

MultiSward

Multi-species swards and multi scale strategies for multifunctional grassland-base ruminant production systems

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Summary

Objective of the deliverable:

To provide dissemination material to groups of stakeholders in Europe.

Activities:

Definition of the documents to be prepared:

- specific information for European stakeholder groups.
- production and validation of documents for dissemination both on a European level and for six countries: Ireland, the Netherlands, Belgium, Poland, France and Italy.

The results obtained after a long period of collecting answers to an on line questionnaire were presented in preview at the final event/international stakeholder meeting of MultiSward in Brussels (February 2014). A first national presentation occurred during the annual meeting of the AFPF (French Association for Forage Production in April 2014 (Versailles-France).

This deliverable will serve as a basis for publications to be presented at the next annual congress of the EGF in September 2014 and the conference participants will have the opportunity to appropriate these national findings to increase dissemination to their own stakeholders.

Teams involved in stakeholder consultation:

- Wageningen UR Livestock Research (DLO-LR), The Netherlands
- Institut National de la Recherche Agronomique (INRA), France
- Teagasc, Ireland
- Poznan University of Life Sciences (PULS), Poland
- Università degli studi di Udine (UNIUD), Italy
- Vlaams Gewest – Flemish region of Belgium (VLAGEW-ILVO), Belgium

Geographical areas covered:

Atlantic regions, mountainous regions, Mediterranean regions, continental regions

Summary:

The European project MultiSward aimed to increase the reliance of farmers on grasslands and on multi-species swards for competitive and sustainable ruminant production systems. Active participation of stakeholders was one of the key objectives of the project. The aim of the current deliverable was to get dissemination material for groups of stakeholders in Europe and various countries from information collected from an on-line questionnaire to get an insight into the importance of grasslands for stakeholders in Europe. This dissemination material is provided for Europe and for six countries in Europe, i.e. Ireland, the Netherlands, Belgium, Poland, France and Italy. The importance of different aspects of sustainability and different functions of grasslands is given for different countries and different stakeholder types. Individual functions of grasslands are highly recognized and appreciated by all relevant stakeholder groups but there were, however, differences between countries and stakeholder types.

1. Europe: Appreciation of the functions of grasslands by European stakeholders

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Abstract

The European project MultiSward aimed to increase the reliance of farmers on grasslands and on multi-species swards for competitive and sustainable ruminant production systems. Active participation of stakeholders was one of the key objectives of the project. The aim of the current study was to get an insight into the importance of grasslands for stakeholders in Europe. An on-line questionnaire on the functions of grasslands was developed in eight languages and 1959 valid responses were obtained. Belgium, France, Ireland, Italy, the Netherlands and Poland were the countries with the highest response. All of the stakeholder groups that were identified as being important in the stakeholder analysis responded to the questionnaire. When asked about the importance of different aspects of sustainability, stakeholders, on average, valued economic aspects the highest, followed by ecological aspects and finally social aspects. There were, however, differences between countries and stakeholder types. The results of the questionnaire show that individual functions of grasslands are highly recognized and appreciated by all relevant stakeholder groups. We conclude that the large European grassland area is considered by all stakeholders to be a valuable resource that is essential for economy, environment and people.

Keywords: grasslands, multifunctionality, stakeholder, sustainability, questionnaire

1.1 Introduction

Grasslands, with their multifunctional roles, can provide a good basis for developing sustainable production systems in the long term (Peyraud *et al.*, 2010). The project MultiSward (www.multisward.eu, 2010-2014) aimed to secure optimal acreage and utilization of grasslands in Europe, to highlight the benefits of grasslands and to conceive, evaluate and promote sustainable ruminant production systems based on the use of grasslands with a high level of multi-functionality to simultaneously increase competitiveness of ruminant production systems and provide environmental goods and biodiversity preservation.

During the last 40 years the European grassland area has significantly reduced, by 15 M ha in favour of the production of fodder maize and other annual crops (FAOSTAT, 2011). Even marginal grasslands tend to be abandoned, particularly in mountainous and Mediterranean areas, where they can be of crucial importance for preserving biodiversity, protecting soils against erosion and maintaining the local population density. The reduction differed between countries. Losses were high in Belgium, France, Italy and the Netherlands while the grassland area remained almost

stable in Luxembourg and the United Kingdom. In 2007, permanent grasslands covered over 57 million ha in the EU-27 and temporary grasslands about 10 million ha, which represents 33% and 6%, respectively, of the total utilised agricultural area (UAA) in the EU-27.

In order to contribute to the overall objective of MultiSward, stakeholder requirements and expectations with respect to multi-functionality of grasslands within Europe should be known, because a better understanding of stakeholders' perspective of grasslands leads to a better understanding of the importance of grasslands. Prior to the MultiSward project the requirements and expectations of stakeholders with respect to the multi-functionality of grasslands in Europe were not known. Therefore, an active participation of stakeholders was one of the key objectives of the MultiSward project. An initial inventory was made of the requirements and expectations of stakeholders with respect to the multi-functionality of grasslands in Europe (Van den Pol-van Dasselaar *et al.*, 2012 and 2013). The aim of the current study was to give new insights into the importance of grasslands for stakeholders in Europe.

1.2 Materials and methods

An international team of representatives from Ireland, the Netherlands, France, Italy and Poland was established representing Atlantic, Mountainous, Mediterranean and Continental regions. The work started with a stakeholder analysis (Pinxterhuis, 2011). The identification of stakeholders is an important first step in stakeholder consultation. Stakeholders are usually defined as those who either affect or are affected (e.g. Freeman, 1984). In the case of grasslands, this means that stakeholders are those who affect grasslands or are affected by grasslands. Both aspects were taken into account when prioritising the stakeholders in the stakeholder analysis. A good stakeholder analysis is essential (Reeda *et al.*, 2009), since only by understanding who has a stake in grasslands, can the appropriate stakeholders be effectively involved in the stakeholder consultation. The stakeholder analysis was undertaken to identify the people or institutions having a clear stake in the multi-functional use of grasslands, or being in the position to play an important role in the development and implementation of new management options for multi-species swards (e.g. can directly benefit, has political power, is executing governance, is economically dependent, etc.). The most important stakeholders were the traditional foursome of primary producer, policy maker, researcher and advisor. NGO's for nature conservation and for protection of the environment were also considered important, together with industry (mainly processing and seed industry) and education. Following the initial stakeholder analysis, the international stakeholder team undertook several studies, including national and international meetings.

A questionnaire on the functions of grasslands was developed in eight languages: Polish, Dutch, Italian, French, English, German, Danish and Swedish, using SurveyMonkey (www.surveymonkey.com). The questionnaire included two main questions on the importance of grasslands in Europe. First, respondents were asked for their opinion on sustainability. This term covers economic, environmental and social issues (profit, planet, people). Respondents to the questionnaire were asked to divide 10 points across these three aspects of sustainability, giving most points to the one they considered the most important aspect (e.g. 4, 3, 3 if they considered that ecological and social aspects are of equal interest and that economy is slightly more important). Second, the respondents were asked to score 42 predefined functions of

grasslands of grasslands for importance in their region (1 = not important; 5 = very important). These functions are examples of the ecosystem services that grasslands deliver. The concept ecosystem services provides a good insight into the benefits that humankind gain from its interaction with natural resources, in this case with grasslands. The Millennium Ecosystem Assessment report (MEA, 2005) distinguishes four groups of ecosystem services: (i) provisioning services: products obtained from ecosystems, e.g. production of food, water, (ii) regulating services: benefits obtained from the regulation of ecosystem processes, e.g. control of climate and disease, (iii) cultural services: non-material benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences, e.g. recreation and beauty of the landscape, and (iv) supporting services: ecosystem services that are necessary for the production of all other ecosystem services, e.g. nutrient cycles, crop pollination.

