Nostalgia versus Pragmatism? How attitudes and interests shape the term sustainable agriculture in Switzerland and New Zealand

Philipp Aerni a,*, Allan Rae b, Bernard Lehmann c

aWorld Trade Institute, University of Bern, Hallerstrasse 6, 3012 Bern, Switzerland
bDepartment of Applied and International Economics, Massey University, Private Bag 11 222, Palmerston North, New Zealand
cAgricultural Economics Group, Institute for Environmental Decisions, ETH Zurich, 8092 Zurich, Switzerland

Introduction

‘Sustainable Agriculture’ is a term that means different things to different people. Some associate it with organic agriculture (Altieri, 1995), some with the food sovereignty movement (Shiva and Bedi, 2002) and some with the concept of state-funded multifunctional agriculture (Van Huylenbroeck and Durand, 2003). Advocates of these concepts of sustainable agriculture focus mainly on the promotion of alternative agricultural practices and awareness-building campaigns for consumers and citizens about the negative impact of international trade on sustainable agriculture. They generally believe that multifunctional production systems are the best way to address the sustainability problems in agriculture. Multifunctional agricultural production systems are based on an integrated farming approach. This sustainability approach comprises a social, an environmental and to a lesser extent, an economic dimension. It takes into account the needs of rural communities and food safety for consumers as well as the impact of agricultural practices on local ecosystem services and the global environment (Tilman et al., 2002; Jordan et al., 2007). Moreover sustainable agriculture is also strongly linked to an all-encompassing view of what life ought to be in general (VanLoon et al., 2005; Thompson, 1994). This multifunctional approach to agriculture has a strong political dimension because it implies that governments have the main responsibility to ensure sustainable agriculture.

Legal experts emphasize the important principles of sustainable development as entrenched in many multilateral environmental agreements and argue that a joint effort, again led by governments, is required to manage the natural resources in a way that does not endanger essential ecosystem services and ensures social and intergenerational equity (Francioni, 2001). Most of these principles of sustainable development refer to the influential report ‘Our Common Future’ published in 1987 by the Brundtland Commission (Brundtland, 1987). This report is based on the implicit assumption that actors in the public and the private sector are willing to act responsibly and thus able to overcome their selfish motives in order to effectively implement the common goals of sustainable development. Yet, in the Brundtland report, as well as in most of the subsequent international reports on sustainable agriculture, it is never quite clear who should participate in this joint effort to ensure the implementation of the resulting regulations and on what kind of based. The resulting temptation to leave the implementation to others (free-rider problem) may lead to the tragedy of the commons, where a wrong institutional setting undermines the sustainable management of the joint resource base (Hardin, 1968).
Even though the Brundtland report recognizes the role of new technologies and the private sector in helping to achieve sustainable development, its recommendations are based on a rather normative approach. Governments are asked to design appropriate regulation and goals of sustainable development and corporations shall develop effective strategies to properly implement these goals. Civil society groups, in turn, are recognized as representatives of the public interest that monitor the activities in the public and the private sector. Yet, 20 years after the Brundtland Report, there is not much evidence to support the assumption that people act responsibly or that social planning can deal with the major sustainability problems effectively (Speth, 2004; Prins and Rayner, 2007; Nordhaus and Shellenberger, 2007). This was also observed in agriculture (Kleijn et al., 2001; Schläpfer, 2006; Rentsch, 2006). Moreover, where ever sustainability problems have been addressed successfully, they were mostly achieved through bottom–up innovation in technology and management – rather than top–down social planning (Nordhaus and Shellenberger, 2007; Prins and Rayner, 2007; Mc Donough and Braungart, 2002).

There are of course views that would object to this and argue that agriculture in Europe has become significantly more sustainable over the past decade. Thanks to agricultural policies that take into account social and environmental values (Van Huyslenbroeck and Durand, 2003). But, again, many scholars are starting to question the overall sustainability of the EU Common Agricultural Policy (CAP) based on their findings obtained in empirical research (Kleijn et al., 2001; Grethe, 2007).

This shows that there is hardly any consensus on how to achieve sustainable agriculture and previously dominant definitions are increasingly questioned. Yet, depending on the interests and attitudes of influential stakeholders, a public debate on sustainable agriculture may be framed in a particular way, regardless of which approach may be most effective. Generally, people tend to frame a problem contingent upon their mental representations of options rather than the objective states of the world (Kahneman and Tversky, 2000); yet, this mental representation of options can also be deliberately shaped by stakeholders who are keen to influence the media discourse in a way that best serves their political agenda (Aerni, 2002; Fairclough, 1995). In the case of national agricultural policy, stakeholders who fear the loss of influence and access to scarce public resources as a result of structural change are likely to frame the national situation in a descriptive way (e.g. small-scale farmers form part of our national identity and are the guardians of sustainable agriculture) and the global situation in a prescriptive way (e.g. economic globalization should be curbed in order to preserve national sustainable agriculture). The reverse would be the case for stakeholders who are likely to benefit from structural change in agriculture; they would argue that economic globalization is an inevitable process (descriptive) and farmers must focus on the opportunities rather than the challenges in order to ensure sustainable change in agriculture (prescriptive) (Fairclough, 2004).

