

Plant genetic diversity in agriculture and farmers' rights in Norway

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Title

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Abstract

This report takes the International Treaty on Plant Genetic Resources for Food and Agriculture as a point of departure and analyses achievements, gaps and needs with regard to its implementation in Norway, with focus on its provisions on farmers' rights. Although much crop genetic diversity has been lost in Norway, substantial efforts are being made to save what is left, and to ensure farmers' rights. Regulations on plant varieties and seed marketing represent some of the barriers, but much depends on how they will be implemented in the time to come. Traditional knowledge is disappearing, despite efforts to stop this. A consolidated strategy is lacking. Economic incentive structures are not yet in place, except for some 'seed money', so most of the work is based on pure idealism. Farmers involved in crop genetic diversity could participate more actively in decision making if they were better organized. The system of public consultation is seriously challenged by Norway's EEA membership, due to the high 'turnover' of decisions requiring implementation at the national level, lack of transparency, and because Norwegian opinions on decisions from the EU carry so little weight. To achieve a say in these matters, it would probably be more useful to work together with other European organizations involved in this issue-area. Nevertheless, much has happened in recent years to facilitate the realization of farmers' rights and enhance the pool of crop genetic resources available to farmers.

Key Words

International Treaty on Plant Genetic Resources for Food and Agriculture, biodiversity, farmers, farmers' rights, breeders' rights, traditional knowledge, benefit sharing, access to genetic resources, plant genetic resources, Norway, FAO

*'We aim to be the best in the world when it comes to
taking care of genetic resources'*

Norwegian Minister of Agriculture and Food,
Lars Peder Brekk, 2011¹

¹ At the "Great Apple Hunt" ('Den Store Eplejakten'), an event arranged by the Norwegian Genetic Resource Centre. Press release from the Centre dated 6 September 2011, at:
<http://www.skogoglandskap.no/nyheter/2011/brekkseplejakt>

Contents

Foreword

1	Introduction	1
	1.1 Why plant genetic diversity and farmers' rights?	1
	1.2 The International Treaty on Plant Genetic Resources for Food and Agriculture and farmers' rights	2
	1.3 ... but does this concern us here in Norway?	5
	1.4 Methodology and structure	7
2	Background on agriculture and crop genetic diversity in Norway	8
	2.1 Basic facts on agriculture in Norway	8
	2.2 Structural changes and crop genetic diversity	9
	2.3 Status of crop genetic diversity in Norway	10
	2.3.1 Crop genetic diversity in cereals, potatoes and vegetables	10
	2.3.2 Crop genetic diversity in fruits and berries	13
	2.3.3 Crop genetic diversity in meadow plants	14
	2.3.4 The informal seed sector	18
	2.3.5 Challenges to research and breeding	20
	2.4 Access to seed material	21
	2.5 Plant breeding and the value chain for seed material	24
3	Farmers' rights in Norway: Basic considerations	28
	3.1 Norwegian views and work at the international level	28
	3.2 Farmers' views on farmers' rights in Norway	29
	3.3 Other views on farmers' rights in Norway	32
	3.4 What is covered by farmers' rights in Norway?	32
4	The right to save, use, exchange and sell seed	33
	4.1 Plant breeders' rights and farmers' rights	33
	4.1.1 Norway and the Union for the Protection of New Varieties of Plants (UPOV)	34
	4.1.2 Proposal to strengthen plant breeders' rights	35
	4.1.3 Draft law rejected with reference to farmers' rights	35
	4.2 Regulations on plant variety release and the marketing of seed and seed potatoes	36
	4.2.1 Prohibition years 2004–2010: Ban on private seed exchange/sales	37
	4.2.2 Background to the prohibitions	38
	4.2.3 Reactions in Norway. EU Commission Directive 2008/62/EC on conservation varieties	39

4.2.4 Disagreement over Commission Directive 2008/62/E: Winds of change	41
4.2.5 Proposal by the Norwegian Food Safety Authority for relaxation of three central regulations	43
4.2.6 More EU seed directives: Vegetables and fodder-plant mixtures	45
4.2.7 Current rules and practice to date	48
4.2.8 Impact of the regulations on genetic diversity in varieties and on farmers' rights	50
4.3 Norwegian patent legislation	51
4.4 Experiences and reflections on farmers' rights to save, use, exchange and sell seeds	53
4.4.1 Conventional farmers	53
4.4.2 Biodiversity farmers	54
4.4.3 Plant breeders	56
4.4.4 Authorized seed shops	57
4.4.5 Common stand	58
4.5 Preliminary conclusions on farmers' rights to save, use, exchange and sell seeds	59
5. Rights linked to relevant traditional knowledge	61
5.1 Farmers' traditional knowledge of genetic resources in Norway	62
5.2 Measures to document and spread traditional knowledge	64
5.3 Relevant regulations on traditional knowledge	68
5.4 Farmers' reflections on traditional knowledge	71
5.5 Preliminary conclusions on traditional knowledge	73
6 Benefit-sharing and the use of genetic resources	75
6.1 Incentive structures and support for conservation work	76
6.2 Farmers' access to crop genetic diversity, and conservation measures	81
6.3 Information, capacity-building and technology transfer	84
6.4 Norway and benefit-sharing with the South	87
6.5 Farmers' reflections on the right to benefit-sharing	90
6.6 Conclusions on farmers' rights to benefit-sharing	92
7 The right to participation in decision-making processes	94
7.1 Organizations representing farmers in Norway	96
7.2 Legislation on farmers' participation in decision-making processes	99
7.3 Farmers' participation in relevant decision-making processes	99

7.4	Farmers' reflections on participation in decision-making processes	102
7.5	Preliminary conclusions on farmers' rights to participation in decision-making processes	103
8	Summary, conclusions and recommendations	105
	Status of crop genetic diversity and seed/propagation materials for farmers	105
	Why farmers' rights are important, and what they entail	106
	The right to save, use, exchange and sell seeds	106
	Recommendations	108
	Rights related to relevant traditional knowledge	108
	Recommendations	109
	The right to share benefits accruing from the use of genetic resources	110
	Recommendations	111
	The right to participate in decision-making processes	112
	Recommendations	113
	References	114
	Annex: Interviews and meetings	117

Foreword

Plant genetic diversity for food and agriculture represents a vast reservoir of fascinating tastes, smells, colours, nutrients, stories and possibilities. It constitutes the genetic basis for all food production, and is of decisive importance for our chances to adapt agriculture to changing environmental conditions, such as climate change. Maintaining and developing crop genetic diversity can be seen as a life assurance policy for future generations, while also giving us possibilities today for dealing with shifting nutritional needs and the demand for more environmentally friendly agricultural production.

The International Treaty on Plant Genetic Resources for Food and Agriculture (the Plant Treaty) is aimed at the conservation and sustainable use of crop genetic resources, and that the benefits accruing from their use are shared in a fair and equitable manner. The challenges are considerable in a world that has lost much of its crop genetic diversity in the course of the past hundred years, and which has still not managed to reverse this negative trend. An important aspect here is to enable farmers to carry on their work of conserving, cultivating and further developing crop genetic diversity – practices that over the past 10,000 years have provided the rich diversity the world has today. To that end, the Plant Treaty has specific provisions concerning farmers' rights.

In 2005, the Fridtjof Nansen Institute established a long-term project to support the implementation of farmers' rights, as they are provided for in the Plant Treaty through research-based guidance. We have facilitated several international consultations, conducted in-depth analyses of national implementation in selected countries, collected success stories, established an international network, held seminars and lectures, and published the results at our website www.farmersrights.org. As part of the FNI Farmers' Rights Project, this report aims to offer an overview on the management of agricultural plant genetic diversity in Norway, taking farmers' rights as its point of departure, and identifying what can be done to better ensure the implementation of the Plant Treaty in this area.

This report has been five years in the making. Farmers' rights proved to be undergoing rapid change, and so our work became an ongoing research endeavour of monitoring developments and documenting the processes in Norway. Thereby the process of developing this report also influenced, to a certain extent, the political decision making documented here. Such influence is always a challenge in social science, and is mentioned specifically in this report where relevant.

The report is the product of a highly participatory process. In addition to document analyses, participation at meetings, seminars and consultations with stakeholders, as well as interviews with farmers, representatives of farmers' organizations, the seed industry and the relevant authorities have also been central. With several informants there has been continuous contact throughout the five-year period. A day-long meeting convened at the Fridtjof Nansen Institute in January 2009 brought together a total of 60 participants, with all relevant actors represented, including the

Regine Andersen

political leadership of the Norwegian Ministry of Agriculture and Food. It provided a unique opportunity to discuss and deliberate together on the central issues involved.

I would like to thank all who have contributed to this study, through interviews, letters, e-mails, written and spoken contributions, fruitful discussions, meetings and seminars – and not least, everyone's encouragement and involvement. Special thanks to the Ministry of Agriculture and Food, for funding the majority of this study, as well as providing considerable moral support for a project which, because of the 'moving targets' involved, took much longer than originally envisaged. I also wish to thank the Norwegian Genetic Resources Centre, for providing support to the all-day meeting in 2009 and other parts of the work, as well as offering invaluable comments and contributions. Finally, thanks go to the Research Council of Norway for supporting the final stage of this work through their Programme 'Environment 2015'. That being said, full responsibility for this study lies solely with the author.

Lysaker, 15 November 2011

Regine Andersen

1 Introduction

This report deals with plant genetic diversity for food and agriculture and farmers' rights in this connection, as set out in the International Treaty on Plant Genetic Resources for Food and Agriculture (the Plant Treaty), adopted by the UN Food and Agriculture Organization (FAO) in 2001. Norway is a party to this treaty, which entered into force in 2004, and is thereby obliged to implement its provisions. The report provides an analysis of the state of genetic diversity in agriculture and farmers' rights in Norway. It examines barriers to, and options for, further achievements as a basis for conclusions and recommendations regarding further steps.

This first chapter delves into the question of why plant genetic diversity in agriculture and farmers' rights are important, and what the Plant Treaty has to say on the subject. Furthermore, the methods and structure of this study are explained.

1.1 Why plant genetic diversity and farmers' rights?

Plant genetic diversity for food and agricultural constitutes the basis for all food production around the globe.² Professional plant breeders and farmers alike depend on this diversity, as it contains the traits necessary to develop plants with regard to their nutritional characteristics, taste, storage and processing. Not least, it contains the traits required to make plants resistant to pests and diseases, and capable of adapting to diverse farming conditions and climate change. Plant diversity is thus essential not only for our nutrition, it is probably the single most important environmental factor in agriculture today, precisely because it determines the extent to which it will be possible to adapt food production to shifting environmental and climate conditions.

And yet, plant diversity has been disappearing at a rapid rate over much of the globe. In 1998, FAO reported that some 80% of the diversity estimated 100 years ago in important cultivated plants like wheat and maize had vanished from the countries generally deemed the centres of their historical origin.³ This is mainly due to the modernization of agriculture, with high yielding varieties and production systems which enabled radical and most necessary production increase, while, however, at the same time wiping out untold varieties of crops.

Moreover, legislation and regulations are making crop genetic resources less available in many countries, thereby limiting the possibilities of their utilization:

- In many countries, plant breeders' rights have been introduced in order to stimulate innovation in plant breeding. In practice, however, more and more countries are placing restrictions on how and to what extent the seeds of protected varieties from the farmer's own harvest may be saved, used and exchanged.

² This chapter is based in part on Andersen 2008a and 2008b.

³ FAO, 1998. Major losses are reported for many other crop species.

- Regulations on plant variety release and the marketing of seed and propagating material have been introduced to ensure plant health and seed quality. Although their provisions vary, the result is increasingly that traditional varieties are excluded from the market, by prohibiting the exchange or sale of seeds from such varieties.

This presents us with a serious dilemma. Rules intended to stimulate innovation by plant breeders may reduce the genetic foundations of plant breeding; and rules intended to ensure plant health may actually compromise plant health because the diversity that could provide genetic robustness is reduced precisely because of such rules.

It is widely recognized that the conservation of plant genetic diversity must be done both *ex situ* (away from the original site, in seed and gene banks, clone archives etc.) and *in situ* on-farm (on site on the farms, active cultivation by farmers). These two main forms of conservation are complementary, as the Plant Treaty observes. Sustainable use of plant genetic resources is first and foremost a question of how these resources are used in plant breeding and farm cultivation.

This is why farmers are central to the implementation of the Plant Treaty, and for making it possible to maintain and preserve plant genetic diversity for the future. They are the custodians of crop genetic diversity on-farm. Their further contribution to on-farm conservation and sustainable use of crop genetic resources depend on their possibilities to use, exchange and sell farm-saved seed. Without basic rights in this regard, their contribution will not be possible. These are among the rights that are known as *farmers' rights* under the Plant Treaty.

1.2 The International Treaty on Plant Genetic Resources for Food and Agriculture and farmers' rights

The International Treaty on Plant Genetic Resources for Food and Agriculture (Plant Treaty) is the first legally binding international agreement devoted solely to plant genetic resources for food and agriculture. Plant genetic resources involve entire species (like wheat and rice, apples and pears), varieties (like the rice varieties Basmati and Jasmin) and the genetic diversity within varieties.⁴ In the Plant Treaty the focus is especially on diversity in and between plant varieties and their wild relatives. For simplicity, throughout this report the basic term used will be *crop genetic diversity*.

The intention of the Plant Treaty is to ensure that crop genetic diversity is preserved and used in a sustainable way, as well as ensuring the equitable sharing of the benefits accruing from the utilization of these resources (Art. 1). In this way, the Plant Treaty is meant to contribute to sustainable agriculture and food security. The Governing Body (GB) of the Plant Treaty is responsible for monitoring its implementation. This body is composed of representatives of all contracting parties to the treaty, a total of 127 countries as of August 2011.

⁴ The Plant Treaty defines 'plant genetic resources for food and agriculture' as *genetic material of plant origin with actual or potential value for food and agriculture* (Art. 2).

Treaty provisions on the conservation of crop genetic diversity (Art. 5) deal with, *inter alia*, survey and inventory of crop genetic resources under threat or of potential use, and support to farmers' efforts to conserve crop genetic diversity in their fields. Countries are to work together to promote the development of an efficient and sustainable gene bank system, with particular emphasis on the need for adequate documentation and for the regeneration of seeds. In addition, the contracting parties are to minimize or, if possible, eliminate threats to crop genetic diversity.

The contracting parties are to promote the sustainable use of crop genetic diversity (Art. 6) by developing and maintaining policy and legal measures to strengthen such practices. Several types of measures are suggested. For example, countries may promote diverse farming systems as well as breeding to enhance utilization of crop genetic diversity. It is also noted that participatory plant breeding may prove useful: this involves farmers and plant breeders working together to develop plant varieties with a view to achieving best possible adaptability to the environment in which the plants are to be cultivated, as well as other considerations important to farmers. In general, it is recommended that more species and varieties should be utilized, especially as regards locally adapted varieties. It is further suggested that countries should review, and, as appropriate, adjust their breeding strategies and regulations concerning variety release and seed distribution in line with the provisions of the Plant Treaty.

The multilateral system of access and benefit-sharing is a central pillar of the Plant Treaty (Arts. 10–13). This system covers the genetic resources of 35 food crop genera and 29 fodder plant genera that are under the management and control of the parties and publicly available. These include major staple crops of the world, such as rice, maize, wheat and potatoes. The aim is to facilitate access to genetic resources to ensure equitable sharing of benefits accruing from the utilization of these resources. Benefit sharing comprises exchange of information, technology transfer, capacity building and the distribution of financial resources. The benefits are to go especially to the developing countries and countries with economies in transition, with the focus on those farmers who conserve and utilize crop genetic diversity. This can be said to involve an operationalization of farmers' rights (see also Chapter 6).

The Plant Treaty devotes a special chapter (Part III) to farmers' rights, where it underscores the importance accorded to them. Part III contains one Article with several paragraphs, Article 9. Here, recognition is expressed of the enormous contributions made, and still being made, by the world's farmers in conserving and sustainably using crop genetic resources, noting that these contributions constitute the foundations for food production around the globe. It is further stated that responsibility for implementing farmers' rights lies with the national governments. Countries are free to choose the measures they deem necessary and suitable, in cognizance of their own needs and priorities. While farmers' rights are not explicitly defined in Article 9, measures are suggested for protecting and promoting these rights, such as

- (a) protection of traditional knowledge relevant to plant genetic resources for food and agriculture
- (b) the right to equitably participate in sharing benefits arising from the utilization of plant genetic resources for food and agriculture
- (c) the right to participate in making decisions, at the national level, on matters related to the conservation and sustainable use of plant genetic resources for food and agriculture

It is further stipulated that nothing in the Plant Treaty shall be interpreted as limiting the rights of farmers to save, use, exchange and sell seed and propagating material from their own fields, subject to national legislation (Art. 9.3). The cautious wording here reflects the immensity of the problems facing the negotiators in achieving consensus in this area, because these rights have such a strong effect on the rights of plant breeders to newly developed varieties. At the same time, however, it is of decisive importance to enable farmers to keep on contributing to the conservation and sustainable use of plant genetic diversity. Even though farmers' rights in this connection are not defined in the Plant Treaty, they are referred to as 'rights which farmers have' (subject to national law as appropriate), which is an important recognition. As the preamble also stresses, these rights, together with the other rights mentioned in connection with the notification in Art. 9.3, are fundamental to the realization of farmers' rights, and must be promoted both nationally and internationally.⁵ This provides the basis for further work on farmers' rights and seeds/propagating material under the Treaty.

As noted, farmers' rights are not explicitly defined in the Plant Treaty (there was insufficient consensus on that point), though there are indications as to what measures may be relevant. These indications become clearer when seen in light of the relevant regulations in the other articles of the treaty, as well as in the Preamble.⁶ The present report will deal with this in some depth, in discussing what, on the basis of Articles 9.2 and 9.3 are generally seen as the four elements of farmers' rights in connection with crop genetic diversity:

- to save, use, exchange and sell farm-saved seed
- protection of tradition knowledge on crop genetic diversity
- participation in benefit-sharing
- participation in relevant decision-making processes

Summing up, we can say that farmers' rights are about enabling farmers to continue conserving and developing crop genetic diversity; of recognizing their work and rewarding them for their contributions to humankind and future generations; and of facilitating their involvement in the making of decisions that concern the management of this genetic diversity in agriculture.

⁵ Preambles to international agreements do not contain legally binding regulations; rather, they form a frame of reference against which to interpret the regulations set out in the various articles of the agreement. For further information on the Plant Treaty, see: www.planttreaty.org, or the presentation on the homepages of the Norwegian Genetic Resource Centre: http://www.skogoglandskap.no/temaer/international_plantetraktat

⁶ Negotiating history and background are also important for interpreting the regulations (see Andersen, 2008b and 2005a; also Bjørnstad, 2004).

1.3 ... but does this concern us here in Norway?

The first use of *farmers' rights* as a political concept dates back to the FAO debate on plant genetic diversity in the early 1980s.⁷ At the time, it arose as a reaction to demands from the industrialized countries to recognize plant breeders' rights as compatible with the International Undertaking on Plant Genetic Resources, that had been adopted in 1983 to ensure the conservation and sustainable use of crop genetic diversity.⁸ According to the developing countries, it would be the industrialized countries that stood to benefit from such systems, whereas in fact the plant breeders would only be putting the finishing touches on a lengthy process of selection, development and breeding already undertaken by Third World farmers. If plant breeders were to have right, then so should the farmers as well. This led to long, charged and highly interesting debates in FAO as to what such rights might involve. The first result was a resolution adopted by the FAO in 1989, placing plant breeders' and farmers' rights on an equal footing. That provided an important backdrop to the provisions on farmers' rights as set out in the current Plant Treaty.

These demands were crucial to the developing countries. For them, it was a question of a central precondition for rural food security, especially in marginal areas where the people are poorest⁹ and plant genetic diversity serves as a kind of life insurance helping to spread the risks from plant diseases, pests, poor soil and difficult climate conditions, and providing the requisites of a balanced nutrition. Moreover, most plant genetic diversity in agriculture originates from the developing countries – whereas the commercial plant breeders seeking to profit from this rich diversity were based in the industrialized countries, this was a central argument. In a North/South perspective, and in terms of justice and equality, it would therefore be important for the developing countries to get farmers' rights internationally recognized. These arguments remain central to positions on and enjoyment of farmers' rights today.

In the industrialized countries, most farmers have shifted to modern forms of agriculture, characterized by reliance on genetically uniform varieties. In such a perspective, the issue of farmers' rights and plant genetic diversity becomes less relevant. However, there are still farmers in these countries who work to conserve, sustainably use and develop plant genetic diversity and who depend on it in their production. We find such farmers especially in organic and biodynamic agriculture,¹⁰ as well as in a few other specific niches. One important reason is that these farmers

⁷ The history of farmers' rights is documented in Andersen, 2005a.