Research partners of MultiSward actively spread the questionnaire in Europe to stakeholders. Furthermore, several relevant associations with members from different stakeholder groups were approached, such as the national Grassland Societies in the respective countries. The questionnaire was available online from spring 2013 and closed at the end of 2013.

The sustainability results were analysed using GenStat (VSN International, 2013). The observed points out of a total score of 10 have been treated as pseudo binomial data, taking the variance to be proportional to binomial variance (McCullagh and Nelder, 1989). Differences between countries, stakeholder type, gender and age in preference of the respondents have been assessed by linear logistic regression analysis of the observed points using a logistic model with main effects. Main effects have been tested with approximate F-tests; differences between countries, stakeholder type, gender and age have been tested with approximate t-tests on all pairwise differences of fitted marginal means on the underlying logistic scale.

1.3. Results and discussion

At the time of closing the questionnaire, 1959 valid responses were obtained for the question on sustainability aspects. The majority of respondents (1798) also provided answers to the question on the different functions of grasslands. The respondents originated from 27 different countries in Europe. There were six countries with more than 200 responses: France (21% of the total responses), Italy (17%), Ireland (13%), Poland (12%), Belgium (11%) and the Netherlands (11%). The remaining countries in the rest of Europe were grouped (15%). All the relevant stakeholder types described in Pinxterhuis (2011) responded to the questionnaire. Responses from researchers, advisors and farmers were abundant, 22%, 19% and 17% of the total responses, respectively. The contribution of policymakers was much lower (6%), but given the fact that there are obviously less policy makers and they are often less eager to respond, we were satisfied with this percentage. Other groups were students (16%), educators (6%), industry (5%), e.g. feed industry, dairy industry, seed industry and finally NGO's (3%). The remaining group, which mainly consisted of people who identified themselves as consumers, press, in between jobs etc. was 6%. Some people identified themselves as belonging to two groups. In those cases, they were classified in the group which they mentioned first. With respect to age and gender, responses were obtained from all age categories. One-third of the respondents was female and two-thirds were male. The percentage of female respondents in the younger age groups was higher than the percentage of female respondents in the

higher age groups. Finally, it was observed that the majority of the respondents had a high level of education, two-thirds of the respondents went to university. It is to be expected that respondents in a number of stakeholder groups have a position that requires a relatively high level of education. The groups farmers, students and the rest group had a lower level of education. A further explanation might be that well educated people may be more willing to respond to a questionnaire.

When people were asked to divide 10 points over economic, ecological and social aspects of sustainability, on average, economy was valued the highest (3.7) followed by ecology (3.4) and social aspects (2.9). The differences were significant, but these means also show that all aspects of sustainability were considered to be important. The effect of country, stakeholder, age and gender is shown in Figure 1. Obviously, respondents only had 10 points to divide. This means that the effects on economic, ecological and social aspects are entangled. When a respondent for instance decides to give more points to social aspects, there will be fewer points left for the other two aspects. We therefore looked for pairwise significance. When analysing economic, ecological and social aspects, the effects of country and stakeholder type were significant ($P < 0.001$). The effect of age and gender was less consistent; after having accounted for the remaining main effects of country and stakeholder type, the age and gender effect was often no longer significant.

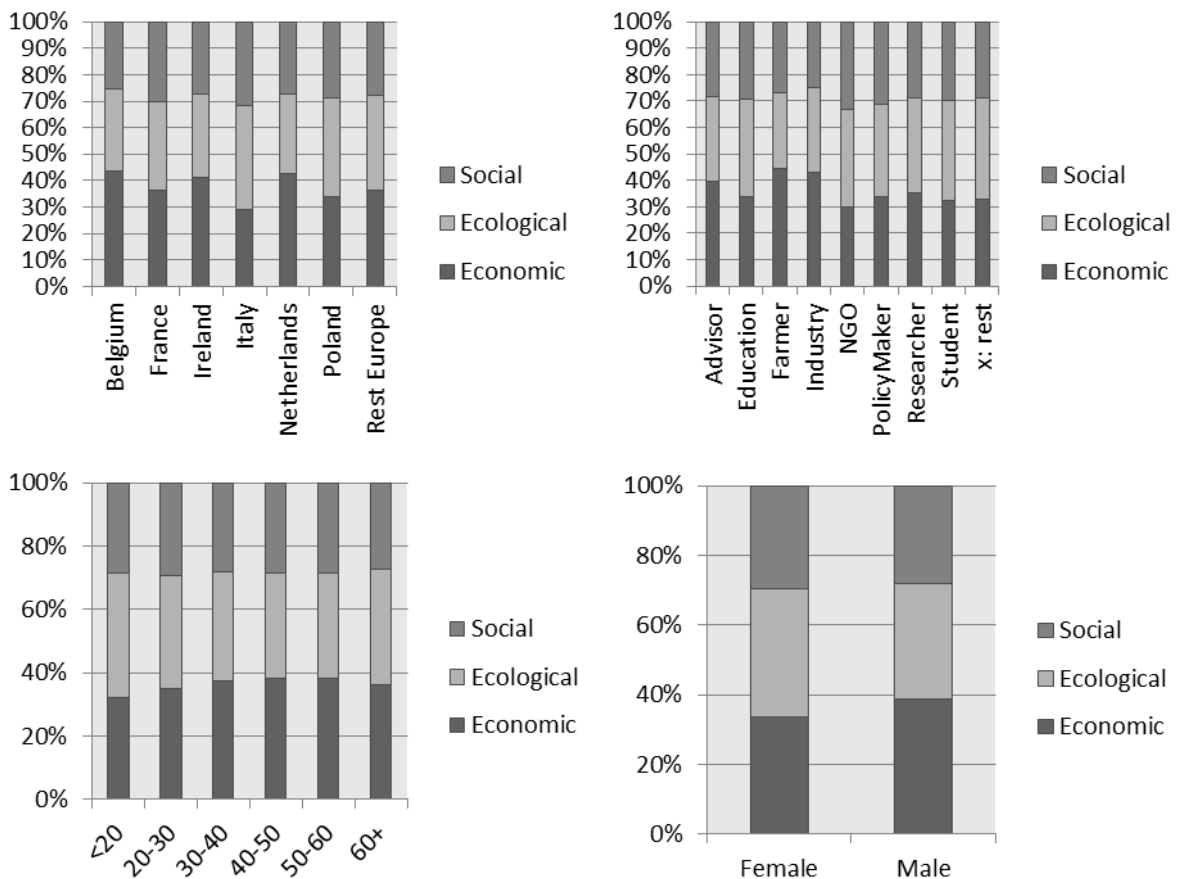


Figure 1. Importance of economic, ecological and social aspects of sustainability for a) different countries, b) different stakeholder types, c) different age and d) different gender (total of economic, ecological and social aspects equals 10 for each group) (n=1959).

Italy showed the lowest ranking for economy, followed by Poland and France (Figure 1a). Belgium, Ireland and the Netherlands had a high ranking for economy. In accordance with this, Italy, France and to a lesser extent Poland showed higher ranking for social aspects than the other countries. Ecological aspects were scored highest for Italy and Poland. Concerning the different stakeholder types (Figure 1b), farmers, industry and to a lesser extent advisors showed the highest ranking for economy; the social aspects were valued the highest by NGO's and policy makers and lowest by industry. Ecological aspects were valued highest by education, research and students and lowest by farmers. There was hardly any difference in the ranking of social aspects in relation to age (Figure 1c). It seems that economy is ranked a bit higher when people get older at the cost of ecological aspects. However, differences were not significant. Females ranked economy lower than males mainly at the benefit of ecological aspects (Figure 1d).

When people were asked to value different functions of grasslands, it was clearly shown that the different functions of grasslands are highly recognized and appreciated by all relevant stakeholder groups (see papers on appreciation of the functions of grassland by Belgian, Dutch, French, Irish, Italian and Polish stakeholders elsewhere in this volume and Van den Pol-van Dasselaar *et al.* (2014) for a summary of all results). It is therefore important that future policies continue to support the conservation of grasslands. Scenarios with less grassland will lead to an overall decrease in total ecosystem services delivered, since grassland is the only land use option which is capable of delivering that large a number of ecosystem services simultaneously.