In this study, we investigate the attitudes and interests that shape national debates on sustainable agriculture. For that purpose, we conducted stakeholder-based surveys in Switzerland and New Zealand. These two countries have very different positions in international agricultural trade and can therefore be expected to reveal different national narratives on sustainable agriculture that, again, allow different stakeholders to dominate the political agenda.

The Swiss approach to sustainable agriculture

In Switzerland, article 104 of the Swiss constitution (approved in 1996) states that the government must ensure a market-based and sustainable agricultural sector that also takes into account the conservation of natural resources and decentralized settlement. The legitimacy of promoting multifunctional agriculture in Switzerland is largely derived from this article. It is based on the assumption that farming (as defined in article 104) provides public services that are not remunerated by the market and therefore justify government intervention. Direct payments (ensuring a farm income that should not be below the national average) and eco-payments (giving additional support to farmers that apply certain agro-environmental measures) were especially designed to compensate for these public services.

At the same time, tariff trade barriers are to be substantially reduced (albeit only by a third of what was suggested by the big players during the Doha Development Round), internal price support will be halved and export subsidies will be abolished. The expected loss of farm income due to lower prices will be compensated through more direct payments. Farm competitiveness shall be further increased through an easing of the use of agricultural land (e.g. encouraging more agro-tourism), easier access to cheaper input products from abroad (e.g. parallel imports), a strengthening of the system of geographical indication, and investment support credits for local initiatives that are likely to add value to agriculture. The budget for R&D in agriculture was however reduced significantly over the past decade and the research priorities shifted from production-related research to agro-ecological research (BLW, 2007). This shift was also accompanied by a stronger focus on monitoring at the expense of active participation in the development of new agricultural goods in collaboration with the farmers.

The New Zealand approach

New Zealand has a major interest in ensuring the sustainability of its competitive and export-oriented agricultural sector since an over-exploitation of its natural resources would not just undermine its competitiveness in agriculture and harm its ‘clean and green’ image but also affect its large tourism industry. It wants to achieve this without returning to the subsidies system that was abolished in the 1980s. Therefore, there is currently an ongoing public debate on how to re-design the New Zealand farming system in order to render its management of natural resources more efficient and sustainable. Especially the increasing use of nitrogen fertilizer for pastures and the inefficient use of water in dairy farming are identified as long-term risks to sustainable agriculture (PCE, 2004). The Resource Management Act (RMA) passed in 1991, is serving as the legal foundation for New Zealand’s endeavour to improve agricultural sustainability. Its purpose is “to promote the sustainable management of natural and physical resources” while “remedying, or mitigating any adverse effect of activities on the environment”. The RMA is based on a highly decentralized bottom–up approach to environmental policy. Even though it authorizes the government to issue national environmental standards, it is up to the local authorities (Regional Councils) to choose the best approach on how to implement them. They set the context for development in their regions and provide a framework for district plans (PCE, 2004). Even though Regional Councils are often dominated by rural interests and slow in embracing bold environmental policies, they may at least ensure the proper implementation of the jointly developed strategy. Regulation of sustainable agriculture in New Zealand thus fosters local participation and responsibility as well as learning from best practices. Apart from environmental regulation, the government as well as farmer organisations in New Zealand are committed to promote sustainable agriculture and food quality through investment in research and development. The Foundation for Research, Science
and Technology (a branch of the Ministry of Research, Science and Technology) plays a major role in the funding of research on new ways to improve sustainable agriculture. Its mission is investing in innovation for New Zealand’s future. It has established relationships with all the major research organisations and key users of science (private sector, local authorities, government agencies, and other public interest groups) that share the same commitment to convert New Zealand into a full-fledged sustainable knowledge economy (Foundation for Research, Science and Technology, 2005). The focus on creating value and innovation in agriculture has not just triggered entrepreneurial activity in the research centres that focus on precision agriculture and biotechnology but also on those that are dedicated to ecological agriculture.

Investigating stakeholder attitudes and interests in Switzerland and New Zealand

The different policy approaches in New Zealand and Switzerland may also reflect the social preferences of their people. But then, again, the two countries share similar social values and affluence and have a high degree of human autonomy in terms of political freedom. The only big difference is that Switzerland represents the ‘old world’ and New Zealand the ‘new world’, and this may matter especially in the business of agriculture. It is quite obvious that stakeholder interests are different in a country like New Zealand where agriculture is responsible for 50% of the total export receipts and makes up 6.1% of the GDP (15.7% if all food and forestry-related businesses are included) (MAF, 2003) compared to a country like Switzerland where agriculture’s share of total export receipts is less than 3% and its contribution to GDP is less than 1% (BLW, 2007). The different stakeholder interests and their respective attitudes towards sustainable agriculture may also have a significant influence on the construction of social preferences in each of the two countries (Lichtenstein and Slovic, 2006).