⁸ This was the precursor to the Plant Treaty. It had been concluded in 1983, but was not legally binding.

⁹ Approximately 75% (or about 9 million) of the world's poorest 1.2 billion people live in rural areas and depend for their livelihoods on traditional agriculture (IFAD, 2001).

¹⁰ Biodynamic agriculture builds on a holistic view of the interrelatedness of life processes in agriculture. Biological diversity is central here, together with good organic understanding. The forces of both the earth and the cosmos are considered to be actively involved. In order to strengthen the life processes and the linkages between them, use is made of compost, humus and plant preparations in homeopathic amounts; consideration is also given to the planetary positions in determining favourable times for sowing and harvesting. Biodynamic farmers have been involved in promoting organic agriculture in many parts of the world, also in Norway, and work closely together with the organic community. For further information, see Swensen, 2009, and www.biodynamisk.no.

have a greater need to adapt production to local environmental conditions and spread the risks, because they do not use the artificial fertilizers and pesticides that are widely used in conventional agriculture today. Moreover, niche production is often based on historical and local food traditions that require older varieties of plants.

Another important reason to promote biodiversity concerns nutrition. In recent decades, the focus of commercial plant breeding has been on higher yields and qualities suitable for industrial food production. Among consumers today there is growing awareness of nutrition and health. Especially organic and biodynamic farmers have sought to meet this new demand by cultivating less conventional varieties (often older ones) that are assumed to have better nutritional qualities. For example, gluten levels in modern wheat varieties are much higher than in older types. While high gluten content is an advantage for industrial baking, it may help explain the rapid rise in gluten allergies. This view seems generally accepted within organic/biodynamic circles,¹¹ and was confirmed by Dr Harald A. Mortensen at a seminar on older varieties held in Sigdal in July 2011. Mortensen noted the health problems that have followed in the wake of the new, high-gluten varieties, adding that he believed the older varieties would experience a comeback because flour with low gluten content would be more in demand, for reasons of health.¹² This shows the importance of being able to fall back on plant genetic diversity, so as to locate and make use of required qualities. A recent large-scale study of international research on the nutritional qualities of organically cultivated food plants has shown that such plants have a range of positive qualities, including appreciably higher levels of antioxidants and vitamin C, a central explanatory factor of which is the choice of plant variety.¹³

Plant genetic diversity is important in Norway as well, not least to meet environmental and climate changes and demands for healthier food. However, as this report will show, only a few farmers are currently cultivating varieties other than those on the official Norwegian plant varieties list, and who have an aware, considered attitude to conserving plant genetic diversity in agriculture. There may be more farmers working to promote semi-natural meadows and pasturelands. Ascertaining numbers here has been very difficult, but there appear to be largely about 100 farmers who can be termed 'biodiversity farmers' in this sense.¹⁴ And so we must ask: are farmers' rights really so important in Norway?

¹¹ This point was mentioned at several meetings held in connection with the preparation of this report, for example by researcher Hans Larsson of Sweden's Agricultural University in Alnarp, at the seminar 'Bread for the Future, From Grains of the Past', held at the farm of Kristin and Johan Svård at Brandbu, 14–15 July 2008

¹² The seminar was arranged by Økologisk Spesialkorn in cooperation with the Norwegian Genetic Resource Centre at Evje Farm in Sigdal, 8–9 July 2011. The reference is quoted from the seminar report published on the home pages of the Norwegian Genetic Resource Centre : <http://www.skogoglandskap.no/nyheter/2011/oekokorn>

¹³ Holmboe-Ottesen, 2010

¹⁴ 'Biodiversity farmer' refers here to a farmer who actively contributes to the conservation of genetic diversity in agriculture by cultivating older plant varieties, conservation varieties or other varieties not included on the official list, and/or by maintaining biodiversity-rich meadows and pasturelands through traditional methods. The term can also refer to farmers who keep older livestock breeds.

Farmers' rights apply to all farmers, of course. But since they are designed specifically to promote the work of biodiversity farmers, they will naturally be of greatest importance to them, as we shall see. This report is based on the assumption that farmers' rights become particularly salient when there are so few farmers left involved in conserving biodiversity and associated knowledge: it becomes increasingly important to ensure continued efforts by these few, to ensure that not also the final remainder of a once actively used genetic diversity and knowledge be lost. Given a good regulatory climate, not least in the form of farmers' rights, it should be possible to encourage more and more farmers to become involved.

1.4 Methodology and structure

This report builds on an analysis of relevant documents and literature (see the footnotes and bibliography), as well as comprehensive consultations with farmers, farmers' organizations, breeders, seed producers and dealers, researchers, representatives of government ministries and governmental bodies, and other stakeholders. In addition, attendance at various seminars and meetings held by central actors, as well as visits to several farms, helped to shed light on the situation and perceptions. (For further details on this and the interviews, see the Annex to the report.)

The main tools come from qualitative methodology, but also statistical material has been taken into account. It has been important to analyze perspectives and experiences within a context, and investigate the cause-and-effect linkages in greater depth. Individual and group interviews were semi-structured, and an interview guide was used as a starting point. The reason for conducting interviews was to gain insight into the practical experiences with and opinions on the issue of farmers' rights. Although much of the sector was represented by the interviewees, the intention was never to provide a statistically representative sample, but to enable in-depth analysis.

An important background for this study is the current situation in Norwegian agriculture as regards crop genetic diversity and farmers. Chapter 2 offers a presentation of the agricultural sector, with special emphasis on precisely those aspects. Another important reason concerns perceptions regarding the issue in Norway, in the farming community but also among other relevant parties, such as those in the seed sector. Chapter 3 looks into Norway's obligations under the Plant Treaty, and examines the views of farmers and other involved parties as to what farmers' rights mean in Norway. This in turn provides the backdrop to the next four chapters, each of which addresses one of the four main elements of farmers' rights, operationalizing them to accommodate Norwegian conditions, and analysing current status, attitudes, and challenges. Special attention is paid to seed legislation, because it has been a highly controversial issue in recent years, and there is a great need for information and explanations here. The final chapter draws the various threads together, with conclusions and recommendations.

2 Background on agriculture and crop genetic diversity in Norway

Contexts are important to any understanding of how farmers' rights can be maintained and strengthened in a given country. This chapter presents some key data on agriculture in Norway, focusing on crop genetic diversity and the situation of farmers.

2.1 Basic facts on agriculture in Norway

With a mainland area of 323,787 km²,¹⁵ and a population of some 4.9 million, population density is low – some 15 persons per square kilometre.¹⁶ Due to the difficult climatic conditions and inhospitable terrain, with thin topsoil in many places, a mere 3.2% of the total area is used for agriculture. The corresponding figure for the EU countries is 40%.¹⁷

According to Statistics Norway, the structure of agriculture has undergone major changes in the course of the past 30 years.¹⁸ The number of work-years in agriculture has fallen by 50%, to 53,300, whereas average farm size has grown, from 7,6 hectares to 21,8 hectares. Meat production grew by 75 percent, whereas dairy production fell by approximately 15%. However, national self-sufficiency has remained unchanged, at about 50%. In 2009, agriculture was responsible for 0.3% of Norway's GDP and 2.1% of total employment.

Between 1999 and 2010, one in every three farms was shut down. By 2010, the country had 46,300 agricultural units left. Whereas the amount of land used for agriculture had increased to 2.5 million acres by 1999,¹⁹ by 2010 it had decreased by 3%, to 2.5 million acres.²⁰ When a farm is shut down, the land is often transferred to other farmers, which helps to maintain the total amount of agricultural land. There is also some new cultivation, but all in all there is a slight decrease in terms of agricultural land. All the same, more arable land is used for other purposes today than prior to 1999. A further major change in the sector is the amount of land used for the cultivation of cereals and oleaginous plants has decreased considerably, from 8,179 acres in 1989 to 3,309 acres as of 2010.²¹ Some 65% of agricultural land is currently used for pasture and meadowland,

¹⁵ This figure excludes the two large Arctic islands of Svalbard and Jan Mayen. With them, total area reaches 385,186 km².

¹⁶ Data as of August 2011 from Statistics Norway (SSB). See: <http://www.ssb.no/areal/>

¹⁷ According to the EU Commission's EuroStat (2011): 'Agri-Environmental Indicators': http://epp.eurostat.ec.europa.eu/portal/page/portal/agri_environmental_indicators/introduction

¹⁸ According to SSB (2011), citing 2010 data from: <http://www.ssb.no/jordbruk/>

¹⁹ According to SSB (2001): 'Jordbrukstelling 1999 – endelege tal. Store strukturendringar i jordbruket.'

²⁰ SSB (2011): 'Strukturen i jordbruket. Endelege tal, 2010: <http://www.ssb.no/stjord/>

²¹ SSB (2010): Table 3, Jordbruksbedrifter med areal av korn- og oljevekster etter størrelsen på korn- og oljevekstareale. 1989, 1999-2010. See: <http://www.ssb.no/emner/10/04/10/korn/tab-2010-11-29-03.html>

with only 35% under actual cultivation (including cultivation for fodder).²²

Almost 90% of Norway's agricultural land is now used for fodder production for livestock.²³ In addition to hayfields and pasturelands, other fodder plants and various cereals are grown for green fodder, with some root plants used for fodder as well (turnips, Swedish turnips and fodder beets). Moreover, most of the production of barley, oat and oleaginous plants goes to animal fodder.

Wheat and rye, potatoes, vegetables, fruit and berries are cultivated primarily for human consumption.²⁴ Since 1980, total harvests of cereals²⁵ have increased moderately, but with some important shifts in proportions as of 2009. Barley has remained on top (337,102 acres in 2009), but with a marked decline in production. Wheat comes next, and here we can note a definite increase in production (to 201,715 acres). Oats rank third, but here production has decreased (to 201,244 acres). Rye production has increased slightly, but is still low. The cultivation of potatoes has fallen sharply (33, 986 acres in 2009), as against a slight rise in vegetables (17,877 acres, outdoor cultivation). The production of fruit and berries is low but stable.

2.2 Structural changes and crop genetic diversity

With the structural changes in Norwegian agriculture, most farmers today employ modern commercial varieties and intensive methods of cultivation/production. Older varieties have been replaced and are hardly to be found in commercial agriculture in Norway.²⁶

There are probably fewer than 100 farmers who cultivate older or special varieties.²⁷ Most of these farmers are engaged in small-scale agriculture, usually organic. In 2010, some 4.4% of total agricultural land of Norway was being cultivated organically (including biodynamic agriculture).²⁸ The biodynamic community is a small one (28 farms),²⁹ but worth noting in this connection, since crop genetic diversity is an important principle in this form of agriculture, and involvement and awareness are particularly high.³⁰

²² According to SSB (2011) citing 2010 data from: <http://www.ssb.no/jordbruk/>

²³ SSB (2010): Landbruket in Norway 2009, pp. 37–38, at: http://www.ssb.no/emner/10/04/sa_landbruk/sa116/jordbruk.pdf

²⁴ All data in this section are from SSB (2010): Landbruket i Norge 2009, Table 2.2.6. Jordbruksareal, etter fylke og bruken av arealet. 2009. Dekar, p. 46. At: http://www.ssb.no/emner/10/04/sa_landbruk/sa116/jordbruk.pdf

²⁵ Throughout this report, the term 'cereals' is used in the British sense, to refer to edible grains – 'korn' in Norwegian (*transl. note*).

²⁶ Asdal, 2008: 9

²⁷ In the absence of statistical data, the figure is based on our survey of farmers and groups engaged in biodiversity issues.

²⁸ SSB (2011): 'Tema: Jordbruk' See: <http://www.ssb.no/jordbruk/>

²⁹ Figure from Biodynamic Association of Norway, e-mail from Berit Swensen, January 2009.

³⁰ All the biodynamic farmers consulted in connection with this report were concerned about biodiversity, and cultivated older/special varieties on their farms (see Annex). They explained that active use of biodiversity is a fundamental principle of their chosen form of agriculture.

From the figures presented above we can see how difficult the conditions for crop genetic diversity are, with small-scale agriculture and decreasing number of farmers. In 2005, the Norwegian government decided that 15% of all food production and consumption should be organic by the year 2015, and an action plan for achieving this goal was adopted in 2009.³¹ Since then, the deadline has been extended to 2020. Although, according to the action plan (p. 4), sales of organic farm produce almost doubled between 2006 and 2009, the target is still a considerable distance away. When organic production increases, there is likely to be a positive effect for crop genetic diversity in agriculture, since it is here that we find most of the biodiversity farmers.

2.3 Status of crop genetic diversity in Norway

Very few of Norway's older landraces³² of cereals, potatoes and vegetables have been preserved for future generations. Almost all have now disappeared. For fruit and berries the picture is brighter, but very little breeding and development have been done in this area, so diversity is threatened all the same. In earlier times there was an abundance of original Norwegian meadow plants, but also here, much has vanished. The modernization of agriculture has undoubtedly resulted in greater efficiency in production, but it has also led to considerable genetic erosion, also in Norway. In this section we look into the status of crop genetic diversity in Norway, that is, the number of varieties preserved in gene banks and the number of varieties in current use. We begin with cereals, potatoes and vegetables, then go on to fruit and berries, and then meadow plants. Finally we examine the informal seed sector, before noting the main challenges to farmers' rights.

2.3.1 Crop genetic diversity in cereals, potatoes and vegetables

Samples of most Norwegian agricultural crop genetic diversity are stored in NordGen, formerly known as Nordisk Genbank (the Nordic Gene Bank), at Alnarp near Malmö, southern Sweden. Table 1 shows the number of cultivars (developed by professional plant breeders) and landraces (resulting from farmers' selection over generations) stored at NordGen for some key species of cereals, potatoes and vegetables.³³

The table shows that NordGen is conserving a considerable amount of varieties in the three categories, especially more recent varieties developed since plant breeding became a recognized profession.

³¹ Ministry of Agriculture and Food (LMD) (2009): *Økonomisk, agronomisk – økologisk! Handlingsplan for å nå målet om 15 pst. økologisk produksjon og forbruk i 2015* (Oslo: LMD)

³² A landrace or a land variety is one that has developed over a long period through farmers' selection of seed from the best plants of the variety they have cultivated, so that varieties with qualities particularly suited to local cultivation conditions have gradually been developed.

³³ There is no clear dividing line between landraces and commercial varieties/cultivars, and there are consequently certain grey areas. Plant breeding in the Nordic countries began in the early 1900s and was based on existing landraces, with selections made from among them. This resulted in commercial varieties that could be very similar to the landraces. In the late 1930s, hybridization began, with the resultant varieties becoming more and more unlike the landraces. All the same, some of the genetic material from the original landraces may remain in the early commercial varieties. There is also no clear dividing line between the two categories in the NordGen database. It has been especially difficult in the case of peas and beans, where material has come to the gene bank from individuals who can document that the variety is an old one, but without knowing the exact name.

However, only few samples of Norwegian landraces are deposited there and preserved for the future. We don't know how many varieties there were before the modernization of Norwegian agriculture, but we can be sure there were far more than the number stored at NordGen today.

Table 1: Norwegian and Nordic seed samples accepted for long-term deposit at NordGen as of 2011, with cultivars and landraces³⁴

	Norwegian seed samples at NordGen (total)	Norwegian commercial varieties	Norwegian landraces	Nordic seed samples at NordGen (total)	Of which Nordic commercial varieties	Of which Nordic landraces
Barley	78	47	13	9 809	390	99
Wheat	29	21	3	649	238	53
Rye	9	2	7	307	51	113
Oats	30	30	0	315	59	46
Potatoes	13	6	7	92	38	40
Carrots	0	0	0	62	59	0
Cabbage	34	34	0	82	82	0
Turnips	19	10	2	89	44	19
Swedish turnips/ Kohlrabi	26	21	2	116	51	35
Common onion	3	3	0	25	24	0
Lettuce	0	0	0	30	23	0
Beans	7	2	3	70	13	48
Peas	15	9	5	1 139	178	139

Another important point about these statistics is that NordGen has a rather large number of landraces from the other Nordic countries. This means that biodiversity farmers in Norway wishing to return to older landraces can also draw on resources from the neighbouring Nordic countries. And that point is of great importance for the formulation of regulations, to which we return later.

³⁴ Many thanks to Svein Solberg, senior researcher at NordGen, for providing this statistical material by e-mail 12 October 2011. The data are based on NordGen's database SESTO. Figures apply only to seed samples accepted for long-term storage. There may be other seed samples whose status is not yet determined. These are not included in this list, except for barley, where NordGen is in the process of accepting a large collection of mutant varieties from Sweden. See: <http://www.nordgen.org/sesto/>

What these figures do not tell is how many landraces of cereals, potatoes and vegetables are still to be found on the various farms and in vegetable gardens samples of which have not been deposited with NordGen. We can assume this figure is low, especially for cereals and many vegetables. What often happened was that the older seeds disappeared from the farms with the transition to modern production techniques. Some of it was collected and delivered to research stations around the country, and these stations have been important sources of material to the old Nordisk Genbank, now NordGen. However, we cannot know what proportion of the original material actually ended up in the gene bank.

For potatoes and certain vegetables, the picture is somewhat brighter. Erling Olsen, farmer and former plant breeder, collected 170 potato varieties at his farm in the Gudbrandsdal Valley in eastern Norway, for example, for which he was awarded the Plant Heritage Prize (Plantearveprisen) in 2006.³⁵ The Norwegian Genetic Resource Centre (NGRC) has established a separate potato gene bank in Norway, in collaboration with Bioforsk (the Norwegian Institute for Agricultural and Environmental Research). Here are deposited samples of varieties Olsen considers of value and which are not already preserved elsewhere, as well as other materials, also from NordGen.³⁶ The reason for establishing a separate gene bank for potatoes in Norway was the ban against importing potatoes from abroad, including from NordGen in Sweden, due to Norway's strict regulations on seed potatoes. As we shall see later, these restrictions have been tightened this much in order to prevent the spread of plant diseases. With a separate gene bank to ensure virus-free potatoes, greater crop genetic diversity in potatoes has again become available to Norwegian consumers.

NordGen is responsible for renewing and propagating the material stored there. This must be undertaken regularly in order to ensure that the seeds can still germinate, and that supplies are sufficient for distribution.³⁷ Each year, some 1,000 varieties are renewed and multiplied, but demand is likely to increase as the collection grows larger and ages. This makes it important to ensure financing, lest important genetic resources die out.

NordGen is also responsible for ensuring that key data on its varieties are stored in a database and made available.³⁸ To this end, NordGen's database, the SESTO gene bank documentation system, has been established. It follows international standards and provides important information on the seed samples stored with NordGen. Work is currently under way on establishing a further information category in SESTO: cultural information on plant varieties.

As regards the varieties in active use today, the official Norwegian list of varieties provides a good point of reference. From Table 2 we can see

³⁵ See Andersen and Winge, 2008: 52–54.

³⁶ Information from the Norwegian Genetic Resource Centre, (Genressurscenter) (2009): 'Genbank for potetsorter i Norge': <http://www.skogoglandskap.no/nyheter/2009/potetvarieties>; also e-mail correspondence with Åsmund Asdal, the Norwegian Genetic Resource Centre, 19 March 2009.

³⁷ Information in this paragraph builds on a telephone conversation with Svein Solberg, NordGen, 20 March 2009.

³⁸ Ibid.

that the number of available varieties of cereals and potatoes has experienced a general increase from 1996/96 to 2011, as has the share of specifically Norwegian varieties. All the same, the number is relatively low, when we consider the multitude of varieties most probably found in Norway previously, as also indicated by figures from NordGen. Modern conventional agriculture uses fewer, more high-yield varieties; moreover, plant breeding and propagation are time-consuming and are conducted along commercial lines – which means not having more varieties currently available than what is cost-effective in a low-demand country like Norway. After ‘varieties meriting preservation’ were permitted on the official list, seven such varieties have been listed (see 4.2): these are included in the figures for 2011 in Table 2.