1.4. Conclusion

MultiSward provided an insight into the appreciation of the different functions of grasslands in Europe. It clearly showed that the different functions of grasslands are highly recognized and appreciated by all relevant stakeholder groups. The large European grassland area appears to be essential for economy, environment and people. We conclude that all stakeholders consider grasslands to be a valuable resource in Europe. Maintaining or increasing the grassland area and thus securing the importance of the different functions and services of grasslands in Europe is a challenge for the coming years. It is, however, important since it will ensure the continuation of different ecosystem services being delivered simultaneously by multifunctional grasslands.

Acknowledgements

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2. Ireland: Appreciation of the functions of grassland by Irish stakeholders

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Abstract

The European project MultiSward studied the appreciation of different functions of grasslands by European stakeholders. This paper describes the importance of grasslands for stakeholders in Ireland. Ireland currently has approximately 4.6 million ha of grassland, which is 90% of the total utilised agricultural area. Irish stakeholders consider grassland to be important for a range of functions and services including milk and meat production, forage production, animal health and welfare, perception of animal production systems and biodiversity. Functions like goat meat production, production of plant fibre, fire control and avalanche control are less appreciated. All stakeholder groups generally agreed on the importance of the functions evaluated.

Keywords: grassland, stakeholders, Ireland

2.1. Introduction

Ireland has a grassland area of approximately 4.6 million ha of grassland (consisting of pasture, grass silage or hay, and rough grazing), which is 90% of the total utilisable agricultural area (O'Mara, 2008). Ruminant production systems (milk and meat) in Ireland are predominantly grass based and Ireland has a long grazing season (February/March to October/November, depending on soil type and rainfall). Grazed grass is the main feed source during the grazing season, and winter forage consists predominantly of grass silage. Grassland in Ireland is predominately permanent pasture and the proportion of agricultural land reseeded (from grass to grass) annually is low at approximately 2% (Shalloo et al., 2011). Perennial ryegrass is the most widely sown grass species. The aim of the current study was to get an insight into the importance of grasslands for stakeholders in Ireland.

2.2. Materials and methods

This study provides results for Irish stakeholders obtained via an on-line questionnaire on functions of grasslands which was distributed throughout Europe. A detailed description of the method can be found in Van den Pol-van Dasselaar et al. (2014, this volume). This paper describes the results for Ireland. In Ireland the questionnaire was distributed to members of the Irish Grassland Association, Teagasc (researchers, students, technicians, advisors), Universities, members of farming organisations, members of government departments and farmers.

2.3. Results and discussion

Two hundred and 32 valid responses were obtained. The majority of these responses came from advisors (67 responses; 29% of total), followed by researchers (66; 28%), farmers (37; 16%), students (26; 11%), education (23; 10%), policy makers (8; 3%),

industry (3; 1%) and NGO's (2; <1%). Tables 1 to 4 show the appreciation of the functions of grasslands by the different stakeholders. The functions are grouped into the four groups of ecosystem services: provisioning services, regulating services, supporting services and cultural services. The provisioning services (Table 1) that Irish stakeholders consider to be most important include milk and meat (beef and sheep) production, production of high quality forage and nutritional quality of animal products for human consumption. Biodiversity and conservation of ecosystems quality are considered to be important regulating services (Table 2), and NGO's and policy makers consider these to be more important than do the other stakeholder categories. Fire and avalanche control are not very important in Ireland. Positive perception of animal production systems, beauty of the landscape, and maintaining population in rural areas are the most important cultural services of grassland (Table 3). Grazing, competitiveness of farming systems, animal health and welfare are considered the most important supporting services (Table 4). In general, across the functions evaluated, there was good agreement between all stakeholder groups.

Table 1. Importance of provisioning services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Policy maker	Researc h	Stu- dents
High quality forage	4.6	4.5	4.6	4.7	4.5	4.1	4.5	4.6
Dairy cow milk production	4.7	4.5	4.5	4.3	5.0	4.4	4.5	4.3
Low cost animal feed	4.6	4.4	4.7	5.0	4.5	4.4	4.5	4.5
Nutritional quality of animal products for human consumption	4.3	4.2	4.6	4.7	5.0	4.0	4.2	4.3
Beef meat production	4.6	4.2	4.1	4.3	4.5	4.4	4.5	4.5
Global food production	4.2	4.0	4.1	4.0	4.5	4.1	4.1	4.2
Region of origin of animal	3.5	3.5	3.8	4.3	3.5	3.4	3.3	3.7
Honey production	1.8	2.6	2.0	1.0	3.5	2.1	2.1	2.1
Sheep meat production	3.6	3.2	2.9	2.0	4.0	3.9	3.3	3.5
Biomass for energy production	1.8	2.2	2.0	1.7	2.5	1.6	2.2	2.7
Sheep milk production	1.8	1.7	1.7	2.0	3.5	2.1	1.8	2.1
Goat milk production	1.6	1.5	1.5	1.0	3.5	1.5	1.5	1.8
Wool production	2.3	2.3	2.1	1.3	3.5	2.4	2.0	2.5
Goat meat production	1.5	1.7	1.5	1.0	1.5	1.3	1.3	1.8
Production of plant fibre	1.6	1.8	1.7	1.0	3.5	1.4	1.6	2.3

Table 2. Importance of regulating services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Policy maker	Researc h	Stu- dents
Biodiversity	3.4	3.9	3.0	2.7	5.0	4.5	3.3	3.4
Conservation of ecosystems	3.2	3.9	3.2	3.0	4.5	4.4	3.5	3.4
Water catchment	3.4	3.8	3.3	2.0	4.0	4.1	3.2	3.4
Erosion control	2.3	2.9	2.8	1.3	2.0	3.3	2.8	2.7
Carbon sequestration	3.0	3.1	2.8	2.3	4.0	3.9	3.3	3.3
Mitigating greenhouse gas	3.3	3.1	2.7	2.3	4.0	4.1	3.2	3.2
Adaptation to climate change	3.1	3.2	3.4	3.0	3.0	3.6	3.1	3.5
Flood plains rivers	2.6	3.1	2.9	1.3	3.5	3.5	2.8	2.9
Pathogen control in cropping	2.4	2.7	3.1	2.3	4.0	3.0	2.5	2.8
Fire control	1.7	1.9	2.5	1.0	1.5	1.6	1.7	2.2
Avalanche control	1.1	1.5	1.6	1.0	1.0	1.0	1.2	2.0

Table 3. Importance of cultural services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- cation	Far- mers	Indus- try	NGO	Policy maker	Research	Stu- dents
Beauty of the landscape	3.7	4.0	3.8	3.3	4.5	4.3	3.7	3.6
Positive perception of animal production systems	4.4	4.1	4.2	4.0	4.0	4.4	4.1	3.9
Rural development	3.1	3.3	3.8	3.7	3.5	4.0	3.4	3.7
Maintaining population in rural	3.7	3.9	4.0	3.7	2.5	4.1	3.5	3.8
Cultural values	2.6	3.7	3.1	3.0	4.0	3.6	3.0	3.2
Tourism / recreation	2.8	3.5	2.7	2.7	3.0	4.0	3.4	3.1
Supporting horses for equestrian sport and recreation	2.4	2.5	2.4	3.3	3.5	3.4	2.8	2.5

Table 4. Importance of supporting services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Policy maker	Researc h	Stu- dents
Grazing	4.9	4.5	4.7	5.0	5.0	4.8	4.6	4.7
Animal health	4.3	4.3	4.6	5.0	4.5	4.0	4.0	4.1
Animal welfare	4.1	4.1	4.5	5.0	3.5	4.1	3.9	4.0
Conservation of soil structure and fertility in cropping systems	3.8	3.6	3.9	4.0	4.5	4.0	3.4	4.0
Feed protein supply at farm level	3.8	3.7	4.2	4.0	4.5	3.5	3.7	4.2
Competitiveness of farming	4.6	3.6	4.4	5.0	5.0	4.5	4.2	4.2
N fixation via legumes	2.9	3.4	3.3	2.3	2.0	3.5	3.2	3.6
Availability of water	2.8	3.3	3.5	1.7	4.0	3.1	3.0	3.8
Crop pollination	2.5	3.0	3.2	2.7	4.0	3.3	2.9	3.2

2.4. Conclusion

A wide range of stakeholders responded to the survey in Ireland. Stakeholders consider grassland to be important for a range of functions and services including bovine milk production, beef and sheep meat production, forage production, animal health and welfare, perception of animal production systems and biodiversity. The least important functions considered by the stakeholders include goat meat production, production of plant fibre, fire control and avalanche control. All stakeholder groups generally agreed on the importance of the functions evaluated.

