Twilight on self-regulation

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A socio-legal evaluation of conservation and sustainable use of agrobiodiversity by industry self-regulation

M. H. J. W. van Amstel-van Saane

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Promotors:
Prof. Dr. P. Glasbergen
Prof. Dr. P.P.J. Driessen

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Acronyms and abbreviations

AMY	Agrobiodiversity Management Yardstick
BD	Biodynamic
B2B	Business-to-business
B2C	Business-to-consumer
CBD	Convention on Biological Diversity
CCA	Commissie voor Consumentenaangelegenheden
CG	Conservation Grade
CLM	Stichting Centrum Landbouw en Milieu
COP	Conference of Parties
CSM	Company Name
CSR	Corporate Social Responsibility
CBD	Convention on Biological Diversity
EC	European Community
EEC	European Economic Community
EN	European Norms
EKO	Name Dutch Organic Eco-label
ESP	Erkend Streekproduct
EU	Eureopean Union
EurepGAP	Euro-Retailer Produce Working Group Good Agricultural Practices
FAO	Food and Agricultural Organization
FLO	Fairtrade Labelling Organisation
GDR	Group Decision Room
GEN	Global Ecolabelling Network
GRI	Global Reporting Initiative
GTZ	Deutche Gesellschaft für Technische Zusammenarbeit
IMF	International Monetary Fund
ISEAL	International Social and Environmental Accreditation and Labelling Alliance.
ISO	International Organization for Standardization
IUCN	International Union for the Conservation of Nature
LCA	Life-cycle analysis
LMC	Livestock and Meat Commission
LNV	Ministerie van Landbouw, Natuur en Voedselkwaliteit
NEN	Nederlands Normalisatie Instituut
NGO	Non-Governmental Organization
NSMD	Non State Market Driven
OECD	Organisation for Economic Co-operation and Development
UN	United Nations
UNDP	United Nations Development Programme

RIVM	Rijksinstituut voor Volksgezondheid en Milieu
RFA	Rainforest Alliance
SAN	Sustainable Agriculture Network
SKAL	Stichting Kontrole Alternatieve Landbouw
SMK	Stichting Milieukeur
VROM	Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieu
VVAK	Voedsel en Voederveiligheid Akkerbouw
WBGU	Wissenschaftliche Beirat der Bundesregierung Globale Umweltveränderungen

1 Introduction

This dissertation seeks to understand whether, and if so, how industry self-regulation can tackle the problem of loss of agricultural biodiversity (agrobiodiversity). Whether industry self-regulation is a reliable regulatory strategy for conservation and sustainable use of agrobiodiversity is evaluated. The concept of agrobiodiversity is a socio-political construct that reflects the international agreement that loss of genetic resources, species and agro-ecosystems should be reversed (e.g. CBD, 1992; FAO, 1996; Millennium Report, 2000; Millennium Ecosystem Assessment, 2005; Rientjes, 1999). Defined by the Dutch Government (LNV, 2002a: 68) as 'biodiversity in an agricultural area' three subsets are distinguished (see also Oerlemans et al., 1999):

- Biodiversity directly involved in agricultural production (for example wheat or cattle). Genetic biodiversity and diversity in terms of breed and species is beneficial for farmers and other actors in the food industry.
- Biodiversity with a life-support function. Examples are natural enemies (e.g. non-toxic fungi, ladybirds and other insects that eat harmful organisms, and birds such as kestrels and swallows that eat harmful insects), pollinators (e.g. bees, bumblebees, butterflies) and soil organisms that transform organic matter into humus and minerals and improve soil structure (e.g. worms, springtails and fungi). While this biodiversity cannot be harvested it does support production and is a useful subset for agricultural production.
- Biodiversity with a landscape-ecological function (e.g. meadow birds or hedgerows). This biodiversity is neither harmless nor harmful and is also referred to as 'accompanying' biodiversity. This biodiversity contributes to the scenic value of the agricultural landscape, to recreation and to the agricultural sector's reputation.

The main international legal framework to reverse agrobiodiversity loss is the Convention on Biological Diversity (CBD). The objectives of this convention are to conserve biodiversity and the sustainable use of its components (art. 1 CBD). At the third conference of parties (COP) of the CBD a specific agricultural biodiversity work programme was established (CBD decision III/11, 1996). The sixth COP formulated the 2010 Biodiversity Target (CBD decision VI/26, 2002): "to achieve by 2010 a significant reduction of the current rate of biodiversity loss at the global, regional and national level (…)". Sub-targets are the sustainable management of production areas and the reduction of unsustainable use and consumption (CBD decision VI/30, 2002). The food and agriculture sector is explicitly mentioned as one of the sectors that contributes to pressure on biodiversity through land-use, nutrient-loading and the over-exploitation of wild resources (Global Biodiversity Outlook 2, 2006).

It is nevertheless not yet clear how to tackle the problem of agrobiodiversity loss with the most effective and clear-cut regulatory strategy, taking production supply chains and consumption patterns into consideration. Section 1.1 sets out the preliminary research that was

conducted which includes a stakeholder analysis. One of the questions the stakeholders were asked was which (regulatory) strategy they considered to be the most promising for conservation and sustainable use of agrobiodiversity.

The self-regulation of industry was given as a promising strategy. Nevertheless, self-regulation is also a disputed concept. Some see it as a promising regulatory strategy, while others stress that it is a weak type of regulation. A literature review discussed in section 1.2 will explore the perceived strengths and weaknesses in literature and society. Subsequently, the objective and the research question of this dissertation are formulated in section 1.3. Section 1.4 briefly introduces the research strategy. The outline of the dissertation is set out in section 1.5.

1.1 Stakeholder perceptions of agrobiodiversity

In the preliminary research we looked at how society perceives agrobiodiversity and which regulatory strategies are identified as being relevant for conservation and the sustainable use of agrobiodiversity (Van Amstel et al., 2005). In order to investigate this topic we analyzed the perceptions of agrobiodiversity among stakeholders from various areas of state, market and civil society (Glasbergen and Driessen, 2002): the food production chain (both mainstream and organic); NGOs; consultancy organizations; government bodies; centers of expertise; and gene banks (see figure 1.1). These are the organizations that will have a major role, either individually or jointly, in implementing measures to make agrobiodiversity more robust.

Grimble and Wellard (1997: 173) define a stakeholder analysis as: "a holistic approach for gaining an understanding of a system, and assessing the impact of changes to that system, by means of identifying the key actors or stakeholders and assessing their respective interests in the system". The general purpose of a stakeholder analysis is to provide a better understanding of environmental problems through a comparative analysis of different perspectives on a problem (Mushove and Vogel, 2005). This part of the research does not measure how agrobiodiversity is

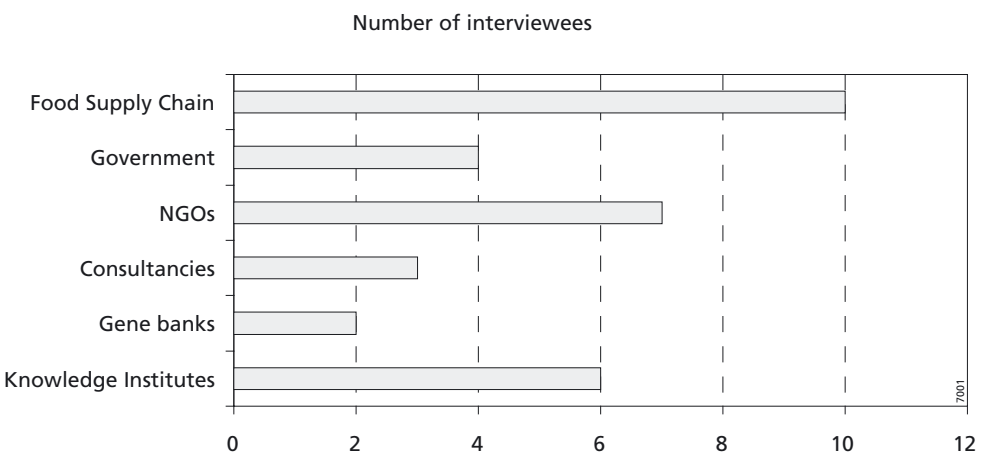

Figure 1.1 Number of interviewees in relation to the different types of organizations

actually promoted by (regulatory) instruments, but the perceptions of the interviewees: in what way do they think that agrobiodiversity is best stimulated by using different instruments, and who do they think are the most suitable stakeholders for conservation and sustainable use of agrobiodiversity.

The stakeholders were selected by using the so-called 'snowball method'. Several key figures from the sectors of policy, science, conservation and consultation of agrobiodiversity were asked to name other actors with a major stake in agrobiodiversity. Thirty-two representatives of these organizations were interviewed during the course of the investigation (Appendix 1 gives the names of the organizations where the interviewees work). Three themes based on the theory of problem formulation as described by De Vries (1998) were discussed. He defines a problem as an inconsistency between preferences and observations which can be decreased by actions. The three themes are:

- *Preferences*: the question was posed as to which kind of agrobiodiversity the organization deemed worthy of preserving and why. To contribute to agrobiodiversity the actual concept of agrobiodiversity, or certain elements of this comprehensive concept, should make sense to a stakeholder (Weick, 1995; O'Connell, 1998; Craig-Lees, 2001). Depending on his or her interests or values an interviewee can have a greater interest in one component of agrobiodiversity than another. A preference to preserve a particular kind of agrobiodiversity can, for example, be a preference to produce old, traditional, regional crop varieties or a preference to preserve the nests of meadow birds on the field. The motivation underlying this choice can be a passion for nature or the wish to sell regional products as an entrepreneur.
- *Observations*: inquiries were made into the availability of knowledge about agrobiodiversity and how it is interpreted. These observations are relevant to operationalise the abstract concept of 'conservation and sustainable use of agrobiodiversity' into concrete and practical agrobiodiversity performance measures. Scientific observations about the actual problem of agrobiodiversity loss make it possible to unravel the gravity of the problem for that particular interviewee and the possibilities to reverse the problem. The actual scientific state of the art is not measured, but the interviewees' perceptions of the usefulness of scientific knowledge to help them interpret how to preserve agrobiodiversity is.
- *Instruments and actions*: The question was asked as to which actor should be involved in agrobiodiversity management. With regard to instruments, the question was which of these actors considered the organization important, ranked according to articles 6 to 13 of the Convention on Biological Diversity. These articles deal with the following topics:
    - Legislation and regulations (the CBD calls this 'general measures for conservation and sustainable use');
    - Identification and monitoring;
    - Conservation in the field (the CBD calls this 'in-situ conservation');
    - Conservation in gene banks (the CBD calls this 'ex-situ conservation');
    - Sustainable use of the components of biodiversity;
    - Economically and socially sound incentives;
    - Research and training;
    - Communication, public education and raising awareness.

The interviews were conducted in the period July 2002-November 2002 and took on average 90 minutes. They were recorded on tape and then transcribed. The interviews were semi-structured. The topics list of the interviews can be found in Appendix 2. When analyzing these interviews we distinguished three ideal types: a holistic, a functional, and an operational perception of

Box 1.1 Three perceptions of agrobiodiversity

Holistic perception

Preferences:

- Conservation of all biodiversity in agriculture.
- Intrinsic value of biodiversity.
- Precautionary principle and human responsibility.

Observations:

- Organic farming is seen as the forerunner in research on sustainable use of biodiversity in agriculture.
- Research is mainly on more practical ways to gain knowledge.

Instruments:

- Organic agriculture, identification and monitoring, conservation in the field and in gene banks, sustainable use, incentives, research, awareness and education at all three levels of agrobiodiversity.
- No command and control regulation.
- Willingness to cooperate and share knowledge of organic farming and nature conservation organizations.

Functional perception

Preferences:

- Most attention for food production using genetic and biodiversity with life-support function.
- Intrinsic value of biodiversity.
- Sustainable agriculture in the Netherlands.
- Economic feasibility and less risk for parties in the chain.

Observations:

- Research which is very important to underpin priorities for functional biodiversity.
- Acquisition of knowledge focused on the functional use of biodiversity on farms.

Instruments:

- Communication about the function of biodiversity in food production as an important instrument.
- Identification and monitoring, conservation in the field and in gene banks, sustainable use, incentives, research, awareness and education at all three levels of agrobiodiversity.
- No command and control regulation.

Operational perception

Preferences:

- Food production using genetic biodiversity.
- Preferably not use the term agrobiodiversity.
- Biodiversity should be available to ensure survival and profitability of the food-producing industry.
- Image of the company/socially responsible entrepreneurship.
- Biodiversity offers new market access.

Observations:

- There is definitely not enough known about biodiversity to underpin corporate actions and this knowledge is not necessary.
- It is difficult to measure or operationalise biodiversity.
- Biodiversity is also a culture-laden concept.

Instruments:

- Conservation of biodiversity is a task for the government and not an obligation for private parties who may take action in sub-areas if they so choose.
- No command and control regulation.
- Priority actions for biodiversity with a production or production support function.
- Identification and monitoring, conservation in gene banks, sustainable use, research, awareness and education for genetic diversity and production-related biodiversity.

agrobiodiversity. The following sections elaborate on these perceptions; their characteristics are summarized in Box 1.1.

Stakeholder perceptions varied from one organization to another. The range of stakeholders supporting a perception is presented in figure 1.2. Initially there seemed to be little significant divergence. Yet despite this first impression, there are marked differences between the perceptions of interviewees representing the food supply chain (non-farmers) compared with non-governmental organizations (NGOs), government and farmers.

In the food supply chain, the holistic perception belongs to those companies involved in organic farming (2) and the functional perception is only expressed by agricultural organizations (2). All other food suppliers (6) support the operational perception. The interviewees in a consultancy and the gene banks expressed concern that the operational perception of corporations could become the major barrier because agrobiodiversity-friendly measures are not considered commercially feasible by these food suppliers. The most dominant stakeholders in the food supply chain – the breeding companies, the processing industry and retailers – all expressed an operational perception. Conversely, most NGOs have a holistic perception (4), followed by the functional perception (3). None of the NGOs have an operational perception of agrobiodiversity. The vision of governmental stakeholders is functional: the market should regulate agrobiodiversity.

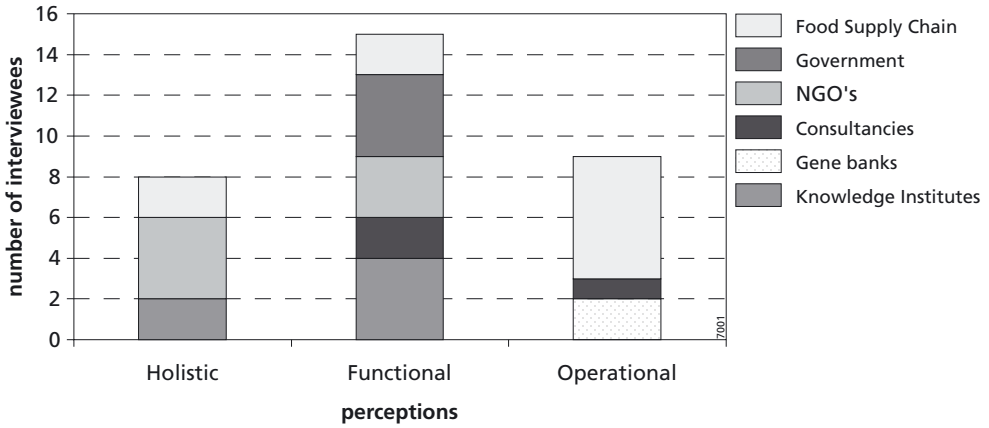

Figure 1.2 Overview of interviewee perceptions per type of organization

Holistic perception of agrobiodiversity

Parties with a stake in the production of organic foodstuffs share their holistic perception with several NGOs and centres of expertise. However, the term 'agrobiodiversity' is not part of their normal vocabulary. Nonetheless, they do see the importance of other forms of biodiversity for conservation or sustainable use: genetic diversity; biodiversity that serves a production-supporting function; and biodiversity that plays a role in landscape ecology. They motivate their preference for these functions by referring to the intrinsic value of biodiversity and man's responsibility to protect it. In other words, the preferred situation is the conservation of agrobiodiversity in all its forms. Formulated thus, the emphasis is on linkages and synergy across levels and subsystems. The goals of food production, biodiversity, and landscape conservation are seen as mutually compatible. As one interviewee said:

> "When you look at agriculture, it often means looking at the production system. The amount of potatoes or the liters of milk. That amount should be optimal. When you look at nature, a production target is irrelevant. It only matters whether something is attractive or rare. In most companies these two are not linked to each other.… I think the social relevance of the concept agrobiodiversity is to connect and combine these two differing worlds. … The chance of biodiversity is that conservation in agriculture will start with different people and different interest groups, which will then cause a more pleasing agriculture and an attractive, natural landscape".

Biodiversity is beneficial to agriculture and vice versa within the context of an attractive landscape that serves a recreational function. From that perspective, potential strategies to preserve agrobiodiversity would include organic agriculture, sustainable agriculture grounded in the bio-cultural heritage, and regional production.

Although there are still gaps in scientific knowledge about agrobiodiversity, these parties still focus on the practical use of agrobiodiversity on farms and for organic agriculture. The acquisition of knowledge is mainly concerned with how biodiversity can be applied and exploited in agricultural production. Thus, the efforts to build up a knowledge base amount

to finding the increments that lead to the integration of and synergy between agriculture and nature. Stakeholders with a holistic perception emphasize the contribution that the CBD's seven instruments can make to a more robust agrobiodiversity. Like the other stakeholders, they too are of the opinion that legislation and regulation cannot do much to promote biodiversity in agriculture. Yet they do see a role for the other instruments named in articles 6 to 13 of the CBD. They give priority to conservation in the field and in gene banks and also to sustainable use, areas in which these parties see themselves as pioneers. Because of their interest and knowledge they have a deeper understanding of the role biodiversity plays in agriculture than other stakeholders. However, they are also willing to share their knowledge with others, and they are optimistic about possible cooperation with the business community. Concomitantly, they are worried that the theme of agrobiodiversity will be a short-lived trend at the government level.

Functional perception of agrobiodiversity

About half of the interviewees have a functional perception of agrobiodiversity. Parties with a functional perception of agrobiodiversity are mainly found in government and trade associations, and also among various consultancy bodies, centres of expertise, and NGOs. A functional perception of agrobiodiversity encompasses the conservation of biodiversity and entails utilization of biodiversity in agricultural production. Priority is given to genetic diversity and biodiversity with a production-supporting function. In line with this perception, various authors (Oerlemans et al., 1999 and Boer et al., 2003a, 2003b) have translated the concept of agrobiodiversity into practical terms. One interviewee mentioned the necessity for a concrete translation as:

> "Agrobiodiversity is better known than several years back. However, we have to take care that agrobiodiversity will not become some kind of buzz word used by everybody without knowledge of its meaning. Currently it can be seen that many people are concerned with agrobiodiversity, but without a concrete benefit for it. There is increasing discussion, but biodiversity is still decreasing. The people who really preserve agrobiodiversity are the owners of animals. One never hears them talk about agrobiodiversity. It should be more concrete. There should be definitive objectives at which we can aim: this is what we must do instead of talking so much about it".

This concept has, for instance, been contextualized in themes like the living soil (soil fertility), healthy plants (crop improvement, control of disease and pests), and robust animals (resistance to disease, and selection). In general, the literature describes concrete measures to make different types of farms robust and sustainable. The message is that sustainable farming can help Dutch agriculture survive when the farming is based on biodiversity. The economic value of such farming is presented as a precondition for the other values of biodiversity. In fact the exploitation of biodiversity does not hinder a profitable farming business. Moreover, taking advantage of biodiversity has a beneficial side-effect: it makes the landscape more attractive. Tourism and recreation could therefore bring in extra income thanks to the more sustainable use of biodiversity on farms.

More scientific understanding on functional agrobiodiversity is needed in order to explain why this perception is so relevant. Many measures that could utilize biodiversity are still in the experimental stage. At this moment, we do not know all the possibilities offered by biodiversity. The interviewees define the problem as a trade-off between conservation and exploitation. They

would have to choose between stimulating biodiversity and accepting the (financial) risks and uncertainties and focusing on a high level of productivity. How can farmers be convinced that biodiversity is feasible in agriculture if the consumers – and this is how the links in the food production chain are generally identified – do not seem to be interested in biodiversity-friendly methods of production?

With the exception of the first instrument – article 6, referring to top-down regulation – all the other instruments named in the CBD (in articles 7 to 13) are considered both useful and appropriate means of promoting agrobiodiversity. The most important aspect is to show how agrobiodiversity pertains to farming practices. This translation task calls for a concerted effort among the interested parties. Their collaboration is crucial. In actual fact, the government and the private sector have a joint responsibility to conserve agrobiodiversity. With regard to the government this joint responsibility means that they must stimulate the private sector to conserve or use sustainable agrobiodiversity. This view reflects the actual agrobiodiversity policy.

Operational perception of agrobiodiversity

Stakeholders who see agrobiodiversity in relation to the running of their business are mainly those parties with an interest in the food production chain and consumer affairs. Other stakeholders – particularly in the gene banks, centres of expertise, and a consultancy body – note a certain amount of tension between operational perception and the conservation of agrobiodiversity. Those stakeholders with an operational perception of agrobiodiversity see no problems, nor do they see any need to develop knowledge. In answer to a question about knowledge development of agrobiodiversity one interviewee said:

> "Development of knowledge? That suggests that it is possible to develop a theory about biodiversity. It is questionable whether this is possible. Is biodiversity something absolute? Is measuring biodiversity underpinned by science or by something else? I have my thoughts about it. I think the expectations of biodiversity are seriously overestimated in the sense that it is measurable. Can anything be said about biodiversity in more absolute terms? People only like cows and calves in the meadows. If extra attention is focused on species diversity in meadows, people will get wet feet walking through them and then they start complaining about it".

It is true that they do attach value to conserving and using genetic diversity, especially when doing so serves the short-term commercial interest and applies to the production process. However, they also note that the genetic resources that are relevant to farming operations are stored in commercial gene banks. Conversely, the overall reduction of (genetic) diversity is seen primarily as a public concern for which the government is responsible. Thus, these stakeholders do not see explicit links between food production, sustainable use of biodiversity, and landscape conservation. This perception is characterized by a skeptical attitude toward the word (agro)biodiversity itself. The concept of (agro)biodiversity is considered vague, abstract, not measurable, and culturally loaded. Thus, they would rather not use this term.

The parties in the food production chain are unwilling to accept any responsibility for the loss of agrobiodiversity. Nonetheless, in the context of corporate social responsibility (CSR), various stakeholders do support actions and instruments intended to conserve agrobiodiversity. Any such support would be always be at the discretion of the private sector; it would never be

mandatory. This lends special significance to research on biodiversity as an aspect of sustainable agriculture and ex-situ conservation. Another area that deserves attention is the new niche market of organic products.

The idea that there could be a connection between Dutch agriculture and biodiversity does not fit into the frame of reference of stakeholders in the processing and retailing branches of the agricultural industry. These companies are usually multinationals. This fact alone implies that they have little interest in Dutch agriculture; they purchase their products on world markets. Nonetheless, their requirements in terms of agricultural products might possibly inhibit a biodiversity-friendly mode of production in the Netherlands. Specifically, they will only accept the delivery of raw materials that are uniform, of good quality, fairly priced, and constantly available. As one interviewee said:

> "The processing industry prefers raw materials at a reasonable price, in reasonable quantities, of a good quality and uninterrupted deliveries since this is the commodity of large-scale production. If you are cutting back on this production flow, it will create problems for the industry. If you are talking about small and fluctuating quantities and qualities as a result of bad weather, the industry will find it unacceptable. Machinery has to be working optimally and in the short term, the industry is just not interested".

Conclusions

Comparing the three perceptions it becomes apparent that exponents of the first and third perceptions do not see agrobiodiversity as a problem. In fact quite the opposite is the case: for stakeholders with a holistic perception the use of agrobiodiversity is one of several means to make agriculture more sustainable. In the minds of stakeholders with an operational perception of agrobiodiversity, loss of agrobiodiversity is a fact of life that might be considered as a problem in the public domain. However, that would have no (mandatory) consequences for private actors. Only those stakeholders with a functional perception – most of whom are involved in implementing the CBD in the Netherlands – see agrobiodiversity loss as a problem. Given that this group – especially stakeholders in government – is also convinced that government should not regulate but stimulate agrobiodiversity, their challenge is to demonstrate and convince entrepreneurs that using biodiversity in agricultural production is both economically feasible and relevant. The actual work involved in creating a more divers agricultural landscape must be left to the private sectors; the government focusing on farmers and other landscape managers. The food suppliers have already indicated that stimulating agrobiodiversity should not be allowed to interfere with their core business of producing food. This seems to be in contradiction with the government focus.

As far as taking action is concerned, the exponents of the three perceptions are in fact reasonably close together. Societal parties take an active stance on the conservation or sustainable use of components of biodiversity – for instance in terms of organic agriculture, controlling diseases and pests, and developing markets for regional products. These activities are consistent with the functional perception of agrobiodiversity. In this light, it is quite possible for stakeholders to cooperate in concrete projects even though they might hold different perceptions.

We can conclude that there is little support for governmental command and control regulation of agrobiodiversity. In government circles, as elsewhere, the idea of government

regulating agrobiodiversity and imposing regulation on the food supply chain meets with resistance. Arguments that dictate caution are: the ambiguity and complexity of the concept of agrobiodiversity, the perceived over-regulation of the agricultural sector by the government and the critical attitude with regard to the long-term ability of the government to regulate this subject.

This preliminary research was conducted in order to specify the precise scope of the research. Industry self-regulation seems the most promising regulatory strategy for conservation and sustainable use of agrobiodiversity. There are several reasons for selecting industry self-regulation. The dominant view taken in policy and the prevailing perception among interviewees is that the private sector should conserve agrobiodiversity. Furthermore, agriculture – more specifically: the industrial production of foodstuff – is held responsible for agrobiodiversity loss (e.g. Visser et al., 1998; Wolff, 2006). Another reason to select industry self-regulation is that certain labels and certification schemes impose standards that stimulate agrobiodiversity. Specific labeling schemes mentioned by the interviewees are organic labels and labels for regional products.

1.2 Industry self-regulation

The preliminary research stimulated us to further explore the concept of self-regulation. Industry self-regulation is a commonly practiced governance strategy nowadays (Parker, 2002; King and Lenox, 2000; Gupta and Lad, 1983). Van Driel (1989: 290) defines self-regulation as: "private rules established – whether or not in cooperation with others – by those to whom they apply, or their representatives, with supervision jointly exercised by these groups". King and Lenox (2000: 689) describe industry self-regulation as: "the self-regulation in which companies join together to regulate their collective actions, to avoid common threat or provide common good by establishing a standard code of conduct". Gunningham and Rees (1997) consider industry self-regulation as an institution with a variable capacity to bring the behavior of industry members within a normative ordering responsive to broader social values. Other terms to indicate this phenomenon are self-governance (Kooiman and Van Vliet, 2000), private regulation (Havinga 2006; Walker et al., 2000; Bartley 2003), communitarian regulation (Rees, 1997) and Non-State, Market-Driven (NSMD) Governance Systems (Cashore, 2002). Industry self-regulation is a broad concept and there are many different forms of self-regulation. Examples being eco-labels, codes of conduct, codes of honor for certain professions, guidelines for individual companies, general conditions incorporated in sale contracts, arbitrary regulations and pricing guidelines.

Although philologically the concept of self-regulation is derived from the two Greek words *auto* (self) and *nomos* (law), self-regulation is not necessarily an exclusively autonomous process. There is a range of government involvement in self-regulation extending from:

- *Voluntary self-regulation*: An industry chooses for self-regulation on the grounds of internal motivation. Standard-setting is based on industry priorities, perceptions and values.
- to *Enforced self-regulation*: The government imposes self-regulation on an industry and demands a minimum of substantive requirements. Non-compliance with these requirements constitutes a legal offence (e.g. Ayres and Braitwaite, 1992; Gunningham and Grabosky 1998; Sinclair, 1997).

There are several views on self-regulation and control regulation. Self-regulation is seen as an *alternative* for command and control regulation: it is more effective, more efficient and able to relieve regulatory overload. Another point of view is self-regulation as a *supplement* to command and control regulation (Priest, 1997). Self-regulation has more flexibility than command and control regulation to differentiate among certain groups more specifically. Conversely, command and control regulation addresses all regulatees with certain specified characteristics in a country (Donner, 1993). An industry can also adopt rates or standards which are inspired by international or national government regulation but extend beyond the rules in command and control regulation. Thus, industries stimulate a culture of compliance with self-regulation, independent of the state (Prakash & Potoski, 2006).

Donner (1993) also mentions a potential disadvantage of the ability of self-regulation to differentiate: it strengthens fragmentation in society. Scattered jurisdiction in society can cause a confusing and uncontrollable legal situation. A third view on industry self-regulation is self-regulation as an independent, market-driven type of governance with the ability to *mediate* between the state and the individual by moralizing and awareness-raising in the industry (Gunningham and Rees, 1997; Cashore, 2002). If communication between the state and the individual is in some way problematic, autonomous self-regulation may be able to communicate values and ethical practices even better than direct command and control regulation.

An underlying problem in the discussion about the relationship between command and control regulation and self-regulation is the degree of successfulness of self-regulation. In scientific discourse the views about the degree of effectiveness are strong and outspoken (Eijlander et al., 1993).

Advocates of industry self-regulation often use arguments that support self-regulation as an alternative for command and control regulation. It has the ability to 'repair' the failures of command and control regulation by the government. This is especially dominant among policy makers (Iannuzzi, 2002; Witteveen and Van der Klink, 2002; Sinclair 1997). Self-regulation is considered more effective, efficient, flexible and less time consuming than command and control regulation. The government benefits from the fact that the industry pays for and implements the production and enforcement of regulation. It is a useful strategy to relieve the regulatory overload (Iannuzzi, 2002; Eijlander et al., 1993). Industry benefits from the possibility to regulate, according to own insights and interests. Furthermore, industry self-regulation is said to have higher levels of compliance and the ability to build a common ethic and more social cohesion in an industry (Gunningham and Rees, 1997; Priest, 1997; Van Montfort and Oude Vrielink-Van Heffen, 2006).

Opponents of self-regulation claim that it is weak, ineffective and serves private interests rather than the public interests it claims to serve. Gunningham and Rees (1997: 363) formulate this as "an esoteric distraction from more important mainstream policy instruments", while Braithwaite (1993:91) states that "Self-regulation is frequently an attempt to deceive the public into believing in the responsibility of an irresponsible industry. Sometimes it is a strategy to give the government an excuse for not doing its job". Other arguments against self-regulation are that it stimulates favoritism; it has narrow regulatory concerns, higher costs to the public and is not accountable (Priest, 1997).

For both the advocates and the opponents of industry self-regulation there are several persistent, methodological difficulties in gathering evidence to support their views. For example, in empirical research relating to enforced self-regulation it is difficult to isolate cause and effect: does government enforcement or the industry self-regulation affect a change? Measuring the costs of self-regulation is another problem: the cost of compliance is often integrated in daily company management and cannot be traced (Oude Vrielink-Van Heffen and Dorbeck-Jung, 2006; Nijsen et al., 2005). These methodological difficulties in measuring the degree of success of industry self-regulation make the judgment of success and failure more dependent on the value given to certain characteristics of self-regulation. These values can change in time or place.

Donner (1993) states that the dominant view on self-regulation in a society varies historically and culturally. In the nineteenth and early twentieth century the significance of self-regulation diminished in favor of the role of the state and command and control regulation. Directly after the Second World War there was initial optimism about the ability to command and control regulation in a democratic state of law, particularly in Europe. The welfare state seemed to have the ability to solve all kinds of social problems. During this period, self-regulation had a negative reputation. It was associated with the interests of individuals, information closure and undemocratic decision-making. However, the optimism about command and control regulation gradually changed. Several regulatory failures such as regulatory overload, problems with enforcement and compliance with regulation, ineffectiveness, high costs and inefficiency, were highlighted. Privatization and liberalization were placed on the political agenda during the period of government of president Reagan (1981-1989) in the United States and prime minister Thatcher (1979-1990) in Great Britain. Since then, governments and international organizations, such as the World Bank and IMF, also promote alternative governance strategies such as self-regulation. In the Netherlands, the concept 'internalisation' was introduced to improve industrial compliance with environmental legislation, followed by a discourse to make companies aware of their environmental responsibilities (Van Tatenhove and Goverde, 2002). Today, industry self-regulation to improve the environment is a common regulatory instrument among several industries.

Yet this fact does not necessarily guarantee a positive attitude in society. In the Netherlands there are people who, despite their good intentions, still have a 'gut feeling' that self-regulation in industry cannot be trusted. During the research, conducted in the period between 2002 and 2006, several persons expressed their anxieties in this respect to the researchers. This uneasiness often relates to the position of consumer. For example, one statement concerned food labels: "There are so many labels on food products today. You cannot distinguish one from the other and they compete with each other. It is too confusing. It cannot all be true, they just want to sell". Another person said about labeling: "These labels cannot be trusted. They say that they are audited, but the auditors are paid by the producers. If the auditor is too critical, he will be fired, or not get paid. And you know, once an industry exists, there is always an interest to survive". A different remark was made about companies which put environmental-friendly results into sustainability reports but not on the product itself: "If they don't have the guts to put it on the product, it cannot be that sustainable".

1.3 Research objective and research questions

So far we have seen that agrobiodiversity is a contested concept. However, there is some consensus that it could be sustained by forms of self-regulation. We have also seen that self-regulation is an equally contested concept. In our search to make the self-regulation of agrobiodiversity operational for research we were looking for a unifying concept. Such a concept, which addresses this feeling of distrust in society, and is contained in the greater part of literature about the effectiveness of industry self-regulation, is the concept of 'reliability'. Reliability is the ability of participants in industry self-regulation to prove to non-participants that their behavior really does have the positive effect on the environment that they claim it has.

Reliability is chosen as an alternative for effectiveness, a concept considered important in the literature. An analysis of effectiveness focuses on self-regulation as an object of analysis. It fails to include the relational aspects between participants and non-participants in self-regulation. Reliability as a unifying concept can rectify this deficiency. Both the concepts of agrobiodiversity and effectiveness are integrated in the definition of reliability. After all, a participant claims to a non-participant that a product or production method is more environmental-friendly as a consequence of (effective) self-regulation.

Reliability of self-regulation is important for a consumer who, for example, can decide for himself to either purchase or boycott a product, become a member of a consumer or environmental organization and vote for environmental-friendly political parties. A single action however always has limited impact because there are many consumers. The concept of reliability is useful for individual consumers in the sense that the degree of reliability of an industry self-regulation can affect the purchase decision.

Reliability of voluntary industry self-regulation is also a relevant theme for governments. The path the Dutch Government has chosen to take with respect to agrobiodiversity is to stimulate instead of to regulate. Stimulating a reliable regulatory strategy can be considered as a meaningful and efficient strategy. When voluntary self-regulation proves to be unreliable – which could have been prevented by government enforcement or regulation – the government is in default. For this dissertation reliability is defined as:

The competence of a food company or food supply chain to prove, and at all times guarantee that agrobiodiversity objectives are being achieved through industry self-regulation.

The objective of this research is to gain insight into industry self-regulation of the food supply chain as a regulatory strategy for conservation and sustainable use of agrobiodiversity by evaluating the reliability of practices of industry self-regulation among food suppliers in the Netherlands. The central research question derived from this aim is:

How and to what extent are the industry self-regulations of food suppliers on the Dutch market reliable regulatory strategies for conservation and sustainable use of agrobiodiversity?

A substantive and procedural dimension of reliability will be distinguished. The substantive dimension of reliability mainly focuses on the integration of agrobiodiversity in the self-

regulations, while the procedural dimension covers other process-related characteristics of industry self-regulations. The research question is thus broken down into two sub-questions, corresponding with the substantive and the procedural dimension:

1. *How and to what extent is conservation and sustainable use of agrobiodiversity made operational in industry self-regulation?*
2. *How and to what extent do food suppliers in the Dutch market have the expertise to prove and assure that agrobiodiversity objectives are achieved through industry self-regulation?*

The first question merely focuses on the content of self-regulation and how agrobiodiversity is integrated in industry self-regulation. The second question devotes attention to the actual process of industry self-regulation. The structure of industry self-regulation, the compliance of participants and the impact of the self-regulation are assessed.

1.4 Research strategy

This dissertation focuses on how industry self-regulation works in the daily practice of participants and to what extent this differs from the theory of a self-regulatory scheme. The science that studies the difference between regulation in theory and regulation in practice is sociology of law. The research will take a socio-legal approach to answer the research question, while the research method used is the ex-post evaluation of the practice of industry self-regulation. It is positioned and based on the publications of several authors (Coglianese and Lazer, 2003; Griffiths, 1996; Gunningham and Rees, 1997; and Nadaï, 1999) and a research model is developed to evaluate the aspect of reliability.

A specific type of evaluation is selected or designed for each dimension of reliability. For the substantive dimension of reliability, an evaluation of program theory was chosen in order to provide insight into the way agrobiodiversity is made operational in industry self-regulation. The procedural dimension of reliability was assessed with the aid of a process evaluation to assess how objectives are achieved in the regulatory process.

Three types of industry self-regulation are evaluated in this research: eco-labels belonging to international labeling families, product-specific eco-labels and contract farming. Five self-regulations are selected for each type of self-regulation. For eco-labels that are part of international labeling families and contract farming these cases are the self-regulation of arable farming, while the selection of product-specific eco-labels also includes other types of agriculture.

Special attention is devoted to the complex concept of agrobiodiversity. All three subsets of agrobiodiversity (mentioned on the first page of this dissertation) are analyzed in the research: the biodiversity directly involved in agricultural production, biodiversity with a life-support function and biodiversity with a landscape-ecological function. This means that the yardstick was developed for one type of agriculture in particular, namely arable farming. Using the 'ladder of abstraction' (Sartori, 1991) a benchmark was designed to evaluate the conceptualization of agrobiodiversity in the case-studies. This benchmark is called the Agrobiodiversity Management Yardstick (AMY). The content of AMY is mainly based on the judgments of ecological agrobiodiversity experts. Their expert knowledge was partly collected in a session held in a Group

Decision Room (GDR), an interactive instrument used to identify and measure consensus between different experts. The three types of self-regulation are analyzed with AMY.

With regard to the procedural reliability of self-regulations, the principles of rule of law, the compliance of farmers and the environmental impact of eco-labels are investigated. A comparison is made of the different types of self-regulation (each having its own typical characteristics) and the results are aggregated to the level of industry self-regulation.

1.5 Outline

The socio-legal approach and the research methodology to evaluate reliability are designed and explained in Chapter 2. The substantive dimension of reliability is the theme of Chapter 3. AMY is developed in this chapter and used to assess five case-studies, the eco-labels of international labeling families. In Chapter 4 the results of AMY are explained in brief and compared to command and control regulation in the Netherlands. Additionally, the procedural dimension of reliability is studied for the eco-labels of international labeling families. The assessment of the substantive and procedural dimension of reliability for the other two types of industry self-regulation is presented in a single chapter. The results of the product-specific eco-labels are explained in Chapter 5. After developing AMY for arable farming in the Netherlands, this yardstick was also tested on other types of agriculture in other countries. In addition to the criteria which are assessed in the chapter about eco-labels of international labeling families, we also asked why the producers choose to use product-specific eco-labels and not the eco-labels of existing labeling families. In Chapter 6 a new, common type of industry self-regulation is assessed and to a certain extent compared to eco-labels or other types of certification. Arable farming labels are often included in the contracts. Transparency proved to be a bottleneck with regard to contract farming. Therefore the analysis of reliability, and especially the procedural dimension, is a more general analysis than that for the eco-labels. While it is also investigated what the potential is of contract farming for agrobiodiversity, the individual contracts are not compared due to reasons of confidentiality. The conclusions and reflections are presented in Chapter 7.

Chapters 3-5 are published separately, while Chapter 6 has been submitted for publication. Hence there is a certain amount of overlap between the various chapters. The methodology of this research is explained in Chapter 2. In chapters 3-6 this methodology is again explained in brief. Some typological changes have been made to meet the different requirements of the journals.

The research for the different chapters has been completed at the moment the chapters were submitted as an article for publication in a journal. For chapter 4 the data collection and analysis finished in 2005, for chapter 3, 5 and 6 in 2006. This means that the chapter refers to the command and control regulation and self-regulation in force in that particular year. Some of these regulations are no longer in force today.

2 Socio-legal perspective and research methodology

2.1 Introduction

This chapter positions the research by introducing and explaining the socio-legal perspective and further explains the research strategy introduced in section 1.4.

In section 2.2 the socio-legal perspective of this study will be elucidated and the underlying assumptions of the research made explicit. The socio-legal perspective stresses that regulation is not simply a paper containing a legal text, but a regulatory process with different stages, that are relevant for reliability.

Section 2.3 presents a research model with the two dimensions of reliability. Two different evaluation methods are selected for the two dimensions of reliability: an evaluation of program theory and a process evaluation. For each dimension the evaluation criteria and the evaluation tools are introduced.

Sections 2.4 and 2.5 give a more detailed and nuanced explanation of these two evaluation methods. In section 2.6 the data collection and analysis of the evaluation of program theory and process evaluation are explained. Section 2.7 underpins the choice to assess three different clusters of industry self-regulation: (1) eco-labels of international labeling families, (2) product-specific eco-labels and (3) contract farming. Furthermore, this section shares information about the concrete application of the research methods to the three different clusters of industry self-regulation. In section 2.8 attention is focused on the validity and the reliability of the research.

2.2 Socio-legal perspective

The socio-legal perspective means that the research does not exclusively assess the legal merits of the industry self-regulation, but also looks at the industry self-regulation as a social, organizational process. In the definitions of self-regulation, given by Van Driel (1989) and King and Lenox (2000) self-regulation is also considered as a social process. Although ecological knowledge will be integrated, the research is not based on a natural science, or more specifically ecology, method of approach. Natural science/ecology is an auxiliary science for the development of a socio-legal methodology to assess the reliability of industry self-regulation.