Table 2: Cereals and potatoes on the official Norwegian varieties list

When:	1996/97*		2008*		2011**	
	Total	Norwegian	Total	Norwegian	Total	Norwegian
Oats (<i>Avena Sativa L</i>)	13	6	11	8	13	11
Barley (<i>Hordeum Vulgare L</i>)	10	4	28	17	34	19
Wheat (<i>Triticum Aestivum L</i>)	15	5	18	4	23	9
Potatoes (<i>Solanum Tuberosum L.</i>)	20	10	36	13	49	25

*From Asdal, 2008: 10; **from the official Norwegian varieties list (*Norsk Offisiell Sortsliste*) for 2011 of the Plant Variety Board (*Plantesortsnemnda*), Norwegian Food Safety Authority (*Mattilsynet*)

As regards vegetables, it is mainly carrots, various types of cabbage, onions, lettuce and hothouse tomatoes that are cultivated in Norway,³⁹ and most of these come from seed originally developed elsewhere.⁴⁰ This is partly because the development of vegetable varieties was downscaled from the late 1990s, and has almost disappeared today.⁴¹

2.3.2 Crop genetic diversity in fruits and berries

As to fruit, apples, pears and cherries have traditionally dominated in Norway. NGRC is working with museums, local farms and educational institutions to preserve fruit varieties. Altogether there are 13 locations with a total of several thousand fruit trees of older varieties.⁴² They include varieties of national preservation value (‘mandated varieties’) and

³⁹ Asdal, 2008: 11

⁴⁰ Information from Magne Gullord, former director of Graminor AS, at a meeting held at Graminor, 4 January 2007.

⁴¹ E-mail correspondence with Åsmund Asdal of NGRC, 20 March 2009.

⁴² For locations, see http://www.skogoglandskap.no/temaer/bevaringssted_tema

varieties that have been collected locally and are of local historical importance. In all, some 400 different varieties are preserved in these collections, distributed approximately as follows:⁴³

- apples: 275 varieties
- pears: 50 varieties
- plums: 50 varieties
- cherries: 25 varieties

A separate database on fruit varieties facilitates access, enabling these varieties to become more widely used.⁴⁴

With regard to berries, the NGRC has been collecting varieties for cloning collections, based on surveys identifying which varieties of strawberries, raspberries, cloudberrries, currants (red and black) and gooseberries should be preserved.⁴⁵

- strawberries: 17 varieties
- black currants: 15 varieties
- red currants: 7 varieties
- gooseberries: 9 varieties
- raspberries: 18 varieties
- cloudberrries (*Rubus chamaemorus*): 4 varieties

Bioforsk Landvik in Grimstad on the south coast houses a collection of threatened varieties of blackberries.

Despite increasing imports, domestic production of fruit and berries in Norway has remained fairly stable, but foreign varieties are widely used. Within the sector, further breeding and development work is carried out on apples, plums, strawberries and raspberries.

2.3.3 Crop genetic diversity in meadow plants⁴⁶

Traditionally, meadow plants in semi-natural meadows and pastures provided the basis of animal husbandry and, in turn, agriculture in Norway. It is reflected in the old Norwegian saying, 'the meadow is the mother of the fields'. It was the fodder from outlying meadows and pastures that made it possible to keep livestock, which in turn created the manure that could be spread on the fields to enable the cultivation of food

⁴³ The Norwegian Genetic Resource Centre (NGRC) (2009): 'Frukt og bær'. See: http://www.skogoglandskap.no/temaer/frukt_og_ber

⁴⁴ Norwegian Genetic Resource Centre (2009): Sortsdatabase for frukt. See: <http://www.skogoglandskap.no/seksjoner/sortsdatabase>. See also Norwegian Genetic Resource Centre (2009): 'Plantearven'. <http://www.skogoglandskap.no/temaer/plantearven>

⁴⁵ Norwegian Genetic Resource Centre (2009): 'Frukt og bær'. See: http://www.skogoglandskap.no/temaer/frukt_og_ber

⁴⁶ Unless otherwise indicated, information in this section was provided by Ann Norderhaug, head of research at Bioforsk Midt-Norway Kvithamar, in a telephone interview, 9 November 2009, and by Akse Østebrot, senior advisor at the Directorate for Nature Management, by email, with updated information and extensive text suggestions sent 14 October 2011. The author wishes to thank both for their valuable assistance and for sharing new information.

plants. Without livestock manure, it would have been virtually impossible to cultivate the land. Norway used to have an impressive range of meadow plants, most of which originated in the country. Today, we can classify meadow plants according to natural habitat: those growing in semi-natural meadows that are neither ploughed, manured nor sown, but where moderate change has been induced by regular reaping and grazing (traditionally managed reaping and natural grazing lands) over many years; and meadow plants that are sown and cultivated on land that is ploughed and fertilized.⁴⁷

The history of these semi-natural meadowlands goes all the way back to the Stone Age, when people began domesticating animals and putting them out to graze. By the Bronze Age, people were cutting and gathering grasses using sickles, and the first hayfields emerged. The landscape was cleared to promote the growth of meadow plants. Gradually, the scythe came into use. Plants migrated in from the forests and landscapes surrounding the meadows, and over the course of thousands of years a unique genetic pool was created, with some 20 to 50 different species per square meter, in ecosystems with a high degree of continuity in cultivation and usage. Today there are somewhere between 650 and 700 plant species that can be linked to these old semi-natural meadows and grasslands. The areas are among the richest in crop genetic diversity in Norway, but are also severely threatened (the Norwegian Biodiversity Centre, Trondheim [Artsdatabanken], 2011).⁴⁸

Different genotypes are found within the various species that have become adapted to different types of use. Those adapted to hayfields generally flower before the harvest season, whereas those adapted to meadowlands tend to flower before the livestock is put out to summer pasture. These are variations that have developed over centuries of adaptation to various locations, and of traditional forms of cultivation. Whereas most species have migrated into the meadows and pasturelands from the surrounding landscape by natural means, some were introduced from the outside.

When in the 1860s it became customary to cultivate meadows and pasturelands, Norwegian farmers experimented with non-indigenous plants.⁴⁹ These, however, tended to be ill-suited to the demanding conditions in Norway. As was increasingly recognized, the most sensible thing to do would be to focus on what grew there naturally. In establishing a new pasture or meadow, the farmer could transfer grasses and hay from other pastures, ensuring natural propagation through the use of available diversity. And later, new varieties and species might arrive from nearby areas.

However, with the 1950s came a sharp reduction in the diversity of meadow plants, when specially bred and developed varieties and artificial

⁴⁷ In addition to these two main groups there are also plants that grow in semi-natural meadows that are not ploughed or sown, but manured or fertilized..

⁴⁸ A. Lindgaard and S. Henriksen (eds) 2011. *Norsk rødliste for naturtyper 2011*. Norwegian Biodiversity Centre /Artsdatabanken, Trondheim.

⁴⁹ Kristin Daugstad (2008): 'Engdyrkinga si historie og bruk av landsortar'. See Norwegian Genetic Resource Centre: http://www.skogoglandskap.no/fagartikler/2008/Engdyrking_historie_og_bruk

fertilizer gave greater yields. This was true also of older landraces and genotypes, but yields of the new varieties were even bigger under the same conditions. With this new type of production, seed mixtures containing many important and preservation-worthy plants were sown, but still far less than the rich diversity of the original meadows and pasturelands. Seeds came from a wide range of sources, from hayfields and meadows, from various different ecosystems, and could also include varieties from outside.

As the methods of production changed, some older genotypes were collected and analyzed, but were often not deemed valuable according to contemporary criteria for grasses and forage plants,⁵⁰ and were therefore not preserved for posterity. In cultivated meadows and pasturelands, modern seed mixtures came into use. These meadows and pasturelands gradually replaced the older hayfields. Many older forage areas were neglected and became overgrown, not least because of a decline in livestock husbandry and indeed of farms. All this has led to the comprehensive erosion of meadow plants in Norway.

Semi-natural vegetation in cultivated areas requires attention and care along traditional lines, with no use of artificial fertilizers, if genetic diversity is to be maintained. The slopes of highland summer pastures, for example, are in themselves an important genetic resource. Semi-natural meadows and grasslands are complex ecosystems. To date, the most effective way of maintaining species variety and genetic diversity is to conserve them as they have been cared for by historic practices based on traditional knowledge.

If manure or artificial fertilizer is spread on a hay meadow or a pasture (including summer highland pastures), half of the species growing there will disappear after a single application of manure. Artificial fertilizer has almost the same effect as manure in favouring nitrogen-loving species, and eliminating those with little tolerance for nitrogen. This disturbs the natural balance: the most competitive varieties emerge supreme, whereas varieties that are less competitive – as are many of those found in semi-natural meadows – will simply disappear.

There are several national institutions working to preserve Norway's semi-natural meadows and their natural values, whether in terms of cultivated landscapes, habitats, species or genetic variation and genetic resources. In *Utvalgte kulturlandskap i landbruket (Selected cultivated landscapes in agriculture)*, a collaborative venture involving the Norwegian Agricultural Authority (SLF), the Directorate for Nature Management (DN) and Directorate for Cultural Heritage (*Riksantikvaren*), semi-natural meadows are represented in several of the 22 selected areas under special management.

The project *Arvesølv* (literally: silver legacy or 'family silver') has focused on targeted action to conserve biodiversity in the most valuable

⁵⁰ Information provided by Petter Marum, plant breeder (grasses) at Graminor AS, in a telephone interview 2 February 2007.

areas.⁵¹ This project began in 2006 as a collaborative venture involving the NGRC, Bioforsk, and the southernmost counties of Aust Agder and Vest Agder, later extended to several other counties as well. In 2009, *in situ* conservation was given a further boost when the Directorate for Nature Management released its *Action Plan for Hay Meadows (Handlingsplan for slåttemark)* (see below), based on the *Arvesølv* concept for preservation and care of hay meadows. This concept involves the preparation of management plans for the further use of meadowlands in danger of becoming overgrown, and the establishment of cooperation and contact mechanisms among interested landowners/users and county-level agriculture and environmental authorities, so that, *inter alia*, farmers can receive economic support to the continued use of these areas, in line with traditional methods.⁵²

In 2011, *The Action Plan for Hay Meadows*⁵³ (DN rapport 2009-6) covered a total of some 1,300 locations with hay meadows deemed 'highly important' or 'important' in terms of biodiversity. The project is implemented by the county-level departments for the environment and for agriculture, working together with landowners in carrying out traditional management methods. Maintenance is to be conducted actively, by means of voluntary agreements with landowners. A few model areas in the two Agder counties in the first year (2009) served as the point of reference for the later conservation work under the Action Plan. As of 2011, approximately 250 areas in 14 of Norway's 19 counties are included, and in the course of 2012 all counties should be involved. There has been extensive collaboration between the *Arvesølv* project team and the authorities responsible for running the Action Plan for Hay Meadows.⁵⁴ Work is now underway on a similar plan that will include coastal heaths and natural grazing areas.

Norway's protected areas include much grazing land and many hay meadows. They were difficult to conserve as long as the older, US-based, approach to nature conservation prevailed in Norway. In contrast to the natural landscapes of North America, much of the Norwegian landscape in protected areas has been shaped through centuries of nature interacting with humans. When cultivated landscapes like these are preserved and managed as 'untouched' landscapes, they change character and lose their protection value. However, recent years have seen a shift in views on the protection of semi-natural areas, and traditional management has achieved greater prominence. This has resulted in better management of protected areas in Norway.

⁵¹ See article on the LMD website (2009): *Kulturlandskap: Arvesølvprojectet utvides*, at <http://www.regjeringen.no/nb/dep/lmd/aktuelt/nyheter/2009/jan-09/kulturlandskap-arvesolvprojectet-utvide.html?id=544036>, and article on the website of the Norwegian Forest and Landscape Institute/Norsk institutt for skog og landskap (2009): *Viktige planter bevares i kulturlandskapet*, at: <http://www.skogoglandskap.no/nyheter/2008/grasilandskap>.

⁵² From the article on the NCRS website (2010): *Fra 0 til 100 på halvannet år*, at: <http://www.skogoglandskap.no/nyheter/2010/arvesolv>

⁵³ Ann Norderhaug and Ellen Svalheim (2009): *Utkast til handlingsplan for slåttemark*. DN rapport 2009-6 (Trondheim: Directorate for Nature Management) See: <http://209.85.229.132/search?q=cache:iCtX23pK7f4J:www.dirnat.no/attachment.ap%3Fid%3D10334+Hatten+og+Norderhaug+%2B+Evaluering+av+SMIL&cd=1&hl=en&ct=clnk&gl=uk>

⁵⁴ See references in footnote 51 above.

By the time the then Nordic Gene Bank (which became NordGen) was established in 1979, it was already too late to conserve the rich diversity of meadow plants in its entirety, but some could be saved and they have been kept at NordGen. Approximately 98% of the meadow plant varieties currently sold in Norway is in fact of Norwegian origin.⁵⁵ Some 13 varieties of grass and five of legumes are considered the major varieties for fodder production in the country.⁵⁶ Even though far less use is now made of semi-natural meadows and hay meadows, the remaining areas are still important for fodder production. Crucially, they represent genetic resources with a potential for further selection, refining and use.

It is becoming more and more important to maintain such semi-natural meadows, especially in light of climate changes. These eco-systems are particularly large and sustainable, not only because of the rich variety of plant life, but also because of all the other organisms involved – like the meadow butterflies of which there is a great diversity. Many of these organisms are threatened. We do not know what we might need in the future, under a changed climate. Nor can we know our future needs as regards livestock and nutrition. Today, some farmers maintain hay meadows in order to produce what they refer to as ‘medicinal hay’ – hay with a more varied, richer nutritional content, which they use for sick livestock. It has also been shown that cows that graze on diversity-rich meadows produce milk with far more nutrients of importance to human beings than cows fed on sown and cultivated meadowlands. For one thing, the level of polyunsaturated fatty acids is higher. The cheese produced by Norway’s Tine dairy company under the name *Engfrisk* (‘meadow-fresh’) is one example of how new fodder combinations can contribute to healthier food products.⁵⁷ The genetic resources of semi-natural meadowlands could become important in the future, in terms of the interrelations between various organisms, facilitating better livestock and human health, and as a foundation on which to base agriculture in Norway.

2.3.4 *The informal seed sector*

This report covers the status of crop genetic diversity in Norway, especially as regards the holdings of gene banks, what is used in conventional agriculture (and included in the official Norwegian list of varieties), and what is found in semi-natural meadowlands. However, there is also an informal seed sector in Norway. Biodiversity farmers make little use of the varieties on the official list, but base their cultivation on material they have either exchanged amongst themselves, or obtained from NordGen, NGRC, or biodiversity farmers and small-scale breeders in other countries. The material may be from older landraces as well as from commercial varieties in use in the 1950s and ‘60s, as these were adapted to varying cultivation conditions and exhibited considerable genetic heterogeneity – a precondition for further

⁵⁵ Information provided by Petter Marum, plant breeder (grasses) at Graminor AS, telephone interview 2 February 2007.

⁵⁶ Svalheim et al. (2005): Bevaring av genressurser: Fôrplanter i gamle enger og beiter (Grimstad: Genressursutvalg for kulturplanter)

⁵⁷ See article on the Tine website (2010): *Tine Engfrisk – Naturlig sunnere ost*, at: <http://www.tine.no/169149.cms>

development through selection. Some biodiversity farmers have a great number of varieties on their farms. We have already mentioned Erling Olsen from the Gudbrandsdal Valley, with his 170 varieties of potato. Another is Johan Swärd from Brandbu in Hadeland, north of Oslo, with about 50 varieties of cereals on his farm. He cultivates some of these every year, and works together with other farmers to promote the cultivation of more of the other varieties. Some varieties are stored in his own gene bank, for use in later seasons. Most of this material has come from the Nordic Gene Bank, in part via Hans Larsson, a researcher at the Swedish Agricultural University, who has carried out impressive work in conserving older Scandinavian cereal varieties. Johan Swärd is Norway's pioneer in the area of cereal diversity. His material is now used, *inter alia*, in the work of Økologisk Spesialkorn AS, a joint venture involving 11 farmers (Johan Swärd among them), based in the farming community of Sigdal, engaged in work with older varieties of *Triticum boeoticum*, *Triticum dicoccum*, spelt (*Triticum spelta*, a low-gluten wheat species), a rye called svedjerug⁵⁸ and several land-varieties of wheat, seeking to make production commercially feasible.⁵⁹ Holli Mølle at Spydeberg, southeast of Oslo, has been working along similar lines, focusing on older varieties of *Triticum boeoticum*, *Triticum dicoccum*, spelt, wheat, rye and barley,⁶⁰ currently involving 12 farms. Holli Mølle has even landed an agreement to supply the large food chain 'Meny' in Norway.

In vegetables, the Norwegian firm Solhatt Organic Seeds⁶¹ and the Swedish firm Runåbergs Frøer⁶² are the most important suppliers of organic seed, both with comprehensive selections available.

For better access to the diversity in fruits and berries in Norway, the NGRC has established special databases to facilitate contact with breeders around the country.⁶³ The firm Økofrukt has specialized in organically grown rootstock and fruit trees.⁶⁴ Jønsi and Kigen farms at Notodden, southwest of Oslo, produce biodynamic fruit from a wide range of varieties.

Some farmers also use small-scale plant breeding companies based in Germany and Austria, ordering seeds and other propagating materials directly from them.⁶⁵ The varieties in question exhibit considerable genetic heterogeneity, which the farmers find well-suited as regards adaption to conditions on their farms.

Because of the informal character of this sector, it is difficult to provide any exact data on the number of varieties and the parties involved.

⁵⁸ No official English translation as yet, but 'slash-and-burn' rye and 'burnt-earth' rye have been suggested and both are accurate and descriptive.

⁵⁹ Økologisk Spesialkorn AS website: <http://www.spesialkorn.net/> Solhatt is Norwegian for the ancient medicinal plant *Echinacea* (transl. comment).

⁶⁰ Holli Mølle AS website: <http://www.holli-molle.no/>

⁶¹ Solhatt Økologiske Frø website: <http://solhatt.no/>

⁶² Runåbergs Frøer website : <http://www.runabergsfroer.se/>

⁶³ See http://www.skogoglandskap.no/emneord/frukt_og_bear

⁶⁴ Økofrukt website: www.okofrukt.no

⁶⁵ Information obtained during interviews with several farmers.

2.3.5 *Challenges to research and breeding*

Little is known about how many varieties there were of food and fodder plants before the modernization of agriculture set in; nor do we know how much has been lost. What we do know is that very little remains in Norway of cereals, potatoes and vegetables, and that we have lost much of the earlier meadow plants. However, by going through the older seed catalogues stored with NordGen, and by studying research reports from testing of older commercial varieties – and there exist other relevant sources as well – we can build up a picture. If that study were undertaken, the results could be useful, providing a better basis for work on the conservation and sustainable use of crop genetic diversity in Norway.

As we shall see, the global tendency today is for plant breeding to become increasingly concentrated in fewer hands. While this report was being prepared, the Swedish plant breeding company Svalöf Weibull AB shut down its vegetable breeding activities.⁶⁶ What this means in practice is the absence any work in the Nordics on breeding and developing vegetable varieties. It will make Norwegian farmers increasingly dependent on procuring propagating material from the Netherlands – material less suited to Nordic conditions and therefore more vulnerable – unless they buy seed from the smaller suppliers mentioned above.⁶⁷ As we shall see in the following, plant breeding in Norway has undergone major structural changes that make it more difficult to continue work on preserving diversity of plant varieties needed in a long, narrow country like Norway, with its wide range of landscapes and climates. When plant breeding in one area stops, research in that area tends to come to an end as well... and with it, the seed collections in that area.

In this situation, the role of NordGen becomes particularly important. NordGen is trying hard to take over all the collections and materials that are abandoned or shut down when activity ceases. This is a race against time, and with limited resources. It is vital to realize that, the more enterprises that are shut down, the more important NordGen's work on the preservation of crop genetic diversity becomes. Only if propagating material is preserved for the use of future generations will it be possible for take up the thread once again, when trends shift and Norway can revive its own plant breeding traditions.

The active efforts of biodiversity farmers in the conservation and sustainable use of plant varieties is especially important in this connection. Their work is central to conserving and expanding the range of varieties that are well suited for Norwegian agriculture, and to passing on important qualities and features linked to nutrition and other needs largely ignored by today's commercial plant breeders. It is also important for spreading knowledge of how to work with plant genetic diversity in agriculture.

⁶⁶ The information in the remainder of this section derives from talks with Morten Rasmussen and Svein Solberg of NordGen, at Alnarp near Malmö, 13 March 2009, and from a telephone conversation with Svein Solberg on 20 March 2009.

⁶⁷ They do not carry out breeding themselves, but test many older and more recent varieties, with a view to possible distribution.