In Switzerland, only very few people are still working as full-time farmers. The views and values of the large non-farming majority are therefore crucial in explaining Swiss agricultural policy. This majority lives in metropolitan areas and regards support for traditional agriculture as an expression of personal values and life style (Beck, 2000). Their disinterest in the modern business of agriculture and their concern that globalization will sweep away idyllic Swiss small-scale agriculture makes them very responsive to political stakeholders that claim to defend the values of rural Switzerland and to stop the ‘killing’ of farms (‘Bauernsterben’). Thus the public debate becomes highly affect-driven and induces political stakeholders to portray themselves as disinterested actors that only have the public good in mind. Research findings in cognitive and social psychology largely confirm the affective view of the public towards political issues that are charged with identity and have a high degree of human autonomy in terms of political freedom. The only big difference is that Switzerland represents the ‘old world’ and New Zealand the ‘new world’, and this may matter especially in the business of agriculture. It is quite obvious that stakeholder interests are different in a country like New Zealand where agriculture is responsible for 50% of the total export receipts and makes up 6.1% of the GDP (15.7% if all food and forestry-related businesses are included) (MAF, 2003) compared to a country like Switzerland where agriculture’s share of total export receipts is less than 3% and its contribution to GDP is less than 1% (BLW, 2007). The different stakeholder interests and their respective attitudes towards sustainable agriculture may also have a significant influence on the construction of social preferences in each of the two countries (Lichtenstein and Slovic, 2006).

In Switzerland, only very few people are still working as full-time farmers. The views and values of the large non-farming majority are therefore crucial in explaining Swiss agricultural policy. This majority lives in metropolitan areas and regards support for traditional agriculture as an expression of personal values and life style (Beck, 2000). Their disinterest in the modern business of agriculture and their concern that globalization will sweep away idyllic Swiss small-scale agriculture makes them very responsive to political stakeholders that claim to defend the values of rural Switzerland and to stop the ‘killing’ of farms (‘Bauernsterben’). Thus the public debate becomes highly affect-driven and induces political stakeholders to portray themselves as disinterested actors that only have the public good in mind. Research findings in cognitive and social psychology largely confirm the affective view of the public towards political issues that are charged with identity and meaning but are not of direct practical relevance to people’s daily lives (Petty and Cacioppo, 1986; Sniderman, 2000; Iyengar, 1991). Depending on the degree of personal involvement, preferences for public goods may be shaped by contextual clues (Kahneman et al., 1999; Sayman and Öncüler, 2005), marketing strategies (Mandel and Johnson, 2002; Belk et al., 1989; Brunsø et al., 2004) as well as political spin (Althaus, 2004; Schildkraut, 2004) rather than deliberative and autonomous judgment. In this context, not just classic lobbying groups but also professional public interest groups are increasingly taking advantage of the weak involvement of the public by framing the debate on sustainable agriculture in a way that portrays them as the trustworthy defenders of the public interest (Furedi, 2003; Aerni and Bernauer, 2006).

In New Zealand, where agriculture is still perceived to be an important business that creates a lot of employment, the public debate about sustainable agriculture may be less charged with symbolic value but be more practical. Since a larger portion of the public feels directly affected by the course of the business of agriculture, they are more likely to get highly involved in the issue (Petty and Cacioppo, 1986). This may allow the important stakeholders to break the value-based meta-discourse down to more concrete problems that have to be addressed in order to make sustainable agriculture compatible with agricultural competitiveness.

In this context, stakeholder surveys may be better able to identify the prevailing public perceptions of sustainable agriculture and their impact on future agricultural policy than representative public perception surveys where participants are likely to be less well-informed and therefore prone to give answers that merely reflect the views of trusted stakeholders rather than their personal interests and attitudes (Aerni, 2002).

Stakeholder surveys in Switzerland and New Zealand

In both countries, the most important stakeholders were selected by means of key informants who were familiar with the national debate on sustainable agriculture and its participants. In addition, literature related to national agricultural policy and media coverage on domestic agriculture was screened in search for additional relevant political actors. The selection by key informants is used mostly in policy and social network analyses (Laumann and Knoke, 1987).

Subsequently, a questionnaire was designed to survey the attitudes of the selected stakeholders and assess their influence in politics (the exact wording of the statements and answers can be found in Annex 1). The questionnaire consisted of four parts: Part I and II contained questions and statements about the importance of the problems of sustainable agriculture and how to address them effectively. They had to be rated on a scale from one to four. Moreover, stakeholders were also asked to rate the overall sustainability of domestic agriculture.

Part III contained a policy network table that included all the institutions and organisations that were considered to be relevant in the national public debate on sustainable agriculture in New Zealand (46 domestic and 7 international stakeholders) and Switzerland (48 domestic stakeholders and 7 international stakeholders). Each institution had to be assessed in terms of influence on political decision-making, public opinion, and the national debate on sustainable agriculture. Moreover, the respondents who themselves represented one of the institutions had to indicate whether they give or receive information/financial support to them. The data obtained allows identifying the stakeholders regarded to be important in the politics of sustainable agriculture and influential as distributors of information and financial support.