Socio-legal science studies law as a social phenomenon and is a sub-discipline of sociology (Schwitters, 1996). Griffiths (1996: 62) describes the sociology of law as an empirical social science aimed at the design of theory with regard to social control. Emphasis is given to specialization in social control and special social control processes, bodies and officials. Typical socio-legal studies are research into the workings of regulation within a target group, research into the accuracy of

factual argumentation in the work and decision-making of lawyers or tracing everyday factors that affect legal decision-making (Hoekema, 1978). Sociology of law has been described as focusing on "law in action" instead of "law in books" or on "law as it is" instead of "law as it ought to be" (Schuyt, 1994; Donovan and Andersen, 2003).

The socio-legal perspective of this research is used to develop a research model (2.3) for analyzing reliability and is based on publications of the following authors:

1. *Coglianese and Lazer* (2003) see regulation as a regulatory, organizational process and distinguish three regulatory stages for each link in the supply chain in the production of saleable products;
2. *Griffiths* (1996, 2003) assumes that effectiveness of regulation cannot automatically be assumed, partly because of legal pluralism and distorted legal communication;
3. *Gunningham and Rees* (1997) state that effectiveness of regulation depends on the degree of institutionalization in the regulatory process. They emphasize that industries can aim at both profit-seeking and more socially or environmentally oriented goals.
4. *Nadaï* (1999) outlines a communicative difficulty in a supply chain. For credence goods it is impossible for a non-participant of industry self-regulation to verify whether suppliers have complied with their self-imposed rules of self-regulation.

Industry self-regulation is not seen as the static reflection of norms written down on paper, but as a cyclic organizational process with different stages: the planning stage, the implementation stage and the outcome stage (Coglianese and Lazer, 2003; Easton, 1953; Nelissen et al., 2004). The participants in an industry self-regulation are found in different links of the food supply chain, mainly growers, the food processing industry and retailers. Figure 2.1 shows a simplified supply chain for a vegetable product. Industry self-regulation can include requirements for each link of the supply chain. A detailed description of the regulatory process for growers is given in figure 2.1.

The planning stage includes the preparation, creation and standard-setting of the industrial production process by the industrial regulators. In this stage, industry self-regulation is created

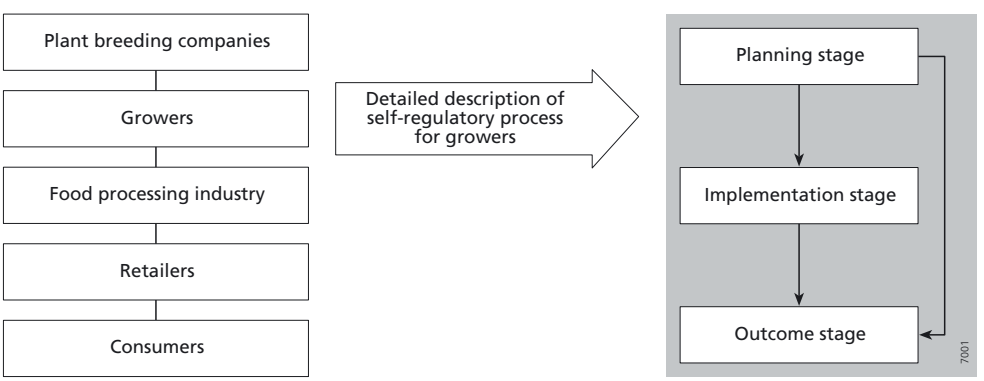

Figure 2.1 Industry self-regulation as a cyclic process for food suppliers

as the result of dialogue between different regulators, taking the values and interests of different groups into account.

The implementation stage concerns the actual production of a foodstuff. The content of industry self-regulation usually seeks to affect and regulate the behavior of producers. The compliance behavior of these producers (in figure 2.1 the growers) and the enforcement and sanction regime (for example of the other chain parties and independent third parties as certification bodies) to stimulate compliance of regulatees are considered in this stage.

The outcome stage refers to the impact of production on the environment. According to Coglianese and Lazer (2003) the output of a supply chain includes private goods (saleable products) and public goods (e.g. clean environment, worker safety or more biodiversity on farmland).

Table 2.1 Contrasting assumptions instrumentalism and social working of legal rules

Instrumentalism	**Social working of legal rules**
1. *The assumption of perfect legal knowledge:* The state heads a chain of command that communicates uniform, undistorted legal messages into a normative vacuum. The message, as intended by the legislator, reaches the individual and is not affected by social structures.	1. *The assumption of the socially contingent character of legal communication:* the communication of legal information is always problematic. In practice, the internal communication within the state does not function as a chain of command. Communications issued by a legislator differ entirely from communications issued by other bodies such as the courts or bureaucratic establishments. Messages do not usually reach the relevant actors directly but are communicated through different intermediaries. These intermediaries each have their own interests (e.g. lawyers, interest groups, trade unions, the media) and only limited capacities and resources. The legal message will become simplified, distorted and supplemented with other information (such as the risks involved and the cost of compliance or non-compliance). If the legal message does manage to get through to the actor, it will seldom be the message as the legislator intended.
2. *The assumption of legal monism:* The state has a monopoly overall (except for extreme situations as mafia or warlord dominance) and excludes other sources of regulation. Instrumentalism looks at the deviant character of non-compliance by an individual as opposed to the presence of other sources of regulation.	2. *The assumption of legal pluralism:* There are many sources of regulation and industry self-regulation is only one of them. Other regulatory sources can be better known, more clear, urgent, pressing or relevant for an actor depending on the social context.
3. *The assumption of legislative autonomy:* The legislator is perceived as an external and independent (f)actor from the social context in which legal rules are effective. Law is an instrument of social change.	3. *The assumption of inseparability of legislation from social life.* Legislation is seen as a process of social interaction among many, executed by specialized participants who engage in social life. The content of legislation is ultimately determined by factors that also affect other forms of social control. Legislation is not an independent, distinct and autonomous force that influences society.

Griffiths (1996, 2003) developed a theoretical approach 'the social working of legal rules' and stated that the effectiveness of a regulation in a social field cannot automatically be assumed. The behavior of regulatees in terms of observing the rules is established and created on what Griffiths calls the shop floor of social life: the concrete social situation where social action and interaction takes place; actions which are the subject of regulation. On this shop floor regulation can be misunderstood, transformed, ignored or otherwise interpreted quite differently than the regulator's original intention. This idea is based on several assumptions which Griffiths highlights by contrasting them with the theoretical perspective of instrumentalism. Although instrumentalism is often criticized, it still seems to play an important role, especially among policy makers (e.g. Witteveen and Van Klink 2000; Van Gunsteren, 1976). In instrumentalism rules are seen as the tools of policy makers to affect social change or as a description of actual behavior (Van Tol, 2005). The effectiveness of rules is seen as the normal situation and the obvious, self-explanatory consequence of regulation. Conversely, ineffectiveness deviates from the normal situation and this needs to be explained. No attention is paid to the complexity of causal relationships (Griffiths 1996: 476). Table 2.1 illustrates the contrasting assumptions of these theoretical approaches.

Gunningham and Rees (1997) stress that the effectiveness of industry self-regulation depends on the degree of its institutionalization in different regulatory stages. Both Griffiths (1996) and Gunningham and Rees (1997) distinguish different effects. Gunningham and Rees see diverse effects for the different regulatory stages: for example, awareness-raising and moralization of the industry in the planning stage, the institutionalization of responsibilities in the implementation stage and a cleaner environment or more agrobiodiversity in the outcome stage.

Gunningham and Rees add a fourth underlying assumption to the three assumptions formulated by Griffiths (1996). Companies cannot be considered as monolithic phenomena: they are neither antisocial profit-seeking beings nor social beings. They have the ability to be both profit-seeking and social, depending on context, other actors or external pressure (Gunningham and Rees, 1997). Companies are able to balance between the Triple P's of sustainability – profit, people and planet.

As already stated in section 1.2, each type of regulation has its own strengths and weaknesses. A complicating factor for the self-regulation of agrobiodiversity by the food supply chain is that agrobiodiversity is a 'credence good'. When the conservation and sustainable use of agrobiodiversity is embedded in the private production process of saleable foodstuffs, it has the important effect that it becomes a credence good (Nadaï, 1999). The core business of the food supply chain is to produce and sell foodstuff. In this production line there is information asymmetry between a seller and a purchaser: a seller is knowledgeable about the production method that has been used to manufacture the product; this is not known to the purchaser. For some commodities the purchaser is able to verify the taste, freshness, color and quality for example. However, certain aspects of other commodities cannot be identified by a purchaser, for example: regional origin, environmental friendliness or the agrobiodiversity performance of a production method regulated by virtue of industry self-regulation. These goods are called credence goods.

There are two major risks with regard to credence goods. Firstly, information can be easily lost in a supply chain. If a farmer sells his goods to a food processing company and does not

provide information about the agrobiodiversity performance of the farming production process, then the food processing company is unaware of that performance and cannot transfer this knowledge to his purchasers (retailers, and subsequently the consumers). Secondly, sellers easily have the opportunity to deceive purchasers because they are unable to verify whether the seller is being truthful or not. There is a potential threat of sellers' opportunism (Karl and Orwat, 2000; King and Lenox, 2002). Particularly when the purchaser is also a consumer fraud seems to be a frequently occurring phenomenon for credence goods (Peattie, 2000).

2.3 Development of the research model

As mentioned above, the research model which is shown in figure 2.2, is based on the publications of these authors. The model is multi-layered: each new layer adding and explaining the research route in more depth. The model has five layers. The first layer shows the *unifying concept* of the research *reliability*. The unifying concept is made operational by unraveling it in several *dimensions*. These dimensions are illustrated in the second layer. The two different evaluation methods are also introduced in the second layer. The two dimensions of reliability are still too abstract to measure directly. For that reason, the third layer describes the *regulatory stages* in the different dimensions on which the analysis focuses. An regulatory stage is not measured in general, but measurable *evaluation criteria* are identified in each regulatory stage. The evaluation criteria can be found in the fourth layer. The fifth layer of the research model shows the *evaluation tools* used to study the evaluation criteria.

The unifying concept is reliability, which we defined as 'The competence of a food company or food supply chain to prove, and at all times guarantee that agrobiodiversity objectives are being achieved through industry self-regulation. It is possible to distinguish two dimensions of reliability for regulation:

- The *substantive dimension* of reliability is related to the actual content of regulation. With regard to self-regulation this means that a food supplier is able to translate the abstract and comprehensive idea of agrobiodiversity into a concrete and feasible normative framework (Gunningham and Rees, 1997; Van Tulder and Kolk, 2001; Kolk & Van Tulder, 2002a).
- The *procedural dimension* of reliability is related to the organization and structure of industry self-regulation and the institutionalization of guarantees, which enables food suppliers to prove and assure that aims are actually relevant in company practice and not just a regulatory decoration. (Gunningham and Rees, 1997; Van Schooten-van der Meer, 1997).

The research strategy to analyze reliability is an ex post evaluation of industry self-regulation. An ex post evaluation is a retrospective assessment of the impact of a regulation or policy which was introduced at an earlier date. Evaluation research is a social science activity that aims to gain insight into the workings and effectiveness of social programs by means of data collection, analysis, interpretation and communication (Rossi et al., 2004).

In section 1.3 the research question is broken down into two sub questions. Each sub question corresponds with a dimension or reliability of self-regulation ('t Hart et al., 2000). The question how conservation and sustainable use of agrobiodiversity is made operational is a

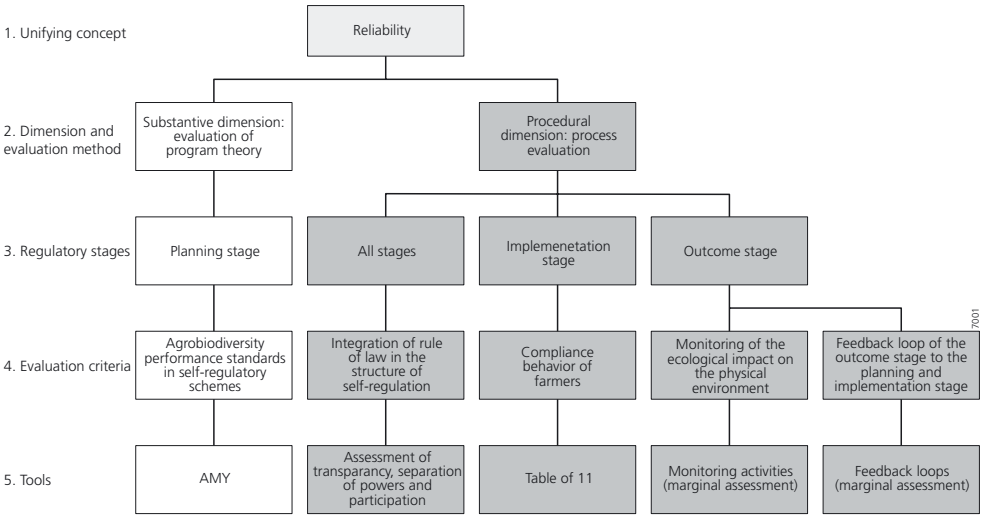

Figure 2.2 Research model of the evaluation of reliability

typical question for the substantive dimension. The question about proving and assuring that the formulated objectives are reached is again a typical question for the procedural dimension. Two different empirical evaluation methods are selected to analyze these dimensions.

- *Evaluation of program theory*: This is an evaluation of the program theory of industry self-regulation which is carried out to answer the research question about the concrete interpretation of agrobiodiversity management into agrobiodiversity performance standards in self-regulatory schemes (evaluation criterion) in the planning stage (regulatory stage).
- *Process evaluation*: this is an evaluation of the interaction between "self-regulation on paper" and "self-regulation in action". All regulatory stages are relevant and there are several evaluation criteria. The structure and organization of industry self-regulation is analyzed in order to understand the guarantees for reliability in the process of industry self-regulation (all regulatory stages). The behavior of farmers on the shop floor is studied and compared to self-regulation on paper (implementation stage). It is also evaluated how participants of self-regulation monitor the impact of the self-regulation on the biodiversity in the physical environment (outcome stage) and whether there is a feedback loop from the outcome stage to the other stages.

Conclusions will be drawn about the degree of reliability of all the self-regulations that were analyzed. In this respect, reliability cannot be seen as a single issue: some elements of a self-regulation can be reliable while others are not. When combining the results of all the investigated self-regulations we see the strengths and weaknesses of self-regulation to promote agrobiodiversity on a more abstract level.

2.4 Substantive dimension of reliability

Rossi et al., (2004) explains the *assessment of program theory,* which can also be called *the evaluation of conceptualization*. Assessment of program theory evaluates a program's conceptualization and design. Conceptualization, design and standard-setting are typical activities in the planning stage of regulation. The evaluation criterion investigated is the existence of any on-farm agrobiodiversity performance standards in a concrete and feasible normative framework (Gunningham and Rees 1997; Parker 2002; Kolk and Van Tulder 2002a & 2002b).

Development of the evaluation tool AMY
There is no method currently available to investigate the substantive dimension of reliability. Therefore the first step in the research was to develop a benchmark, which we called the 'Agrobiodiversity Management Yardstick' (AMY).

Our choice to call this tool the agrobiodiversity *management* yardstick does not mean that agrobiodiversity is seen as a purely managerial topic. On the contrary, agrobiodiversity is a politicized sustainability topic, which is the result of taking profit, planet and people into account. The reason for us to call it a 'management yardstick' is because agrobiodiversity performance standards are part of private farm management.

The development of AMY and the evaluation of program theory of agrobiodiversity management was transdisciplinary research carried out by social and natural scientists. To assess the program theory of industry self-regulation it is essential to obtain clarity as to how natural science interprets agrobiodiversity management and makes it operational in concrete, on-farm measures. In order to make the abstract notion of 'agrobiodiversity management' operational on a farm there are two limitations that must be taken into account:

1. *The difference between the abstract comprehensive concept of agrobiodiversity and the more limited concrete interpretation of agrobiodiversity.* The abstract concept of agrobiodiversity includes all living beings in agro-ecosystems. To conceptualize agrobiodiversity management into concrete rules, the structure of a rule as an 'if..then…' statement is relevant. According to Stone (2002) it is necessary to interpret the specific local context or the situational conditions in specific terms. Every rule contains one or more situational conditions. Only when these situational conditions are met can the formulated instruction for behavior be valid (Van Tol, 2005). For the conceptualization of agrobiodiversity management the situational conditional part of the rules is restricted to the geographically defined area of the Netherlands and the arable farming sector.
   The main reason to restrict the development of AMY for the Netherlands and for arable farming is that a specific type of farm in a (relatively) small country allows us to cover a whole range of broad and comprehensive agrobiodiversity performance measures. Agrobiodiversity is such a complex topic that it would be confusing to include several situational conditions, each with their own specific measures. For example: if situation A applies (such as arable farming), activities 1-10 stimulate agrobiodiversity, if situation B applies (e.g. animal husbandry), the activities formulated in rule 11-20 should be taken into account. The focus of the conceptualization of the abstract concept into concrete agrobiodiversity performance measures is on the 'then' part of the rule as an 'if…then…' statement.

To ensure that a concrete measure actually contributes to agrobiodiversity management a methodology developed by Sartori (1991) called the 'ladder of abstraction' is used to conceptualize agrobiodiversity. The ladder of abstraction is based on the idea of classification. The degree of similarity is flexible: the smaller the number of classes in a classification, the higher the intra-class variation between the classified phenomena. In other words: the more abstract a phenomenon is described, the more variance there is between components within that description. A ladder of abstraction distinguishes several levels of abstraction and makes it possible to 'descend' from abstract agrobiodiversity policy goals to the concrete level of agrobiodiversity performance measures on a farm.

2. *The current gaps in scientific knowledge about the relation between agrobiodiversity and agricultural practice.* Classification of agrobiodiversity management into concrete agrobiodiversity performance measures is a challenge for ecological science. This challenge relates to the state of art of natural science on the problem of agrobiodiversity loss and the possibilities to reverse this loss through agricultural management practice. Published ecological knowledge is fragmentary, location specific, often uncertain and partly inconsistent (Kassas, 2002; Struik and Almekinders, 2000). This makes it impossible to base the instrument entirely on scientifically proven and published relationships between agrobiodiversity performance measures and agrobiodiversity management. AMY is therefore based on expert judgment about the plausibility of relationships. Hence, the instrument is underpinned by literature reviews, expert interviews and, most importantly, an expert consensus workshop.

AMY was designed in several research steps. A draft concept of AMY was developed on the basis of a literature review and 4 expert interviews with ecologists focusing on different knowledge fields (e.g. soil biodiversity, development of indicators, organic farming, food webs). The organizations of these interviewees can be found in Appendix 1, while Appendix 2 shows the interview topics list. The draft concept was sent in advance to twelve workshop participants (Van Amstel & De Neve, 2005). The organizations of these 12 experts are given in Appendix 1. This workshop took place in a Group Decision Room (GDR).

A GDR with a Group Support System (GSS) is an innovative, interactive communicative tool, which can be used for research (Bongers et al., 2001). A network of computers facilitated the discussion between the participants on the structure and classification of agrobiodiversity management. This was broken down into the categories used in the yardstick. The network gave the experts the opportunity to comment on the draft concept yardstick and to reflect on the experts' perceptions of agrobiodiversity as well as how they translate agrobiodiversity management into performance measures.

The use of GGS has several advantages above a 'conventional' workshop. Participants can give input on the computer simultaneously (which can produce a substantial amount of information) and anonymously. There is an equal distribution of input from both the dominant and the more silent participants. Anonymous input has the advantage that an idea can be assessed independent of the (hierarchical and social) status of the person who formulated it (Bongers, 2000). Another advantage is that GSS can stimulate creativity and synergy: participants can build on the ideas of other colleagues and use insights from different angles.

Participants should be moderately computer literate. They must also be able to understand the software in about 20 minutes. Various tools (e.g. electronic brainstorming, voting, survey) and several breaks are necessary otherwise the workshop would be too intensive (this can hinder the concentration of the participants) (Agterbosch, 2006). GDR sessions can contribute positively to several aspects of problem analysis, such as the exchange of information and views of different stakeholders, problem evaluation, getting commitment, and voting priorities to solve a problem (Wealtherall and Nunamaker, 1999). In this case, the GSS successfully increased insight into and contributed toward the structuring of the complexity of the problem of conservation and sustainable use of agrobiodiversity. The end result of the yardstick was markedly different from the first draft thanks to the input from the experts. This resulted in an agrobiodiversity management yardstick with 5 levels of abstraction which were used to assess industry self-regulation.

With respect to the classification of agrobiodiversity management into different levels of abstraction it is necessary to explain the nature of the classes. Classes do not impute 'real sameness', but similarity, or as Wittgenstein (1992) calls it 'family resemblance'. Wittgenstein (1992) and Ross (1978) proved that people who classify formulate exact and exclusive classes, but with undefined boundaries. They generally classify a phenomenon by comparing it to an example within the category that they consider as a prototype. This means that classification in a category also depends on the classifier: the context, the social group, the education and the aim of classification are all important for category content. In this respect, the scientific context, training and education of the ecological experts, and the methodology used to collect the insights of the ecologists, affected the outcome and content of AMY.

Application of AMY

Using AMY, the agrobiodiversity performance of the different self-regulatory schemes of the industry self-regulation clusters are measured in several ways:

1. The yardstick creates an overview of agrobiodiversity performance standards of self-regulatory schemes that promote agrobiodiversity.
2. By showing the classes of farming activities in which the standards are classified the yardstick classifies how industry self-regulation decision-makers translate agrobiodiversity management in the self-regulatory schemes. The contribution of different self-regulations and different clusters of self-regulation can thus be compared.
3. The efficacy of these standards is also given. In the expert consensus workshop the experts not only identified agrobiodiversity performance measures but also gave an efficacy score to each measure on a 5-point scale. The efficacy scores of the total number of measures in a self-regulatory scheme are then added up and can be compared to the efficacy score of other self-regulations.
4. The nature of standards (voluntary, optional or obligatory) of self-regulatory schemes can be compared. The latter is relevant for compliance with the self-regulation in the process evaluation.
5. The efficacy score (3) is multiplied by the number (1) of agrobiodiversity performance standards in a self-regulatory scheme. This creates a general picture of the efficacy score of a self-regulatory scheme. The results of the different schemes can then be compared.

The terminology of method 4 may need some explanation. All evaluated industry self-regulations are voluntary self-regulations. Companies can choose to participate or not; however, once that choice has been made, a self-regulatory scheme can have voluntary, optional or obligatory standards. In addition to the above, interviews were also conducted on the subject of the substantive dimension of reliability (see section 2.6).

2.5 Procedural dimension of reliability

The procedural dimension of reliability is examined by means of process evaluation. This assesses how the agrobiodiversity performance standards are actually met by self-regulation participants and whether or not the realization is as intended by the standard setters (Rossi et al., 2004). Implementation of regulation may seem straightforward, but is often difficult in practice (e.g. Griffiths 1996; Gunningham and Rees 1997).

Process evaluation assesses all regulatory stages and the relation between the different stages of the regulatory process. There are four evaluation criteria:

- the integration of rule of law in structure and organization of the self-regulatory process as such (all regulatory stages);
- the actual behavior of participants (farmers) and how they apply and integrate the self-regulatory scheme in their production process (implementation stage);
- the measuring and monitoring of impact of the self-regulatory scheme and behavior of participants on the biodiversity in agricultural areas
- the possibilities for participants of self-regulation to give feedback to the planning or implementation stages.

Each research criterion is discussed in this section under three different headings. Under the heading 'monitoring of the ecological impact and feedback loops of the outcome to the planning and implementation stage', both measuring and monitoring and the feedback loops are taken into account. Under the heading the evaluation criterion, the evaluation tool and the application of the tool are explained.

Integration of rule of law in the structure of self-regulation

To analyze whether rule of law is integrated in self-regulation, the first step in the research was to identify the most relevant principles of rule of law to prevent one party from abusing powers at the expense of another. Using rule of law principles, the structure of a self-regulation can be created such that it aims to enlarge the societal basis of industry self-regulation and avoid autocratic and asymmetric relations between the different participants (Ogus, 1995; Van Schooten-van der Meer, 1997; Gunningham and Rees, 1997). Asymmetry paves the way for misuse and informal agreements; principles of rule of law can help to focus on symmetry in powers and the abilities of the parties involved.

Van Schooten-van der Meer (1997) compared several theories of classic legal philosophers. She identified three principles enshrined in the rule of law. To a certain extent, the principles she selected overlap with the principles of good governance (UNDP, 1997) and principles of Corporate Governance (OECD, 2004). In a food supply chain, industry self-regulation has the

ability to diminish information asymmetry between different chain parties and consumers (either participants of the industry self-regulation concerned or non-participants) at the moment of sale of a credence good. There is concurrence between the literature about industry self-regulation and the classic works investigated by Van Schooten-van der Meer (1997). In both types of literature the necessity of these principles is stressed.

The principles of rule of law (Van Schooten-van der Meer, 1997; Stoeckl 2004; UNDP, 1997), which are the evaluation criteria used in examining the structure and organization of self-regulatory processes, are:

1. *Transparency:* Application of the principle of transparency can diminish information asymmetry by requiring verification. Transparency is based on the idea of free flow of information and accountability. Transparency about standards, enforcement of standards and the outcomes of regulation, are necessary conditions for legal equity. Legal equity means that all standards are applied to comparable producers in the same way (Gunningham and Rees, 1997, Van Schooten-van der Meer, 1997). When these results are made public the purchaser is able to verify both the standards and the compliance of the producer (Eijlander et al., 2003; Erskine and Collins, 1997; Nilsson et al., 2004; Thøgersen, 2000; de Boer, 2003).

2. *Separation of powers:* With respect to self-regulation, the principle of separation of powers helps diminish asymmetry by reducing the subjectivity of the information about how the product is produced. In the literature on labeling, separation of powers is referred to as the independence of third parties (Van Schooten- van der Meer, 1997; De Graaff, 1996; Erskine en Collins 1997). Kirchhoff (2000) explicitly claims that independent third party labels, as a form of industry self-regulation, are more reliable than labels owned and ruled by companies. This is the result of a clearly articulated division of responsibilities among different supervisory, regulatory and enforcement authorities (OECD, 2004). Several competencies are important in this regard: to set standards (standardization); to implement the standards; to monitor implementation and verify compliance (certification); to guarantee that certification is done by an independent party (accreditation); to measure the effects of self-regulation; to select farmers for the supply chain.

3. *Participation:* The principle of participation can diminish information asymmetry by enabling different participants in or outsiders of industry self-regulation to have a voice in the standard-setting process or to represent their intentions either directly or through legitimate intermediaries (OECD, 2004). Participation can improve consumer confidence: the more parties involved, the larger the basis for support in society (Van Schooten- van der Meer, 1997; Nillson et al., 2003).

We examined whether these principles of rule of law increase the level of reliability between sellers and purchasers and if so, how and to what extent. These principles have been made operational for to analyze the selected self-regulations.

Regarding the principle of transparency we evaluated which information is publicly accessible or available upon request and how understandable this information is presented in all the three stages of the regulatory process. For the principle of separation of powers, we assessed how the responsibilities are divided among different supervisory, regulatory, enforcement and

executive authorities in all three stages of the regulatory process. With respect to participation we studied whether actors are able to affect standard-setting directly or indirectly.

Compliance behavior of participants in industry self-regulation
Compliance was selected as the evaluation criterion of reliability since it is the most controversial and most discussed dilemma for the effectiveness of industry self-regulation (Parker, 2002; Ayres and Braitwaite, 1992; Gunningham and Rees, 1997; Gunningham and Grabosky, 1998; Christmann 2000; Christmann and Taylor, 2001 and 2005; Havinga, 2006). As explained in Griffiths' theory, non-compliance is neither abnormal nor irregular. Rules are made, interpreted and adjusted on the shop floor of life, where other values, interests or social control can affect a regulatee to such an extent that a choice for non-compliance or creative interpretation of the rules is obvious.

With regard to the behavior of participants in industry self-regulation, the research focused on the behavior of farmers given that they are the actors that can directly affect biodiversity on private farmland. The implementation stage is the regulatory stage in which self-regulation participants choose either to comply, to comply in a 'creative' manner or to ignore the self-regulatory framework in their day-to-day business practices.

The evaluation tool used to assess compliance behavior is the so-called 'Table of Eleven' (T11) developed by Ruimschotel, the Dutch Ministry of Justice and the Erasmus University of Rotterdam (Justitie, 2005). The T11 methodology was developed with the goal to assess compliance with legislation and government regulation, but can also be used to assess new private regulatory initiatives such as certification (Van Erp and Verberk, 2003). T11 provides an overview of eleven factors that determine a target group's compliance behavior. Three main dimensions of compliance are distinguished in T11:

1. Spontaneous compliance because the farmer is convinced that he has to comply with the standards. There are several risks for non-compliance, for example when a farmer is not aware of self-regulation, does not understand the self-regulation, does not agree with the self-regulation or has an advantage not to comply.
2. The farmer complies with the regulation because he assumes that someone supervises. The risks for non-compliance can appear when the farmer knows that there is a little chance to be reported, audited or detected.
3. The farmer complies because the auditor is authorized to impose punishment. There are (positive or negative) sanctions that enforce compliance. There are risks for non-compliance when there is a little chance on a sanction or when the sanction does not harm the farmer.

Ruimschotel identifies eleven areas of potential risk for non-compliance with the regulations. This table of eleven consists of 11 propositions. The propositions about the risk of non-compliance are formulated and transcribed for this research and presented in table 2.2.

The table of eleven is applied in the process evaluation. For each T11 proposition, the institutional guarantees of self-regulation are examined in the self-regulatory schemes or other documents of industry self-regulation. In addition, the interviewees were asked to share information about actual compliance practices. Furthermore, the annual reports of labeling organizations

Table 2.2 Table of Eleven

	Dimension of spontaneous compliance (risks of non-compliance)
T1	Non-compliance by farmers through lack of awareness of standards and also lack of clarity in standards.
T2	Non-compliance is advantageous to farmers in terms of time, money, and effort. The financial barrier can be attributed to both the production method and audit costs.
T3	Farmers perceive standards of the industry self-regulation as unreasonable.
T4	Farmers are unwilling to conform to (external) authority.
T5	Behavior of farmers is not sanctioned by unauthorized persons (informal chance of getting caught).
	Dimension of control (risks of non-compliance)
T6	Little perceived chance that unofficially discovered offenses will be reported to inspectors (informal chance of being reported)
T7	Little perceived chance of inspection after committing an offense (chance of control)
T8	Little perceived chance of discovery of an offense when an auditor inspects (chance of detection)
T9	Little perceived chance of selection for an additional inspection after discovery of offense (chance of selection)
	Dimension of sanctions (risks of non-compliance)
T10	Little perceived chance of sanction after detection of an offense (chance of sanction)
T11	Little harm by the sanctions and additional disadvantages of sanctioning (sanction type)

or companies are examined and the information contained in these reports about compliance, audits, enforcement, sanctions and priorities of auditors is taken into account. This provides a picture as to how compliance with industry self-regulation functions in practice.

Monitoring of the ecological impact on the physical environment and feedback loops from the outcome stage to the planning and implementation stage

There are two evaluation criteria relevant in and for the outcome stage. Firstly, it is evaluated whether participants of self-regulation organize the measuring and monitoring of the impact of the self-regulation on the biodiversity in farmlands in the outcome stage. The evaluation of the impact of self-regulations and farmer behavior on agrobiodiversity in the outcome stage is the most far-reaching and controversial step for institutionalization of industry self-regulation (Gunningham and Rees, 1997). Secondly, it is analyzed whether there is a feedback loop from the outcome stage to the planning stage and implementation stage to improve or adjust the self-regulatory scheme.

Measuring and monitoring the biodiversity effects on farmland is an area of expertise of ecologists. Typical methods used for measuring and monitoring are counts of species in an area, soil or water and quality measurements. Measuring and monitoring agrobiodiversity is perceived as a difficult and expensive activity. Despite these difficulties it is a step which is necessary in order to have some knowledge about the impact of industry self-regulation. The results could underpin the accuracy of the self-regulatory scheme and thereby improve reliability in terms of communication. This typical ecological approach could not be used. Our evaluation of the outcome stage is a more marginal assessment: we only assessed whether measuring and monitoring were in place in a self-regulation organization.

The feedback mechanism is mainly chosen to emphasize that self-regulation is a cyclic process. The quality of standards are improved when scientifically proven. In addition to this, the standards or behavior of farmers can be adjusted when no effects are measured. Since the evaluation of monitoring was a marginal assessment, there is no concrete evaluation tool to evaluate the feedback loops: we only assessed whether feedback mechanisms were applied in a self-regulation organization.

2.6 Data collection and analysis

The data for the substantive and procedural dimension of reliability was collected from different sources. Written documents used were the self-regulatory schemes themselves and other associated documents such as handbooks, leaflets, informative letters and annual reports. In addition, written documents about the self-regulations were also analyzed.

To understand the behavioral aspects, approximately 55 interviews were held in some 40 organizations (see Appendix 1). These interviewees were involved in one or more self-regulations. Occasionally, several persons in one organization were interviewed depending on their authority and expertise. For each self-regulation we aimed to interview at least one person involved in standardization, auditing, monitoring and a farmer who implements the self-regulation.

For some self-regulations we were unable to interview all four people representing the different areas. Some organizations only allowed us to speak with the press officer or the importer. In some cases, the names of farmers were not given in order to protect their privacy. Others argued that they had too little time or interest to give an interview. One person was only willing to give an interview if the researchers would do them a favor by using their network and influence in government to arrange certain things. Our refusal made this interview impossible.

In contrast, some interviewees were very helpful by mentioning other people who were also interested in being interviewed. Others were enthusiastic and said they were willing to participate by observing, showing us the farm or company or introducing other potential interviewees. Others, especially the corporate interviewees, had a well-organized marketing department and gave us products or accessories with the company's name on them or offered free product tasting sessions to the research group.

A topics list containing different topics was used for all three selected types of self-regulation (appendix 2). For each case, information was gathered on all topics. Depending on the number of interviewees, their position and expertise, specific topics were selected for the interviews. In one case it was not possible to collect data on all topics. This happened when a company culture seemed open – promises had been made to give the name and contact details of several possible interviewees – but proved to be closed. In another case it was clear from the beginning that the company was unwilling to share a large amount of information. Only one interview was allowed. In that case our strategy was to ask about all four research criteria in general and more detailed information about the criteria that were unclear (participation, compliance and environmental impact monitoring).

The interviews were held in the period 2003-2006. Most interviews were face-to-face, while some were held over the telephone, often because the interviewee lacked time or because he or she came from abroad. Although we tried to avoid it, in a few cases the data was collected by e-mail. The interviews took on average 75 minutes and were recorded on tape and then transcribed.

We used 'open coding' to analyze the interviews (Corbin and Strauss, 1990). This means that small pieces of text are analyzed and labels are given to the identified, or described phenomena in the text. Several labels are compared, and this creates categories and sub-categories. The data will be generated in categories and sub-categories which are related to the research model's research criteria.

2.7 Selection of industry self-regulations

There is a large spectrum of different types of industry self-regulations varying from codes of conduct and voluntary agreements to guidelines for companies or general conditions included in sale contracts. Within this broad spectrum of industry self-regulations, which in itself is a relatively weak governance mechanism, we selected the strongest and legally most elaborated types. The reason for selecting those self-regulations with more enforcement and sanction mechanisms was the assumption that the more common agricultural practices are found in these self-regulations, and that they have more opportunities for transition. The self-regulations studied concentrate on the sale between seller and purchaser. Reliable sales-related self-regulations can increase market transparency and diminish information asymmetry between the seller and the purchaser of credence goods (Nadaï, 1999).

The selected self-regulations belong to the food supply chains of food suppliers that offer products to consumers in the Netherlands. The Netherlands signed the CBD and has a (commercial) agricultural area that covers approximately two-third of the country's geographical area, which makes agrobiodiversity policy a substantial part of biodiversity policy in terms of area. The criterion is that the Netherlands is the trading area, because most commercial trade flows are international. Taking these selection criteria into account, two types of industry self-regulation were selected:

1. Eco-labels: environmental friendly labeling or certification. Two types of eco-labels were researched, namely:
   a. *eco-labels* that belong to *international labeling families* (such as organic labeling, biodynamic labeling, labeling based on Life-Cycle Analysis and regional labeling) in different countries or *eco-labels that are used more widely by food suppliers on the Dutch market* and;
   b. Product-specific eco-labels brought on the market by *individual producers*.

Both types of eco-labels can be used for business-to-business (B2B) and business-to-consumer (B2C) communication.

2. Contract farming: A legally binding agreement between a farmer/seller and a purchaser/food processing business that regulates the supply, quality, price and sometimes the production method of a product in advance (Eaton and Shephard, 2001). The focus is on the generally applied standards includes sales contracts. Contract farming is a typical B2B communication instrument.

While eco-labeling and contract farming provide interesting cases, the combination of these two types of self-regulation is also relevant for agricultural practice. There can be some overlap between contract farming and labeling. Firstly, contract farming between a farmer and a food processing business could, for example, be used to underpin a food processing business's product-specific label to communicate to consumers. Secondly, labeling and contract farming are intertwined and often combined. Contracts between farmers and food processing businesses often contain a clause that requires the farmer to participate in a labeling scheme. The organic food supply chain, for example, is entirely based on contract farming. In contrast, labels include the legal entity of 'supply chain director'. There is one direct eco-label participant, for example in the food processing industry. This person has a large number of suppliers who automatically become indirect participants in eco-labels because their supply contract with the food processing business requires them to produce conform the labeling scheme set out on the eco-label. In this case the supply chain director is responsible for the farmers' compliance. A far-reaching consequence of the non-compliance of a single farmer can be sanctions imposed on all persons involved.

A total of 15 industry self-regulations are evaluated in the following chapters. This involved a cluster of five practices for each type of self-regulation. All industry self-regulations selected were required to have standards in the self-regulatory schemes that go beyond public regulation otherwise it would have been impossible to separate the working of the self-regulation from the working of public regulation. Detailed information about the selection of the particular cases is given in the relevant chapter. Initially the eco-labels from international labeling families were studied (September 2003-December 2005). Thereafter, contract farming (December 2004-July 2006) and subsequently the product-specific eco-labels of individual companies (October 2005-August 2006).

Applicability of research methods on three clusters of industry self-regulation
The procedural dimension of reliability was assessed equally for all three clusters. The application of research methods varied in detail since the research methods were tailored to the three clusters of industry self-regulation. An overview of the evaluation of the substantive dimension of reliability and the differences among the three clusters is shown in table 2.3

AMY is the evaluation tool for the substantive dimension reliability; the five cases of the three clusters were successively assessed by using this yardstick.

Table 2.3 Applicability of AMY on three research clusters of industry self-regulation

AMY measuring methods	Eco-labels (internat.fam.)	Product-specific eco-labels	Contract farming
1. number of standards in regulatory scheme	√	√	√
2. different categories of farming activities	√	√	√
3. efficacy of standards	√	-	-
4. nature of standards	√	√	√
5. efficacy score multiplied by number of standards	√	-	-

There are several uncertainties related to measuring method 1. For contract farming, this uncertainty is related to a lack of transparency. Several parties did not permit us to see or copy the contract due to the market-sensitive information it contained. They were asked to describe the standards of the contracts related to agrobiodiversity and in some cases the general characteristics of the contracts were made available. The number of agrobiodiversity performance standards (AMY measuring method 1) therefore might deviate from the actual contracts. This cannot be said with any certainty but we took this risk in order to give an indication about the contract. Nevertheless, we decided not to calculate the efficacy (AMY measuring methods 3 and 5) due to lack of precision.

AMY measuring method 1 is also somewhat speculative with regard to product-specific eco-labels, but for different reasons. When selecting the practices of product-specific eco-labels very few were found that related to arable farming in the Netherlands. However, although AMY was developed specifically for arable farming in the Netherlands this did create the opportunity to find out whether AMY could also be applied to labeling schemes in other countries and other areas of farming as well. In comparison with government regulation, industry self-regulation is not limited to national boundaries, while some of the AMY measures mentioned by the experts did not seem to be bound to a specific type of farming either.

The labeling schemes of the product-specific labels were assessed on the AMY measures as given by the experts and the additional measures found in the eco-labels of international labeling families in the Netherlands. In some cases the product-specific labeling scheme explicitly claimed to stimulate 'biodiversity', 'habitats' or 'endangered species'. In these cases the standard in the product-specific labeling scheme was also included.

The ecological experts gave the efficacy score for the Netherlands only, and therefore the efficacy was not calculated for the product-specific eco-labels.

2.8 Validity and reliability of research

Several guarantees are included in the research in order to ensure its validity and reliability. The research methods used were mainly qualitative, although to a certain extent AMY quantifies the number of standards in self-regulatory schemes. Validity and reliability are explained both in general and separately for the evaluation of program theory and for the process evaluation.

Validity of the research

Joppe (2000, cited in Golafshani, 2003) describes the validity of a research as: "Validity determines whether the research truly measures that which it was intended to measure or how truthful the research results are. In other words, does the research instrument allow you to hit 'the bull's eye' of your research object?"

The internal validity of the research is improved by the triangulation of methods and triangulation of sources. For convergence with other methods and sources there has been a triangulation of research methods by describing a policy analysis, a stakeholder analysis, an evaluation of program theory and a process evaluation. The sources relevant for this research were:

- literature
- legislation
- policy documents
- annual reports
- information leaflets
- self-regulatory schemes
- documents in the media
- documents of non-governmental organizations
- interviews
- expert workshop.

The internal validity is further improved by using 'embedded units of analysis' (Yin, 1984). The three clusters of each five cases of industry self-regulation were separately analyzed and the results generalized for industry self-regulation. The validity of the research questions were improved by pre-testing: using one of the self-regulations (an eco-label) the research questions and interview questions were first tested. Some minor adjustments were made. Reliability of the research was also assured because the research methodology was repeated. The external validity, the representativeness of the sample chosen from a population is explained in section 2.6, and for each type of self-regulation in the chapters dealing with these types of self-regulations.

