

Eco-labeling and information asymmetry: a comparison of five eco-labels in the Netherlands

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Abstract

Eco-labels have become commonplace instruments of self-regulation. This paper analyzes five food labels with respect to the reliability of their information. For each one, four aspects are examined: 1. mention of biodiversity; 2. reference to rule of law to assure buyers' confidence; 3. notification of farmers' compliance; and 4. information on ecological impact. The analysis reveals that eco-labels fail to communicate adequately; they do not diminish the information gap between seller and buyer. The main shortcomings of the eco-labels were found in their ambiguity about environmental themes, their failure to assure the buyer about the product's ecological impact, the insufficient information about producers' compliance, and presence of recommendations.

Keywords: eco-label, information asymmetry, consumer assurance, producer compliance, environmental impact (3-5)

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1. Introduction

Imagine someone who wants to buy an environmentally friendly product. He or she cannot be sure which environmental problems are addressed by the product or how environmentally friendly the production method is [14]. In other words, 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’ [16]. 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 [10]. How can a buyer protect himself from a company that is ‘green-washing’ – that is, selling a product that seems to be more environmentally friendly than it really is? [12] 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 [8]. 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 [19] [11] [8] [9] [28] [21]. 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 [7] [24] [8] [15] [29]. All these pros and cons revolve around the issue of assurance: the reliability of voluntary agreements [17].

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 [13] [25]. 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 in agricultural areas (called ‘agrobiodiversity’) is a critical issue for agro-food eco-labeling schemes, but it is also difficult to specify [3] [5]. Modern large-scale farming is often singled out as a major threat to biodiversity

[20] [23] [30] [31]. 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.

2. Framework of analysis

The research question is: do eco-labels which 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 [1] 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, such as fruit, dairy or arable farming. In this research only the labeling schemes for arable farming are investigated.

Van Amstel-van Saane and De Neve [26] have designed an index of arable farming measures pertinent to biodiversity. Their 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 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. These are the following: 1) crop rotation; 2) selection of varieties; 3) fertilization; 4) crop protection; 5) soil management; 6) water management; 7) management of buffer zones; 8) management of nature and natural processes; 9) conservation of traditional agrarian landscape elements; and 10) integrated management of the farm and its surroundings. In addition, the experts allocated about 160 management measures to these ten categories.

For the first sub question, a desk study was carried out. This entailed examining the arable farming labeling schemes represented by the selected eco-

labels. The aim was to identify farming measures that had an impact on agrobiodiversity [32] [40] [38] [47] [49] [51].

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 [28]. 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 [32] [33] [34] [37] [40] [41] [42] [43] [44] [45] [46] [47] [48] [49] [50] [51]. 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 respondents 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 respondents for their comments.

The third sub question addresses farmers’ compliance. We used the methodology developed by Ruimschotel [22] [27] to analyze the incorporation of institutional guarantees in eco-labels. 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 organization measure this. To answer the fourth sub question, we consulted the annual reports of the eco-label organizations [47] [49] [33] [34] and drew upon the interviews as well. We also studied the methodology used for monitoring and measuring by the eco-label organizations [2].

3. Selection of eco-labels

All major institutionalized Dutch third-party eco-labels for arable farming are included in the selection for this study. This means that any labels that the producers own themselves and use to guarantee their own environmentally friendly behavior have been excluded from the analysis [18]. Although there are more labels for arable farming, the selection is limited to those eco-labels and certificates claiming environmental friendliness (EurepGAP). International, European, national, and regional labels are part of the selection. The following eco-labels are included in this study:

- *EurepGAP* is the abbreviation for the Euro-Retailer Produce Working Group (Eurep) combined with the acronym for Good Agricultural Practices (GAP), joining their name with their aim. An initiative of several European retailers in 1997, it has evolved into a global partnership for safe and sustainable agriculture between agricultural producers and their retail consumers. There are three types of standards, called ‘control points’ in EurepGAP terminology: 100% compliance with major ‘musts’, 95% compliance with minor ‘musts’, and recommendations. Major ‘musts’ are compulsory standards, while minor ‘musts’ are optional standards.
- *Demeter*. The Dutch biodynamic (BD) association, founded in 1937, is a member of Demeter International. This BD eco-label includes the standards of the European Regulation on Organic Farming EEG no. 2092/91 [38]. It also sets conditions that go beyond the scope of this EU regulation. Demeter translates the BD principles into compulsory standards, optional standards, and guidelines (i.e., recommendations). The farmer is explicitly given the responsibility to implement these standards with regard to the natural environment of the farm (BD Vereniging, 2005a). Besides heeding the conditions of the labeling scheme, farmers have the possibility to show what other environmentally friendly measures they take. They do so when filling in an evaluation

form. For each farmer, the type of measures taken are placed on the Internet website of the BD foundation.

- *EKO*. In 1992, as a result of the EU regulation no. 2092/91, there was a merger between two foundations: Stichting Ekokeurmerk Controle [Foundation Eco-label Control] and Stichting Keur Alternatief voortgebrachte Landbouwproducten (Skal), [Foundation label alternative production of agricultural products]. These two foundations had organized organic farming in the Netherlands up to that time. Since 1992, the Netherlands has had one single organic eco-label, EKO, which is owned by Skal, a private foundation. Skal is also responsible for inspections. The EU regulation is implemented at the state level by the Dutch Ministry of Agriculture, Nature Conservation and Food Quality [37]. The EKO standards (compulsory and optional standards in combination with recommendations) have been harmonized with this regulation.
- *MK* is the abbreviation for Milieukeur [Environmental label]. Since 1995, Stichting Milieukeur (SMK) [Foundation environmental label] has owned and developed the MK label. This labeling scheme is based on a life-cycle analysis. MK works with a credit system: points are assigned to reward some actions and penalize others. To be eligible to use the MK label, a producer is obliged to have a positive score at the end of the season, both for the company in general and for each crop in particular. MK has compulsory standards. By complying with optional measures, it is possible to collect extra credit points.
- *ESP* is the abbreviation for ‘Erkend Streekproduct’, or ‘recognized regional product’. The foundation Streekkeigen Producten Nederland (SPN) [Regional products of the Netherlands] has established several principles and set framework standards emphasizing regional aspects and sustainable production. Regional organizations have elaborated the national standards in response to the regional situation. SPN recognizes MK and EKO as sustainability labels. In 2005, SPN started to revise the ESP standards, which include both optional standards and recommendations.

Four of the selected eco-labels – Demeter, EurepGAP, MK, and ESP – are voluntary eco-labels. This means that they are completely developed and executed by the private sector, without government interference. The exception is EKO; it operates under a self-regulation regime, which is enforced by the EU [19]. Furthermore, EurepGAP is a trade label, while the other four labels are consumer labels.

4. Agrobiodiversity measures in eco-labels

Agrobiodiversity as an environmental theme is not well developed in Dutch agro-food eco-labels. Of the five eco-labels, only EurepGAP and ESP explicitly mention biodiversity as an environmental theme. Several respondents from eco-

label organizations noted that it is difficult to operationalize the concept of agrobiodiversity. The problem lies in its comprehensiveness: ‘all living organisms and the relations between them in agricultural areas’ forms a working definition of agrobiodiversity. Therefore, almost any farming activity will influence agrobiodiversity.