2.4 Access to seed material

Most Norwegian farmers appear to be satisfied with the seed materials that are available.⁶⁸ They generally appreciate the fact that seeds have been tested for purity of variety, diseases and germination capacity: it gives a sense of security. They trust the producers and therefore prefer the varieties they recommend. Usually there is enough seed available of the varieties most in demand. If demand for popular varieties outpaces availability, steps are usually taken to increase seed production for the next season.⁶⁹

However, not all farmers share these views. Many organic farmers, as well as most of Norway's biodynamic farmers, need a broader assortment than the official list of varieties offers, both to adapt production to local environmental conditions, and because the demands of various consumer groups are more diverse, especially as regards niche producers.⁷⁰ The certification criteria for organic and biodynamic produce require the seed material to be organically produced. However, for farmers wishing to purchase organic seed material on the official list, the assortment is extremely limited. For example, as of January 2006, there were only two varieties each of rye and wheat, two varieties of timothy, one variety of red clover, four mixtures of fodder plants, and only one variety of potato.⁷¹ It is not possible, say seed sector representatives, to offer a wide assortment of varieties because of low demand from farmers and the general need for economic profitability.⁷²

Organic seeds on the list of varieties are essentially the same as for conventional agriculture, apart from having been produced organically. The breeding process is conventional: it is only the cultivation of seeds from the multiplied material that is organic for seed material meant for organic farming. There are discussions from time to time as to whether the available assortment is satisfactory for organic production. Most of the conventional varieties, according to the seed sector, perform just as well in organic agriculture, though further scientific analysis is needed here too.⁷³ By contrast, as organic and biodynamic farmers maintain, the analyses depend on the evaluation criteria employed.⁷⁴ In their view, conventional varieties can be said to function satisfactorily for organic agriculture only if purely quantitative criteria are used as the point of

⁶⁸ According to a letter to the author from Christian Brevig, project leader at the Norwegian Agricultural Extension Service (*LFR, Norsk Landbruksrådgiving*) 7 March 2006, and an interview with Pia Borg, then senior advisor, the Norwegian Farmers' Union, 8 March 2006.

⁶⁹ According to letter from Christian Brevig (see above).

⁷⁰ According to discussions at the Seed Days in Vestfold County, 25 January 2006, and farmers interviewed at Fokhol, 7 April 2006. Pia Borg of the Norwegian Farmers' Union also confirmed in an interview, 8 March 2006, that these views are widely held among organic farmers.

⁷¹ According to presentations by Marit Moe of the Norwegian Food Safety Authority (*Mattilsynet*); Jon Atle Repstad, Norwegian Agricultural Purchasing and Marketing Cooperative (*Felleskjøpet Øst-Vest, now Felleskjøpet Agri*); and Erik Tandem of Strand Brænderi, at the Seed Days in Vestfold County, 25 January 2006.

⁷² For example, Jon Atle Repstad (see above), 25 January 2006.

⁷³ According to a letter to the author of this report (RA), from Jon Atle Repstad (see above), dated 6 March 2006.

⁷⁴ According to organic farmers at the Seed Days in Vestfold County, 25 January 2006, and farmers interviewed at Fokhol Farm, 7 April 2006.

reference. Organic and biodynamic farmers focus on qualities, such as nutritional quality and suitability in organic production. Here, the conventional varieties often score low, they say. For example, organic bakers in Norway have been critical to Norwegian-produced organic wheat. One of the two varieties that were available in 2006 was low in protein content, and when the two varieties were mixed for sale, they yielded dough with poor rising qualities.⁷⁵

Other qualities appreciated by organic and biodynamic farmers include the degree to which the varieties absorb water, how they make use of nutrients in the soil, and their adaptability to specific organic and biodynamic methods of production.⁷⁶ For biodynamic farmers it is also important that varieties can adapt to the conditions on their farms – the farm's 'individuality' as they call it.⁷⁷ This requires a certain degree of genetic heterogeneity, enabling farmers to work on these varieties, selecting seeds from plants that satisfy their own preferences. This is how biodynamic agriculture has retained traditional knowledge of how farmers develop plant varieties generally lost to conventional agriculture today.

For these reasons, Norway's biodiversity farmers tend to look to the more informal seed market, as mentioned above. They exchange seed among themselves; place their orders with NordGen or NGRC; or obtain/purchase from farmers in other countries, Sweden in particular. Some farmers obtain seed from small firms abroad specializing in materials for organic production, generally located in Germany, Austria and Sweden.⁷⁸ Biodiversity farmers see NordGen as an important source of crop genetic diversity, but the problem with ordering from NordGen is that the seeds must be multiplied. It is demanding work and takes a considerable time; NordGen is therefore not as popular a source as demand might indicate, something NordGen itself admits. It does distribute seed samples to private parties to an increasing extent, but very little of it to farmers.⁷⁹ Biodiversity farmers in Norway have discussed whether it might not help to set up one or more gene banks for multiplied material.

Biodynamic farmers need to buy less seeds than conventional and organic farmers. A biodynamic farmer might cultivate the same variety of, say, rye for more than 20 years, each year selecting the best seeds from the harvest for sowing the next season, without mixing in other seeds.⁸⁰ The biodynamic farmers have germination capabilities and plant health tested at an authorized laboratory: this is particularly important for them, as they do not use artificial pesticides.⁸¹ The seed is cleaned by millers who offer

⁷⁵ At the Seed Days in Vestfold County, 25 January 2006.

⁷⁶ According to biodynamic farmers interviewed at Fokhol Farm, 7 April 2006.

⁷⁷ Not unlike French 'territoire'

⁷⁸ According to biodynamic farmers interviewed at Fokhol Farm, 7 April 2006.

⁷⁹ Information from Morten Rasmussen and Svein Solberg of NordGen, in conversation, 13 March 2009. Exact figures are not available.

⁸⁰ As Heinrich Jung of Åmot Gård in Arneberg explained during an interview at Fokhol Farm, 7 April 2006, he cultivates rye in this fashion as well.

⁸¹ Biodynamic farmers interviewed at Fokhol, 7 April 2006

such services. The special methods of production in biodynamic agriculture make it possible to maintain the size of harvests over time: harvests may not be as large as conventional farms achieve, but they remain stable in good as well as difficult years. Biodynamic farmers also say quality often improves over time, in relation to the criteria of importance to them.⁸² With their relatively low need for buying seed material not in demand by others in Norway, biodynamic farmers face special challenges.⁸³ However, as long as they can obtain the seed material they require, they will continue to make an important contribution to crop genetic diversity in Norway.

Also some conventional farmers save seeds from their own harvests. The extent is uncertain, and probably varies from one species to another. There is reason to assume that between 15 and 25% of the seed grain and some 10–15% seed potatoes come from farmers' own harvests.⁸⁴ It is especially the large-scale farmers who follow this practice, as they can afford to pay to have the seed cleaned.

Until well into the 1990s Norway maintained a reserve seed depot for use in emergencies or natural catastrophes. For a brief interim period, seed producers were paid to maintain their own reserve depots, but the system was soon dropped. Today, Norway has no reserve depots for seed and propagating materials, possibly making agriculture more vulnerable to harmful insects and diseases, such as the 2006 outbreak of *fusarium* in oats;⁸⁵ or crop failure of extreme climate events, as was the case during the very wet summer in South Norway in 2011. That autumn saw renewed media discussion as to whether reserve seed depots should be re-established in Norway.

The most common approach to plant breeding is to use material already available on the market, from other commercial varieties.⁸⁶ Around the globe, the genetic base of many crop varieties is narrowing down. This means that the need for genetic resources is likely to increase in the coming years. But also today there is a need for the materials stored in gene banks, not least for use in breeding for special qualities, like resistance to certain diseases.

Summing up, then: most of Norway's farmers are satisfied with the selection of seed materials available – but for many organic farmers, and most biodynamic farmers, the official list of varieties cannot meet their needs; they thus make use of other channels.

⁸² According to biodynamic farmers interviewed at Fokhol, 7 April 2006. See also Swensen, 2009.

⁸³ According to biodynamic farmers interviewed at Fokhol, 7 April 2006.

⁸⁴ Good data are not available here. According to Graminor, as much as 25–30% of all seed corn and 15% of seed potatoes probably comes from farmers' own holdings (interview, 4 January 2007). Other sources indicate far lower figures.

⁸⁵ According to information presented to the author of this report by Magne Gullord of Graminor AS 4 January 2007. This meant that between 25 and 30% of the demand for oat seed could not be met; moreover, it would take a long time to regain the previous levels of oat production.

⁸⁶ According to Magne Gullord of Graminor AS, at a meeting with the authors at Graminor, 4 January 2007. The remainder of this paragraph builds on information from this meeting, which was attended by most of Graminor's breeders.

2.5 Plant breeding and the value chain for seed material

Norway represents a small and very special market for seed materials. This is partly because the agricultural sector is small and still shrinking, but it is also because the country lies so far north. Temperatures are at times comparable to many other countries', but light conditions are totally different.⁸⁷ Summers are short, but with many hours of daylight, extremely short nights and great changes in light conditions over the course of the growing season. It is therefore essential for plants to react not only to temperature, but also to light conditions when they prepare for winter. Moreover, plants not adapted to light conditions at high-latitudes will often experience stress because of the lack of rest periods during the short summer nights, and may not thrive.

This special situation, which Norway shares with very few other countries, makes the seed/propagating materials market less attractive for multinationals and other foreign companies, and much of the seed sector is still Norwegian-owned. An exception is grass seed, where almost everything is imported. Another exception concerns berries, where there is little breeding or development in Norway, aside from strawberries and raspberries. However, foreign breeders have also been hesitant to introduce new varieties because Norwegian legislation accords them fewer rights than they enjoy in other countries,⁸⁸ so the range of berry varieties on sale is somewhat limited. Vegetable varieties are tested for adaptability to Norwegian conditions before they are made available for sale. Most of these varieties are hybrids, so the farmers will normally have to buy new seed every year. Today's situation as regards vegetables and berries is the result of, *inter alia*, lack of resources (and thus capacity) for plant breeding in a small country with such special needs.

Plant breeding is a basic pillar of agriculture, an important factor in the conservation and sustainable use of crop genetic diversity, as well as farmers' rights. Let us take a closer look at the history of plant breeding in Norway.

Official plant breeding began at the College of Agriculture (now the Norwegian University of Life Sciences) in 1909, at a time when plant breeding was seen as a responsibility of the authorities. Gradually, *Planteforsk* (the Norwegian Institute for Plant Research) emerged as a central actor (from 2005 merged with two other research institutes to become *Bioforsk*). In 1993 Norsk Kornforedling AS was established, a semi-private institution with the Norwegian state as main owner (51.1% of the shares). Throughout the Western world, the seed sector was becoming privatized, as this was deemed more efficient. Norway joined this bandwagon somewhat later than many other countries, but also in Norway it was assumed that privatization would provide greater efficiency while relieving the state of financial responsibility. The Norwegian Parliament approved the establishment of a stock company

⁸⁷ According to a letter to the authors from Jon Atle Repstad, Norwegian Agricultural Purchasing and Marketing Cooperative (*Felleskjøpet Øst-Vest*, now *Felleskjøpet Agri*), 6 March 2006.

⁸⁸ We return to this point later in the report.

for plant breeding – in practice an expansion of Norsk Kornforedling – Graminor A/S in 2002.⁸⁹

Today, Graminor is Norway's most important plant-breeding company. It is owned by Felleskjøpet Agri (36.7%), the Norwegian state (34%), Sweden's Lantmännen SW Seed (15.1%), and two other companies. The basic expertise was already in place at Norsk Kornforedling; Planteforsk added breeders specialized in other types of plants. Most of Norway's current breeding/development of cereals, meadow plants, potatoes, fruit and berries is conducted by Graminor. The company also represents foreign plant breeders. Its central aim is to supply the Norwegian market with high-yielding, well-adapted, healthy varieties.

On the whole, plant breeding in Norway is not something to grow rich from – demand is too low and the needs too complex in this long, narrow northern country with such wide variations in cultivation conditions. While breeding and development within certain species can prove profitable, with other species it is quite the opposite. This makes Graminor heavily dependent on the Norwegian state's purchase of services, to ensure continued breeding and development also of species that do not yield economic profits. As we shall see in Chapter 4, in 2005 a new law on plant breeders' rights was proposed, one that would ensure Graminor somewhat higher licence revenues, covered by the farmers. For various reasons the bill was discarded, as further detailed in Chapter 4. In light of the ongoing structural changes on Norwegian agriculture, it seems likely that plant breeding will remain partially a state responsibility in the future as well, and that the role of the state will be decisive for the number of varieties available.

There are many actors involved in the seed sector, and it can be instructive to examine the division of work among various institutions. Bioforsk⁹⁰ is responsible for much of the basic research that provides the foundation for plant breeding in Norway. Once a plant breeder has developed a new variety, the Norwegian Food Safety Authority (*Mattilsynet*) applies for recognition of that variety. As a rule, the Food Safety Authority delegates the testing of new varieties to Bioforsk, which in turn may well further delegate it to the Norwegian Agricultural Extension Service (*NLR – Norsk Landbruksrådgivning*).⁹¹ If the new variety is tested and meets the requirements, it is then approved by the Plant Variety Board (*Plantesortsnemnda*) under the Norwegian Food

⁸⁹ The remainder of this section builds on information from the Graminor website: www.graminor.no.

⁹⁰ Bioforsk (Norwegian Institute for Agricultural and Environmental Research) is a state research institute under the Ministry of Agriculture and Food, and is the country's leading institute in the field of agricultural research. Main expertise is in the areas of food quality and security, agriculture and district development, environmental protection and natural resource management.

⁹¹ This is a membership organization with some 28,000 members, organized into 77 local circles or 'rings' (thus the original name, 'Pilot Rings') throughout the country, to ensure expertise as regards the many different local growth conditions. These local groups are owned and controlled by the members, with a small secretariat at Ås outside Oslo. NLR serves as a meeting point for farmers and researchers. Experience from various sites is communicated to the research institutions, and research results are communicated to the farmers. The local groups conduct testing of varieties, often in collaboration with Bioforsk. The members are eligible for updated advisory services –concerning the choice of varieties, but also on other relevant topics like fertilizers and pesticides. Source: <http://lfr.no/Docs/0000060C.html>

Safety Authority⁹² and entered in the official list of plant varieties. Many companies multiply and sell seeds of varieties once these have been certified by the Food Safety Authority – these include Felleskjøpet A/S (the Norwegian Agricultural Purchasing and Marketing Cooperative),⁹³ Strand Unikorn A/S⁹⁴, Norgro A/S,⁹⁵ Agrokonsult A/S,⁹⁶ Gartnerhallen,⁹⁷ Økofrukt D/A⁹⁸ and several smaller firms and initiatives.⁹⁹

A special feature of the Norwegian seed market is the collective ownership structure in many of the central companies. In theory at least, this structure gives farmers the possibility to influence the companies, although in practice it may prove more difficult – not least because,

⁹² Norwegian Food Safety Authority (*Mattilsynet, Statens tilsyn for planter, fisk, dyr, og næringsmidler*) was established in 2004. It administers all legislation concerning the production and sales of food, the food chain from sea and soil to table. This includes all activities within primary production, the food industry and small-scale production, importers, grocery shops and restaurants/café of all types. Within these areas the Norwegian Food Safety Authority has responsibility for collecting information and analysing the situation, preparing rules and regulations, advising enterprises and individuals, and monitoring compliance with regulations. The Norwegian Food Safety Authority operates under three state ministries: the Ministry of Agriculture and Food (LMD), the Ministry of Fisheries and Coastal Affairs (FKD) and the Ministry of Health and Care Services (HOD). Administrative responsibility lies with the LMD. Source: the Norwegian Food Safety Authority. http://www.mattilsynet.no/om_mattilsynet

⁹³ *Felleskjøpet* is the main actor as regards multiplication and sales of seed materials in Norway. It is one of the oldest and largest agricultural cooperatives in the country, and currently has some 52,000 members. The aim is to strengthen the economic conditions for its membership. Felleskjøpet sells fodder, seeds and propagating materials, fertilizers and sprays, tractors, threshing machines, various implements and equipment, as well as selected other goods, from its 102 sales outlets located throughout the country. Felleskjøpet stands for 75% of the market shares in seed corn, and was in 2001 given responsibility for regulating the market for the corn/cereals sector. Some of the varieties is provided are organically produced. Source: official website of Felleskjøpet: www.fk.no/article/view/739, accessed 1 August 2006; and Felleskjøpet (2003): *The Norwegian Agricultural Purchasing and Marketing Cooperative – A Profitable Collective Venture* (Oslo: Felleskjøpet), p. 7.

⁹⁴ In September 2008, the owners of Unicorn A/S and A/S Strand Brænderi decided to merge the two firms into a new company, Strand Unicorn A/S. This new company develops and sells seed potatoes, it multiplies seed corn and other seed, receives grain harvests and sells spirits and fodder. Interestingly, A/S Strand Brænderi was Norway's first agricultural cooperative: it was established by 20 farmers in 1843 and was later transformed into a stock company within the Norgesfôr chain. The cooperative originally produced spirits from potatoes, but later became a central supplier of seed materials and other products like potato meal, fertilizer and concentrates. Sources: Strand Unikorn: Fusjon A/S Strand Brænderi and Unikorn A/S. <http://www.norgesfor.no/Lokalbedrifter/Strand-Brænderi/> website, accessed 24 March 2009; and Norgesfôr Strand Unikorn: Om Strand Brænderi. <http://www.norgesfor.no/Lokalbedrifter/Strand-Brænderi/Kontakt-/Om-Strand-Brænderi/>, accessed 24. March 2009.

⁹⁵ NORGRO A/S provides vegetable seed, bulbs, flower seed, young plants and saplings, plant protection as well as fertilizers and the like for gardens. The company is fully owned by GRØNT AS, which in turn is owned by Felleskjøpet Agri BA. Source: NORGRO: Om Norgro A/S. Website accessed 24 March 2009 at: http://linux1.egroup.no/~norgro/index.php?url_channel_id=1&url_publish_channel_id=2&well_id=2

⁹⁶ Agroconsult A/S is a somewhat smaller firm, started in 2001, that offers seed of Norwegian grass varieties, clovers, root vegetables and other vegetables and wild flowering plants. Some of this is organically produced, and none of the seeds are coated.

⁹⁷ Gartnerhallen is the largest organization for producers of fruit, berries, vegetables and potatoes in Norway. It is one of the oldest agricultural cooperatives in the country, with some 1,400 gardeners and potato farmers as members. From the website: <http://www.gartner.no/web/?id=omoss>, accessed 11 December 2008.

⁹⁸ Økofrukt DA specializes in fruit trees particularly suited for organic cultivation and production.

⁹⁹ There are many smaller seed producers who aim mainly at meeting the demand from organic agriculture. Gjennestad Gartnerskole specializes in strawberries and raspberries; Solhatt Økologiske Frø (see footnote 61) sells seeds for vegetables, herbs and plants, and has a wide selection; Norsk Økologisk Korndyrkerforening has worked together with researcher Hans Larsson of the Swedish Agricultural University and has produced some seed materials.

today, most of them are stock companies with clear ambitions and aims to produce economic profit for the owners.

Norway's seed market is organized primarily to produce large quantities. With the privatization of the sector and the economic conditions, it has become difficult to maintain the wide diversity in plant varieties adapted to harsh growing conditions and the requirements of this long, narrow northern country. As we have seen, several smaller firms and initiatives have emerged to meet demands for greater crop genetic diversity in agriculture, but as yet this structure appears rather vulnerable, precisely because of the limited demand. It remains to be seen whether these groupings will manage to grow and develop as a parallel structure or perhaps create the foundations for collaboration with the more formal seed sector. As will be shown later in this report, there are potentials for cooperation between the two structures that could facilitate greater diversity in plant varieties in the seed sector in Norway.

3 Farmers' rights in Norway: Basic considerations

As farmers' rights are not clearly defined in the Plant Treaty, it is up to each country to give them content. What can these rights mean for a small but affluent country like Norway, with a low and constantly shrinking number of farmers? Work on this report was meant to help stimulate this discussion, through interviews, meetings and seminars, and identifying shared elements in the understanding of what farmers' rights can mean in Norway. The springboard for this chapter is Norway's policy positions and work in the international arena. We then turn to the views of farmers and others on what these rights ought to involve. Against this backdrop, we can then sketch some shared features of how farmers' rights are understood in Norway.

3.1 Norwegian views and work at the international level

During the negotiations that led to the regulations on farmers' rights, as set out in the Plant Treaty, Norway was widely seen as a reliable bridge-builder.¹⁰⁰ While supporting the positions of the developing countries of the global South in many areas, the Norwegian delegation also worked to achieve compromises among the various parties – and received considerable praise, also from the developed North, for its efforts.¹⁰¹ On several occasions the Norwegian delegation underscored the centrality of rights of farmers to save, use, exchange and sell seed from their own harvest. The delegation also worked to ensure binding regulations on benefit-sharing and conservation of crop genetic diversity in the fields. Norway provided economic support to the negotiations by helping to fund several of the meetings and given financial assistance to some of the delegations from developing countries.