Given that the research methodology to evaluate the substantive dimension of reliability of industry self-regulation still had to be developed a great deal of attention was devoted to the so-called 'content validity'. This means that the research method AMY should actually measure the agrobiodiversity performance of self-regulatory schemes by covering all relevant areas. One complicating factor in this respect is that ecological science is scattered and fragmentary on the agrobiodiversity performance of concrete on-farm management measures. To ensure content validity, the ladder of abstraction (Sartori, 1991) was chosen to structure agrobiodiversity management in concrete categories. In addition, the ecological experts on agrobiodiversity in the Netherlands were invited to participate.

The following applies with regard to the content validity of the process evaluation. The process evaluation was developed to cover the structure of industry self-regulation and all regulatory stages of the regulatory process. The selection of the rule of law principles is embedded in literature. The methodology of the table of eleven is often used by different types of actors interested in compliance and had already been made operational for labels (Van Erp and Verberk, 2003). With respect to measuring and monitoring the impact of regulation on biodiversity in the field and the feedback loops from one regulatory stage to another, the assessment was marginal. This means that these topics were addressed with very general, open questions focusing specifically on these items. No concrete evaluation tool was selected (as was the case with the selection of rule of law principles and the eleven propositions of the table of eleven).

Reliability of research

Joppe (2000, cited in Golafshani, 2003) defines reliability of research as: "The extent to which results are consistent over time and an accurate representation of the total population under

study is referred to as reliability and if the results of a study can be reproduced under a similar methodology, then the research instrument is considered to be reliable".

Analytic generalization of the results in qualitative terms was possible. The newly developed methodology had the ability to systematically evaluate self-regulations. Result reliability is improved by:

- The research methodology was developed on the basis of insights derived from the existing literature about industry self-regulation.
- The systematic analysis of the clusters of industry self-regulation with the research methodology based on a conceptual research model.
- A comparison of the different clusters of industry self-regulation whereby our aim was to formulate conclusions on the level of abstraction of industry self-regulation, not taking concrete, specific circumstances into consideration.

With respect to the possibilities to make generalizations of the chosen 15 industry self-regulations for the total population, there was a difference between the evaluation of program theory and the process evaluation.

The results of AMY could not be generalized. Each self-regulatory scheme has its own dynamics and interpretation of agrobiodiversity into concrete agrobiodiversity performance standards.

With regard to the process evaluation, to a certain extent the results could be generalized for other eco-labels. Each of the 15 case studies had their own structure and organization, varying from an exact copy of the 'certification triangle' (see figure 4.1) to a simple seller-purchaser relationship. With respect to the results of the principles of rule of law, a certain level of generalization would be feasible. The behavior of self-regulation participants could to a certain extent also be generalized. Examples of behavior found in this research (such as creative interpretation of labels, passing audits without farm management change, etc.) are also found in literature.

3 Development of the agrobiodiversity management yardstick

Mariette van Amstel, Willem de Neve, Joop de Kraker and Pieter Glasbergen. (2007a) 'Assessment of the potential of eco-labels to promote agrobiodiversity'. *Ambio*, 36(X) (in press).

3.1 Introduction

As a signatory to the Convention on Biological Diversity (CBD), the Dutch government has adopted conservation and sustainable use of biodiversity as policy goals. The CBD defines the in-situ conservation as "the conditions where genetic resources exist within ecosystems and natural habitats, and, in the case of domesticated or cultivated species, in the surroundings where they have developed their distinctive properties" (article 2 CBD). According to the CBD sustainable use means "the use of components of biological diversity in a way and at a rate that does not lead to the long-term decline of biological diversity, thereby maintaining its potential to meet the needs and aspirations of present and future generations" (article 2 CBD). These goals also concern the on-farm biodiversity on private lands (agrobiodiversity), as these covers about 70% of the surface area of the Netherlands (LNV, 2004; Berkhout & Van Bruchem, 2003). Moreover, there is a growing awareness that agriculture and biodiversity are interdependent (Wood and Lenné, 1997; 1999). The CBD lists several strategies for conservation and sustainable use of biodiversity. One such strategy is to encourage the private sector to develop methods for sustainable use of components of biodiversity (article 10 CBD), which may be achieved through industry self-regulation (Gunningham and Grabosky, 1998; Dedeurwaerdere, 2002; Gunningham and Young, 2001).

An eco-label is a type of self-regulation of the agro-food chain that may have potential for conservation and sustainable use of agricultural biodiversity (GTZ, 2001; WBGU, 2001). To assess whether an eco-label is an appropriate governance strategy, a major question to be answered is: in what way and to what extent do current eco-labels stimulate conservation and sustainable use of agrobiodiversity? By answering this question, this paper aims to contribute to the development of knowledge to assess the role of self-regulation in conservation and sustainable use of agrobiodiversity.

Currently, it is not clear to what extent conservation and sustainable use of agrobiodiversity is stimulated by eco-labels. Some eco-labels claim to promote agrobiodiversity (Manhoudt et al., 2002; De Snoo and Van de Ven, 1999), while others seem to avoid this complicated issue diplomatically. Many actors – especially those from the agro-food chain – consider the concept of agrobiodiversity as too abstract, unclear, inaccessible and immeasurable. Although several actors felt that many environmentally friendly regulations already promoted agrobiodiversity in

the Netherlands, none could give an overview of all existing regulations and an explanation how these regulations contribute to conservation and sustainable use of agrobiodiversity (Van Amstel et al., 2003). Thus, for an assessment of the potential of eco-labels to stimulate conservation and sustainable use of agrobiodiversity we need an instrument that enables us to link the content of regulation explicitly to agrobiodiversity. In developing this instrument, we faced two major challenges: how to make the abstract concept of agrobiodiversity operational, and how to deal with current knowledge gaps on the relationships between specific agricultural practices and agrobiodiversity?

Our solution to the first problem was to introduce a "ladder of abstraction" (Sartori, 1991). A ladder of abstraction distinguishes several levels of abstraction and makes it possible to "descend" from abstract agrobiodiversity policy goals to the concrete level of management measures on a farm.

The second problem concerns the fragmentary, location specific, often uncertain and partly inconsistent nature of the present published ecological knowledge on agrobiodiversity (Kassas, 2002; Struik and Almekinders, 2000). This makes it impossible to base the instrument purely on scientifically proven and published relationships between management measures and agrobiodiversity. Therefore, we decided to strive for plausibility based on expert judgment. Hence, the resulting instrument, called the "agrobiodiversity management yardstick" (AMY), is underpinned by literature reviews, expert interviews and, most importantly, an expert consensus workshop.

In this paper, we will first describe the development of the yardstick and subsequently its application to five eco-labels. The yardstick is developed for and applied to Dutch eco-labels in arable farming. However, as these eco-labels are typical representatives of international labeling families, the results of our assessment are presumably relevant to other countries as well.

3.2 Development of the yardstick

The relationship between an eco-label and agrobiodiversity can be described as a chain with four elements (box 3.1). Ideally, the potential of eco-labels to promote agrobiodiversity would be assessed with a comprehensive field study targeting the fourth element of the chain. However, even apart from the many methodological problems, a comparative assessment of this kind of five eco-labels would be extremely time-consuming and costly. In our study, we focused on the second element of the chain, the labeling schemes. Thereby we assumed that full compliance with the standards of the labeling schemes is guaranteed by the certifying institutions. These standards may vary in the extent to which they are compulsory, however, and this aspect is included in the study. The eventual impact of the standards on agrobiodiversity was not measured, but assessed indirectly with a yardstick for agrobiodiversity management. This yardstick is basically a checklist of on-farm management measures that contribute to conservation and sustainable use of agrobiodiversity.

The extent to which eco-labels stimulate these policy goals can thus be evaluated, by comparing the standards of the labeling schemes with the measures of the yardstick.

The yardstick was developed in three steps: (a) A study of scientific literature on relationships between agricultural practices and agrobiodiversity. (b) Interviews with four experts discussing

Box 3. 1 Relationship between an eco-label and agrobiodiversity.

Eco-label. An product eco-label sets certain goals concerning reduction of environmental burden and/or stimulation of positive environmental impact of a production process. These goals may include promotion of agrobiodiversity.

↓

Labeling scheme. A labeling scheme is a set of standards an eco-label holder (producer) has to comply with. For each product or product group different labeling schemes are designed.

↓

Standards. The British Standards Institution and the International Organisation for Standardisation (ISO) define a standard as: "a published specification that establishes a common language, and contains a technical specification or precise criteria and is designed to be used consistently, as a rule, a guideline or a definition" (www.standardsglossary.com, consulted November 22, 2006). The standards may encourage conservation and sustainable use of agrobiodiversity.

↓

Compliance. The eco-label holder must comply with the standards of the labeling scheme. There is an inspection of compliance by an (independent) third party. Compliance thus concerns the extent to which the standards regarding conservation and sustainable use of agrobiodiversity are met in actual farming practice.

↓

Impact on agrobiodiversity. The measures (step 3) can have a more or lesser positive impact on biodiversity on farmlands.

first ideas for a yardstick. (c) A workshop with a dozen experts to discuss a prototype, resulting in the final version of the yardstick. For the interviews, experts with different agrobiodiversity research areas were selected: an expert about on-farm biodiversity indicators, about soil biodiversity, about organic agriculture and about agri-environmental schemes. About fifty natural scientists, working in the field of agrobiodiversity, were invited for the expert consensus workshop. The invited scientists were involved as researchers or conference visitors in Biodiversity Stimulation Programme of the Netherlands Organisation for Scientific Research or added to the list using the "snowball-method".

The first step was to make an inventory of agrobiodiversity management measures. In this inventory we aimed to cover the full range of arable farming practices that affect biodiversity. Further criteria in our selection of management measures were exclusiveness (no overlap), suitability for eco-labeling schemes, practicality for the farmer, and relevance for Dutch agro-ecological conditions. The literature study resulted in an inventory of over thirty classes of farming activities with a potential impact on agrobiodiversity. In the second step this inventory was discussed with four scientific experts on agrobiodiversity, specializing in soil biology, organic farming, landscape ecology and farm nature development, respectively. On the basis of both the literature study and the interviews with the experts a prototype of the yardstick was drafted (Van

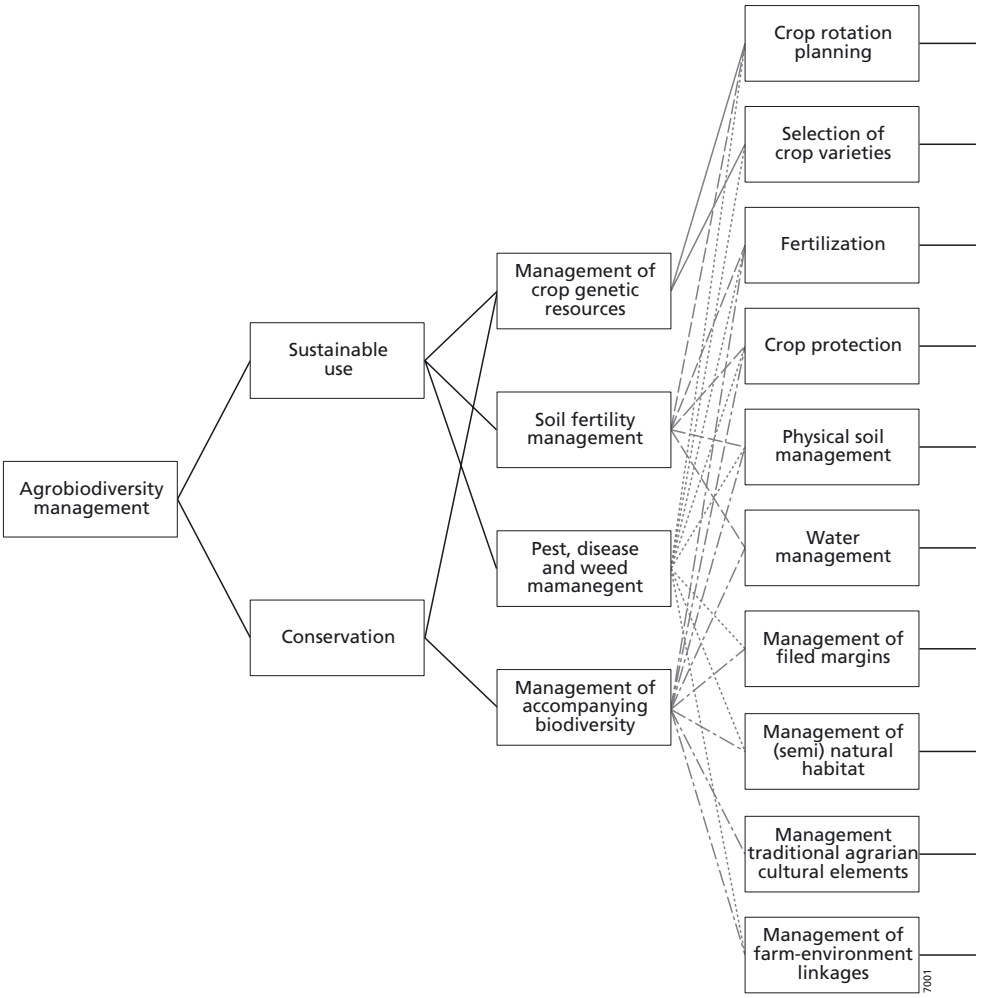

Figure 3.1 The first four levels of abstraction of AMY.

Amstel & De Neve, 2005). This prototype yardstick had five "levels of abstraction", similar to the final version, presented in figure 3.1.

This figure illustrates the first four levels of abstraction of AMY and the relation between the categories of the different levels. The first and highest level of abstraction just contains one category, "agrobiodiversity management". At the second level two major forms of agrobiodiversity management are distinguished, conform the goals of the CBD: "sustainable use of agrobiodiversity with a production function", and "on-farm conservation of agrobiodiversity". The third level emphasizes the different functions of agrobiodiversity management, according to the themes formulated in Dutch national policy on agrobiodiversity (LNV, 2004; VROM, 2005). Agrobiodiversity at stake in the three categories of management of "genetic resources", "soil

fertility" and "pests and diseases", is usually referred to as functional biodiversity, i.e. biodiversity with an agronomic production value (Oerlemans et al., 1999). The fourth category, "accompanying biodiversity", does has a production function of public goods and contributes to landscape and recreational values. At the fourth level of the yardstick ten categories of management activities at farm level are distinguished that may affect the agrobiodiversity management functions at the third level of yardstick.

The fifth level of the yardstick contains about 140 on-farm management measures which impact positively on agrobiodiversity. The measures were extracted from the literature, mainly from Boer et al. (2003a, 2003b), Landschapsbeheer Nederland (1998) and Platform Biologica (2002), or suggested by experts. In general these measures make the ecological conditions on farmland less harsh and more diverse, e.g. by reducing the input of biocides and the disturbance or compaction of soil, providing a greater diversity of food sources and breeding sites, and establishing corridors for dispersal (cf. Asteraki et al., 2004; Cortet et al., 2002; Duelli and Obrist, 2003; Hole et al., 2005; Pokarzhevskii and Krivolutskii, 1997; Schippers and Joenje, 2002; Smart et al., 2005; Stoate et al., 2001). A full overview of these measures can be found in De Neve (2006).

The final version of the yardstick was developed in a consensus workshop with a dozen scientific experts on agro-ecology and agrobiodiversity in the Netherlands. This consensus workshop was held in a group decision room (GDR), with a network of computers. This network facilitates the communication process of conventional discussions (Wealtherall and Nunamaker, 1999). The prototype yardstick was discussed level by level in several rounds, each consisting of a plenary introduction to the topic, parallel (electronic) collection of the responses of the experts, plenary discussion of the responses, and parallel assessment of the outcomes by the experts, with the electronic voting system. The four functionally defined management themes at level 3 were generally accepted and only adapted in wording. Discussion and assessment of the categories of farming activities at level 4 resulted in the addition of two new categories (water management and management of farm-environment linkages), and the removal of a few categories which received scores lower than 6 on a 10-point scale. The relationships between the categories at level 4 and the functional themes at level 3 were also assessed by the experts (0 = no relation, 1 = relation). Only relationships with a mean score larger than 0.5 were maintained. At level 5, numerous additional management measures were suggested by the experts. Subsequently, all management measures were assessed with regards to their efficacy. Efficacy refers to the positive impact of a management measure on agrobiodiversity, the extent to which it contributes to conservation and sustainable use of agrobiodiversity. Efficacy was scored individually by the experts on a five-point scale, ranging from 1 (= this measure is not effective at all) to 5 (= this measure is certainly effective). Only measures with a mean score larger than 2.0 were included in the yardstick. In table 3.1 examples of such measures are presented, along with the mean efficacy score of the management measures per farming activity. Category 10, "management of farm-environment linkages" is a cross-cutting management activity, and many concrete measures to tune the farm to its environment are grouped under the preceding activities (e.g. category 6, table 3.1). The measures that are included in category 10 generally pertain to formal-legal aspects of management of farm-environment linkages, such as an obligation for a conservation plan. The complete list with management measures can be found in De Neve (2006) in Dutch. About two-third of management measures were identified in the farming categories "management of field margins", "management of semi-natural habitat", "management of traditional agrarian cultural elements" and "management of farm-environment linkages".

Table 3.1 Mean efficacy scores of experts attributed to management measures per farming activity (AMY level 4) and examples of management measures with efficacy scores above and below average.

Categories of farming activities and examples of management measures	Efficacy score
1. Crop Rotation Planning	3.30
- On adjacent fields, crops are grown from different product groups. E.g. wheat and barley are not grown on adjacent fields, but wheat and sugar beet are.	3.70
- Cropping frequency in the rotation is 1:6 years.	3.00
2. Selection of Crop Varieties	3.44
- Regional varieties are grown.	3.90
- Growing of rare varieties is standard practice.	2.90
3. Fertilization	3.55
- Compost is applied, (partly) replacing fertilizer.	4.00
- Animal manure is applied in place of inorganic fertilizer.	2.90
4. Crop Protection	3.60
- Non-crop vegetation attracting natural enemies is established on the farm.	4.29
- Use of mechanical weed control is maximized.	3.00
5. Physical Soil Management	3.71
- The longevity of permanent grass land is maximized.	4.83
- In the fields, always the same wheel tracks are used.	3.33
6. Water Management	3.00
- Water drainage of farmland is in tune with surrounding nature reserves.	3.83
- The farm does not participate in a project for temporary water storage on farmland.	2.33
7. Management of Field Margins	3.39
- Field margins cover at least 5% of the farm land.	4.67
- Field margins are planted with green manure crops.	2.00
8. Management of (Semi) Natural Habitat	4.03
- Natural waterways, such as a brook, are maintained.	4.83
- Species-specific management is implemented for at least two mammal species.	3.33
9. Management of Traditional Agrarian Cultural Elements	3.52
- A traditional farm orchard (with widely spaced, tall fruit trees) is maintained.	3.80
- When harvesting hay-producing crops, hay is stored in a traditional haystack.	2.60
10. Management of Farm-Environment Linkages	3.68
- The farm is a member of an agri-environmental association with an approved, regionally coordinated management plan.	4.29
- The farm participates in a research project on (functional) biodiversity.	3.14

3.3 Assessment of five eco-labels with the yardstick

Selection of eco-labels

All major institutionalized Dutch third-party product eco-labels for arable farming were included in the study. International, European, national, and regional labels were part of the selection. The national and regional eco-labels have comparable counterparts in other countries, which make them internationally relevant as well. All these eco-labels are, to a more or lesser extent, guided by the European Norms NEN-EN 45011 on product certification systems and the

ISO 65 Guide of the International Organization for Standardization (ISO, 1996). The following eco-labels were selected:

- *EKO.* Since 1992, as a result of the European Regulation on Organic Farming EEC no. 2092/91, The Netherlands have one single organic eco-label, EKO, which is owned by Skal, a private foundation (SKAL, 2005).
- *Demeter.* The Dutch biodynamic (BD) association, founded in 1937, is a member of Demeter International. This BD eco-label includes the standards of EU regulation no. 2092/91. It also sets conditions that go beyond the scope of this EU regulation (Vereniging voor Biologisch-dynamische Landbouw en Voeding, 2004).
- *Erkend Streekproduct, ESP* [Recognized Regional Product]. The foundation Streekeigen Producten Nederland (SPN) [Regional products of the Netherlands] has established several principles and framework standards emphasizing regional aspects and sustainable production (Stichting Streekeigen Producten Nederland, 2000). Regional organizations have elaborated the national standards in response to the regional situation.
- *EurepGAP* is the abbreviation for the Euro-Retailer Produce Working Group (Eurep) combined with the acronym for Good Agricultural Practices (GAP). It is an initiative of several European retailers founded in 1997, that has evolved into a global partnership between agricultural producers and their retail consumers for safe and sustainable agriculture (EurepGAP, 2004a-d).
- *Milieukeur* [Environmental Label]. Since 1995, SMK [formerly Stichting Milieukeur: Foundation environmental label] has owned and developed this eco-label (SMK, 2004 2005a-b). The labeling schemes are based on Life-Cycle Analysis, following the European Eco-label for non-food products. The International Organisation for Standardization has standardized Life-Cycle Analysis within the ISO 14040 series (ISO, 1997).

Assessment of eco-labels

The standards of eco-labels, as defined in box 3.1, were assessed in several ways. The number of standards per labeling scheme contributing to conservation and sustainable use of agrobiodiversity was determined by comparing and contrasting these standards to the management measures in AMY (level 5). By clustering the relevant standards per farming activity (AMY level 4), the width of coverage of the eco-label was determined. Furthermore, the average efficacy of the relevant standards of a labeling scheme per farming activity was determined, and lastly, the compulsory nature of these standards was examined.

The comparison of the labeling schemes with AMY yielded three types of standards relevant for agrobiodiversity:

- Type I: standards matching management measures in AMY (circa 50%).
- Type II: substantive standards that did not match any measures included in AMY level 5, but judged by us to have a positive impact on agrobiodiversity (circa 30%). Some of these standards are formulated in more general terms and match level 4 of AMY. The farmer is given a responsibility and choice how to interpret and adopt more sustainable measures for that particular farming activity. Some standards are related to management measures in AMY, but do not match closely. Others are formulated more indirectly: for example requirements to machinery for crop protection resulting in one of the level 5 management

measures. Finally, there is a small number of standards that were not mentioned by the literature or the experts (circa 6 %).

- Type III: registration standards (circa 20%). The registration standards are procedural and regulate the obligation to keep records of the activities on the farm. These standards are relevant because they create a possibility to check farmers' compliance with the substantive standards. The impact of these criteria is indirect; the direct impact on agrobiodiversity is caused by substantive standards aiming at physical measures.

Further analyses were only conducted with type I and II standards, type III standards were excluded due to their procedural character.

After identifying and counting the number of type I and II standards in each labeling scheme, the standards were clustered per farming activity and their mean efficacy was calculated. For type I standards the efficacy scores were used of the measures in AMY level 5 to which the standards were matched. For type II standards, however, such scores were lacking, as they could not be matched to any of the measures in AMY rated by the experts in the consensus workshop. Therefore, we attributed to Type II standards the mean efficacy score of the farming activity to which they belonged (table 3.1), minus 1 point. The reason for this downward correction was that type II standards had neither emerged from our literature study, nor were they mentioned spontaneously by the experts. Therefore they are expected to be less effective in promoting agrobiodiversity. The exact value of the correction factor (minus 1 point, on the five-point scale for efficacy) is arbitrarily chosen. The mean efficacy per farming activity was calculated for each eco-label as the arithmetic mean of the efficacy scores of all type I and II standards recorded in that category.

In addition to this, the nature of the standards of labeling schemes has been examined. Standards can be compulsory or optional, or they take the form of recommendations. Farmers are obliged to comply with compulsory standards. Typical of compulsory standards are the expressions "must", "is not allowed", "totally forbidden" or "any use of not allowed means leads to decertification". Optional standards manifest themselves in various ways. An example is a threshold criterion. This entails an obligation to comply with a certain number of standards. Examples of expressions that are used by optional standards are "ought to…or….", "minimal 1 measure of the following list" or "requirements must be formulated (content of these requirements are free applicable)". Recommendations demand voluntary compliance with standards. A farmer can choose to comply or not, but it has no consequences. Examples of expressions that are used for recommendations are "attention needs to be paid to", "is recommended" and "need to be aimed for". An overview of all expressions considered characteristic for the three categories can be found in De Neve (2006).

Results of the assessment

All of the examined labeling schemes contain standards that stimulate conservation and sustainable use of agrobiodiversity, but there are large differences between the eco-labels (figure 3.2). The number of type I and type II standards ranged from 6 (ESP) to 42 (Milieukeur).

When type III standards (on registration) are included, EurepGAP has the highest score with 63 standards (not shown in figure 3.2). This large number of registration standards is a consequence of EurepGAP's emphasis on traceability and transparency. The registration standards specify in detail what and how to register. All eco-labels contain standards in at least 6 of the 10 categories

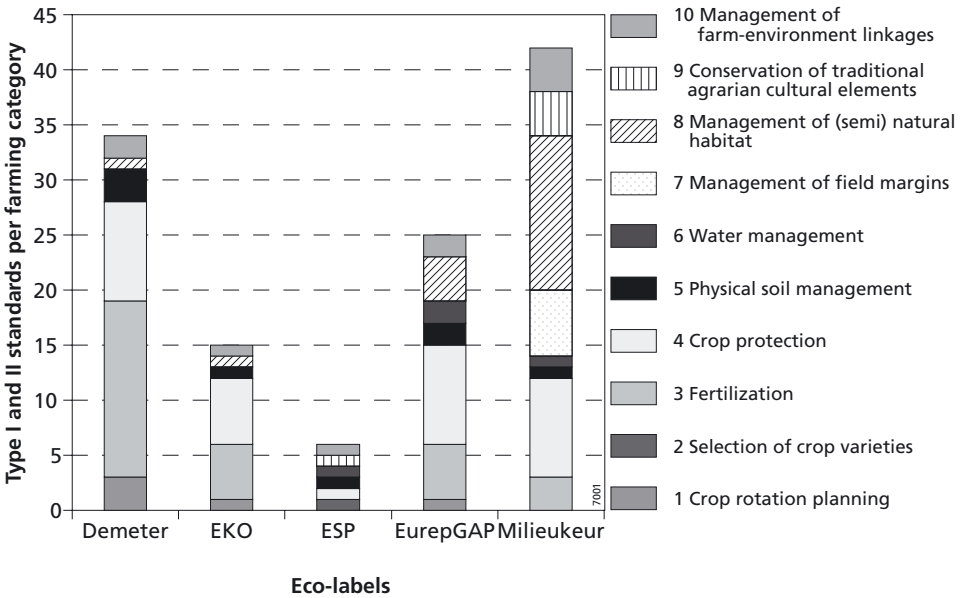

Figure 3.2 Number of standards per farming activity, per eco-label

of farming activities, but none of the eco-labels covers all these categories. Demeter, EKO and Erkend Streekproduct score on 6 categories of farming activities, EurepGAP on 7, while Milieukeur has 8 categories in the labeling scheme. When only type I standards are considered, EKO and Erkend Streekproduct score in 3 categories. The type I standards of EurepGAP are found in 4 categories, the Demeter type I standards in 5 categories and Milieukeur type I standards in 8 of the 10 categories of farming activities. Several eco-labels have only 1 or 2 standards per farming activity. All labeling schemes, except for the one of Erkend streekproduct, contain type I and type II standards in the categories of fertilization and crop protection. This means that all these labels have standards that limit the possible negative impact of crop protection and fertilization on biodiversity. Standards in the categories of soil management and management of farm-environment linkages were found in all labeling schemes. Yet within the four categories mentioned, the eco-labels usually differ in the number of standards and the management measures these standards represent. Standards in the categories of management of field margins and selection of crop varieties were only represented in the labeling schemes of Milieukeur and Erkend streekproduct, respectively.

The mean efficacy of the type I and II standards found in the labeling schemes varies substantially among the eco-labels in most categories of farming of activities (figure 3.3). The differences however between the eco-labels are not consistent. There is no eco-label that has the most effective standards for agrobiodiversity management in all categories of farming activities.

Compared to the means per farming activity (table 3.1), the means of the standards of eco-labels in that particular category are lower most of the time. This is not due to the lower means of type II standards, but for almost all eco-labels the means of type I standards per farming activity

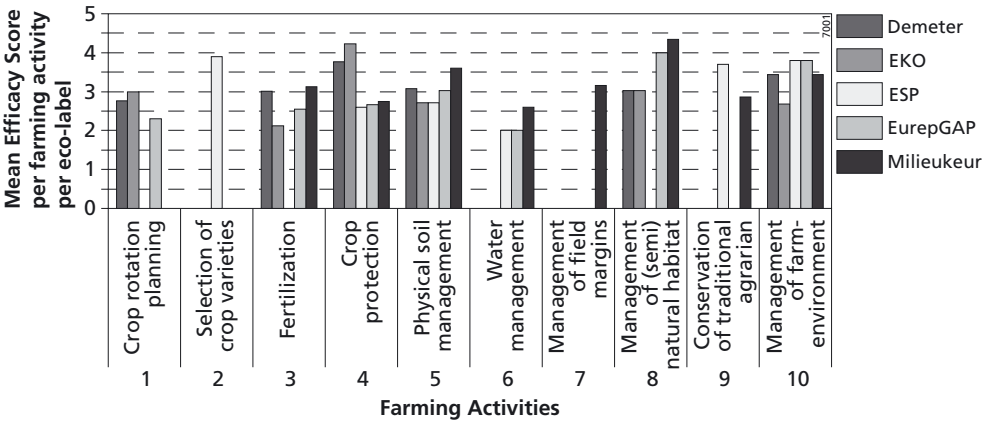

Figure 3.3 Efficacy of standards per farming activity, per eco-label. See table 3.1 for explanation on the numbered categories of farming activities. 1 – this measure is not effective at all. 2 – this measure is not very effective. 3 – this measure is effective. 4 – this measure is very effective. 5 – this measure is certainly effective as a means of agrobiodiversity management.

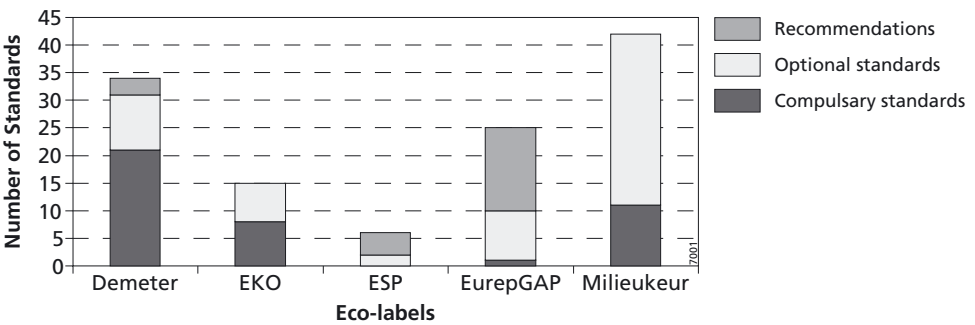

Figure 3.4 Nature of standards, per eco-label

are lower than the means of level 5 management measures for the same farming activity of AMY. This indicates that in general the labeling schemes of the eco-labels contain measures that were judged by the experts as relatively less effective for agrobiodiversity management compared to the other management measures in AMY. Exceptions are Erkend Streekproduct in category 2 and 9, Milieukeur and EurepGAP in category 8 and all eco-labels in category 10.

When the nature of the type I and II standards in the labeling schemes is considered, large differences between the eco-labels become apparent (figure 3.4). In EKO and Milieukeur all relevant standards are either compulsory or optional, whereas in EurepGAP most of the type I and II standards are only recommendations. Demeter is the eco-label with most compulsory standards (20), followed by Milieukeur (11). The biodynamic label Demeter includes all the compulsory and optional standards of the organic EKO-label, but the additional requirements result in a doubling of the number of standards that are agrobiodiversity-friendly.

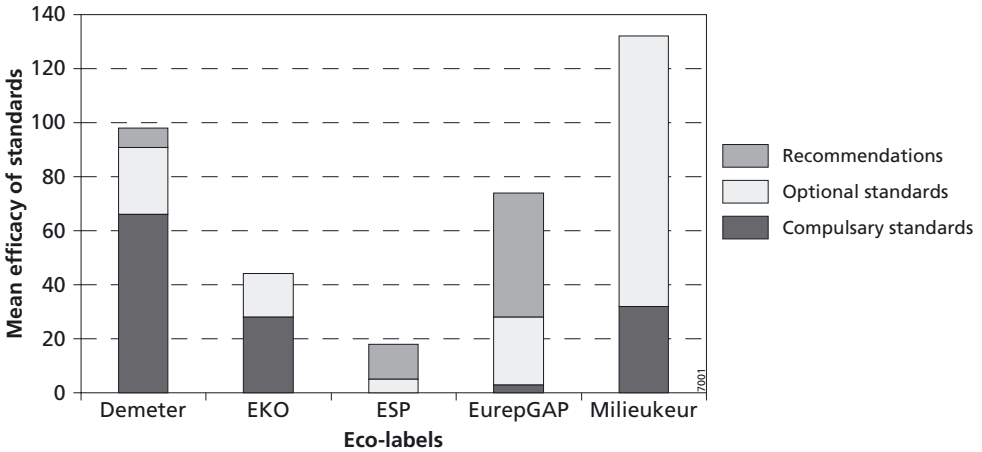

Figure 3.5 Number* mean efficacy of type I and II standards, per eco-labels. (Fig.3.2) multiplied by means efficacy (Fig. 3.3)

An integrated picture of the results is provided by figure 3.5, where the total number of type I and II standards per eco-label is "weighted" for efficacy, by multiplying the number of standards per farming activity (figure 3.2) with the corresponding calculated mean efficacy (figure 3.3). The maximum attainable value on the Y-axis would be 595 (175 * 3.4), which is highest recorded number of standards for an eco-label multiplied with the mean score for efficacy of all 175 measures. Given this maximum, it can be concluded that all five labels have a limited efficacy and can improve in absolute terms. Figure 3.5 shows that Demeter has the highest combined score of compulsory measures and efficacy for agrobiodiversity management, but that Milieukeur has the greatest potential for agrobiodiversity management due to the many optional standards with a high efficacy score.

3.4 Discussion and conclusions

Approach

The yardstick for agrobiodiversity management is designed as a ladder of abstraction with five different levels. It proved possible to descend on the ladder to the level of concreteness needed to assess the labeling schemes of eco-labels and still have a plausible relation with the top of the ladder. The ladder of abstraction made it possible to compare how and to what extent different eco-labels stimulate conservation and sustainable use in their labeling schemes for arable farming.

To construct the yardstick, ecological expert knowledge about agrobiodiversity was mobilized through a consensus workshop. This proved necessary, especially for the construction of the fifth, most concrete level of the yardstick, because from the scientific literature a consensus view cannot be derived. The knowledge about agrobiodiversity management is fragmentary and sometimes inconsistent, and the focus in the scientific literature is on novel or unique findings and disagreements, rather than on consensus and agreement. Also during the consensus

workshop, the discussions on the yardstick prior to assessment by voting showed a rather strong divergence, with a focus on disagreements. Interestingly, in the (parallel) assessment it turned out that the experts disagreed only on circa 10% of the measures that were discussed, while they agreed on circa 90%. The expert consensus workshop was thus an essential tool to provide us with a clear image of what Dutch scientific experts agree upon with regards to the relationships between farming practices and agrobiodiversity.

The order in which the yardstick has been developed could have been different. We first developed the yardstick, and then analyzed the eco-labels. As a consequence we had to distinguish the type II standards in eco-labels: the standards that possibly affect agrobiodiversity, but are not included in AMY. The effect of these standards on agrobiodiversity is less certain, because the experts did not judge their efficacy. It would be tempting to conclude that the order of the study should be reversed: first analyze the eco-labels and then have the experts judge them. That would however cause two problems. First, it is methodologically more correct to develop a yardstick and then measure with it, since the reverse approach would (unconsciously) influence the results. Another, even more urgent reason is that the yardstick would develop a bias to these five eco-labels, which is not desirable since we intend to apply AMY also to other types of regulation. Therefore we chose for a flexible and open mechanism on level 5 of AMY, creating the opportunity to add the other – type II – measures, even though it is more laborious.

Another issue is the objectivity of the assessment method. The decision as to whether a standard of an eco-label matches a management measure of AMY can sometimes be rather subjective. There is a tension between a broad or a narrow formulation of a management measure in AMY. The disadvantage of a broad formulation is that different interpretations are possible, whereas a narrow and accurate formulation may make it difficult to match the standards of eco-labels with the management measures of the yardstick. The formulation of the standards differs among the eco-labels and differs from the formulation in the yardstick. Some standards are formulated in a way that they match several management measures of AMY. A choice has to be made to which management measure the standard is matched. As mentioned above, we have chosen a rigid interpretation and have designed the category of type II standards for the standards that did not meet the management measures fully. The choice for an open level 5 of AMY is connected with this more rigid interpretation of the (type I) standards.

Despite these methodological issues, the yardstick for agrobiodiversity management proved to be useful for the purpose for which it was developed. In absolute as well as comparative terms we could assess with AMY how and to what extent labeling schemes of five current eco-labels stimulate conservation and sustainable use of agrobiodiversity. AMY may be utilized for assessment of eco-labels of other agricultural sectors and other regions as well, although not as a ready-made yardstick. Useful elements are the ladder of abstraction and the consensus workshop to substantiate the yardstick with expert knowledge. Furthermore, the large amount of management measures at level 5 will provide a useful starting point, but of course adaptation is required according to the specific nature of the agricultural sector, such as horticulture and cattle breeding, or to the agronomic, geographical and climatological conditions of a particular region or country. In addition to eco-labels, AMY may be applied for the assessment of other types of (self-) regulation for conservation and sustainable use of agrobiodiversity. In such an assessment, AMY could be used for evaluation of governance mechanisms like private regulation and policy instruments.

Results

The extent to which the five eco-labels stimulate agrobiodiversity management is in general limited and differs substantially among the labels. EKO and Demeter distinguish themselves by addressing the core activities of the farmer. They focus in particular on fertilization and crop protection – two farming activities that are often considered to have a negative impact on agrobiodiversity. Milieukeur can be characterized as the eco-label that emphasizes conservation of biodiversity on the non-productive areas of the farm (field margins, (semi) natural habitat and traditional farm elements), whereas Erkend streekproduct emphasizes the regional aspects (regional crops and varieties) of agrobiodiversity. For EurepGAP both the fertilization and crop protection are relevant categories, but also the conservation of (semi)natural habitat. None of the eco-labels included in our study refers explicitly to agrobiodiversity in their goals. In two cases, Erkend streekproduct and EurepGAP, the word (agro) biodiversity was mentioned in the labeling schemes, but despite of this these two rank lowest among the five labels in terms of number of compulsory or optional standards relevant to agrobiodiversity.

Compared to the four other eco-labels, Erkend streekproduct stimulates least the conservation and sustainable use of agrobiodiversity. The number of relevant standards in its labeling scheme is considerably lower than in the schemes of the other eco-labels, and although the standards are unique, none of these are compulsory. This can be explained by the function of Erkend streekproduct, which is intended as a framework for smaller regional labels, which set their own specific standards.

Of the remaining four eco-labels EurepGAP is the weakest, because most standards are optional or recommendations. Milieukeur and Demeter appear to stimulate agrobiodiversity management most. The labeling scheme of Milieukeur contained the highest number of standards relevant to agrobiodiversity (42), with the best coverage of farming activities (8 categories). The broad coverage of farming activities by Milieukeur can be explained by its basis in Life Cycle Analysis, which aims to include the environmental aspects of the complete production chain. The relative weakness of Milieukeur is that about 75% of these measures are optional. Demeter is the eco-label with the highest number of compulsory biodiversity-friendly measures (20).

The ranking of the eco-labels is a relative measure. In absolute terms, none of the five eco-labels had a high score. The scores varied from 6 to 42 standards per eco-label, out of the circa 175 on-farm measures in AMY (type II standards included). In all cases the score included optional standards and recommendations, which makes compliance of farmers with all of these standards less likely. An interesting outcome of this study is that all ten categories of farming activities are covered when the results of the five eco-labels are combined. This means that eco-labels could learn from each other and improve by exchanging knowledge and experiences with standards relevant to agrobiodiversity.

Conclusions

Are eco-labels an appropriate instrument for conservation and sustainable use of agrobiodiversity? AMY shows that it is possible to translate the abstract, comprehensive concept agrobiodiversity management into concrete on-farm measures. These management measures, sometimes formulated at the higher level of abstraction of the farming activities, are found in eco-labels. This makes eco-labels in theory an appropriate instrument for conservation and sustainable use of agrobiodiversity. In practice however, management measures for agrobiodiversity are as yet not very well represented in the labeling schemes of eco-labels. Even the highest-ranking eco-

labels do not have a substantial number of compulsory standards in all categories of farming activities: Demeter has a relatively narrow focus on fertilization and crop protection, whereas the standards of Milieukeur are optional in many cases. Compliance to these eco-labels does therefore not guarantee the agrobiodiversity-friendliness of all relevant farming activities. This is a major drawback, as all these aspects of farm management are interacting factors in sustaining agrobiodiversity, and their joint effect is likely to be as strong as the weakest link.

Can we expect an "improvement" of eco-labels as an instrument for conservation and sustainable use of agrobiodiversity? We do not expect substantial improvements in the near future because agrobiodiversity is not a prominent theme in societal debate and government policy (Van Amstel et al., 2005). Especially for those eco-labels who now have improved compliance with the standards as a major priority, main changes of the labeling schemes cannot be expected soon. In case of changes, however, AMY could function as a source of inspiration. Another option is the establishment of a new eco-label with a special focus on conservation and sustainable use of agrobiodiversity, but given the multitude of eco-labels already on the market, we do not expect a broad societal basis for such a label.

In addition to the Netherlands, the findings of our study are also relevant to other countries. The standards of Demeter and EurepGAP are applied worldwide, whereas EKO is based on EU regulation for organic farming. Milieukeur and Erkend Streekproduct are part of international labeling families based on Life-Cycle Analysis (ISO 14040, 1997) and protection of regional products. The outcomes of our assessment for the Netherlands are thus probably a good indication of the potential of eco-labels for self-regulation of conservation and sustainable use of agrobiodiversity elsewhere.