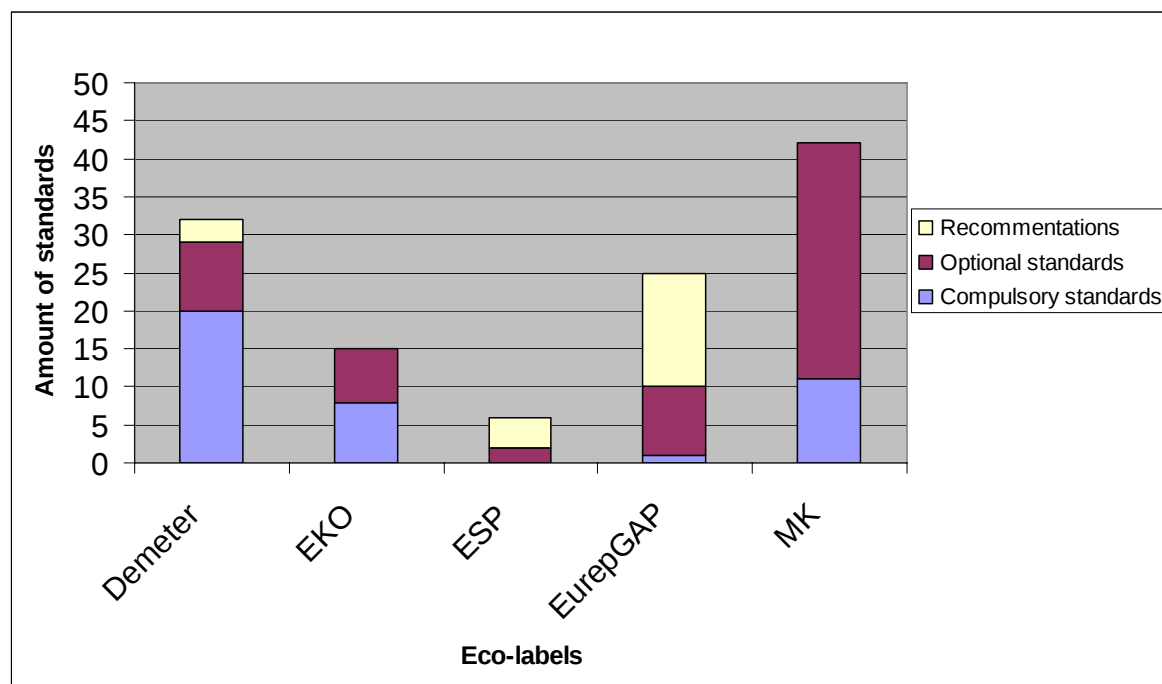


Figure1: Number and character of agrobiodiversity management standards in eco-labels

To measure the degree to which agrobiodiversity management is included as a criterion in the eco-labels, the number of biodiversity-friendly standards is gauged. Of course, the number of times this criterion is mentioned does not capture the level of agrobiodiversity friendliness that these standards envision. In that light, it should be noted that the standards of Demeter, EKO, and MK place high value on environmental friendliness. Furthermore, the major categories of farming activities in the index differ for each of the eco-labels. MK covers eight of the ten farming activities. EurepGAP addresses seven, while EKO, Demeter, and ESP cover six each. For Demeter, the analysis excluded the agrobiodiversity-friendly measures that go beyond the labeling scheme, extra measures noted on the annual evaluation form. If they were to be included, though, Demeter would score on nine out of the ten farming activities.

All five labeling schemes seek to comply with standards for fertilization, crop protection, soil management, and management of the relation between the farm and its surroundings. In addition, MK also regulates the management of the buffer zone, ‘semi’-nature, and traditional elements of the cultural landscape. ESP is the only label that takes the selection of regional varieties into account when setting its standards. EKO and Demeter place strong emphasis on the crop rotation plan, fertilization, and crop protection.

The eco-label with the most agrobiodiversity-friendly standards is MK (42), followed by Demeter (32). The eco-label with the greatest number of compulsory standards is Demeter (20), followed by MK (11). The eco-labels

that explicitly mention biodiversity as an environmental topic – namely, ESP and EurepGAP – mainly employ recommendations or optional standards in this regard.

5. 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 broken: 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 and enforcement of standards 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.

5.1. Separation of powers

This principle distinguishes third-party eco-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 breaking 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 [4]. 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 AB assures the sector of the independence, impartiality, confidentiality, and integrity of the certification bodies by using Guideline 65 of the International Standardization

Organization (ISO) for product certification. This guideline is the basis on which European Norms (EN) 45011 [39] were formulated. Figure 2 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.