Against the backdrop of this involvement, Norway assumed a central role in the follow-up to the regulations on farmers' rights in the initial years after the Plant Treaty entered into force. During the first meeting of the Governing Body (GB) in Madrid in 2006, the Norwegian delegation, supported by a large number of developing countries, proposed that farmers' rights should be put on the GB's work agenda,¹⁰² thereby ensuring that the topic would be taken up for negotiation at the next session of the GB. In that connection Norway took the initiative to an informal international consultation held in Lusaka, Zambia, September 2007, arranged by the Zambia Agricultural Research Institute, the Norwegian Ministry of Agriculture and Food and the Fridtjof Nansen Institute. It resulted in a report that was presented at a 'side event', a parallel seminar, to the Second Session of the GB, held in Rome, November 2007.¹⁰³ The report also provided the foundation for an 'input

¹⁰⁰ Clive Stannard, FAO Secretariat of the Commission on Genetic Resources for Food and Agriculture, in an interview with Svanhild-Isabelle Batta Torheim (formerly Bjørnstad); see Bjørnstad 2004, p. 27.

¹⁰¹ The remainder of this section is based on Bjørnstad, 2004, p. 83.

¹⁰² All documents referred to here are available at:
http://www.farmersrights.org/about/fr_in_itpgrfa_6.html

¹⁰³ Andersen and Berge, 2007

paper', a formal document on farmers' rights from Norway and Zambia. The input paper prepared the ground for negotiations on farmers' rights at the Second Session of the Governing Body, and was also referred to in an information document from the secretariat on farmers' rights.

Against the backdrop of this process, the Second Session of the GB adopted a resolution on farmers' rights encouraging the treaty parties and other relevant organizations to submit their views and experiences regarding the implementation of farmers' rights. These in turn would form the basis for negotiations at the Third Session of the GB in Tunisia, June 2009, on further steps with regard to farmers' rights. To this third meeting, Norway and many other countries had forwarded reports on their experience and views on farmers' rights.¹⁰⁴ As other relevant institutions were invited to submit their experiences and views, the Fridtjof Nansen Institute submitted an information paper summing up global experience and offering recommendations,¹⁰⁵ based on the work in connection with its Farmers' Rights Project.¹⁰⁶ The contributions to this Third Session in turn formed the basis for a new resolution on farmers' rights, which, *inter alia*, encouraged countries to review their national measures relating to farmers' rights, making any necessary adjustments. 'National measures' here referred especially to seed legislation.¹⁰⁷ Norway participated in the informal group that negotiated the final text.¹⁰⁸

Thus, Norway has played a central role in promoting farmers' rights internationally, and has taken firm standpoints in important areas. That makes it natural to ask whether national policy is in line with this international work. After all, what Norway decides to do within its own borders can also give important signals to others.

3.2 Farmers' views on farmers' rights in Norway

When work on this report started, the concept of farmers' rights was not particularly well known in Norway. Most of the farmers who were consulted in connection with this report were initially questioning or

¹⁰⁴ Ministry of Agriculture and Food, Norway (2009): *Information paper on views on, and experiences with, Farmers' Rights in Norway*. Submitted to the Secretariat of the International Treaty on Plant Genetic Resources for Food and Agriculture, and published as an information paper for the Third Session of the Governing Body of the International Treaty in Tunis 1–5 June 2009 (IT/GB-3/09/Inf. 6 Add. 5) Available at: <ftp://ftp.fao.org/ag/agp/planttreaty/gb3/gb3i06a5e.pdf>. The paper was written by the author of the current report (RA), based on the findings presented here.

¹⁰⁵ Regine Andersen (2009), *Information paper on Farmers' Rights submitted by the Fridtjof Nansen Institute, Norway, based on the Farmers' Rights Project*. Submitted to the Secretariat of the International Treaty on Plant Genetic Resources for Food and Agriculture, 19 May 2009 and published as an information paper for the Third Session of the Governing Body of the International Treaty in Tunis 1–5 June 2009 (IT/GB-3/09/Inf. 6 Add. 3). Can be downloaded here: <ftp://ftp.fao.org/ag/agp/planttreaty/gb3/gb3i06a3e.pdf>

¹⁰⁶ See: www.farmersrights.org

¹⁰⁷ An earlier version of the negotiation text referred solely to seed legislation, a formulation backed by all countries except Canada. A compromise was reached: the term 'national measures' should be used instead, on condition that it would also include seed legislation. Source: see next footnote.

¹⁰⁸ The author of this report (RA) was a member of the Norwegian delegation to the meeting, and took part in the work of the informal group that negotiated the resolution on farmers' rights. The following countries/regions were represented in this group: Angola and Kenya for Africa; Brazil for Latin America and the Caribbean; the Netherlands; Norway and the EU for Europe; and Canada for North America.

sceptical. A common reaction was that these rights, as set out in the Plant Treaty, should be self-evident – why should they be called ‘rights’? When it was explained that some of these ‘self-evident’ points could in fact no longer be taken for granted in Norway – for example, that seed exchange among farmers was prohibited at the time¹⁰⁹ – these farmers began to show greater understanding of how *rights* may be both justified and useful as a concept.

However, many still wondered why they should be called *farmers’ rights*. The fact that farmers are in a position to conserve crop genetic diversity by means of these rights is not merely significant for them in particular: it is a basic precondition for food security and nutrition, today and in the future. Therefore, they maintained, these are rights that apply to all humanity.¹¹⁰ They disliked the implication that the formulation ‘*farmers’ rights*’ made it appear as if farmers were demanding something on behalf of themselves, where the rights in question are intended to enable them to act on behalf of humanity, taking societal responsibility for the conservation and sustainable use of our plant heritage. There was broad agreement that a different term would have been preferable, one that could reflect this societal responsibility – but they realized this would be difficult to achieve now that the concept and term ‘farmers’ rights’ had become generally recognized internationally. The best solution would be to work on the basis of this concept and try to fill it with content.

All farmers consulted in connection with this report agreed that farmers’ rights should cover all the rights necessary to enable farmers to conserve crop genetic diversity in agriculture and to use and further develop it in a sustainable way.¹¹¹ This means the rights to save, use, develop, exchange and sell seed; further, ensuring the underlying conditions for this, with proper compensation and support; it also includes the knowledge connected to crop genetic diversity, that it may be maintained and carried further; and that farmers be ensured access to participating in decision-making processes on matters relating to crop genetic diversity.

One important question that came up in various interviews was: exactly which farmers are these farmers’ rights supposed to apply for? In many circles it was widely held that the issue was not particularly relevant for most farmers, because in Norway today they can purchase their seed materials from seed companies.¹¹² This view was largely supported by the organic farmers consulted,¹¹³ who felt that farmers’ rights in Norway were most relevant for biodiversity farmers, and less for those involved in conventional agriculture working with purchased seed materials. All the same, most of them agreed, it would not be feasible to limit farmers’ rights to certain groups of farmers and not others: they should be available to all farmers at all times, and would be relevant to the extent

¹⁰⁹ This ban on seed exchange came as a surprise to most of them; see Chapter 4.

¹¹⁰ This view was expressed on several occasions: during the ‘Seed Days in Vestfold County’, 25 January 2006, and during the group interview at Fokhol Farm, 7 April 2006 (see interview list)

¹¹¹ See note 106 above

¹¹² This view is reflected, *inter alia*, in the response to this author (RA) from NLR and Felleskjøpet (Norwegian Agricultural Purchasing and Marketing Cooperative). (See Annex.)

¹¹³ At the seminar ‘Seed Days in Vestfold County’, 25 January 2006 (see list of interviews)

that the farmers needed them. Further, it was noted that also many conventional farmers are concerned about conserving and exchanging seed materials, and that the largest farmers' organization in the country, Norges Bondelag (Norwegian Farmers' Union), see this right as essential to farmers' control of their work situation and autonomy as farmers.¹¹⁴

Thus we can conclude that farmers' rights apply to all farmers, but are especially relevant for those who conserve and further develop plant genetic diversity in agriculture. And since most of these biodiversity farmers are to be found in organic and biodynamic circles, it is here that farmers' rights will be of greatest importance.

All representatives of farmers' organizations who were interviewed in connection with this report were aware of the importance of promoting farmers' rights: they are decisive for Norway's long-term ability to feed its own population. It is not enough merely to freeze seeds from older varieties and store them in gene banks: active use is necessary to ensure continued preservation and development of this diversity, and of the accompanying knowledge. Therefore it is important to ensure that the legal and political framework conditions do not counteract or limit this work, but instead help to facilitate and stimulate it. Implementation of farmers' rights is one means of ensuring that the regulatory conditions are appropriately shaped and formulated.

From many sides it is noted that awareness of farmers' rights is generally low – among the authorities, in the population at large, and among farmers themselves. This makes it all the more important to work to raise awareness here. A related factor is the low awareness of the value of crop genetic diversity in agriculture. Theoretical knowledge is too shallow: what is needed is a deeper understanding of the importance of plant genetic diversity for food security and nutrition. In particular, many of those interviewed mentioned the urgency of raising farmers' awareness on this point.

In the process of preparing this report, awareness of farmers' rights has increased considerably among farmers in Norway. In part, this is due to interviews, meetings, lectures and seminars held in connection with the report; and in part it can be seen as the result of discussions and debates on relevant Norwegian legislation and on international negotiations, in the media and at meetings and seminars arranged by the Ministry of Agriculture and Food, the Norwegian Genetic Resource Centre (NGRC), the organization Oikos – Organic Norway and the Development Fund of Norway (*Utviklingsfondet*).

Summing up, then, we can say that biodiversity farmers in Norway recognize farmers' rights as a precondition for being able to continue their work of conserving and sustainably using crop genetic diversity. We see also that the standpoints put forward by Norway in FAO, mainly in support of developing countries, enjoy broad backing among Norwegian farmers.

¹¹⁴ Interview with Pia Borg, then senior advisor at the Norwegian Farmers' Union, 8 March 2006.

3.3 Other views on farmers' rights in Norway

In connection with this study, all links in the value-chain and all relevant interest groups have been consulted. The submitted responses and opinions show widespread agreement on the importance of farmers' rights in Norway. Some of those consulted are especially keen on finding the right balance with plant breeders' rights, so that both sides have optimal conditions for contributing to the preservation and sustainable use of crop genetic diversity.¹¹⁵ Others focus more on balancing farmers' rights with the need to ensure plant health and the quality of propagating material.¹¹⁶ Although not all respondents were equally specific on these points, many of them indicate implicitly that they see it as both important and possible to take these considerations into account. All those consulted agree on the necessity of realizing of farmers' rights in order to ensure the preservation and development of crop genetic diversity in Norway. What this entails in practice as regards the various elements of farmers' rights will be sketched out below and elaborated in the next chapters.

3.4 What is covered by farmers' rights in Norway?

From the interviews conducted for this report and the positions taken by Norway in negotiations on the Plant Treaty, we can highlight the rights on which there appears to be a high degree of agreement among all relevant groups in Norway:¹¹⁷

1. the right of farmers to save own seed and propagating material on their farms, and to use and further develop crop genetic diversity as wished, as well as to exchange seed materials with other farmers and to sell such propagating material that is not protected by plant breeders' rights, on condition that considerations of plant health and seed quality are heeded;
2. efforts to maintain and further develop knowledge concerning crop genetic diversity;
3. the right to compensation for the extra cost of conserving plant genetic diversity for the common good and for coming generations, and measures to support this work;
4. the right to participate in decision-making processes concerning crop genetic diversity.

These rights correspond largely to the suggestions included in the Plant Treaty, although in some instances they go further, while in others they are less comprehensive. We take a closer look at this in the following chapters on farmers' rights in Norway.

¹¹⁵ Graminor in particular has put forward this view.

¹¹⁶ A view expressed especially by Felleskjøpet (Norwegian Agricultural Purchasing and Marketing Cooperative).

¹¹⁷ This applies to actors in the seed industry as well as the seed marketing sector, among farmers and their organizations, in agricultural advisory services and among the relevant authorities.

4 The right to save, use, exchange and sell seed

Perhaps the most vague formulation in the Plant Treaty is the provision stating that nothing in Art. 9 on farmers' rights "shall be interpreted to limit any rights that farmers have to save, use, exchange and sell farm-saved seed/propagating material, subject to national law and as appropriate" (Section 9.3). The wording represents the compromise achieved in the negotiations on the the Plant Treaty after much disagreement among the parties over whether the regulations on farmers' rights to keep, use, exchange and sell seeds should be legally binding or not. There were powerful interests on both sides. Although the wording does not provide guidance in this area, it does introduce an important conceptual understanding: it addresses the saving, use, exchange and sale of seeds as farmers' rights. The formulation of Section 9.3 treads a fine line between recognizing customary practices as rights but without adopting a position on how such rights should be recognized in the different countries. The importance of these rights is nevertheless emphasized in the Preamble to the Plant Treaty, which, unlike the provisions, is not binding. These rights, it states, are fundamental to the realization of farmers' rights, and should be promoted at the national and international levels.

The right to save, use, exchange and sell seed and propagating material in Norway is regulated in fine by two laws, the Act on Plant Breeders' Rights (Lov om planteforedlerrett) and the Act relating to Food Production and Food Safety, etc., commonly known as the Food Act (Matloven) with their associated regulations on plant varieties release and the marketing of seed and propagating material and of seed potatoes. We shall look at these and certain other relevant laws and regulations in more detail in the following sections.

4.1 Plant breeders' rights and farmers' rights

Norwegian legislation on plant breeders' rights was adopted in 1993 and led to the country's membership of the International Union for the Protection of New Varieties of Plants (UPOV).¹¹⁸ While a few changes have been made to the law since then, they are quite insignificant. This means that farmers are entitled to save seed from their own harvest of protected varieties to use the following season. The law does not prevent farmers from exchanging seeds among themselves (though the Food Act has regulations on this, see section 4.1.1 below). It is illegal for farmers to sell seeds of varieties that are protected under the Act on Plant Breeders' Rights.¹¹⁹

¹¹⁸ Lov om Planteforedlerrett (LOV 1993-03-12 nr. 32): <http://www.lovdata.no/all/hl-19930312-032.html>.

¹¹⁹ It should be mentioned in this connection that anyone can breed varieties and apply for plant breeders' rights for them, including farmers. The most famous example of a variety bred by a farmer in Norway is the 'Grindstad timothy'. Tollef Grindstad, a farmer from Rakkestad, was granted plant breeder's rights for a timothy variety which had originally been a landrace and which he had developed through selection. It is now the most widely used timothy variety in southern Norway as well as parts of Sweden and Finland. It is also exported to Estonia, Lithuania, Iceland and Canada. Tollef Grindstad earns between six and eight hundred thousand Norwegian kroner per year on the sale of the variety. Sources: The Norwegian Genetic Resource Centre (2008): *Historia om*

In 2005, the Norwegian government decided to reject a proposed amendment that would have engendered a significant expansion of plant breeders' rights. Although Norway was a member of UPOV under what is called the 1978 Convention, the new law would set the stage for Norwegian membership under the so-called 1991 Convention, which is far more rigorous. When the Norwegian government rejected the bill, one of the main arguments was precisely the need to take farmers' rights into account.¹²⁰

4.1.1 Norway and the Union for the Protection of New Varieties of Plants (UPOV)

The Union for the Protection of New Varieties of Plants (UPOV) was founded in 1961 to foster the development of new plant varieties and the trade in them by establishing a uniform system in member countries on plant breeders' rights to new plant varieties for a fixed period. In this way, plant breeders' efforts would be recognized and compensated, and the system would stimulate further innovation in the field.¹²¹ The patent system was not fit for purpose in this area; the protection it afforded would be so strict as to deny plant breeders any opportunity to build on each other's work. An alternative system was needed. Under the 1961 UPOV Convention, plant breeders were given broad exemptions from property rights. The same applied to farmers. They paid a license fee when the seed was purchased, after which farmers were free to use and exchange seeds as they wished. The first UPOV Convention entered into force in 1968 and has since been amended several times. Every time, the changes have reduced farmers' options. Most member states base their membership today either on the 1978 or 1991 Convention. After 1998, new countries may only join UPOV under the 1991 Convention. Norway was a member before this date, however, and retains the right to extend its membership of UPOV under the terms of the 1978 Convention.

There are important differences between the 1978 and 1991 Conventions under UPOV. The most important with a view to farmers' rights is that farmers under the 1978 Convention could still save seed from their own harvest and sow it the following year, as they had done since the dawn of agriculture. Under the 1991 Convention, this is forbidden, though exceptions can be made for small farmers if the seed is used on their own land, to a limited extent and in compliance with plant breeders' interests. In practice it means that a license fee is imposed for this type of use as well. In Germany, for instance, farmers pay in many cases 80% of the total cost of the licence if they re-use seed from the previous year's harvest.¹²² Another important difference between the two acts of the

Grindstad timotei, : http://www.skogoglandskap.no/fagartikler/2008/historia_om_grindstad_timotei; and TV2 News, 17 October 2005: <http://pub.tv2.no/nettavisen/side2/tv/article475264.ece>

¹²⁰ See for eksempel *Nationen*, 1 November 2005: <http://www.nationen.no/landbruk/article1805683.ece>

¹²¹ This and the following section are based on Andersen, 2008, pp. 146–160.

¹²² The German law on the protection of plant varieties allows farmers to save seed from protected varieties if they pay a fee to the rights-holder. The Bundesgerichtshof (Federal Court of Justice) has set the fee at 80% of the full licence. Sources: Bundesministerium der Justiz: Sortenschutzgesetz. Adopted 1985, latest revision 2008 (http://bundesrecht.juris.de/sortschg_1985/BJNR021700985.html), and Deutscher Bauernverband (2007): Bundesgerichtshof: Pauschale Nachbauggebühr in Höhe von 80 Prozent zu hoch - DBV sieht

Convention is that under the terms of the 1978 version farmers may exchange seeds and propagation material from protected varieties, but may not under the 1991 Conventions. Sale of protected seed is forbidden under both versions of the UPOV Convention.

4.1.2 *Proposal to strengthen plant breeders' rights*

The amendment of the Norwegian legislation was proposed in response to the privatization of the seed industry a few years previously. The government expected the seed industry to acclimatize itself to market forces, allowing for a gradual reduction of government support. In the event, however, it proved impossible to recoup expenses with revenue from the licence fees sanctioned under the old law on plant breeders' rights. The seed industry therefore suggested amending the law, thus enabling Norway to become a member of UPOV on the basis of the 1991 Convention. This would ensure necessary, if insufficient, funds for plant breeding. The draft law was sent out for consultation in January 2005. All the farmers' organizations and several voluntary organizations opposed the bill. Members of the scientific community warned against adopting it as well.¹²³ Two reasons in particular were cited:¹²⁴

- The new law would limit the traditional rights of farmers to save, use and exchange seed materials from their own harvest;
- The costs would be borne by the farmers since they would have to buy the seed materials every new season. For some plant species, small farmers would be able to use seed materials from their own harvest, but only after paying a licence fee to the rights-holders.

Although there was support for the bill across much of the plant breeding industry, it proposed adding several more exemptions for farmers.

4.1.3 *Draft law rejected with reference to farmers' rights*

Following the general election of 2005, which brought an alliance of socialists and environmentalists (i.e. Labour Party, Centre Party and Socialist Left Party) into power, a former board member of the Norwegian Farmers' Union, Terje Riis-Johansen, was appointed minister of agriculture. One of his first acts was to reject the bill because, in his opinion, it undermined farmers' rights.¹²⁵ Some months later the minister facilitated a transfer of funds to the breeding industry to compensate for

Vorteilhaftigkeit der Rahmenregelung bestätigt
(http://www.pressrelations.de/new/standard/result_main.cfm?pfach=1&n_firmanr_=100982§or=pm&detail=1&r=287153&sid=&aktion=jour_pm&quelle=0).

¹²³ The author of this report prepared a consultation response which was filed on behalf of the Fridtjof Nansen Institute, see next footnote.

¹²⁴ Consultation documents are available at the Ministry of Agriculture's website:
<http://www.regjeringen.no/en/dep/lmd/Documents/horinger/Horingsdokumenter/2005/horing-forslag-til-ny-lov-om-plantefored.html?id=97784>

¹²⁵ See *Nationen*, 1 November 2005: <http://www.nationen.no/landbruk/article1805683.ece>. See also press release from the Ministry of Agriculture:
<http://www.regjeringen.no/nn/dep/lmd/Aktuelt/Nyheiter/2006/Planter-Styrket-finansiering-av-planteforedling.html?id=100736>

loss of revenue.¹²⁶ This was an important step. While the plant breeding industry in Norway is small, it is nonetheless essential for Norwegian agriculture, as we have seen in the preceding chapters. No matter how the law is changed, it would seem virtually impossible to recoup all the costs of plant breeding caused by tighter plant breeders' rights.¹²⁷ Plant breeding in Norway will therefore continue to depend on government support for the time being.