4 Process evaluation of eco-labels

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4.1 Introduction

Chapter 3 contains the evaluation of conceptualization of agrobiodiversity in the labeling schemes of eco-labels. This chapter continues the evaluation of eco-labels, except that now the focus is on the process evaluation. A challenge in process evaluation is the existence of information asymmetry between the seller/producer and the buyer/consumer.

The consumer cannot be sure which environmental problems are addressed by the product or how environmentally friendly the production method is (Loureiro and McCluskey, 2000). There is information asymmetry between the seller and the buyer: the buyer is unable to identify the environmental friendliness of the production method by the look, taste, or smell of the product. A producer who sells a product can assure consumers of an environmentally friendly production method by providing information about these "credence goods" (Nadaï, 1999). But can a buyer trust a seller's word? Credence goods allow a producer to engage in opportunistic behavior, especially when the buyer is willing to pay a higher price (Karl and Orwat, 2000). How can a buyer protect himself from a company that is "green-washing" (Kirchhoff, 2000) – that is, selling a product that seems to be more environmentally friendly than it really is? Eco-labeling is a means to narrow the information gap: independent third parties assure the consumer that the producer has complied with published, transparent, environmentally friendly standards.

Eco-labels are self-regulatory information instruments. Since the 1980s, self-regulation has been increasingly adopted as an alternative to governmental command-and-control regimes. A considerable amount of research has been done on the effectiveness of self-regulatory instruments, and this paper should be read in the context of that debate. Several advantages of self-regulation are mentioned here. These include flexibility and sensitivity to the market, responsiveness, the producer's willingness to comply, standards anticipating the most recent technology, and efficiency (Gunningham and Grabosky, 1998; Kagan et al., 2003; Karl and Orwat, 2000; Parker, 2002; Rubik and Frankl, 2005; Van Schooten-van der Meer, 1997) On the other hand, the literature also highlights some disadvantages. For instance, self-regulation is said to be deceptive; it serves corporate interests instead of the public good. Furthermore, it is an inadequate means to tackle complex environmental problems. In most cases, the standards are neither binding nor transparent, while both enforcement and punishment are ineffective. In addition to this the abundant amounts of environmental friendly labels, logo's and brand are perceived by consumers as confusing (Galarraga Gallastegui, 2002; Gunningham and Grabosky, 1998; Meeuwsen and Deneux, 2002; Nilsson et al., 2004; Shamir, 2004; De Waart and Spruyt,

2001). All these pros and cons revolve around the issue of assurance: the reliability of voluntary agreements.

The aim of this paper is to evaluate the assurance problem of eco-labeling schemes. It examines the extent to which eco-labels narrow the information gap between sellers and buyers with regard to the environmental friendliness of a product. Five Dutch agro-food labels have been selected for an analysis of their content. They were examined in terms of their information on biodiversity and the assurances they offer buyers with respect to their trustworthiness. With trustworthiness or reliability of an eco-label we mean that the standards of an eco-label are clear, that producers comply with these standards during the production process and that there is an ecological impact on the environment. Consumers should be able to rely on producers information in their purchasing decision (Leire and Thidell, 2005; Van Erp and Verberk, 2003). The findings of this research have a broader significance than the Netherlands: three of the five selected eco-labels maintain standards on arable farming that have also been introduced in other countries.

Biodiversity is selected as the environmental theme this paper focuses on. About 81 % of the Dutch (compared to 80% of the 15 'old' EU-countries) is very or rather worried about biodiversity loss, besides 62% of the Dutch people worry about Genetic Modified Organisms in their food (Dekker and Van der Meer, 2005). Biodiversity in agricultural areas (called "agrobiodiversity") is a critical issue for agro-food eco-labeling schemes. We consider several environmental themes consumers worry about, such as too much fertilizer or crop protection agents on products, relevant for agrobiodiversity loss. Modern large-scale farming is often singled out as a major threat to biodiversity (Roschewitz et al., 2005; Schmitzerger et al., 2005; Wood and Lenné, 1999 and Young et al., 2005). Therefore, the potential benefit of trustworthy eco-labels is great. This type of self-regulation by the food-supply industry may improve the negative reputation of farmers by giving them a more environmentally friendly reputation and thereby generating more trust in their products.

4.2 Framework of analysis

The research question is: do eco-labels who address biodiversity issues, sufficiently diminish the information gap between seller and buyer to be a trustworthy self-regulative instrument? This research question breaks down into four sub questions. Coglianese and Lazer (2003) distinguish three stages of an organization process of regulation: the planning stage, the implementation stage and the output stage. The four sub questions deal with these stages. The first one with the planning stage. The second one pertains to both the planning and implementation stages, while the third question focuses on the implementation stage. Finally, the fourth one concerns the output stage. The four sub questions are formulated as follows:

1. Which agrobiodiversity friendly measures are included in eco-labels?
2. How and to what extent do eco-labels assure buyers to be a trustworthy instrument?
3. How and to what extent do eco-labels enforce farmers' compliance?
4. How and to what extent is the environmental impact of an eco-label measured and monitored?

To answer the first sub question, we need to know the extent to which labeling schemes of eco-labels specify measures to conserve agrobiodiversity and promote its sustainability. An eco-label usually has several labeling schemes. A labeling scheme is a document with the production standards for a group of products. In this research only the labeling schemes for arable farming are investigated.

In chapter 3 AMY is developed. The focus on arable farming reflects the context of governmental policy. Compared to policy on animal husbandry, the arable farming policy is relatively straightforward. Notably, it has fewer conflictual issues to address, animal diseases being the most intransigent of these. The index is based on the ecological literature and the governmental agrobiodiversity policy that aims to "stimulate" farmers to produce more agrobiodiversity-friendly (Boer et al., 2003a; Landschapsbeheer Nederland, 1998; LNV, 2004), but also on the expert opinion of fourteen scientists. These physical scientists shared, compared, and complemented their knowledge about agrobiodiversity in a Group Decision Room. First, they identified ten farming activities that they considered significant for agrobiodiversity management. In addition, the experts allocated about 175 management measures to these ten categories.

For the first sub question, a desk study was carried out. This entailed examining of public legislation and the arable farming labeling schemes represented by the selected eco-labels. The aim was to identify farming measures that had an impact on agrobiodiversity beyond public legislation (Vereniging voor biologisch-dynamische landbouw en voeding, 2004; EEC Regulation no. 2092/2091; EurepGAP, 2004a; SMK, 2004, 2005a & 2005b; Stichting streekeigen producten Nederland, 2000)

Besides looking into the measures stipulated by the standards underpinning the eco-labels, the study examines the character of these standards. Standards may be compulsory or optional, or they may take the form of recommendations. Producers are obliged to comply with compulsory standards. Optional standards manifest themselves in various ways. For example, they may take the form of a threshold criterion. This entails an obligation to comply with a certain number of standards. Another example is a buffer criterion couched in a credit point system. The positive points awarded to the producer for implementing the optional measures compensate for the negative points brought on by engaging in polluting activities. Recommendations entail voluntary compliance with standards. The producers can choose to comply with them or not. Non-compliance with the recommendations has no negative consequences for the producer. If the eco-label is not explicit about its binding nature, the wording of the standard is decisive. Phrases in standards like "attention needs to be paid to" are considered to constitute recommendations. Standards couched in language such as "minimum standards are set for" and "must either … or" are perceived as being optional. The verbs "must", "is obliged", and "is forbidden" are indicative of compulsory standards.

The second sub question concerns the procedural guarantees of regulation. They give the weakest party in an asymmetric relationship a stronger position when faced with the use or abuse of power by the strongest party. A discipline that has provided insight into the rule of law is legal philosophy. Its practitioners often mention the principles of separation of powers, democracy, and legal equity as means to diminish asymmetry through regulation (Van Schooten-Van der Meer, 1997). Pursuing the research question how eco-labels assure buyers to be a trustworthy instrument, we consider whether these principles also apply to labeling schemes. We evaluate selected eco-labels to determine if and how the incorporation of these principles of rule of law

assures consumers that information asymmetry is diminished, which gives them the opportunity to judge whether the eco-label is trustworthy.

To answer the second and third sub question, we studied the same resources as those used for the first sub question, but this time we supplemented them with manuals, checklists, information leaflets, and the annual reports of the eco-label organizations (Vereniging voor biologisch-dynamische landbouw en voeding 2004, 2005a-b; LNV, 1996; EurepGAP, 2004a-d; Groene Hoed, 2005; Demeter International, 2004; SKAL 2002 & 2005; SMK, 2004, 2005a-b; Stichting streekeigen producten Nederland, 2000). The findings from desk research were supplemented by information derived from 17 in-depth interviews.

The interviews were held with representatives of different types of organizations involved in eco-labeling, such as farmers, processors, retailers, labeling organizations, certification bodies, standardization bodies, and appeal bodies. For each type of organization, we used a specific list of topics, depending on the organization's role in the certification process. Most of the interviewees were familiar with more than one of the selected eco-labels. They were asked to compare the different labels on specific topics. The research results were later presented to the interviewees for their comments.

The third sub question addresses farmers' compliance. We used the methodology developed by Ruimschotel to analyze the incorporation of institutional guarantees in eco-labels (http://t11.net/T11.htm, retrieved October 10, 2005; Van Erp and Verberk 2003). Ruimschotel identifies eleven potential areas at risk of non-compliance with regulations. The "rules of the game" – such as communication, control, sanctions, knowledge management and chain steering – constitute the institutional guarantees. These are included in a labeling scheme to enforce the farmers' compliance. The labeling schemes of the eco-labels are examined to discover which institutional guarantees are designed to assure compliance for each area at risk of non-compliance.

The fourth sub question addresses the ecological impact of a labeling scheme on the farmland. The reason that an eco-label has environmental friendly standard beyond government regulation is to matter more for the environment. With the fourth research question we investigate how a better environmental quality is monitored and how labeling organizations measure this. To answer the fourth sub question, we consulted the annual reports of the eco-label organizations and drew upon the interviews as well (SKAL, 2005; SMK 2005b, Vereniging voor biologisch-dynamische landbouw en voeding 2005a-b). We also studied the methodology used for monitoring and measuring by the eco-label organizations (CLM, 2004).

4.3 Agrobiodiversity performance standards in eco-labels compared to regulation

Chapter 3 presents the results of measurements of the eco-labels with AMY. To remind, the eco-label with the most agrobiodiversity-friendly standards is Milieukeur (24 % of AMY), followed by Demeter (19.4 %). The eco-label with the greatest number of compulsory standards is Demeter (12 %), followed by milieukeur (6.3 %). The eco-labels that explicitly mention biodiversity as an environmental topic – namely, Erkend streekproduct and EurepGAP – mainly employ recommendations or optional standards in this regard. For both Erkend streekproduct and EurepGAP, the standards that explicitly mention the word biodiversity are formulated as recommendations.

Box 4.1 Main agrobiodiversity priorities of legislation corresponding with the 10 categories farming activities of AMY

1. *Crop rotation planning*: No legislation prescribing the farmer a crop rotation scheme.
2. *Selection of varieti*es: Varieties are protected by Plant Breeder Rights (exception farmer's privilege for potatoes and grains). A commission publishes an annual recommending field crop list (Zaaizaad en Plantgoedwet, 1967; UPOV, 1991)
3. *Fertilization*: Fertilization regulation is organized as a chemical balance sheet, farmers are charged if they exceed P_2O_5 and N standards. Quality standards organic fertilizers (Meststoffenwet, 1986)
4. *Crop protection:* A list with crop protection agents which are allowed in the Netherlands based on a judgment of a commission implementing several European Directives (Bestrijdingsmiddelenwet 1962; Coucil Directive 91/41/EEC, 1991; Commission Directive 98/82/EC, 1998; Directive 2000/60/EC of the European Parliament and the Council, 2000)
5. *Soil management*: A general precautionary principle that everyone who pollutes or damages the soil is obliged to prevent soil pollution or restore through soil sanitation (Wet Bodembescherming, 1994; Wet Milieubeheer 1979)
6. *Water management*: reduction of pollution of inland surface water by input of fertilizer and crop protection agents (Wet verontreiniging oppervlaktewateren, 1969; Directive 2000/60/EC of the European Parliament and the Council, 2000).
7. *Management of field margins:* Buffer zones required along surface water
8. *Management of semi-natural habitat*: a subsidy available for agri-environmental schemes. Prohibition hunting, with the possibility for exception of damage of agricultural crops.(Flora en Faunawet, 1998; Subsidie Agrarisch Natuurbeheer, 1999).
9. *Management of traditional agrarian cultural elements*: a subsidy available for agri-environmental schemes (Subsidie Agrarisch Natuurbeheer, 1999).
10. *Management of farm-environmental linkages*: a subsidy available for agri-environmental schemes. Farm management plans in "special areas of conservation", as an implementation of the Bird and Habitat Directives (Natuurbeschermingswet 1998; Subsidie Agrarisch Natuurbeheer, 1999; Council Directive 79/409/EEC, 1979; Council Directive 92/43/EEC, 1992)

In this section we try to access how these themes selected in eco-labels overlap with the agrobiodiversity-themes in Dutch government policy. The government legislation is arranged conform the 10 categories of AMY: 1) crop rotation planning; 2) selection of varieties; 3) fertilization; 4) crop protection; 5) soil management; 6) water management; 7) management of field margins; 8) management of semi-natural habitat; 9) conservation of traditional agrarian landscape elements; and 10) management of farm-environmental linkages. In the categories with farming activities AMY has 175 biodiversity-friendly management measures beyond the measures in the obligatory public legislation.

Dutch policy makers frequently emphasize that they aim to "stimulate" instead of "legislate" agrobiodiversity (LNV, 2004; VROM 2005). This government policy does not prescribe or give an

economic incentive, but intents to persuade the farmer to produce more biodiversity-friendly by means of communication and explanation. Basic assumption of this policy is the responsibility of the food supply chain to promote agrobiodiversity. These communicative policy documents offer an opportunity for eco-labels – as one of the self-regulative instruments of the food industry – to include agrobiodiversity-friendly measures beyond legislation. As mentioned earlier, these policy documents are resources for the 175 management measures beyond legislation in AMY. Despite the government emphasis on communication, we found a large body of Dutch laws – embedded in European law or international treaties – that affect the different aspects of agriculture and biodiversity, as shown in Box 4.1.

Box 4.1. shows the legislation that is obliged for conventional farming or the legislation that regulates subsidies which affect agrobiodiversity. Most of these legislations aim to prevent

Box 4.2 Priorities in eco-labels

EurepGAP
- Integrated Pest Management and minimal quantities crop protection agents (4)
- Conservation management plan for the farm or the region (8 & 10)

Demeter
- Obligation crop rotation (1)
- No fertilizers, min 60% manure of organic companies, obligation cover crops in crop rotation, limitation P_2O_5 and N, priority closed cycle (3)
- No chemical crop protection (4)
- Farmers' opportunity to add measures beyond the labeling scheme. These measures and the farmer who implements them are transparent for the consumer in a database on the Demeter website

EKO
- Obligation crop rotation (1)
- No fertilizers, limitation N (3)
- No chemical crop protection (4)

Milieukeur
- Limitation crop protection agents (4)
- Size and management of field margins (7)
- Management of semi-natural habitat and traditional agrarian cultural elements. Conservation management plan (8,9,10)

Erkend Streekproduct
- Region-specific production in combination with conservation regional varieties (2)
- Conservation management plan (10)

pollution of fertilizer and crop protection agents in water and soil. Box 4.2. shows which categories of AMY are the priorities of five labels for standards beyond legislation.

All five labeling schemes seek to comply with standards for fertilization, crop protection and management of the relation between the farm and its surroundings. In addition, milieukeur also regulates the management of the buffer zone, "semi"-nature, and traditional elements of the cultural landscape. Erkend streekproduct is the only label that takes the selection of regional varieties into account when setting its standards. Hereby Erkend streekproduct is the only label that aims to reverse the negative impact of the plant breeder rights in conventional agriculture. To obtain this right a variety needs to be new, distinct, uniform and stable. Especially, the uniformity-criterion is said to be threat for (genetic) diversity in agricultural systems (Kameri-Mbote and Cullet, 1999). EKO and Demeter place strong emphasis on the crop rotation plan, fertilization, and crop protection.

In conclusion, the government creates a possibility for labels to regulate this subject, but considering their score on AMY, labels only succeed partly in the implementation of these stimulating measures. And even when they are covered, labeling schemes only partly have compulsory measures to regulate this topic. Most eco-labels have a coverage of agrobiodiversity themes, which is also covered by legislation.

4.4 Rule of law to assure trustworthiness to buyers

This section considers the principles of rule of law provided by eco-labels. We examine whether – and if so, how – these guarantees diminish the information asymmetry and increase the level of trust between sellers and buyers. As mentioned above, the individual autonomy of a weak party in an asymmetric relationship can be enhanced by three principles enshrined in the rule of law: separation of powers, democracy, and legal equity.

With respect to an eco-label, the principle of the separation of powers helps diminish asymmetry by objectifying the information. A farmer has a monopoly on information about the environmental friendliness of his production methods. This information monopoly is unraveled: an independent third party decides on the production method (standardization) and another third party controls this (certification). The responsibility to carry out the standards lies with the farmer.

The principle of democracy can diminish information asymmetry by encouraging participation. The influence that producers, consumers, trade unions, environmental organizations, and other societal organizations exert on the process of setting standards provides these parties with more knowledge about the production methods. At the same time, it gives them a deeper understanding and a broader basis of support in society at large.

Application of the principle of legal equity can diminish information asymmetry by requiring verification. Legal equity means that all standards are applied to comparable producers in the same way. Transparency of standards and how they are enforced are necessary conditions for legal equity. In case these results are made public, the buyer can verify both the standards and the compliance of the producer with them. Another aspect of verification is traceability. To assure an environmentally friendly product, the actors and actions throughout the food supply chain need to be traceable.

Separation of powers

This principle distinguishes third-party labels from other forms of self-regulation. In general, the other forms do not differentiate the function of legislation (standardization) from that of execution (certification) by independent third bodies. The unraveling of the information monopoly of the producers by eco-labels is usually routed through two independent third parties: the standardization body (SB) and the certification body (CB). The standardization body has set the standards for environmentally friendly production. The certification body is responsible for enforcement of the standards and for assuring the compliance of producers (De Graaff, 1996). The task of performing a check – to make sure that the certification body is really independent – is relegated to the Accreditation Body (AB). In short, the AB controls and audits the certification body on procedural matters. The Accreditation body assures the sector of the independence, impartiality, confidentiality, and integrity of the certification bodies by using ISO Guideline 65 (1996) for product certification. This guideline is the basis on which European Norms NEN-EN 45011 were formulated. Figure 4.1 depicts these bodies, along with their competencies, as a "certification triangle". This diagram shows that the powers of the different bodies are designed to assure consumers that the producers' compliance with the standards is subject to independent control.

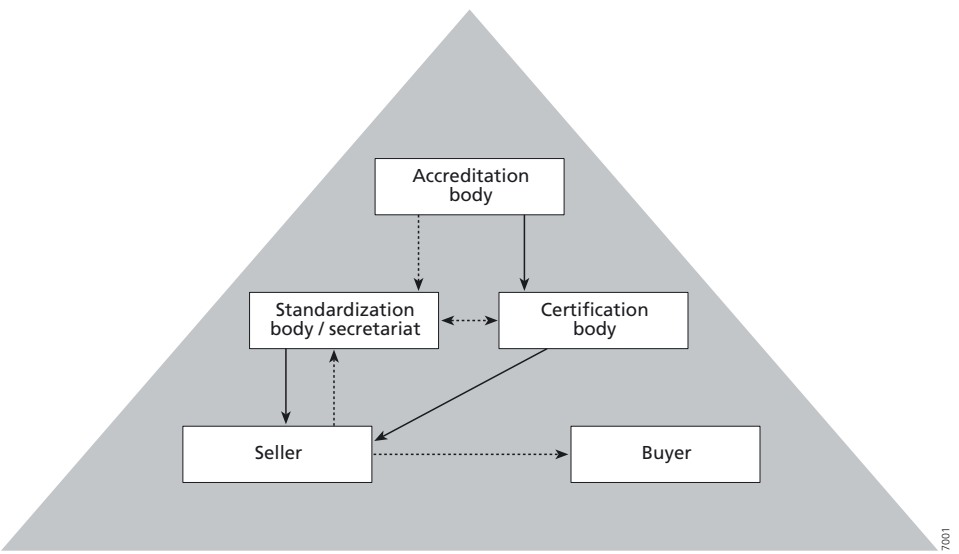

Figure 4.1 Certification triangle. Based on the certificaction pyramid of De Graaff (1998). Continuous arrows indicate a regulatory relation: a contract where the seller/producer (S) agrees to comply with the standards of the eco-label (as drawn between the SB and the S) or a contract about control of CB to S and AB to CB. The dotted arrows shows written communication, meetings or participation: the seller (S) communicates to the buyer (B) about the product with the eco-label or certificate. Sometimes a seller can be part of the SB or advise the SB. The SB and CB have to make appointments how to implement the standards. This dotted arrow shows lines of coordination between the SB and (several) CBs for setting the standards and making arrangements on how to inspect companies for compliance with them.

The separation of powers is the basis to provide assurances about the planning and implementation stages of eco-labels. An independent third party is in charge of standardization in the planning stage. And another independent third party checks whether the producers have complied with those standards in the implementation stage. If they pass, the certification body gives a declaration of conformity. This means that the producer has acted in conformity with the standards. There is no independent third party that measures and monitors the results in the output stage of an eco-label. Labels do not assure the customer that the product conforms to their standards; they merely assert that the production method is in compliance.

The organizational structure under which the labels Milieukeur, EKO, and EurepGAP operate is the same as shown in figure 4.1. For all labels there is one standardization body and secretariat for standardization. Some labels (EKO, Demeter) have one certification body, while others have several (EurepGAP and Milieukeur). Both Demeter and Erkend streekproduct have less separation of powers than shown in the certification triangle. Demeter has not been approved by the Dutch Accreditation Council (RvA), the only such body in the Netherlands. Although Demeter includes EN 45011 in its certification system, it is also subject to the internal accreditation system of Demeter International. Thus, members of a standardization or certification body in another country accredit the Dutch Demeter label. Erkend streekproduct also incorporates the EN 45011 standards, but there is no accreditation. Further, the functions of the standardization body and the certification body are combined to some extent. The regional organizations belonging to Erkend Streekproduct have their own inspectors. At the same time, these regional organizations can interpret the national Erkend streekproduct standards according to their own regional situation.

Democracy

Consumer confidence in the product may improve if the customers are involved in the standardization process. The producer's involvement in standardization can make the standards more accurate conform recent technological developments. But it can also make the producers more willing to internalize the standards in their production methods. These advantages do not necessary materialize, however (Parker, 2002; Van Erp and Verberk, 2003).

Participation in the standardization process of an eco-label can be direct or indirect. One means of direct participation is through attendance at public hearings; another is through a procedure to suggest changes in the labeling scheme. Participation in eco-labels is indirect when representatives of branches of industry or NGOs are included in the standardization body or advisory body.

Milieukeur and Demeter are the only two labels with direct participation, which is also open for consumers. Milieukeur organizes hearings to discuss a proposed labeling scheme before it becomes operational. The remarks made at the hearings are not always taken up in the labeling scheme, but any refusal to incorporate them is accompanied by an explanation of the reasons. Milieukeur also allows independent members – that is, members not attached to any organization but involved in the labeling process – to join the standardization body. Demeter has another procedure for improving the labeling schemes. Anyone can put a request for making changes and improvements in the labeling scheme on the agenda. The suggestions are not always adopted, but any refusal to do so is motivated.

All five labels use indirect participation in their decision-making on standards. None of the five labels choose their representatives by voting. In the standardization bodies and advisory

bodies of EurepGAP and Milieukeur, each of these organizations is represented by a delegate. In this way, society at large is more strongly represented in Milieukeur than in EurepGAP. Concretely, Milieukeur includes government authorities and organizations of employers, consumers, environmental groups, and branches of industry. Milieukeur has a balanced composition in the standardization body; this balance is required by the statutes of SMK. For EurepGAP, participation is limited to branch organizations. The final decisions on labeling for Demeter are made by the Dutch biodynamic (BD) organization, in which membership is open to the public at large. Erkend streekproduct operates with indirect participation of the regional organizations: they also represent the regional producers and their interests. Erkend streekproduct's regional organizations are part of the advisory body. The organizations do not exert a direct influence on the Erkend streekproduct criteria, although the regional organization can include suggestion of farmers in the labeling schemes of the regional eco-labels.

EKO has the most complicated participation procedure, and its standards match up to those set in the EU regulation. Farmers can introduce changes in the labeling scheme through national consultations. The representative of the Dutch government can then decide to propose these changes to the European Union authorities in Brussels. Furthermore, they can engage in lobbying to convince the interest groups of the need for change. These groups are also consulted on proposals to change the EU regulation. Nevertheless, changing the EU regulation is less feasible than changing a completely private labeling scheme. The interviewees estimate that it would take two or three years to change the regulations, even if all went smoothly. However, the big labels are also less flexible than small ones because there are more stakeholders involved. The interviewees from EurepGAP also considered the decision-making process for change of standards to be difficult.

Legal equity

With respect to legal equity, both the standards and the information about producers' compliance should be accessible, transparent, and understandable. Transparency allows for an assessment of whether standards are equally applied. Legal equity also means legal security. In the long run, the producers will be inclined to organize their company in conformity with the eco-labeling because they are sure the standards will not suddenly change (Van Schooten-van der Meer, 1997) Another aspect of legal equity is traceability. Traceability of behavior of links in the production chain, is one of the main reasons that eco-labels emphasize transparency.

The labeling organizations communicate with other parties about standards but not about implementation. They do not make information about producers' compliance public. In the labeling schemes the procedures about the frequence of audits and the sanctions for non-compliance are found. A written annual overview that informs buyers about the actual implementation of these procedures – in terms of the annual amount of audits, re-audits, sanctions and priorities in auditing – is however not available for 4 of the 5 labels. The declaration of conformity that an accredited certification body gives to a company is considered sufficient for two labels. On that basis, buyers are assumed to have assurance that the standards are being met. The exception to the rule is the eco-label EKO, which does provide information to the public. Their annual report elaborates on the degree of compliance of producers as expressed in executed controls, enforced sanctions, legal procedures, and policy priorities. When interviewees from other labeling organizations were asked about their communication policy, some said they did not keep records on compliance (1 accredited and 1 non-accredited label), while others said that

the publication or sharing of such information would amount to an invasion of the producers' privacy (1 accredited label) or that the audits were just recently started and the phase of re-audits and sanctions had not yet come (1 non-accredited label). These responses are strange, to say the least, since the main purpose of eco-labels is to assure the buyer of the producers' compliance. A declaration of conformity becomes more convincing when the certification bodies give information about how thoroughly and frequently they control the activities of the producers.

Demeter – and, in the future, perhaps Erkend streekproduct too – interpret transparency of compliance in a different way. The Demeter website offers insight into the activities of an individual farmer that go beyond the Demeter labeling scheme. Some of these activities are important for biodiversity: e.g., the management of buffer zones, treatment of elements of the cultural landscape, and the use of traditional varieties. The critical consumer can actually visit this farmer and check whether he really lives up to his profile.

There is one case that is incompatible with the legal equity principle, which 80% of the involved interviewees told us. According to one of the standards of EurepGAP, national regulation is included in the labeling scheme. However, there are differences among EU countries. This means that farmers who produce the same product are subject to different regimes. The Netherlands' crop protection regulation is one of the most stringent in Europe. As a result, it is illegal to certify Dutch strawberries using a particular pesticide as crop protection. Yet

Table 4.1 Rule of law in eco-labels

	EUREPGAP	DEMETER	EKO	MK	ESP
Separation of powers	In conformity with certification triangle	No independent accreditation	In conformity with certification triangle	In conformity with certification triangle	- No independent accreditation - Overlap between functions CB and SB for regional organizations
Democracy	- Indirect participation for producers - Transparency of standards	- Direct participation for everyone - Indirect participation for everyone - Transparency of standards	- Indirect participation for Dutch government - Consultation interest groups to change EU law - Transparency of standards	- Direct participation for everyone - Indirect participation for producers and NGOs according to rules for composition - Transparency of standards	- Indirect representation by the regional organizations - Transparency of standards
Legal equity	- Declaration of conformity - Traceability	- Declaration of conformity - Traceability - Individual transparency of company performance beyond labeling scheme	- Declaration of conformity - traceability - Transparency compliance of companies	- Declaration of conformity - Traceability	- Declaration of conformity - Traceability - Intention for transparency individual company

it is legal to certify Belgian strawberries that are cultivated under the same conditions, since the Belgian regulation does not prohibit this kind of crop protection.

Except for ESP, all eco-labels demand traceability of resources throughout the food supply chain. For EurepGAP traceability is one of the major items.

Comparison of the five eco-labels

All five eco-labels make use of the principles of the rule of law to diminish information asymmetry. They nevertheless differ in how they go about this. Table 4.1 gives an indication of the variety of ways. The eco-labels EurepGAP, Milieukeur, and EKO put more emphasis on objectification by independent bodies, while the EKO, Demeter (and later perhaps Erkend streekproduct) labels accentuate verification. Of the three principles, the one that is least substantially elaborated in these eco-labels is legal equity. The core assurance of eco-labels is the declaration that producers' behavior conforms to the standards. Yet the labeling organizations do not give information about the producers' compliance, the frequency of controls, the type of non-compliance, the standards that are less often complied with, the amount and nature of the sanctions, or the policy of the certification bodies.

4.5 Farmers' compliance with the labeling schemes

This section examines the institutional guarantees of farmers' compliance with the standards of a certification scheme of the eco-label. They are evaluated on the basis of the "Table of Eleven" (T11) methodology developed by Ruimschotel, The Dutch Ministry of Justice and the Erasmus University Rotterdam. Because the enforcement of producer compliance is not very transparent, the actual implementation of the institutional guarantees by auditors cannot be studied, other than based on information from the interviewees.

The information from the interviewees induces us to question farmers' compliance with the labeling schemes. Interviewees told us several anecdotes of non-compliance. An example is a thorough clean-up of the farm the day before an announced audit in combination with the borrowing of "missing" gears from neighbors to pass the audit. Others mentioned the use of illegal crop protection agents bought in Belgium or Germany or the use of prohibited fertilizer without recording in the registration. Even a food processor told us to know which farmers did not comply with a label, although it was not a problem for that processor because the farmers passed the audits. Having a label is considered more important than complying with the labeling scheme. The interviewees from certification organizations validated this impression by mentioning that they have a top priority for enforcement and emphasizing the improvements to enforce which were made during the last years. Nevertheless, about 80% of the interviewees from the labeling organizations and certification organizations confirmed that if the farmers really wanted to cheat, they could find a way to do it.

Ruimschotel identifies eleven areas of potential risk of non-compliance with the regulations. These areas are listed in table 2.2. The T11 method was originally designed to evaluate compliance with government regulations, but it is also pertinent to eco-labels (Van Erp and Verberk, 2003). T11 distinguishes three types of compliance behavior: spontaneous compliance, compliance through control, and compliance through sanctions.

Table 4.2 Institutional guarantees for compliance per eco-label

	Institutional guarantees created by eco-label	Demeter	EKO	ESP	Eurep-GAP	MK
	Spontaneous compliance					
1	Formulation of standards interpretable in one way	+	+	-	+	+
1	Providing and publication of standards	+	+	+	+	+
1	Providing and publication of explanation and additional information in newsletters, magazines, and annual reports	+	+	+	+	+
1	Explanation of standards by secretariat or CB in case of ambiguity	+	+/-	+	+/-	+
2	Appointment for a better price for eco-labeled product	+	+	+	-	-
2	Obligation of retail to suppliers to use the eco-label	-	-	-	+	-
2	Offering transparency to individual farm level	+	-	-	-	-
2	Covenants for market development of eco-labeled farming	-	+	-	-	-
2	Commercials for market development of eco-labeled farming	-	+	-	-	-
2	Open days for public on farms to become familiar with production method	+	+	+	-	-
3	Eco-labels are not required but farmers can select the eco-labels with standards they perceive as reasonable	+	+	+	+	+
3	Participation of farmers in standardization process	+	+/-	+/-	+	+
3	Required transitional period to conform with the labeling scheme	+	+	-	-	-
3	Required agricultural courses during the transitional period	+	-	-	-	-
4	License agreement that regulates registration obligation, self-inspection, report duty, and acceptance of auditors on the farm	+	+	+	+	+
	Control					
6	Exercise report duty (t4), possibly extra control for a group of farmers that join the eco-label together	+	+	+	+	+
7	Prohibition of simultaneous organic and conventional (EKO) farming or organic and biodynamic (Demeter) farming	+	+	-	-	-
7	Published prescribed checklist of control points	+	+	-	+	-
7	Annual announced inspection of the registration of farm activities	+	+	+	+	+
7	A report duty of the farmer to register/report changes on the farm	+	+	+	+	+
7	Annual announced inspection of the farm	+	+	+	+	+
7	Annual announced inspection of the traceability of resources and auxiliary material	+	+	-	+	+
7	Taking samples and testing them in a laboratory	+	+	-	+	+
7	Unannounced inspections	+	+	+/-	+	+
8	Continuity of inspections	+	+	+/-	+	+
8	Well-trained auditors, clear rules and interpretation documents, rotation of auditors	+	+	+/-	+/-	+

(Table 4.2 continued)

9	Selection for extra inspections after observed non-compliance	+	+	+/-	+	+
	Sanctions					
10	Consideration whether breach of rule is an offense of underlying principle	+	-	-	-	-
11	Instructions	-	-	+	-	-
11	Written warning	+	+	-	+	-
11	Fine	+	+	-	-	+
11	Remove label product/take back products	+	+	+	+	+
11	(Partial) suspension	+	+	-	+	+
11	Partial cancellation	+	+	+	+	+
11	Report non-compliance as criminal offense to government	-	+	-	-	-
11	Publication of sanctions	+	+	-	-	-

Compliance is said to be spontaneous when the farmer knows the standards, perceives them as being reasonable, and sees some advantages (including financial ones) in complying with them. A farmer is susceptible to compliance as a consequence of control when he calculates the risk of being reported, audited, detected, and selected for extra monitoring. Compliance through sanctions comes into play when a farmer calculates his chance of incurring sanctions and places a specific value on the harm that a sanction may cause.

For each proposition of T11, the institutional guarantees per eco-label are presented in table 4.2. The number of the proposition is shown in the left column, which corresponds with the left column in table 2.2. For most propositions, several institutional guarantees are mentioned. If an eco-label creates an institutional guarantee, it is marked with a plus sign (+); if it does not, a minus sign (-) is shown. Table 4.2. illustrates the ambivalent situation (of +/-) for an eco-label. This occurs when different resources contrast with each other. It also occurs when the institutional guarantee is created indirectly.

Spontaneous compliance

T11 identifies five areas of risk of spontaneous non-compliance (t1-5). Interviewees perceive the second proposition as the most problematic risk of non-compliance, while the fifth proposition seems to have little relevance to them. Table 4.2 shows 15 institutional guarantees to prevent spontaneous non-compliance.

The interviewed farmers and processors mentioned that environmentally friendly production is often more expensive than conventional production, but it also takes more time and trouble. In addition, it entails extra costs for the certification procedure. Relatively few institutional guarantees have been instituted in response to this risk by voluntary eco-labels. This relates to the function of an eco-label. In the marketplace, eco-labels provide buyers with the information the need to make their purchase decision. The idea is that the market puts a value on the qualities of an eco-label. This creates advantages (financial and otherwise) for the producer. A weak point of the eco-label scheme is that, when the buyers do not recognize or value its qualities, producers will have less incentive to comply with the standards (Van Erp and Verberk, 2003). There is a

difference between the voluntary eco-labels and EKO, though: EKO engages in several activities to influence the market for its products (Platform Biologica, 2004 & 2005).

The risks of unawareness (1) and unreasonableness (4) of standards are obviated by transparency and communication about the labeling scheme. The farmers who participate by choice can choose to join an eco-label. Several farmers experienced this freedom as an advantage and reason for spontaneous compliance. The exception is the label EurepGAP. Even the most environmental friendly farmers we interviewed disagreed with the obligation of the Dutch retailers to farmers to supply only EurepGAP certified products.

Compliance through control

T11 contains four propositions for the risk of control due to non-compliance. The institutional guarantees in eco-labels deal with all four of these risks. The five labels have many institutional guarantees in common to cover the dimensions of control.

Although almost all labels give high priority to the enforcement of labeling schemes, the interviews show a varied picture about auditors qualities, the frequency and arrangement of audits. Strengths of the auditor qualities are that they receive a theoretical, practical and label-specific training. In addition they have a general document with control points, the labeling schemes and sometimes an interpretation document as a reminder. For the accredited labels the accreditation organization also supervises auditor qualities. Two times a year there are auditor consultation and harmonization consultation between the different certification organizations. In the interviews nevertheless also some weaknesses appeared. First, it is possible to interpret the control documents in different ways as a consequence of the terminology which is used (e.g. a judgment of a "good" quality of water without quality standards/parameters about what is good, worse or bad quality). Second, the interviewed auditors were not sure about the content of the control documents and gave incompatible answers about the audit-guidelines in the control documents. One auditor for example mentioned that a digital picture is sufficient prove that a farmer complies with a label, while another auditor considered a digital picture insufficient prove of compliance. Another inconsistency is the inspection of the crop protection agents. None of the auditors knew whether they were authorized to inspect for crop protection agents on other places than the crop protection storage.

The dimension of control is directly related to the information gap between the producer and the buyer. Auditors can only do their job if the farmer is willing to keep his books in accordance with his farming activities. This means that there is also an information asymmetry between the farmer and the auditor. Once or twice a year, the auditor has the opportunity to verify the books by carrying out a company inspection and taking samples. The information asymmetry between the farmer and the auditor is nevertheless substantially less than the information asymmetry between the farmer and the consumer. The auditors nevertheless mention in the interviews that the audits are debatable. The samples are not analyzed for all possible chemicals and auditors only inspect the storage of crop protection agents. In addition the farmer has to tell and explain how he complied with the standards that are not applicable in that period of the year. In sum, growers' compliance with labels is ambigious. With the words of one of the interviewees "farmers interpret labels as creative as public regulation".

Nevertheless, the interviewed farmer and processor interviewees felt that EKO and Demeter were the most stringent in their audits. Next in the order of strictness were Milieukeur and EurepGAP, followed by Erkend streekproduct at some distance. Erkend streekproduct also

has fewer possibilities for control than the other labels. For Erkend streekproduct, some of the institutional guarantees are scored as +/- in table 4.2. This means that Erkend streekproduct can conduct unannounced and extra inspections; continuity of inspections is also possible. 66% of the interviewees working with Erkend streekproduct said that none of these options have been used on a large scale yet.

Compliance through sanctions

T11 identifies two areas of risk of non-compliance as a consequence of a sanction regime. There are several institutional guarantees in the form of sanctions. These vary from giving instructions to imposing fines or canceling participation. The sanction regime of the eco-labels is perceived as strict: after one offense, sanctions are easily imposed. Unlike other eco-labels, Demeter has always considered an infringement of the standard to be an offense of underlying biodynamic principles. The interviewees perceive some sanctions as harmful, others not. The labeling schemes do not standardize the penalties for particular offenses – nor, in fact, do the certification bodies.

Comparison of the five labels

For all five eco-labels, the institutional guarantees for spontaneous compliance are subordinate to the institutional guarantees for control and sanctions. Eco-labels focus more on the latter type. The institutional guarantees for control and sanctions are better organized and better attuned to one another than the guarantees to facilitate spontaneous compliance. In other words, an eco-label without provisions for control and sanctions cannot assure the consumer that a farmer has complied with the standards of a labeling scheme.

What are the consequences of this priority? As indicated in section 2, an eco-label has various instruments at its disposal: recommendations, optional standards, and compulsory standards. Recommendations cannot be enforced by inspections or by imposing sanctions. Aside from some degree of persuasion through publications of these recommendations, eco-labels cannot guarantee that the farmers will comply with the recommendations. Non-compliance has no negative consequences for the farmer. The exception is Demeter. Under this eco-label, farmers have the opportunity to demonstrate their compliance to a point even beyond that stipulated in the Demeter standards. They can do so because of Demeter's system of promoting transparency at the level of the individual farm.

The same argumentation applies to optional standards. Certification bodies provide a declaration that the farmers have complied with the required percentage of the optional measures. Nevertheless, the certification bodies cannot assure the consumer that the farmers have complied with the optional standards beyond the required percentage.

Do the eco-labels offer sufficient institutional guarantees for an auditor to enforce farmers' compliance? From our research, we can conclude that eco-labels theoretically offer an auditor sufficient institutional guarantees that the compulsory and (partly) optional standards are being implemented by the farmer. The extent to which the auditors actually use these guarantees has is not been systematically investigated. This is due to the lack of transparency of certification bodies about their audits.

4.6 Ecological impact

The ecological impact of an eco-label presumes a causal relationship between the standards in the eco-label and the ecological situation on the production land. To identify this causal relationship, information is needed about the content of the eco-label, about the farmer's compliance, and about the biodiversity on the farmland. Furthermore, external influences should be excluded to be certain that it is a causal relationship.

The identification of a causal relationship is difficult. Monitoring research is expensive and the scientific prove for causality within an agro-ecosystem is complex. Despite these difficulties, the results cannot be ignored because the claims of eco-labels – or their perception in society – often directly refer to results. Over and over again one speaks of "environmental-friendly" products and "sustainable products" instead of "environmental-friendly *produced* products" or "sustainably *produced* products". This communication shows a (consumers) expectation of results and therefore this criterion is measured.

None of the eco-labels has a large-scale monitoring system to measure the ecological impact of the standards. As mentioned above, auditors take samples on the farm. These samples are tested for crop protection substances or fertilizers. The tests vary from year to year. These samples cannot be considered as a large-scale system for monitoring biodiversity, though they could form part of such a system.