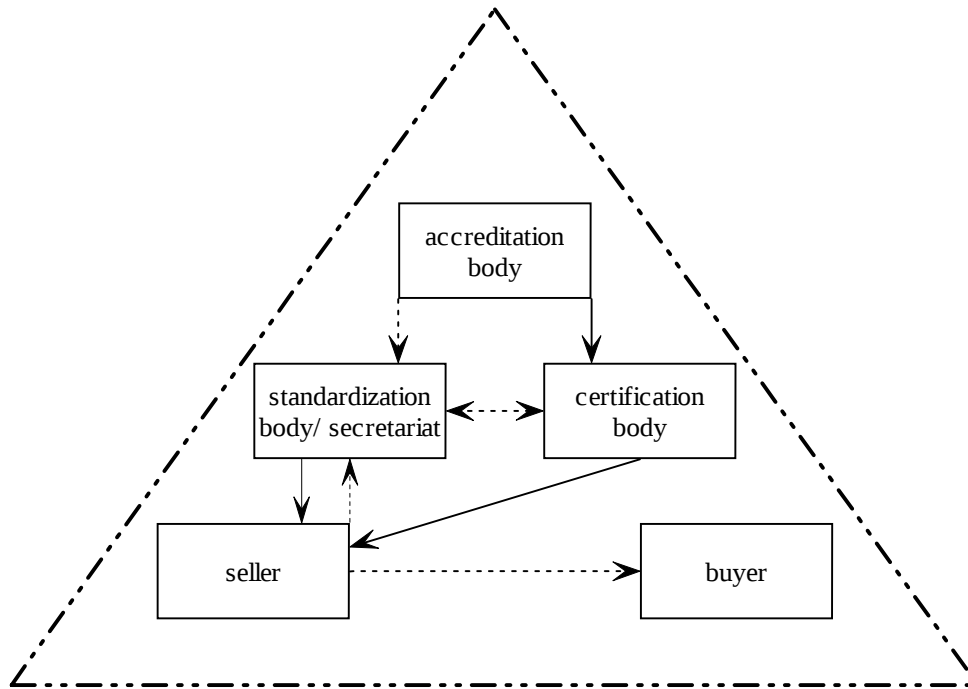


Figure 2: Certification triangle, based on De Graaff [4].

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. Eco-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 MK, EKO, and EurepGAP operate is the same as shown in figure 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 MK). Both Demeter and ESP 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. ESP also incorporates the EN 45011 standards, but there is no independent AB. Further, the functions of the standardization body and the certification body are combined to some extent. Although accredited certification bodies do not audit ESP, the regional organizations belonging to ESP do have their own inspectors. At the same time, these regional organizations can interpret the national ESP standards according to their own regional situation.

5.2. *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 [19] [27]

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.

MK and Demeter are the only two labels with direct participation. MK 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. MK 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 eco-labels use indirect participation in their decision-making on standards. None of the five eco-labels choose their representatives by voting. In the standardization bodies and advisory bodies of EurepGAP and MK, each of these organizations is represented by a delegate. In this way, society at large is more strongly represented in MK than in EurepGAP. Concretely, MK includes government authorities and organizations of employers, consumers, environmental groups, and branches of industry. MK 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. ESP operates with indirect participation of the regional organizations: they also represent the regional producers and their interests. ESP's regional organizations are part of the advisory body. The organizations do not exert a direct influence on the ESP 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 respondents 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 respondents from EurepGAP also considered the decision-making process for change of standards to be difficult.

5.3. Legal equity

With respect to legal equity, both the standards and the information about producers' compliance should be accessible, transparent, and understandable [6]. 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 [28].

As discussed above, the labeling organizations communicate with other parties about standards but not about implementation. They do not make information about producers' compliance public. The declaration of conformity that an accredited certification body gives to a company is considered sufficient. 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 reports elaborate on the degree of compliance of producers as expressed in executed controls, enforced sanctions, legal procedures, and policy priorities. When respondents from other labeling organizations were asked about their communication policy, some said they did not keep records on compliance, while others said that the publication or sharing of such information would amount to an invasion of the producers' privacy. 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 ESP 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 known case that is incompatible with the legal equity principle. 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 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.

5.4. 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. Figure 3 gives an indication of the variety of ways. The eco-labels EurepGAP, MK, and EKO put more emphasis on objectification by independent bodies, while the EKO, Demeter (and later perhaps ESP) 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.

	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

Figure 3: Rule of law in eco-labels

6. 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 [22]. Because the enforcement of producer compliance is not very transparent, the actual implementation of the institutional guarantees by auditors cannot be studied. Therefore this section focuses on the presence of institutional guarantees to enforce compliance by farmers.

