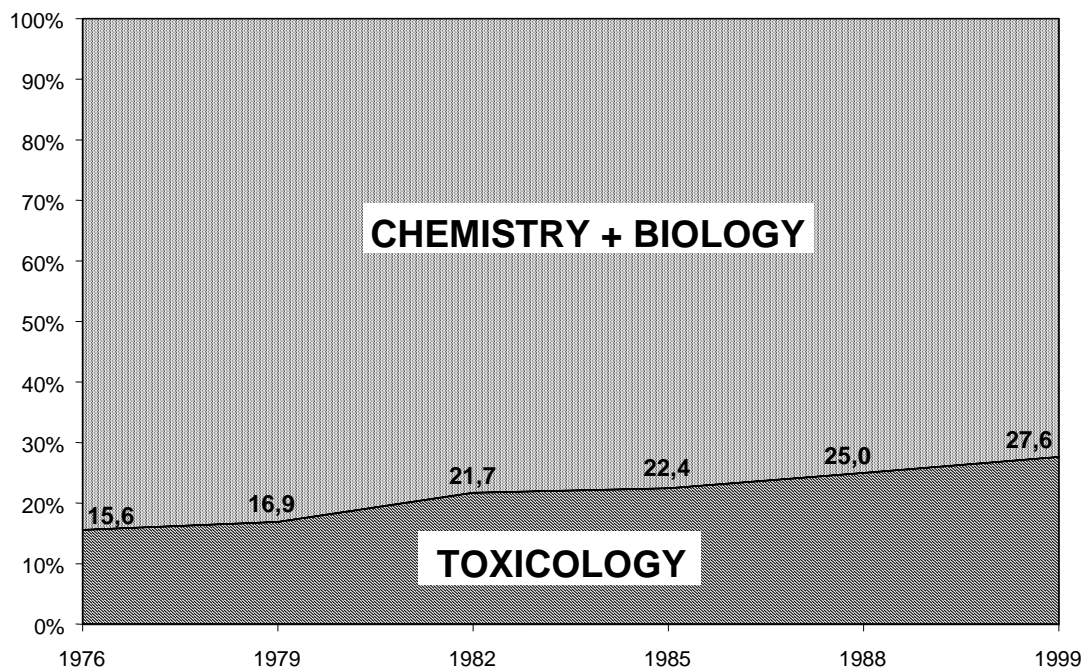
German regulations on pesticides set mainly two relevant restrictions: The chemical industry is obliged to fulfil a catalogue of requirements to get their products licensed and farmers have to respect legal instructions concerning storage and spreading of substances. Since the late 1970s the chemical industry complains about the additional production costs they have to bear due to the requirements concerning toxicology, residuals, metabolism and ecological effects on plants and animals, soil, water and air. Data published by the industry reveal that the share of toxicology (which is mainly associated with rising legal requirements) climbed from 15.6 percent of total expenditure for research and development in 1976 to 27.6 percent in 1999 (see fig. 1). To calculate the costs resulting from pesticide regulations the over-proportional rise of costs from the field of toxicology is attributed entirely to environmental policy. By assuming full transmission of the cost difference on farm input prices¹⁸, cost effects of developments in other branches of the firms as well as market developments on the demand side are neglected – the relevance of the cost increase in toxicology is therefore probably over-estimated.

Pesticide legislation in Germany further demands “state of technology” application machinery and sets standards for its maintenance and cleaning, for storage of substances and for the necessary qualifications of the person responsible for the application. These provi-

¹⁸ It is assumed that prices for pesticides would have laid 12 percent lower than actually observed if regulations on pesticides had not been in place.

sions mean additional costs for complying farmers and are calculated on the basis of other studies' findings.¹⁹ Taxes on pesticides are not in place in Germany – in contrast to Denmark, Finland, Sweden, Belgium, UK and several States of Canada and the USA.

Figure 1: Share of toxicology in total expenditure for pesticide research and development in German chemical industry 1976-1999



source: own calculations based on IPS/IVA-Annual Reports 1982-1999

3. Empirical assessment of the economic effects of environmental regulations in Germany

3.1 The model

Methodological basis for assessing the effects of environmental policy on farm profitability is the linear optimisation model BEMO developed by Prof. Werner Kleinhanss at the Bundesforschungsanstalt für Landwirtschaft (FAL) in Braunschweig, Germany. At FAL it is used to explore effects of agricultural policy reform scenarios, for example concerning the Agenda 2000 process or possible reforms of the milk quota system.²⁰ BEMO is a single period linear programming model that reflects alternative farm management options considering the current frame of agricultural policy (as e.g. the quota and premia regime). Middle- to long-term projections are possible through assumptions on the devel-

¹⁹ See Grote et al. (2000) and Waibel and Fleischer (1998).

²⁰ See for example Kleinhanss (2000) and Kleinhanss et al. (2001).

opment of yields and prices. The model recurs to a pool of individual farm data (40,000 farms in time series of over 10 years covering more than 200 variables) out of which a representative sample of about 1000 farms is drawn. For the present study the model was accomplished by additional modules to incorporate restrictions set by current environmental policy.