Milieukeur is the only eco-label that takes the environmental impact into account. It reports on this issue annually. The findings are used for further standardization (SMK, 2005a). It uses a method that compares the Milieukeur results for one or two crops with an expert opinion about conventional farming. The environmental index designed by CLM is used to measure the environmental impact of farming on water life in surface water, on terrestrial life, and on infiltration in groundwater. Since March 2005, the risk to useful organisms such as biological controllers and pollinators is also included in this environmental index. This is a positive development for agrobiodiversity. The environmental index may measure causality between the labeling scheme and data from the environment, but it does not communicate the findings. Therefore, a causal relation between an eco-label and environmental impact is not proven. It is thus difficult to incorporate the results in the standards.

As mentioned earlier, the declaration of conformity does not include an assessment of ecological impact in its criteria. The instrument of eco-labeling is designed to give assurances about the planning and implementation stage, but not about the output stage. This partly explains why most eco-labels do not take the output stage into account; Milieukeur is the only one to do so. Apparently, the assumption is that compliance with standards will generate a better environment. For a relatively simple environmental problem, it is plausible (though never assured by the eco-label) that an improved ecological impact automatically follows from compliance by the producer. For complex environmental problems, however, it is naïve to assume that, given sufficient procedural guarantees, the intended effects will occur. Klein et al. (2001) for example showed that Agri-Environmental Schemes do not effectively protect biodiversity in Dutch landscapes. The impact of their publication was large, both among scientists and policy makers. An explanation for the disturbance is the assumption that results in pilot studies in combination with compliance assurances will produce comparable results on a larger scale. A research that shows the unexpected but opposite results, attacks this assumption.

If the ecological impact of eco-labels on biodiversity is unknown, the ecological results cannot be taken into account during the standardization process.

4.7 Conclusions

This paper considered whether eco-labels addressing biodiversity issues sufficiently diminish the information gap between the seller and the buyer. We developed a new method to examine the degree of reliability of self-regulation. This method combines insights from legal philosophy, policy sciences and ecological science.

Eco-labels are unclear about how they standardize biodiversity. Some disguise an environmental theme, while others only briefly standardize it. Dutch law prohibits the misleading of consumers, but language such as "sustainable" and "environmentally friendly" is too vague to specify the meaning of an eco-label. Two out of the five eco-labels had the word biodiversity in their labeling scheme. These two labels offered the least amount of compulsory and optional standards (two and nine standards) for conservation and sustainable use of biodiversity. The three eco-labels that did not include the word biodiversity in the labeling scheme have between 8,6% and 24 % standards (either compulsory or optional) in six to eight categories of farming activities of AMY. A consumer who wants to buy the most biodiversity-friendly eco-labeled product will most likely select a label mentioning the word biodiversity. But a quick glance at the information on the labels will not help him find the most biodiversity-friendly product. Indeed, one label that claims biodiversity-friendliness even ignores a negative aspect of agriculture for biodiversity. The criterium of a uniform varieties as required in the Plant Breeders Rights, are said to contribute to the erosion of agrobiodiversity through the introduction of uniform, high-yielding varieties (Kameri-Mbote and Cullet, 1999). Only Erkend streekproduct seems to have the intention to reverse this development by including a standard about regional varieties in their labeling scheme.

In addition to this, labels seem more inspired by the environmental themes covered by legislation than by the communicative policy documents of the government. A challenge for producers to further implement communicative government policies into labeling schemes and an invitation for governments to further stimulate these producers.

Our main conclusion is that the efforts to make the labels as reliable as possible partly fail, eco-labels do not provide enough information to diminish the information gap.

Eco-labeling has some advantages. One is that eco-labels are a means to start developing standards. In the cases studied here, that process encourages farmers to think about biodiversity issues. Thus, eco-labeling might induce a farmer to change his behavior and show more concern with biodiversity. This puts the disadvantage cited in the literature – that self-regulation is not able to tackle complex environmental problems – into some perspective. This advantages can become larger if the labels adopt the communicative government policy.

Second, in principle, eco-labels have sufficient institutional guarantees to enforce producer compliance through the compulsory and optional standards. Although there is insufficient information about the implementation in practice, eco-labels are equipped to prevent non-compliance. A disadvantage of these inspections are the dependence and information asymmetry between the producer and the certification body. However, this information gap is substantially smaller than the information asymmetry between the producer and the buyer.

Despite these advantages, the following shortcomings may be distinguished.

One would assume that environmentally friendly labeling means that the quality of the environment actually improves through the production process. This is not necessarily so, however. Eco-labels only cover the planning and implementation stage and exclude the output stage. The ecological impact of an eco-label is not measured and monitored; thus, it cannot be communicated to the consumer. A buyer hardly ever sees the results or hears the success stories of what eco-labels have accomplished, though he may expect to receive information on this.

A second disadvantage is that there is insufficient communication about producers' compliance. The core of the assurance provided by eco-labels is that producers comply with environmentally friendly standards. The disadvantage of objectification is that trust in a producer is replaced by trust in an accredited certification body. There is still an information gap between the producer and the buyer. But there is also an information gap between the certification body and the buyer. The only communication that certification bodies are prepared to offer the buyer is a declaration of conformity. It is unclear how certification bodies execute their audits, how often, and how thoroughly. Nor is it clear what kind of offenses they observe among the producers. Furthermore, there is no information available about penalties, about which sanctions are used for what kind of offenses, or about which policies and executive priorities are pursued by the secretariats of eco-labels and certification bodies.

Thirdly, recommendations in labeling schemes cannot be enforced by inspections and sanctions. Therefore, recommendations hamper efforts to diminish the information gap. Even if the information supply were sufficient, specific, and clear, the phenomenon of recommendations in labeling schemes would remain a source of potential confusion. Eco-labels offer insufficient guarantees for spontaneous compliance. Thus, they cannot assure the consumer that the producer has complied with the recommendations. Communication to the consumers about the recommendations would only confuse them. The same applies to that part of the optional standards that go beyond the obligatory threshold.

In view of the failure of eco-labeling schemes to diminish the information gap, does the eco-label have a future? The answer is "yes, but".

All of the organizational stages of eco-labeling would have to be adjusted. Besides providing sufficient possibilities for participation, there is a need for clarity and sufficiently specific terminology during standardization in the planning stage. The EU has already started to formulate minimum standards for organic labels. This makes organic farming more readily distinguishable from other declarations of environmental friendliness.

Moreover, a consumer must be able to evaluate the well-defined environmental themes in eco-labels. This would be possible with a system of merit ratings, with different levels of environmental friendliness. Furthermore, transparency and communication about producers' compliance is required in the implementation stage. In addition inclusion of and communication about the output stage would strengthen the environmental claims of an eco-label and diminish information asymmetry. However, the expenses of these changes would raise the price of eco-labeled products. As the goal of eco-labels is to inform the consumer, it is questionable whether eco-labeled products would be able to compete in the market with products that are not eco-labeled. In the present situation, consumers are not only insufficiently informed, but they will also be easily confused by so many labels that are somehow related.

This leads to the third point: the role of governments in this almost entirely private-sector branch. In the planning stage of eco-labeling, the government can require clear, explicit, and

specific terminology for themes of eco-labels in combination with information on how these themes are standardized. Furthermore, the government can require the inclusion of the output stage in the eco-labeling as a means to enhance the reliability of eco-labels. An accompanying advantage of government regulation would be a decrease in the number of eco-labels in the market. As several eco-labels will not be able to comply with these government requirements, the number of labels will diminish. This would be an advantage to the consumer: fewer eco-labels but more reliable ones would make the market more transparent. It would give buyers an opportunity to evaluate and reward the eco-labeled products. In turn, the market would eventually demonstrate the viability of eco-labels.

5 Evaluation of product-specific eco-labels

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5.1 Introduction

With regard to agricultural biodiversity, the government in the Netherlands has defined a policy of "stimulation instead of regulation" (Parliamentary Report II 2004/2005). Although the loss of agrobiodiversity is a relatively complex environmental problem, this government considers (stimulated) self-regulation of private actors as more obvious problem-solving, than command and control regulation. As we know, government stimulation of the private sector through subsidies for the sake of conservation or sustainable use does not necessarily lead to the desired effects, even when the rules are diligently followed (e.g. Klein et al., 2001, Mayer and Tikka, 2006). It is thus important to find out if there are other strategies that could potentially be effective. One of those possible strategies is regulation through the market.

An eco-label is a typical market instrument of food suppliers, which is found on a great many products in the Netherlands and other countries. Its purpose is to reduce the information asymmetry between the buyer and seller by providing information to a customer who takes an item's environmental performance into account when acquiring it (Gunningham and Grabosky, 1998). Essentially, an eco-label attests to the producer's claim that the product has certain environmental qualities (De Boer, 2003). Thus, an eco-label is a policy instrument that is intended to increase transparency in the market (Erskine and Collins, 1997; Galarraga Gallastegui, 2002). Environmental friendliness is a credence good. This means that the consumer cannot discern whether the producer's claim is based on facts or falsehoods. The purchaser can see, smell, touch, or taste the product but still cannot determine whether it really was produced in an environmentally friendly way (Loureiro et al., 2002, Nadaï, 1999).

An eco-label is a form of self-regulation in industry for the public good. The literature gives ample evidence that self-regulation does not always have the intended effects. In the case of eco-labels, three explanations are usually given: eco-labels do not make the market transparent; eco-labels scarcely influence consumer behavior; and eco-labels have no influence on manufacturers (e.g. Erskine and Collins, 1997; Nunes and Riyanto, 2005; Leire and Thidell, 2004; Karl and Orwat, 2000).

One reason why eco-labels do not make the market more transparent is that the consumers do not have sufficient knowledge. Too few consumers have ever heard of eco-labels (Erskine and Collins, 1997; De Boer, 1997; De Boer, 2003; Nillson et al., 2003). Furthermore, consumers are not well enough informed about what eco-labels represent and thus about the environmental benefits they stand for (De Waart and Spruyt, 2001; CCA, 2004; Nillson et al., 2003). Moreover, it is not

easy for a labeling organization to provide clear information about the content of an eco-label, especially when the labeling scheme applies many different criteria (Brom, 2000; Nunes and Riyanto, 2005). That said, Leire and Thidell (2004) conclude that consumers make too little use of the available information. Then too, an abundance of eco-labels can cause confusion and thus disrupt the market. Nunes and Riyanto (2005) and Spaargaren (2005) mention the Netherlands as an example of a country with too much environmental information on products. Thørgenson (2000) identifies the problem as information overload, whereby eco-labels become invisible to the consumer. As Kirchhoff (2000) and the CCA (2004) point out, confusion arises when many labels make roughly the same claims and are thus no longer distinguishable from each other (Meeuwsen and Deneux, 2002).

Another reason why eco-labels do not work as they should is that they apparently have a limited influence on consumer behavior. The preferences for environmental friendliness that the public indicates in surveys are not borne out in their actual shopping behavior (Peattie, 2000). Other considerations such as price, quality, and consumption patterns may deter them from making an environmentally friendly purchase (e.g. Leire and Thidell, 2004; De Boer, 2003). To be fair, the public assumes that everything in the stores meets minimum environmental standards (CCA, 2004). At the same time, various investigations indicate that consumers have no confidence in the eco-labels or green information (Peattie, 2000; Thørgenson, 2000; De Boer, 2003; Erskine and Collins 1997).

Finally, the actual effect of eco-labels may be different than intended due to the role of the producers. Adherence to standards is the Achilles heel of self-regulation (e.g. Parker, 2002; Gunningham and Rees, 1997; Havinga, 2006; King and Lenox, 2000). Mechanisms to enforce self-regulation by companies are scarce. As Karl and Orwat (2000) note, it is tempting to call one's product environmentally friendly, even though that claim cannot be backed up. Peattie (2000) states that 60% of English advertising about sustainability is not based on facts. In contrast, there are also producers that do carry out environmental self-regulation but deliberately refrain from communicating this to the public, perhaps because environmental friendliness has a tree-hugging image among their target group (De Waart and Spruyt, 2001).

The disparity between the actual and the intended effect of eco-labels raises questions about their reliability. The reliability of eco-labels is an underexposed area in the research literature; most research is focused on their effectiveness or credibility. The focus of the present study is precisely on that gap in knowledge. That is, it considers the capacity of a selling party – a producer of foodstuffs – to provide a purchaser with proof and guarantees that the labeling scheme of an eco-label is not only adhered to but also has a beneficial effect on the environment.

Another aim of the present study is to fill a second gap in knowledge. Frequently, research is done on eco-labels belonging to an existing "international labeling family". International labeling families are the eco-labels organized according to a certain method that appear in different countries. An example of a labeling family are the organic labels, such as EKO in the Netherlands, Agriculture Biologique in France, Biogarantie in Belgium, Bio-Siegel, Bioland and Naturland in Germany, Soil Association in the UK and the organic seal in the USA. Another example of an international labeling family are the labels based on Life Cycle Analysis, standardized in ISO 14040, with family members as European Eco-label in the EU, Milieukeur in the Netherlands, Nordic Swan in Scandinavia and Blue Angel in Germany. In contrast, the present study focuses on product-specific eco-labels that are placed on a market by a single multinational firm. The focus was narrowed to the Dutch market because eco-labels are often

country-specific. Multinationals were selected in order to generalize from the findings of this study; the conclusions should be applicable to other countries where these companies operate and market their products under the same or a similar label. What makes these product-specific eco-labels interesting is that precisely these labels are presumed to contribute to the information overload confronting the public. This research seeks to answer two questions. First, how reliable are the product-specific eco-labels of multinationals that claim to stimulate agrobiodiversity, operating on the Dutch foodstuffs market? Second, why do producers choose to put their "own" eco-label on the market?

5.2 Framework of analysis

For this study, we define reliability as the capacity of the party producing and selling foodstuffs to provide both evidence and guarantees that the standards for agrobiodiversity set by an eco-label are effective. Hereby, we focus on a situation of information asymmetry between the buyer and seller. We see an eco-label as a form of self-regulation of industry and distinguish three stages of regulation – planning, implementation, and outcome stage – in an organizational process of regulation (Coglianese and Lazer, 2003; Stoeckl, 2004). During these stages, the following research criteria of reliability play a role:

1. The agrobiodiversity performance standards that are incorporated in the labeling schemes van eco-labels (planning stage);
2. The distribution of responsibilities and information by way of certain legal principles of rule of law (planning stage and implementation stage);
3. Compliance with the standards set in the labeling scheme (implementation stage).
4. Measuring and monitoring the effects of the labeling scheme (outcome stage).

The first step is to analyze the standards couched in the charters of the eco-labels. With the Agrobiodiversity Management Yardstick (AMY) as an aid, we compare how eco-labels stimulate agrobiodiversity (Van Amstel et al., 2007a). AMY is a classification tool distinguishing ten types of farming activities. Placing the standards set forth in the labeling schemes in these categories allows us to compare the schemes.

The second research criterion refers to the distribution of responsibilities and information among parties in the product chain and with respect to consumers. On the grounds of the principles of transparency (e.g. Gunningham and Rees, 1997), separation of powers (Ogus, 1995; De Graaff, 1998), and participation (Nillson et al., 2003), the buyer is assured that information is accessible and that there is a division of powers among different regulatory and supervisory authorities (OECD, 2004). In that light, these three principles will be examined more closely here (Van Schooten-van der Meer, 1997).

The third research criterion of reliability is the compliance behavior of parties in the product chain. We investigate how the risk of non-compliance is anticipated in the labeling schemes of the eco-labels.

It is important to measure the effectiveness of the labeling schemes, the fourth research criterion, notably because they do not necessarily have any consequences for agrobiodiversity, even when the standards have been met (Gunningham and Rees, 1997; Kleijn et al., 2002). We

investigated whether companies measure the effect of rules they themselves have imposed and/or whether these results have implications for a revision of the labeling schemes.

Finally, we conducted interviews with experts to find out why the producers prefer to place their "own" eco-label on the market instead of joining up with an existing labeling family. The first step in this investigation consisted of desk research. We studied diverse documents such as annual reports, sustainability reports, newsletters, and fact sheets (Bonduelle, 2003a and 2003b; CG, year unknown, 2005 and 2006; FLO, 2001, 2005 and 2006; LMC, 2003a, 2003b and 2006; SAN, year unknown, 2005a and 2005b). In addition, we conducted 13 semi-structured expert interviews. An expert was usually an employee of the multinational or someone from another organization with links to the eco-label. The interviews were either recorded on tape and then transcribed or, in a few cases, done in writing. Before processing the interviews, the texts were made anonymous.

5.3 Selection of cases

The original population of product-specific labels comprised some 20 labels. Several selection criteria were formulated to select the cases. The population was initially delimited by requiring the label to be based on a scheme covering the production method. Thereby, certain labels were excluded: labels indicating that money is donated to a foundation; labels stating that a product complies with religious dietary laws; and labels pertaining to the packaging. The second delimitation, that the eco-label has to appear on the package, means that the label could play a role in the consumer's decision to buy the product. Third, the label has to refer explicitly to environmental friendliness, as judged by the wording. We looked for words such as organic, environmentally friendly, and green (Van der Meulen, 2003). Having applied these criteria, we were left with the following labels (and the multinationals they belong to):

- *Agrofair* is a Dutch importer and distributor of tropical fruit, providing various European countries with fruit from South America and Africa. Agrofair sells the fruit by the brand name *Oké,* so that the products also bear an *Oké* label.
- *Albert Heijn* is a Dutch supermarket chain with various house brands in its product line. *Greenfields,* one of its own brand names, has a label for beef and lamb products from Ireland and Northern Ireland (UK).
- *Bonduelle* is a French producer of processed vegetables. The products are grown in Europe and sold under the brand name Bonduelle. The label on the package bears a text claiming "controlled environmentally friendly cultivation" (in Dutch) which is a variation on the original French eco-label "*Agriculture Raisonnée*".
- *Chiquita* is a US importer of fruit that grows bananas in South America. Since September 2005, Chiquita has sold bananas bearing the sticker of the *Rainforest Alliance* (RFA).
- *Jordan's Cereals* is an English company selling granola bars and fruit bars under the brand name Jordan's. Farmers from the United Kingdom provide the raw materials for these products. A label printed on the package reads "*Conservation Grade, Farming for Wildlife*" (CG)

5.4 Agrobiodiversity performance standards in labeling schemes

The first criterion of reliability is whether the standards set by labeling schemes do in fact stimulate agrobiodiversity. In an earlier study (Van Amstel et al., 2007a), we designed an agrobiodiversity management yardstick (AMY). Agrobiodiversity is a socio-political construct: the reason that this concept is defined, formulated and communicated is that some consider it of great importance to take actions to maintain and conserve agro-ecosystems, species or genetic resources. This yardstick aims to connect the abstract concept agrobiodiversity with concrete on-farm actions, a combination that we have called agrobiodiversity management.

Sartori (1991) gives a solution to avoid the pitfall of miscomparing when a concept with a high level of abstraction is interpreted differently in dissimilar concrete regimes. Sartori's solution is called the ladder of abstraction, which is the blueprint of AMY. The ladder of abstraction is based on the idea of classification and distinguishes several levels of abstraction. Few abstract categories have large intra-class variation, while many concrete categories have large inter-class variation. To design AMY we organized an expert workshop with 12 ecological experts. They defined agrobiodiversity management categories (both designing their own categories and using existing categories of the CBD and a conference organized by the Dutch Ministry of VROM, 2005) and connected them in the ladder of abstraction, as is shown in figure 3.1. On the fourth level of abstraction, they distinguished ten categories of farming activities that are indicative of agrobiodiversity management in accordance with eco-labels pertaining to the cultivation of crops

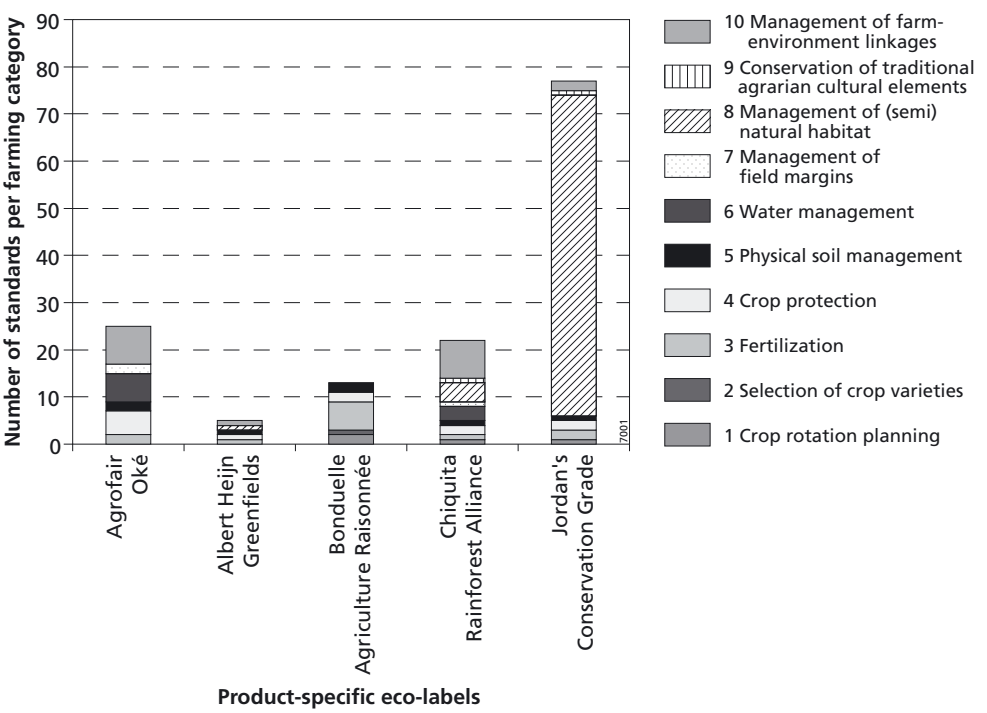

Figure 5.1 Number of standards per category farming activities

in the Netherlands. On the fifth level, about 160 concrete agrobiodiversity performance measures were distinguished in these 10 categories.

These ten categories are also used in the present study to identify and classify the differences in standards we found among the eco-labels, comparing the about 160 management measures with the labeling schemes. The labeling schemes of various products were studied: bananas (Oké and RFA), beef and lamb meat (Greenfields), and cultivated crops (Agriculture Raisonnée and CG). Since AMY is developed for arable farming in the Netherlands, we also included standards of eco-labels in our count that explicitly referred to biodiversity. Especially category 3-10 showed large overlap in formulation and structure with the eco-labels of international labeling families in the Netherlands, which are earlier assessed by us (Van Amstel et al. 2006, 2007a).

As figure 5.1 shows, the five labels purport to stimulate agrobiodiversity in different ways. Bonduelle focuses specifically on sustainable use (covered by the first six types of farming activities), whereas Jordan's CG emphasizes the preservation of agrarian nature (the last four types). Chiquita RFA and Agrofair Oké have measures for both the preservation and the sustainable use of agrobiodiversity. There is a major difference in the amount of standards of Jordan's CG, the only label specifically focusing on biodiversity, and the other labels. AMY has the widest coverage under the label Agrofair Oké (eight types) and Chiquita RFA (seven types).

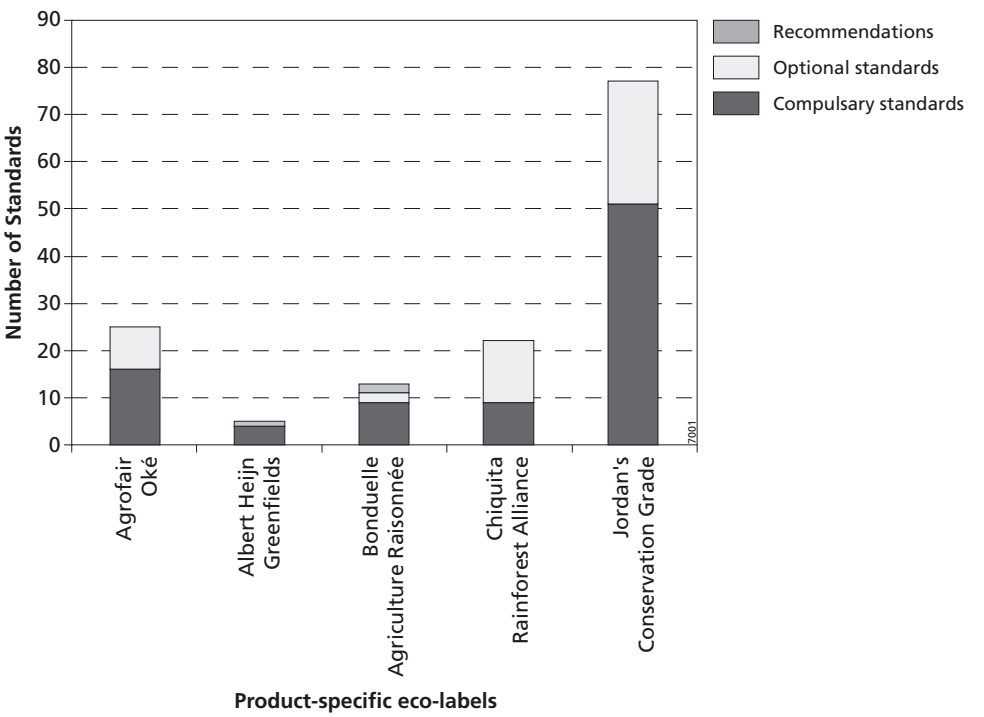

Figure 5.2 The nature of standards of product-specific eco-labels

CG is the only label that has set quantitative standards for agrobiodiversity. For instance, it stipulates that 10% of the farmland under the scheme should be subject to habitat management.

In addition, we looked into the nature of the standards in figure 5.2. Obligatory and optional standards as well as recommendations may be found in labeling schemes. For instance, an obligatory standard might contain the word "must", while an optional standard may state "there must be either …or…", and a recommendation may contain the wording "is advised". Compliance with recommendations is entirely voluntary.

The five labels also differ with respect to the force of their standards. All have obligatory norms while most also have optional standards or recommendations. Even only including obligatory standards, the leading position of CG is still undoubted.

5.5 Principles of rule of law

The literature on eco-labels gives guidance on reducing the information asymmetry between the producer/seller and the buyer. There is some overlap between these principles and those found in the literature of the philosophy of law concerning the protection of a weak party from a strong one within an asymmetrical power relation. Van Schooten-van der Meer (1997) selected three legal principles that are frequently cited in work on the philosophy of law. In subsequent research, she then applied these principles to self-regulation:

- The principle of *transparency*. Transparency among the parties regarding standards, compliance with those standards, and the effects of doing so are important. Transparency can prevent non-compliance with self-regulation within the supply chain by ensuring that parties have access to knowledge about the behavior of other chain parties (traceability). On that basis, none can claim lack of information as an excuse (Gunningham and Rees, 1997; Erskine and Collins, 1997; Nilsson et al., 2003; Thøgersen, 2000; De Boer, 2003).
- The principle of the *separation of powers*. Independence, or the separation of powers, prevents a conflict of interests (De Graaff, 1998; Erskine and Collins, 1997; Kirchhoff, 2000; Van der Valk and Van der Zeijden, 2002). Separation of powers means a clearly articulated division of responsibilities among different supervisory, regulatory, enforcement and executory authorities (OECD, 2004).
- The principle of *participation.* Nillson et al. (2003) point out that commitment by stakeholders enhances the credibility of an eco-label. When parties formulate rules for themselves, they will be more inclined to comply with them (Gunningham and Rees, 1997). Drawing NGOs into the standardization process can increase public support for regulation.

These legal principles have been operationalized for eco-labels in terms of good governance. Regarding the principle of transparency, we investigated the extent to which the information is transparent. Concerning the principle of the separation of powers we examined how the various responsibilities are distributed. With respect to participation, we asked whether or not – and if so, which – parties in the product chain and NGOs are involved in setting the standards for a labeling scheme.

Transparency
For all five eco-labels, we found that the producer provides general information about the eco-label (see www.agrofair.nl, www.fairtrade.net, www.maxhavelaar.nl, www.ahgreenfields.nl, www.bonduelle.nl and www.bonduelle.com, www.chiquita.nl, www.chiquita.com, www.rainforest-alliance.org, www.conservationgrade.co.uk, www.Jordan'scereals.com, all retrieved July 21, 2006). Moreover, we found that Agrofair and Chiquita have posted the labeling schemes on their own websites. The labeling schemes of Greenfields, Bonduelle and CG may be obtained indirectly: for Greenfields on the websites www.lmcni.com and www.bordbia.ie; the labeling schemes of Bonduelle and CG are available upon request.

None of the eco-labels provide information on compliance with the labeling schemes. That kind of information is considered confidential. Furthermore, according to one interviewee, the consumers have no interest in this information. All the consumer needs to know is that compliance is monitored. The only one of these schemes that does give some insight into monitoring of compliance is CG, which makes available the manuals used by the inspectors.

The RFA provides general information on the environmental performance of the label. The alliance has published research on this matter on its website (www.ra.org, retrieved August 9, 2006). CG has posted material on both the general effects of the eco-label and the effects that have been measured on demonstration farms (www.conservationgrade.co.uk, www.farmedenvironment.co.uk, both documents retrieved on August 9, 2006). The other eco-labels do not give any information about environmental impact.

Separation of powers
Kirchhoff (2000) differentiates exogenous from endogenous labels. Exogenous labels are subject to control by an independent third party (certification body), whereas endogenous labels are self-formulated environmental claims. With the aid of the certification triangle of De Graaff (1998), as depicted in figure 4.1, we can analyze the structure of an exogenous label.

Each of the bodies has a different set of responsibilities. The standardization body designs and develops the labeling scheme that the seller/producer has to comply with. The certification body audits and certifies the seller. The accreditation body makes sure that the certification body is really independent, based on Guideline 65 of the International Organization for Standardization (ISO) and European Norms (EN) 45011. The continuous arrows in figure 4.1 indicate a regulatory relation (contract), while the dotted arrows indicate a form of interaction (label on a product, written communication, meetings, or participation). The seller communicates with the buyer about the product that bears the eco-label or certificate. In some cases, a seller can be part of the standardization body or can advise the standardization body. Both the standardization body and the certification body have to agree on how to implement the standards. This dotted arrow indicates lines of coordination between the standardization body and the certification bodies. They need coordination when setting standards and when making arrangements on how to inspect companies for compliance with the norms.

If we were to draw a diagram depicting endogenous labels, it would be simpler in design, since it would contain only two parties: a seller and a buyer. The seller himself would then guarantee the buyer that the product is environmentally friendly.

Only one of the five product-specific eco-labels of the multinationals is an endogenous label. It is Bonduelle's agriculture raisonnée label. Here, the endogenous status means that Bonduelle

itself is in charge of the labeling scheme. Bonduelle contracts the farmers; Bonduelle's liaison officers monitor compliance by farmers; and Bonduelle takes care of the label for the package.

The other four labels are exogenous. As it turns out, Agrofair's Oké label is the same as that of the Fairtrade labeling family, of which Max Havelaar is the labeling organization. Oké does not add any content to the Fairtrade label. Underlying Greenfields are the labeling schemes of two organizations: the Livestock and Meat Commission (LMC) for the United Kingdom; and Bord Bia for Ireland. The Greenfields packaging does not bear the labels of either of these organizations, so the links are invisible. The eco-label that Albert Heijn and Jordan's use on their products is also accredited. That is not the case for the eco-labels that Agrofair and Chiquita use, though. Both Fairtrade and RFA are currently working on becoming accredited labels in the future. With the exception of the Bonduelle label, the four other labels are used by other companies outside the Dutch market. In the course of our investigation, the RFA label was also adopted by another producer in the Netherlands. Thus, labels that appear to be product-specific on one particular market are not necessarily product-specific when more countries are taken into account.

Participation

Four of the five labeling schemes – the exception is Bonduelle – have been developed in consultation with independent third parties. For two labels, namely Fairtrade and RFA, that other party is the ISEAL Alliance (2006), and both labels endorse its Code of Practice. It states, among other things, that the organizations setting the standards form a cross-section of the relevant parties. They are representative in terms of the subject matter and the geographical area where the standards apply. For three labels – namely Fairtrade, RFA, and LMC – the schemes are also subjected to a round of public consultation in which anyone can comment on the labeling scheme. This procedure is a bit less extensive for CG. The standards of that scheme are set by a consultancy firm, the Farmed Environment Company. Subsequently, the labeling scheme is submitted for approval to an independent committee consisting of farmers, academics, and members of civil society organizations.

Comparison of the labels

These three principles – transparency, independence, and participation – underpin the organization and implementation of the labeling process of the four exogenous eco-labels. It is important to them for the monitoring body to be objective. A common problem is that the transparency has limits. General information and lists of standards are easily accessible (i.e., the planning stage is transparent). In contrast, information on measuring the outcomes (i.e., on the outcome stage) is only available in incidental cases. Information on compliance with the standards (the implementation stage) is scarce.

The only principle endorsed by the endogenous label is transparency. We found no indication of a separation of powers or of participation in the development of its labeling scheme.

5.6 Farmers' compliance with the labeling schemes

Farmers' compliance behavior cannot be investigated by conducting a literature study and expert interviews. Basically, that is because these sources do not yield data on compliance. For

instance, they do not reveal priorities for enforcement, how many checks were made, the kind of violations observed, or which sanctions were imposed. We have therefore narrowed the range of our analysis. It is focused on the likelihood of compliance, in light of the content of the labeling schemes. The methodology for this analysis is based on the "Table of Eleven" (Van Erp and Verberk, 2003). The table of 11 (table 2.2) depicts 11 dimensions that play a role in compliance by a target group. Each dimension is also associated with risks of non-compliance.

The table of 11 distinguishes two dimensions of compliance, spontaneous and enforced. Farmers who comply spontaneously follow the rules of self-regulation by their own volition. Alternatively, they may follow the rules because they face inspections or sanctions.

Spontaneous compliance

All of the eco-labels take measures to ensure that members of the target group (T1) are acquainted with the rules. The most thorough of the four in this respect is LMC, the organization behind Greenfields. LMC requires farmer to endorse the labeling scheme; by signing, they affirm that they have read and understood the standards.

In addition, all of the eco-labels ensure that compliance will be advantageous to the farmers (T2). For instance, farmers can sell their product above the market price. In this regard, one interviewee saw room for improvement in CG, as price fluctuations can sometimes wipe out the margin. Fairtrade offers a financial bonus for implementing the standards from the labeling scheme (FLO 2001). Farmers are guaranteed that Bonduelle and Albert Heijn will buy their products; alternatively, they achieve higher levels of operational efficiency when affiliated with RFA and Fairtrade.

Comparison of the eco-labels suggests some difference with respect to how reasonable the standards are (T3) and how willing the farmer would be to comply with the authority (T4). However, CG ranks highest on both points. Under this scheme, the farmers have to write a motivation plan specifying individual targets for their own farm. Jordan's then selects its farmers on the basis of their plans.

Finally, there is greater chance of spontaneous compliance when the technicians doing the monitoring are not official inspectors (T5). Scientists and NGOs have conducted various studies on the eco-labels. Recently, a French investigation was published that was critical of the results of Fairtrade (Jacquiau, 2006). The results of research on Bonduelle show a more diverse picture. An investigation by the environmental organization Milieudefensie (Ende and Tielens, 2006) gives Bonduelle a good report card, whereas the consumer organization called Goede Waar en Co is critical of the Bonduelle label (www.goedewaar.nl, retrieved August 23, 2006). Two other labels, Jordan's and Chiquita, were also scrutinized by this consumer organization, while Greenfields was assessed by the animal welfare society (www.dierenbescherming.nl, retrieved August 23, 2006). Various investigations with negative outcomes have been published on Chiquita (Deutsche Gesellschaft für Technische Zusammenarbeit, 2001; Gallaghar and McWhither, 1998; Stein, 2001; Swedish Society for Nature Conservation, 2005; and Lustig, 2004). The five dimensions of spontaneous compliance are set forth in Table 5.1.

Enforcement

Each of the five labels has a regime for monitoring and imposing sanctions. According to the interviewees, though, the labeling organizations do not always get the results of unofficial inspections or, if they do, that knowledge does not always lead to adjustments (T6). RFA and

Table 5.1 Spontaneous dimensions of compliance per eco-label

Eco-label	Institutional guarantees for dimensions of spontaneous compliance	
Agrofair – Oké	(T1)	Some of the standards indicate how monitoring takes place
	(T2)	Higher price and financial bonus for products, so that the farmers do not go bankrupt; more efficient farms, no charge for certification, farmers are stockholders of Agrofair
	(T3)	Voluntary scheme, civil society organizations are involved in setting standards
	(T4)	Opportunities for control and obligations for rapportage are set forth in contract.
	(T5)	Supply chain parties check on each other; Goede Waar en Co is positive, negative audit in French research
Albert Heijn – Greenfields	(T1)	Farmer signs standards to affirm understanding; newsletters and extra information; standards indicate how monitoring takes place
	(T2)	Purchase guarantee, fair price for costs incurred, knowledge about consumer preferences
	(T3)	Voluntary scheme, market parties involved in setting standards
	(T4)	Opportunities for control and obligations for rapportage are set forth in contract
	(T5)	AH monitors itself, control of animal welfare moderately positive
Bonduelle – Controlled environmentally friendly cultivation	(T1)	Standards set forth in contract, explanation and consultation during contract negotiations, cultivation surveillance by agricultural extension services
	(T2)	Purchase guarantee
	(T3)	Voluntary scheme
	(T4)	Opportunities for control and obligations for rapportage are set forth in contract
	(T5)	Research by Milieukeur (positive) and Goede Waar en Co (negative)
Chiquita – Rainforest Alliance	(T1)	Training for farmers, extra explanation and technical support by certifying body, newsletter Chiquita
	(T2)	Higher price to compensate for costs, more efficient farms, knowledge of consumer preferences
	(T3)	Voluntary scheme, civil society organizations are involved in setting standards (T4) Opportunities for control and obligations for rapportage are set forth in contract
	(T5)	Certified farmers monitor each other; Chiquita and RFA are subject to many investigations by third parties,:Goede Waar en Co positive: American investigations negative
Jordans – Conservation Grade	(T1)	Training for farmers, extra explanation possible, technical support
	(T2)	Farmers usually get a higher price, stronger competitive position for processors
	(T3)	Voluntary scheme, farmers are selected on basis of their motivation, farmers are involved in setting standards
	(T4)	Opportunities for control and obligations for rapportage are set forth in contract
	(T5)	Negative assessment by Goede Waar en Co.

Fairtrade are the only ones that take comments about the farmers as grounds to carry out extra inspections (SAN, 2005a). Bonduelle uses the positive outcomes of research as promotional material; the firm indicates that it disagrees with the negative outcomes in publications. Albert Heijn discusses research findings with NGOs, but it is unclear whether or not the discussion leads to action or improvement.

With respect to announced inspections (T7), the monitoring frequency for the four exogenous labels – once every 12 or 18 months – is low. With such a gap, a farmer could operate in a way that does not correspond with the labeling scheme. Then, when the time comes for inspection, the farmer could show the auditor what he would like to see instead of the real situation. Such evasive behavior is less likely for a number of requirements of CG and RFA. Obviously, habitats and buffer zones are not established in a day. It is possible, though, to

conceal prohibited pesticides before the announced audit occurs. The monitoring frequency for Bonduelle is unclear but seems to be higher than for the exogenous eco-labels. Bonduelle has an agronomists services to provide the growers with guidance and crop surveillance, in combination with monitoring in all stages of the production process. This agronomist service has actually taken over some of the executive responsibilities that traditionally belong to the grower. But the farmers have an extra incentive to comply. Not only does the firm's agronomist service pick up

Table 5.2 Enforcement dimensions per eco-label

Eco-label	Institutional guarantees for enforcement dimensions (T6-T11)	
Agrofair -Oké	(T6)	Signals from supply chain parties about violations are investigated
	(T7)	Annual audit; intention of audit depends on the risk of the production sector
	(T8)	Interview farmers and control bookkeeping, annually trained auditors, no rotation
	(T9)	Unannounced extra audits when signals on non-compliance are received
	(T10)	Up to a year for remediation; afterwards, suspension or de-certification
	(T11)	Suspension upon non-compliance, de-certification upon repeated non-compliance or a lengthy period without showing progress
Albert Heijn – Greenfields	(T6)	AH listens to the assessment of the label by the animal welfare group Dierenbescherming; own inspections have no consequences
	(T7)	Annually announced control of bookkeeping, every 18 months an announced inspection of farm and livestock, annually possibly unannounced samples collected at 5-10% of the farms
	(T8)	Accredited certifier, trained auditors, rotation of inspectors
	(T9)	Possibly selection of farms for extra inspection
	(T10)	Month allowed for remediation, afterwards suspension, contract with AH rescinded
	(T11)	Duration of suspension depends on kind of violation
Bonduelle – Controlled environmentally friendly cultivation	(T6)	Bonduelle uses positive assessment in promotional material
	(T7)	Inspections by internal agrarian extension services, frequency unclear
	(T8)	Control books and collect samples, no information on the auditors
	(T9)	Possibly selection of farmers for extra inspections
	(T10)	Bonduelle is not required to buy products that do not meet the standards and
	(T11)	can rescind the contract
Chiquita – Rainforest Alliance	(T6)	RFA responds to comments of farmers and complaints by other stakeholders
	(T7)	Each year announced inspections
	(T8)	Triple Checking System, rotation of auditors, trained auditors
	(T9)	Unannounced extra inspections when complaints are received
	(T10)	For certification, the farmer must meet 80% of all standards, 50% of the standards
	(T11)	for each principle, and 100% of the critical standards; when standards are not met, evaluation is made to determine if problem is systematic or temporary; period to resolve the problems between 6 months and 2 years; sanction consists of losing the certificate
Jordans – Conservation Grade	(T6)	No research results known at CG.
	(T7)	Annually announced inspections for the general requirements; per year, 20% of the farms inspected for habitat
	(T8)	General requirements inspected by trained inspectors of accredited body on the basis of a specific auditing scheme; still no rotation of inspectors; inspection of habitats by independent ecologists on the basis of a specific auditing scheme
	(T9)	Extra inspections if the habitats do not pass; so far, no need to re-inspect farm for general requirements
	(T10	General requirements for system of minor and major problems that could lead
	(11)	to rescinding the contract with the processor; habitats that still do not pass after re-inspection also lead to rescinding the contract with the processor.

the bill for these inspections, but the firm also selects the farmers with whom it wants to enter into a contract. Indeed, as the interviewee from Bonduelle stated, only the very best farmers are offered a contract.