Ruimschotel identifies eleven areas of potential risk of non-compliance with the regulations. These areas are listed in figure 4. The T11 method was originally designed to evaluate compliance with government regulations, but it is also pertinent to eco-labels – at least in theory [27]. T11 distinguishes three types of compliance behavior: spontaneous compliance, compliance through control, and compliance through sanctions.

	<i>Risks of non-compliance for the dimensions of spontaneous compliance</i>
1	Non-compliance by farmers through unawareness of standards and lack of clarity in standards
2	Non-compliance is advantageous to farmers in terms of time, money, and trouble. The financial barrier may be attributed to both the production method and the cost of certification.
3	Farmers perceive standards of the eco-label as unreasonable.
4	Farmers are not willing to conform to authority of SI / CI.
5	Behavior of farmers is not sanctioned by unauthorized others (informal chance of getting caught).
	<i>Risks of non-compliance for the dimensions of control</i>
6	Little perceived chance that informally discovered offenses will be reported to auditors (informal chance of being reported)
7	Little perceived chance of inspection after committing an offense (chance of control)
8	Little perceived chance of discovery of an offense when an auditor inspects (chance of detection)
9	Little perceived chance of selection for an additional inspection after discovery of offense (chance of selection)
	<i>Risks of non-compliance for the dimensions of sanctions</i>
10	Little perceived chance of sanction after discovery of an offense (chance of sanction)
11	Little harm by the sanctions and additional disadvantages of sanctioning (sanction type)

Figure 4: Risks identified with the Table of 11 (based on Ruimschotel [22] [27])

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 figure 5. The number of the proposition is shown in the left column, which corresponds with the left column in figure 4. 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. Figure 5 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 (e.g., when the participation of the farmers is not direct or through a branch organization but instead through a regional organization).

6.1. Spontaneous compliance

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

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 [27]. There is a difference between the voluntary eco-labels and EKO, though: EKO engages in several activities to influence the market for its products [35] [36].

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 producers experienced this freedom as an advantage: they felt they had a choice among eco-labels.

6.2. 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 eco-labels have many institutional guarantees in common to cover the dimensions of control.

	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	+	+	+/-	+/-	+
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	+	+	-	-	-

Figure 5: Institutional guarantees for compliance per eco-label

Although the institutional guarantees are all similar, the interviewed respondents felt that EKO and Demeter were the most stringent in their audits. Next in the order of strictness were MK and EurepGAP, followed by ESP at some distance. ESP also has fewer possibilities for control than the other labels. For ESP, some of the institutional guarantees are scored as +/- in figure 5. This means that ESP can conduct unannounced and extra inspections; continuity of

inspections is also possible. The respondents said that none of these options have been used on a large scale yet.

Respondents from different eco-labels said that if the farmers really wanted to cheat, they could find a way to do it. Therefore, almost all eco-labels give high priority to the enforcement of standards. 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. In principle, this could be a reason for the consumer to be assured that the farmer does produce in conformity with the environmentally friendly standards.

6.3. 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 respondents 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.

6.4. 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 choice? 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 not been systematically investigated. This is due to the lack of transparency of certification bodies about their audits.

7. 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.

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.

MK 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 [49]. It uses a method that compares the MK results for one or two crops with an expert opinion about conventional farming. The environmental index designed by CLM [2] 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; MK 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.

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

8. Conclusions

This paper considered whether eco-labels addressing biodiversity issues sufficiently diminish the information gap between the seller and the buyer. The main conclusion is that, despite efforts to make the labels as reliable as possible, they fail to provide enough information to diminish the information gap. The following shortcomings may be distinguished:

- Eco-labels are unclear about the environmental themes they standardize. 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 15 and 42 standards (either compulsory or optional) in six to eight categories of farming activities. 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.
- 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.
- 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.

- 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.

Despite these drawbacks, eco-labeling also 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. Despite the disadvantage cited in the literature – that self-regulation is not able to tackle complex environmental problems – there is an indirect positive development of awareness raising.

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.

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’.

First, 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.

Second, 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 convenient. 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.

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