The analysis proceeds in three steps: First the individual production programmes of the sample farms are optimised.²¹ The objective function maximizes farm income (gross margins). In this formulation the model contains all relevant restrictions set by the environmental policy that was in place in the period of the data collection. The model is calibrated so that the aggregated results come as close as possible to the actually realised production programmes.

In a second step the environmental policy restrictions are loosened and the individual production programmes again optimised. This creates a hypothetical situation without environmental policy – the farms are allowed to “do what they like”. The third step compares the two optimisation results and analyses along certain classification criteria (arable, cattle and dairy, pig, poultry and mixed farms, region and farm size) the effects on farm incomes and management programmes.

3.2 Translation of environmental policy measures into model restrictions

This section exemplifies the integration of the manure regulations into the model in some detail and describes briefly modelling approaches for some other environmental regulations.

Manure

According to the Fertilizing Ordinance manure may be applied up to a limit of 170 kgN/ha on arable land and 210 kgN/ha on grassland. Soils already well provided with phosphorous and potassium may be supplied only up to the level of plant uptake. Assuming that fertilizing above uptake must lead to an accumulation of nutrients in the long run (if soils are not highly permeable which would nevertheless result in other problems) the model formulates the strict restriction to limit phosphorous and potassium supply to the level of plant uptake. The upper limit to manure spreading with respect to its nitrogen content is derived from the arable and grass land area multiplied by 236 kg N and 291 kg N respectively²². Since in many cases animal density lies above the level tolerated by the

²¹ Recurring to averages based on individual farm data taken out of the period 1996-1999.

²² These numbers take account of deductible losses during storage and spreading according to the German Fertilizing Ordinance and were valid until January 2003. Since the presented analysis looks at the effects of implementation of environmental policy measures in an ex post perspective it is still based on

above mentioned restrictions the model includes the possibility to rent additional land for manure spreading or to take part in a manure exchange. According to regional animal density differing prices for manure disposal are identified by iterations that bring regional demand and supply into equilibria. In regions with low livestock density arable farmers are willing to pay for manure to be spread onto their land up to the price they would have to pay for an equivalent mineral fertilization (according to practice this equivalent is set to only 15 percent of total N-content in the excrements – resulting in prices close to zero or arrangements like free delivery by the supplying farm). Farmers in regions with high animal density in contrast have to pay up to 7 • per m³ or up to 300 • per hectare of land to get rid of their excess manure.

Other environmental regulations

Other model representations of environmental policy measures are inter alia: 12 percent price difference for pesticide inputs due to the licensing restrictions (see part 2 above), the instructions for the storage of fertilizers and pesticides amount to about 10 •/ha per year (including other environmentally motivated building regulations) and 2 •/ha are calculated for taking and analysing soil samples and preparing nutrient balance-sheets.

3.3 Preliminary results

The presented preliminary results are based upon data sets representing average farms for the classes mentioned above which were aggregated to sub-sector and sector levels by using statistical aggregation factors.

Tab. 1: Income effects²³ of environmental policy measures – all farms

environmental policy measure	average change in farm incomes
Fertilizing Ordinance (limits for nutrient application)	- 2,4 %
soil tests and preparation of nutrient balance-sheets	- 0,2 %
pesticide regulations (incl. ban of substances)	- 0,9 %
building regulations and storage instructions	- 1,0 %
layer hen keeping ordinance	- 0,02 %
environmental policy - total	- 4,5 %

The results of the model runs suggest that average farm incomes lay 4.5 percent lower than they could without environmental policy measures.²⁴

that “old” policy framework. Losses of nitrogen during spreading of manure are now (2003) not deductible anymore.

²³ Farm income is defined here as gross margin (Gesamtdeckungsbeitrag).

Arable farms are least affected – only with respect to pesticides regulations they experience moderate cost differences (see table 2). For cattle and dairy, pig and poultry farms the Fertilizing Ordinance is most relevant – it leads to average losses of 6 to 10 percent (but to moderate gains for arable farms).

Tab. 2: Income effects of environmental policy on different farm types

policy measure	all	arable	cattle & dairy	pig & poultry	mixed
Fertilizing Ord.	- 2,4 %	+ 1,5 %	- 4,5 %	- 8,6 %	- 2,9 %
tests	- 0,2 %	- 0,3 %	- 0,2 %	- 0,2 %	- 0,2 %
pesticides reg.	- 0,9 %	- 1,8 %	- 0,6 %	- 0,9 %	- 0,9 %
building reg.	- 1,0 %	- 1,4 %	- 0,9 %	- 0,9 %	- 1,1 %
layer hen ord.	- 0,02 %	- 0,02 %	- 0,01 %	- 0,2 %	- 0,03 %
total	- 4,5 %	- 2,1 %	- 6,1 %	- 10,7 %	- 5,1 %

Specialized pig and poultry farms insufficiently equipped with land are most severely affected in their farm management and income opportunities (see table 3). A decrease of livestock would involve the heaviest losses, so most farmers choose to adapt by renting additional land or by using manure exchange institutions – which is particularly expensive in regions with already high stocking density. Cattle and dairy farms are in a similar situation (see table 4).