The eco-labels train their auditors to identify violations when they carry out an inspection (T8). They also have checklists and interpretation documents for the labeling schemes. The method used by RFA is called triple checking. This means that the manager, employees, and documents are all checked at the same time. The four exogenous eco-labels also conduct extra, unannounced inspections in the event that previous audits had turned up any irregularities (T9).

All of the eco-labels penalize farmers who are found to be in violation (T10). Yet only two eco-labels have a system of sanctions that describe precisely under which conditions a particular measure would be imposed. Specifically, these are CG and Greenfields (CG 2005, LMC 2003a, 2003b). But RFA and Fairtrade can also impose sanctions, namely by suspending or decertifying the farmer (T11). Table 5.2 gives an overview of the enforcement dimensions for each eco-label.

Comparison of the labels

We did not assess the extent of actual compliance due to a lack of information. One conclusion we could draw is that all of the eco-labels have specified institutional guarantees to reduce the chance of non-compliance. With respect to the dimensions of spontaneous compliance, we found that eco-labels put most effort into informing farmers of the standards (T1) and the advantages of compliance (T2). In addition, we found that inspections are also conducted by unofficial bodies (T5). Both RFA and Fairtrade take these results as grounds for holding extra inspections. For the rest of the labels, though, informal checks have little impact on compliance. Yet this does not mean that such checks would have no effect; they could undermine the credibility and public acceptance of an eco-label.

With respect to the institutional dimensions, the emphasis is on increasing the chance that a farmer will get caught (T8). The inspectors are trained and rotated, and inspection rounds are scheduled systematically. Nonetheless, it remains to be seen whether these efforts come to naught because of the low frequency of inspections. At a frequency of once or twice a year, fraud is an easy option for a farmer. Furthermore, the sanction policy is not very strict. The farmer almost always gets the chance to fix what was wrong. Alternatively, together with the certification body, the parties try to find a way to attain the desired situation. Compared to the other eco-labels, Jordan's has the most institutional guarantees.

5.7 Monitoring of the outcome stage

In this section, we discuss whether the environmental impact of an eco-label is monitored and, if so, what comprises such an auditing system. Systematic measurements increase the reliability of an eco-label.

The only label to systematically monitor environmental impact is CG. The Centre of Hydrology and Ecology carries out annual surveys of the biodiversity present on two demonstration farms (www.farmedenvironment.co.uk, retrieved August 8, 2006). These findings are also used in the process of setting standards and revising the labeling scheme.

The scheme the RFA uses to monitor environmental impact is less extensive. Due to a lack of funds, there is no systematic monitoring. Impact assessments are made at a small scale, though,

Table 5.3 Auditing environmental impact per eco-label

Eco-label	Audit	Frequency	Feedback
Agrofair -Oké	No	-	-
Albert Heijn – Greenfields	No	-	-
Bonduelle – Controlled environmentally friendly cultivation	No	-	-
Chiquita – RFA	Yes	Incidentally	No, used in promotional material
Jordans – CG	Yes	Annually	Yes, used to set standards

for instance by trainees. According to the interviewee from RFA, the organization is aware that they should improve monitoring, and they recently received a subsidy to do so. Even so, the results will not be used as feedback in any efforts to adapt the labeling scheme. The reason is that RFA does not set any quantitative targets. Another organization, Conservation International, was commissioned by Chiquita to conduct comparative research on the effects of RFA by studying two farms, one certified by RFA, the other not. In light of the results, Chiquita decided to certify all of its own plantations.

No environmental impact studies are carried out by the Greenfields and Oké labels; Bonduelle has not provided any information on the subject. The results are summarized for each eco-label in Table 5.3. One reason why the farmers contracted by these eco-labels are not systematically audited is the assumption that if the standards are met, the anticipated effects will logically follow. Thus, there will be no need to measure them. But there are other reasons too: there might not be enough money, or the effects might not be measurable. However, both RFA and Fairtrade are working on ways to improve their monitoring system. In the future, environmental impact might well be measured at Fairtrade.

5.8 Reasons to adopt a product-specific label

The second research question in the present study asks why firms choose to communicate their environmental friendliness by means of a product-specific eco-label. To answer that question, we first consider the producers' motivations. Then we discuss their opinions on whether the introduction of yet another eco-label might confuse the consumers.

The interviewees motivate their choice of a label in two ways: with arguments in favor of introducing their "own" eco-label; and arguments against using eco-labels from existing labeling families.

The most prevalent reason to use a product-specific eco-label is in order to distinguish a particular product from other products. Bonduelle wants to use the label to let consumers know that Bonduelle does something that the other firms do not. Similarly, Jordan's uses the CG label to distinguish itself from other companies. And Chiquita, after working with the RFA for 14 years, has decided to let the consumers know of its link with this label in response to the competition on the West European market. In this way, the public can tell a Chiquita banana from other bananas. Agrofair has designed the Oké label to differentiate itself from other producers aligned with Fairtrade. Yet there are other arguments in favor of an eco-label, be it product-specific or part of a family. The reason why environmentally friendly products yield higher profits is that consumers are willing to pay more for a product that is sustainably

Table 5.4 Reasons to prefer an eco-label of their own over an existing eco-label

Eco-label	Reasons in favor of an own label	Reasons against an existing label
Agrofair – Oké	Differentiation	Does not differentiate
Albert Heijn – Greenfields	Consumer preference, more profit	Evokes fear in consumer about normal product line
Bonduelle – Controlled environmentally friendly cultivation	Differentiation, customer loyalty	Evokes fear in consumer about normal product, organic label not feasible
Chiquita – Rainforest Alliance	Differentiation, RFA active on the subject and directed toward problem-solving	Organic label not feasible, in the early 1990s the Fairtrade standards were not available for bananas
Jordans – Conservation Grade	Differentiation, responding to specific preference of consumers	Organic label not feasible

produced. And a company can advertise under its own eco-label to improve its image or customer loyalty. Consider the case of Chiquita, which started to work with the RFA when the amount of negative publicity on the company kept increasing. Jordan's chose to sign on with an eco-label that is concerned with biodiversity because, as consumer research has shown, the British consumer is mainly interested in an eco-label that promotes wildlife.

A number of interviewees gave some reasons why a company would not choose to affiliate with an existing label. First, an existing eco-label is not a distinguishing feature. This concern is evident among the producers using the existing label Fairtrade. As a case in point, Agrofair's 'own' Oké logo presents the Fairtrade standards in a positive light. The producer of Tony's Chocolonely, in contrast, puts a different slant on the Fairtrade standards: its "own" label states that the product is "100% slave-free", as guaranteed by Max Havelaar. Thus, while the claims of both companies are based on Fairtrade certification, the Oké and "Slave-free" logos differentiate the two product lines. Second, it is said that existing labeling families might possibly have a negative spin-off on conventional products that do not bear an eco-label. For instance, the interviewee from Bonduelle noted that by including organic foods in Bonduelle's product line, consumers might get the idea that "normal" Bonduelle products are not environmentally friendly. One reason to decide against organic production is that producers feel they could not possibly apply the large-scale industrial methods that organic production would entail. Table 5.4 presents these concerns for each eco-label.

Regarding the confusion that the diverse eco-labels create for the public, the most important concern for producers with their own eco-labels, according to the interviewees, is that the consumer should recognize the eco-label and have a positive response to it. Whether or not the consumer is well informed about the meaning of the eco-label is considered less relevant. Thus, the producer is hardly concerned about whether its own eco-label confuses the public or not. Actually, the producer has an interest in keeping the public from being able to compare its own eco-label with other eco-labels. Indeed, the comparison might not turn out well for the own label.

5.9 Conclusions

The aim of this study was to find out whether or not product-specific eco-labels stimulation agrobiodiversity are reliable and why producers prefer product-specific eco-labels. We cannot demonstrate that any of the five eco-labels examined here should be considered reliable for all three stages of self-regulation. The missing evidence is particularly acute for the implementation stage, in the absence of documentation on how the participants in the eco-label schemes have complied with the standards. In fact, for most of these eco-labels, we could not demonstrate the impact on biodiversity either. There is usually not enough money available to audit farmers' performance, so the effects on the environment are not monitored but assumed.

Comparing the five eco-labels, the most reliable eco-label turns out to be CG, which has also included quantitative agrobiodiversity standards in the labeling scheme. This eco-label selects participants on the grounds of their motivation and the most far-reaching distribution of responsibilities among independent third parties. Moreover, it is the only one of the eco-labels to annually carry out a systematic audit of performance and use the results as a feedback loop when making adjustments in the labeling scheme.

With respect to standards for agrobiodiversity performance, three labels – namely Oké, RFA, and Bonduelle – are roughly equal. Greenfields has adopted the lowest agrobiodiversity performance standards. Regarding the procedural requirements for reliability, the middle bracket consists of Oké, RFA, and Greenfields. Arrangements are made to distribute responsibilities among independent third parties, and there are various guarantees of compliance with the labeling schemes. However, environmental performance is not systematically audited. Bonduelle, the only endogenous eco-label, trails behind the rest. It does not arrange for independent audits. Nor does it compensate for this lack of objectivity by conducting its own inspections. Thus, there is no subsequent feedback loop for the sake of setting standards for the labeling scheme.

This study shows that it is in principle possible for food producers to regulate a public good, specifically agrobiodiversity, through industry self-regulation and to integrate that good in the food supply chain. Apart from the finding that eco-labels are not reliable for all stages, the study also reveals that their capacity to reduce the information asymmetry between the seller and the consumer is very limited. This is also clear from the reasons that multinationals give for choosing to operate under an eco-label of their own rather than one from an existing labeling family. Their rationale is not that they want to provide the consumer with better information, and that their own label can do that best. Rather, they believe that for marketing reasons a company needs a way to distinguish itself from its competitors. Thus, they argue, companies have to be able to put a label of their own on their entire product range.

It seems that their main objective is not to reduce the information asymmetry by informing consumers about their products. Actually, the information they provide is context-specific in a sense that it is geared entirely to a producer with a certain knowledge level, understanding of and experience with production processes. It is not directed at the consumer in the shop at all, who is the end-user of the product. Consumers are left in the dark about how the environmental effects of one eco-label compare to those of another, as they do not have information about the entire production-process of suppliers.

It remains to be seen if eco-labels are really so suitable as instruments of governance for the conservation and sustainable use of agrobiodiversity. After all, the results of the product-specific eco-labels and the reliability weaknesses are comparable to the weaknesses of eco-labels

of international labeling families (Van Amstel et al., 2006). And if so, it is unclear just how eco-labels might be made more robust and by whom.

In our opinion, the strength of the eco-labels lies in their capacity to translate an abstract notion like biodiversity into terms relevant to a specific supply chain. Their great potential lies in the possibility to take concrete measures through that chain to stimulate agrobiodiversity. In that regard, eco-labels would seem to have a reasonable chance of success within a chain and through business-to-business communication, at least if we can assume that eco-labels are reliable. This does not mean, however, that the eco-label is also a suitable means to resolve the problem of information asymmetry between the producer and the consumer. Meanwhile, the eco-labels are not making any mutually comparable information about environmental impact available to consumers. Until they do, these instruments will not be up to the task of reducing information asymmetry.

In order to improve the quality of eco-labels, governments would have to set standards for labels. Preferably, this would occur at the level of the European Union, for the sake of a broad, level playing field and to assure equality and interchangeability among the Member States. Those standards should ensure that two conditions are met. First, in general, there must be transparency on compliance with the labeling schemes. For instance, annual reports should be published giving figures for audits carried out, enumerating the violations found, sanctions imposed, and cases taken to court. This information is currently published for the organic labels under EU regulation. Second, and more specifically, efforts should focus on monitoring the environmental impact and on putting together mutually comparable information on these effects for consumers. From a legal standpoint, this would entail defining the concept of the eco-label in terms of regulation. That means reserving usage of the word by giving it trademark status and setting a few criteria for its application. Before any such steps could be taken in a real social context, however, some obstacles would have to be overcome. In the present situation, the parties offering business-to-business eco-labels for consumer products do not seem to have any interest in making labels mutually comparable, nor in focusing on a label's environmental impact.

6 Evaluation of contract farming

6.1 Introduction

Postwar agrarian practice has encountered a sustainability problem, namely the loss of biological diversity (agrobiodiversity). Farmers exploit nearly one-third of the world's land for food production and tend to plant fewer crop varieties on a larger scale. Today, about 80 to 90 percent of the world's food comes from between 10 and 20 percent of the cultivated plant species. Traditional and regional crops are threatened with extinction because they are no longer used in agriculture (Heller and Keoleian 2003). Agrobiodiversity is more than crop diversity. It is an umbrella concept, covering all organisms living on farmland (CBD decision III/11 1996). In a recent policy document (LNV 2002), the Dutch government identified three dimensions of agrobiodiversity: 1. genetic resources of crops and livestock; 2. biodiversity with a life-support function, e.g. natural enemies of pests and diseases; 3. biodiversity with a landscape-ecological function, such as meadow birds and hedgerows.

A country with a large share – about 69 percent – of its land under cultivation is the Netherlands (Berkhout & Van Bruchem, 2003). Highlighting the Dutch situation, this paper investigates various means to reverse the loss of biodiversity in a country with a large, innovative, export-oriented agricultural industry. The loss of agrobiodiversity is seen as a second-order problem (Wolff, 2006). In other words, it is partly caused by solutions to other problems. Specifically, in an effort to prevent food scarcity – as experienced during the Second World War – the Dutch turned to large-scale agricultural industrialization. And one consequence of commercial agriculture is the loss of agrobiodiversity (FAO, 1997).

Agrobiodiversity loss is a public problem. Yet no systematic investigation has been conducted on the capacity of the food supply chain to resolve it. Industry self-regulation as a governance mechanism is said to have an advantage over public intervention: being more flexible, it can anticipate technological changes within the supply chain. Standards can be more clear-cut, detailed and cost-effective than standards in public regulation (Gunningham and Grabosky, 1998).

A widespread approach to self-regulation in commercial agriculture is contract farming. Rather than a means to stimulate sustainable agriculture, this approach is a type of vertical integration in the food supply chain – a means to optimize the production process. Contract farming is grounded in a legally binding agreement between a grower/seller and a buyer (most often a processor). The contract regulates in advance the supply of a grower's harvest to the processor, frequently at predetermined prices (Eaton and Shephard, 2001). By signing, a grower agrees to provide a specific commodity, produced in accordance with the qualitative and quantitative demands of the purchaser. The company supports the grower's production by providing a supply of inputs or technical assistance and by purchasing the commodity. Eaton and Shephard distinguish three areas addressed in contract schemes:

- *Market provisions*: The agreement contains terms and conditions for future sale of a crop, such as prices and production quota.
- *Resource provisions*: Under the contract scheme, the company supplies inputs such as seeds, pesticides, and technical advice.
- *Management specifications*: The contract prescribes the production methods, input regimes, and cultivation and harvesting specifications of the grower (e.g., a timetable with dates for planting).

Although the contract binds two parties who are unequal in terms of scale – namely, "the small farmer and the big business" (Glover and Kusterer, 1990) – both benefit from the agreement. Food processing companies often engage in contract farming because their processing plants have high fixed costs. These companies have an interest in inflows of raw materials that are constant, uniformly shaped and of excellent quality, and in correspondence with the plant's capacity (Porter and Phillips-Howard, 1997; Little and Watts, 1994). Contract farming is advantageous to the grower because it allows him to explore reliable new markets that would not necessarily be accessible otherwise. Growers will not cultivate new crops unless they know they can sell them. Processors, in turn, will not invest unless they are sure they can produce the required commodity at the required quality. Both parties derive assurances from contract farming. In addition, contract farming lowers the growers' price risk because prices are set in advance. These fixed prices may be higher than on the open market. Growers also benefit from contract farming because inputs like seeds and fertilizer are often supplied by the company, sometimes on credit. Access to technical assistance from agronomists is another advantage. These fieldworkers teach the growers the skills they will need to introduce new technologies – and all at the company's expense. (Eaton and Shephard, 2001).

The extent to which contract farming can help achieve public goals is controversial. Some companies are already writing sustainability into their business strategies and supplier contracts (e.g. IUCN et al., 1996; GRI, 2002). The Dutch division of Friends of the Earth even sees contract farming as a precondition for sustainable agriculture, arguing that long-term relationships between a grower and a company create opportunities for sustainable development (Milieudefensie, 2003). Others emphasize disadvantages. Contract farming has been blamed (Burch et al., 1990) to threat agrobiodiversity, for example by narrowing the genetic resource base. They point out that contract farming is most fully developed in those sectors with the greatest reliance on just a few plant varieties. Contract farming of monocultures require high levels of chemicals and water, which has a negative effect on the biodiversity in farmlands.

Thus, both positive and negative impacts of contract farming on agrobiodiversity have been identified. In light of the strengths and weaknesses of several contracts, this paper examines the potential contribution of contract farming to agrobiodiversity. In the following, we refer to a food processor as the "company" and a farmer as the "grower".

6.2 Framework of analysis

We have developed an analytical framework to evaluate the potential contribution of contract farming to the promotion of agrobiodiversity. While we compare different contracts, it is not our purpose to judge which one is the best. Instead, we try to ascertain which contractual

arrangements have a positive effect on agrobiodiversity. These characteristics are elicited through the following analytical framework, which cites four research criteria that enable a contract to promote agrobiodiversity. The regulatory process goes through three stages: planning, implementation, and output (Coglianese and Lazer 2003). The four research criteria of the framework refer to these stages. The first one refers to the planning stage; the second to both the planning and the implementation stage; the third to the implementation stage; while the fourth one concerns the outcome stage. The four research criteria are as follows:

1. Agrobiodiversity performance standards must be part of the contract;
2. Contractual guarantees assure that the parties abide by the contract;
3. The grower has to comply with the agrobiodiversity performance standards in the contract;
4. The impact on the physical environment of the farmland is monitored; the contracting parties get feedback on the results.

Regarding the first research criterion, we examine how contracts specify measures for agrobiodiversity-friendly management. To that end, we use the agrobiodiversity management yardstick (AMY) as drawn up by Van Amstel et al. (2007a). This tool classifies agrobiodiversity management in ten farming activities. The standards set forth in the contracts are compared with these categories, and the agrobiodiversity performance standards are grouped in these categories. This classification allows us to compare how different contracts promote agrobiodiversity. AMY is also used to determine whether the standards in the contract schemes are obligatory, optional, or voluntary.

The second research criterion concerns procedural guarantees that give the weakest party in an asymmetric relationship a firmer position when faced with the use or abuse of power by the strongest party. Inequality creates an opportunity for the dominant party to pursue private gains that conflict the formal contract. The dominant party can force the weaker one to bow to these private motives instead of complying with the contract scheme. If these private interests supersede the contract as the informal guidelines for agricultural production, it is no longer possible to assess whether the standards in the contract schemes are effective, simply because they are not carried out. A discipline that has given some insight into the rule of law is legal philosophy. Its practitioners often mention the principles of separation of powers, transparency, and participation as means to diminish asymmetry through regulation (Van Schooten-van der Meer 1997; Vos 2005). These principles are also referred to as principles of Corporate Governance (OECD, 2004). In the following, we consider whether these principles also apply to contract farming.

The third research criterion addresses the growers' compliance with the agrobiodiversity performance standards in the contract. We use the methodology developed by Ruimschotel and further elaborated for certification by Van Erp and Verberk (2003) to analyze how compliance is stimulated in contracts. Ruimschotel identifies eleven potential areas at risk of non-compliance with regulations. The contract schemes are examined to discover how they assure compliance for each risk area.

The fourth research criterion concerns monitoring the ecological impact of contract farming, specifically its effect on the fields. Biodiversity loss is a complex environmental problem. For instance, while pilots or tests suggest that particular management measures would have a positive effect on biodiversity, such measures do not necessarily have a positive effect at a larger scale (e.g.

Kleijn et al.,2006). Thus, the impact of the contract scheme should be evaluated before drawing any conclusions about the effectiveness of a contract. In this paper, the burden of proof lies with the contracting parties; we did not conduct ecological field research ourselves. Expanding on this research criterion, we examine whether there is a feedback loop of results to the contracting parties. The loop would connect the outcome stage to the planning stage. We investigate whether the results of monitoring are communicated to the contracting parties, to improve the quality of the standards.

6.3 Selection of cases

To examine the potential contribution of contract farming to agrobiodiversity management, we have chosen to conduct a comparative case-study analysis. Because the research is explorative, we selected contracts that we would expect to make a greater contribution to agrobiodiversity management than public regulation might. We approached a random selection of Dutch food processing companies and asked them whether they engage in contract farming with environmentally friendly standards that go beyond those imposed by law. For practical reasons, our comparison is limited to arable farming. Agrobiodiversity management varies by branch of agriculture, and public regulation of agrobiodiversity is relatively less complex for arable farming. All selected companies are domiciled in the Netherlands. The reason to conduct this study there is that this country's agricultural industry is large, intensive, innovative, and highly productive. The selected cases are heterogeneous with regard to their scale (regional companies versus multinationals) and crops (five crops of the crop rotation plan are included). While the range makes it difficult to compare the companies, this variety has added value when exploring the potential contribution of contracts to promote agrobiodiversity. The selected case material is drawn from the contracts of the following five firms:

1. *Agrico*: The Agrico Group is a multinational potato growers cooperative that grows, breeds, collects, processes, and markets potatoes. (www.agrico.nl, retrieved April 21, 2006). This study examines the contracts between Agrico and growers for the table market. Table potatoes are partially prepared at a washing and packing station but need further preparation by the consumer. In the contracts, the standards are formulated as market provisions (a good price according to the company, production quota), resource provisions, and management specifications. Agrico requires the growers to have a Food and Safety Certificate Arable Farming (VVAK certificate, HPA Certificeringsoverleg 2005a-b) and EurepGAP (2004 a-d) certificate for their table potatoes.

2. *CSM Sugar:* CSM Sugar is a company that produces sugar and syrups but also pulp, molasses, and lime fertilizer. It is a subsidiary of the multinational bakery supplier CSM (www.csm.nl and www.csmsuiker.nl, retrieved April 21, 2006). The contracts between CSM and Dutch growers of sugar beets are examined in this study. In these contracts, the standards are formulated as market provisions (price corresponding with quality), resource provisions, and management specifications. CSM obliges its contractors to have the Food and Safety Certificate Arable Farming (VVAK certificate, HPA Certificeringsoverleg 2005a-b).

3. *Gulpener*: Gulpener is a regional beer brewer in Limburg, a Dutch province. The brewery emphasizes its regional identity and specialty beers. Gulpener has contracts with barley growers in its home province (www.gulpener.nl, retrieved April 21, 2006). The contracts have market provisions (quota and a price higher than on the market, according to the parties), resource provisions, and management specifications. The contracts contain an obligation to produce in accordance with the eco-label Milieukeur (SMK 2004; 2005b).

4. *Heineken Skylark:* Heineken is one of the five largest breweries in the world (Heineken 2006a). In general, Heineken does not engage in contract farming with growers. One exception is a sustainable agriculture project called Skylark, which was started in 2003 (Heineken 2006b). As of 2006, several other companies take part in Skylark. The companies that joined the "Friends in Rotation" are Suikerunie and CSM Sugar (sugar beets), gebr. Van Liere (onions), Agrarische Unie (cereals), Cargill malt, and Heineken (barley). The contracts for this project include a management specification formulated as a statement of intent to make arable farming more sustainable. In addition, the market provisions are relevant. Any growers joining this project must have a EurepGAP or a VVAK certificate.

5. *Unilever SAI:* Unilever is a Dutch-British manufacturer of brand-name products in food, home care, and personal care. Since 1998, Unilever has run several pilot projects under its "Sustainable Agriculture Initiative" (SAI; Unilever 2003a and b; 2004, 2006). The pilots with contract farmers are in the UK and Germany. Nevertheless, this study focuses on the pea project in the UK, which was selected in order to include long-term sustainability results. The results of the spinach project in Germany are also taken into account in the event they differ from the results in the UK. The Unilever contracts contain market provisions, resource provisions, and management specifications.

The study draws upon several kinds of resources. One is the general information provided by companies, such as websites, annual reports, annual sustainability reports, and publicity leaflets about the projects. In addition, we take non-market-sensitive parts of the contracts into account (i.e., wording in the contracts that is not deemed to disclose classified information). The companies were generally willing to divulge the management specifications, but we were denied access to the market provisions. Furthermore, we held 24 semi-structured interviews with various kinds of actors: growers, contractors, fieldworkers, company managers, auditors, and members of labels. The interviews were made anonymous prior to processing.

6.4 Agrobiodiversity performance standards in contracts

Published ecological knowledge about agrobiodiversity is often fragmentary, uncertain, and location specific, while it is also partly inconsistent (Kassas, 2002; Struik and Almekinders, 2000). Therefore the Agrobiodiversity Management Yardstick (AMY) is also based on expert judgement about the plausibility of relationships between farm management measures and biodiversity on farmlands. In Van Amstel et al. (2007a) the development and content of AMY are explained step-by-step. AMY has 10 categories of farming activities in which about 160 management measures are allocated by the ecological experts.

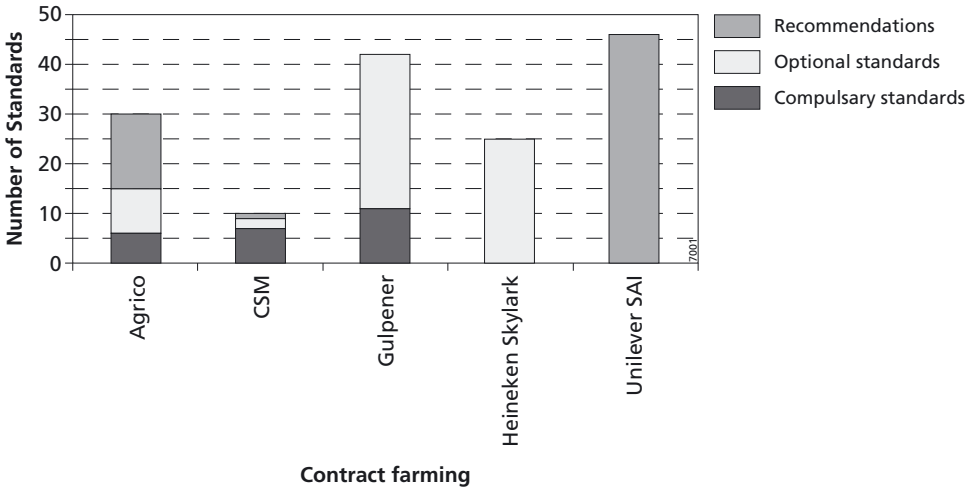

Figure 6.1 Number and nature of standards per contract.

Box 6.1 Examples of agrobiodiversity performance standards in the 5 contracts

Selection of Crop Varieties
- Crop selection is based on regional and farm-specific circumstances

Fertilization
- High price for high-quality product, which requires limited fertilization
- Cover crops
- Limit nitrogen input
- Limit nutrient losses

Crop protection
- Avoidance broad-spectrum insecticides
- pest action thresholds
- Integrated Pest Management
- Use of false seed beds

Management of semi-natural habitats
- Creation of biodiversity plots
- Wild bird food crops
- Artificial nesting and roosting sides as bird boxes or skylark plots
- Bat roosting boxing

In this paper the contractual measures that promote agrobiodiversity may be identified with the Agrobiodiversity Management Yardstick (AMY). In figure 6.1 the amount of agrobiodiversity performance standards per contract are presented, in combination with their nature (obligatory, optional or recommendation).

The comparison between the companies has been somewhat difficult, because we did not have insight into most contracts. For Agrico the amount of standards is a combination of the actual contract and the EurepGAP standards (2004a) that are required in the contract, for CSM it is a combination of the required VVAK standards (HPA, 2005a) and the information from their web site and interviews. Gulpener shows a reflection of the standards of Milieukeur (SMK, 2004) and for Heineken and Unilever the Skylark report (2006b) and Good Agricultural Practice Guidelines (2003a) are guiding. Box 6.1 gives examples of the agrobiodiversity performance standards that are mentioned in these five contracts.

To a certain extent it could be said that all five contracts have standards with a positive impact on agrobiodiversity. The formulation of the standards differs among contracts. In some contracts standards are very concrete, for example about the bird or bat roosting boxes, while others formulate in general to "create biodiversity plots", without mentioning how.

Some companies reward environmental-friendliness with a higher price, whereas it coincides with a high quality product, others recommend while relatively few standards are obligatory. Figure 6.1 shows that the nature of standards also varies from recommendations to compulsary standards.

Figure 6.2 indicates a bias how agrobiodiversity is stimulated by contracts. This figure shows the total amount of agrobiodiversity performance standards of the 5 contracts (n=153). While crop variety is practically ignored as a means to stimulate agrobiodiversity, there is relatively much attention for crop protection, fertilization and the management of (semi) natural habitats.

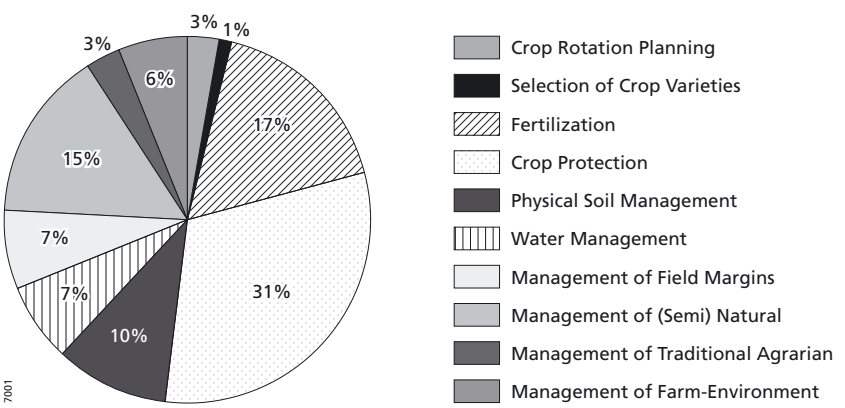

Figure 6.2 Total agrobiodiversity performance standards 5 contracts divided among 10 categories farming activities

6.5 Principles of Corporate Governance

Contractual guarantees are designed to assure that contracting parties act according to the contract. This section considers the assurances that are grounded in rule of law and corporate governance: transparency, separation of powers and participation (OECD, 2004; Van Schooten-van der Meer 1997). As Moore (1973) has already explained, parties can tacitly agree not to live up to the letter of the contract, even if they themselves have concluded the contract. In that event, a conflict arises between the parties' juridical and moral/informal obligations toward each other. There may be a long-term relationship between a grower and a company with a history of highly productive agriculture – sometimes several generations of growers on a farm have been contracted. In such cases, informal arrangements between these parties may increase the chance of mutual agreement on a deviation from the formal contract.

In this section, we examine how those principles of good governance are working in practice and whether they can ensure that all parties will comply with the contract instead of entering into an informal agreement to arrange their production relations differently. This is relevant because contract farming is embedded in a supply chain consisting of other suppliers and – ultimately – the consumer. The principles of good governance in contracts, and the labels which are part of the contracts (EurepGAP, VVAK and Milieukeur), can give the members of the chain information how growers and processors produced the product.

Transparency

In the food supply chain, transparency affects the traceability of a product. Transparency also makes it possible to check on a contracting party and make sure there is nothing to hide. With respect to transparency, not all information in the contracts is relevant when trying to establish how agrobiodiversity performance the contracts are. The market provisions of price and quantity of the produce are generally confidential information and do not tell us much about how environmentally friendly it is. In contrast, market provisions like quality standards for a product, resource provisions, and management specifications do give us some information about biodiversity. Based on various documents, we can assess the biodiversity-friendliness of a product. To do so, the prescriptive parts of a contract must be accessible. Moreover, the descriptions of the growers' compliance with these standards and the environmental impact must be both readily available and understandable.

In practice, transparency about contract farming is an extremely difficult and sensitive issue. In all five cases, third parties have access to some documents, but insufficient to give a comprehensive judgment.

In the five cases, third parties have access to different types of documents. Documents on the sustainability projects of Heineken (2006b) and Unilever (2003a, 2003b) provide descriptions of the project, the steps taken so far, and the monitoring results. In addition, Unilever also gives an overview of the generally applicable measures in their Good Agricultural Practices Guidelines (2003a, 2003b). There is full information sharing within both of Unilever's projects. The company has instated internal transparency in order to learn from the experience of all participants. This approach also offers a means for growers to check whether the company is treating them equitably. For both Unilever and Heineken the investigated contracts are small projects. There is no information available how the projects match and fit in the more mainstream requirements of these processors.

Another type of information is provided by CSM. This company describes how they calculate pricing. Their pricing system, which is based on the quality of the sugar beets, is operated jointly by the company and its growers (http://agrarisch.csmsuiker.nl, retrieved June 2, 2006). High nitrogen input has a negative effect on the quality of the beets. This system is based on the premise that growers will limit the nitrogen input if they are paid less for a low-quality beet. In addition, the company publishes the annual results of the quality system, generalized for the different areas in the Netherlands. This allows each grower to judge whether he has been producing the same quality as the others and to assess differences over time.

As mentioned above, Agrico, CSM and Gulpener refer to labels in their contract. The labels EurepGAP, VVAK, and Milieukeur prescribe how the grower is supposed to behave. Some of these labels also publish limited information about the environmental impact (e.g., SMK 2005b). In general, the information flow about compliance and environmental impact is poor when a prescriptive document is available. Prescriptive contracts seem more limited in the information they share than the reports of the sustainability projects of Heineken and Unilever.

In general it can be said, that it seems that the degree of transparency depends on the character of self-regulation in the contract, specifically on whether it makes recommendations or sets optional or obligatory standards. Companies that write recommendations or optional standards into the contracts seem less reluctant to offer transparency about compliance than companies with compulsory standards.

Separation of powers

Based on their contract freedom, parties make arrangements, carry them out, and correct each other if they are not satisfied with the outcome. In practice, one of the parties might accumulate several powers while the other party does not. In the event the weaker party is not satisfied with the outcome, he would then be unable to negotiate and correct the other party. A clear division of responsibilities among different supervisory, regulatory and enforcement authorities may indicate an integer, professional and objective fulfillment of duties (OECD, 2004)

In literature, contract farming is seen as controversial because of it's unequal relationship between grower and company, especially in developing countries (e.g. Key and Runsten, 1999; Burch et al, 1999; Porter and Phillips-Howard 1997). The relationship between a company and a grower is considered unequal, and not only in terms of scale. The company accumulates multiple powers and responsibilities instead of distributing them over several parties. The degree to which a grower relies on a company will vary. It depends on how much control a company has over a farm (Gafsi and Brossier 1997). The accumulation of several powers by the company can create several dependencies. If the contract contains market provisions, the company becomes one of the financial resources of a grower. If there are resource provisions in the contract, the company can decide which inputs the grower can use, but also how the growers are educated and advised by their own agronomists. If the growers derive the input as a loan from the supplier, an extra interdependency is created. Management specifications in a contract allow the company to prescribe which production process is to be used on the farm. By deploying their own fieldworkers, a company can monitor the grower's implementation of the company's requirements. The link between quality and price of the product ensures that the grower will meet the standards of the contract schemes. In addition, the accumulation of powers creates an opportunity for the company to choose its growers. As there are more growers than companies, the companies can be picky (Eaton and Shephard, 2001). The technical assistance from

agronomists in the fields of all of the growers provides the company with insight in the behavior of all contract growers. On that basis, the management can select the most cooperative ones. In other words, the growers who supply products of the best quality and are most willing to adopt the farming practices that the company prefers are optimizing their chance of continuation of the contractual relationship. As one of the interviewees of a company said:

> "We only select the best farmers and we have long-term relations with them, so they know what we expect of them."

The interviewees perceive the relation between company and grower rather different than the literature. In all five cases, the accumulation of powers of the company does not have a negative effect on the relationship with the grower. On the contrary, from the perspective of the growers and companies, cooperation with the company is often seen as pleasant and trustworthy. The interviewees seem to prefer the company and consider it much better than the critical attitude of auditors from government or certification bodies of labels. In that regard, one of the interviewees of a company remarked that:

> "You can unfortunately no longer get by without labeling because the customer expects oversight of the production process by an independent body".

Contracting parties often emphasize that they are good and willing compliers, which is verified by third party control. They insert a clause in the contract that requires a food-safety certificate or an environmentally friendly label. The compliance of growers to the labeling scheme of a label is certified by independent bodies.

Participation

The principle of participation is firmly embedded in private law as contract freedom. This means that parties are free to enter into an agreement. If they cannot reach consensus through negotiation, there will be no contract. Another aspect of contract freedom is that the parties are held responsible under law for their actions, even when the consequences of living up to a contract are very harmful to one of the parties. However, this does not apply if the agreement was concluded through deceit, threats, or abuse of circumstances.

In the five case-studies, the position of grower and company differs. In most of the cases examined here, individual growers participate indirectly in a contract. A company negotiates with the growers cooperatives and offers the individual grower a contract. That grower can choose to agree with the contract for a commodity and accept it as it is offered, without the opportunity to design it himself or be actively and directly involved in standard-setting.

Although there is voluntary participation, in contract farming, there seems to be a gap between the contracted product and the actual deliverables with respect to the labels specified in the contract. That which the parties have agreed in the contract (namely, compliance with the label) does not match up with what they appear to be doing in practice. Nearly all interviewees (growers, companies, auditors) confirmed that it is possible to pass the periodical audit without living up to the letter of the labeling schemes. They attribute this laxity to the frequency of inspection visits as well as to the qualifications and independence of the auditors. When most of the interviewees (growers and company representatives) were asked to compare compliance with

the labels to compliance with the contracts, they expressed greater confidence in compliance with the contracts.

Furthermore, the growers openly admitted to some of the five companies that they had not met the requirements set by the labels. Essentially, they were evading legislation prohibiting the use of certain pesticides in the Netherlands. Another concrete example they gave was the clandestine disposal of certain proscribed materials; by night, some individuals had been seen dumping these substances in a ditch a few kilometers away from their own farm. The companies often know which growers are using prohibited crop protection chemicals without acknowledging this in their bookkeeping. In general, though, the companies do not mention this to the auditors or government inspectors. When asked, the representatives of these companies said that it was good enough if a grower complied with the formal requirements and had a label. In fact, the grower bears all the risks of non-compliance. Incidentally, one of the most adamant growers we interviewed sketched the prevailing state of trust among the parties in the chain and the general distrust of the auditors and government inspectors. As he remarked:

> "Naturally we [the growers among ourselves and the companies] do not report any infringements to the auditor or the government; obviously, we have the same adversary. Not even if you feel that some practices run against the grain of good business".

The companies' tight-lipped stance is understandable in light of their interests. The interviewees explained that the reason for non-compliance with the label or the law is that the growers are trying to comply with the quality standards that the companies impose on them. A good quality product is rewarded in terms of money and image. The picture becomes even more clouded when a grower delivers an inferior product. The company can then put sanctions on the grower, even if the quality is lower simply because the grower has met the requirements of the law or the label. These reciprocal favors would seem to suggest that, in some cases at least, there is an informal arrangement between the grower and the company, although we did not find any demonstrable proof. Meeting the quality requirements (such as taste, size, amount of certain substances in the product, being free of disease) for the product set forth in the contract would have higher priority than compliance with a label or with the law. In both examples – illegal pesticide and illegal disposal – environmental pollution may occur, and this damage can also have consequences for biodiversity.

We may conclude that the parties are free to enter into a contract that leads to a dependency relationship. The principles of good governance are not sufficiently embedded in contract farming to fully protect a weaker party against a stronger one during the time both parties are bound by this contract. Even though this relationship is asymmetric, it turns out that the parties can build up a bond of trust. We cannot prove that informal arrangements actually exist between the contracting parties. Nonetheless, we can say that in general the contracting parties in this relationship do have the opportunity to make informal arrangements with one another.

6.6 Growers' compliance with contracts

In this section, we examine how the growers' compliance with a contract is guaranteed. The focus is on the standards in the contract schemes, not on the labels. Compliance is evaluated on the basis of the "Table of Eleven" (T11) methodology, as developed by Ruimschotel and further elaborated for certification by Van Erp and Verberk (2003). T11 distinguishes three types of compliance behavior: spontaneous; through control; and through sanctions. It is said to be spontaneous when a grower knows the standards, considers them reasonable, and sees some advantages (including financial ones) in complying with them. A grower is likely to comply as a consequence of control when he calculates his risk of being reported, audited, detected, and selected for extra audits. Compliance through sanctions comes into play when a grower calculates his chance of incurring sanctions and places a certain value on the harm that a sanction may cause.

A complicating factor in this assessment is the lack of transparency in written documents (e.g. annual reports) about the compliance level of growers, the organization and priorities of control, and the amount and type of sanctions. Our major source of information consists of interviews. It should be taken into account that we interviewed various parties who have a long-term trust relationship with each other. In that light, their mutual loyalty may have created some bias in our information. Heineken – who requires a statement of intent to perform and sets optional standards – is the only company that is transparent about the level of compliance. It turns out that growers complied with 80 percent of the optional crop protection measures in project Skylark during the period 2003 – 2005 (Heineken 2006b).

Spontaneous compliance

In private law, the keystone of any contract is spontaneous compliance. As noted above, the contracting parties can agree informally not to comply with parts of the contract scheme, if the situation so requires. Furthermore, the only one who knows about the compliance behavior is the grower himself, which may tempt him not to comply. On the other hand, it is in a company's own interest to know about its growers' compliance with the contract scheme.

A farm's bookkeeping provides insight into the grower's compliance behavior. Since the labels require farmers to keep management records anyway, the companies merely have to aggregate the computerized data received from different growers. This gives the companies insight into the farm-level data and the growers' compliance behavior. The companies can link such data to the environmental results (Unilever 2006). One of the interviewees mentioned that some companies combine that body of information with the data they would need to trace products.