Finally, the last part of the questionnaire contained general questions about type, size and activities of the organisation that the respondent represented.

Survey response rates

The stakeholder perception surveys on sustainable agriculture were carried out in New Zealand from April 2006 to August 2006 and Switzerland from November 2006 to February 2007.

In both countries, key informants were identified with the help of the local partners. The subsequent joint selection of stakeholders was first people-driven (identifying the best-known personalities...
in the public debate) and then group-driven (searching for appropriate survey participants within the remaining stakeholder groups that may not be directly relevant in the public debate on sustainable agriculture but nevertheless have an interest in the topic and are considered to have a significant influence either on public opinion or political decision-making). The public debate on sustainable agriculture is therefore made up of stakeholders that are associated with that particular topic in the media, as well as their real and potential political affiliates in their respective social networks.

The selected stakeholders in Switzerland (CH) and New Zealand (NZ) were asked to complete a semi-standardized questionnaire on the importance of the problems of sustainable agriculture and the best approaches to address these problems.

In New Zealand, 39 respondents completed and returned the questionnaires. They represented 33 different domestic institutions. The total return rate of questionnaires was 81%.

In Switzerland, 41 questionnaires were completed and returned, representing 36 different domestic institutions. This amounted to a total return rate of completed questionnaires of 86%.

The respondents represented academia, business, mass media, NGOs, government, and legislative institutions.

Fig. 1 shows the distribution of stakeholders in Switzerland and New Zealand. There is a higher share of representatives from academia and business in New Zealand. In return, the participation of representatives from government and legislature is higher in Switzerland. This largely reflects the fact that the role of government in New Zealand agriculture shrunk significantly after the cut back of subsidies in the 1980s and is now limited to the support for research, pest and disease control, agri-environmental measures and climatic disaster relief. Judging from the comments of the respondents, there was a concern that the interpretation of the results could be highly subjective and used for political purposes. This concern was addressed by later sending out a draft report on the survey results to all the participants together with an explanation of the results. The participants in the workshops held in Switzerland (in September 2007) and New Zealand (in October 2007) did not think that there was a bias in the ratio of participants from the different institutional groups, nor did they question the validity of the results obtained in the survey. There was however a lively discussion about the political implications of the results. Especially Swiss workshop participants found that there was not enough emphasis on the particular socio-economic and environmental background that underpins national agricultural policy.

Data analysis

Comparative descriptive analysis

This descriptive analysis mainly evaluates the mean values and standard deviations obtained from the data in Part I and II of the questionnaire. It reveals a couple of interesting perception differences in Switzerland (CH) and New Zealand (NZ). NZ respondents tended to oppose direct payments, the Precautionary Principle, and a tax on food miles as measures to promote sustainable agriculture. Moreover, they believed that the most important sustainability problems in domestic agriculture (water and fertilizer consumption, nutrient pollution, greenhouse-gas emissions) cannot just be addressed by educating consumers and promoting organic farming and eco-labelling standards, but must also include the use of new technologies, such as biotechnology and precision farming, and incentives for the private sector to invest in sustainable agriculture.

CH respondents, in turn, tended to endorse government support for farmers and the Precautionary Principle for new technologies. They felt that ‘international trade competition’ is the most important problem of sustainable agriculture. This rather defensive view of sustainable agriculture is confirmed by the overall assessments of the sustainability of domestic agriculture in NZ and CH: CH respondents turned out to be quite confident that domestic agriculture is already sustainable, while NZ respondents turned out to be more sceptical.

Perception pattern analysis

The respondent ratings given to the questions and statements in Part I and II of the questionnaire were categorized into 13 variables that combined different types of problems and statements (for a detailed description of the statements see Annex II). Subsequently, perception patterns in Switzerland and New Zealand were identified by means a cluster analysis (Ward’s minimum-variance method, Canonical Discriminant Analysis).

The statistical tests related to the Canonical Discriminant Analysis (Square Distance, F Statistics, NDF, DDF, Mahalabonis Distance for Squared Distance, Wilk’s Lambda, Pillai’s Trace, Hotelling-Lawely Trace and Roy’s Greatest Root) all showed a probability of less than 0.05 (of not being different). That allows us to conclude with a high degree of confidence that the clusters are different.

The following discussion of the results uses tables and graphs that illustrate the results of the group perceptions of sustainable agriculture obtained through the perception pattern analysis in CH and NZ. Table 1 shows the perception clusters obtained for Switzerland and Table 2 for New Zealand. Three different

![Fig. 1. Number of participants and shares of the different stakeholder groups.](image-url)
perception clusters were created for each country. The survey participants were categorized in the table according to their institutional affiliation.

### Perception patterns in Switzerland

The cluster analysis of the Swiss survey data revealed three main perception groups (see Table 1). Fig. 2 portrays the three clusters in a spiderweb where the concentric angular circles indicate the average cluster rating of the variables on a scale from one to four.