Tab. 3: Income effects of environmental policy on pig and poultry farms

policy measure	all	pigs	poultry	others
Fertilizing Ord.	- 8,6 %	- 13,0 %	- 4,1 %	- 8,1 %
tests	- 0,2 %	- 0,1 %	- 0,2 %	- 0,2 %
pesticides reg.	- 0,9 %	- 0,6 %	- 0,3 %	- 0,9 %
building reg.	- 0,9 %	- 0,6 %	- 0,8 %	- 0,9 %
layer hen ord.	- 0,2 %	- 0,1 %	- 6,7 %	- 0,1 %
total	- 10,7 %	- 14,3 %	- 12,1 %	- 10,1 %

²⁴ Due to a lack of representative data neglecting horticulture and permanent crops.

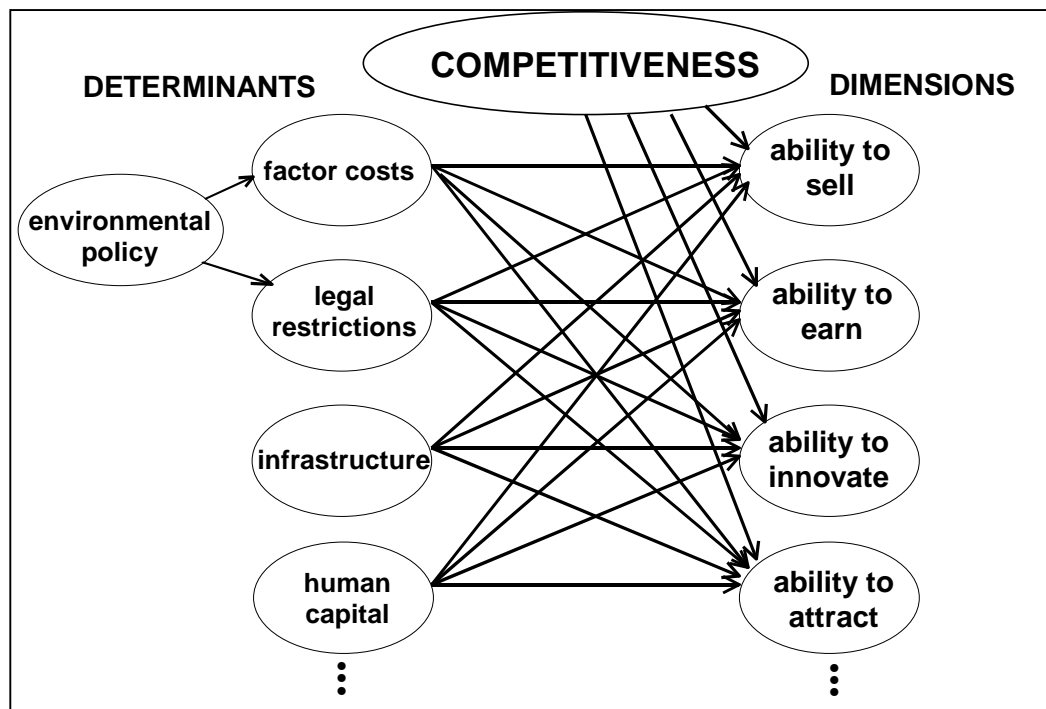
Tab. 4: Income effects of environmental policy on cattle and dairy farms

policy measure	all	dairy	cattle
Fertilizing Ord.	- 4,5 %	- 5,7 %	- 2,7 %
tests	- 0,2 %	- 0,2 %	- 0,2 %
pesticides reg.	- 0,6 %	- 0,4 %	- 0,9 %
building reg.	- 0,9 %	- 0,7 %	- 1,2 %
layer hen ord.	- 0,01 %	- 0,0 %	- 0,1 %
total	- 6,1 %	- 7,0 %	- 4,8 %

4. Consequences for the international competitiveness of the German agricultural sector

There are numerous ways to define the term “international competitiveness”. Referring to that extensive discussion the present study develops a concept to systematize the construct “competitiveness”. Competitiveness is presented as a complex system of causal relationships between determinants and dimensions of competitiveness. The determinants define the driving forces that make a sector internationally competitive and the dimensions show which are the elements competitiveness consists of (see figure 1).

Figure 1: Structural model representing the construct „competitiveness“



The relevance of the determinant “environmental policy” has to be weighted relatively to other determinants, such as: land rents, wages, building and energy prices, the availability of human capital, infrastructure, soil quality, climate, and political factors such as support and trade regimes, reliability of property rights and stability of the political system in general.

Besides the analysis concerning the relative relevance of different determinants it is necessary to investigate the conditions relevant competitors are confronted with. Because of the great number of countries involved and the difficulties to analyse their environmental policy towards the agricultural sector and its consequences on farm income this investigation is - within the scope of this study - not possible in depth, but only as a qualitative overview. Referring to a number of studies comparing some particular regulations in some particular countries it is possible to state that in most countries competing with Germany on the world market for agricultural goods environmental policies are present that regulate the domestic agricultural sectors in an intensity similar to German legislation. The overview did not reveal any outstanding unilateral or unequivocal disadvantages for German farmers (and vice versa).

