

# **Compliance with regulations in EU agriculture vis-à-vis its main competitors; An explorative and comparative overview with a focus on cross-compliance**

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## **Abstract**

Regulations and standards are introduced in agriculture to control agricultural practices and by that assure food safety, improve their sustainability and reduce its potentially harmful effects on biodiversity, soil, water and air. Other measures are implemented to improve land management practices. Obligatory cross-compliance was introduced in the European Union with its 2003 CAP-reform, the main objective of the instrument being to improve compliance with standards that were previously insufficiently adhered to. In addition, rules for Good Agricultural and Environmental Conditions (GAECs) need to be respected.

In this paper the EU's policy framework is analysed from the perspective of responsive and economic regulation theories as well from its impact on compliance and competitiveness. Best-estimates of degrees of compliance at regulation specific and member state specific levels are provided. Moreover, costs of compliance are examined and the order of magnitude of competitiveness impacts is assessed. Finally, the EU's approach is contrasted with approaches followed in other countries, notably the US, Canada and New Zealand.

As such the paper aims to provide further insights into the relative impacts of various pieces of regulation on EU agriculture, provide a crude assessment about impacts on costs and the competitiveness of EU agriculture vis-à-vis its main competitors. Moreover, further insight is gained in how different countries might approach similar problems with different regulatory strategies.

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# 1 Introduction<sup>1</sup>

Farmers are facing a regulatory environment including more and more fields, such as environment, biodiversity, food safety, animal welfare, etc. Agriculture is less and less seen as an isolated business, but as an industry which by its nature has a complex interaction with ecology, nature and landscape services (multifunctionality), which even more than for any other sector emphasizes the need for sustainability. It is increasingly recognized that the still wide public support given to agriculture should enhance rather than hinder sustainability. In the EU the latest CAP reform (Luxembourg Agreement, 2003) introduced obligatory cross-compliance, an enforcement mechanism emphasizing the importance attached to farmers' compliance with regulations. Farmers eligible for direct payments of the CAP that are detected to be non-compliant are, depending on the degree of violation, punished with a partial or complete reduction of these payments. Where the EU relies on the stick, other countries are more reliant on the carrot, i.e. using voluntary approaches which might be combined with positive financial incentives.

Farmers not only face regulatory constraints, but at the same time are increasingly involved in voluntary certification schemes or standards in order to provide assurance about the quality and the safety of their products and the environmental sustainability of their production techniques. These voluntary certification schemes might interact with the obligatory regulatory requirements, which also specify certain minimum standards on often related fields. Under some conditions voluntary schemes driven by the private sector (self-regulation), or as facilitated and encouraged by the public authorities, might even be thought to be an alternative strategy to achieve the same policy goals.

This paper focuses on regulatory standard rather than voluntary standards and certification regimes. The first aim of the paper is to describe and analyse the impacts of the main regulations as included in the EU's obligatory cross-compliance package, introduced with the 2003 CAP reform (Luxembourg Agreement). A second aim is to provide a comparative analysis with respect to the EU's key-competitors, notably the US, Canada and New Zealand. There the question is raised to which extent and in which way they regulate the same issues as the EU does with the regulations covered in its cross-compliance package. As far as possible, differences in approaches and impacts will be compared.

As regards the impact of regulations and standards the analysis is still difficult for various reasons. Data on degree of compliance and costs of compliance with regulations are in most cases only scarcely available. Moreover there exist intricate relationships between various regulations and standards. For example, where a regulation imposes a cost, at the same time complying to a related voluntary standard might bring in an associated cost-offset (e.g. the interaction between the Birds and Habitat Directive and Agri-Environmental Schemes). As another example, the costs associated to a combined set of regulations or standards might differ from the aggregate sum of costs associated with the single standards. Synergies between

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<sup>1</sup> The author gratefully acknowledges the contributions made by various partners of the Cross-Compliance 6<sup>th</sup> Framework Project (see the reference list for the specific country reports (Deliverable 5) produced within this project, from which a lot of material is synthesized.

standards may in a relative sense reduce the accumulation of costs. This lack of information and abundance of complexities is the reason that analyses often have a qualitative or case specific character. This paper tries to combine both qualitative and quantitative analyses of a broad set of regulations and standards, where the emphasis is on the general overview, orders of magnitude, rather than on the tiny detail. As regards the impacts the main focus will be on the economic impacts, and less on achieved the benefits (such as increased sustainability). Particular attention is paid to impacts on the EU's (external) competitiveness with respect to three key trade-partners, notably the US, Canada and New Zealand.

The paper is organized as follows. Section 2 discusses several issues of regulation, notably the theory of enforcement based on the responsive regulation approach, a summary of results from the economic theory of compliance and the potential impact of regulation on competitiveness. Section 3 discusses best estimates of compliance and costs of compliance for five EU-15 member states. It also includes some information on the estimated order of magnitude of impacts on competitiveness. Section 4 provides further details about the EU's key competitors, notably the US, Canada and New Zealand respectively. Section 5 provides a comparative and synthetic overview. The paper closes with a number of concluding remarks (Section 6)

## **2 Issues of regulation**

### ***2.1 Regulatory strategies and styles of enforcement: the pyramids***

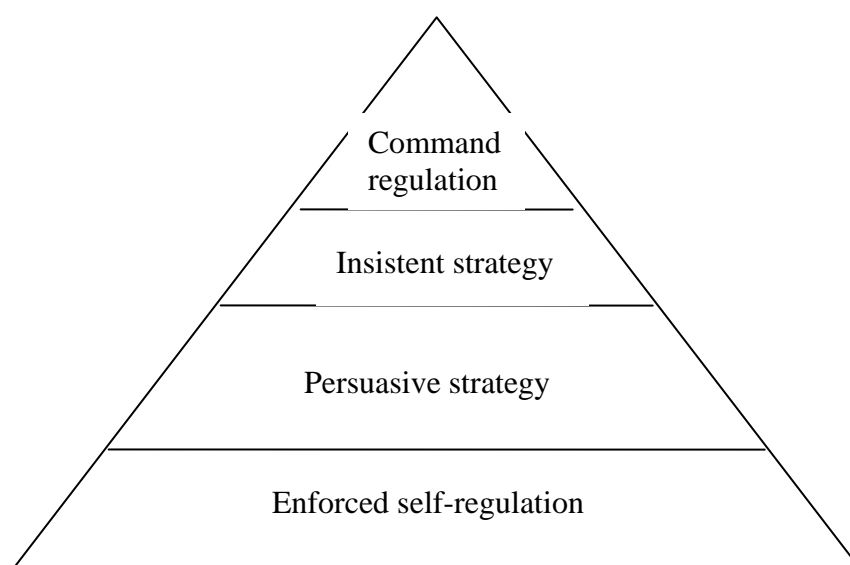
Several issues can be raised with respect to regulation and standards, such as the reasons why to regulate, the selection of a certain regulatory strategy, explanations for the chosen type of regulation, the setting of standards, regulatory enforcement, risk issues, etc. (see Baldwin and Cave (1999) for a general overview). In this case our aim is more limited and mainly focusing on issues of enforcement and compliance. Regulation generally comprises three stages: (i) the enactment and enabling of legislation, (ii) the creation of regulatory administrations and rules, and (iii) the bringing to bear of those rules on the persons or institutions sought to be influenced or controlled (Hutter, 1997). The third stage or enforcement stage is far from trivial and as vital to the success of the regulation as the first two<sup>2</sup>. Ill enforcement can undermined the most sophisticated designs of regulation. Failures to identify and deal with breaches of rules may reduce regulatory statues to mere paperwork.

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<sup>2</sup> From a theory of regulation perspective attacking positive financial incentives as 'wrong' (read: redundant) because it is not done to pay people for obeying the law is beyond reality. It is as doing as if people generally behave selfish and opportunistic (for example as profit maximizers), except when the government puts a requirement on them by law. As the whole regulation literature underscores, full compliance cannot be taken for granted and sanctioning and enforcement systems usually 'fail' in achieving full compliance.

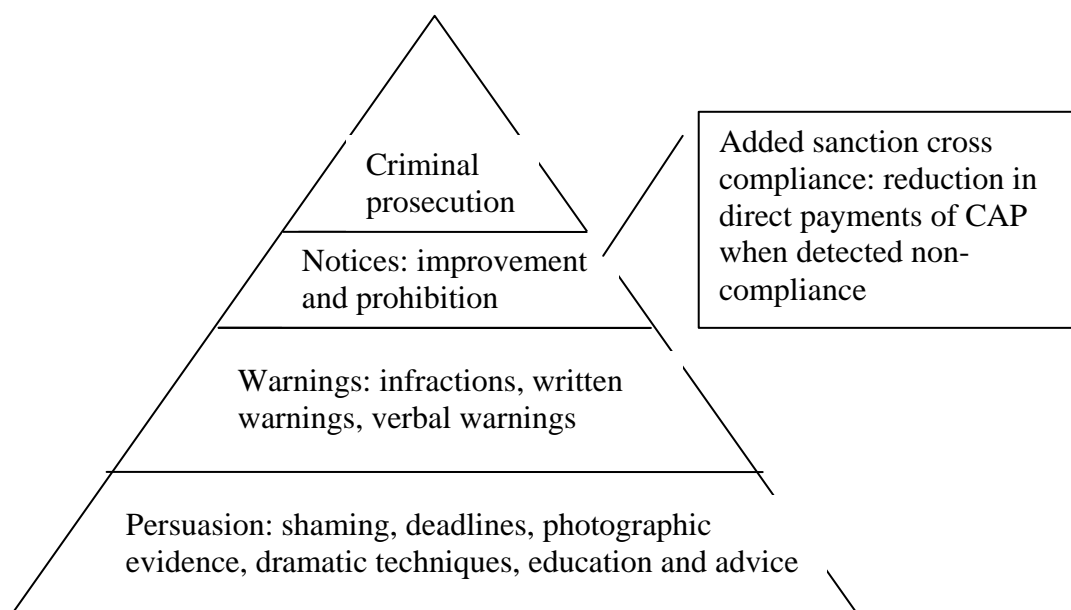
Regulatory officials may seek compliance by law or standards not merely by resort to formal enforcement and prosecution (which is often very time consuming and costly), but also by using a host of informal techniques, including persuasion, education, advice, technical assistance, negotiation and incentives. With respect to the latter one classical voluntary cross-compliance and the EU's obligatory cross-compliance mechanism come into the picture. Within the theory of regulation in that respect the so-called pyramid of enforcement and pyramid of sanction are relevant frameworks. The pyramids are originally developed by Ayres and Braithwaite (1992), as part of their responsive regulation approach. As such the pyramid of sanctions and the pyramid of enforcement strategies, as developed in the theory of regulation, are discussed first, in order to create a general framework for analysing and understanding different approaches.