The first perception group (Cluster 1) contained 13 observations. While it did not contain any representatives from academia (A) and NGOs (N), it included all the 6 politicians (L) who participated in the survey (see Table 1). The line that represents the perception of Cluster 1 in Fig. 2 indicates that its respondents perceived Swiss agriculture to be quite sustainable (sustain) thanks to direct payments, eco-payments and the expansion of organic agriculture, statements that make up the strongly approved variable \(_{redistn}^{ecoproducts}\). It is therefore not surprising that they did not regard wrong policy incentives (policy) and lack of innovation and change (innovation) as serious problems in agriculture. They endorsed the use of the Precautionary Principle and the concept of multifunctional agriculture represented by the variable values; and they were strongly against the use of modern precision farming and genetic engineering (technology). Moreover, they were rather sceptical about agricultural reform and trade liberalisation (progressive).

The second perception group (Cluster 2) contained 14 observations and was dominated by 5 NGO representatives (national and international) and 4 academic representatives (mainly representing social scientists and agro-ecologists). Fig. 2 shows that they did not think that Swiss agriculture was very sustainable and emphasized the importance of the different sustainability problems (climate, input, culture, food). They believed that wrong policy incentives and lack of innovation and change help explain many of the problems of sustainable agriculture in Switzerland. Generally, they are progressive-minded but at the same time sceptical toward the use of modern technology in agriculture and pragmatic in the sense that they endorsed the popular statements that free trade and the private sector tend to undermine sustainable agriculture. Overall, they thought change was necessary but not in terms of technological and economic change but in the way we think about food and agriculture.

The third perception group (Cluster 3) containing 14 observations was dominated mainly by respondents from academia (4) government (4), NGOs (3) and business (2). They believed that Swiss agriculture was generally sustainable and did not regard the problems of sustainable agriculture to be very serious. Food quality and food price were perceived to be particularly irrelevant problems (food), probably implying that Switzerland already produces the best food quality and consumers have the purchasing power to pay for it. They tended to be less negative about the role of new technologies (technology) but still thought that alternative agriculture was a better solution to the problems of sustainable agriculture (ecoproducts\_redistn). Generally, they believed that Swiss agricultural policy was on the right track to address the future challenges of sustainable agriculture (they do not see policy and lack of innovation as important problems).

Overall, all the three perception groups showed strong support for the variables values and ecoproducts\_redistn. This confirms the strictly value-based approach to sustainable agriculture in Switzerland.

### Perception patterns in New Zealand

The cluster analysis with the New Zealand data also produced three perception groups (see Fig. 3). The first perception group (Cluster 1) consisted of only 9 respondents mainly representing academic institutions (5) (see Table 2). Even though respondents in this cluster generally thought that agriculture in New Zealand was quite sustainable (sustain), they considered high use of input as well as quality and price of food to be rather important problems of sustainable agriculture. They were highly reform-minded (progressive) and focused for that purpose on investment in research and development (technology, innovation). Even though they also seemed to endorse a value-oriented approach (referring here more to the statement about bottom—up principles within the respective variable), they rejected heavy government intervention to ensure sustainable agriculture (eco-products\_redistn).

---

**Table 2**
The number of observations in each NZ cluster in total and by institutional group.

<table>
<thead>
<tr>
<th>Clusters</th>
<th>Academia</th>
<th>Business</th>
<th>Gov.</th>
<th>Legis.</th>
<th>Media</th>
<th>NGOs</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>1</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>13</td>
<td>7</td>
<td>6</td>
<td>4</td>
<td>2</td>
<td>7</td>
<td>39</td>
</tr>
</tbody>
</table>
Cluster 2 is the largest one (19 respondents) covering mainly government officials (5), academics (5) and NGO representatives (4). The prevailing perception pattern is similar to the one of Cluster 1 with the difference that the respondents in Cluster 2 tended to think that the problems of sustainable agriculture in New Zealand were largely limited to high input (especially water) and climate (especially greenhouse-gas emissions). Respondents of Cluster 2 however tended to be less worried about wrong policy, food quality and biodiversity-related issues (biodiv).

Cluster 3 consisted of 11 respondents mainly representing academics (3) and politicians (3). It had a much more pessimistic perception of sustainable agriculture in New Zealand. Its respondents believed New Zealand agriculture was not sustainable at all and rated all the problems of sustainable agriculture to be very important. In their eyes, New Zealand agricultural policy did not provide appropriate incentives to address the problems (policy). This also explains why they did not endorse the progressive view, were sceptical about the role of technology and trade (pragmatic) and tended to favor the use of European measures to promote sustainable agriculture (ecoproducts_resdistn). Apart from sharing the view that input is an important problem for sustainable agriculture, cluster 1 and 2 did not have much in common with cluster 3. Business representatives were almost evenly distributed across the three clusters. This mainly indicates the diversity represented within the business group of the survey ranging from large corporate players to the New Zealand Business Council for Sustainable Development and organic farming business.