In general, companies do not usually force growers to comply. They prefer to use persuasion: raising awareness and explaining the advantages of compliance but also demonstrating how reasonable the contract is. Some companies also offer support; for instance, they may help growers resolve problems that might otherwise deter them from compliance, even if these problems do not directly affect the company. As noted by one interviewee from a company, their strategy of raising awareness and explaining new management measures has turned the growers' initial resistance into support for the contract. In the five cases, the strategy took various forms: technical assistance by agronomists; courses; kitchen-table discussion groups; trips for growers to meet colleagues in other countries, and so forth. Another example is a Biodiversity Action Plan for a farm, which is designed to serve the grower's particular interests. Sometimes

the company invites third parties to embed the sustainable practices in the management plan and thereby persuade the grower to produce sustainably. In the case of Gulpener, there is a website for consumers, who can go online to find out who the growers are and where they live (www.gulpener.nl, retrieved April 21, 2006). For the spinach fields of Unilever, there even is a partnership with tourist information bureaus, which arrange walking or cycling tours through the fields.

Another way to convince and persuade growers is by evaluating the results of a project. In the pilots of Unilever and Heineken, the growers can tell which areas and indicators they have learned most about and from which they benefit most. Companies also persuade the growers by way of the market provisions in their contracts. Agrico and Gulpener, for example, mention that they pay their contract farmers a good price, which induces them to sign on with this company instead of another.

In all five cases, the growers belong to cooperatives. Some companies educate the growers in farmer groups. These groups give an extra stimulus to spontaneous compliance, according to several interviewees. Members of the group can learn by sharing their experiences. In addition, they encourage each other to implement sustainable measures.

Compliance through control

A company's capacity to audit and impose penalties makes its persuasion strategy more viable. T11 contains four propositions on the risk of inspections due to non-compliance. These are the risk of being reported, the risk of inspection after an infringement, the risk that this infringement will be discovered, and the subsequent risk of re-audits.

The risk of being reported seems small. A farmer may become aware of non-compliance on the part of other growers through the grower groups. These groups provide a forum to discuss supposed misbehavior and thereby make it unnecessary to report an infringement. Theoretically, the opportunity for a company to select the best growers could induce farmers to snitch on each other, especially if a company is willing to accept anonymous tip-offs. That said, none of the interviewees mentioned any such incident.

The risk that an inspection will be held and an infringement detected are greater, as is the risk of being re-audited. The continuous presence of fieldworkers on the farm makes it easier to carry out inspections for compliance with the contract. Unilever's fieldworkers, for example, give an early warning while supervising cultivation. This often amounts to a simple remark like "If you were audited, this would be an infringement for this or that particular reason". After a warning, the grower often corrects the infringement. In the cases of Agrico and CSM, inspection entails checking a small number of relatively unambiguous standards, which are easy to inspect. The inspection carried out by Agrico also depends on the growers' records. Nonetheless, the physical presence of fieldworkers at all stages of the production process makes it plausible that the grower will be motivated to record these aspects correctly, in contrast to the aspects inspected once a year by an auditor of a certification organization. To avoid conflicts of interest, the fieldworkers' own manager checks and supervises their inspections.

Inspections carried out by CSM are indirect. The degree to which the sugar can be extracted from the raw material is determined by another institute, namely IRS. IRS is independent with regard to this test, the amount of money that CSM would have to pay the grower depends on the results of this test. Given the long-term relation between a company and its growers, the company can pay extra attention to those areas where the grower has shown weaknesses.

Compliance through sanctions

T11 identifies two situations where risk of non-compliance arises as a consequence of a sanction regime. The first one is that the chance of incurring a sanction is perceived to be small. The second is that sanctioning does not do the infringer any harm.

Parties can agree on the sanction regime in a contract, but a contract is always an instrument of private law. This means that parties have limited authority compared to the authority of a government. The aims of public and private sanctions also differ. While a public sanction is also a means to educate the infringer and prevent recurrence, a private sanction is intended to re-establish the original situation as agreed in the contract.

A company can sue a grower in civil court to enforce compliance with the contract. But the long-term trust relation between parties makes this unlikely. Moreover, the costs of a judicial process can deter the parties from starting a law suit. Another reason not to go to court is the accumulation of powers of a company. This gives the company some opportunities for extra-legal punishment of a grower in the event of non-compliance. A first preventive informal sanction is that a grower must be able to justify and explain his non-compliance to a technical adviser. Saying that "we always did it that way" is not convincing enough to overrule the technical advice, which is usually underpinned with scientific argumentation and explained extensively to the grower. Another extra-legal sanction is available: the company can exclude a grower from future contracts if he does not comply. In some situations, a company could decide to allot a grower a smaller production quota. This could happen if the fieldworkers get the impression that a grower is unable to deliver a larger quantity while guaranteeing a certain quality. A smaller quota would allow the grower to concentrate on the quality and management provisions. Several important sanctions are connected to the company's quality standards. A grower has to produce raw material of high quality. If the produce does not meet this standard, the company can pay less, which makes the grower feel the consequences where it hurts. A company might also decide not to buy the low-quality raw material at all.

In general, it is plausible that growers will be more willing to comply with a contract than with a label. The company's use of persuasion and its appeal to trust, in combination with the threat of punishment through the accumulation of powers, makes it quite likely that the contract will be implemented properly – or at least according to the mutual informal interpretation of the contract by the contracting parties.

6.7 Monitoring of the ecological impact and feedback loops

In this section, we first assess the ecological impact of a contract. To that end, a causal relationship is presumed to exist between the standards in the contract and the ecological situation on the land under cultivation. To verify the nature of this relationship, we need information about the content of the contract, about the farmer's compliance, and about the biodiversity on the farmland. Furthermore, we must exclude external influences to be certain that it is indeed a causal relationship. Secondly, we assess whether the results of monitoring are communicated to the contracting parties. Doing so would allow them to adjust the standards of a contract to enhance sustainability.

The pilot studies of Unilever and Heineken give due attention to evaluation and monitoring. At the start of these projects, a baseline measurement was made to determine the situation on

Table 6.1 Strengths and weaknesses contract farming

Evaluation criteria	Tools	Strengths	Weaknesses
1. Agrobiodiversity performance standards in contracts	AMY assessing the contracts.	The agrobiodiversity performance standards that are important for the industry are included in the contract.	Some forms of biodiversity receive less attention, such as the non-industrial cultivars and "agrarian nature".
2. Rule of Law	Participation contract	Contract freedom between parties gives them the opportunity to stimulate biodiversity as they see fit	Contract freedom does not prevent informal agreements between parties
	Separation of Powers in contract	1. Accumulation of powers gives the company the opportunity to engineer precisely and decisively. 2. Involvement of more companies creates less accumulation of powers and an opportunity to make a sustainability project less dependent on one company	Accumulation of powers makes the level of sustainability dependent on the company
	Transparency of contract, compliance and impact	Transparency enlarges the learning effect because growers can also learn from each others' experience.	Limited transparency about compliance with prescriptive contracts can create a perception that the growers and company have something to hide from third parties.
3. Growers' compliance	Spontaneous compliance (T1-5)	Contract freedom and persuasion create support and understanding for compliance by the grower.	Dependence on the company side of the contract for continuation and costs for training and education of fieldworkers and growers.
	Compliance through control (T6-9)	Presence of fieldworkers in different stages with advice and audits assure high level of compliance	Combination of advice and audits can indicate a conflict of interests.
	Compliance through sanctions (T10-11)	Sanctions aim to re-establish the agreement between grower and company, which gives opportunity for long-term cooperation	Sanction regime has priority by high-quality produce not (yet) by the level of sustainability
4. Monitoring and feedback	Monitoring of physical environment	1. Monitoring convinces the grower of the relevance of management provisions 2. Monitoring gives an assurance of compliance with contractual management provisions instead of informal agreements	Costs of monitoring can negatively affect the scale of the project
	Feedback mechanisms	The feedback loops create opportunity to adjust the contract scheme	Knowledge available on request does not guarantee that contract parties will ask for more sustainable production methods.

the farms. Heineken gives an overview of 27 measurements and trends pertaining to the ten selected indicators for sustainable arable farming for the period 2003 – 2005. Third parties – for example the volunteers conducting the research on birds for SOVON – may have more expertise in some kinds of measurement. Therefore, Skylark has asked them to carry out the evaluation. The advantage of getting non-governmental organizations involved is that they give legitimacy to the results. Unilever also measured the situation at the start of the project in 1998. Each year, several evaluations are performed, depending on the new measures and experiments. In light of these evaluations, Unilever has created guidelines for sustainable agriculture pertaining to several crops (tea, palm oil, vining peas, spinach and tomatoes). The company got scientists and specialists involved in the procedures. The company also monitored the situation for several years and at several places in order to exclude a time- or place-specific effect and to determine the wider scope of these management measures.

The other three companies do not have a large-scale evaluation and monitoring program. Thus, they do not map any diminishing negative impacts on the environment. Nor do they note any improvement in biodiversity on the farmland of the contracting farmers. Despite the lack of a monitoring program, Agrico and CSM do have access to information on farming, biodiversity, and ecological relationships. Agrico has a large research institute with 96 ha farmland where it can carry out its pilot projects. Both CSM and Agrico financially support and partner with several research institutes, thereby benefiting from their knowledge. These research institutes also investigate the ecological relations as far as these are relevant to cultivating that particular crop; organic farming is one example. The results of this research are not necessarily incorporated in conventional farming contracts, although they could be.

Gulpener is a smaller company and does not have its own research department. For SMK – the owner of the eco-label Milieukeur – biodiversity is a difficult issue, mostly due to its comprehensiveness. The research institutes and consultancies that provide SMK with information do give attention to agrobiodiversity. Milieukeur already has several agrobiodiversity performance standards, though these are not systematically monitored. The impact of crop protection is one of the categories that is measured – but just for one crop a year. In all three cases, information transfer by these research institutes is by request only. Accordingly, there is a gap in knowledge between the results and the standards set forth in the contracts.

6.8 Conclusions

This paper has investigated how contract farming might help promote agrobiodiversity, presenting evidence on the strengths and weaknesses of this practice in five case studies.

Table 6.1 gives an overview of the findings from the five cases. It turns out that contract farming promotes biodiversity in several ways. Its management measures can be integrated into economically sustainable production in pilot studies. And its accumulation of powers gives a company the ability to move purposefully and get quick results. This research confirms that contract farming – as a type of self-regulation in the chain – is flexible and capable of anticipating technological changes. Another strong point is the emphasis placed on the environmental impact of some contracts. Yet another is their internal transparency, allowing the parties to share the results of voluntary or optional measures.

Along with these strengths, contract farming also has some weaknesses with respect to the promotion of agrobiodiversity. First, there is a strong preference to stimulate functional agrobiodiversity through contracts with a focus on the negative consequences of fertilization and crop protection. Crops in the production process are industrial varieties, not regional or traditional ones. This finding partly underlines the conclusions of Burch et al (1990), who found that contract farming diminishes the genetic resource base. Biodiversity with a landscape-ecological function is only promoted in a limited way. Therefore, in our opinion, contract farming has limited potential to promote other types of agrobiodiversity.

Another weakness is that the rule of law is not sufficiently embedded in contract farming. A contribution to biodiversity thereby depends on the motivation of the company. The rule of law cannot stop the contracting parties from spontaneously making informal agreements. The company does have the power to force a grower to comply, using either persuasion or punishment. In the absence of transparency, though, we cannot give a definite answer about which agreements are being enforced by the company, by the contract, or by informal agreement. This makes contract farming a risky self-regulatory instrument within a public policy framework. In that sense, the promotion of agrobiodiversity seems to be subordinate to the production requirements. Accordingly, an increase in contract farming would create uncertainty about compliance with agrobiodiversity performance standards. This risk diminishes when the impact of contract farming is monitored instead – and especially when third parties are involved in monitoring.

For the sake of a future potential contribution to agrobiodiversity, we would recommend the type of contract type used by Heineken. Essentially, this is a contract with a compulsory statement of intent to become more sustainable in combination with an obligation to report on the steps being taken in that direction. Both the measurement and monitoring of the results are carried out by external parties who are well qualified and can communicate about results. In this approach, the growers would have to explain which measures they will take to make their agricultural production more sustainable. Nonetheless, this approach could remove the taboo on compliance with mandatory standards. The less obligatory the rules, the more willing the farmers and companies would be to talk about them, and thus the more transparent the communication would be. We should recall that the practice of preservation and sustainable use of biodiversity in the agricultural sector is still in its infancy. In that light, we would advise governments to stimulate this strategy. Doing so would increase the amount of applicable knowledge while making it accessible to a wider range of growers.

First of all, a government could offer support by taking on the role of a knowledge broker. This is feasible in the Netherlands, given this country's current policy on agrobiodiversity. The fact is that nowadays government authorities want to stimulate instead of regulate. They can apply their knowledge – not only of the social and scientific factors but also of the actors involved – to the task of making connections among the companies, ecological researchers, consultancy bureaus, and organizations in civil society. It is our opinion that they can also provide financial support for concrete projects and thereby require transparency from the recipients and (annual) reporting on the results.

7 Conclusions and Reflections

7.1 Introduction

The objective of this research is to gain insight into industry self-regulation as a regulatory strategy for conservation and sustainable use of agrobiodiversity in the Netherlands by evaluating the reliability of the practices of industry self-regulations among food suppliers on the Dutch market. Three different types of industry self-regulation were assessed: eco-labels belonging to international labeling families, product-specific eco-labels and contract farming.

The research takes a socio-legal approach, implying that the focus is on regulation in practice as opposed to regulation on paper. Self-regulation is seen as a cyclic regulatory process with a planning, implementation and outcome stage and feedback loops between the different stages (Coglianese and Lazer, 2003). The effectiveness of self-regulation cannot automatically be assumed (Griffiths, 1996). Participants in self-regulation might have to make a normative appraisal between the two sustainability values of 'profit' and 'planet' in the different regulatory stages (Gunningham and Rees, 1997). There is a situation of legal pluralism here: participants in self-regulation have to deal with many regulatory sources while other self-regulations can be more clear, more urgent or more relevant for an actor in a specific context. In addition, regulatory communication is in itself problematic and distorted. Messages are communicated by intermediaries, each having their own interests and limited capacities and resources.

The reliability of industry self-regulation is a relatively complex term because of the aspects set out in the foregoing. Reliability is defined as: the competence of a food company or food supply chain to prove, and at all times guarantee that agrobiodiversity objectives are being achieved through industry self-regulation.

A distinction is made between the substantive and the procedural dimension of reliability. An evaluation of program theory of agrobiodiversity in industry self-regulation is carried out to analyze how agrobiodiversity management is integrated in the agrobiodiversity performance standards of feasible normative frameworks of industry self-regulations. A process evaluation of the clusters of industry self-regulation is performed in order to understand the guarantees for reliability in the process of industry self-regulation. The results of this research strategy provide insight into the procedural dimension of reliability: an assessment is made of the research criteria 'rule of law', 'compliance', 'monitoring' and 'feedback'.

This chapter contains both conclusions and reflections. First, the conclusions regarding the reliability of the evaluated self-regulations are presented in section 7.2. The consequences of the conclusions for several participants and non-participants in industry self-regulation are set out in section 7.3. Reliability is seen as a relative concept depending on the position and relations of an actor. Section 7.4 compares the results of this research with literature about industry self-regulation. The research perspective and methodology is reflected upon in section 7.5.

7.2 Reliability to promote agrobiodiversity

The general conclusion is hardly surprising: that all the evaluated self-regulations to stimulate agrobiodiversity were neither 100% reliable nor 100% unreliable. All are to be found in a gray area, the twilight zone between reliability and unreliability. They all contained aspects that need to be improved. The conclusion that none of the industry self-regulations were completely reliable is consistent with many publications on this topic (e.g. Parker, 2002; Gunningham and Rees, 1997).

Secondly, considering the methodology used, Jordans Conservation Grade is the most reliable self-regulation with regard to both the substantive and the procedural dimension. This self-regulation has the highest number of agrobiodiversity performance standards in the labeling scheme, and is one of the few self-regulations that integrates environmental impact monitoring in the regulatory cycle.

This section explains which elements are more reliable and which are less reliable by using the research model structure illustrated in figure 2.2. The research model consists of five layers and the headings in this section are organized conform the research criteria in the fourth layer of the model. These research criteria are: agrobiodiversity performance standards in self-regulatory schemes, integration of rule of law in the structure of self-regulation, compliance behavior of farmers, monitoring of the ecological impact on the physical environmental and feedback loop of the outcome stage to the planning stage and implementation stage. The conclusions regarding the fourth and fifth research criteria are combined.

Agrobiodiversity performance standards in self-regulatory schemes

The conceptualization of conservation and the sustainable use of agrobiodiversity into concrete and feasible standards in self-regulatory schemes proved possible for food suppliers. Agrobiodiversity management is to a certain extent included in all self-regulatory schemes. The AMY categories of 'fertilization' (no. 3), 'crop protection' (no. 4), 'soil management' (no. 5) and 'management of farm-environment linkages' (no.10) were the categories most often mentioned in the self-regulations. Figure 7.1 shows that 13 self-regulations address categories 4 and 5, while 12 self-regulations focus on the categories 3 and 10. In government circles (both in the Netherlands and the EU) fertilization, crop protection and the management of farm-environmental linkages are three policy areas which involve a large (sometimes enormous) amount of regulatory information. Although there is no causal relationship demonstrated between public regulation and industry self-regulation in this research, the emphasis on these categories seems to support the view that self-regulation could be seen as a supplement to command and control regulation (Priest, 1997; Donner, 1993). Industry self-regulation goes beyond command and control regulation in terms of the environmental themes already framed and legislated by government.

However, category 2 'selection of crop varieties' is only included in 2 self-regulations. Voluntary industry self-regulation is not adequately equipped to solve the problem of loss of crop varieties. The only self-regulations explicitly stating that traditional and regional crops must be used are the regional eco-label *Erkend Streekproduct* and one of the contracts. This regional label can be qualified as a food supplier self-regulation, but it is not very 'industrial' in the sense that it foresees in large-scale production.

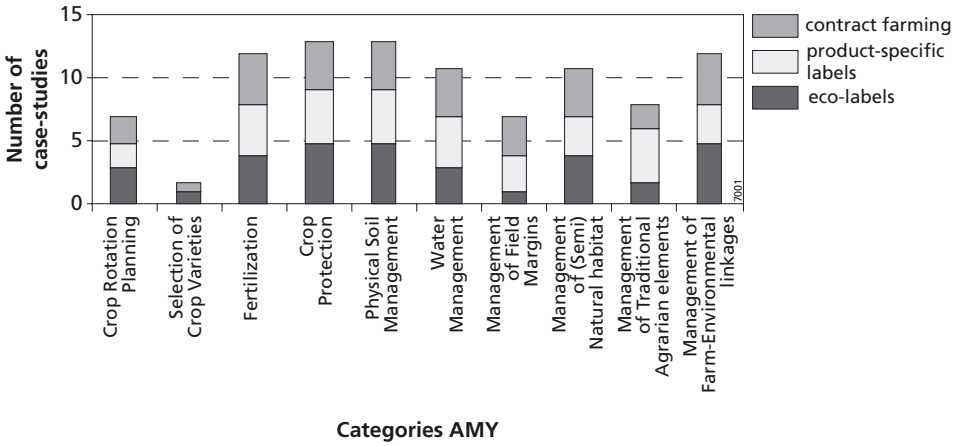

Figure 7.1 Scores of the three types of industry self-regulation in the different categories of agrobiodiversity management

Burch et al., (1990) concluded that contract farming narrows the genetic resource base of crops. About 80 to 90 percent of the world's food today is produced from 10 to 20 percent of the cultivated plant species (Heller and Keoleian, 2003). This project underlines Burch et al., (1990) in the sense that selection of crop varieties is hardly an issue for industry self-regulations and affects the tendency to narrow the genetic base of crops. Neither contract farming, nor eco-labeling focuses on this aspect of the problem of agrobiodiversity loss (Van Amstel et al., 2006, 2007a and 2007b).

It should be emphasized that the fifteen industry self-regulations together cover all AMY categories, while coverage of all themes in a single self-regulation is seldom seen. Therefore, we can conclude that there are opportunities to become knowledgeable about self-regulations from others in the same field. This analysis has shown that there are sufficient opportunities to learn from one another.

For the further conceptualization of agrobiodiversity, contract farming – under certain circumstances – could be a useful instrument, resulting in ecological discoveries about agrobiodiversity and mutual relations between organisms in the agro-ecosystem. If a food processing business and a grower are willing to invest in agrobiodiversity, experimental contract farming has the ability to discover new, relevant agrobiodiversity performance measures. It is possible to select innovative and motivated farmers through education and by using computer-tools, more frequent controls and the technical expertise of agricultural experts. Research networks, consisting of conservation organizations, food processing businesses and farmers, could be established in order to develop this knowledge and monitor the environmental impact on farmland.

Integration of rule of law in the structure of self-regulation

While the substantive dimension of reliability is evaluated as regulation on paper, the evaluation of the procedural dimension also looks at the workings of a regulation in practice. The criteria taken into consideration are the degree of integration of rule of law in the structure of self-regulations, degree of compliance in the implementation stage and the degree of measuring and monitoring of the ecological impact in the outcome stage. The assessment also looks at how well the feedback loops function between the different stages. In this section conclusions are drawn about the degree to which the principles of rule of law are included in the self-regulatory schemes in all stages of self-regulation. The three principles assessed are 'transparency', 'separation of powers' and 'participation'.

Firstly, the fact that transparency was lacking proved to be a major bottleneck for the research. We have looked at the information available on self-regulation schemes, the aspect of compliance and the monitoring of the ecological impact. Information about the implementation and outcome stage was scarce. Moreover, the existing information seemed inconsistent, especially in terms of compliance. Neither labeling nor contract farming is organized or structured in such a way that it discloses information about compliance to the non-participants in industry self-regulation.

Most eco-labels provide information about the substantive standards in the regulatory scheme. Information as to how industry self-regulation is organized and structured, and information showing which participants are involved in standard-setting, is also available. This information about substantive standards is more concerned with 'regulation on paper' and fails to address 'regulation in action'.

With respect to the implementation stage, the labeling schemes often only regulate the enforcement capacity (audits, sanctions, etc.) and fail to address the rule-following behavior of the producer. Officially, a product label or certificate must assure outsiders that the rule-following behavior of producers is exactly conform the written regulation. In the official reading it is sufficient to publish the labeling scheme and use the label to show that the producer has passed the annual audit. Other information contradicts this official reading: interviews with farmers, auditors and labeling organization participants indicated a difference between the written rules of the labeling schemes and how the participants actually behave. They explained that the enforcement process is not yet optimal and spoke of several detected and undetected infringements on the part of producers. Publications by other scientists and non-governmental organizations confirm this view (Parker, 2002; Christmann and Taylor 2001, 2005; www.keurmerken.info and www.fairfood.org, viewed on January 19, 2007). This indicates that industry self-regulation is prone to misinterpretation, transformation, distorted communication, and even deliberate circumvention of the rules.

It would be far too simple to conclude that the official method used today for most eco-labels will not suffice. If a regulatory scheme prescribes long-term systematic changes in farm management, such as keeping a certain percentage of the land non-productive or preserving specific landscape elements such as trees or hedgerows, then it becomes more difficult for a producer to prepare the audit. In such cases, communication about a labeling scheme and the actual behavior might be easier.

Another strategy to convince non-participants about the benefits of industry self-regulation is to achieve a higher level of transparency about the results of industry self-regulation in the

outcome stage. Only the few self-regulations that actually measure the impact on biodiversity, also communicate the results.

There is less transparency about contract farming than about eco-labeling. Contract farming is therefore more difficult to research. However, exceptions in this respect are the small sustainability projects. If it is in the interests of a (food processing) company to share information about projects, then that information is made available (albeit on a more general level than specified in the contract). While a food processing company's sustainability report does provide information, that information is more likely to be focused on the company itself than on the actual agricultural production. There is more information available in specific sustainability projects, although the communication strategy differs from eco-labeling. Reports are published on agricultural practices, monitoring results and, occasionally, communications on the sustainability approach taken are sent out to others in the immediate vicinity of the growers. This creates opportunities for recreation or tourism.

To conclude, both eco-labeling and contract farming fail to narrow the gap in information between the seller and the purchaser (non-participant). Thereby industry self-regulation does not fulfill the theoretical promise to make the market more transparent. This conclusion is in line with the underlying assumption formulated by Griffiths (1996) that intermediaries simplify legal messages. Such messages can subsequently be distorted by these intermediaries who take care of their own interests.

Secondly, the separation of powers principle is mostly used in the eco-labeling system to convince outsiders that a self-regulation is reliable. The separation of powers principle also gives an extra guarantee that the agrobiodiversity performance standards of a labeling scheme are both desirable and feasible, by including third parties in the self-regulation. The organizational structure of eco-labels of international labeling families and product-specific eco-labels divides the responsibilities among different authorities. While separation of powers is not institutionalized in contract farming, third parties are occasionally involved in industry self-regulation, for example for a species count. And although they are involved, they have authority with regard to the development and content of the self-regulation. When they are structurally excluded from the self-regulatory process, there is an institutionalized uncertainty as to whether companies are indeed honest about their agrobiodiversity performance and thus no guarantees can be given to a purchaser.

Thirdly, there is a difference between eco-labels and contract farming in terms of the degree of participation. Some eco-labeling systems involve a variety of societal actors in the standardization process and hearings are organized. Others only include chain parties in the standardization process. Contract farming does not directly involve parties other than the contracting company and the farmer (with the exception of Heineken and Unilever sustainability projects).

A reason for parties to participate in the standardization process is given in the literature as being a wider basis of support. A second reason mentioned in literature is a higher level of sustainability (Van Schooten-van der Meer, 1997; Nillson et al., 2003). We found no evidence in support of the notion for a wider basis of support or more consumer confidence. The interviewees did not see any link between the degree of participation to the support of a self-regulation. In contrast, a tentative conclusion is that most democratic self-regulations include more far-reaching sustainability standards in the regulatory scheme. However, this is difficult

to underpin given that we were unable to give efficiency scores for product-specific labeling and contract farming. The efficiency results for the eco-labels of international labeling families (figure 3.6) indicate this tendency.

Compliance behavior of farmers

One aspect which is often criticized in literature is the degree of compliance with self-regulation (e.g. Gunningham and Rees, 1997; Parker, 2002). Our results confirm the conclusion in literature that compliance is one of the weak elements of industry self-regulation. Neither for eco-labels nor for contract farming are participants able to guarantee constant compliance with the rules of a self-regulatory scheme.

For those eco-labeling systems subjected to independent third party audits the focus is on proving and assuring the compliance of producers by stressing the powers of the enforcement institutions. The formalized certification bodies with independent auditors are a new industry with its own interests. Nevertheless it is debatable whether compliance with the standards by means of auditing during the production process is the point that needs to be emphasized. Audits are carried out once in every 12 or 18 months. There are also accounts and rumors of how to pass the audit without integrating the standards in farm management. If emphasis on the enforcement apparatus remains intact, it would be advisable to improve reliability by integrating and institutionalizing the responsibility for monitoring the environmental (agrobiodiversity) impact.

The uncertainty as to how producers interpret standards in contract farming is connected to the lack of transparency and participation discussed above. Thus far, the indications are that through a combination of frequent education, negotiation and inspection, farmers and agronomical services together create a practice which is closely related to the standards contained in the contract. However, this is uncertain since it is not communicated well to outsiders.

Monitoring of the ecological impact on the physical environmental and feedback loop of the outcome stage to the planning stage and implementation stage

A major weakness is that industry self-regulations pay relatively little attention to measuring and monitoring the impact of regulatory schemes in the outcome stage. Monitoring results is said to be difficult and expensive, while causal relationships are complicated. Yet there is a glimmer of hope on the horizon in that some companies are actually measuring biodiversity, and that others see its relevance and are giving it consideration. Since measuring and monitoring is limited, feedback about results is also limited.

If participants in self-regulation started to measure and monitor, they could overthrow the uncertainty that has been created in terms of behavior and replace it with the results of their own conduct for biodiversity and the environment. Such information would be relevant for outsiders (does the self-regulation in question really matter in practice?) such as consumers and government. One of the advantages in this respect is that it is much easier to communicate environmental improvements than to communicate compliance with self-regulation. The Conservation Grade website for example claims "to deliver a five times increase in wildlife" (www.conservationgrade.co.uk, consulted December 8, 2006) since the beginning of this self-regulation. This increase has been proven by research conducted by an NGO and not by research carried out by the company itself. Communication of these results not only indicates that conservation and sustainable use of agrobiodiversity is part of the farm management, it is

intended to make the purchaser aware that purchasing a particular product does matter and will make a difference. After all, when there is a 'five times improvement' over a certain period of time for that particular area, the product might also perform better than other products.

Although measuring, monitoring and establishing causal relationships between regulation, behavior and results is (still) difficult, it would present the opportunity to start framing the environmental friendliness (including biodiversity) in terms of impact instead of assuring compliance with environmental-friendly rules.

7.3 Reliability and different societal actors

Now that we have reached the conclusion that industry self-regulation is not completely reliable, the question still remains: whether and if so why does industry self-regulation still make sense? In other words: is industry self-regulation of agrobiodiversity reliable enough in the communication between seller and purchaser? Can the industry self-regulation 'outsider' trust the 'insider', even though there is not 100% reliability of self-regulation.

While reliability is a concept that focuses on the verifiable expertness or competence of an institution, Poortinga (2005) shows that the element of trust has two general components on an empirical level. These components are 'competence' and 'care' (Johnson, 1999). Competence is the verifiable expertness of an organization. Care is "a cluster of several instinctive components" (Metlay, 1999). The care component overlaps with the concept of credibility as defined by Nilsson et al., (2003): "the state in which an organization *is held in high regard and trusted* by other parties because of its fair and honest business practices" (italics MvA).

This distinction between the components 'competence' and 'care' makes it clear that answering the question whether self-regulation is reliable enough will be based on a certain amount of subjectivity regarding the weight attached to the competence component. This subjectivity probably differs for each individual, depending on individual motivations such as trust in institutions in general and awareness of the environment in particular. In addition, the judgment of whether an industry self-regulation is sufficiently reliable also depends on the type of actor.

This section discusses the consequences of self-regulations which are not completely reliable for the different actors, the question whether they consider self-regulation reliable enough, and the possibilities to improve the aspect of reliability. The different types of actors reviewed are food suppliers, consumers and government.

Food suppliers

For food suppliers the substantive dimension of reliability can be seen as an opportunity. They could help to improve the substantive dimension of reliability as many agrobiodiversity discoveries have yet to be made and a theory has still to be developed about what effectiveness means for the outcome of (industry self-) regulation on farmland: is it simply a question of more species, or are there also qualitative requirements involved, such as more rare and threatened species. By conducting agrobiodiversity experiments through industry self-regulation companies could contribute to this development. For example through partnerships or cooperation between knowledge institutes, parties in the food supply chain and environmental organizations. In that sense the Skylark project, initiated by Heineken, which involves different farmers and different

food suppliers, is an interesting and inspiring example. Unilever started a stakeholder dialogue and chose biodiversity as an indicator of sustainable arable farming: Heineken adopted this indicator in the Skylark project and invited other businesses in the food processing industry to join them in the project; this might have a positive effect on their perception of agrobiodiversity.

In the institutional approach taken by Gunningham and Rees (1997), two stages of 'moralization of the industry' are distinguished: the development of industry morality and its institutionalization. In the first stage an industry morality must be developed in discourse, by reflecting on and discussing the utilization of shared values to establish commitment. The result is a reconstruction of the existing industry behavior before the normative framework is formulated. The Skylark project, adopting biodiversity as one of Unilever's indicators, is an example of industry moralization and its broader institutionalization.

Agrobiodiversity management by means of industry self-regulation offers food suppliers a concrete opportunity in terms of corporate social responsibility and contract farming. Forerunner food suppliers can take their time to translate agrobiodiversity into agrobiodiversity performance measures which they develop and research themselves. However, the industry is not pressured by government or non governmental organizations. This means that the demand for agrobiodiversity performance measures will most likely not have broad support among food suppliers. The further development of agrobiodiversity management will be slow and limited to the forerunners as opposed to being taken up by a large number of food supply companies.

Other industry self-regulations develop in a slightly different way, as described by Gunningham and Rees (1997). Discussions have been held about sustainable agricultural production in general, but not about (agro)biodiversity in particular. Stimulation of agrobiodiversity, for example, is not debated actively; it is not even mentioned in the Demeter and Milieukeur self-regulations. Although agrobiodiversity is not identified as a major environmental issue for these particular self-regulations, there are standards in the self-regulatory schemes which have the (unintentional) consequence of conservation and the sustainable use of agrobiodiversity. Both Demeter and Milieukeur have a relatively high number of agrobiodiversity performance standards.

The question whether industry self-regulation is reliable enough is relevant in the food supply chain. For the participants it is important since reliability feeds the motivation to stay involved. For non-participants, sufficient reliability may be an incentive to become involved either by becoming a participant or by including some of the agrobiodiversity performance standards of the self-regulatory scheme in their own production process (CCA, 2004). Although the issue of reliability is important for the food supply chain the aspect of feasibility often is a more urgent problem. None of the investigated self-regulations are completely reliable. Another example of how difficult it is to ensure the reliability of a production method in a production chain is given by Teun van de Keuken, the manufacturer of Tony's Chocolonely chocolate bars. In his – legal and media – struggle against slave-free chocolate he illustrates how difficult it can be for a company in the supply chain to guarantee '100% slave-free' chocolate. Although he admits that it is virtually impossible to give a 100% guarantee, he demonstrates a passion and intense concern to produce in a more sustainable fashion. He has even changed the '100% slave-free' label to 'on our way to 100% slave-free' in order to stress the impossibility of giving such a guarantee to consumers without compromising the goal.

If reliability proves to be almost unmanageable in practice, how then can we discern those companies that are really intent on improving the environment from those that simply profess to do so? We gave the example of Tony's Chocolonely because it not only demonstrates a food supplier's adeptness, but also the great efforts involved. The message here is that while the manufacturer provides evidence of slave-free production as far as possible, he is still unable to prove it completely. Another example of this approach is the Shakie's company. On some of their products and on their website Shakie's explains that they use organic products where at all possible. They state that their belief that organic farming is important because it leads to the recovery and conservation of nature and landscape. Some of their product wrappers give a telephone number consumers can call to verify whether that particular product is produced from organic fruits or vegetables.

The two examples given above demonstrate another way of informing non-participants of self-regulation. As long as labeling only emphasizes the ability to prove that a product is produced sustainably, the reliability gap remains. If companies could find a way to include the struggle for sustainability on labels and show their knowledge and their good intentions, even if it is unable to give absolute proof of reliability, labeling would then inform outsiders of the self-regulation more accurately and give them the choice of whether to trust a label or not on the basis of more realistic information.

Consumers

The outcome of this research causes several dilemmas of reliability and credibility for those consumers wishing to buy environmental-friendly products.

Firstly, from the consumer's point of view, purchasing a product means showing credibility; not purchasing it implies the opposite. With regard to labels only emphasizing the company's knowledge, there is no middle road: you either purchase or not. A 100% reliable self-regulation deserves credibility, but none of the assessed self-regulations are completely reliable. Still buying, to reward the food supplier's good will and his efforts? Even if as a consumer you are aware that producers are tempted to cheat, especially if you are willing to pay more? Moreover, making a purchase is rewarding the industry for not doing it's job properly and does not stimulate it to become more reliable. Buying labeled products can in practice mean rewarding uncertainty about compliance. However, not purchasing the environment friendly product but a conventional one is buying a product which is more likely to be an inferior product in terms of sustainability and possibly also produced by a food supplier who has no interest in the environment at all.

With regard to most of today's labels there is no room for products which are only 'on their way to 100%'. As mentioned above, a change in communication strategy to obtain the consumer's trust by showing both knowledge and concern, could reverse this situation.

The second dilemma for a consumer is the fact that it is impossible to judge which is 'the best' agrobiodiversity self-regulation and to compare the different self-regulations. It is not clear how the different agrobiodiversity performance standards in self-regulations weigh up in relation to each other and which product is the best to purchase in terms of agrobiodiversity performance. To a certain extent AMY could help the consumer make his choice by mapping the number of standards and in certain cases their efficacy. Even then it remains difficult since current scientific state of the art does not make it possible to compare the impact of different cumulative standards of self-regulations. Information provided by NGOs could also be helpful in choosing

which product to purchase. The websites on which NGOs assess and judge eco-labels are more informative than those that simply give a description of the labels.

The inability to compare not only relies on the scientific state of the art, there is also an underlying normative conflict. Is conservation or sustainable use a better management strategy for agrobiodiversity? Should a self-regulation focus in depth on, for example, bird habitat management or a reduction in the use of pesticides or both, but more in general to become the most biodiversity-friendly self-regulation? Each choice will create its own agrobiodiversity and is the one better than the other? Natural science has not (yet) been able to answer this question, and maybe it never will.

Thirdly, procedural measures make it difficult for consumers to compare products. With voluntary and optional measures a purchaser is unaware which measures are chosen and adopted and which measures are not included in farm management. Additionally, the rule seen as an 'if…then…' statement is relevant to explain why it is difficult for consumers to be able to make a comparison. If an 'if' of the different self-regulated products is the same, it might be possible to make some comparisons. However, the situational conditions differ for different producers in different countries: climatological and geographical circumstances vary. In other words, there are different 'ifs', which are also usually followed by different 'thens'. Self-regulations do not provide any information about the situational circumstances of a farmer, only about the 'thens': the rules complied with. But how, as a consumer, to compare, rank these measures and standards of labeling schemes if producer circumstances and the meaning of the self-regulatory scheme in that specific context is unclear? Self-regulations do not, and cannot, fulfill their promise to create market transparency. Consequently, consumers can only make an abstract and thus hypothetical comparison.

In addition, in the interviews several food suppliers stated that it is in their interests that labeled and conventional products cannot be compared. Their aim with an eco-label is to distinguish their products from others. If comparison is possible, then it is also possible to verify that one company's labeled product is less environmental-friendly than that of another. More importantly, for food suppliers who also offer conventional products, a ranking in environment friendly labels can create a perception that the conventional products are *not* environment friendly at all. From the supplier's point of view, this is something that must be avoided at all costs.

Government

Jordans, the company investigated giving the most attention to monitoring and measuring effects, claims to 'deliver a five times increase in wildlife' in the United Kingdom through voluntary self-regulation. And this, by the way, is a conventional industrial supplier that offers their products in mainstream supermarkets. It seems that with an anticipatory, facilitating government, a certain degree of the potential for agrobiodiversity self-regulation remains unutilized. We suspect that if governments and NGOs continue to give low priority to policy on agrobiodiversity, then the possibilities to improve the potential for agrobiodiversity will continue to be limited. All but one of the fifteen investigated self-regulations were voluntary self-regulations; the exception being EKO, the organic label based on EU regulation. Would the agrobiodiversity performance of these self-regulations improve if agrobiodiversity-friendliness is enforced by the government?

And would other companies adopt agrobiodiversity performance measures? An answer in the affirmative would imply a radical and unlikely change in current government policy.

The government's attitude towards the agrobiodiversity performance of industry self-regulations is verbose. The current attitude set out in policy documents and the attitudes of policy makers is to 'stimulate' and not to 'regulate' agrobiodiversity. In contrast, there are many other environmental topics which are governed by legislation that stipulates exactly how a company may and may not act. Most of the agrobiodiversity performance standards in self-regulation were found in the categories of fertilization, crop protection and the management of semi-natural habitats. There are several specific international and national command and control regulations in place for crop protection and fertilization, and subsidy is available for the management of semi-natural habitats. In some self-regulations, government regulation is mentioned explicitly as the 'zero level' thus distinguishing the self-regulation by virtue of stricter or more far-reaching standards.

We see that the approach taken by this government, to stimulate agrobiodiversity and to regulate other aspects concerned with the environment, is neither helpful nor strategic on the route towards stimulating agrobiodiversity among food suppliers. It gives an implicit message that other environmental subjects are more needy of regulation. Self-regulations already emphasize those environmental topics that are regulated, and as an (unintended) effect agrobiodiversity is thus stimulated. The concept of agrobiodiversity seems unnecessary in order to reach the desired result. In other words, when compared with the concept of sustainable agriculture, the added value of the concept of agrobiodiversity in policy has not yet been proven. Agrobiodiversity is insufficiently distinguished from other environmental topics.

A possibility for the government to stimulate agrobiodiversity – both in the national and international dimension – could be to facilitate a knowledge platform which would recognize this added value. Communicating this knowledge to different societal parties and stimulating partnerships between companies in the food processing industry, farmers, scientists and government (e.g. the Skylark project) could be a constructive way for the government to contribute to conservation and the sustainable use of agrobiodiversity.

In addition to agrobiodiversity management, the quality of labeling should be another point of concern for the government. We support the decision of the Dutch Government to set up a database for sustainability labels (VROM, 2004), especially if it contains a label reliability assessment. The procedural dimension as assessed in this research could be used to assess the procedural dimension of the labels in that database. Currently, the procedural design of the different self-regulations that have been evaluated varies considerably and thus confuses consumers. An eco-label is unable to make the market fully transparency for consumers.

Another role for the government is to create clarity about what certification or labeling means, and which procedural quality guarantees are given. One concrete suggestion would be to establish a single procedure to offer legal protection to a term such as 'label', 'certification' or a new term, listing several quality requirements. Possible quality requirements could be: accreditation, independent audits by a certification organization, the possibility for third parties to assess unspecified results or audit generalizations, an independent standardization body and independent verification of the impact on the physical environment.

The government does not necessarily need to execute these tasks itself; they are now performed by certification and accreditation bodies. It is the government's task to make these procedural aspects uniform in order to realize a self-regulatory instrument to increase the aspect of reliability.

7.4 Results compared to the literature about industry self-regulation

From the literature we see that self-regulation functions better in some circumstances than in others (Gunningham and Grabosky, 1998). Havinga (2006), Parker (2002), Kolk and Van Tulder (2002), and King and Lenox (2002) identified conditions for the success or effectiveness of self-regulation. The type of industry which is seen as most suitable for self-regulation is a highly organized sector with a small number of actors. If a large part of the sector refuses to comply with self-regulation or compete in terms of price and quality, but prefers to adopt lower quality standards, then the effectiveness of self-regulation is threatened.