The pyramid of enforcement strategies distinguishes between styles of enforcement, with at the base a light touch style of enforced self-regulation and the degree of enforcement increasing when moving upward, ending with strict command and control at the pinnacle. The pyramid of sanctions illustrates that regulators may seek gains in compliance to law not merely by formal enforcement and (time consuming and expensive) prosecution, but by using a host of other informal techniques, such as education, advice, persuasion and negotiation. In his respect sometimes the distinction is made between compliance and deterrence approaches to enforcement. In order to seek compliance with regulations the compliance approach emphasises the use of measures falling short of prosecution. The deterrence approach emphasize penalties and prosecution as mechanisms to deter future infractions (Baldwin and Cave, 1999, 97). Within the compliance strategy Hutter (1988) has added two sub strategies, labelled respectively as the persuasive and insistent strategies (see Figure 1). Both aim to secure compliance, but the first is more accommodating than the second.



Source: Baldwin and Cave (1999, 100)

**Figure 1** Pyramid of enforcement strategies



Source: adapted from Baldwin and Cave (1999, 100)

**Figure 2** The sanctions pyramid

The pyramids are associated with the so-called responsive regulation approach, as developed by Ayres and Braithwaite (1992), which sees enforcement as involving a progression through different compliance seeking strategies and sanctions. In the model of ‘responsive regulation’ those regulated are subjected to increasingly interventionist regularly responses as they continue to infringe and to less interventionist actions as they come to comply (Baldwin and Cave, 1999, 99). They further comment that rejecting punitive regulation is naïve, but to be totally committed to it is ‘to lead a charge of the light brigade. The trick of successful regulation is to create a balance and synergy between punishment and persuasion<sup>3</sup>.

How can the EU’s cross-compliance regime be positioned within this theoretical framework about the enforcement of regulation? In a strict sense all SMRs and GAECs can be characterized as command measures. The EU’s introduction of cross-compliance (beyond the already legal sanctioning system) can be located as part of an insistent strategy of compliance (see Figure 1). By using the direct payments associated with the CAP to create leverage, the Commission increases the enforcement pressure and signals its insistence on compliance with the concerned regulations. The threat of a reduction of direct payments in case of non-compliance could be added as an additional type of sanction (see Figure 2). Although not explicitly mentioned, the requirements regarding sampling (based on risk assessment,

<sup>3</sup> The theory of regulation further shows the linkages between enforcement strategies and regulatory policy design (i.e. the relationships between the pyramids), an issue that will be not further discussed here since the focus is not primarily on the specific content and specification of individual regulations. However, for a more elaborate analysis of compliance this issue deserves additional attention (e.g. OECD, 2004b). Regulations need not only to be enforced, but also need to be enforceable.

inspecting each year at least 1 per cent of farmers receiving direct payments) and on additional reporting and record keeping by farmers could be added as additional instruments enforcing compliance and/or proving the farmer's state of compliance (see also the remarks based on the economic approach to compliance discussed in the next subsection)<sup>4</sup>.

With introducing the cross-compliance instrument the Commission not only gave farmers eligible for direct payments a further incentive for compliance, also compliance (i.e. the proper implementation of EU legislation at member state level) at macro level was encouraged (alongside opening an infringement procedure, the EU can now withdraw payments if a member state is non-compliant)<sup>5</sup>. Moreover, it could be argued that the Commission by cross-compliance introduces a harmonized EU wide incentive system, which makes it less dependant on the legal sanctioning systems, which vary over member states. Finally, the cross-compliance instruments can be argued to have an attractive proportionality property: big farms, receiving relatively large amounts of direct payments, but also having large shares in production are in absolute terms facing the threat of a relatively large reduction in payments received. By following a so-called whole farm approach, indirectly at least some pressure is generated on branches of production which are not in itself eligible for direct payments, but are now linked to others in case of mixed operations.

The paper briefly describes which requirements were selected to be part of the cross-compliance package, without trying to explain why certain measures were selected and others not. It also abstains from providing reasons for the reliance on regulatory measures. These issues will be largely taken for granted here. The main aim is to make an evaluation how the EU's cross-compliance policy is likely to affect its agriculture, in particular the compliance with regulations, costs of production and competitive position. Moreover, a comparative overview is made with respect to three of the EU's key trading partners in which it is examined what kind of regulatory strategies they follow and the impacts they have or might have in the future if current practices are judged to be non-satisfactory.

The regulatory standards taken into account are the Statutory Management Requirements (SMRs) and conditions for Good Agricultural and Environmental Practices (GAECs) as they are part of the cross-compliance package. The EU's cross-

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<sup>4</sup> Note that it is not tried to explain the introduction of the cross-compliance measure based on the theory of regulation, but rather to position it within a broader context of possibilities. Later on, when the approaches of the EU's key competitors are discussed we will again refer to this framework. The responsive regulation theory also discusses the linkages between the pyramids, i.e. between the type of rules applied and the related appropriate or most-suitable enforcement mechanism. No effort is done here to check whether the choices the EU has made are well-matching with the recommendations of this theory. Finally, as regards the explanation of the introduction of cross-compliance it is recognized that also political motives such as legitimizing the introduced de-coupled direct payments (payments for 'for nothing') by linking them to 'proper' and responsible farmer behaviour, as well as avoiding land abandonment played a role (e.g. IEEP, 2006).

<sup>5</sup> Formally there is a distinction between regulation following from an EU Regulation, which is directly applicable in all member states and therefore need no implementation in national law, whereas regulation following from EU Directives is reliant on implementation in national law. See Annex A for more detail about the character of various regulations. However, also in case of EU Regulations the Commission is 'dependent' on member states for private enforcement. EU Directives leave more space for member state influence and adaptation to specific situations, since they are generally binding with respect to the end to be achieved but not as regards the means how to achieve this.

compliance includes (SMRs) with respect to biodiversity (Birds and Habitat Directives), Environment (Sewage Sludge Directive, Nitrate Directive, Groundwater Protection Directive), Public, animal and plant health (including regulations of food safety, identification and registration of animals, restrictions on the use of plant protection products and growth promoters in the animal sector, etc.), animal welfare, notification of (contagious) diseases (foot and mouth, BSE, Blue tongue) and good agricultural and environmental practice-conditions (soil erosion standards, soil organic matter content, maintenance, preservation of permanent pasture). See Annex A for further details<sup>6</sup>.

Rather than relying on obligatory regulation, governments might also try to improve environmental quality, etc. by offering voluntary schemes with or without technical assistance and financial incentives to farmers. In the latter case these voluntary schemes might operate as a direct substitute for the obligatory regulation approach as chosen by the EU and strengthened by the recently added cross-compliance mechanism. It is even possible that the government uses the voluntary standard approach as a first step, transforming such schemes at a later stage into regulatory constraints, therewith imposing obligatory compliance of all participants. Indeed some non-EU countries seem to just follow this voluntary approach. On the other hand, voluntary standards or certification may also originate from the private sector or have a hybrid public-private character. In that case they will usually have a complementary character, specifying performance levels which go beyond the minimum requirements as imposed by the regulatory authorities and address particular commercial and marketing interests.

## ***2.2 Understanding participation and degree of compliance***

Regulations and standards are aimed at adjusting the farmer's or supply chain's behaviour in such a way that an increased performance level is achieved. Whether this will be actually realized depends on the conformity to standards. As compliance to standards might impose costs and benefits the individual actor's degree of compliance is likely to be a function of these costs and benefit, where in case non-compliance is considered also the costs of punishment play a role. In general these costs of punishment depend on the magnitude of the fine associated with (various degrees) of non-compliance as well as on the probability of detection to be non-compliant. The latter in turn depends on the intensity of the monitoring and inspection regime associated with the standards.

In case of voluntary standards participation is voluntary and there will be no direct punishment in case of non-participation, but rather exclusion from the benefits related to participation. The decision to participate will thus depend on the net benefits (e.g. price premium less additional costs of production associated with voluntary standard)

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<sup>6</sup> Although we describe which requirements were selected to be part of the cross-compliance package no effort is made to explain why certain measures were selected and others not. This selection process is best understood as a complex political compromise between DG-Agri and other DGs within the Commission. As will be remarked later arguments could be made for including more regulations as well as for including less regulations.

which can be realized from participating as compared to those of not participating. If a farmer participates, however, he is obliged to follow the requirements of the standard and will be punished in case of non-compliance. In extreme cases he might be even excluded from the voluntary scheme and lose the net benefits it generate. In case of regulatory constraints participation is obligatory, and the choice not to participate is illegal.

From the economic theory of regulation (see for example Sutinen and Kuperan (1999) for a general discussion of this theory, which is also open to account for certain non-economic factors, and see OECD (2004b) for a discussion about environmental compliance) it can be summarised that the degree of compliance will be higher or increase (relative to an initial situation and/or relative to other standards and regulations):

- the higher are the net benefits of participation;
- the lower are the costs of compliance;
- the less restrictive are the requirements following from regulations or standards;
- if the probability of detection increases (for example due to a more intensive inspection and monitoring regime);
- if the penalty is increased, for example by increasing the marginal penalty, or by increasing the fixed penalty;
- when farm support payments received are made conditional on the degree of compliance (additional enforcement mechanism).

The introduction of obligatory cross-compliance together with a system of partially decoupled payments and intervention price declines for certain products (Luxembourg Agreement, 2003) implied a strengthening of the enforcement system of the regulations included in the cross-compliance package. So already before the arrival of CC farmers faced unconditional binding obligations (the pre-existing SMR legislation). However, CC added to this the single farm payment to be made conditional on compliance with these regulations, therewith adding to the leverage exerted on farmers<sup>7</sup>. When violating the regulations, alongside the normal legal punishment, farmers could lose (part) of their single farm payments. Moreover, a more strict monitoring and inspection regime was imposed (1% of the farms should be inspected each year, with sample selection based on risk profiles of farmers).

As compared to the initial situation, with cross-compliance, the EU's effective sanctioning system is increased, and relative to the initial situation the probability of being detected increased. Moreover, some further agricultural product price declines were pursued, which were partly compensated by means of (increased) direct payments. Because the latter became part of the sanctioning mechanism, they

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<sup>7</sup> In their study on environmental cross-compliance the OECD (forthcoming) argues that making legal requirements the subject of cross-compliance creates a redundancy. However, this presupposes that the legal sanction system is adequate and proper in inducing a full compliance with the regulations and that the monitoring and inspection intensity remains the same. With cross-compliance usually a systematic inspection regime is imposed, whereas under normal legal requirement this is not always present. Moreover, in practice the legal sanction systems are often not sufficient to ban out all non-compliance behaviour. So CC can be relevant also for already existing binding statutory management requirements.

increased the leverage and thereby its effectiveness<sup>8</sup>. From the theoretical framework developed so far this should clearly provide farmers an incentive to improve their degree of compliance to the regulations. The increased compliance might induce further costs for the EU's agricultural sector, which in turn might affect competitiveness, which is the next issue to consider.

### **2.3 Assessing competitiveness**

Surprisingly the notion of competitiveness—although often used in business and policy-maker language—has no single definition and clearly established link to economic theory. In itself, competition is a complex economic phenomenon, which alongside the notion of classical price competition includes a multitude of other dimensions. The competitiveness concept has been used in a broad set of contexts and levels of aggregation (country, industry, firm level) and is often defined relative to its use.