Policy network analysis

The policy network analysis allows for the identification of politically influential stakeholders and their respective position in the networks of information exchange and financial support.

The policy network table in Part III of the questionnaire was completed by around 90% of the respondents in each country. The respondents were also invited to add names of organisations they thought were missing in the table. Yet, they only added 4 stakeholders in Switzerland and 3 in New Zealand. Since none was mentioned twice it can be assumed that they are generally not considered to be core actors.3

The following section provides a simplified version of a social network analysis that looks mainly at the position of the different stakeholders in the network of financial support. Stakeholders that are identified as important givers of financial support can be considered influential in the political priority-setting process because they are likely to also get political support from those who receive financial support from them. In turn, stakeholders who may be of crucial importance as contributors of relevant information may find their position in the public debate undermined by their high dependence on the financial support from a stakeholder with a particular policy agenda.

Social network analysis

The social network analysis identifies the key stakeholders in the national debates on sustainable agriculture by dint of their centrality in the different information and financial exchange networks (Laumann and Knoke, 1987).

Respondents were asked at the end of Part III of the questionnaire to indicate if they collaborate with each of the roughly 50 organizations listed in the policy network table of NZ and CH, and, if so, in what way (giving or receiving information/financial support).

The results obtained for the network of information exchange revealed that the core stakeholder in Switzerland was the Swiss Farmer Association (Schweizer Bauernverband) whereas in New Zealand it was the Parliamentary Commissioner of the Environment (PCE).

Networks of financial support in Switzerland and New Zealand

The Analysis of the Networks of Financial Support merits a closer look. Even though fewer respondents responded to the question whether they give to and/or receive financial support from each of the institutions listed in the policy network table, the results were nevertheless interesting. The merging of the two separate networks (we give/we receive financial support from them) into one single network was carried out manually. In this context, all asymmetric ties were symmetrized in order to give a more complete picture (e.g. if one respondent indicates that she received support from a particular institution, we assume that the respondent of this particular institution, even though he did not complete this part, would have indicated that he gave financial support to her). The manual portrayal also allows for the use of colours to highlight the core actors and their function in the network.

Fig. 4 shows the financial support network in Switzerland. The most important givers of financial support (mainly research grants) appear to be government institutions such as the Swiss Office of Agriculture (G2) and the Swiss Office for the Environment (G3), followed by the European Union (I4) (Switzerland pays to be a full participant in the European Framework Program), Coop, a retailer (B4), and the Social-Democratic Party (L7).4

N4 (FIBL: the Swiss research institute for organic farming) is identified as the most important receiver of financial support. Other important receivers were the Agricultural Technical University in Zollikofen (A8), the Institute of Geography at the University

---

3 There were three respondents in New Zealand who completed the questionnaire but were not directly affiliated with any of the institutions listed. One represented a large corporate dairy farm (attributed to the business section), one a producer organisation (meat & wool) attributed to the NGO section, and another one an farmer-owned research organisation (dairy insight) that was also attributed to the NGO section.

4 The politician who filled in this part is also chairman of a non-governmental organisation. This may explain the financial support for two international NGOs.
of Bern (A3), ETH Zürich (department of agriculture and food science) (A1) and Agroscope ART Reckenholz (A6) (a national research institute).

It is interesting to observe that only retailers, such as B4 (Coop) and B5 (Migros) seemed to be important sponsors of asymmetric research in the business world; and they tended to focus on organic farming research. Even agro-chemical companies such as Syngenta (B1) appear to sponsor merely environmental research (A2, Institute of Environmental Sciences, University of Zurich) and support business-related media coverage (M4, a farmer weekly). The cantonal departments of agriculture (G5) also seemed to play a more dense (see Fig. 5). There seemed to be many more institutions that gave and received financial support. Apart from the federated Farmers (N1), Fonterra (B1), Ravensdown (B8) (a fertilizer company) and BioGro (B11) (certification of organic products), the Royal Society (A9), and the Crown Research Institutes such as AgResearch (A7), Landcare (A5) and, to some extent, HortResearch (A8), seem to play a dominant role in the giving and receiving networks of financial support. It receives financial support from B4 (Coop) and sponsors research at FBL.

The network of financial support in New Zealand looks slightly more dense (see Fig. 5). There seemed to be many more institutions that gave and received financial support. Apart from the federated Farmers (N1), Fonterra (B1), Ravensdown (B8) (a fertilizer company) and BioGro (B11) (certification of organic products), the Royal Society (A9), and the Crown Research Institutes such as AgResearch (A7), Landcare (A5) and, to some extent, HortResearch (A8), seem to play a dominant role in the giving and receiving networks of financial support. This can be explained by the fact that these national research institutes were semi-privatized in the 1990s and therefore forced not just to apply for research grants but also invest in new products. By far the most important giver of financial support was the Foundation for Research, Science and Technology (G4). It supported research at the Crown Research Institutes and universities, as well as research conducted in the private sector (B1). Research sponsored by the Ministry of Agriculture and Forestry (MAF) (G1) and the Ministry for the Environment (MFE) (G2) seems to be marginal by comparison. Another important giver of financial support appears to the ruling Labor Party (L2) that sponsors government agencies as well as research. Yet, this is related to the fact that the respondent of this party was also the incumbent Minister of Agriculture and Forestry. Finally, there

---

5 Many politicians in New Zealand are also assuming high positions in government (if appointed by the ruling party). In this case the respondent was also Minister of Agriculture and Forestry.