Acknowledgements

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3. The Netherlands: Appreciation of the functions of grassland by Dutch stakeholders

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Abstract

The European project MultiSward studied the appreciation of different functions of grasslands by European stakeholders. This paper describes the importance of grasslands for stakeholders in the Netherlands. There is currently 1 million ha of grassland in the Netherlands, which is 40-45% of the total agriculturally utilised area. Dutch stakeholders appreciate the different functions of grasslands, especially high quality forage, dairy cow milk production, low cost animal feed and grazing. Functions which are less relevant for the Netherlands like sheep and goat production, fire control and avalanche control are also less appreciated. We conclude that stakeholders appreciate grasslands in the Netherlands as a valuable resource for many ecosystem services.

Keywords: grassland, stakeholders, the Netherlands

3.1. Introduction

Grasslands cover almost 1 million ha in the Netherlands, which is 40-45% of the total agricultural area. The majority of these grasslands (75%) are permanent grasslands; 20% is temporary grasslands and 5% is natural grasslands (CBS, 2014). Grasslands are usually intensively managed and dominated by perennial ryegrass (*Lolium perenne* L.). The grasslands are used as feed for dairy cattle. The Dutch dairy sector is characterised by relatively high levels of supplementation, mainly silage maize and concentrates. Silage maize covers about 10% of the total agricultural area in the Netherlands (CBS, 2014) and is fully used for dairy feed. About 70% of the dairy cattle is grazing at least part of the grazing season (CBS, 2014). The aim of the current study was to get an insight into the importance of grasslands for stakeholders in the Netherlands.

3.2. Materials and methods

An on-line questionnaire on the appreciation of functions of grasslands was spread throughout Europe. A detailed description of the method can be found in Van den Pol-van Dasselaar *et al.* (2014, this volume). This paper describes the results for the Netherlands. In the Netherlands, the questionnaire was spread to members of the Netherlands Society for Grassland and Fodder Crops and the Dutch farmers' association LTO. Furthermore, it was spread via social media like LinkedIn.

3.3. Results and discussion

At the time of closing the questionnaire, 206 valid responses were obtained. The majority of these responses came from farmers (90 responses which equals 44% of total response), followed by advisors (34; 17%), researchers (30; 15%), industry (29; 14%), policy makers (8; 4%), education (8; 4%) and NGO's (5; 2%). Students were not included, since only 2 students responded.

Tables 1 to 4 show the appreciation of the functions of grasslands by the different stakeholders. The functions are grouped into the four groups of ecosystem services: provisioning services, regulating services, supporting services and cultural services. Many provisioning services are highly appreciated by Dutch stakeholders, but a number of them like sheep and goat production are less relevant under Dutch conditions. This is also true for some regulating functions like fire control and avalanche control. Cultural services like the contribution of grasslands to the beauty of the landscape and the perception of animal production systems are seen as important. With respect to supporting services animal health is valued high, especially by farmers. Farmers and policy makers consider feed protein supply at farm level also as an important function of grasslands.

Table 1. Importance of provisioning services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Policy maker	Researc h
High quality forage	4.4	4.0	4.8	4.6	4.0	4.0	4.5
Dairy cow milk production	4.6	4.3	4.5	4.6	4.2	4.6	4.7
Low cost animal feed	4.4	3.8	4.6	4.3	3.2	3.9	4.1
Nutritional quality of animal products for human consumption	3.9	3.6	3.9	4.0	3.2	3.8	3.9
Beef meat production	2.9	2.8	3.0	3.7	2.8	2.4	3.3
Global food production	3.6	3.8	4.0	4.2	2.6	3.5	3.7
Region of origin of animal	3.5	3.4	2.9	3.6	3.6	3.5	3.1
Honey production	2.4	2.8	2.0	2.3	2.8	2.6	2.1
Sheep meat production	2.1	2.6	2.1	2.9	3.2	1.9	2.3
Biomass for energy production	1.8	2.3	1.5	2.3	2.0	1.8	2.1
Sheep milk production	2.1	2.4	1.7	2.6	3.2	1.5	2.0
Goat milk production	2.3	2.1	1.8	2.8	2.8	1.8	2.0
Wool production	1.8	2.0	1.7	2.2	2.8	2.1	2.0
Goat meat production	1.8	1.6	1.4	2.3	2.6	1.3	1.7
Production of plant fibre	1.8	1.8	1.5	2.2	1.8	2.3	1.9

Table 2. Importance of regulating services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Policy maker	Researc h
Biodiversity	3.6	4.1	3.2	3.3	4.4	3.5	3.7
Conservation of ecosystems	3.8	4.0	3.3	3.4	4.6	3.9	3.4
Water catchment	3.3	2.8	2.4	3.2	2.8	3.3	3.2
Erosion control	2.6	2.9	2.3	3.0	3.5	2.4	2.5
Carbon sequestration	3.3	2.8	2.9	3.2	4.0	3.9	3.5
Mitigating greenhouse gas	3.3	3.8	2.9	2.9	4.0	3.9	3.2
Adaptation to climate change	3.5	2.7	2.8	2.8	3.4	3.6	3.2
Flood plains rivers	3.0	3.6	2.3	3.3	3.4	4.6	3.2
Pathogen control in cropping	3.5	3.3	3.1	3.4	3.2	3.3	3.2
Fire control	1.9	1.8	1.7	2.2	2.4	1.6	1.8
Avalanche control	1.4	1.8	1.3	1.6	2.0	1.1	1.7

Table 3. Importance of cultural services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- cation	Far- mers	Indus- try	NGO	Policy maker	Research
Beauty of the landscape	3.9	4.1	3.8	3.6	4.2	4.0	4.1
Positive perception of animal production systems	4.4	3.8	4.1	3.9	4.2	4.3	3.9
Rural development	3.3	3.1	3.3	3.3	3.6	3.0	3.2
Maintaining population in rural	3.5	3.8	3.7	3.6	4.2	3.6	3.5
Cultural values	3.6	3.3	2.9	3.2	3.4	4.0	3.6
Tourism / recreation	3.1	3.9	2.7	3.1	3.2	3.3	3.4
Supporting horses for equestrian sport and recreation	2.1	2.1	1.7	2.8	3.3	2.0	2.3

Table 4. Importance of supporting services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Policy maker	Researc h
Grazing	4.5	3.8	4.2	4.3	4.0	4.8	4.3
Animal health	4.0	3.9	4.4	4.1	3.8	3.9	4.0
Animal welfare	3.9	3.9	4.0	4.0	4.2	4.1	3.7
Conservation of soil structure and fertility in cropping systems	4.1	4.1	4.0	3.9	3.6	4.0	4.0
Feed protein supply at farm level	4.4	3.9	4.7	4.3	3.8	4.8	4.4
Competitiveness of farming	3.5	3.3	3.7	3.6	2.8	3.9	3.9
N fixation via legumes	3.4	4.1	3.2	3.4	3.4	3.9	3.3
Availability of water	3.4	3.8	3.5	3.6	3.8	3.4	3.3
Crop pollination	2.6	2.7	2.4	2.6	3.6	2.8	2.3

3.4. Conclusion

Dutch stakeholders appreciate the different functions of grasslands, especially high quality forage, dairy cow milk production and grazing. Functions which are less relevant for the Netherlands are also less appreciated. We conclude that stakeholders appreciate grasslands in the Netherlands as a valuable resource for many ecosystem services.