From a producers perspective competitiveness could be described as the ability to supply goods and services in the location, form and place sought by buyers, at prices that are as good or better than those of other potential suppliers, while earning at least the opportunity costs of the return on resources employed. Alternatively, national sector level competitiveness refers to the ability of a country to produce goods and services that meets the test of foreign or world market competition, while simultaneously maintaining and expanding domestic real income.

Regulations and standards might affect competitiveness in various ways. As regulations will often have a cost-increasing impact on production, it is likely to weaken the competitive position relative to those not faced with these regulations or those faced with less strict regulations. As regards voluntary standards, they are likely to be only viable if they in one way or another improve the competitive position of a product or production process. One could think of quality assurance schemes creating a price premium in the market, which more than compensates for the additional costs that have to be made. Another possibility could be that a quality assurance game preserves or restores consumer trust in the concerned product, and as such creates market access. Although not creating a premium in the market, consumer trust and access can also be seen as benefits. Where in case of voluntary standards the market 'cares' that the impacts on competitiveness are balanced with costs, in the regulatory case this will be not the case. Since regulations impose obligatory standards and their main aim is usually not to achieve a market premium, but rather aimed at other policy goals, they are more likely to negatively affect competitiveness.

Although one should be careful to draw conclusions about competitiveness from simple cost of production comparisons, knowledge of the components of costs are useful for a better understanding of competitiveness. Moreover, cost components may be used to approximate shifts in supply curves (Sharples, 1990). For example, suppose we are interested to evaluate the impact of a, say 25%, increase in pesticide

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<sup>8</sup> This underscores the need when assessing the impacts of regulatory policies to put them in a proper context and not in isolation. Market and price support policies, modulation of direct payments, cross-compliance and regulations interact.

costs in cereals production (resulting from one of the SMRs associated with cross-compliance) in the EU on its competitiveness. By knowing the ratio of pesticide costs to total variable costs and fixed cost of production and marketing of cereals, and assuming that there would be no significant change in the input mix, one can make an approximation on how much the EU's supply curve would shift up (see Jongeneel et al 2006 for further details).

In this paper an attempt is made to assess the potential impact of the EU's cross-compliance regime on competitiveness. It is very important to realize that since most of the standards concerned (all SMRs and often also parts of the GAECs) were already pre-existing EU (or national) legislation, in principle cross-compliance cannot be said to introduce additional costs. The costs are primarily related to standards rather than to the enforcement mechanism. However, to the extent cross-compliance improves the degree of compliance with standards, they may lead to increased costs, at least as far as these standards were previously ignored. From this perspective, more information about both the initial degree of compliance as well as the (additional) costs of compliance becomes crucial for a competitiveness impact assessment. An attempt to recover this information is provided in the next section. In a later stage this information will be used to do some preliminary quantitative analysis.

### **3 Compliance, costs and impact in the EU**

#### ***3.1 Best estimates of compliance for 5 selected Member States***

Table 1 summarizes the estimated degree of compliance for all SMRs as well as for the GAECs for six selected member states<sup>9</sup>. The Table summarizes the information gathered in detailed country reports about cross-compliance. Because of the uncertainties and problems with exact measurement general classifications are made rather than reporting specific numbers. The following legend was used. Compliance is considered very high if the degree of compliance is greater than 95% (95% of the farmers or more are fully compliant). Compliance is labeled as 'high' in case the degree of compliance is in the interval 90%-95%. Compliance is labeled as 'not high' if compliance rates were in interval 80%-90%. Compliance was labeled 'low' when the degree of compliance was in the interval 70%-80%. It was labeled as 'very low' when the degree of compliance was in the interval 40%-70%. Finally, it was labeled to be 'extremely low' in case of compliance rates below 40%. For a detailed comments about usually country specific measurement procedures followed (sample, experts, etc.) one should consult the underlying reports.

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<sup>9</sup> The new member states which got accession to the EU since 2004 are not explicitly taken into account here. Although they had to adopt the *Acquis Communautaire* (i.e. all EU regulations) as regards cross-compliance they got a temporary exemption. Initially for them only incompliance with the GAEC requirements could lead to payment sanctions, whereas from 2009 and onwards also non-compliance with the SMRs can lead to a reduction in direct payments received. As regards Spain cross-compliance measures tied to single farm payments have been introduced not before January 2006.

The general impression from Table 1 is that compliance is rather high for the groundwater protection and sewage sludge requirements. With respect to the Nitrate Directive and the identification and registration of bovine and ovine and caprine animals compliance rates are significantly below the level of full-compliance.

In a number of cases the rates of compliance were difficult to establish. A first example are the Birds and Habitat Directives, where for most countries the (relevant Natura 2000) areas are now properly selected, but where in most cases still the management plans have to be defined and implemented. As such this prohibits detection of non-compliance. A second example is the requirement to notify diseases like Foot and Mouth, BSE, swine vesicular disease and Bluetongue. Whether notification is properly done can be only observed in case of outbreaks. Although this complicated the empirical measurement of compliance, it is still estimated that compliance will be very high.

As regards animal welfare, these requirements have become part of cross-compliance in 2007. This might explain why no systematic information about compliance was yet available, although in principle this does not preclude the measurement of compliance, since the legislation is already there, independent from cross-compliance.

When a lack of compliance is observed this remains to be further qualified. Lacking compliance could reflect different situations. A farmer who by far not meets the requirements does not comply, as does a farmer which only lacks compliance in a minor respect. With the current information available, it turned out to be infeasible to obtain a refined understanding on the qualification of compliance with all the standards<sup>10</sup>. For two important cases, notably the Nitrate and Identification and Registration Directives some further details are given below.

Together with the SMR on Identification and Registration of Animals, the Nitrate Directive is one with significant levels of non-compliance. The compliance estimate for France was based on studies carried out by the Ministry of Agriculture according to which in 2003 one quarter to one third of the farms keeping animals was oversupplying manure. However, some difficulties were experienced in decomposing the total fertilization in terms of organic manure and chemical fertilizers. 90 percent of crop land and 50 percent of grassland complied with the requirement to register manure applications. The estimate for Germany was based on on-the-spot checks done in 2005 in three German Länder, notably Lower Saxony, Mecklenburg-Western Pomerania, and Thuringia. From the on-the-spot check done in Lower Saxony it appeared that about half of the total number of non-compliers faced difficulties due to insufficient reporting to be available. Just like with Germany, currently an infringement procedure is pending for Italy for not properly implementing the Nitrate Directive in national legislation (lacking macro-compliance). By now most of the

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<sup>10</sup> More detailed information is available within government circles but was not (yet) accessible for this research. From a survey done among Dutch farmers the impression was got that in most cases the non-compliance has not a serious character. This means that when there is no full compliance often it are only a limited number of issues at which the farmer is non-complying (see remark about eartag loss below).

twenty one regions in Italy have designated vulnerable areas (Nitrate Vulnerable Zones, NVZ), but the large majority has not yet set up any action plan. Emilia-Romagna is the only region which can boast complete compliance with the Directive. Taking into account the lacking implementation the degree of compliance at national level is provisionally estimated to be about 10% (share of Emilia-Romagna NVZ in the country's total NVZ-area). The Netherlands renewed its manure policy in January 2006 and switch from a system focused on so-called loss norms to a more strict system focusing on surplus-norms. This is likely to have decreased the farmer's rate of compliance (*ceteris paribus*). For the UK the main cause of breaches of the Nitrate Directive was the failure to keep adequate records outlining N application on land within the NVZs. The second most common breach was excess amounts of manure used by intensive livestock farms that are based in NVZs. Very few breaches were recorded relating to storage requirements.

As regards the identification and registration of animals Table 1 shows there is a significant degree of non-compliance, with 30% non-compliance not being an exception. A large part of the lack of compliance seems to be due to the loss of eartags, which are inherent to the EU's current system<sup>11</sup>. Loss rates of 4% are quite normal, but also sometimes peak rates of about 20% were recorded. Loss rates depend on farming practice and systems. As became clear from a Dutch survey and German on-the-spot checks, identification and registration of animals is one of the most frustrating requirements to the farmers. In general non-compliance with the ovine and caprine animals identification and registration requirements is much higher than for ovine animals (based on information from France, Germany, and The Netherlands).

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<sup>11</sup> The Identification and Registration Directive requires an animal to have a double eartag. When only one eartag is lost the animal is still identifiable, although a farmer having such an animal is non-compliant with (all the aspects of) the regulation.

**Table 1** Estimated degree of compliance in selected EU-15 member states (observations mainly based on 2005 data; see main text for used Legend)

	Environment	France	Germany	Italy	Netherlands	United Kingdom	Spain
Environment	Birds and Habitat Directives	n.a.; probably very high	management plans not yet in place in most areas	management plans not yet in place in most areas	very high	very high	very high
	Protection of groundwater	not very high for exhaustible oils	very high	very high	high	very high	very high
	Sewage Sludge Directive	very high	very high	very high	very high	very high	very high
	Nitrate Directive	dairy farmers low and beef farmers extremely low	not high	extremely low; national implementation tool place only recently	low, (mainly due to recent change in the regulations)	very high	high
Identification and Registration of Animals	Identification and Registration of bovine animals	high, but not always within 7 days	very low	n.a.; databank working since 2005	very high	low	very high
	Identification and Registration of ovine and caprine animals	extremely low; new regulation since 2005	very low	n.a.; databank working since 2005	high	very high	very high
Public, Animal and Plant Health	Plant protection products	high, no precise estimate available	n.a.	n.a.	high	n.a.	n.a.
	Food Traceability and Food Safety	n.a.	n.a.	n.a.	high	n.a.	n.a.
	Hormones and beta-antagonists	n.a.	n.a.	n.a.	n.a.	very high	n.a.
	Notification of diseases	high, no precise estimate available	n.a.	n.a.	high	n.a.; since 1 January 2006 imposed	n.a.
Animal Welfare	Housing of calves	expected to be high	expected to be high	expected to be high	expected to be high	expected to be high	n.a.
	Housing of pigs	expected to be high	expected to be high	expected to be high	expected to be high	expected to be high	n.a.
Good Agricultural and Environmental Condition	Soil erosion control	n.a.	very high	n.a.	not high	very high	very high
	Maintain Soil Organic Matter	n.a.	very high	n.a.	not high	very high	very high
	Soil Structure	n.a.	very high	n.a.	not high	very high	very high
	Minimum Level of Maintenance	n.a.	very high	n.a.	not high	very high	very high

Rather than identifying the level of compliance in a certain year (like is estimated here for the year 2005), one would like to assess whether the introduction of cross-compliance is likely to lead to an improved rate of compliance. In principle this would require a comparison of the rate of improvement in compliance without cross-compliance introduced (reference rate of improvement or deterioration in compliance) with the rate of improvement in compliance as observed under cross-compliance<sup>12</sup>. In general it was not possible to make such an analysis, which would require a time series analysis of rates of compliance<sup>13</sup>. However, even without such an analysis, it is possible to combine rates of compliance with expected improvements in compliance. If the current rate of compliance is already very high, the rate of improvement due to cross-compliance is likely to be limited. On the other hand, where current rates of compliance are low, potentially cross-compliance can contribute to improvement in compliance.