---

Conclusions and discussion

The stakeholder surveys in Switzerland and New Zealand revealed diverging views over the impact of international trade on sustainable agriculture. This confirms the assumption that national definitions of sustainable agriculture may be highly dependent on a country’s position in the international agricultural trading system. New Zealand is competitive and therefore forced to reconcile agricultural business with sustainable agriculture through innovation and incentive-based policies. The mainly progressive attitude of stakeholders in the New Zealand survey largely reflects this. It also explains why New Zealand respondents generally consider new technologies to be an integral part of sustainable agriculture and endorse a bottom–up approach in agricultural policy that hands over most of the decision-making power to farmers. Its focus on technological innovation and its commercial application is also reflected in the importance of the Foundation of Science, Research and Technology in the network of financial support.

Swiss agriculture, in turn, is less competitive and therefore more likely to frame international trade as a major problem of sustainable agriculture that needs to be addressed through government regulation and planning. This rather defensive approach is reflected in the Swiss survey by the generally negative view of the role of new technologies in agriculture and the perception that international trade competition is the most important problem in sustainable agriculture. The Swiss network of financial support helps explain the conservative attitude by revealing that the private and the public sector mainly sponsor research projects are related to environmental monitoring and organic farming but not the advancement of technological innovation in agriculture.

The Swiss approach is well-embedded in the international legal framework of sustainable agriculture which tends to frame the sustainability problem as a ‘market failure’ problem that requires government intervention. The resulting social planning approach is however vulnerable to the principal-agent problem in the sense that the agent (the farmer) takes advantage of the situation of asymmetric information by passing on only the information that is required to get the payment from the principal (the government) (Aerni, 2006). As a result, farmers may not feel directly responsible for managing their natural resources in a sustainable way.
The Swiss survey further indicates that the political interest groups that benefit from the social planning system in agriculture are more likely to see sustainable agriculture as a problem of economic and technological change. This view resonates well with an affluent society that has a largely nostalgic view of farming. It is however more difficult to create this affect-driven view in a country like New Zealand where agriculture is still an important business that creates many jobs in urban and rural areas. Its business approach to sustainable agriculture is based on a process of trial and error and characterized by a high-involvement of the public and the farmers in the joint search for best practices. This adaptive approach to sustainable agriculture takes into account the role of local entrepreneurship and innovation (Stokstad, 2005). In this sense, the definition of sustainable agriculture in New Zealand differs from the classic definition of sustainable development as outlined in the Brundtland report. That does not mean that there is no role for government, but it may have to focus more on its role as a facilitator of sustainable change rather than merely regulating potentially unsustainable change. The case of New Zealand proves that the new knowledge economy would provide ideal conditions for farmers to empower themselves and address their local environmental challenges through an easier and quicker access to relevant knowledge and technology. This would encourage them to use their natural resources more efficiently, take advantage of the opportunities of technological and economic change and assume a more assertive position in negotiations with the powerful players in the global food chain.

The Swiss government could facilitate such a change by abandoning its role as nanny of Swiss farmers and becoming a coach that assists farmers in their efforts to become innovation-driven entrepreneurs. The government could also financially encourage Swiss researchers to collaborate more closely with farmers and the private sector in the development of sustainable technological innovation in agriculture. This is however unlikely to happen as long as the New Zealand view of sustainable agriculture is not represented in the public debate in Switzerland. In the 1980s, the New Zealand Federated Farmers felt that the national subsidies system was taking decision-making power away from them without addressing their real concerns. They therefore endorsed radical agricultural reform. In Switzerland, the Swiss Farmer Association (Bauernverband), which turned out to be the central player in the Swiss network of information exchange, may also eventually decide to move from a defensive to a more bold and offensive strategy. This would make Swiss agriculture more compatible with the spirit of the WTO Agreement on Agriculture and may make it economically, socially and environmentally more sustainable.