Acknowledgements

The research leading to these results has received funding from the European Community's Seventh Framework Programme (FP7/ 2007-2013) under the grant agreement n° FP7-244983 (MULTISWARD) and n° FP7-314879 (Autograssmilk) and from the Dutch ministry of Economic Affairs (KB-12-006.04-003 and BO-22.04-005-002).

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4. Belgium: Appreciation of the functions of grassland by Belgian stakeholders

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Abstract

The European project MultiSward studied the appreciation of different functions of grasslands by European stakeholders. This paper describes the importance of grasslands for stakeholders in Belgium. Belgium currently has 578 504 ha of grassland, which is 43.3 % of the total agriculturally utilised area. Belgian stakeholders appreciate grasslands especially for feed protein delivery at farm level, as a source of high quality forage and low cost animal feed especially for dairy milk production under grazing conditions. The most appreciated ecological aspects are conservation of ecosystems and biodiversity, erosion control and beauty of the landscape.

Keywords: grassland, stakeholders, Belgium

4.1. Introduction

Grasslands covers 43.3 % (578 504 ha) of the agricultural area in Belgium: 38.0 % is permanent grassland and 5.3% is temporary grassland. The area and the proportion of grasslands are higher in Wallonia (350 000 ha and 49% of AA) than in Flanders (228 400 ha and 37% of the AA)(Anonymus, 2014) . The main forage production system in Flanders is based on regularly resown pastures and on annual forage crops (temporary pastures and silage maize). The system in Wallonia is mainly based on permanent pastures. Extensive grasslands are rare in Belgium. Intensive grasslands are dominated by *Lolium perenne* L. Compared with the European average cattle intensification level is high to very high. The aim of the current study was to get an insight into the importance of grasslands for stakeholders in Belgium.

4.2. Materials and methods

An on-line questionnaire on functions of grasslands was spread throughout Europe. This study provides results for Belgian stakeholders. A detailed description of the method can be found in Van den Pol-van Dasselaar et al. (2014, this volume). In Belgium, the questionnaire was spread to members of the ILVO network, Landbouwcentrum voor Voedergewassen and the FP7-project Autograssmilk. Furthermore, it was spread via social media.

4.3. Results and discussion

When closing the questionnaire, 209 valid responses were obtained. The majority of these responses came from farmers (77 responses, or 37% of total response),

followed by researchers (32 or 15%), advisors (30 or 14%), students (29 or 14%), policy makers (17 or 8%), industry (13 or 6%), education (6 or 3%) and NGO's (5 or 2%). The answers are grouped into four groups of ecosystem services: provisioning, regulating, supporting and cultural services. For the Belgian stakeholders the main provisioning service is to deliver high quality forage at a low cost for animal feed mainly used for dairy milk production (Table 1). The most important regulating services are conservation of ecosystems, biodiversity and erosion control (Table 2). Belgian stakeholders establish the important role of grassland in the positive perception of animal production systems and beauty of the landscape. The score for tourism/recreation is rather low (Table 3). The most important supporting services are grazing and feed protein supply at farm level (Table 4).

Table 1. Importance of provisioning services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Policy maker	Researc h	Stu- dents
High quality forage	4.2	4.0	4.4	4.1	4.0	3.9	4.3	4.0
Dairy cow milk production	4.2	3.7	4.3	4.2	4.6	4.1	4.5	4.0
Low cost animal feed	4.2	4.8	4.4	4.1	4.8	3.9	4.4	3.7
Nutritional quality of animal products for human consumption	3.8	4.5	3.8	3.5	3.4	3.9	4.1	3.7
Beef meat production	4.1	3.8	3.7	3.9	4.4	3.9	4.0	3.8
Global food production	3.7	3.7	3.6	3.5	3.2	3.1	3.7	3.8
Region of origin of animal	3.8	3.7	2.9	3.0	3.0	3.0	3.5	3.6
Honey production	2.5	2.8	2.3	2.2	1.8	2.3	2.4	3.0
Sheep meat production	2.7	2.3	2.1	2.5	1.8	2.2	2.1	2.8
Biomass for energy production	2.1	2.3	1.7	2.0	1.8	2.1	1.9	2.5
Sheep milk production	2.2	2.2	2.0	2.2	2.0	2.0	1.8	2.4
Goat milk production	2.5	2.5	2.1	2.3	2.0	1.9	2.1	2.1
Wool production	2.1	1.7	1.7	1.8	1.6	1.9	1.7	2.3
Goat meat production	2.2	2.2	1.6	2.1	1.6	1.9	1.8	2.0
Production of plant fibre	1.8	2.0	1.5	1.9	1.4	1.6	1.6	2.6

Table 2. Importance of regulating services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Policy maker	Researc h	Stu- dents
Biodiversity	3.7	3.8	2.9	3.2	3.8	3.5	3.8	3.8
Conservation of ecosystems	3.3	4.0	3.1	3.2	4.0	3.5	4.1	3.9
Water catchment	3.6	3.2	2.9	2.4	3.2	3.2	3.6	3.2
Erosion control	3.5	3.7	3.3	3.3	3.8	3.6	3.9	3.3
Carbon sequestration	3.7	3.5	3.3	3.3	3.0	3.9	4.1	3.4
Mitigating greenhouse gas	3.5	3.5	2.7	3.2	2.4	3.1	3.5	3.2
Adaptation to climate change	3.1	3.5	2.7	2.6	2.0	3.0	3.4	3.1
Flood plains rivers	2.9	2.3	2.4	2.4	2.8	3.1	3.2	3.1
Pathogen control in cropping	3.4	3.5	3.2	3.6	2.2	3.6	3.6	3.5
Fire control	2.1	1.8	2.0	2.2	1.2	2.1	1.8	2.8
Avalanche control	1.8	1.5	1.5	1.2	2.4	1.6	1.5	1.8

Table 3. Importance of cultural services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- cation	Far- mers	Indus- try	NGO	Policy maker	Research	Stu- dents
Beauty of the landscape	3.5	4.0	3.3	3.4	4.2	3.3	4.0	3.7
Positive perception of animal production systems	4.1	4.7	3.8	3.8	4.6	3.4	4.1	3.7
Rural development	3.4	3.2	2.7	2.8	2.6	3.1	3.6	3.0
Maintaining population in rural	3.4	4.0	3.1	3.4	3.2	3.2	3.8	3.5
Cultural values	2.7	4.0	2.2	2.5	3.2	2.8	3.1	2.7
Tourism / recreation	3.0	3.2	2.1	2.4	3.8	2.8	3.0	2.4
Supporting horses for equestrian sport and recreation	2.2	2.2	1.6	2.0	1.6	2.5	2.4	3.1

Table 4. Importance of supporting services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Policy maker	Researc h	Stu- dents
Grazing	4.3	4.5	4.2	3.6	4.0	4.0	4.5	4.3
Animal health	3.9	4.2	4.2	3.9	3.4	3.3	3.8	4.4
Animal welfare	3.7	3.8	4.0	3.9	3.4	3.2	3.8	4.3
Conservation of soil structure and fertility in cropping systems	4.1	3.2	3.8	3.5	4.0	4.2	4.0	3.9
Feed protein supply at farm level	4.4	4.4	4.2	3.5	4.0	3.9	4.5	3.4
Competitiveness of farming	3.6	3.7	3.3	3.2	3.8	2.9	3.6	2.9
N fixation via legumes	3.7	4.0	3.4	3.0	3.4	3.5	4.0	3.4
Availability of water	3.4	3.0	3.1	2.9	2.8	3.1	3.4	3.7
Crop pollination	2.9	3.0	2.5	2.5	2.2	2.6	2.9	3.6

4.4. Conclusion

Belgian stakeholders appreciate grassland especially for feed protein delivery at farm level, as a source of high quality forage and low cost animal feed especially for dairy milk production under grazing conditions. The most appreciated characteristics are conservation of ecosystems and biodiversity, erosion control and beauty of the landscape. Grasslands induce a positive perception of animal production systems and are considered as essential components of animal health and welfare.