4.2 Regulations on plant variety release and the marketing of seed and seed potatoes

The rules for plant variety release and the marketing of seed and seed potatoes have changed radically over the past ten years. From a free market environment in which farmers could sell all types of seed to each other,¹²⁸ almost everything was banned in 2004. Farmers were not only forbidden to sell seed among themselves, they couldn't exchange seed material or give it away. Only government authorized seed shops were allowed to sell seed, excepting though seed of varieties that weren't on the official list of varieties. The variety recognition criteria were so stringent that most of the old varieties would be rejected. Farmers could only continue to cultivate what they already had on their farms in 2004. If they lost some varieties, lost interest in the work or for any other reason stopped saving and cultivating them on their farms, the varieties would go out of production, and no other farms would be able to take over. The regulations made it almost impossible to conserve plant genetic diversity on farms and it would have only been a matter of time before this work ceased altogether. Had it not been for the farmers' readiness to ignore the rules, with the authorities indicating that they would turn a blind eye, work on crop genetic diversity on farms would have suffered a serious setback.

The reason for the new policy lay in Norway's EEA membership. The new rules met with widespread consternation both in Norway and the EU. As a result, the EU issued directives with a view to softening the rules; these directives Norway is currently in the process of implementing. As of 2010, farmers (and others) are allowed to sell seed (but not seed potatoes) to each other provided it is done on a non-commercial basis. It is still illegal for seed retailers to sell seeds of varieties that are not on the official list, but it is now possible to apply for recognition of so-called conservation varieties and traditional vegetable varieties, which can then be traded under a certain framework and with certain restrictions (see below). The recognition criteria are now more flexible, and there is reason to believe that some of the old and distinctive varieties will be approved, and thus become tradable within these constraints and restrictions. Farmers also have the opportunity to establish authorized seed shops for the sale of such varieties. There is still much work to do with the implementation and enforcement of the new regulations both for

¹²⁶ See Ministry of Agriculture press release: <http://www.regjeringen.no/nn/dep/lmd/Aktuelt/Nyheiter/2006/Planter-Styrket-finansiering-av-planteforedling.html?id=100736>

¹²⁷ This became apparent during conversations with Graminor representatives.

¹²⁸ It was not allowed to sell varieties protected by plant breeders' rights, cf section 4.1.

the farmers and the authorities, there are some limitations in the system. Its effect on the conservation and sustainable use of crop genetic diversity remains to be seen.

Since the rules governing the recognition of plant varieties and sale of seed and seed potatoes are of such great importance to farmers' opportunities to conserve and further develop crop genetic diversity, and are moreover central to farmers' rights to use, exchange and sell seed / propagation material, these issues will be given special attention here. Another reason to devote space to the subject is that farmers and other affected parties have found it difficult to understand what the rules actually mean, why the changes were made, and the historical background. Section 4.2.1 is therefore an attempt to explain the development of the regulations and their substantive content in a more accessible manner.

4.2.1 Prohibition years 2004–2010: Ban on private seed exchange/sales

In 2003, Norway's parliament passed the Food Act. It replaced a number of earlier laws on agriculture, food production, food trade and food security.¹²⁹ The Food Act also governs the sale and production of seed materials, as specified in separate regulations. In this connection, the regulations on seed materials (Såvareforskriften)¹³⁰ were changed in 2004 to bring them in line with the EU directives on the sale of seed and in light of Norway's obligations as a member of the EEA.¹³¹ The EU directives prohibit the exchange and sale of seed and propagating material for commercial use. Because Norway omitted the directive's specification 'for commercial use', Norway's regulations became even stricter. All forms of marketing of seeds in Norway were consequently banned, apart from marketing undertaken by government-authorized seed shops (§ 4). 'Marketing' means "possession with a view to sale, offering for sale, distribution and the sale and any other form of transfer, with or without compensation" (§ 3n). In other words, farmers and hobby gardeners were prohibited from selling and exchanging seeds, and it was forbidden to give seeds away. It was even forbidden to save seeds with a view to selling, exchanging or giving them away.

The ban applied to virtually all kinds of food and fodder plants,¹³² whether protected by plant breeders' rights or not. Norwegian authorities were probably unaware of the implications of omitting the phrase 'commercial use' from the text, making Norwegian legislation more rigorous than EU requirements. Whatever the circumstances, the new regulations marked a radical break with customary practices in Norwegian agriculture.

¹²⁹ Lov om matproduksjon og mattrygghet (LOV 2003-12-19 nr. 124).

¹³⁰ Forskrift om såvarer (FOR 1999-09-13 nr. 1052).

¹³¹ While agriculture is not included in the EEA agreement, plant varieties and seed are, so the EU rules relating to seed material apply in principle in Norway as well. Forskrift om såvarer (FOR 1999-09-13 nr. 1052) makes reference to EU rules in this area.

¹³² Apart from plant varieties that were not covered by the regulations – a small number in practice – discussed below. Seed potatoes are dealt with by another set of regulations and in principle are more strictly regulated, as discussed below.

In addition, two other important requirements were imposed.

- Only seed of released varieties could be traded in Norway. A variety was released if it was on the official Norwegian list of varieties or on the EU's common lists of released varieties (§ 15). To be approved, the variety needed to be distinct from other varieties, genetically uniform and stable – in accordance with UPOV's technical guidelines, and it had to pass the valuation test to determine if it was of sufficient cultivation and utility value (most horticultural species and some other plants were exempted from the valuation regulation), in compliance with the Plant Variety Regulation (§ 3 and § 4).¹³³
- All seed must be certified to be eligible for trading, with the exception of berries, fruits, herbs and park plants (§ 15 of the Plant Variety Regulation). Certified seed is seed that is bred under governmental supervision, and classified in accordance with established quality standards (§ 3a). For the seed to be certified, it had to be shown to have stemmed from a released variety.

Most of the varieties Norway's biodiversity farmers have been working to conserve and develop do not comply with the criteria enumerated in these regulations. Because of this, the sale of these varieties was banned as of 2004.

All the same, it took nearly two years before farmers (and gardeners) became aware of these new regulations.¹³⁴ They continued therefore in their customary manner, unaware that it was now forbidden.¹³⁵ Later, they discovered inventive ways to circumvent the rules, for example by selling seed grain as cereals. As long as the Norwegian Food Safety Authority was turning a blind eye, the regulations were not actually harming crop genetic diversity in Norway, but nor did they encourage the conservation and sustainable use of the country's plant heritage either.

4.2.2 Background to the prohibitions

The purpose of the regulations on seed materials was to ensure the highest possible standards of health and quality in the production and sale of seeds (§ 1), a matter of importance for all stakeholders in agriculture. Plant diseases and poor seed quality can have serious consequences for productivity, and legislation in this area has historically facilitated

¹³³ FOR 1999-10-01 nr. 1069: Forskrift om prøving og godkjenning av plantesorter.

¹³⁴ The first time the organic community heard of this was at the Vestfold County Seed Days (Frødagene i Vestfold), 25 January 2006. The author of this report has been unable to identify a single individual who was asked to take part in hearings on the changes to the regulations among the many organizations and individuals that have been interviewed. This could suggest that the regulations were not sent out for consultation or that the consultation process was inadequate. Nor, apparently, had steps been taken to make the changes known before the Seed Days in Vestfold, at which the Norwegian Food Safety Authority presented them.

¹³⁵ Although no farmers in Norway have been prosecuted under the new regulations so far, the situation is different in France. In March 2008, Kokopelli, a French farmers' organization that preserves and sells seed of old plant varieties, was taken to court in the first case under the new EU seed regulations. The organization was fined € 35,000 for storing, trading and selling seeds of traditional and rare varieties that are not included on the official EU list of plant varieties. Source: Kokopelli's website and press releases, as well as personal communication with their lawyer Blanche Magarinos-Rey (e-mail, 17 September 2008) and François Burgaud of the organization of French seed producers, GNIS, which welcomed the verdict (e-mail, 4 November 2008).

significantly higher production yields and improved quality of agricultural produce. The new regulatory constraints represented nonetheless a paradox. Plant health in the long run depends on sufficient genetic diversity from which to develop the varieties with the necessary resistance to plant diseases and pests at any given time, and adapted to other environmental factors and needs. Eliminating the option to conserve plant genetic diversity means eliminating one's ability to ensure plant health in the future. The short-sighted regulations on plant health therefore clashed with society's longer-term need precisely to ensure plant health. For the first time, regulations intended to ensure plant health and seed quality effectively pulled the carpet from under their own goals.

Powerful interests in the EU seed sector brought pressure to bear to engineer this particular formulation of regulations. There are no such constellations in Norway.¹³⁶ When the regulations were changed, law makers probably had conventional agriculture and the needs of farmers who mostly buy seed materials on the official Norwegian list in mind. The conservation and sustainable use of crop genetic diversity were likely not a pertinent issue to the people drafting the regulations at the time, when Norway had barely managed to ratify the the Plant Treaty which entered into force at about the same time as the regulations were being redrafted. Little was done to align one policy area with the other.

4.2.3 Reactions in Norway. EU Commission Directive 2008/62/EC on conservation varieties

The situation was brought to the attention of the Ministry of Agriculture and Food in 2006.¹³⁷ In responding, the Ministry said it would have the regulations changed by the end of 2007 to facilitate the conservation of plant genetic resources.¹³⁸ The work on drafting the amendments was delegated to the Norwegian Food Safety Authority; for various reasons the Authority took longer than first anticipated, not least because they were expecting the EU to adopt a new directive with possible implications for the design of regulations.

In 2008 the EU adopted a directive on conservation varieties which entered into force 30 June 2009. As an EEA member, Norway was obliged to comply with this directive.¹³⁹ The directive seeks to ensure the conservation and sustainable use of 'conservation varieties'. Such varieties may be cultivated and marketed even when they do not meet the general requirements for recognition of varieties and sale of seeds and

¹³⁶ The author of this report is currently heading a project on Norwegian seed legislation at the intersection between EU rules and international environmental agreements. The processes leading up to these decisions by the EU will be studied in detail with a view to establishing the stakeholders, interests, power, strategies, relative influence and outcomes.

¹³⁷ Letter from the author to Secretary Per Harald Grue, Ministry of Agriculture and Food, 1 December 2006, inquiring into the interpretation of the seed regulations and their harmonization with the Plant Treaty.

¹³⁸ Letter from Head of Section Kjell Nyhus and Marianne Smith, Ministry of Agriculture and Food, to the author, 9 February 2007 (LMD referanse: 200602968/MSM)

¹³⁹ Commission Directive 2008/62/EC of 20 June 2008 providing for certain derogations for acceptance of agricultural landraces and varieties which are naturally adapted to the local and regional conditions and threatened by genetic erosion and for marketing of seed and seed potatoes of those landraces and varieties. See:

<http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2008:162:0013:0019:EN:PDF>

propagating material (art. 2). Instead, the directive sets out its own guidelines for the recognition and inclusion of such ‘conservation varieties’ in the national list of varieties and the production and marketing of the seed material.

Negotiations preceding the adoption of the directive were difficult because of competing interests. Key players in European seed industry were pushing for a very tight regime; the liberal rules on conservation varieties would ‘skew competition’, they argued.¹⁴⁰ Farmers’ organizations and NGOs, on the other hand, wanted the widest possible legal manoeuvrability in the conservation and sustainable use of crop genetic diversity. Economic interests clashed with the public interest over conservation and sustainability; the former interests had a major impact, however. These are the basic features of the directive.

Basic requirements: Landraces and varieties which are naturally adapted to the local and regional conditions and threatened by genetic erosion (art. 1) and are of interest for the conservation of plant genetic resources (art. 4.1) may be approved in accordance with the directive.

Compliance with DUS criteria: Varieties must meet the normal requirements of distinctness, uniformity and stability for approval (art. 4.2). But in some cases (off-types), the uniformity requirement may be relaxed somewhat.¹⁴¹

Genetic restrictions: Approved varieties must be conserved in such a way as to ensure continued varietal identity and varietal purity, and shall be inspected in accordance with given provisions to verify compliance (art. 19).

Geographical restrictions: A conservation variety shall only be cultivated and marketed in its region of origin, and seed may only be produced here (art. 11 and 13). The region of origin shall be identified prior to approval (art. 8) and can include more than one country.

Certification requirements: The usual certification requirements apply here, with an exception of the requirement on minimum varietal purity. Nevertheless, the directive stresses that the seed shall have sufficient varietal purity (art. 10).

Marketing requirements: Seeds may only be marketed by authorized seed shops in the seeds’ region of origin with exceptions for cases in which a Member State approves additional regions in its own territory for such marketing (art. 13). The prohibition on seed exchange between farmers remains, in other words, in place under the new directive. In order for farmers to be able to sell seed they must establish authorized seed shops.

¹⁴⁰ See, for example, the opinion of the European Seed Association on the Commission Working Document of 17 March 2005, a document which later resulted in the directive: http://74.125.77.132/search?q=cache:X8VbpNHvv4MJ:www.euroseeds.org/pdf/ESA_05.0217.pdf+EU+Directive+Conservation+Varieties+unfair+competition&hl=en&ct=clnk&cd=1&client=opera, dated 13 May 2005.

¹⁴¹ A population standard of 10% and an acceptance probability of at least 90% shall be applied.

Quantitative restrictions: The quantity of seed marketed shall not exceed 0.5% of the seed of the same species cultivated in the country in one growing season, or alternatively a quantity necessary to sow 100 ha, whichever is the greater quantity (art. 14). This is the general rule. For certain named species,¹⁴² stricter provisions apply. In these cases, the percentage shall not exceed 0.3%, or a quantity necessary to sow 100 ha, whichever is the greater quantity. The total quantity of seed of conservation varieties marketed in each country shall not exceed 10% of the seed used yearly of the species involved. If this leads to a quantity lower than necessary to sow 100 ha, the maximum amount of seed of the species concerned may be increased to a quantity necessary to sow 100 ha.

Although these rules were designed to soften the previous regulations that were obviously hindering the conservation and sustainable use of crop genetic diversity in agriculture, they are nonetheless very restrictive. They run counter to customary practices among farmers for whom we can thank for the plant genetic diversity we have today. Clearly, the rules are unlikely to encourage farmers to continue this work. This despite the fact that the EU has ratified the Treaty the Plant. To summarize: under the directive on conservation varieties, (1) seed exchange among farmers is still prohibited; (2) only approved conservation varieties may be marketed; (3) requirements on genetic uniformity remain rigorous; (4) marketing and use of a conservation variety are forbidden outside of its region(s) of origin; (5) there is a quantity restriction on the marketing of seed of such varieties; and (6) the varieties if they have developed them further.

4.2.4 Disagreement over Commission Directive 2008/62/E: Winds of change

There is widespread disagreement in the EU over the directive on conservation varieties. There are many organizations and networks of farmers in the EU involved in activity relating to plant genetic diversity in agriculture, especially in Italy, France, Germany, Switzerland and Spain, and most of them have joined forces in a European network: *Let's Liberate Diversity*,¹⁴³ which organizes seminars and issues statements. The network is proactive and seeks to influence national governments and their policies on the EU. *Let's Liberate Diversity* maintains, among other things, that¹⁴⁴

- farmers don't need laws limiting the use of genetic diversity in agriculture, but laws which facilitate such use;
- the market for seed of locally adapted varieties and seed mixtures must be allowed to thrive;
- all obstacles to work to preserve genetic diversity must be removed and replaced by positive incentives.

¹⁴² *Pisum sativum* (peas), *Triticum spp.* (wheat), *Hordeum vulgare* (barley), *Zea mays* (maize), *Solanum tuberosum* (potato), *Brassica napus* (raps) and *Helianthus annuus* (sunflower).

¹⁴³ See: <http://www.liberate-diversity-hungary2011.org/>

¹⁴⁴ Brochure setting out the platform of *Let's Liberate Diversity*, published 10 October 2009.

A research project under the EU's 6th Framework Programme, 'Farm Seed Opportunities',¹⁴⁵ held its closing conference in Marseilles, 14–15 October 2009. Research results were aimed at strengthening the basis on which European politicians make decisions with an eye to negotiating and implementing regulations relating to seed and propagating material. The overriding goal was to enhance the conservation and sustainable use of plant genetic diversity with a particular focus on the basis for, and potential consequences of, the new EU directive on conservation varieties.

The project team counted researchers with expertise from agricultural and social scientific disciplines and jurisprudence, along with farmers from six European countries. They concluded that¹⁴⁶

- most of the varieties of interest to farmers working to conserve and use genetic diversity sustainably cannot be approved on the basis of criteria established by the EU in its directive on conservation varieties;
- the criterion on genetic uniformity is the opposite of what is actually needed from a conservation viewpoint: genetic diversity. The criterion should be abolished for conservation varieties;
- the term 'region of origin' is useless inasmuch as local adaptation is dynamic and responds to changes in the environment. A constraint of this nature is therefore unwanted;
- the term is, moreover, misleading, insofar as only a minority of the domesticated plants grown in Europe today originate here;
- current regulations on seed and propagation material impede the development of a seed market for diversity;
- the regulations on quantity limits are based solely on the commercial seed industry's need to protect market shares.

The EU conducted a thorough evaluation of its 12 directives in the seed sector.¹⁴⁷ The report includes the following points.

- regulations are perceived as too inflexible for people working on conservation and sustainable use of genetic diversity;
- an assessment should be made on whether farmers should be allowed to exchange small seed quantities among themselves;
- an assessment should be made whether to leave more of the decision-making in this area to the individual Member State, in compliance with the subsidiarity principle.

¹⁴⁵ See the project's homepage: <http://www.farmseed.net>

¹⁴⁶ From a lecture by one of the project's key officials, Prof. Edith Lammerts van Bueren, of the Louis Bolk Institute, Netherlands, at the closing conference, 14 October 2009, also attended by the author of this report.

¹⁴⁷ Assessment implemented at DG SANCO. See: <http://ec.europa.eu/food/plant/propagation/evaluation/>

In following through on this EU evaluation, several so-called 'impact studies' were conducted with a view to amending the regulations. There was also a comprehensive, Europe-wide consultation. This process was completed in 2011 and will inform the impending regulatory changes.¹⁴⁸ In the meantime, the EU directive on conservation varieties is being implemented in Europe, and new directives would be issued. They include a directive on traditional vegetable varieties (adopted November 2009); and one on mixtures of fodder plant seed (adopted August 2010, see below).¹⁴⁹ An important question for the future design of regulations is how these directives are implemented in each country. As certain central players put it, in order to ensure a solid foundation for upcoming changes to EU regulations, governments should interpret the directive as widely as possible.¹⁵⁰

In other words, there powerful forces in the EU pulling in both directions. What the result of the evaluation process will be is still unclear. How individual countries act when implementing existing directives will be of great importance in this process.

4.2.5 Proposal by the Norwegian Food Safety Authority for relaxation of three central regulations

Following a long and complicated process, a certain degree of media attention and an open dialogue with farmers' organizations, other relevant organizations and researchers, the Norwegian Food Safety Authority proposed in 2009 changes to the current regulations for the seed sector.¹⁵¹ The proposal concerned the Plant Variety Regulations, Seed Marketing Regulations and Seed Potato Regulations.¹⁵²

The draft amendments "on the approval of conservation varieties and production and sale of seed and seed potatoes of those varieties, and on exceptions for non-commercial trading of seed" were sent out for consultation in September 2009. A total of twenty organizations and bodies responded with comments to the draft.¹⁵³ Of these, six were

¹⁴⁸ The action plan on this work is available at the homepage of DG SANCO: http://ec.europa.eu/food/plant/propagation/evaluation/docs/AP_council_2009_en.pdf. To monitor future developments with regard to the review, see: http://ec.europa.eu/food/plant/propagation/evaluation/index_en.htm

¹⁴⁹ To monitor regulatory changes in the EU in this area, see: http://ec.europa.eu/food/plant/propagation/conservation_varieties/index_en.htm

¹⁵⁰ For example Kees van Ettehoven, then head of the Netherlands Variety Testing Department, at the closing conference on "Farm Seed Opportunities", 14 October, 2009.

¹⁵¹ All case documents are available from the website of the Norwegian Food Safety Authority: http://matilsynet.no/regelverksutvikling/horinger/2009/h_ring_av_forskriftene_om_s_varer_settepotatoes_og_om_plant_varieties_72617

¹⁵² While recognition of plant varieties and the sale of seed are covered under the EEA Agreement, seed potatoes are not. That notwithstanding, the Seed Potato Regulations were included in this proposal to ensure consistency across the relevant Norwegian regulations.