Annex I

Problems and statements in Part I and II of the Questionnaire

(the words written in bold represent the abbreviations used in the tables and figures)

<table>
<thead>
<tr>
<th>List of Problems to be assessed in Part I (Section 1.1):</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. high use of nitrogen fertilizer</td>
</tr>
<tr>
<td>2. high energy consumption</td>
</tr>
<tr>
<td>3. high water consumption (irrigation)</td>
</tr>
<tr>
<td>4. high use of plant protection (chemicals, sprays)</td>
</tr>
<tr>
<td>5. wrong market/policy incentives (subsidies)</td>
</tr>
<tr>
<td>6. frequent tilling</td>
</tr>
<tr>
<td>7. nutrient pollution</td>
</tr>
<tr>
<td>8. greenhouse gas emissions</td>
</tr>
<tr>
<td>9. damage to biodiversity</td>
</tr>
<tr>
<td>10. monoculture practices</td>
</tr>
</tbody>
</table>

Annex I (continued)

<table>
<thead>
<tr>
<th>List of Problems to be assessed in Part I (Section 1.1):</th>
</tr>
</thead>
<tbody>
<tr>
<td>11. poor food quality</td>
</tr>
<tr>
<td>12. international trade competition</td>
</tr>
<tr>
<td>13. low degree of farm innovation</td>
</tr>
<tr>
<td>14. insufficient investment in research and development (R&amp;D)</td>
</tr>
<tr>
<td>15. weak support services (extension, technical assistance, credit)</td>
</tr>
<tr>
<td>16. loss of rural culture</td>
</tr>
<tr>
<td>17. loss of traditions in farming</td>
</tr>
<tr>
<td>18. low price of food</td>
</tr>
<tr>
<td>19. high farmer indebtedness</td>
</tr>
<tr>
<td>20. institutions that prevent change</td>
</tr>
</tbody>
</table>

List of 14 Statements to be judged in Part II:

1. Sustainable agriculture requires a bottom-up approach.
2. Poverty is the true enemy of sustainable agriculture
3. Free trade in agriculture forces farmers to pursue profits at the expense of sustainable practices.
4. Organic agriculture will remain a niche market and therefore only make a small contribution to sustainable agriculture on a global scale.
5. The farmer does not just produce food but provides many public services that ensure the ecological, cultural and social sustainability of a society.
6. Farming is not a part of nature but a source of environmental pollution.
7. Educating consumers will help change their behaviour and ultimately send signals to farmers to adopt more environmentally friendly farming practices.
8. Sustainable agriculture is a term that is prone to abuse by vested interest groups.
9. The application of the Precautionary Principle ensures sustainable agriculture by preventing the spread of potentially risky new agricultural technologies. (PP)
10. There is no use for strict environmental rules in agriculture if the technology that allows to comply with these rules in a cost-efficient way is not available (Rules&T)
11. Technology transfer, technical training and the improvement of scientific understanding is not meant to be part of the concept of sustainable agriculture (Sustainability&T)
12. Intensive large-scale farming is not necessarily unsustainable and extensive small-scale farming is not necessarily sustainable. (FarmScale)
13. The private sector undermines efforts to achieve sustainable agriculture.
14. The problem is not world agricultural trade liberalisation as such but countries that fail to implement the necessary reforms to ensure a sustainable and competitive farming sector in future. (Reform)

Annex II

Assigning statements to variables (Cluster/Biplot Analysis)

Variables created for Part I of the questionnaire

Section 1.1.:

| INPUT: | Sustainability challenges related to the input of agricultural production comprising the problems nitrogen, water, plant protection, and nutrient pollution; |
| CLIMATE: | Sustainability challenges related to agriculture and climate change comprising the problems energy, tilling and greenhouse gas emission |
### Annex II (continued)

<table>
<thead>
<tr>
<th>POLICY</th>
<th>Sustainability challenges related to inadequate policies comprising the problems incentives, trade, support and debts</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIODIV:</td>
<td>Sustainability challenges related to loss of biodiversity comprising the problems biodiversity and monoculture</td>
</tr>
<tr>
<td>FOOD:</td>
<td>Sustainability challenges related to the quantity and quality of food comprising the problems price and quality</td>
</tr>
<tr>
<td>INNOVATION:</td>
<td>Sustainability challenges related to the problems of lack of innovation and change</td>
</tr>
<tr>
<td>CULTURE2:</td>
<td>Sustainability challenges related to the problems of loss of culture and traditional farm practices</td>
</tr>
</tbody>
</table>

### Section 1.3:

| ECOPRODUCTS_REDISTN: | Assessment of the impact of Taxing Food Miles, Direct Payments, Organic Farming and Labelling Eco-Friendly Agriculture |
| TECHNOLOGY: | Assessment of the impact of Genetic Engineering and Precision Agriculture |

### Section 1.4:

| SUSTAIN | How sustainable is agriculture in your country? |

### Variables created for Part II of the questionnaire:

| VALUES | combines statements that reflect a certain set of values with regard to agriculture. These include Bottom-up, Poverty, Public Service (pserve), Educating (educ), and the Precautionary Principle (PP), |
| PRAGMATIC | combines statements that reveal a realistic view about the politics of sustainable agriculture. The statements include Abuse, Rules&T (rules) and Pollutor (pollute). Moreover it contains critical statements with respect to globalization that are likely to have resonance in public such as Free trade (ftrade) and private sector (psector), |
| PROGRESSIVE | combines the statements that indicate a certain impatience with current policies of sustainable agriculture. These include Farm-Scale (farmscal), Organic Farming (organic), Sustainability&T (techtran) and Reform, |

### References