Acknowledgements

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5. Poland: Appreciation of the functions of grassland by Polish stakeholders

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Abstract

The European project MultiSward studied the appreciation of different functions of grasslands by European stakeholders. This paper describes the importance of grasslands for stakeholders in Poland. Poland currently has 3.29 million ha of grassland, which is 21.3% of the total agriculturally utilised area. Polish stakeholders consider grassland to be important for a range of functions and services including animal health, dairy cow milk production, nutritional quality of animal products for human consumption, low cost animal feed, beauty of the landscape and biodiversity. Functions like goat milk and meat production, wool production, production of plant fibre and avalanche control are less appreciated.

Keywords: grassland, stakeholders, Poland

5.1. Introduction

Grasslands occupy in Poland the total area of 3.29 million hectares, which constitutes 21.3% of the total UAA or 12.6% of the entire area of the country. However, this area does not include leys established on arable land (temporary grasslands) covering 0.45 million ha, whose time of utilisation does not exceed 4-5 years (Goliński, 2014). Meadows represent 77% and pastures about 23% of the grassland area. The share of permanent pasture in Poland has decreased during the last 20 years by more than 50%. The number of cattle and sheep has also decreased. Several regional programs have been initiated to stimulate economic development and preservation of cultural heritage. The peculiar characteristics of Polish grassland are their persistency, various conditions of their habitats, high floristic diversity, multifunctionality expressed in the predominance of mowing over grazing, moderate and low intensity of use and also very important roles in the natural environment, culture and landscape (Warda and Kozłowski, 2012). The aim of the current study was to get an insight into the importance of grasslands for stakeholders in Poland.

5.2. Materials and methods

This study provides results for Polish stakeholders which have been obtained via an on-line questionnaire on functions of grasslands which was spread throughout Europe. A detailed description of the method can be found in Van den Pol-van Dasselaar *et al.* (2014, this volume). In Poland, the questionnaire was spread to members of the Polish Grassland Society (researchers, students, technicians, advisors), universities and institutions related to grassland, farming organisations, government departments, NGO's and farmers.

5.3. Results and discussion

At the time of closing the questionnaire, 204 valid responses were obtained. The majority of these responses came from students (110 responses which equals 54%), followed by researchers (42; 21%), farmers (20; 10%), advisors (15; 7%), education (9; 4%), industry (5; 2%) and NGO's (3; 2%). Policy makers were also included but no responses were received. Tables 1 to 4 show the appreciation of the functions of grasslands by the different stakeholders. The functions are grouped into the four groups of ecosystem services: provisioning services, regulating services, supporting services and cultural services. The provisioning services that Polish stakeholders consider to be most important include dairy cow milk production, nutritional quality of animal products for human consumption and low cost animal feed. Biodiversity and conservation of the quality of ecosystems are considered to be important regulating services. Beauty of the landscape is the most important cultural service of grassland. Animal health and welfare are considered the most important supporting services. In general, across the functions evaluated, there was good agreement between all stakeholder groups.

Table 1. Importance of provisioning services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- cation	Far- -	Indus- try	NGO	Researc h	Stu- dents
High quality forage	4.1	3.9	4.2	4.4	3.0	4.0	3.3
Dairy cow milk production	4.5	3.9	4.2	4.2	4.0	3.8	3.5
Low cost animal feed	4.3	4.0	4.2	3.8	3.7	4.0	3.4
Nutritional quality of animal products for human consumption	4.1	4.0	3.6	4.6	4.0	3.9	3.8
Beef meat production	3.5	3.3	3.9	2.8	2.7	3.2	2.9
Global food production	3.4	3.8	3.2	3.4	2.7	3.3	2.7
Region of origin of animal products	2.8	3.9	2.6	2.8	1.7	3.5	3.1
Honey production	3.1	2.8	3.4	2.6	2.7	3.0	3.1
Sheep meat production	2.0	2.3	1.4	1.6	2.0	2.2	2.0
Biomass for energy production	2.5	3.2	2.3	2.6	3.0	2.2	2.7
Sheep milk production	2.0	2.3	1.5	1.2	2.0	2.3	2.1
Goat milk production	1.8	2.4	1.6	1.2	2.0	1.9	1.9
Wool production	1.7	2.4	1.7	1.0	2.0	1.8	2.1
Goat meat production	1.8	1.9	1.5	1.4	2.0	1.7	1.9
Production of plant fibre	1.7	2.3	1.6	1.4	1.3	1.6	2.0

Table 2. Importance of regulating services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Researc h	Stu- dents
Biodiversity	3.6	4.0	4.2	3.4	3.7	4.4	3.9
Conservation of ecosystems quality	3.6	4.0	3.8	3.4	3.3	3.9	3.5
Water catchment	3.4	4.0	3.8	3.8	4.0	3.9	3.5
Erosion control	3.5	4.0	4.0	3.6	3.7	3.9	3.5
Carbon sequestration	2.5	3.1	2.7	2.2	2.3	3.3	2.7
Mitigating greenhouse gas	3.2	3.7	3.4	3.8	3.3	2.9	3.2
Adaptation to climate change	2.8	4.2	3.0	3.6	3.7	3.2	3.2

Flood plains rivers	3.1	3.9	2.4	2.0	2.7	3.5	3.0
Pathogen control in cropping	2.7	3.2	3.4	3.4	2.3	2.4	3.2
Fire control	2.7	3.3	2.7	2.4	2.0	2.4	3.3
Avalanche control	1.9	2.8	1.1	1.0	1.3	1.6	2.1

Table 3. Importance of cultural services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- cation	Far- mers	Indus- try	NGO	Research	Stu- dents
Beauty of the landscape	4.1	4.1	4.2	3.6	3.3	4.3	4.2
Positive perception of animal production systems	3.8	3.3	3.7	3.2	2.7	3.6	3.3
Rural development	3.1	3.9	3.3	3.6	2.3	3.2	3.5
Maintaining population in rural	2.7	3.8	2.6	2.4	1.7	2.6	3.0
Cultural values	2.5	3.9	3.0	2.8	2.7	3.1	3.6
Tourism / recreation	3.2	3.8	3.1	2.6	3.3	3.7	3.5
Supporting horses for equestrian sport and recreation	2.6	2.9	2.4	1.6	2.7	2.6	2.6

Table 4. Importance of supporting services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Researc h	Stu- dents
Grazing	3.8	3.8	3.2	3.6	3.3	3.8	3.3
Animal health	4.3	4.0	4.3	4.6	3.7	4.0	3.8
Animal welfare	4.1	3.4	4.0	3.8	4.0	4.0	3.7
Conservation of soil structure and fertility in cropping systems	3.7	4.0	3.5	3.4	2.3	3.8	3.7
Feed protein supply at farm level	4.4	4.0	4.0	4.0	2.3	3.6	3.3
Competitiveness of farming	3.1	3.0	3.2	3.6	3.0	3.0	2.9
N fixation via legumes	3.7	3.6	3.9	3.8	3.0	3.2	3.3
Availability of water	3.7	4.0	3.4	3.6	3.3	3.6	3.8
Crop pollination	3.1	3.0	3.3	2.8	3.0	3.2	3.2

5.4. Conclusion

Polish stakeholders consider grassland to be important for a range of functions and services including animal health, dairy cow milk production, nutritional quality of animal products for human consumption, low cost animal feed, beauty of the landscape and biodiversity. The least important functions considered by the stakeholders include goat milk and meat production, wool production, production of plant fibre and avalanche control. All stakeholder groups generally agreed on the importance of the functions evaluated.