5. Conclusions

Due to their compliance to environmental regulations the majority of farms in Germany face additional costs of between 2 and 5 percent of gross margins. Specialized pig and

poultry farms insufficiently equipped with land are most affected – which can lead to income losses of 10 to 20 percent in comparison to a hypothetical situation without environmental policy.

Environmental policy and animal welfare legislation do not harm the competitiveness of German farmers on the world market for agricultural goods. Only farming practices that impose a potential threat to the quality of ground and surface water resources face truly sensible restrictions: farms with high livestock density in regions where animal husbandry is already highly concentrated. This policy translates social preferences into practice and reduces negative external effects resulting from agriculture that would otherwise impose costs on the society. By correcting non-sustainable practices environmental policy secures long-term development possibilities and acceptance of the agricultural sector among citizens and consumers.

It lies beyond the scope of this paper to investigate all other relevant determinants of competitiveness in similar detail. Nevertheless it is evident that there are other determinants of competitiveness that are more relevant than environmental policy. The German agricultural sector has some disadvantages due to relatively high wages and land rents. On the other hand a highly developed infrastructure, an excellent education level, and the capability to use most advanced technology are strengths that are able to compensate the handicaps. Taking into account the present state of the international discussion on the future conceptions of environmental and agricultural trade policy leads to the judgment that an early adoption of stricter environmental standards is more likely to result in gains in international competitiveness than to do any harm to the domestic agricultural sector.

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National administration's view: Co-ordination of the Länder in achieving the requirements of Reg. (EC) 1259/99 and Reg. (EC) 1257/99 in defining and controlling good farming practice (GFP)

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Structure of the presentation

1. GFP in the case of the horizontal regulation (1259/1999)
 - 1.1 General approach in Germany
 - 1.2 Core elements of GFP
 - 1.3 Results since 2002
2. GFP in the case of the regulation on rural development (1257/1999)
 - 2.1 General approach in Germany
 - 2.2 Administrative solution
 - 2.3 Results
3. Outlook – new requirements (cross-compliance)

GFP in the case of the horizontal regulation (1259/1999)

The Horizontal Regulation requires that the member states take appropriate environmental measures with regard to the agricultural areas and the agricultural production for which direct payments are made, so that more importance is attached to environmental issues in the scope of the common market organization. This provision can be implemented through the following measures:

- specific subsidies for environmental measures,
- general environmental requirements, and
- specific environmental requirements as a prerequisite for direct payments.

1.1 General approach in Germany

In Germany, the obligation as per Article 3 of the Horizontal Regulation is implemented through provisions defined in **specialized agricultural law** and the **agri-environmental measures** carried out in the scope of Regulation (EC) 1257/1999 (Regulation on the support for rural development). This paper will focus on the former part and is therefore limited to the implementation of the special legal provisions.

Specialized agricultural law applies throughout Germany to **all utilized agricultural areas** and animal husbandries and therefore to **all agricultural enterprises**. It constitutes a comprehensive set of framework rules for German agriculture and is the result of a continual development process. The provisions that are particularly relevant for the environment within specialized agricultural law are those regulating fertilization and plant protection. Specialized agricultural law both implements existing EU law provisions and defines specific national requirements. Due to the federal structure of the Federal Republic of Germany, specialized agricultural law is enforced by the Länder.

The individual issues of specialized agricultural law are controlled at the agricultural enterprises by the various specialized authorities according to their respective responsibilities. The organizational structure of these specialized authorities is defined by the Länder and therefore differs from Land to Land. Depending on the Land, the authorities responsible for inspections may be Agricultural Offices, Agricultural Chambers, Plant Protection Offices or Land Agencies (“Landesanstalten”).

Controls may be carried out as

- planned checks (often depending on plant development stage and weather),
- spontaneous sampling, and
- special purpose checks based on a suspicion or a filed report.

1.2 Core elements of good farming practice

In specialized agricultural law, the provisions of fertilizer and pesticide law constitute the essential elements of good farming practice (GFP) from the perspective of environmental protection. These two areas are of major importance for all biotic and abiotic protected resources. Compliance with the provisions on fertilization and plant protection will make an effective contribution to environment protection, nature conservation and immission protection.

The following areas are subject to concrete controls by the Länder, carried out by the specialized authorities:

a) Fertilization

- Regarding the use of fertilizers, direct application into surface waters should be avoided and care should be taken that fertilizers are not washed into any surface waters in the interest of water protection.
- Regarding the use of liquid organic fertilizers (slurry, liquid manure, fowl manure, sewage sludge and liquid secondary raw material fertilizer containing nitrogen), it is required to observe a general prohibition period (15 November to 15 January).
- Regarding the application of nitrogen from livestock manure, enterprises are required to comply with land size-related maximum levels (EU Nitrate Directive).
- To determine the required fertilizer rates, the nutrients contained in the soil, in particular nitrogen, phosphate and potash, must be analyzed. This is required annually for nitrogen, and at least once every six years for phosphate and potash. In the case of livestock manure, it is furthermore required to analyze the total nitrogen, phosphate and potash levels before application.
- The results of the soil analyses, the applied procedures and the nutrient balances must be recorded by the farm.

b) Plant protection

- Regarding the use of pesticides, the requirements laid down upon approval of the pesticide and the application bans, limitations and provisions according to German plant protection law must be observed (e.g. application rate, required distance to water systems and required waiting time).
- Persons intending to use pesticides are required to have expert knowledge and to be able to give proof of this (proof of expertise). Expertise is attained through completion of an appropriate apprenticeship (vocational training), e.g. as a farmer, or through a separate examination to be taken at the respective responsible Länder authorities.
- The plant protection equipment used must be inspected at specific time intervals by official or officially approved control agencies. The owner of the plant protection equipment is required to give proof of these official controls by attaching a test badge on the equipment.