### **3.2 Best estimates of costs of compliance and competitiveness**

As regards the costs a clear distinction has to be made between costs associated with cross-compliance, which mainly operates as an additional enforcement mechanism, and the costs associated with the underlying SMRs. Whereas the SMRs were all already pre-existing legislation, cross-compliance at this domain not led to new requirements on farmers. As far as the induced improvements in compliance will lead to additional costs, these costs are related to those standards (and its ignorance) rather than to cross-compliance. With respect to the SMRs cross-compliance might only lead to a marginal increase in costs due to some ‘added’ administrative and record keeping procedures.

The field where cross-compliance could be linked to new requirements is the newly imposed GAEC-conditions. Although this is newly introduced legislation, it appears on closer inspection to include a lot of pre-existing national legislation. Decomposing the GAEC ten sub requirements and considering five member states generates 50

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<sup>12</sup> One might consider that without the introduction of cross-compliance being the degree of compliance would still improve over time. One factor why the degree of compliance might improve over time is because satisfying requirements is likely to be at least partly linked with (replacement) investments, i.e. the ongoing upgrading of farm technology and equipment.

<sup>13</sup> In case of the Netherlands, where a detailed survey was done, it was found that for Dutch dairy farmers degrees of compliance have been improved, in particular with respect to the Identification and Registration of animals. Also from Germany there is anecdotal evidence degrees of compliance have been improved. Interviewed farmers in Germany stated that due to the uncertainty and the higher financial risk, they tend to do “more than necessary” or try to be “even better than required” in order to make sure that their direct payments are not threatened. Triggered by cross-compliance farmers expressed increased interest in management tools, advisory systems and checklists in order to improve their farm practice.

entries. Out of these 50 nearly 20 (40 percent) consist of pre-existing national legislation. So, also in this respect the costs that can be attributed to cross-compliance are likely to be low since the introduced new legislation is also in this field limited<sup>14</sup> . .

As regards the potential impacts increased compliance may have on costs of production and competitiveness, two pieces of information are crucial. One is the change in the degree of compliance. This information is not available from the previous section (see Table 1 which report levels of compliance, no changes in compliance). However, it might be possible analyze some scenario's, assuming a certain improvement in compliance and that analyze potential impacts in a rather hypothetical way. Table 1 might help to introduce some realism, in the sense that one will not expect big improvement in compliance to happen when compliance is already very high. In contrast in cases where the degree of compliance in 2005 is estimated to be rather low and adding to this information about the costliness of improving compliance (see next paragraph), an informed best-guess could be made assuming a more or less significant increase in compliance.

The second piece of information is the already referred to costs of compliance with standards. Table 2 provides a rough and indicative overview of the costs of compliance with standards as they were estimated based on specific country analysis using a variety of sources and approaches. The estimates have a somewhat fragmented character, irrespective the efforts that were undertaken to create some kind of standardized procedure. In a number of cases no information was simply available<sup>15</sup> .

Irrespective of the weaknesses in the data some general patterns can be distinguished from Table 2. As regards the ordinary costs of compliance the Nitrate Directive and Animal Welfare requirements could impose significant costs on farmers (not yet satisfying these standards, *viz.* being non-compliant). To mention a few examples, for France the ordinary costs associated with compliance of the Nitrate Directive amount about €6300 for an average intensive dairy farm in the Bretagne area, and up to €30.000 per average intensive beef farm located in a French NVZ. In contrast, the costs of arable farms (specialized cereals or having general field cropping systems) are estimated to be zero.

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<sup>14</sup> This is even more so because member states are not obliged to come up with a regulatory measure for each possible entry, but have a certain freedom in the exact specification of measures.

<sup>15</sup> See Deliverable 7 (De Roest , 2006a) for more details about the standardized procedures to perform costs of compliance calculations.

**Table 2** Some indicative best-estimates of costs of compliance with standards for selected EU member states.

	Environment	France	Germany	Italy	Netherlands	United Kingdom	Spain
Environment	Birds and Habitat Directives	€190/ha; depends on management plan; farmers may be compensated (Rural Development)	n.a. ; depends on management plan; farmers may be compensated (Rural Development)	n.a. ; depends on management plan; farmers may be compensated (Rural Development)	€160/ha; depends on management plan; farmers may be compensated (Rural Development)	low; Directive does not compel farmers to carry out positive management	€33/ha, excluding any AES compensation payment
	Protection of groundwater	Low, as for management of exhausted oils; €30/farm	Return system of exhausted oils is free of charge; considerable costs might be incurred with storage	Delivery charge for exhausted oils and pesticide containers is zero	Delivery charge of exhausted oils (low); costs for storage	Costs of requesting authorization and correct storage	€1000-€8000 costs for flow measurement system
	Sewage Sludge Directive	All costs of soil testing, transportation and application are met by sewage producers; Sewage sludge is free source of nutrients providing net gain: approximate €33/ha as fertilization value	No costs; farmers are usually paid for applying sewage sludge	n.a.	No significant costs; main costs come from record keeping	All costs of soil testing, transportation and application are met by sewage producers; Sewage sludge is free source of nutrients providing net gain.	n.a.

Table 2 (continued)

		France	Germany	Italy	Netherlands	United Kingdom	Spain
Identification and Registration of Animals	I & R of bovine animals	€1.80/animal; €109/farm; €0.004/kg milk; €0.003/kg meat	€2.65-€3.19 per animal (including n.a. services)	n.a.	€2.75 per animal +0.15h/animal*€7.00=€4.50 (excl.loss), €5.00 including loss	€4.20 per animal (replacement); passports are for free; replacement costs passport €70	2,2-2,5 €/animal (depending on the system used)taking into account amortisation, movements, labour 12,2-15,70€/animal and year
	I & R of ovine and caprine animals	n.a.	n.a	n.a	€1.35 per animal +0.15h*€7.00=€3.10 (exl.loss)	n.a	1,63 €-4,64€/animal and year (depending on the system used)
Public, Animal and Plant Health	Plant protection products	zero	cupboard costs €200-€2000	n.a.	n.a.; but non-zero	n.a.; no additional costs	zero
	Food Traceability and Food Safety	zero	construction costs of new silo's (cereals storage)	n.a.	n.a.; record keeping time costs	no additional costs	zero
	Hormones and beta-antagonists	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
	Notification of diseases	zero	n.a.	zero	zero	zero	zero
Animal Welfare	Housing of calves	extra costs €10/calf	n.a.	n.a.	n.a.	n.a.	n.a.
	Housing of pigs	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Good Agricultural and Environmental Condition	Soil erosion control			creation of water gullies €66/ha			
	Maintain Soil Organic Matter	no costs for animal farms; average total cost €222/arable farm	no major costs; there are costs of soil cover, but this is compensated by expected additional returns	extra ploughing costs €20/ha; cleaning channels €17/ha; expenses for shredding and planting €2/ha	operational costs low; annual investment costs varying from €0-€100/ha, with a medium value of €5/ha	no detailed estimates available, but no major costs identified	No cost for animal farms; about 200 €/arable farm
	Soil Structure			costs for surface levelling and water drainage €36/ha; cleaning ditches €6/ha			
	Minimum Level of Maintenance			varying from €20/ha to €1740/ha			

For the Netherlands, which recently had to adjust its national laws in order to satisfy the Nitrate Directive criteria, there are studies indicating that the costs of compliance in 2006 due to the 'new' regulation could amount €2100 for an average dairy farm, and €5700 for average intensive livestock production (pigs and poultry) farms. In contrast, arable farmers could realize a €3000 per average farm benefit of the regulation. In the period 2006-2009 both costs and benefit show a tendency to significantly increase.

For the Lombardy-region in Italy, which is the region with the highest animal load, it was found that the difference in costs for slurry management between ordinary zones and vulnerable zones amounted €0.12 per kg of pig meat produced. Total costs in the vulnerable zone were estimated to be €0.238 per kg of pig meat.

As regards the animal welfare requirements for sows, data from Italy show that the additional housing costs associated with switching from the old standard practice system to a new system which satisfies the welfare requirements, could amount to about €700 per sow place.

For the UK the total or ordinary compliance costs associated with the Nitrate Directive were estimated to be €4950 per dairy farm, €480 per beef farm, zero for sheep farms, about €1500 per average pig farm. No good data were available for the poultry sector, but significant costs are expected there also.

As regards the GAECs where there are costs, like those involved in reducing soil erosion for example by green manure cover crops, these could amount €500 per hectare. However, at the same time there are often expected benefits from these actions, which in terms of higher returns, would in the end (partly) offset the costs. This also explains why a lot of farmers have already voluntarily included such actions to be part of their good farming practice. The net costs due to cross-compliance are therefore estimated and expected to be low.

Given that the requirements following from the GAECs are tailor-made taking into account the specifics of the local area (slope and erosion, olive groves, intensive or extensive arable production, etc.) it is not easy to provide general costs estimates. The variation in requirements and conditions is reflected in differences in costs.

Because one of the regulations expected to create relatively most impact on agriculture was the Nitrate Directive for the dairy sector, this case was further developed as an example for assessing the potential impacts on competitiveness. Combining the estimates of estimated degrees of compliance with the costs estimates (where the latter ones were further checked with the literature), at sectoral level a maximum a cost increase of less than 1 percent was estimated. A first assessment of the impact of the estimated impact on competitiveness, exploiting the GTAP modeling tool, resulted in a loss of EU dairy exports of about 2% and an import increase of a similar magnitude. This is a limited impact, even although volume the EU traded with other countries shrank with about 150 million tons. Since most other measures will involve lower percentage costs increases, the impacts on competitiveness and trade are expected to be very limited<sup>16</sup>.

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<sup>16</sup> Note this is a very preliminary and indicative estimate, which really represents work in progress and requires cautious interpretation. Further details will be reported later in the project. The computational

## 4 The EU's key competitors

### 4.1 The US

The major U.S. federal policies related to agriculture and the issues of environmental quality, animal identification, food system health, and animal welfare that were reviewed differ significantly from the standards applied in the EU. They are usually less restrictive and more relying on voluntary participation rather than being obligatory. The inventory of federal policies did not generally provide information on the specific constraints at the farm-level imposed by the regulations.

The specific regulations that apply to U.S. farms of various types are highly dependent on the products and states in which the farming and marketing operations occur. Unfortunately, this level of specificity will be examined in the second part of the project.. As such, this project will proceed to unveil the specific regulations and their associated impacts on selected types of farming operations in the leading states for production of the respective products.

One of the main results from the federal policy inventory, is that, in the U.S., across the policy areas there is a large variation of regulations and implementation levels. For example, with respect to environmental quality, there are several comprehensive laws that have been in existence for decades. However, it has only been in recent years that some of the environmental laws are being implemented and enforced at farm level. The CAFO regulations enacted in 2002, under the Clean Water Act of 1972, is a good example of this.