¹⁵³ In all, twenty-two agencies commented: County Governor of Vestfold; Ministry of the Environment; Directorate for Nature Management; Oppdal Farmers Advisory Bureau; County Governor of Sør-Trøndelag; Felleskjøpet Agri BA; Plant Variety Board; Bioforsk – Organic; Bioforsk – Plant Health; Bioforsk East Landvik – Department for Seed Breeding and Grass for Green Spaces; NordGen; Fridtjof Nansen Institute; Oikos – Organic Norway; Norwegian Farmers' Union; Norwegian Farmers' and Smallholders' Union; Norwegian Development Fund; Biologisk-dynamisk forening; Norwegian Youth Development Fund; Friends of the Earth Norway; Green Living; Agrokonsult; Norwegian Genetic Resource Centre. Three of the bodies consulted had no comments: County Governor of Oslo; Ministry of the Environment; and the Plant Variety Board.

positive and/or suggested improvements on technical issues.¹⁵⁴ The other fourteen were essentially in favour of the proposal, but critical to several issues. They submitted proposals of their own. These were the Directorate for Nature Management, Bioforsk – Organic Food and Farming, NordGen, Fridtjof Nansen Institute, Oikos – Organic Norway, Norwegian Farmers Union, Norwegian Farmers and Smallholders Union, Norwegian Development Fund, Biologisk-dynamisk forening (Biological Dynamic Association), Norwegian Youth Development Fund, Friends of the Earth Norway (Norges Naturvernforbund), Green Living (Grønn Hverdag), NGRC, Oppdal Farmers Advisory Bureau (Oppdal landbruksrådgivning).¹⁵⁵ The comments and suggestions were particularly concerned with restrictions relating to region of origin, uniformity, conservation value, marketing quantities, specific restrictions related to seed potatoes, and the need the opportunity to develop varieties in farmers' fields and be compensated for the costs associated with establishing seed dealers and approval of varieties.

Although the consultation bodies put in a great deal of time and effort examining these issues and offering constructive suggestions, hardly any of their ideas were taken into account at the end of the day. The few changes that were made by the Norwegian Food Safety Authority as a result of the consultation were limited to improving the wording and providing clarification, but stopped short of substantive changes to the proposal.¹⁵⁶ None of them have anything to do with the substantive and very similar proposals submitted by so many of the main consultative bodies. The Norwegian Food Safety Authority offered two reasons. First, in the opinion of the Norwegian Food Safety Authority, it would be contrary to the EU conservation variety directive. Second, it was not within the Authority's mandate from the Ministry of Agriculture and Food to concern itself with Norway's relations with the Plant Treaty and the Convention on Biodiversity. Although the Norwegian Food Safety Authority was as flexible as possible during the first round on the EU directive, the tendency to ignore consultation responses is a general democratic problem arising from Norway's EEA membership. EU regulations have priority over proposals from Norwegian consultative

¹⁵⁴ These were Agrokonsult; Bioforsk – Plantehelset; Bioforsk Øst Landvik – Department for Seed Breeding and Grass for Green Spaces; Fellesskjøpet AGRI BA; and County Governor of Sør-Trøndelag.

¹⁵⁵ Each of which offered relatively fulsome responses and suggestions, with the exception of Oppdal Farmers' Advisory Bureau (Oppdal landbruksrådgivning) which commented solely on seed potatoes and suggested that gene banks and the like should be allowed to sell them.

¹⁵⁶ In the regulations on testing and recognizing plant varieties, the definitions in § 3 of novelty test and value test are specified in greater detail and the phrase in § 4 "represent an interest" is changed to "be interesting", "plant protection rights" to "protection of plant breeders' rights". In the Seed Regulations the definition of land race in § 3, "a set of populations" becomes "a collection of populations" and "growth conditions" becomes "environmental conditions". In the definition of genetic erosion in the same paragraph, "diversity" (diversitet) is changed to "manifold" (mangfold) and "within" (innen) becomes "inside of" (innenfor). Gene bank is given a more precise definition: "A business with a collection of seeds or propagating material for long-term preservation is available through distribution in smaller quantities for the purpose of development, research, education and propagation." In § 14 the statements about sampling of seed consignments are given a more precise formulation to indicate who has responsibility for what. Sampling for laboratory control and controlled cultivation is to be undertaken by the Norwegian Food Safety Authority or a sampler authorized by the Norwegian Food Safety Authority and analysis of seed consignments to be performed by a public laboratory or laboratory authorized by the Norwegian Food Safety Authority. The changes to the definitions in § 3 of the Seed Regulations are repeated in the Regulations on Seed Potatoes.

bodies – whether the latter are never so unanimous – when disparities occur between a Norwegian proposal and an EU regulation.

The matter was sent to the Ministry of Agriculture and Food. On 30 April 2010, the Ministry endorsed the changes to the Regulation of 13 September 1999, No. 1052 on Seed Materials; the Regulation of 2 July 1996, No. 1447 on Seed Potatoes; and the Regulation of 1 October 1999 on the Testing and Approval of Plant Varieties in accordance with the Norwegian Food Safety Authority's recommendations. This action served to soften the prohibitions of 2004, and the Norwegian Food Safety Authority went to great lengths to accommodate EU regulations to the principles of sustainable management of crop genetic diversity. What the regulations actually mean and what current practice looks like today are explained in section 4.2.7 below.

4.2.6 More EU seed directives: Vegetables and fodder-plant mixtures

As early as November 2009, the EU passed directive no. 2009/145/EC on traditional vegetable varieties. The purpose of the directive was to facilitate the sale of seed of no intrinsic value to commercial producers but which had been adapted to thrive in particular conditions. That included, for example, technical problems to do with climate, soil or cultivation. In Norway, these varieties are called traditional vegetable varieties. Sweden has chosen to call them amateur vegetable varieties, and there is some controversy in Norway and other countries as to the right designation. For convenience we shall be using the Norwegian variant here. With regard to traditional vegetable varieties the directive has no provisions on region of origin, nor on the threat of genetic erosion as a criterion for inclusion on the official list of varieties. The requirements on breeding are much less stringent as well.

The criteria for including vegetable varieties on the list of varieties as traditional varieties, thus allowing for legal marketing, is that they should have no intrinsic commercial value and should only be sold in small packets of 5, 25 and 250 grams (depending on the species). Commercial value means in this context varieties of no intrinsic value to commercial crop production.¹⁵⁷ The seeds of traditional varieties can therefore be sold to gardeners on a hobby basis, but not to farmers for commercial use in agriculture. These two regulations (small seed packets and selling only for non-commercial use) are intended to limit the dispersal of these varieties.

The regulations on traditional vegetable varieties will not help farmers preserve crop genetic diversity in vegetables, as the farmers per definition are debarred from using seed of such varieties. In addition, additional conservation rules on vegetable varieties introduced simultaneously make it even harder to conserve these varieties. Another problem arises in relation to varieties originating from outside the EU and EEA area. It has become increasingly popular to grow vegetable species in the EU and

¹⁵⁷ It is apparent in the title of the English version, which refers to “vegetable varieties with no intrinsic value for commercial crop production but developed for growing under particular conditions and for marketing of seed of those landraces and varieties”.

Norway whose origin and dispersal are in countries outside Europe. The process is connected with immigration and tourism, and the arrival of new eating habits in consequence. Permission to grow outside plant varieties here in Norway is conditional on approval of an application for registration as a variety with the EU/EEA. For varieties that do not meet the requirements for normal variety recognition or for other reasons are not eligible for such recognition (economic reasons for example), they may be approved as conservation or traditional varieties as applicable. In these situations, the so-called variety owner must apply for recognition, but will not enjoy property rights to the varieties if they are registered in this way. That is, variety owners bear the cost of registering a variety, but without securing the right to use it, and use of the variety will be strictly limited. There is a complicating factor here, which makes it very difficult to import new varieties from outside the EU/EEA.¹⁵⁸ So, one can ask whether this makes a difference from a conservation and sustainable use perspective. Should we not be concentrating rather on diversity originating in our own country or region? It is a moot question, but the fact remains that what genetic diversity we have today evolved because it was possible to exchange and sell seeds over relatively large distances and across national boundaries. If we want this to continue, the regulations are clearly a problem. It also means it will not be possible to grow some varieties even if doing so was a commercially viable proposition in the form of demand, and at best, customers will simply have to consume imported goods.

The EU directive on traditional vegetable varieties has been implemented in several EU member states. It sparked heated discussions in Sweden before and after its entry into force, 1 January 2011. Perhaps the firm in Sweden to suffer most is Runåbergs Frøer, the largest organic vegetable company in Sweden. The firm has created a multitude of different varieties which they offer for sale throughout Scandinavia.¹⁵⁹ According to Johnny Andreasson, CEO at Runåbergs Frøer, it is impossible to comply with the regulations Sweden put in place after the directive. There are several reasons for this.¹⁶⁰

- They cannot register many of the varieties they used to sell, because the variety owner is resident outside the EU and has no interest in bearing the cost and hassle of registration;
- Registration costs 800 Swedish kroner per variety, and since Runåbergs Frøer seeks to promote diversity, it translates into an overall cost of 80,000 Swedish kroner for all the varieties, an amount which a small, non-profit company which already hardly makes ends meet is financially prohibitive;

¹⁵⁸ This is a big problem for some seed producers, e.g. Runåbergs Frøer in Sweden, as the author learned during a conversation with Johnny Andreasson, CEO at Runåbergs Frøer, under Älvsjömessan (Stockholm International Fair), 25 March 2011. See also Runåbergs Frøer (2011): EU Sortslistor for Köksväxtfrøer: <http://www.runabergsfroer.se/?m=300>

¹⁵⁹ See: www.runabergsfroer.se

¹⁶⁰ All information on Runåbergs Frøer derives from conversations with CEO Johnny Andreasson during the Älvsjömessan, 25 March 2011.

- They have to label the varieties sold under the amateur varieties directive (traditional vegetable varieties in Norwegian) which makes it clear that they cannot be used for commercial vegetable production. It would destroy the majority of the customer base, since they essentially sell seeds to farmers.

Were Runåbergs Frøer to follow the rules, they would be catapulted into bankruptcy, and Sweden – as well as the other Nordic countries – would lose access to seeds in a very large pool of vegetable varieties – and at a time when industrial vegetable breeding in the Nordic countries is to all intents and purposes a thing of the past. This is why the firm has chosen to ‘ignore the whole thing’, and continue as before, well aware that they are breaking the law.

Norway is in a different situation. There is no vegetable processing industry in the country any more, and no seed businesses of Runåbergs Frøer's type, even if a small company is currently trying to secure a foothold.¹⁶¹ When Norwegian farmers want a distinctive variety, mostly of the organic type, they tend to take their business to foreign firms, not least Runåbergs Frøer. What happens in Sweden, then, has major implications for farmers in Norway.

The Norwegian Food Safety Authority sent the draft regulations on traditional vegetable varieties out for hearing in December 2010. The draft was largely based on the EU directive, but for reasons of space they had left out vegetable conservation varieties. It wasn't necessary to include them, the Authority said, and it will deal with them in the practical management of the regulation.¹⁶² They keep the cost of registering conservation varieties in Norway much lower than in Sweden, at 480 kroner plus a billing fee.

Seven consultative bodies responded.¹⁶³ Of these, four responses were positive or had no comment. They put particular emphasis on the greater flexibility of the new regulations when it comes to trading vegetable varieties. The NGRC, Gardeners' Association (Gartnerforbundet) and Fridtjof Nansen Institute had comments and suggestions regarding the constraints on the sale of these varieties. The NGRC and Fridtjof Nansen Institute both responded to the proposal in light of the Plant Treaty. With few exceptions, the proposal was nevertheless adopted essentially in its draft version, and entered into force 29 June 2011.

The latest EU directive in this area is Commission Directive 2010/60EU of 30 August 2010 providing for certain derogations for marketing of fodder plant seed mixtures intended for use in the preservation of the natural environment. It would take too long to explore this directive in

¹⁶¹ Solhatt Økologiske Frø AS sell vegetable, herb and flower seeds. Starting with imported seed, they hope eventually to produce their own seed material. See: <http://solhatt.no/>

¹⁶² According to the consultation paper from the Norwegian Food Safety Authority on amending the regulations on testing and approval of plant varieties and the seed regulations, dated 22 December 2010.

¹⁶³ The consultation process with responses can be seen in full here: http://www.mattilsynet.no/regelverksutvikling/horinger/2010/h_ring_av_forskriftene_om_godkjennings_av_plant_varieties_og_produksjon_og_omsetning_av_s_varer_86030

detail. Suffice it to say that it is written in the spirit of the conservation varieties directive, and subject to implementation in Norway as soon as the Norwegian Food Safety Authority has adapted Norwegian legislation to the directive.

4.2.7 *Current rules and practice to date*

The new rules on conservation varieties of domesticated plants and traditional vegetable varieties are enacted in three regulations.

- Plant Varieties Regulations concerning approval of plant varieties for listing on the Norwegian official the list of varieties;
- Seed Regulations concerning the marketing of seed;
- Seed Potato Regulations concerning the sale of seed potatoes.

The regulation on testing and approval of plant varieties applies to all species covered by the regulations on seed materials and seed potatoes. The regulations on seed materials cover the most important named species of cereals, fodder plants and grass for green spaces, beets, oleaginous and fibrous plants and all kinds of vegetables and berries, fruits, landscape plants, spice plants, medicinal plants and ornamental plants. The seed potato regulations comprehend all seed potatoes. As a result, only a small number of plant species are not covered by the regulations on the approval and sale of plant varieties. It covers species of cereals, fodder crops, landscaping grasses, oleaginous and fibrous plants not mentioned in the regulations on seed materials: very few in practice. One example, however, is emmer (*Triticum dicoccum*), a species of the wheat family which is not included our ordinary wheat (*Triticum aestivum*) as it is named in the regulations, and is therefore not subsumed under it. The same applies to einkorn wheat (*Triticum monococcum*). Both species are grown on several farms in Norway. Apart from these species, the vast majority of food and forage plants cultivated by biodiversity farmers are currently covered by the regulations.

As of 2009, farmers were once again allowed to save, exchange and sell seed, with the exception of seed potatoes, on a non-commercial basis. This is spelt out in the legislative history of the 2009 amendments to the said regulations, but exactly what ‘non-commercial’ is supposed to mean is not defined. There may be good reasons for not establishing an interpretation since it remains something of a ‘hot potato’ in the EU, and the Norwegian Food Safety Authority has obviously wanted to give Norwegian farmers as much flexibility as possible in this area. Non-commercial trading of seed of old varieties (exchange and selling in small quantities) among biodiversity farmers appears to be picking up.¹⁶⁴

Farmers may also establish authorized seed shops for conservation varieties on relatively easy terms, such as their being registered in Norway and led by a manager with appropriate qualifications. This does not apply to seed potatoes, though the regulations do allow the Norwegian Food Safety Authority to let gene banks and the like sell seed

¹⁶⁴ This assumption is based on regular contact with senior figures in the farming community.

potatoes, on certain conditions. So far, Økologisk Spesialkorn AS (see section 2.3.4) is the only seed shop authorized to sell conservation varieties (category C).¹⁶⁵

For Økologisk Spesialkorn, and possibly other seed retailers of the same kind, the sale seed of conservation varieties is conditional on recognition of the varieties. To obtain recognition as a variety worthy of preservation and entered on the list of varieties, it has been of interest to the conservation of plant genetic resources; its area of origin must be identifiable; and it has to be maintained in this area. There is no requirement to perform a novelty value test or examination, provided certain other conditions regarding documentation of utility are met. The variety must not be protected by plant breeders' rights or included on the official Norwegian list of varieties over the past two years.

The applicant seeking recognition for a conservation variety must provide information of area of origin; name and any known synonyms; description of the variety; utility value; growth characteristics and conservation value; as well as planned approach to preserving the variety. That is, assurances must be given that the variety's characteristics will not change but be maintained in the variety's approved form.¹⁶⁶ Recognition costs 550 Norwegian kroner per variety at the current rate.

NordGen has offered to act as applicant and conservationist of the seed-propagated varieties, and may also assist others who wish to apply for recognition of such varieties in Norway. NGRC offers the same services in respect of potato varieties.

To date, seven conservation varieties are approved and included on the official Norwegian list.¹⁶⁷ Four wheat varieties¹⁶⁸ and one barley,¹⁶⁹ with NordGen as the approved conservationist, and two potato varieties where NGRC is the approved conservationist.¹⁷⁰ About 40 varieties of spring wheat, oats, barley, peas and beans are on file with NordGen awaiting description in preparation for an application for approval.¹⁷¹ Økologisk Spesialkorn (see Section 2.3.4) is seeking recognition of several varieties, primarily the rye svedjerug. NordGen assists in the work to describe the varieties for application.

¹⁶⁵ Cf. Norwegian Food Safety Authority's list of registered seed retailers, as of 5 July 2011, available :

http://www.mattilsynet.no/mattilsynet/multimedia/archive/00068/Registrerte_s_varefo_68985a.pdf

¹⁶⁶ Cf. application form for inclusion on the official Norwegian conservation variety list, available : http://www.mattilsynet.no/skjema/planter/skjemaer_s_varer_8315

¹⁶⁷ *Plantesortsnemnda/Norwegian Food Safety Authority (2011): Norsk Offisiell Sortsliste*, as of 15 March 2011.

¹⁶⁸ Diamant II, Fram, Møystad and Ås II.

¹⁶⁹ Domen.

¹⁷⁰ Rød Kvæfjord and Tromøypotet.

¹⁷¹ Information provided by Svein Solberg, Senior Consultant, NordGen, during a lecture at the seminar Variety Diversity in Norwegian Agriculture and Horticulture, organized by the Norwegian Genetic Resource Centre at Skog og Landskap, Ås, 26 May 2011.

The potato gene bank under the NGRC will have around 90 potato varieties by the end of the approval procedure for the current varieties.¹⁷² These are mainly from the Nordic Gene Bank, Graminor and the NGRC. The latter has evaluated Erling Olsen's varieties, inter alia (see section 2.3.1) and selected the most interesting varieties with a view to further conservation. All varieties are stored *in vitro* at Bioforsk, and Overhalla Cloning Centre will produce clones for distribution to ensure access to virus-free seed potatoes of approved varieties. Several options are being considered to facilitate such access. The NGRC is spearheading this work.

Vegetable varieties can be registered either as conservation varieties or traditional vegetable varieties. At the present time, no varieties of vegetables have been registered, either as the one or the other. The requirements for approval as a variety worthy of conservation are more stringent than the requirements for approval of traditional varieties, since approval of the latter does not require a threat of genetic erosion or proof of region of origin where the variety will be maintained. In return, it may not have commercial value, i.e. the crop may not be traded on the open market, and only be sold in small packets, as specified above. In practice, traditional vegetable varieties will therefore only be suitable for hobby use in gardens and the like.

The Norwegian Food Safety Authority is currently in the process of approving varieties, in accordance for the time being with the rules on conservation varieties. It can be a daunting task at times because of having to obtain the necessary documentation and having to establish new procedures. In this sense, the rules are demanding also for the authorities.

4.2.8 Impact of the regulations on genetic diversity in varieties and on farmers' rights

The amended rules that entered into force in 2010 have improved farmers' rights compared with the 2004–10 situation. However, compared with the period before 2004, these rights still remain very inflexible. Farmers cannot freely sell seed, and only on a non-commercial basis, and many conditions need to be met before varieties can be approved for sale by approved seed dealers/retailers. Bureaucratic procedures are convoluted, make it harder for farmers to schedule operations and develop their industry, especially while the new rules are being phased in. For example, Økologisk Spesialkorn is growing the rye svedjerug over a large area, but needs approval and inclusion on the list of varieties to sell the seed and meet a growing demand on the market. If this demand is not met, it could easily evaporate. Whether the Norwegian Food Safety Authority will manage to approve this variety depends on the accompanying documentation and the Authority's workload. Seen thus, the regulations represent an impediment, albeit far from an insurmountable one. Some farmers are critical of the requirements for establishing a seed retailing business, and are not at all happy with all the

¹⁷² Information provided by Åsmund Asdal, Senior Consultant, Norwegian Genetic Resource Centre, during a lecture at the seminar Variety Diversity in Norwegian Agriculture and Horticulture, organized by the Norwegian Genetic Resource Centre at Skog og Landskap, Ås, 26 May 2011.

paperwork it entails. Good agronomists are not necessarily good bureaucrats. NordGen and NGRC are trying to make it as easy as possible. Nevertheless, the regulations place a few trip wires in the way of those who are not familiar with this type of application work and reporting requirements.

How the regulations will impact plant genetic diversity is too early to tell. That they dilute farmers' rights to exchange and sell seed is undeniable, however.