1.3 Results for 2002

Overall, the controls that were carried out found a relatively low number of offences, similar to previous years. The rate for fertilization ranges between 1.3 % and 8.4 % and for plant protection between 2.6 % and 3.5 %. Overall, the control rate was clearly increased compared to previous years, by approx. 38 %. The ascertained number of offences, however, only increased by just over 16 %. The control rate increase was an important step towards intended improvement of the controls.

The number of inspections carried out in Germany in 2002 was between 1,000 and 11,000 depending on the offence checked. In relation to the approx. 360,000 agricultural enterprises receiving direct payments, this corresponds to an annual inspection rate of 0.3 % to 3.1 %.

The relatively high number of controls combined with the low number of ascertained offences is a clear indication that farmers generally respect and observe the specialized agricultural-law system in Germany. Hence, the system is making a substantial contribution to ensuring environmentally sound agricultural cultivation and to improving the environmental situation, particularly in the area of the abiotic resources.

However, analyses of the available nutrient rates in the soil and the nutrient contents of the livestock manure to be applied need further improvement. In this regard, it is necessary – with the support of the advisory services – to work on improved implementation, which, in turn, must be ensured by a high control density.

2. GFP in the case of the regulation on rural development (1257/1999)

In contrast to the direct income subsidies in the scope of the Horizontal Regulation, compliance with GFP is a mandatory requirement for granting support funds. This applies to the compensatory allowance in less favoured areas, the agri-environmental measures, the investment promotion for individual enterprises and the promotion of young farmers.

For the administrations in charge of paying and managing these support instruments, this means that 5% of all supported enterprises must be subjected to on-the-spot checks of compliance with GFP according to the Rules of the Integrated Administration and Control System (IACS).

Hence, of an approx. 150,000 enterprises that receive the compensatory allowance, on-the-spot checks of compliance with GFP have to be carried out for approx. 7,500 enterprises. These checks are carried out in addition to the specialized agricultural-law controls described in the first section. Altogether, this makes high demands on the agricultural administrations in Germany, in particular because the rules of the IACS state that controls in the scope of rural development measures must be completed before payment of the compensatory allowance.

2.1 General approach in Germany

For the additional inspections required under Regulation (EC) 1257/1999, it was necessary to find a procedure that would take into account the requirements of EU Law yet still be feasible for the agricultural administrations. The solution to this problem was to limit the GFP controls according to Reg. 1257/99 to a few meaningful core indicators. These were designed in such way that experts of the specialized authorities were not necessarily required for the checks but that these could also be carried out by the control agencies of the EU paying agencies. The result was the nationally uniform GFP checklist for Germany. The aim of this list, which the control services of the paying agencies usually use as a basis to make on-the-spot checks of compliance with GFP, is to filter out the enterprises that are very likely to be in breach of GFP. The suspected cases as identified by these controls are passed on to the responsible specialized authority, which, in turn, carries out a detailed inspection of this enterprise.

2.2 Administrative solution

This GFP checklist comprises three pages and covers major parameters relating to fertilization and plant protection. These include:

Fertilization

1. Inspection of the documents
 - on the soil analyses of the basic nutrients phosphate and potash,
 - on the nitrogen levels that are necessary to determine the needed fertilizer rates, and
 - on the records of the nutrient balances.
2. Inspection whether at the time of the controls any indications of a non-immediate incorporation of liquid organic fertilizer in uncultivated farmland exist.

Plant protection

1. Check for proof of expertise,
2. Check for valid test badge of the pesticide sprayer used.

Other

Are there any obvious indications of a breach of GFP?

If this checklist provides no indications of any offences, it is assumed that the agricultural enterprise complies with GFP. However, if an offence is ascertained during the more in-depth controls of the specialized agricultural law authorities carried out due to an initial suspicion, the specialized authority will report this offence to the paying agency. Depending on the seriousness of the offence, the paying agency will impose a sanction or will refuse any further payment of support funds.

This system is supplemented by cross checks. This means that any offences ascertained by the specialized authorities in the scope of their own agricultural-law controls obviously must be reported to the paying agencies as well. Hence, a system of “communication channels” is created between the specialized authorities and the paying agencies, further improving the control level as a whole.

2.3 Results

After some initial difficulties, which is certainly not unusual for any novelty, the GFP checks of the paying agencies based on the checklist have proved useful. The interaction between paying agencies and specialized authorities has continually improved as well. Therefore, it may be concluded that the system of indicator questions overall works well from the perspective of the agricultural administration.