With respect to biodiversity the Endangered Species Act is relevant. With respect to agriculture pesticides are a common source of species alteration. The Environmental Policy Agency (EPA) has programs, which address the detrimental effects of pesticides, including scientific risk assessment of pesticides with respect to the listed species, and attempts to find means to avoid concerns for the listed species. States maintain or develop conservation programs to protect threatened and/or endangered species. Federal financial assistance and incentives are available to facilitate state action.

As regards environmental issues the approach toward managing the environmental impact from farming has been largely voluntary, or with compliance being a condition for cost-sharing assistance with best management practices. The Clean Water Act (CWA), which was originally focused on point sources of pollution, has been expanded to non-point pollution, with agriculture identified as one of the key sectors. However, it was not until 2002 that the federal government issued specific rules governing Concentrated Animal Feeding Operations (CAFO's), requiring the design and implementation of a comprehensive nutrient management plan. Since only

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work done on this by Matty Demont and Koen Dillen from University of Leuven is gratefully acknowledged.

2 percent of all confined livestock operations are CAFO's, this policy currently only affects a minor number of farms. The implementation and enforcement of the CWA is delegated to the states. Many states are anticipating future federal rule changes and already creating regulations similar to the CAFO-one for smaller farm operations.

The CWA also contains provisions with respect to sewage sludge and stipulates concentration limits for arsenic, cadmium, copper, lead, mercury, molybdenum, nickel, selenium and zinc as well as proper application practices. In addition to the CWA there is the Clean Air Act, which is aimed at regulating air emissions from area, stationary, and mobile sources (including nitrogen gasses, methane from dairy cows, ammonia, odour, nitrogen oxides from fertilized fields, etc.). The potential costs of monitoring non-point pollution are the reason that agriculture has been largely exempt from environmental regulations. To protect drinking water quality the Safe Drinking Water Act provides further regulations (residues of pesticides, fungicides, fertilizers and their metabolites). Due to the way in which 'public water systems' are defined only a very small proportion of the farms will be directly subject to these regulations. Moreover, unless prohibited by additional state laws, in general farms can dispose of solid, non-hazardous agricultural wastes (including manure and crop residues returned to the soil as fertilizers or soil conditioners, and solid or dissolved materials in irrigation return flows) on their own property.

With respect to animal identification and registration, a formerly voluntary program, the Animal Identification Plan, is being transformed into a mandatory regulation, called the National Animal Identification System. There is a suite of laws related to food system health, however their impact at the farm level is not readily available, as many of these laws apply at post-harvest stages. Filling the void of mandatory federal animal welfare regulations are a series of industry-led standards that are only mandatory for producers wishing to sell to certain market segments.

The US has established a comprehensive web of authorities to govern food safety issues, among which the Food and Drug Administration, the Food Safety and Inspection Service and the Animal and Plant Inspection Service. In particular attention is given to health based standards for pesticides. Hormones and beta-antagonists may be used in certain livestock classes. Since 1989 a program is effective which certifies meat to come from non-hormone treated cattle (in order to address exports interests to the EU).

Animal welfare issues are currently weakly addressed in the US. No federal legal protection exists for animals raised on a farm. There is some law in relation to transporting farm animals across state lines, although this law is considered to be rather weak. Moreover, the most well-known law regarding animal cruelty, the Animal Welfare Act, entirely excludes animals raised for food production. Beyond this there are a number of existing federal regulations that related to the treatment of animals, but also these are rarely applied to on-farm situations. There are some private initiatives aimed at increasing transparency about animal welfare to consumer groups in the pigs and eggs sector.

Regarding the land management requirements, the majority of government interventions in the US in agriculture takes the form of voluntary programs that use

technical assistance and cost-sharing to establish best management practices. There are a host of such programs, mainly administered by the USDA. The five most important ones are the Conservation Reserve Program, the Environmental Quality Incentives Program, the Wetland Reserve Program, the Conservation Security Program and the Grassland Reserve Program. In 2005 about 3.5 billion dollar was spent on these programs.

Given the foregoing it was difficult to obtain any reliable compliance and costs figures associated with up-keeping standards. An attempt was made to provide cost estimates for a number of state and federal regulations that have a direct impact on U.S. agriculture, with a particular focus on the dairy and swine sectors, but results are not yet available.

## **4.2 Canada**

Canadian farmers do have to comply with numerous federal and provincial environmental regulations that govern agricultural production practices. Additionally, there are many programs that do require environmental standards be applied in primary agriculture in Canada. Farmers also participate in voluntary, industry-led standards that aim to mitigate the negative impacts of agricultural production practices on the environment. These voluntary, industry-led standards are embodied in voluntary programs, often in partnership with governments, which may be certified by a government agency or otherwise.

These Codes of Practice are usually initially described as voluntary, but are used as the basis for payments in government agri-environmental programs. This is the way in which environmental cross-compliance is applicable in Canada. Farmers can, if they so desire, receive a payment under a government program, if they comply with an environmental standard that is often embodied in a voluntary Code of Practice.

Environmental regulations include a broad range of issues and instruments that include air, water, and soil quality; biodiversity and wildlife and habitat preservation; and human, animal and plant health. It was not possible to address these issues in depth, and therefore the focus was on describing a selected set of environmental regulations programs and policies related to agriculture in Canada at the federal, provincial and municipal levels; regulations, programs and policies in place for the identification and registration of animals; for public, animal and plant health and for animal welfare.

From the research it appeared that the agri-environmental landscape in Canada cannot be easily described in terms of statutory management requirements or good agricultural and environmental conditions as in the case of the EU. In Canada, there is a division of authority between the federal, provincial and municipal levels of government. Agriculture is a shared jurisdiction between the federal and provincial levels of government but the primary responsibility lies with the provincial governments. Environmental concerns in Canadian agriculture have been addressed through a combination of policy measures at several levels of government in Canada: federal and provincial legislation and regulation; municipal and zoning permit processes; common law litigation and liability with respect to nuisance, public

nuisance and riparian rights; national and provincial voluntary stewardship initiatives such as Codes of Practices, Environmental Farm Plans and Best Management Practices and economic instruments such as payments.

The federal government is for a nationwide system of water and air quality standards, pesticide registration, and financial assistance for regional agricultural environmental projects. Most provinces have their own legislation to protect water and air quality, public health and other environmental values that might be impaired by agriculture. They also have passed a “Right to Farm” legislation, to clarify the standards under which farmers can be held liable for nuisances. The most critical environmental issues, ranked according to importance, are the use of pesticides, air and water quality. Water contamination by nitrogen has become an increasingly important issue in all provinces. The same holds for biodiversity (wildlife habitat provision on farm land), which has been under pressure in particular to the intensified agricultural production. The policies pursued have been effective in the sense that air and soil quality have generally improved during the last 20 years.

As regards wildlife and biodiversity there are several biodiversity initiatives aimed at addressing key issues such as agricultural practices (conservation tillage, rotational and delayed grazing, buffer zones around pastures), habitat conversion and fragmentation, wild species at risk, diversity of domesticated species, living modified organisms and atmospheric changes. Often these initiatives include economic incentives.

As concerns the protection of groundwater and sewage sludge applications, or more generally water quality, all provinces have adopted legislation, strategies, policies or guidelines that affect siting and managing of livestock production. Where intensification of production is most pronounced the use of nutrient management plans is most common. A main driver behind the siting restrictions (farm building and manure storage facilities) is odour (Minimum Distance Separation legislation). Right to farm-legislation protects farming activities from nuisance actions (odour, dust, noise) provided that the farm operations conform to “normally accepted agricultural practices”. The legislation usually contains requirements with respect to sufficient manure storage capacity (prescriptions varying from 150 to 250 days were found). Land application standards for manure deal primarily with setbacks from wells and surface water, and application times and methods. For example, the Nutrient Management Act of the Ontario province stipulates that no person shall apply liquid manure to land, within 150 meters from the top of the bank of surface water in case the maximum sustained slope of the land is 25% or greater, or to land closer than 100 meters to a municipal well. If liquid agricultural source materials are applied at any time when the soil of the land is snow covered or frozen, application must be done by injection or by spreading and incorporation into the soil within 6 hours. The Ontario legislation also contains some conditions for calculating the maximum application rates for manure, which are based on crop production requirements plus a surplus-margin.

However, by examining environmental concerns in Canadian agriculture, it has been shown that there are numerous regulations concerning pollutants such as nitrates and sludge that farmers must obey. Given this difference in agri-environmental landscapes, we present our findings by describing the regulations, programs and policies that govern the livestock and crop production sectors and the conservation

and protection of wildlife and biodiversity. We have similarly described the regulations, programs and policies governing the identification and registration of animals; public, animal and plant health; and animal welfare. We have not used the suggested methodology to evaluate costs of cross-compliance. As we have indicated, the concept of environmental cross-compliance is not used the same way in Canadian agriculture as it is used in the EU context. However, we have reviewed the literature to determine the abatement costs that are associated with implementing standards within agri-environmental regulations. The application of non-agricultural source material (sewage sludge; pulp and paper biosolids) is subject to various standards and in general not allowed without having obtained approval from the authorities. Restrictions include stipulations for metal concentrations, requirements to minimize runoff potential, and maximum application rates.

As regards Nitrate there is no Nitrate Directive comparable to that of the EU. The water quality guideline for nitrate-nitrogen concentration is 10 milligrams per litre. A survey study showed that in several provinces there are a significant amount of wells (10% or more) where the concentration is higher. The policies described above have to contribute to reducing the nitrate problems. Likely more restrictive application requirements will follow in the future.

As respect with issues included in the EU's GAEC requirements (soil health, erosion), overall soil quality in Canada (and provinces) is increasing (with Quebec as an exception). These improvements were largely due to changes in land management and land use, including things like decreases in area under summer fallow, increases in cropland area under reduced tillage or no till and increase in areas under forage crops). As such these policies counteract the evolution from small, low-mechanized mixed farms to larger, highly mechanized farms growing monocultures, a development which increased soil degradation (erosion, productivity loss, soil crusting and compaction, acidification, etc.).

Each province has its own separate soil conservation programs and regulations. In the east these programs mainly deal with drainage, soil fertility and reforestation; in the western provinces the focus is more on land rehabilitation, erosion control, drainage, irrigation and tillage. Many of these programs include provisions for technical and financial assistance to farmers for implementing appropriate management practices as well as to purchase equipment or build erosion structures. Not only at the level of the provinces, but also at federal level soil health gets attention (e.g. National Soil Conservation Program, 1989). Participation into such programs is usually voluntary, but made attractive by financial incentives. As an example of the degree of participation, in Ontario about 20% of the land participated in the Land Stewardship Program. In the programs a lot of attention goes to communicate best management practices (including buffer strips, erosion control structures like grass waterways, stabilization of stream banks, livestock fencing and crossing, fragile or marginal land retirement, residue management, adjusted crop rotations, strip cropping, etc.).