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6. France: Appreciation of the functions of grassland by French stakeholders

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Abstract

The European project MultiSward studied the appreciation of different functions of grasslands by European stakeholders. This paper describes the importance of grasslands for stakeholders in France. France currently has 11 million ha grasslands, which is 38% of the total agriculturally utilised area. French stakeholders especially appreciate the functions of production of forage quality, low production costs and production of protein as well as the suitability for grazing or biodiversity production. Functions like production of biomass for energy production or for fibre are less appreciated. We conclude that French stakeholders recognize the high potential of grasslands for developing animal production systems that are economically viable and environment-friendly.

Keywords: grassland, stakeholders, France

6.1. Introduction

France has a very large acreage devoted to permanent and temporary grasslands contributing to a total of 11 million ha (38% of the total agricultural utilised area). Annual forage crops are very important, especially silage maize (5.5 % of the total agricultural utilised area). Presently, most temporary grasslands are sown with mixtures of grasses and legumes producing large amounts of protein rich feed. They also include a significant acreage of lucerne in some specific regions, grown as pure crops, even if this acreage has declined since 1990. Permanent grasslands are abundant, especially in mountainous areas and hilly regions, where they are the main feed resources for the large herds of suckling cows but also in Normandy and eastern France for dairy herds when it is not possible to plough. Despite an important reduction in the last three decades, grasslands are a major component of most French landscapes. Dairy farming is important in lowland areas of the Western part of France and also in the mountainous regions in East (Franche-Comté and Alps) and in Massif Central. In these regions, milk is processed to produce PDO cheese. High milk yield and animal performances and low production costs are key issues for the farmers, who are concerned by the work load and by the preservation of the environment. The aim of the current study was to get an insight into the appreciation of the functions of grasslands by stakeholders in France.

6.2. Materials and methods

This study provides results which have been obtained via an on-line questionnaire on functions of grasslands which was spread throughout Europe. A detailed description of the method can be found in Van den Pol-van Dasselaar *et al.* (2014, this volume).

This paper describes results for French stakeholders. In France, the questionnaire was spread to members of the French Grassland Society (AFPF) and promoted during conferences of this society.

6.3. Results and discussion

At the time of closing the questionnaire, 356 valid responses were obtained from France. The majority of these responses came from advisors (142 responses which equals 40% of total response) followed by research (116; 32%), industry (24; 7%), farmers (24; 7%), policy makers (21; 6%), education (17; 5%) and students (10; 3%). Three responses only were provided by members of NGOs and their ratings will be little discussed. Tables 1 to 4 show the appreciation of the functions of grasslands by the different stakeholders. French stakeholders gave a well-balanced appreciation across the various ecosystem services: provisioning services, regulating services, supporting services and cultural services.

Table 1. Importance of provisioning services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Policy maker	Researc h	Stu- dents
High quality forage	4.1	3.8	4.1	3.6	4.3	4.1	3.7	4.2
Dairy cow milk production	4.0	3.6	3.8	4.0	3.0	4.0	3.8	4.2
Low cost animal feed	4.3	3.9	4.1	3.7	2.7	4.4	4.0	4.4
Nutritional quality of animal products for human consumption	3.7	3.5	4.0	3.2	4.3	4.4	3.7	3.9
Beef meat production	4.2	3.8	4.0	4.0	3.7	4.3	3.7	3.6
Global food production	3.8	3.4	3.6	3.3	3.7	3.8	3.5	3.3
Region of origin of animal products	3.5	3.6	3.7	3.5	4.0	3.8	3.5	3.0
Honey production	2.8	2.9	2.5	2.7	3.0	2.9	2.9	2.7
Sheep meat production	3.4	2.8	3.1	3.4	2.7	3.7	3.1	2.4
Biomass for energy production	1.9	2.1	1.7	2.3	2.3	1.8	2.0	2.2
Sheep milk production	2.4	2.9	2.1	2.9	2.0	2.2	2.4	2.2
Goat milk production	2.7	2.7	2.4	2.5	2.3	2.7	2.4	2.1
Wool production	1.8	2.0	1.8	2.2	2.0	1.8	1.7	2.0
Goat meat production	1.7	2.0	1.8	2.3	1.3	1.9	1.8	2.1
Production of plant fibre	1.6	1.6	1.7	2.1	1.7	1.6	1.8	1.4

Table 2. Importance of regulating services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Policy maker	Researc h	Stu- dents
Biodiversity	4.1	4.3	3.9	3.6	4.7	4.6	4.2	4.3
Conservation of ecosystems quality	3.9	3.9	3.6	3.7	4.0	4.5	4.0	3.7
Water catchment	4.0	4.1	3.7	3.9	4.0	3.9	3.9	3.2
Erosion control	3.6	3.5	3.7	3.7	2.7	3.8	3.6	3.8

Carbon sequestration	3.5	3.6	3.5	3.3	2.0	3.8	3.8	3.2
Mitigating greenhouse gas emissions	3.5	3.2	3.3	3.3	2.3	3.5	3.4	3.1
Adaptation to climate change	3.4	3.6	3.8	3.3	3.0	3.7	3.3	3.0
Flood plains rivers	2.9	3.3	3.4	3.0	3.3	3.5	3.0	2.3
Pathogen control in cropping system	3.1	3.0	3.1	3.0	2.0	3.0	3.0	3.4
Fire control	2.2	2.0	2.4	2.4	3.0	2.5	2.2	2.4
Avalanche control	1.8	1.7	1.6	1.9	2.3	2.0	2.1	1.6

Table 3. Importance of cultural services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- cation	Far- mers	Indus- try	NGO	Policy maker	Research	Stu- dents
Beauty of the landscape	4.0	3.9	4.2	3.2	4.7	4.3	3.9	3.8
Positive perception of animal production systems	4.2	3.9	4.0	3.8	4.0	4.4	4.0	3.4
Rural development	3.3	3.6	3.2	3.2	3.7	3.9	3.4	3.6
Maintaining population in rural areas	3.2	3.7	3.5	3.0	3.7	4.1	3.4	3.3
Cultural values	3.4	3.2	3.0	2.8	4.3	3.9	3.4	2.8
Tourism / recreation	3.2	3.6	3.2	2.8	4.0	3.8	3.3	2.5
Supporting horses for equestrian sport and recreation	2.2	2.1	2.1	2.3	3.0	2.4	2.3	2.1

Table 4. Importance of supporting services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Policy maker	Researc h	Stu- dents
Grazing	4.6	4.3	4.3	4.0	3.7	4.5	4.4	4.6
Animal health	3.7	3.4	4.0	3.3	3.7	3.6	3.4	3.5
Animal welfare	3.9	3.4	4.1	3.2	3.7	3.8	3.5	4.1
Conservation of soil structure and fertility in cropping systems	3.9	3.6	4.0	3.9	4.3	3.9	3.9	4.1
Feed protein supply at farm level	4.0	3.9	4.3	3.6	3.0	4.0	3.7	3.8
Competitiveness of farming systems	3.9	3.6	4.0	3.5	2.3	4.0	3.6	3.3
N fixation via legumes	4.0	3.9	4.0	3.8	2.3	3.7	3.7	4.3
Availability of water	3.2	2.8	3.4	3.3	2.7	3.4	3.3	3.1
Crop pollination	2.9	3.2	3.0	3.2	2.0	3.0	3.2	3.1

6.4. Conclusion

French stakeholders provided a high number of responses to the on-line questionnaire. There were very subtle differences among groups of stakeholders and this means that their views related to the most important functions are commonly shared and that a policy in favour of grasslands would probably be approved by all stakeholder groups. Provisioning and supporting services are considered as

essential. But regulating services, especially biodiversity, and cultural services are also identified as important.