Past years have shown that the rate of ascertained offences is lower in relation to the total number of controlled enterprises than the rate of offences ascertained by the specialized agencies. This result, however, is plausible, since the two systems cover different enterprise structures. While the controls carried out by the specialized authorities focus mainly on intensive farming and large enterprises, the controls for GFP compliance of enterprises that participate in agri-environmental measures or receive the compensatory allowance generally tend to focus on smaller and rather extensively farmed enterprises. The structure of the selected enterprises therefore clearly differs owing to the different risk analyses on which the special authorities or paying agencies respectively base their selection. While special authorities base their selection of controlled enterprises on agricultural risk aspects, paying agencies usually base their selection on the level of payment made to the individual enterprise (compensatory allowance or agri-environmental measures).

3. Outlook – new requirements (cross compliance)

With regard to the issue of a further improved consideration of GFP, cross compliance is certainly the appropriate term to describe current discussion on the reform of EU Agricultural Policy. What does cross compliance mean? It simply means that direct payments are conditional to compliance with provisions relating to environment, food safety, animal welfare and occupational safety.

The regulation proposed by the EU Commission identifies 38 EU regulations and EU directives in this respect (annex III of the draft regulation) and provisions to maintain the land in good agricultural condition (annex IV). The latter mainly refer to aspects of soil protection, for which no EU-wide provisions exist yet, and to provisions on the minimum cultivation of land.

According to the present state of discussion, it may be assumed that granting direct payments, regardless if these are decoupled fully, partially or not at all, will in future depend on compliance with certain standards. The need for cross compliance is not called into question on principle by any Member State. The current discussion rather focuses on the extent of the provisions to be included in the scope of cross compliance. No matter which concrete provisions will eventually be laid down in the text of the regulation, the following question arises:

Can the procedure, by which GFP controls have been successfully carried out so far within the framework of support for rural areas (second pillar of the CAP), be transferred to the future policy (first pillar of the CAP)?

I believe not. My reasons for this in brief are:

1. The number of provisions to be observed clearly exceeds purely environmental issues. A checklist, however designed, would not only have to consider two standards as in the past (Nitrate Directive and Pesticide Directive) but 38-X standards.
2. It is furthermore doubtful whether it would be possible to develop similar meaningful indicator questions for the additional standards as those used for fertilization and plant protection.
3. The depth and breadth of expertise required to check or assess possible offences can probably not be provided by the control services of the paying agencies.
4. The number of farms requiring controls will more than double (from 150,000 to 360,000).

What conclusions can be drawn?

1. Cross compliance should be controlled by the specialized authorities responsible for the control of specialized agricultural law. These are obliged to report the ascertained offences to the paying agency (obligation to report) so that the paying agency can then cut the direct payments accordingly.
2. A control rate of 5 % per year would mean that specialized authorities would have to carry out 18,000 additional on-the-spot checks. This exceeds the scarce resources of the agricultural administrations and would eventually even put the existing control system at risk, since the result would be a misallocation of control resources. In this context, consideration must be made that the specialized agricultural checks are often very detailed and that some of the individual standards are checked by very complex procedures.
3. In many cases, even a substantially limited number of controls may be sufficient from an expert viewpoint. If a minimum control rate is deemed at all necessary, consideration should be made whether different control rates for the individual agricultural sectors may be more reasonable. Overall, the average control rate across all specialized authorities should certainly not exceed 1 %. This would still mean 3,600 on-the-spot checks per year.
4. Furthermore, it should be investigated whether the Member States should be granted a longer control period in view of the limited control capacities. This would also pro-

vide the opportunity to have specific control focal points each year, which would influence the object of the checks and the selection of the enterprises.

5. Finally, it would also have to be investigated whether systematic control is actually needed or even possible for all cross-compliance provisions. In some cases, it could be sufficient for specialized authorities to report ascertained offences to the paying agency. In this context, I am mainly thinking of the provisions on livestock diseases. The question whether a farmer actually complies with his reporting obligations and restrictions in case a livestock disease breaks out can only be meaningfully checked when there is an actual case of a disease.

Control of environmental law in general and in the framework of Reg. (EC)
1257/99: Procedures, Problems and perspectives

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Introduction: Control of environmental standards and “good agricultural practice”

According to Article 3 of the Regulation (EC) No. 1259/1999 all member states are bound to control general and specific environmental standards as a requirement for direct payments and to impose appropriate sanctions in the case of violations. Germany discharges this commitment by the implementation of the national special agricultural legislation. This particularly contains especially environmentally relevant regulations on the use of fertilizers, plant protection, soil- and nature protection. In these fields „good agricultural practice“ (GAP) is defined legally. Compliance with GAP and its control is a requirement for payments within the scope of agri-environmental programmes according to Regulation (EC) 1257/1999.

Legal definition of GAP is the standardized basis of agricultural production. In addition, however, the farmer must have the possibility of an individual reaction on his specific site- and weather conditions and the internal requirements. The GAP is seen much more distinguished by the agricultural advisory services.

The special legislation applies throughout Germany for all areas of land used for agriculture and livestock farming, as well as for farms with their various production lines, crop ratios and sizes.

Control of compliance with GAP (general control of agri-environmental legislation) in Northrhine-Westfalia

Implementation and control of the national agri-environmental legislation and thus of GAP is in the responsibility of the federal states. According to the specific conditions there are different organizational structures, specialised control bodies and a different way of enforcement of the control. In the following the established control system of the most relevant agri-environmental regulations (regulations on the application of fertilizers (Fertilizers Ordinance) and the use of plant protection products) in Northrhine-Westfalia will be described.