Company top management should become involved and self-regulation integrated into everyday operations. The attitude of employees should be professional; they should be motivated to follow a policy of self-regulation. Another condition is that there should be sufficient overlap regarding the general concern for private and public interests. The government and other external parties should put a certain amount of pressure on industries and free rider behavior of individual companies should be avoided.

The research model developed in this dissertation could also be seen as a normative model. For it to be successful, self-regulation must be reliable, and for self-regulation to achieve this it must integrate principles of rule of law, concrete standards in a normative framework, compliance and monitoring of the impact of the environment.

Some of the conditions set out in literature and the research criteria and results in the research model overlap, such as the self-regulatory schemes related to everyday activities and the potential for compliance of responsible companies. Based on our research results we would choose a different formulation for the condition framed in literature as 'pressure from external parties' (Gunningham and Rees, 1997). In some self-regulations the involvement of external parties is seen as an added value for a better quality of self-regulation. A nature conservation organization is skilled in counting birds, for example. Even without pressure the involvement of this external party improves the quality and reliability of self-regulation.

With regard to the condition of a highly organized sector with few actors, our conclusion is that this is not essential, even though such circumstances can facilitate the social working of self-regulation. While the aspect of organization in the sector analyzed is relatively low, there are many actors and some of the self-regulations, such as Conservation Grade or Milieukeur, in this sector are well-formulated and institutionalized.

Two conditions for success: 1) top management involvement and 2) internal motivation with regard to self-regulation as part of the professional attitude of employees, were not assessed with the research model. As stated in section 7.3, inclusion of the degree of involvement and motivation of management and employees in self-regulation would improve the accuracy of self-regulations. If these criteria were included in the research model it would become a more powerful tool.

Table 7.1 Advantages of industry self-regulation in literature

Advantages for	Also advantages for	Disadvantages for
Industry: governments sometimes reward companies with a less strict license or permit regime (Van der Woerd, 1997)	Government: fewer inspections and lower costs	
Innovative and technological improvements of self-regulation are easier assimilated than command and control regulation (Iannuzzi, 2002)	If true: the environment/ biodiversity	Other parties: unable to verify
Companies are considered as well-informed regulators that have a detailed knowledge of the industry; this enables them to regulate more effectively and accurately (Gunningham and Grabosky, 1998)		Others: knowledge gives the opportunity to choose the 'easy' environmental problems.
Opportunity to standardize an environmental theme in self-regulation with regard to own preferences and insights (Iannuzzi, 2002).	Government: fewer inspections and lower costs	The environment: possibly not the most far-reaching standards.
Forerunners have leading position and can more easily comply with command and control regulation. Therefore there is less risk of sanctions (Iannuzzi, 2002)		Others: creates lucrative opportunity for non-compliance
Self-regulation is a more flexible regulatory instrument than command and control regulation (Gunningham and Grabosky, 1998)	Environment: quick introduction new clean technologies	
Certification and accreditation organizations: new interest groups emerge that make independent audits their business and have an institutionalized interest to prove that labeling is most reliable type of self-regulation (De Graaff, 1995; Erskine and Collins 1997; Kirchhoff 2000)		Others: mix of own institutionalized interests and interests of others
Consumer: Inform the consumer and increase transparency in the market (Erskine and Collins 1997; Nunes and Riyanto, 2005)		Consumers: self-regulation does not have the intended effects on market transparency

As a derivative of the research results there are several conditions for success that can either be added or stressed: the need for transparency and communication of the actual state of the art instead of the desired developments, the need for monitoring the results and the inclusion of feedback loops in the regulatory process.

Even if self-regulation functions optimally, the literature identifies several advantages and disadvantages. What is advantageous for one actor is not necessarily advantageous for another. It might even be a disadvantage. Tables 7.1 and 7.2 show how literature describes an actor's behavior (column 1). This behavior is identified as an advantage or a disadvantage for both this type of actor and the reputation of self-regulation. In the second and third column the advantages and disadvantages resulting from this action are described for other actors.

The literature that emphasizes the advantages of industry self-regulation generally focuses on the advantages for the industry itself. The arguments used are related to the flexibility of that particular type of regulation and to the autonomy of the company. The autonomy of the company is related to the absence of command and control regulation and the opportunity for companies to act in accordance with their own insights with regard to a public good. The results of this analysis seem to contradict this. There is more industry self-regulation with regard to those agrobiodiversity categories that are thoroughly legislated by the government than to those categories where there is less regulation. Command and control regulation is not always a threat; it is also a 'zero-measurement' and a source of inspiration for self-regulation. In literature, self-regulation is also seen as advantageous in that it reduces the administrative burden and government expenditure. Seen as a 'zero-measurement' and source of inspiration, self-regulation will not reduce the administrative burden and expenditure unless the government and industry formulate the relevant agreements.

The types of argument put forward about industry self-regulation in literature are not so much related to a company's identity or its image. They are common arguments to explain, for example: corporate social responsibility. We concluded that information about caring for the environment and the struggle involved could also be communicated. If companies find a way to communicate this through labeling, then communicating their enthusiasm could become advantageous for industry self-regulation.

Another argument which is not mentioned as an advantage for the industry is that of a financial incentive. Conversely, this argument is used to describe the disadvantages of industry

Table 7.2 Disadvantages of industry self-regulation as described in literature

Disadvantages for/created by behavior of	Advantages for	Also disadvantages for
Industry:		
Pretence to listen to stakeholders and thereby 'silencing' them without an actual change of behavior will damage the reputation of self-regulation (Parker, 2002).	Individual company/ free rider	Environmental organizations, consumers, government and other non-participants
Self-regulation gives companies an easy opportunity to deceive the other actors (Karl and Orwat, 2000; Gunningham and Rees, 1997; King and Lenox, 2002).	Individual company/ free rider	Deceives other parties (e.g. consumers, government)
Information about compliance is omitted to avoid conflict by: - using compliance systems for symbolic purposes (legitimization, good publicity) - senior managers passing compliance inconsistencies on to low-level employees - individual (low-level) employees can be scape-goated to avoid company responsibility (staff) (Parker, 2002)	Individual company	Uninformed parties, (low-level employees)
Government:		
self-regulation sometimes is a strategy to give the government an excuse for not doing its job (Braitwaite, 1993)		Environment/ biodiversity: problem is not tackled

self-regulation (see table 7.2). Especially when consumers are willing to pay more for a labeled product it can be lucrative for a company to participate in the labeling system and yet not comply with it.

These disadvantages show how important it is to avoid free rider behavior: an individual benefit (in terms of money, time and trouble) can harm the entire reputation of a self-regulation. The use of the table of eleven – as interpreted in our research model – can be used to identify how free riders circumvent self-regulation.

A comparison between literature and the research results confirms some of the advantages and disadvantages mentioned and also adds others to the list. This analysis creates a more nuanced picture with respect to three of the advantages for industry (table 7.1) mentioned in literature:

- The notion that the industry is a well-informed regulator is not always true. A company may be better-informed about the opportunities for the industry, but that does not mean that it is well-informed about the environmental problems concerned or how to help find a solution. Several investigated self-regulators have 'shopped around' for this knowledge, inviting consultancies or establishing partnerships with universities or other knowledge-institutes.
- Second, self-regulation is not only an easy road for companies to take in order to standardize an environmental theme according to their own preferences and insights. Our analysis shows that certain labeling organizations or companies feel that they should include a difficult theme like (agro)biodiversity in their labeling scheme, but are uncertain how to go about it. The opposite of taking the 'easy road' is regret and inconvenience about what has not been chosen.
- Forerunners do not always find it easier to comply with command and control regulation. As we have seen in Chapter 4, the crop protection legislation can be incompatible with the interests of farmers to avoid pests or diseases. A more environmental-friendly production method can also make a farmer more vulnerable in comparison with his more conventional counterpart, who can choose from more alternative means of crop protection.
- Although an institutionalized interest of the certification and accreditation organizations is assumed to favor labeling and certification above other types of self-regulation, labeling does not necessarily deserve the most credit for all our research criteria. Our research indicated that for the frequency, continuity and type of sanctions, contract farming might be a more effective instrument. Here the emphasis is on 'might be' because the degree of transparency of contract farming is less than the degree of transparency of labeling.

This research has identified another advantage for knowledge institutions and NGOs, and to a certain extent for companies too. Experiments with contract farming, and also the development of a monitoring system by these parties – each with their own expertise – leads to the generation of new practice-oriented knowledge which then becomes applicable and tailor-made for the company concerned (see also Regeer, 2007). Another advantage is emphasized in this research model: self-regulation is not only relevant for the industry, but can also be beneficial for other parties on the understanding that because of its (relative) reliability it is a trustworthy self-regulation.

Considering the disadvantages of industry self-regulation this research confirms that self-regulation gives companies the opportunity to deceive and hold back information about compliance; a need that is voiced in literature. Lack of transparency is one of the most urgent disadvantages of industry self-regulation. This is a problem that needs to be solved because of its major impact on the aspect of reliability. Another disadvantage for all actors involved has already been mentioned. Most self-regulations lack monitoring systems and consequently it is difficult to underpin biodiversity improvement in self-regulated areas. In addition, self-regulatory systems fail to offer the opportunity to reflect on the actual quality of the self-regulation and the possibilities to improve it. If the environmental impact is monitored it also creates the opportunity for consumers and industry to start negotiations with the government to reward them in the form of a less severe license, permit, or auditing regime.

A general conclusion is that this research agrees with socio-legal literature about industry self-regulation: it can be a strong, successful and even relatively reliable instrument, but there is a major risk of unverifiable misuse by the industry.

7.5 Reflections on the socio-legal research model

In the last section of this dissertation we reflect on the developed research model. Suggestions are made to improve the model and possibilities for its wider application are identified.

A first reflection to improve the research model is to include the involvement and motivation of a company's management and its employees as research criteria. During the research, several interviewees expressed a serious, well-intentioned concern about the environment. Nevertheless, we could not conclude that the investigated industry self-regulations were completely reliable because the aspect of motivation was not included in the research model.

It would even be possible to analyze the extent to which internal motivation is stimulated via the regulatory process. Some self-regulations offer incentives to inspire and encourage internal motivation, for example for Conservation Grade. To be able to use this label farmers are required to follow a two-day course during which they design their own on-farm conservation plan. Based on the quality of that conservation plan, Jordans then selects its suppliers. While we did state that this contributed to the aspect of reliability in Chapter 5, we did not included this criterion explicitly in the research model. Based on these results we would now like to modify the research model and add this criterion.

Secondly, the research model pays relatively little attention to the planning stage. In this research the only research criterion identified in the planning stage is 'the degree of agrobiodiversity performance standards'. It would be an enrichment to identify a research item as 'the development of self-regulatory schemes'. A study of the process of standardization would give insight into the role and interests of the different standard-setters, how interests are incorporated in the self-regulation, and whose interests are best represented.

Reflecting on the methodological approach, we would like to make some suggestions for applying the research model differently. Conducting an anthropological, detailed, in-depth

analysis of just one or a few cases would give added value. Our research model is partly based on Griffiths theory (1996, 2003), which almost invites the researcher to use an anthropological approach. In this study we have presented a more general picture by studying fifteen cases (but with less detailed information) about one particular case. For example: there are several of the investigated labels that require fire extinguishers to be present on a farm. Interviewees informed us that some farmers borrow fire extinguishers from one another the day before they are audited. The reason for borrowing such a device is simply to pass the inspection. A more in-depth analysis would have revealed who borrows, why they borrow, from whom do they borrow, how they talk or joke about the audits, etc., etc. A recommendation for more research would be to take the in-depth anthropological perspective. It would be a useful and information-rich supplement to this approach.

Another enrichment could be suggested with respect to the development of AMY. In our expert workshop for developing AMY only scientists were included when selecting the experts. If we had the opportunity to develop the yardstick a second time we would suggest to include farmers, as potential users of the yardstick, and NGOs that advocate conservation of biodiversity. The expertise of these actors could improve the quality of the yardstick.

With regard to the substantive dimension of reliability, the 'ladder of abstraction' methodology and the expert workshop can also be utilized to map other (sustainability) themes. There is no need to revise the research criteria of the procedural dimension: they can be applied to any industry self-regulation, regardless of its content. Our socio-legal research model could be applied more broadly for other sustainability themes, in other industries and in other countries.

Samenvatting

Zelfregulering in schemeringlicht
Een rechtssociologische evaluatie van behoud en duurzaam gebruik van agrobiodiversiteit door zelfregulering

Dit onderzoek geeft inzicht in zelfregulering door bedrijven als een reguleringsstrategie voor het behoud en duurzaam gebruik van agrobiodiversiteit. Daartoe wordt de betrouwbaarheid van bestaande zelfreguleringspraktijken van voedselaanbieders op de Nederlandse markt geëvalueerd. De Nederlandse overheid heeft agrobiodiversiteit gedefinieerd als 'biodiversiteit in een landbouwgebied'. Hierbij worden drie niveaus onderscheiden: genetische diversiteit direct betrokken in de landbouwproductie, biodiversiteit met een life-support functie en biodiversiteit met een landschapsecologische functie (LNV, 2002). In een vooronderzoek hebben stakeholders zelfregulering geïdentificeerd als een kansrijke reguleringsstrategie voor beheer van agrobiodiversiteit. Twee typen zelfregulering, keurmerken en contractteelt, zijn diverse malen door hen genoemd.

Zowel in wetenschappelijke literatuur als in de maatschappij zijn de visies op zelfregulering sterk en uitgesproken (Eijlander et al, 1993; Donner, 1993; Parker 2002). Voorstanders benadrukken het effectieve, flexibele en efficiënte karakter van zelfregulering (Iannuzzi, 2002). Tegenstanders stellen dat normen niet goed worden nageleefd, controle zwak is en de belangen van het bedrijf worden gediend in plaats van publieke belangen (Gunningham and Rees, 1997).

Deze studie richt zich op de betrouwbaarheid van zelfregulering die vrijwillig door bedrijven is geïnitieerd. Betrouwbaarheid is gedefinieerd als: "De expertise van een voedselbedrijf of productieketen om te bewijzen en voortdurend te garanderen dat agrobiodiversiteitsdoelen worden bereikt via zelfregulering". Met dit concept betrouwbaarheid onderzoeken we hoe een producent/verkoper tegenover de consument/koper kan bewijzen dat het gedrag gedurende het productieproces daadwerkelijk een positief effect heeft op het milieu. Er is een onderscheid tussen de inhoudelijke en procedurele dimensie van betrouwbaarheid. De inhoudelijke dimensie richt zich op de integratie van agrobiodiversiteitsbeheersmaatregelen in zelfreguleringsschema's. De procedurele dimensie evalueert de procesgerelateerde karakteristieken van zelfregulering.

Het onderzoek is opgezet vanuit een rechtssociologisch perspectief. Het richt zich op de werking van zelfregulering in de dagelijkse praktijk van de deelnemers en hoe deze kan verschillen ten opzichte van een zelfreguleringsschema. Zelfregulering wordt opgevat als een cyclisch, sociaal organisatieproces. Coglianese en Lazer (2003) hebben dit proces onderverdeeld in drie fasen: de planningsfase, de implementatiefase en de resultaatsfase. Griffiths (1996) geeft aan dat regulering niet zonder meer als effectief kan worden gezien. Een van de genoemde oorzaken is dat een

bedrijf niet monolithisch is. Het stimuleren van agrobiodiversiteit betekent het balanceren tussen de duurzaamheidswaarden 'planet' en 'profit'. De mate van institutionalisering van zelfregulering binnen een bedrijfscultuur is mede van belang bij deze afweging (Gunningham en Rees, 1997). Een extra complicatie voor zelfregulering door de industrie is dat agrobiodiversiteit een 'credence good' is (Nadaï, 1999). Een verkoper weet in hoeverre agrobiodiversiteit is gestimuleerd in het productieproces van het product, maar een koper weet dit niet en kan deze eigenschap van het product ook niet achterhalen.

Onderzoeksmethodologie
De onderzoeksmethode is een ex post evaluatie. Twee verschillende onderzoeksstrategieën zijn geselecteerd om de inhoudelijke en procedurele dimensie van betrouwbaarheid te evalueren. Een evaluatie van programma theorie is uitgevoerd om antwoord te krijgen op de vraag of, en zo ja hoe agrobiodiversiteitsbeheer in zelfregulering is geïntegreerd. Een proces evaluatie is uitgevoerd on te onderzoeken hoe de agrobiodiversiteitscriteria worden uitgevoerd door deelnemers van zelfregulering en of deze uitvoering wel of niet in overeenstemming is met de bedoeling van diegenen die het zelfreguleringsschema hebben opgesteld. Betrouwbaarheid is geoperationaliseerd in vier onderzoekscriteria:

Inhoudelijke dimensie van betrouwbaarheid
- De wijze waarop agrobiodiversiteitsbeheerscriteria in de zelfregulering zijn geïntegreerd (planninsfase).

Procedurele dimensie van betrouwbaarheid
- De wijze waarop rechtsbeginselen als transparantie, participatie en scheiding van bevoegdheden in de structuur van zelfregulering zijn opgenomen (alledrie de fasen).
- Het nalevingsgedrag van deelnemers aan zelfregulering (implementatiefase).
- Het monitoren van de fysieke omgeving waaruit blijkt dat de biodiversiteit in landbouwgebieden is verbeterd als gevolg van zelfregulering en de wijze waarop deze resultaten worden teruggekoppeld in het reguleringsproces (prestatiefase).

Er zijn drie typen regulering geanalyseerd: a) milieukeurmerken die deel uitmaken van internationale keurmerkfamilies, b) product-specifieke milieukeurmerken en c) contractteelt. Voor ieder type zelfregulering zijn elk vijf cases geselecteerd, zodat in het totaal 15 zelfreguleringen zijn geëvalueerd.

Agrobiodiversiteitsbeheerscriteria in zelfregulering
Er was op dat moment geen methode beschikbaar om te kunnen beoordelen in welke mate zelfreguleringen agrobiodiversiteitsbeheersmaatregelen bevatten. Het is daarom noodzakelijk een dergelijke meetlat te ontwikkelen, die we de 'Agrobiodiversity Management Yardstick'(AMY) hebben genoemd. Verschillende versies werden aan ecologische experts aangeboden. Zij werden uitgenodigd hun reactie te geven in interviews (4 ecologische experts) of via een expert-workshop (12 ecologische experts) in het Utrechtse beleidslab. Gelet op de onzekerheid in de gefragmenteerde, soms tegengestelde en locatie-specifieke ecologische literatuur over de relatie tussen agrobiodiversiteit en agrobiodiversiteitsbeheer, is AMY gebaseerd op het expert oordeel over waarschijnlijkheidsrelaties. AMY richt zich op akkerbouw in Nederland.

Om er zeker van te zijn dat een concrete maatregel daadwerkelijk bijdraagt aan agrobiodiversiteitsbeheer, is een methodologie gebruikt, die ontwikkeld is door Sartori (1991) en ook wel een 'ladder van abstractie' wordt genoemd. Een ladder van abstractie onderscheidt diverse abstractieniveaus en maakt het mogelijk om 'af te dalen' van abstracte beleidsdoeleinden naar het concrete niveau van agrobiodiversiteitsbeheersmaatregelen op een boerderij.

Alle 15 geanalyseerde zelfreguleringen bevatten criteria voor het beheer van agrobiodiversiteit, maar er zijn verschillen gevonden tussen zelfreguleringen. Het aantal criteria varieerde van 5 tot 78. Als het type criteria in beschouwing wordt genomen, blijken grote verschillen tussen de zelfreguleringen. In sommige zelfreguleringsschema's zijn de criteria aanbevelingen terwijl ze in andere zelfreguleringsschema's een verplicht of optioneel karakter hebben.

De thema's die vaak voorkomen in de zelfreguleringen – zoals bemesting, gewasbescherming en beheer van (semi) natuurlijk habitat – overlappen met het Nederlandse beleid over deze thema's. Daarentegen is er slechts één zelfregulering die het gebruik van traditionele of regionale gewassen in beschouwing neemt om de genetische diversiteit die direct betrokken is bij de landbouwproductie te stimuleren.

Rechtsbeginselen

Er worden drie rechtsbeginselen in beschouwing genomen om te onderzoeken hoe zelfregulering een zwakkere actor een sterkere positie kan geven in een ongelijke relatie (Van Schooten-van der Meer, 1997). We evalueren hoe de beginselen van transparantie, participatie en scheiding van machten in de structuur van zelfreguleringen geïntegreerd zijn.

Voor alledrie de typen zelfregulering was het gebrek aan transparantie een van de grootste problemen in dit onderzoek. We hebben de beschikbare informatie onderzocht over zelfreguleringsschema's, over naleving en monitoring van de ecologische impact. Informatie over de implementatie en resultaatsfase was schaars. Zowel de keurmerken als de contractteelt is zodanig georganiseerd en gestructureerd dat informatie over naleving niet aan de niet-deelnemers van zelfregulering wordt verstrekt.

Wat betreft machtenscheiding zijn de milieukeurmerken waarbij derde partijen betrokken zijn en de contractteelt tegenovergesteld aan elkaar als het gaat om de regulerende, toezichthoudende en sanctionerende bevoegdheden. Keurmerken worden meestal door een onafhankelijke derde partij gecontroleerd, wat hen beter volgbaar maakt dan bij contractteelt. Het beginsel van machtenscheiding geeft aan keurmerken een extra garantie dat de agrobiodiversiteitsbeheersmaatregelen zowel gewenst als haalbaar zijn, door derde partijen in de planning en implementatie te betrekken en hen regulerende, toezichthoudende of sanctionerende bevoegdheden te geven. Hoewel machtenscheiding niet is geïnstitutionaliseerd in contractteelt, worden derde partijen soms wel betrokken.

Er is een verschil tussen de twee typen milieukeurmerken en contractteelt in termen van de mate van participatie bij het opstellen van criteria voor zelfreguleringsschema's in de planningsfase. Terwijl milieukeurmerken diverse keten- en maatschappelijke actoren betrekken, zijn de contracten slechts bekend en worden zij slechts bepaald door de contracterende partijen. De proefprojecten binnen contractteelt vormen hier een uitzondering op. Een tentatieve conclusie is dat zelfreguleringen waarbij veel maatschappelijke actoren betrokken zijn, een relatief groot aantal agrobiodiversiteitsbeheersmaatregelen bevat.

Nalevingsgedrag
Nalevingsgedrag is het meest controversiële en bediscussieerde dilemma voor de betrouwbaarheid van zelfregulering (e.g. Parker, 2002, Ayres and Braitwaite, 1992, Christmann and Taylor, 2001). Voor de evaluatie van het nalevinggedrag van boeren is "de tafel van 11" gebruikt (Van Erp en Verberk, 2003). De tafel van 11 geeft een overzicht van 11 factoren die het nalevingsgedrag van een doelgroep bepalen, verdeeld over de dimensie van spontane naleving en naleving als gevolg van handhaving.

De resultaten bevestigen het beeld in de literatuur dat het aspect van naleving een van de zwakkere elementen van zelfregulering is. Voor keurmerken geeft met name de lage frequentie van de aangekondigde controle aan de telers de mogelijkheid om in een audit positief beoordeeld te worden, hoewel de regels in de dagelijkse bedrijfsvoering niet volledig worden nageleefd. Ook blijkt er geen eenduidigheid te zijn tussen de geïnterviewde auditors over de eigenlijke beoordeling (hoever mogen ze gaan) en onderbouwing (wat geldt als bewijs). Wanneer een auditor te kritisch is of een sanctie te zwaar, kan een teler de audits door een andere certificeringsinstelling laten doen of het vrijwillige keurmerk opzeggen.

Bij contractteelt is de frequentie van toezicht en controle hoger en wordt dit bovendien gecombineerd met advisering. Echter, onder meer door de vertrouwensband tussen een teler en verwerker die soms al jarenlang samenwerken, is het voor een derde partij – zowel later in de keten als voor de consument – moeilijk controleerbaar of de naleving plaatsvindt zoals naar buiten toe wordt gecommuniceerd.

Monitoring van de impact op biodiversiteit
Ten aanzien van het meten en monitoren van de impact van zelfregulering op agrobiodiversiteit in de resultaatsfase, valt op dat slechts weinig zelfreguleringen zich hiermee bezig houden. Monitoring wordt gezien als een moeilijk en duur onderwerp, terwijl causaliteit niet altijd vast te stellen is. Hoewel sommige deelnemers aan zelfregulering het wel belangrijk vinden, zijn de kosten een grote belemmering. Hieruit volgt ook dat er vrijwel geen feedback mechanismen zijn tussen deze fase naar de andere fasen van zelfregulering. Er is slechts één zelfregulering waar wel structureel metingen van de impact op de biodiversiteit worden gedaan. Deze zelfregulering gebruikt de vindingen om het keurmerkschema te herzien en communiceert naar consumenten dat er X keer meer planten, dieren en insecten worden aangetroffen.

Algemene conclusie
De algemene conclusie is dat geen van onderzochte zelfreguleringen volledig betrouwbaar is. Ze kunnen allemaal geplaatst worden in een grijze zone, het schemerlicht tussen betrouwbaarheid en onbetrouwbaarheid. Dit bevestigt dat zelfregulering een omstreden begrip is, het beeld dat uit de literatuur naar voren komt.

Deze conclusie betekent niet noodzakelijk dat zelfregulering geen functie heeft. Dit hangt mede af van de positie van een deelnemer of niet-deelnemer aan zelfregulering in het sociale veld. Voor een bedrijf kan zelfregulering het bewustwording van bepaalde milieuthema's genereren of zorgen voor een ontdekking of inspiratie hoe criteria te formuleren. Zelfregulering heeft zelfs de mogelijkheid van het moraliseren van de industrie, of kan bijdragen aan het institutionaliseren van verantwoordelijkheden en nalevingsgedrag.

Vanuit het standpunt van een consument gezien, is de aankoop van een product een teken van geloofwaardigheid, terwijl niet-aankopen juist het tegengestelde betekent. Er is geen

middenweg: of je koopt een product of niet. Kopen kan een beloning zijn voor industrie die zijn werk niet volledig doet en stimuleert niet om meer betrouwbaar te worden. Een aankoop van een product met een keurmerk beloont de onzekerheid over naleving. Daarentegen betekent het niet-aankopen van een milieuvriendelijk, maar van een gangbaar product, het aanschaffen van een product dat misschien geproduceerd is door een voedselproduct die helemaal geen interesse heeft in het milieu.

De meeste milieukeurmerken hebben geen mogelijkheid om te laten zien dat ze 'op weg naar 100% betrouwbaarheid" zijn. Een verandering in communicatiestrategie bij bedrijven zou het consumentenvertrouwen kunnen verbeteren. Wanneer bedrijven laten zien wat de motieven zijn en hoe zij het gevecht aangaan om de productieketen meer duurzaam te maken, zou deze situatie kunnen veranderen.

Summary

Twilight on self-regulation
A socio-legal evaluation of conservation and sustainable use of agrobiodiversity by industry self-regulation

This research gains insight into industry self-regulation as a regulatory strategy for conservation and sustainable use of agrobiodiversity. To that end, the reliability of the practices of industry self-regulations among food suppliers on the Dutch market are evaluated. The Dutch government has defined agrobiodiversity as 'biodiversity in an agricultural area'. Three subsets are distinguished: genetic diversity directly involved in agricultural production; biodiversity with a life-support function and biodiversity with a landscape-ecological function (LNV, 2002). In a preliminary research industry self-regulation is identified by stakeholders as a promising regulatory strategy for management of agrobiodiversity. Two types of self-regulation, eco-labels and contract farming, are often mentioned by them.

Both in scientific literature and in society views about self-regulation are strong and outspoken (Eijlander et al., 1993; Donner, 1993). Advocates emphasize effectiveness, flexibility and efficiency of self-regulation (Iannuzzi, 2002). Opponents claim that self-regulation is weak, ineffective and serves private interests rather than the public interests it claims to serve (Gunningham and Rees, 1997).

This study focuses on the reliability of self-regulation which is voluntarily initiated by companies. Reliability is defined as: the competence of a food company or food supply chain to prove, and at all times guarantee that agrobiodiversity objectives are being achieved trough industry self-regulation. With this unifying concept reliability, we investigate how producers/sellers can prove and guarantee to consumers/buyers that their behavior during the production process really does have the positive effect on the environment as they claim it has. A substantive and procedural dimension of reliability are distinguished. The substantive dimension focuses on the integration of agrobiodiversity management measures in self-regulatory schemes. The procedural dimension covers process-related characteristics of industry self-regulations.

The research takes a socio-legal approach. It focuses on how industry self-regulation works in the daily practice of participants and to what extent this differs from the theory of a self-regulatory scheme. Industry self-regulation is seen as a cyclic social organizational process. Coglianese and Lazer (2003) distinguish three stages of an organizational process of regulation: the planning stage, the implementation stage and the outcome stage. Griffiths (1996) states that effectiveness of regulation cannot automatically be assumed. One of the causes mentioned, is that a company is not monolithic. Stimulation of agrobiodiversity in a concrete case means balancing between the sustainability values 'planet' and 'profit'. The degree of institutionalization of self-regulation in a corporate culture is relevant for this consideration (Gunningham and

Rees, 1007). A complicating factor for self-regulation of agrobiodiversity by the food supply chain is that agrobiodiversity is a credence good (Nadaï, 1999). A seller is knowledgeable about the agrobiodiversity performance of the production method that has been used to manufacture the product; this is not known to the purchaser, while he is unable to identify this commodity of the product.

Research methodology

The research method is ex post evaluation. Two different empirical research strategies are selected to evaluate the substantive and procedural dimension of reliability. An evaluation of program theory of industry self-regulations is carried out to answer the research question about concrete interpretation of agrobiodiversity management in self-regulations. A process evaluation is conducted to assess how agrobiodiversity performance standards are met by self-regulation participants and whether or not the realization is as intended by the standard-setters. Reliability has been made operational in four research criteria:

Substantive dimension of reliability

- The degree of integration of agrobiodiversity performance standards in self-regulatory schemes (planning stage).

Procedural dimension of reliability

- The degree of integration of principles of rule of law (transparency, participation and separation of powers) in the structure of self-regulation (all stages).
- The compliance behavior of participants of industry self-regulation (implementation stage)
- The degree of measuring and monitoring of the ecological impact that shows that agrobiodiversity has been improved (outcome stage) and the degree of feedback loops between the different regulatory stages.

Three types of industry self-regulation are analyzed: a) eco-labels which are part of international labeling families, b) product-specific eco-labels and c) contract farming. For each type of self-regulation five cases are selected, together a total of 15 industry self-regulations were evaluated.

Agrobiodiversity performance standards in self-regulation

There is no method currently available to investigate to what extent self-regulations contain agrobiodiversity performance measures. It was therefore necessary to develop such a tool, which we called the 'Agrobiodiversity Management Yardstick' (AMY). AMY was designed in several steps. Several drafts were offered to ecological experts. They were invited to react and give their input in interviews (4 ecological experts) or in an expert-workshop (12 ecological experts) in the Group Decision Room in Utrecht. Due to uncertainty in fragmented, sometimes inconsistent and location specific ecological literature about the relation between agrobiodiversity and agrobiodiversity management, AMY is based on expert judgment about the plausibility of relationships. AMY focuses on arable farming in the Netherlands.

To ensure that a concrete measure actually contributes to agrobiodiversity management a methodology developed by Sartori (1991) called the 'ladder of abstraction' is used to conceptualize agrobiodiversity. A ladder of abstraction distinguishes several levels of abstraction and makes

it possible to 'descend' from abstract policy goals to the concrete level of agrobiodiversity performance measures on a farm.

All 15 examined self-regulatory schemes contain standards for agrobiodiversity management, but there are large differences between the self-regulations. The number of standards ranged from 5 to 78. When the nature of standards is considered, large differences between self-regulations become apparent. In some self-regulatory schemes all relevant standards are only recommendations whereas in other self-regulatory schemes they are either compulsory or optional.

The themes that were often found in the self-regulations – as fertilization, crop protection and management of (semi) natural habitat – overlap with Dutch policy about these themes. There is only one self-regulation that takes the selection of traditional or regional varieties into account when setting its standards to stimulate the genetic diversity directly involved in agricultural production.

Principles of rule of law

Pursuing the question how self-regulation can give a weaker actor a stronger position in an asymmetric relationship, three principles of rule of law are considered (Van Schooten- van der Meer, 1997). We evaluate how the principles of transparency, separation of powers and participation are integrated in the structure of the self-regulations.

The lack of transparency with regard to all three types of self-regulation was a major bottleneck in this research. We have looked at the information available on self-regulatory schemes, the aspect of compliance and the monitoring of the ecological impact. Information about the implementation and outcome stage was scarce. Neither labeling nor contract farming is organized or structured in such a way that it discloses information about compliance to non-participants in industry self-regulation.

With regard to separation of powers, the supervisory, regulatory or enforcement authorities are divided differently among eco-labels and contract farming. Eco-labels are better verifiable for non-participants on self-regulation than contract farming. The separation of powers principle gives an extra guarantee to eco-labels that agrobiodiversity performance standards are both feasible and desirable, by including third parties in the planning and implementation stage of self-regulation giving them supervisory, regulatory or enforcement powers. While separation of powers is not institutionalized in contract farming, third parties are occasionally involved.

There is a difference between the two types of eco-labels and contract farming in terms of the degree of participation in the standard-setting in the planning stage. While eco-labels involve chain parties or societal parties, the terms of a contract are only known and decided by the contracting parties. The pilot projects in contract farming are an exception. A tentative conclusion is a self-regulation which involves many societal actors contain a relatively large amount of agrobiodiversity performance standards.

Compliance behavior

Compliance behavior is the most controversial and discussed dilemma for reliability of self-regulation (e.g. Parker, 2002, Ayres and Braitwaite, 1992, Christmann and Taylor, 2001). The evaluation tool used to evaluate compliance behavior of farmers is the 'Table of Eleven' (Van Erp and Verberk, 2003). T11 provides an overview of eleven factors that determine a target group's compliance behavior, divided among the dimensions of spontaneous compliance, and compliance through enforcement.

The results confirm the conclusion in literature that the aspect of compliance is one of the weak elements of industry self-regulation. For eco-labels the relatively low frequency of announced audits creates an opportunity to pass the audit, without integrating all standards in farm management. There also is lack of uniformity among interviewed auditors how to audit and whether something is sufficient prove of compliance. When an auditor is too strict or a sanction too severe in the opinion of a farmer, he can choose another certification body or terminate the participation in the voluntary self-regulation.

The uncertainty as to how producers comply with standards in contract farming is connected to the lack of transparency and participation discussed above. Thus far, the indications are that through a combination of frequent education, negotiation and inspection, farmers and agronomical services together create a practice which is closely related to the standards contained in the contract. However, this is uncertain since it is not communicated well to outsiders.

Monitoring of the impact on biodiversity

With regard to measuring and monitoring of the impact of self-regulation on agrobiodiversity in the outcome stage, industry self-regulations pay relatively little attention. Monitoring results is said to be difficult and expensive, while causal relationships are complicated. Some self-regulation participants see its relevance and are giving monitoring consideration, but the costs are a major drawback. As a result of lack of monitoring, feedback loops of the outcome stage to the planning and implementation stage were hardly found. There is only one eco-label that systematically monitors the environmental impact. These findings are also used in revising the labeling and communicates to consumers that there are X times more plants, animals and insects.

General conclusion

The general conclusion is that all evaluated self-regulations to stimulate agrobiodiversity were neither fully reliable nor fully unreliable. All are found in the gray area, the twilight zone between reliability and unreliability. This confirms that self-regulation is a contested concept, as stated in literature.

This conclusion does not necessarily mean that self-regulation does not have any function. This also depends on the position of a participant or non-participant in the social field. For a company, self-regulation can help to raise awareness of certain environmental themes or discover and inspire how to formulate standards. Self-regulation even has the ability of moralization of the industry in the process of institutionalization of responsibilities and compliance behavior.

From the consumer's point of view, purchasing a product means showing credibility; not purchasing it implies the opposite. There is no middle road: you either purchase or not. Making a purchase is rewarding the industry for not doing it's job properly and does not stimulate it to become more reliable. Buying labeled products can in practice mean rewarding uncertainty about compliance. However, not purchasing the environment friendly product but a conventional one is buying a product which might be produced by a food supplier who has no interest in the environment at all.

With regard to most of today's labels there is no room for products which are only 'on their way to 100% reliability'. A change in communication strategy of producers to obtain the consumer's trust by also showing their concern and struggle to make the supply chain more sustainable, could reverse this situation.

Appendix 1

Organizations of interviewees preliminary research (personal communication, telephone communication and/or e-mail communication in 2002).

1. AIDEnvironment
2. Albert Heijn
3. Alterra
4. CBL
5. Centre for Genetic Resources, the Netherlands
6. CLM
7. Consumentenbond
8. DLV Advies nv
9. ID-Lelystad
10. Louis Bolk Instituut
11. LTO Nederland
12. Ministery of Agriculture, Nature Conservation and Food Safety (LNV), 3 interviews
13. Ministery of Housing, Spatial Planning and the Environment (VROM)
14. NAJK
15. Nederlandse Voedingsmiddelenindustrie VAI
16. Noordelijke Pomologische Vereniging
17. Plant Research International
18. Plantum
19. Platform Biologica
20. Raad voor het Landelijk Gebied
21. Rabobank Nederland
22. Rathenau Instituut
23. Slow Food
24. Stichting DuVo
25. Stichting Landschapsbeheer Nederland
26. Stichting Natuur en Milieu
27. Stichting Zeldzame Huisdierrassen
28. Triodos Bank
29. Unilever
30. Wageningen University

Organizations of experts interviewed for the development of the yardstick (personal communication in 2004/2005). Interviews within the framework of the Master's thesis of Willem de Neve.

1. CML
2. Louis Bolk Institute
3. RIVM
4. Wageningen University

Organizations of experts involved in the expert-workshop for the development of the yardstick.
Expert-workshop February 22, 2005 Group Decision Room, Utrecht
Within the framework of the Master's thesis of Willem de Neve.

1. Alterra
2. CLM
3. CML
4. Louis Bolk Institute
5. Ministery of Agriculture, Nature Conservation and Food Safety (LNV)
6. Ministery of Housing, Spatial Planning and the Environment (VROM)
7. Netherlands Institute of Ecology
8. Open University
9. Wageningen University (3 experts)

Organizations of interviewees consulted to assess the reliability of the three types of self-regulation (personal communication, telephone communication and/or e-mail communication in 2004-2006). Several interviews held within the framework of the Master's theses of Simone Hanegraaff or Claar de Brauw.

1. Agrarische Unie
2. Agrico
3. Albert Heijn
4. Alterra
5. Bonduelle Benelux
6. CBL
7. CBSG
8. Chiquita International
9. Chiquita Nederland
10. CMI Certification
11. CSM
12. Demeter
13. EurepGap
14. Farmed Environmental Company
15. Gulpener
16. Groene Hoed
17. Groentehof
18. Growers (on request anonymous)
19. Heineken
20. Jan Robben Aardbeien
21. Jordan's Cereals

22. Lifestock and Meat Committee
23. LTO Nederland
24. Max Havelaar
25. Milieukeur
26. Ministery of Agriculture, Nature Conservation and Food Safety (LNV)
27. Ministery of Economic Affairs (EZ)
28. Ministery of Housing, Spatial Planning and the Environment (VROM)
29. MPS
30. NAK tuinbouw
31. NAJK
32. NIFCC
33. Plant Research International
34. Platform Biologica
35. Rain forest Alliance Amsterdam
36. Rain forest Alliance Costa Rica
37. SGS
38. Skal
39. Streekeigen Producten Nederland
40. Triligran
41. Unilever
42. Waddengoud

Appendix 2

Topiclists interviews preliminary research

- Own definition agrobiodiversity
- Three subsets of agrobiodiversity
- Societal relevance agrobiodiversity
- Interest organization of interviewee
- Societal conflicts
- Position food suppliers and network parties
- Stimulation of agrobiodiversity
- Relationship between agrobiodiversity and agriculture
- Future Dutch agriculture
- Suggestions for case-studies

Topiclist interviews development AMY

- Yardsticks to measure agrobiodiversity
- Type of yardsticks
- Indicators agrobiodiversity
- Application of yardstick
- Completeness
- Exclusiveness
- Yardstick and eco-labels

Topiclist interviews evaluation three types of self-regulation

Evaluation structure and organization
- Steering through self-regulation
- Structure of self-regulation and 'checks and balances'/quality guarantees
- Division of authorities
- Selection of standards of self-regulatory schemes
- Underpinning selection standards of self-regulatory schemes
- Formal and informal participation of different parties in the selection of standards of the self-regulatory schemes
- Transparency self-regulations
- Communication among companies
- Communication with consumers
- Complaints about the self-regulation

Evaluation content self-regulation (criterion substantive dimension)

- Relationship self-regulation and command and control regulation
- Added value of self-regulation for conservation and sustainable use agrobiodiversity/beyond command and control regulation
- (Agro)biodiversity implicit or explicit in self-regulatory schemes

Compliance behavior

- Understandability, clarity and awareness of self-regulatory schemes
- Self-regulation, continuity farm management and investments farmers
- Feasibility self-regulatory scheme
- Behavior member self-regulations
- Motives to join self-regulation
- Compliance with self-regulation
- Motives, time and trouble to comply with self-regulation
- Verifiability self-regulatory scheme
- The nature and character of the audit
- Agreements among auditors, protocols for auditors
- Information technology and audits
- Optimization of audits
- Chance to be reported and detected after violation
- Extra audits
- Difference between auditors and competing certification organizations
- Sanctions in self-regulatory schemes
- Enforcement of sanctions
- Reactions of members self-regulation on the sanctions
- Comparison of own self-regulation with others in term of audits and sanctions

Monitoring impact and feedback loops

- Effectiveness and efficiency of self-regulation
- Monitoring effectiveness
- Prove of effectiveness
- Feedback loops different regulatory stages

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