Acknowledgements

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7. Italy: Appreciation of the functions of grassland by Italian stakeholders

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Abstract

The European project MultiSward studied the appreciation of different functions of grasslands by European stakeholders. This paper describes the importance of grasslands for stakeholders in Italy. Italy currently has approximately 6.0 million ha of grassland, consisting of permanent grassland, pastures and temporary grassland which is 47% of the total agriculturally utilised area (12.9 million ha). Italian stakeholders considered grassland to be important for a range of functions and services but especially appreciate conservation of the quality of ecosystems and biodiversity such as beauty of the landscape and cultural values. Important functions like carbon sequestration and mitigating greenhouse gas emissions are less known and appreciated. All stakeholder groups generally agreed on the importance of the functions evaluated.

Keywords: grassland, stakeholders, Italy

7.1. Introduction

Italy has a grassland area of approximately 6.0 million ha of grassland (consisting of permanent grassland, pasture and temporary grassland) which is 47% of the total utilizable agricultural area (12.9 million ha). Ruminant production systems are predominantly grass based on mountain areas and in Southern Italy, and based on maize silage on plains of Northern Italy (e.g. Po valley). Cattle (5.7 million), sheep (6.6 million) and goats (about 800 thousands) are the most important types of animals reared. The most important grassland species cultivated are sainfoin in Southern Italy and lucerne in Central and Northern Italy. (INEA, 2012; ISTAT, 2010). The aim of the current study was to get an insight into the appreciation of the functions of grasslands by stakeholders in Italy.

7.2. Materials and methods

This study provides results which have been obtained via an on-line questionnaire on functions of grasslands which was spread throughout Europe. A detailed description of the method can be found in Van den Pol-van Dasselaar *et al.* (2014, this volume). This paper describes the results for Italy. In Italy, the questionnaire was distributed and collected during national and international meetings held in different regions of Italy, to the Alpine Zootechnical Society (SooZooAlp), University of Udine (researchers, students, technicians, advisors), Universities, members of farming organisations, members of government departments and farmers. Furthermore, it was spread via social media. The majority of the answers to the questionnaires have been collected during the meetings and sent to the elaboration centre.

7.3. Results and discussion

At the time of closing the questionnaire, 241 valid responses were obtained from Italy. The majority of the 241 valid responses came from students (117 responses which equals 49 % of total response), followed by NGO (30; 12%), education (24; 10%), policy makers (22; 9%), researchers (20; 8%), advice (14; 6%), farmers (11; 5%), and industry (3; 1%).

Tables 1 to 4 show the appreciation of the functions of grasslands by the different stakeholders. The functions are grouped into the four groups of ecosystem services: provisioning services, regulating services, supporting services and cultural services.

Table 1. Importance of provisioning services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Policy maker	Researc h	Stu- dents
High quality forage	4.1	4.0	3.7	3.7	3.8	4.3	3.8	3.5
Dairy cow milk production	3.3	3.4	3.3	2.7	3.5	3.4	3.5	3.6
Low cost animal feed	3.6	3.1	2.9	2.0	2.7	4.1	3.5	3.0
Nutritional quality of animal products for human consumption	3.6	3.9	3.5	2.7	3.7	4.3	3.5	3.7
Beef meat production	2.8	2.8	3.6	3.7	3.0	3.2	3.0	3.7
Global food production	2.7	3.1	3.4	3.0	2.8	3.3	2.8	3.4
Region of origin of animal products	3.5	3.7	3.5	3.0	3.5	3.9	3.8	3.8
Honey production	3.5	3.6	3.2	3.7	3.8	3.7	3.4	3.5
Sheep meat production	2.1	2.5	2.8	2.7	2.3	3.1	2.9	3.0
Biomass for energy production	2.4	2.2	2.7	3.0	2.1	2.1	2.0	3.2
Sheep milk production	1.9	2.5	2.3	2.7	2.4	3.7	2.9	2.8
Goat milk production	2.3	2.1	1.9	2.7	2.6	3.1	2.7	2.6
Wool production	1.5	2.0	1.8	2.0	2.0	2.2	2.2	2.5
Goat meat production	2.4	2.0	2.1	2.7	2.3	2.5	2.6	2.7
Production of plant fibre	2.4	2.1	2.2	2.0	1.8	1.7	2.0	2.9

Table 2. Importance of regulating services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Policy maker	Researc h	Stu- dents
Biodiversity	4.6	4.7	3.7	3.0	4.5	4.7	4.1	3.9
Conservation of ecosystems quality	4.7	4.7	4.1	3.0	4.5	4.4	4.0	4.0
Water catchment	4.3	3.7	3.3	3.3	3.5	3.6	3.3	3.4
Erosion control	4.1	3.9	3.3	4.3	3.7	4.2	3.6	3.3
Carbon sequestration	3.6	3.6	2.9	3.0	3.3	3.3	3.2	3.0
Mitigating greenhouse gas emissions	3.2	3.5	3.1	2.3	3.1	3.5	3.0	3.2
Adaptation to climate change	3.4	3.8	3.3	2.3	3.4	3.3	2.7	3.4
Flood plains rivers	3.9	3.7	3.5	3.3	3.2	3.0	2.9	3.5
Pathogen control in cropping system	3.3	3.1	2.7	2.7	3.2	3.1	2.5	3.4
Fire control	3.4	3.7	3.4	3.3	3.2	3.4	3.1	3.4
Avalanche control	3.4	3.0	2.7	2.0	2.9	3.0	2.2	3.2

Table 3. Importance of cultural services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- cation	Far- mers	Indus- try	NGO	Policy maker	Research	Stu- dents
Beauty of the landscape	4.6	4.8	4.3	4.0	4.4	4.5	4.0	4.0
Positive perception of animal production systems	3.7	3.4	2.8	3.3	3.4	4.0	3.7	3.4
Rural development	3.9	3.6	4.0	3.0	3.6	3.9	3.4	3.4
Maintaining population in rural areas	3.9	3.4	4.1	2.7	3.4	4.2	3.2	3.3
Cultural values	4.0	4.3	4.3	2.7	4.0	4.4	3.7	3.7
Tourism / recreation	3.8	4.0	3.6	3.3	4.0	4.0	3.4	3.6
Supporting horses for equestrian sport and recreation	1.8	1.9	1.8	2.5	2.1	2.6	1.9	2.3

Table 4. Importance of supporting services of grasslands according to the respondents of the questionnaire (1 = not important; 5 = very important).

	Advice	Edu- catio	Far- mers	Indus- try	NGO	Policy maker	Researc h	Stu- dents
Grazing	3.6	3.9	3.2	3.7	3.7	4.6	4.2	3.7
Animal health	3.9	4.2	4.0	3.0	3.8	3.8	3.5	3.8
Animal welfare	3.6	4.1	3.7	3.3	4.0	3.8	3.7	3.7
Conservation of soil structure and fertility in cropping systems	4.0	3.9	3.7	3.7	3.9	4.1	3.6	3.6
Feed protein supply at farm level	2.8	2.6	2.7	2.0	2.4	3.5	2.6	2.9
Competitiveness of farming systems	3.8	2.9	3.3	2.7	3.2	3.7	2.9	3.2
N fixation via legumes	3.3	3.5	3.1	3.0	2.9	3.5	3.0	3.2
Availability of water	3.4	3.6	4.0	3.0	3.3	4.0	2.9	3.7
Crop pollination	3.6	4.0	3.3	2.7	3.3	3.5	2.9	3.6

7.4. Conclusion

A wide range of stakeholders responded to the survey in Italy. Italian stakeholders considered grasslands to be important for a range of functions and services but especially appreciate conservation of the quality of ecosystems and biodiversity such as beauty of the landscape and cultural values. Important functions like carbon sequestration and mitigating greenhouse gas emissions are less known and appreciated. All stakeholder groups generally agreed on the importance of the functions evaluated.

Acknowledgements

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