Application of fertilizers and use of plant protection products

The regulations on the application of fertilizers stipulate that fertilisers may only be applied in accordance with the principles of GAP. The Fertilizers Ordinance (Düngeverordnung) was finally enacted in 1996 and implements the EU Nitrates Directive. It ensures that the type and quantity of the fertilisers applied, as well as the period of time over which it is applied are oriented on the requirements of the crop and the soil. In this respect, it is necessary to take into consideration the available nutrients in the soil, its organic substance as well as the location and crop conditions.

The use of plant protection products is comprehensively regulated by the Plant Protection Act (Pflanzenschutzgesetz) and its legal bases (e.g. Pesticides Ordinance, Use of Pesticides Ordinance, Pesticides Training Ordinance and Bee Protection Ordinance).

In this respect, preventive measures like advisory and educational measures or the development of forecasting systems are accorded high priority.

The appropriate supervisory authority for the implementation of this special legislation is the Ministry of the Environment, Conservation, Agriculture and Consumer Protection Northrhine-Westfalia (NRW). The task of ascertaining compliance with statutory provisions of GAP and their control and inspections has been transferred to the Directors of the Agricultural Chambers as representative of the regional government. The Agricultural Chambers in NRW are divided in a public authority (Director of the Agricultural Chamber) and a autonomy-section, which is partly financed by the farmers. Inspections and control (public authority) are strictly separated from advisory and education (autonomy).

Environmentally relevant orders or exceptions within the scope of the Fertilizers Ordinance have to be conferred amicably with the regional water authority. The water authority is responsible for the fixing of distances to water bodies and modifications according to the prohibition of applying farmyard manure and liquid secondary raw manure in winter. The Directors of the Agricultural Chambers are also responsible for the prosecution of breaches of the law.

Enforcement of control and inspections:

The choice of facts, that have to be controlled results from the analysis of potential risk for the environment, the effort and efficiency of the control and the probability for a contempt of the corresponding standard. For example applying liquid manure close to water bodies or on frozen or waterlogged soil can be a high environmental risk, but a systematic on the spot check is not possible or efficient. In

comparison, the documentation of the nutrient accounting system can be controlled easily and highly efficient, but there is no high risk for the environment if these documentations cannot be submitted by the farmer. However, from the control of these documentations conclusions about the requirements for the compliance with the GAP can be drawn.

Scope of inspections (Fertilisers Ordinance)

In a first step the documentation of the nutrient accounts are requested from 1000 farmers (about 2%). In a second step they are checked on plausibility (risk assessment) and about 20% of these farms are checked on the spot. With this two-stage procedure the efficiency of the extensive on the spot check can be considerably increased.

Farms, which

- have an amount of manure containing more than 170 kg (210 kg) of nitrogen per ha arable (green-) land,
- export farmyard manure to other farms,
- receive farmyard manure despite own livestock,
- receive secondary raw material fertilizers,
- have a nitrogen surplus of more than 60 kg N per ha,
- have a phosphorus surplus of more than P₂O₅ per ha,
- have a potassium surplus of more than 40 kg K₂O per ha or
- overstate their yield unrealistically

are checked with high priority.

These systematic inspections differ from inspections prompted by complaints or specific concerns.