As regards the identification and registration of animals, Canada has its own national identification program (introduced in 2001) for cattle and bison, managed by the Canadian Cattle Identification Agency, which is an industry-led non-profit organization. The background of this program was the wish to eliminate any sources of disease and food safety problems, which could threaten public health, animal

health, or consumer confidence. An electronic database has been developed to track the herd from origin from tags. Every bovine animal has to be identified with an official eartag before leaving the herd of origin or co-mingling with cattle of other owners (rule includes some exemptions). Barcode tags as well as electronic tags are used. Relative to the Canadian system, the EU's system is more comprehensive since it not only regulates identification, but also registration at birth and movements. In the Canadian system there are no mandatory rules for registration at birth, although recently a (voluntary) age verification program was started. Moreover, producers are not required to maintain their own management records for bovine animals (for ovine animals they have to keep record), and replace lost eartags within a limited time. The use of double eartags is not required; a single tag suffices.

Only pesticides that are registered for use under the Pest Control Products Act may be imported, sold or used in Canada. Provinces and territories may further regulate the sale, use (can even locally prohibit nationally allowed pesticides), storage, transportation and disposal.

The core of the Canadian food safety system is the federal Food and Drugs Act (FDA) and the federal Department of Health. The latter sets standards and policies, carries out food-borne disease surveillance activities that provide a system of early protection. The various levels of governments collaborate with non-governmental organizations, consumers and industry to ensure the integrity and comprehensiveness of the food-safety system.

The use of hormonal and thyrostatic action substances and beta-antagonists is also regulated under the FDA. There are six approved hormonal growth promoters, which have been approved for use in beef cattle only.

Notification of diseases is regulated under the Reportable Disease Regulation, which requires all suspect cases of Bluetongue, swine vesicular disease, foot and mouth disease, and Bovine Spongiform Encephalopathy (BSE) to be immediately reported to the authorities. This regulation seems rather similar to the relevant EU SMRs on disease notification. Canada has been free of foot and mouth disease since 1952. Since 2003 three cases of BSE have been found.

As regards animal welfare voluntary farm animal guidelines are stipulated in National Codes of Practice in the Care and Handling of Farm Animals. There also is federal and provincial legislation. The codes are often incorporated in the bylaws of municipalities, and hence they play an important role in ensuring that animal welfare standards are met. Stakeholders in the animal food industry also promote animal welfare issues by connecting animal care with quality product. Included in the standards are minimum housing requirements for calves and pigs. In general the minimum space requirements for pigs are somewhat smaller than those specified in the EU regulation.

### **4.3 New Zealand**

New Zealand's situation is special in that farming has played and still plays an influential role and is still part of the 'backbone' of New Zealand's economy. The country has a specialized natural advantage for agriculture, in particular for pastoral farming, horticulture, forestry, seafood. About 85% of New Zealand's production is

currently exported, with agricultural, horticultural and forestry products earning over 60% of its total export income. The large agricultural sector is operating with almost no government support.

Although farming is in general less intensive than in the EU, in some areas New Zealand faces significant soil erosion problems, resulting from the removal of natural forest cover for pastoral farming. The resulting sediment along with nutrient run-off and discharge of agricultural wastes has also contributed to an increasing concern about water quality. With respect to the management of issues of eutrophication, nitrate, and reduced clearness, New Zealand's current system, which mainly relies on consents and voluntary approaches and non-regulatory rules, seems not satisfactory to reach full compliance of all dairy farmers with the environmental management requirements.

The main tool for managing natural resources and safeguarding the life carrying capacity of air, water, soil and eco-systems is the Resource Management Act (RMA, 1991). This RMA involves several key concepts, among which the development of comprehensive effects-based legislation, the desirability of intervening only where required and clearly justified, the requirement of clearly focused outcomes (targets) where intervention is justified, and the need to use appropriate policy instruments in order to achieve cost-effective solutions. The standards set by the RMA authorities can differ from region to region depending on differences in environmental issues and situations.

The restrictions imposed by the RMA are often specified in district plans, made up by territorial authorities. Requirements include effects of land use and subdivision, controlling noise, protection the surface of lakes and rivers, pollution and discharges, and hazardous substances. Consent is required only if such plan's explicitly require this. Discharges to water and the management of water quality is usually delegated to Regional Councils, whereas the RMA empowers local authorities to control land use in order to achieve a number of sustainable management objectives (restricting expansion of potentially damaging activities to vulnerable land and amenity concerns like dust and odour). Moreover, alongside the provision of advice to landowners, these local authorities may also impose regulations enabling improvement of the sustainability of the farmer's land management practices. Central government has as yet not specified any national policy statements on specific resources.

Regional and district councils have developed policies and rules to address the effects of sustainable land use. Each rule outlines whether an activity is permitted (no resource consent required), controlled (subject to consent, which has to be granted as long as the applicant can demonstrate that the activity will comply with any concerned standards, or has only minor or acceptable negative effects), restricted discretionary (subject to consent where the council can decide not to grant the allowance, or can impose additional conditions), discretionary (must apply for consent and regional council can exercise broad discretion), non-complying (usually no resource consent will be granted), or prohibited (no consent can be granted).

Changes in New Zealand's landscape have been dramatic, approximately 63% of its area has been converted from native forest, wetland and tussock land to farm, exotic

forests, settlements and roads. As a consequence the country experienced a decline in indigenous biodiversity, which since the 1980s and 1990s has induced a response from the government to 'turn the tide' by among others the adoption of a national biodiversity strategy. Changes in legislation and administration have brought about significant improvements; still some mechanisms which were developed during the last decade are still not fully effective. As an example, freshwater systems continue to degrade, a process exacerbated by land use intensification. Similarly, halting the biodiversity loss remains a huge challenge.

Whereas New Zealand has nothing comparable to the EU's Bird Directive, it pays attention to natural habitat preservation. At present the majority of policies and objectives encourage the voluntary protection of land, identified as recommended areas of protection (RAPs) or significant natural areas (SNAs).

With regard to the issues covered by the EU's Groundwater Directive, the disposal of transmission oils on land is not allowed and there exists a voluntary take-back system for used oils. However, most farmers keep them and use them for burning or oiling dirt roads. Pesticide containers can be buried after triple rinsing them and cutting them up. Several programs provide free of charge collection of unwanted chemicals. Direct discharges of heavy metals, organohalogenes, organophosphorous and organotin compounds is regulated and also the application of pesticides and insecticides is a strictly controlled activity.

Sewage sludge disposal on land is considered a discretionary activity. Thus, consent is required, which specifies a list of requirements regarding location, ingredients, treatment type, etc. In general sewage sludge should not be used in production of crops where it can enter into the food cycle.

Regarding the EU's Nitrate Directive in New Zealand effluent from the farm is to be disposed on the land (after ponding) and fertilizer applications should follow a Code of Good Practice. The latter states manure discharge to be a controlled activity, where the rate of application may not exceed 150kg N per ha annually (and no more than 50kg/ha within a period of 24 hours), buffer zones should be respected and runoff and ponding of effluent should be avoided. Because the issue of nutrients derived from intensive farming has become a big concern a private-public partnership tries to come up with self-regulation (partnership includes nationwide dairy cooperative Fonterra as well as regional councils).

With respect to the identification and registration of animals a multiple of private registration systems currently exist. There is no unique nationwide public system, although efforts are made to come to a more coordinated system (see also Box). The use of hormonal growth promotants is strictly regulated and can be only used in beef production. Implanted animals are all registered on a national database.

With respect to food safety (tracking and tracing) New Zealand lacks a system comparable to the EU's. The Directives regarding animal diseases (foot and mouth, swine vesicular disease and bluetongue) regulation is irrelevant in New Zealand since these diseases are at current not present.

Animal welfare is regulated by a code which provides minimum standards for different holding systems. The current industry is estimated to largely comply with these minimum standards, which are in place for more than 10 years already, allowing most farmers to anticipate the standards when making new investments (buildings).

As regards the GAECs in the EU there is also no comparable system in New Zealand. As already mentioned before, Regional Councils have regulative power and have specified different rules which vary with regional circumstances. Many of them operate extension services on resource management issues and may provide financial assistance for farm erosion schemes. Most of the management of erosion prone land is through control on vegetation clearance and soil disturbance. In some region (Eastern Region) rather strict requirements are formulated, which are expected to raise the cost of farming.

Given the difference of the regulations (less intensive, and more relying on voluntary action rather than obligatory actions, as compared to the EU) issues of compliance and costs are also different. Generally speaking 'compliance' is estimated to be often high and costs are expected to be rather low.

## 5 Comparison and synthesis

In this section a comparative assessment of the EU regulatory *cum* cross-compliance regime with similar regulations in the US, Canada and New Zealand is made. As was already argued in the previous sections the regulations in the US, Canada and New Zealand differ substantially from those in the EU, although at the same time in most cases there exist regulations addressing the same issues. But it is not only differences in regulations which complicates a comparative analysis. Also the local contexts are rather different. This regards in particular intensities in production, which can be very different, both at national and local scales. A similar remark could be made with respect to the institutional structure. Whereas in the EU there is tendency to unification in legislation in particular where it regards minimum requirements, in other countries the structure of legislative responsibilities allows for more differentiation over the national territory. Although this reduces general transparency, it has the potential advantage to better address local issues.

The difference in contexts is reflected in the main problems that are addressed with the standards similar or corresponding to those included in the EU's cross-compliance package. Table 3 provides an indicative overview the main problems that are addressed. For reasons of comparison the EU's effects are added at the most right column<sup>17</sup>. As can be seen from Table 3 the main issue of biodiversity is the preservation or prevention from degradation of habitats. As regards the environment the preservation of water quality is central. Whereas in the EU nitrate contamination

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<sup>17</sup> See the underlying country reports for more details about the selected specific which were taken into account.

of ground water is a key issue, also in Canada and New Zealand this issue is of growing importance. With respect to health guaranteeing food safety is a primary goal. Included under this heading are more or less strict regulations about the use of hormone growth promoters. This is in particular an issue in the EU, but it indirectly also affects the EU's trading partners. Another key issue is the monitoring and surveillance of contagious animal diseases, where New Zealand has a special position since it is still free from some main animal diseases (partly related to its relatively isolated location). For the EU's competitors animal welfare issues are mainly consumer and/or market driven, whereas in the US long-distance transportation gets specific attention. The main theme covered by regulations on good farming practices is erosion, although the scope in the EU is somewhat broader.

As already became clear in the previous sections, the US, Canada and New Zealand don't have a cross-compliance policy similar to the EU's one. However, all the themes addressed under the EU's cross-compliance are also the subject of policy attention in the other countries. Table 3 provides a summary of the main differences in the policy approaches followed in the various countries.

As will be clear from Table 4 the type of regulatory policy instruments used have consequences for the interpretation of a concept like 'degree of compliance'. For voluntary schemes, for example, the degree of compliance does not make sense in a direct way, or it should an expression indicating too which extent one adheres to the rules when one participates in such a scheme. However, for reasons of comparison it would be interesting to know too what extent farmers participate in such schemes and what share of the total land area is covered with such a voluntary scheme<sup>18</sup>.

Referring back to the theoretical framework about enforcement of regulations, as discussed in Section 2 before, it is clear that the US, Canada and New Zealand follow different approaches from the EU. In general they are more lying on the lower layers of the pyramids of sanctions and enforcement strategies. Elements like incentives (e.g. voluntary cross-compliance in Canada), education, advice and technical assistance (e.g. erosion combating schemes in Canada and New Zealand) as well as persuasion play a relatively important role. In terms of the pyramid of enforcement strategies, the EU's competitors can be argued to generally follow a persuasive regulatory approach, strongly appealing to voluntary actions. In particular New Zealand's Resource Management Act seems a good example of responsive, well-targeted and proportional regulation contributing to cost-effective solutions.

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<sup>18</sup> The underlying country reports provide some anecdotic information on this, but generally for the non-EU countries this information remains limited.

**Table 3** Main problem areas addressed with regulation

Theme	US	Canada	New Zealand	EU
Biodiversity	No specifics	Protection of habitats	Decline in indigenous biodiversity; habitat preservation	Protection and preservation of habitats
Environment	Water quality; environmental pressure from Concentrated Animal Feeding Operations	Pesticide use, water (save drinking wells, increasing importance of nitrate contamination, and air quality (odour)	Degrading water quality; increasing importance of nitrate contamination	Nitrate, heavy metals, water quality
Health	Food safety	Food safety; hormone growth promoter products use; animal disease surveillance	Food safety; hormone growth promoter products use;	Food safety; hormone growth promoter products use; registration and traceability of animals; contagious animal diseases; use of plant protection products;
Animal welfare	Long-distance transportation	Minimum housing requirements; intensive livestock farming practices; humane transportation and slaughter	Minimum requirements, dry sow stall	Minimum space, and minimum requirements regarding other animal 'needs'
Good agricultural and environmental practice	Mainly erosion	Erosion, and soil quality (has improved already)	Erosion and sustainable land use (vegetation clearance ad soil disturbance)	Erosion, organic matter content, soil structure

**Table 4** Regulatory policy approaches chosen

Policy instrument	US	Canada	New Zealand	EU
Direct regulation	In particular applied for regulation food safety, plant protection products	In particular applied for regulation food safety, plant protection products	In particular applied for regulation food safety, plant protection products	Dominant kind or regulation applied
Cross-compliance	Compliance only required for cost-sharing assistance with best management practices	Farmers can receive payments if they comply with standards embodied in a voluntary codes of practice	Instrument not used	Obligatory cross-compliance since Luxembourg agreement (2003) covering biodiversity, environment, health and animal welfare
Taxes and subsidies	Financial incentives linked to voluntary conservation programs	Financial incentives linked to specific 'good' agricultural practices	Some financial assistance for farm erosion schemes	Selectively used to encourage collection of used transmission oil, a.o.; implicit subsidisation of farm assistance (see below)
Technical assistance	Plays an important role, in particular regarding environment and good farming practices	Plays an important role, in particular regarding environment and good farming practices	Plays an important role, in particular regarding environment and good farming practices	Farm advisory service complementary to cross-compliance, will be in place in 2007
Contracts and voluntary schemes	Play an important role in particular regarding environment, animal welfare, registration of animals	Play an important role in particular regarding environment, animal welfare, registration of animals	Play an important role in particular regarding environment, animal welfare, registration of animals	No use of voluntary schemes for achieving minimum standards as in the CC package, instrument only used for achieving 'services' going beyond minimum standards

Also in case of Canada responsiveness in the regulatory approach is not absent. Regulating starting by facilitating and stimulating voluntary participation to standards might end by transforming private standards in obligatory regulations, required to be complied to by all. As it was noted, for example in case of the Nitrate regulation, that the current approaches are considered to be not sufficient in coping with the problems, further increases in enforcement strategies and sanctioning instruments (i.e. climbing the pyramids) might be expected for the future. This in the end also regards the issue of appropriately setting standards. So far this element was not discussed. The setting of standard needs an good evaluation of the aimed benefits and the degree to which these are realized. Such an assessment, although very relevant, is beyond the scope of this paper, and generally not easy to determine (e.g. Baldwin and Cave, 1999, 118-124).

Table 5 summarizes some main results and puts them in an EU perspective. Alongside the contextual information already presented in Tables 3 and 4 additionally some information is given about production intensities. It should be noted that intensity here only provides an (per country) average indication. Production intensities not only vary over countries, but also may strongly vary within countries. Whereas intensity of production helps to put the need for regulation into perspective, it needs careful interpretation. Whereas, for example, the average production intensities in Canada and New Zealand are lower than in the EU, also these countries are now faced with growing problems regarding the nitrate contamination of groundwater. In general, however, relatively high production intensity is likely to create a high pressure on environment, animal health and welfare issues, which create an increased need for regulation in order to ensure sustainability<sup>19</sup>.

Table 5 is based on a comparison of the regulations as described in the underlying country reports (see Winsten, 2006; Fox and Ramlal, 2006; and Meister, 2006). A provisional draft was discussed within the consortium, which leads to several revisions and where necessary additional expert information was used to further increase precision. The table compares the regulatory efforts from the key competitors with that of the EU (reference level). Three aspects are considered: intensity of regulation, degree of compliance and costs of compliance. The estimates have (necessarily) a qualitative character<sup>20</sup>.

With respect to the intensity of regulation, the EU level (as included in the SMRs and GAECs) is taken as a reference or benchmark. So, if in the cell of Biodiversity for Canada there is 1 minus sign, this should be read as that the intensity of regulation (the restrictiveness of the requirements) is estimated a bit less than the level of biodiversity regulation prevailing in the EU due to the Birds and Habitat directives. More minus signs would indicate less restrictive regulation, whereas a plus sign indicates a more restrictive regulation than in the reference case.

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<sup>19</sup> Within the scope of the project it was not possible to calculate detailed location and regulation specific production intensity estimates.

<sup>20</sup> The author realizes quite well the tricky nature of this kind of aggregation and summarizing efforts of situations that can be very different from each other and thereby are not easy to compare. Table 5 should therefore be interpreted with due caution.

**Table 5** Comparative overview of regulations: the EU, US, Canada and New Zealand

Theme	Field	EU		Canada			New Zealand			United States		
		degree of compliance	costs of compliance	intensity of regulation	degree of compliance	costs of compliance	intensity of regulation	degree of compliance	costs of compliance	intensity of regulation	degree of compliance	costs of compliance
Production intensity (average)	average production intensity	high		low to medium			medium			medium		
<b>SMRs</b>	<b>SMRs</b>											
Environment	Biodiversity (Birds & Habitat Directives)	moderate	low	- / +	not relevant	negligible	--	not relevant	negligible	---	unkown	low
	Protection of groundwater	high	low	- / +	unknown	low	-	moderate	low	--	high	low
	Sewage sludge	high	negligible	- / +	high	low	-/+	high	low	--	high	low
	Nitrate	moderate	significant-high	-	moderate	unknown	--	low	unknown-significant	---	high	low
Identification and registration of animals	I&R of bovine animals	moderate-high	low-significant	- / +	high	low	-	moderate-high	low	---	high	low
	I&R of ovine and caprine animals	moderate-high	low-significant	-	high	low	-	moderate-high	low	---	high	low
Public, animal and plant health	Plant protection products	high	low	- / +	high	low	-	unknown	low	-	unknown	low
	Food traceability and safety	unknown	unknown	-	unknown	unknown	--	unknown	unkown	--	unkown	unkown
	Hormones and beta-antagonists	high	low	-	high	low	-	high	low	-	unknown	low
	Notification of diseases	high	low	- / +	high-not relevant	negligible	not relevant	not relevant	not relevant	- / +	high	negligible
Animal welfare	Housing of calves	unknown	significant	-	unkown	unknown	-	high	low	not relevant	not relevant	not relevant
	Housing of Pigs	unknown	significant	-	unkown	unknown	-	high	low	not relevant	high	not relevant
<b>GAECs</b>	<b>GAECs</b>											
GAECs	Soil erosion control	unknown	unknown	-	not relevant	low	-	unkown	low-significant	---	high	low
	Maintain soil organic matter	unknown	unknown	-	not relevant	negligible	--	not relevant	negligible	not relevant	not relevant	negligible
	Soil structure	unknown	unknown	-	not relevant	negligible	--	not relevant	negligible	not relevant	not relevant	negligible
	Minimum level of maintenance	unknown	unknown	-	not relevant	negligible	---	not relevant	negligible	not relevant	not relevant	negligible

Source: Based on factual information as can be found in the country reports underlying this document and complementary expert judgments. Cost of compliance are additional costs of compliance in case of previous non-compliance. See main text for marking rules used.

The level of compliance for the EU is an average based on the results obtained for the selected member states. Compliance in this case is understood as compliance to the local national regulations. If a certain field is not regulated, or left completely to voluntary action, then in the degree of compliance cell the 'not relevant' code is provided. The legend used is very indicative and not directly comparable with that used before in Table 1.

The costs of compliance also need to be related to a country's own regulations. Costs are categorized as 'negligible', 'low', 'moderate', 'significant', and 'high'. It is worth emphasizing that costs here need to be understood as all costs involved in satisfying the regulation and is not limited to the 'additional costs' raised by cross-compliance. Where there is financial assistance or a cost sharing mechanism, attempts are made to adjust the cost of compliance. If schemes are voluntary, it is assumed that these side payments will exactly match the additional costs. This implies that the net costs of compliance will then be zero or 'negligible'.

There are some relationships expected between the various columns. A low degree of compliance is likely to be correlated with a low (observed) cost of compliance. A similar relationship is expected regarding the intensity of regulation: a low intensity of regulation implies requirements that are likely to be satisfied at relatively low costs.

Where no information is available the Table 5 shows also the gaps in the knowledge.

## **6 Concluding remarks**

From this research several concluding remarks can be drawn, partly from a more theoretical perspective and partly based on empirical results.

As regards the responsive theory of regulation enforcement and the economic theory of compliance, it can be argued that the EU follows a relatively heavy regulatory regime, whereas its main competitors are relying more on a light-touch approaches, with strong reliance on persuasion, advice, education, voluntary participation and positive incentives (voluntary cross-compliance, technical assistance). With the introduction of cross-compliance the EU introduced an additional enforcement mechanism, signalling its insistence on farming practices and land use that preserves the environment, takes care of biodiversity, saves the 'physical capital' of the soil, ensures food safety, deals in a proper way with health aspects of animals and plants, and takes care that commercial interests are balanced with animal welfare considerations.