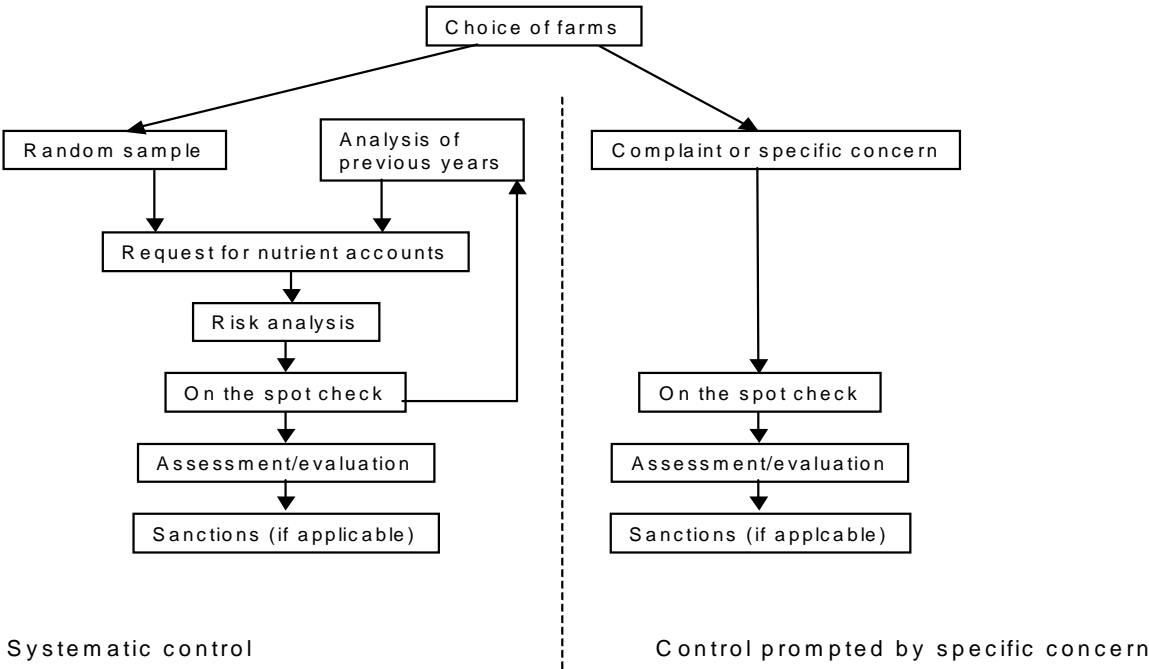


Fig. 1: Choice of farms for inspections in the scope of the Fertilizers Ordinance

The efficiency of the inspections is increasingly improved by continuous feedback and analysis of previous years. Farms that are cautioned will be inspected preferred the following year.

Control of GAP as a requirement for subsidies in the scope of Reg. (EC) 1257/1999 and Reg. (EC) 1750/1999

The enforcement of Regulation (EC) No. 1750/1999 and the Commission guidelines is realised via local inspections to ensure conformity with the essential aspects of GAP in addition to the scheduled annual inspections of 5% subsidised farms within the scope of the EAGGF subsidy programme. If there are any indications of non-conformity with the GAP, the relevant authorities are informed and requested to implement a more detailed investigation of the matter at the farm in question. The subsidy-granting authorities are appropriately informed by responsible specialist authorities of any breach of special legislation.

In 2002 about 17.500 farms in NRW got payments according to the Reg. (EC) 1257/1999. 3000 of these farms were checked with the help of the “indication criteria”; if there are indications of non-conformity with the GAP a detailed on the spot check of the specific authority is necessary. In the scope of the Fertilizer Ordinance 977 farmers were notified the authority which enforced 227 detailed inspections. A fining system was initiated in 209 cases (including fining systems

on account of compliants and other concerns). Imposed fines are notified the paying agency and the payments are reduced by the amount of the fine.

Assessment of the control procedure

The chosen „Indication criteria“ to prove the compliance with GAP have to meet the following demands:

- easy to control
- controllable at every season
- controllable by the IACS inspector without detailed background knowledge of special legislation,
- clear guidelines from the special legislation and
- environmental relevance.

Instructions which regulate the acting on the spot (e.g. applying of fertilizers to frozen ground) don't fulfil these demands. Therefore the indication criteria comprise the proof of specific documentations (e.g. nutrient account, results of soil analysis). They are relatively rough indicators, which can „indicate“ but not „prove“ right or wrong agricultural practice. It is difficult to consider both, practicable inspections and environmentally relevant facts, so that the detailed inspections of the special legislation authorities can be concentrated on farms with increased environmental risk. An example in the scope of the Fertilizers Ordinance makes this problem clear:

In the past many farms were notified by the IACS inspectors to the special control bodies because the data of stipulated soil analysis could not be submitted for all fields. The subsequent control of the special control body often led to the result, that on the fields in question no fertilizers were allowed (e.g. grassland extensification) so that the Fertilizers Ordinance was not appropriate. A lot of human resources were spend for environmentally not relevant farms. In the light of decreasing resources such a system is not efficient. The on the spot check of the IACS control have to make a more distinguished selection. In the given example fields which are not fertilized will be considered in the first IACS control for the future.

On account of the experiences of the federal states in Germany with the implementation of this control system the checklist with the „indication criteria“ is checked regularly and will be adapted if necessary.

Regarding to the number of controls this two stage „screening“ approach is highly efficient. With the available human resources in the special control bodies of the federal states a high control rate is realizable in this way.

Outlook:

According to the actual discussion about the „midterm review“ the direct payments will depend on compliance and control of GAP. Both, the number of standards to be controlled and the range of controls are discussed. According to an actual “non paper” of the commission the standard IACS control rate will be 5% of all beneficiaries of direct payments. A control plan has to be established for each selected farm in which all standards applicable to the farmer are listed. These farms will be notified to the special control bodies which have to proceed with a risk assessment after their own rules. A minimum control rate of 50% (20% resp.) out of the 5% pre-selected farms is envisaged (between 1 and 2,5% of all farms getting direct payments).

It is still not clear, how the IACS control body can list all relevant standards for each selected farms. For this a detailed inspection of the farm is necessary. Beyond it each of the special control bodies has to enforce on the spot checks which could be an enormous burden for the farmers: farms may be controlled by up to 10-15 different inspectors in one single year. According to the stipulated control rates the control activity of the special control bodies has to be noticeably extended. In the scope of the Fertilizers Ordinance about 1000 farms of 45.000 farms which get direct payments (=2,2%) are included in the specialised control in NRW, but only 200 (0,5%) are checked on the spot. An extension to more than 1% of the relevant farms is not feasible.

In the light of the limited and dwindling human resources at the relevant authorities, more emphasis on inspection activities is inevitably resulting in less staff being available to provide an advisory service. This is regrettable since a modification of behaviour towards GAP is generally more effectively realised by way of advice rather than sanctions.