Cross-compliance introduced a harmonized added incentive aimed at improving compliance both at member state and farm level. As such it goes beyond the legal sanctioning system, which is still kept in place. These legal sanctioning and enforcement (sanctions and inspection) regimes, which tend to differ over member states, in principle might lead to differences in achieved level of compliance over member states. The infringement cases the Commission has with some member states

(amongst others about the proper national implementation of the Nitrate Directive) already underscore that this is not only theoretical. The added enforcement mechanism might reduce this variation and as such contribute to a more equal level playing field. From the perspective of the EU authorities (DG Environment) cross-compliance introduces an additional enforcement element, making achieved compliance levels less dependent on national discretion and variations in monitoring and inspection systems over member states (including variation in macro-compliance). According to the economic theory of compliance this additional incentive structure (threat to lose direct payments in case of non-compliance and the increased probability of being detected) should improve the sector's compliance with regulations. Anecdotal empirical information confirmed this, although it appeared with the currently accessible and available data not possible to make a quantitative assessment of the increases in compliance.

Compliance with regulations was found to be generally high. This holds for the SMRs as well as for the GAECs, with as two main exceptions the Nitrate Directive and the Identification and Registration requirements. With regard to the non-compliance rates found for the Nitrate Directive, this could be partly related to the problems some member states have with compliance at macro-level. As a response national legislation is further adjusted to EU standards, which subsequently further tightens the restrictions to be satisfied at farm level, which may negatively affect, at least temporarily, the degree of compliance at farm level. Compliance with the Identification and Registration requirements was hampered by a significant loss of eartags, which need in time replacement. The experience with electronic systems outside the EU (e.g. New Zealand) suggests that cheaper and more robust identification systems might be possible.

Where compliance is already high (groundwater protection, sewage sludge, notification of diseases) cross-compliance has limited potential to create increased compliance 'benefits'. From a responsive regulation perspective this could be a reason to in the future remove these Directives from the cross-compliance package, or when keeping them in, reduce the severity of the sanctions. Where there is substantial non-compliance, cross-compliance is expected to be most effective in increasing compliance. From a responsive regulation-perspective it could be argued that in case compliance does not sufficiently improve, further emphasis (increased inspection and monitoring and payment reduction threats) on these regulations is welcome. With the current information, from this paper no such a recommendation can be made. However, the theory of regulation as well as obtained first experiences suggest that further adjustments, improving the efficiency as well as the effectiveness might be possible and need to be given attention.

Except for the marginal costs associated with additional record keeping and administrative procedures associated with the SMRs and the additional costs resulting from newly introduced GAECs, cross-compliance has no costs. Since the SMRs which are part of cross-compliance are all pre-existing legislation, the (additional) costs associated with compliance should be primarily attributed to this legislation and not to cross-compliance. As such the benefits of cross-compliance (improved compliance) are likely to easily outweigh its costs. A counter argument to this could be that for making a balanced statement the increased monitoring and inspection costs have to be taken into consideration. However, the monitoring and inspection costs, necessary to assure an acceptable level of compliance, could be argued to be firstly

standard related and as such not attributable to cross-compliance. This still leaves open that cross-compliance has its own monitoring, inspection and public administrative costs, which were however not part of the analysis of this study.

The (additional) costs of cross-compliance associated with the GAECs is found to be rather low. A lot of farms (animal holdings) will probably face no costs at all, where others (arable farms) might face some costs, in particular costs associated with maintenance activities (soil cover, erosion control). These will be generally low, and often wholly or partly offset by additional returns.

Ordinary costs of compliance with the SMRs can be significant. In particular the costs associated with the Nitrate Directive and Animal Welfare requirements could have serious impacts. Farms previously non-complying may be faced with costs amounting several thousand euros per farm.

Using the impact of the Nitrate Directive on the EU dairy sector as an illustrative example, it was found that improved compliance will only lead to a marginal increase of costs at the sectoral level. Although increased compliance with regulations will in principle negatively affect the EU's competitiveness, a preliminary assessment suggests these effects to be very limited. In order of importance, other factors and shocks affecting competitiveness might easily overrule and dominate cross-compliance induced effects.

As regards the EU's key competitors, the comparative analysis covering all the themes addressed in the SMRs and GAECs showed that in general the intensity of regulation is less in these countries as compared to the EU. Also the production intensity in these countries is lower than the EU, which might partly explain the lower need for regulation. Lower regulation intensity however, does not necessarily imply a higher level of environmental degradation, biodiversity loss, or harm to animal welfare. All three non-EU countries have a rather similar approach on measures to control the environment, which relies relatively much on voluntary action. This action is facilitated and encouraged by financial incentive and assistance schemes. The financial incentives include cross-compliance mechanisms (e.g. Canada, where participating in voluntary schemes is sometimes a side condition for receiving of specific direct payments).

In a comparative sense, the regulatory intensities in Canada and New Zealand seem to be rather comparable. The US presents the lower end of regulation spectrum. The legislation there is usually less restrictive and when existent often not applied to the farm level. This could be because either agriculture is exempted or because the monitoring costs of non-point pollution are felt to be too high to take monitoring and inspection serious. As compared to the US, Canada and New Zealand rely to a relatively high degree on exports of sensitive products. This has likely caused a great focus on issues which relate to market risks, such as food safety, surveillance systems on animal diseases).

This paper mainly focused on enforcement and compliance with standards, with a particular emphasis on the EU's recently introduced cross-compliance regime. Moreover it provided a comparative overview on the variety of regulatory approaches followed by some of the EU's key competitors (the US, Canada and New Zealand). As such its emphasis was more on impacts on costs and competitiveness rather than on the achieved benefits of regulation. A benefits assessment was clearly beyond the scope of this paper. However, for a proper and integral evaluation of regulatory

systems and regulatory requirements an integral evaluation of the achieved benefits is required. This will then also bring in issues about the (appropriate) setting of standards (i.e. in such a way that the policy objectives aimed at with the various regulations can feasibly realized). There are some signals both from outside and inside the EU that improvements can and need to be made here (e.g. OECD, 2004a). Further research in this direction is needed.

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## **Annex A Additional details about EU cross-compliance standards**

The Statutory Management Requirements require compliance with a number of articles from 19 EC Directives / Regulations which address environmental, public, animal and plant health and animal welfare. 9 of these will apply for cross-compliance purposes in 2005, a further 7 from 2006, with the remaining 3 being applied from 2007.

- Applicable from 1.1.2005: Environment; Public and animal health; Identification and registration of animals
- Applicable from 1.1.2006: Public, animal and plant health; notification of diseases
- Applicable from 1.1.2007: Animal welfare

Issues on environment, public and animal health, identification and registration of animals, public, animal and plant health; notification of diseases and animal welfare are provided in the following table.

**Table A1:** Statutory Management Requirements referred to in Article 3 and 4 of Regulation 1782/2003 (amended by Reg 21/2004)

Directives/Regulations	Articles
<i>Environment</i>	
Council Directive 79/404/EEC of 2 April 1979 on the conservation of wild birds (OJ L 103, 25.4.1979, p. 1)	Articles 3, 4 (1), (2), (4), 5, 7 and 8
Council Directive 80/68/EEC of 17 December 1979 on the protection of groundwater against pollution by certain dangerous substances (OJ L 20, 26.1.1980, p. 43.)	Articles 4 and 5
Council Directive 86/278/EEC of 12 June 1968 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture (OJ L 181, 4.7.1986, p. 6)	Article 3
Council Directive 91/676/EEC of 12 December 1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (OJ L 375, 31.12.1991, p. 1)	Articles 4 and 5
Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild flora and fauna (OJ L 206, 22.7.1992, p. 7)	Articles 6, 13, 15, and 22(b)
<i>Public and animal health; Identification and registration of animals</i>	
Council Directive 92/102/EEC of 27 November 1992 on identification and registration of animals (OJ L 355, 5.12.1992, p. 32)	Articles 3, 4 and 5
Commission Regulation (EC) No 2629/97 of 29 December 1997 laying down detailed rules for the implementation of Council Regulation (EC) No 820/97 as regards ear tags, holding registers and passports in the framework of the system for the identification and registration of bovine animals (OJ L354, 30.12.1997, p. 19)	Articles 6 and 8
Regulation (EC) No 1760/2000 of the European Parliament and of the Council of 17 July 2000 establishing a system for the identification and registration of bovine animals and regarding the labelling of beef and beef products and repealing Council Regulation (EC) No 820(97) (OJ L 204, 11.8.2000, p. 1)	Articles 4 and 7
Council Regulation (EC) No 21/ 2004 of 17 December 2003 establishing a system for the identification and registration of ovine and caprine animals and amending Regulation (EC) No 1782/2003 and Directives 92/102/EEC and 64/432/EEC (OJ L 5, 9.1.2004, p. 8).	Articles 3,4 and 5
<i>Public, animal and plant health</i>	
Council Directive 91/414/EEC of 15 July 1991 concerning the placing of plant protection products on the market (OJ L 230, 19.8.1991, p. 1)	Article 3
Council Directive 96/22/EC of 29 April 1996 concerning the prohibition on the use in stockfarming of certain substances having a hormonal or thyrostatic action and of beta-agonists, and repealing Directives 81/602/EEC, 88/146/EEC and 88/299/EEC (OJ L 125, 23.5.1996, p. 3)	Articles 3, 4, 5 and 7
Regulation (EC) No 178/2002 of the European Parliament and of the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety (OJ L 31, 1.2.2002, p. 1)	Articles 14, 15, 17(1), 18, 19 and 20
Regulation (EC) No 999/2001 of the European Parliament and of the	Articles 7, 11, 12, 13

Council of 22 May 2001 laying down rules for the prevention, control and eradication of certain transmissible spongiform encephalopathies (OJ L 147, 31.5.2001, p. 1)	and 15
<i>Notification of diseases</i>	
Council Directive 85/511/EEC of 18 November 1985 introducing Community measures for the control of foot-and-mouth disease (OJ L 315, 26.11.1985, p. 11)	Article 3
Council Directive 92/119/EEC of 17 December 1992 introducing general Community measures for the control of certain animal diseases and specific measures relating to swine vesicular disease (OJ L 62, 15.3.1993, p. 69)	Article 3
Council Directive 2000/75/EC of 20 November 2000 laying down specific provisions for the control and eradication of bluetongue (OJ L 327, 22.12.2000, p. 74)	Article 3
<i>Animal welfare</i>	
Council Directive 91/629/EEC of 19 November 1991 laying down minimum standards for the protection of calves (OJ L 340, 11.12.1991, p. 28)	Articles 3 and 4
Council Directive 91/630/EEC of 19 November 1991 laying down minimum standards for the protection of pigs (OJ L 340, 11.12.1991, p. 33)	Articles 3 and 4(1)
Council Directive 98/58/EC of 20 July 1998 concerning the protection of animals kept for farming purposes (OJ L 221, 8.8.1998, p. 23)	Article 4

As regards the GAECs, Article 5 of Regulation 1782/2003 states that Member States shall ensure that all agricultural land, especially land which is no longer used for production purposes is maintained in good agricultural and environmental condition. Member States shall define at national or regional level minimum requirements for good agricultural and environmental condition taking into account the specific characteristics of the areas concerned. As a specific obligation for all Member States article 5 of the Regulation asks for the maintenance of permanent pasture, for all other measures of Annex IV Member States may act independently and lay down proper rules of good agricultural and environmental condition.