4.3 Norwegian patent legislation

A patent is a type of intellectual property right designed essentially for the purpose of protecting inventions. They give the inventor an exclusive right of up to 20 years to the use of the invention, and thus to make money on it. It represents therefore an important stimulus to innovation. For various reasons, patents have not been a feature of the plant breeding community, not least because plant variety protection (plant breeders' rights) has been better suited to the needs of the sector (see section 4.1). The plant variety protection system offers more flexibility for parties wishing to develop protected plant varieties, a crucial factor in driving innovation in the sector. This situation is changing, however, because an increasing number of countries are allowing the patenting of individual plants, parts of plants, or the processes employed to breed them. In Europe, it is not allowed to patent inventions tied exclusively to a particular plant variety, but plant varieties can be affected by other, more far-reaching patents. Most patents have been issued for genetically modified plants, and so far Norway does not permit the cultivation of genetically modified plants on its territory. Patents relating to conventional plants remain few in number, although there are some, and several applications are currently under consideration for conventional plants.¹⁷³ This is one reason why this report devotes relatively little space to patents. Another is that the subject is treated in great detail in Tvedt, 2010, pp. 181–255. We shall therefore only take a brief look at the main features and likely implications.

In December 2003, the Patent Act¹⁷⁴ was amended to bring it in line with the EU's patent directive.¹⁷⁵ This followed a stormy debate on Norwegian sovereignty over patent laws and ethical questions surrounding the patenting of life forms. The amended patent law entered into force in February 2004. Norway then applied to join the European Patent Organization (EPO), of which it became a full member, 1 January 2008. Since then, patents of relevance to agriculture in Norway are mainly dealt with by the European Patent Office (EPO).¹⁷⁶

¹⁷³ Examples are collected in Then and Tippe (2011), available : http://www.no-patents-on-seeds.org/sites/default/files/news/patente_report_2011_final_en.pdf

¹⁷⁴ Lov om patenter (LOV 1967-12-15-9, latest amendment: LOV 2007-06-29-80 of 2008-01-01): <http://www.lovdato.no/all/hl-19671215-009.html>

¹⁷⁵ European Parliament and Council Directive 98/44/EC on the Legal Protection of Biotechnological Inventions.

¹⁷⁶ I would like to thank Morten Walløe Tvedt of the Fridtjof Nansen Institute and Bell Batta Torheim of the Norwegian Development Fund for comments and suggestions on the matters dealt with in this section.

Under the current patent law, patents can be granted for plants and their constituent parts, but not for plant varieties. Whether this has any practical significance is a debated topic. If a particular plant contains a gene or gene sequence inserted by a specific, patented technique, all similar plants containing the patented gene or gene sequence will be covered by the patent. And in practice, plant varieties will be affected, even though the patented innovation is not in itself connected to a particular plant. The innovation could also apply to more than one variety. In both cases, the sale of plant varieties will fall under the patent holder's exclusive right. Examples from other countries¹⁷⁷ show that if a harvest is mixed with patented genes, the cultivation process itself could constitute an infringement of the patent, even when the farmer is unaware of the presence of the patented gene (which may have been transported by pollen or by seed transported across agricultural areas).

Processes can also be patented, but EPO took in December 2010 an important decision in relation to breeding procedures. These, the body determined, are not patentable. The decision arose after two patents had been granted for methods of processing broccoli and tomatoes. Patent holders were a British company, Plant Bioscience Ltd. (for the broccoli patent) and the Israeli Ministry of Agriculture (for the tomato patent). If patents had remained in force, they would apply to all broccoli varieties with higher levels of a particular protein resulting from the breeding process, and all tomatoes with reduced water content as a result of such a process. The implications for broccoli and tomato growers could have been profound. The patents, however, were challenged by various plant breeders, including Syngenta. The patents, they argued, covered methods that were common in plant breeding. This protest resulted initially in the EPO decision to exclude processing methods from patentable innovations. EPO ruled that while biological instruments or means, such as genetic markers, may themselves be patentable inventions, their use does not make an essentially biological process patentable.¹⁷⁸ Despite the December 2010 ruling, EPO has granted several patents related to conventional plant breeding.¹⁷⁹

Patent law gives farmers the right to save and use seed materials from patent-protected material without having to compensate the rights-holder (§ 3b). But the implementing regulations¹⁸⁰ limit this right to specific types of fodder plants, cereals, oleaginous and fibrous plants (§ 89). Further, only small-scale farms, defined as the area that is required to produce for example 185 tons of potatoes or 92 tons of corn per season, may avail themselves of this right (§ 90). All other farmers have to pay a

¹⁷⁷ Cf. the case of the Canadian farmer, Percy Schmeiser, accused by Monsanto of having grown genetically modified canola patented by Monsanto, which he had bought and paid for. Percy Schmeiser maintained that the seeds must have entered his fields accidentally and accused Monsanto of contaminating his fields with genetically modified organisms. The case circulated through the Canadian justice system for several years. The court decided in 2004 that the patent was valid, but did not order Schmeiser to pay damages for growing Monsanto canola. In 2008, Monsanto helped cover the cost of cleaning the farm of the genetically modified rape.

¹⁷⁸ See EPO press release: <http://www.epo.org/news-issues/press/releases/archive/2010/20101209.html>

¹⁷⁹ <http://www.no-patents-on-seeds.org/en/information/news/new-patent-granted-bayer-breaks-law>

¹⁸⁰ Patentforskriften (Forskrift til patentloven) (FOR 2007-12-14-1417): http://www.lovdata.no/cgi-wif/wiftdles?doc=/usr/www/lovdata/for/sf/jd/jd-20071214-1417.html&emne=pateentlov*&

licensing fee if they re-use seed material derived from the patented material. Unless otherwise specified, the charges will amount to 50% of the cost of new seed material. Farmers are obliged to inform the rights-holder of the use of the patented material (§ 91) to enable them to exercise their rights. Exchange and sale of patented seed materials among farmers are prohibited in all cases.

Norway's patent law could restrict the right of farmers to save, use, exchange and sell seed material in the future if patenting proliferates in the sector. If this happens, it could also affect farmers' rights indirectly by limiting their opportunity to breed the plants in question, thus reducing the diversity of available plant varieties in the plant breeding industry.¹⁸¹ As we will see later in this report (Chapter 6), access to the seed of a rich variety pool is an important asset to farmers, and is therefore covered in Section 9.2 [b] of the Plant Treaty. Having said that, Norway's patent law has not yet affected farmers' rights in practice, since the use of a patent in connection with agricultural plants is still far from widespread here.

4.4 Experiences and reflections on farmers' rights to save, use, exchange and sell seeds

There are mixed opinions in Norway about farmers' rights to save, use, exchange and sell farm-saved seed, though the differences separating the various interest groups are not as wide as in many other countries. In this section we will be looking at the experiences and thoughts of farmers (conventional as well as biodiversity farmers), breeders and retailers about these rights. The reason for giving experiences and reflections so much space in this report, is that they are central to the development of legislation to facilitate conservation and sustainable use of plant genetic diversity.

4.4.1 Conventional farmers

As we saw in section 2.4, conventional farmers store seed from their own harvest for use in the next growing season, but we do not know exactly how widespread the practice is. Generally, conventional farmers use the varieties sold by the seed retailers. This varies from plant species to plant species and is also dependent on the size of the area under cultivation. For example, it would be economically unfeasible to save seed for use on small areas.¹⁸² The cost of cleaning the seed would not be much cheaper than what it would cost to buy new seed, so there would be nothing to gain. For farmers with more land it would be more profitable, and is indeed seen as an attractive strategy during an economic recession.¹⁸³ The situation is different for strawberries. According to a strawberry grower,¹⁸⁴ it has often been difficult to find disease-free plants. This

¹⁸¹ This, inter alia, is documented in a report by the Centre for Genetic Resources, Wageningen, Netherlands (Louwaars et al., 2010), available : <http://documents.plant.wur.nl/cgn/literature/reports/BreedingBusiness.pdf>

¹⁸² According to Pia Borg, Senior Consultant, Norwegian Farmers' Union, in an interview 8 March 2006.

¹⁸³ Ibid.

¹⁸⁴ Thorbjørn Bye from Fredrikstad, quoted in the newspaper *Nationen*, 1 March and 1 November 2005.

farmer therefore tried to find good plants which could be bred and used again from year to year. The method is considered less risky than buying new material every year.

For conventional farmers, exchanging seed material makes most sense during the spring sowing season. When the snow has melted and the soil is finally warm and dry enough to sow, haste is imperative. One farmer may run out of seed while another has too much, and farmers are used to helping each other out. According to the Norwegian Farmers' Union, being in control of one's own work is a fundamental right. If enjoyment of this right is diminished, it would be a loss of autonomy and a step in the wrong direction. All farmers' organizations in Norway have rejected the proposal to toughen plant breeders' rights.¹⁸⁵ Working in concert with the Norwegian Development Fund and environmental organizations, they sent a letter to the Ministry of Agriculture and Food urging the authorities to amend the regulations on plant variety and propagating material so as to restore farmers' rights to seed materials.¹⁸⁶

4.4.2 Biodiversity farmers

Biodiversity farmers in Norway have been profoundly disturbed by the situation regarding farmers' rights to save, use, exchange and sell seed. Oikos – Organic Norway has therefore sent a consultation paper to the Ministry of Agriculture and Food on the draft plant breeders' rights law and called together with others for a revision of the plant variety and propagating material regulations (see above). Oikos has taken several steps in this matter already. As early as December 2006, the editor of the Oikos membership magazine *Grobladet*,¹⁸⁷ Marit Wright, sent a letter to the Ministry of Agriculture and Food expressing concern over the plant variety and propagating material regulations. The problems featured in several articles in Oikos journals. In autumn 2008, Oikos organized two meetings with farmers' organizations and other stakeholders to discuss ways forward, with the Norwegian Food Safety Authority participating at one of them.¹⁸⁸ Oikos renewed its commitment by hosting and attending additional meetings, and maintaining contact with the Norwegian Food Safety Authority.¹⁸⁹ The reason they are so committed is obvious: saving and exchanging the seed of different, often unregistered varieties are prevalent and important to the survival of these production systems in the organic and biodynamic agricultural sector.

These freedoms are most important to biodynamic farmers. To biodynamic farmers, for example, a re-using rye seed over a twenty-year

¹⁸⁵ See consultation papers at the official consultation webpage: <http://www.regjeringen.no/nndep/lmd/Dokument/Hoyringar/Hoyringsdokument/2005/horing-forslag-til-ny-lov-om-plantefored/4.html?id=97788>

¹⁸⁶ Letter from the Norwegian Development Fund to the Food and Agriculture Minister, October 22, 2007. The letter was signed by the Fund; Norwegian Gardeners Association; Friends of the Earth Norway; Oikos – Organic Norway; Norwegian Farmers and Smallholders Union; Green Living; Biologisk-dynamisk forening; Norwegian Farmers' Union; Spire – Norwegian Youth Development Fund; and the Norwegian Organic Grain Farmers' Association.

¹⁸⁷ *Grobladet* has since been merged with Oikos membership magazine *Ren Mat*.

¹⁸⁸ At OIKOS headquarters, 20 November 2008

¹⁸⁹ At OIKOS headquarters, 20 November 2008

cycle appears to work: it gives plants the time they need to adapt to the environment and develop attributes and potentials to the full.¹⁹⁰ It is also common practice to exchange seed material which has shown itself to be well adapted to the special conditions. Since the seed sector cannot meet the needs of these farmers, it is important to let them continue to exchange of seed material. Without this opportunity, or with a severely curtailed system, it would become impossible to run their farms, they insist.¹⁹¹ In that case, a key group in the conservation and sustainable use of crop genetic diversity in Norwegian agriculture would no longer be able to continue its stewardship role.

Traditional varieties and farmers' selections based on these varieties are attracting ever wider interest in Norway, and some of the farmers with more experience in this line of work want to use the opportunity to promote interest in conservation and sustainable use of crop genetic diversity within the farming community. By offering to sell larger quantities of seed materials to these farmers, they hope to stimulate interest as well as making a living from the business.¹⁹² Several farmers are also trying to widen the market for old and exciting varieties by working with retail chains, for example. Here, they have to deliver larger quantities over time and reliably. It can be done if farmers banded together and shared or sold seed among themselves.

Since the risk of plant disease is one of the main arguments against farmers exchanging seed materials among themselves, it featured as one of the questions we put to biodynamic farmers during interviews conducted in connection with this report.¹⁹³ It was essential to keep the risk of pests and diseases at the lowest possible level, they told us, and because they cannot and will not use chemical pesticides they depend entirely natural methods of control, all based on well-established procedures and principles. First, crop rotation and tillage keep disease pressure low. Second, they know a great deal about how to select seeds and adapt varieties to new environments. Third, they get authorized laboratories to test germination quality and incidence of fungal and other diseases, and therefore feel in control of the situation. As professional farmers with extensive knowledge of the varieties they grow, they feel able to shoulder responsibility for the decisions they make, and criticize rules that deprive them of autonomy. Without the possibility of exchanging seed, it would have been impossible to maintain the standard of health and quality of the seeds and cultivation systems founded on experience and traditional knowledge.

An attempt is being made by the authorities, the biodynamic farmers tell us, to force them to follow laws and regulations designed for a different type of agriculture. But doing so would undermine the health and quality

¹⁹⁰ According to farmers interviewed at Fokhol, 7 April 2006.

¹⁹¹ According to biodynamic farmers interviewed at Fokhol 7 April 2006. Taking an example, they explained how biodynamic farmers introduced spelt (*Triticum spelta*, a species with low gluten content) to Norway – which today is a very popular product. This would not have been possible if current laws had applied back then.

¹⁹² Farmer Johan Swärd has discussed this point with the author on several occasions, for example, in a telephone interview with the author on December 20, 2006.

¹⁹³ Fokhol 7 April 2006.

of their seed materials.¹⁹⁴ Plants are exposed to greater risk of disease in conventional agriculture than in organic agriculture, resulting in restrictive rules on, for example, seed exchange among farmers. Over the past ten years, regulations and rules have removed more and more responsibility for agriculture from the farmers and transferred more and more of it to the authorities. Farmers have less and less responsibility and less and less space to put their traditional knowledge into practice. They are being deprived, they say, of the ability to control their working conditions and perform their role as stewards of biodiversity in agriculture.

There is a great need to be able to exchange old varieties between countries, according to some of the biodiversity farmers, who are worried that the new seed material regulations will prevent these activities.¹⁹⁵ Precisely because so little of Norwegian plant genetic diversity remains, they need to bring in varieties from other countries, such as Sweden, Finland and Russia, in order to enrich diversity and perhaps strengthen them in part by using old Norwegian varieties from the time when seeds flowed freely between countries.

Farmers who are actively involved in plant genetic diversity work all believe it is wrong to limit their options to the preservation of so-called conservation varieties.¹⁹⁶ One cannot 'freeze' varieties in the form in which they are registered. What matters is the use and further development of plant genetic diversity. The farmers are not interested in maintaining the old varieties in the form in which they acquired them from, e.g. NordGen. The point is to adapt them to their own needs, demands and environmental challenges, thereby facilitating greater diversity. It's about continuing several thousand years of tradition and knowledge, from which stems the variety of crops the world has at its disposal today. As farmer Johan Swärd put it: 'We don't need a museum for conservation varieties, what we want is to grow them.'¹⁹⁷

4.4.3 *Plant breeders*

Plant breeding in Norway is a challenge because there are many different cultivation zones with widely varying environmental conditions. This on top of the ever-decreasing number of farmers who buy seed material. Plant breeding is therefore only profitable to a limited extent. The development of highly popular varieties may pay financially and provide some return, but for less popular varieties it can easily result in a loss. It is important to ask, then, whether the breeding sector is able to meet the need of farmers for different varieties and ensure financially viable businesses.

¹⁹⁴ According to farmers interviewed at Fokhol, 7 April 2006.

¹⁹⁵ As Johan Swärd in particular was keen to advocate at the meeting with the Norwegian Food Safety Authority on the seed regulations at Oikos headquarters, 20 November 2008.

¹⁹⁶ According to the farmers and representatives of farmers' organizations who were present at the meeting with the Norwegian Food Safety Authority on the seeding regulations, at OIKOS headquarters, 20 November 2008.

¹⁹⁷ Telephone interview with the author, 20 December 2006.

When the plant breeding industry was privatized and Graminor established in 2002, it was necessary for the company to look at the financing of its activities because the political signals were unmistakable: Graminor should not expect to receive public funds in perpetuity. Since the one-off license fee farmers paid when they bought seed materials was insufficient to cover costs, Graminor suggested tightening the law on plant breeders' rights to increase license revenue – an idea that was rejected (see section 4.1 above). Graminor therefore still depends on selling services to the Ministry of Agriculture and Food in order to breed varieties that are not commercially profitable. Successful breeding requires long-term planning to meet future contingencies in the form of plant diseases, pests and climate change. The current funding structure constrains Graminor, it is said, because the government transfers funding for limited periods and leaves little room for long-term planning.

All the same, tightening the legislation on plant breeders' rights would probably not have solved the problem.¹⁹⁸ First, the new licensing system would be difficult to implement and Graminor would not have had the capacity to enforce it. Second, license fees would not have generated sufficient revenue anyway since the market is simply too small. Third, an amendment to the law could have led the authorities to raise the bar in their estimates of Graminor's ability to earn its upkeep, and lower their willingness to help help it financially.

According to Graminor's former director, Magne Gullord, Graminor is primarily concerned with ensuring dependable, long-term financing that allows it to lay long-term plans.¹⁹⁹ Whether this is achieved by means of legislative changes or government transfers is less important; what matters is that it provides for a successful, viable plant breeding industry in Norway.

Referring to the regulations on plant variety and propagating material, Gullord²⁰⁰ meant that farmers should be allowed to exchange seed materials and perhaps sell this material as long as it is not protected by plant breeders' rights, and provided it does not undermine plant health and professional plant breeding activity. The latter does not seem to be a problem since Graminor lacks the capacity to offer varieties for which demand is marginal. Graminor's then director maintained that farmers who want to sustain traditional varieties should have the right to do so.

4.4.4 Authorized seed shops

Felleskjøpet Agri is the largest company trading seed in Norway, and therefore a vital stakeholder in this context. Although the company expressed concern for the difficult economic situation facing the Norwegian plant breeding industry, it could not support the call to tighten plant breeders' rights,²⁰¹ essentially because of the adverse effect it would

¹⁹⁸ This point emerged during the January discussion referred to in the preceding footnote.

¹⁹⁹ Magne Gullord, then director of Graminor, interviewed in January 2007.

²⁰⁰ January 2007 interview.

²⁰¹ See consultation response, Lars Fredrik Stuve, director, FK, to Agriculture Minister, 18 April 2005: <http://www.regjeringen.no/nn/dep/lmd/Dokument/Hoyringar/Hoyringsdokument/2005/horing-forslag-til-ny-lov-om-plantefored/4.html?id=97788> (see Norske Felleskjøp)

have on farmers' rights and because the proposed system, in the company's view, would not be sufficient to secure the necessary funding for plant breeding in Norway. Enforcing compliance with the law would be so costly, moreover, that what was gained on the swings would be lost on the roundabout. Felleskjøpet therefore urged the authorities to reject the bill on tougher plant breeders' rights.

Felleskjøpet Agri, on the other hand, was positive to the regulations on plant variety and propagating material during the 'prohibition era', as the only stakeholder of those consulted in connection with this study. The organization has worked for decades to ensure high quality seeds in terms of plant health, purity and germination capacity.²⁰² Regulations were important in this respect. Rigorous seed material rules are particularly important for organic farmers, said Felleskjøpet, since these farmers cannot use pesticides against pests or diseases that happen to accompany the purchased seeds.

Even so, Felleskjøpet Agri backed proposals to change the regulations on plant variety release and seed marketing, on which stakeholders were being consulted in 2009.²⁰³ The company supported plans to make it easier to save, multiply and sell seed of conservation varieties and land varieties. Indeed, the company contended, the term 'native ecotypes' should be introduced as an equivalent to 'conservation varieties'. Felleskjøpet Agri believed that the propagation and sale of seed should be subject to the same rules. The most important considerations in this respect were the safety against wild oats, isolation distance and purity requirements (less germination capacity).

4.4.5 *Common stand*

Most agree that plant breeding in Norway will remain a government responsibility, given that the industry in part would not be financially viable without state funding. Tougher plant breeders' rights will not solve this problem; indeed the cost of policing compliance would add to the cost of the seeds and undermine farmers' rights. It is therefore important to determine the best way of financing the Norwegian plant breeding industry so that it can meet the demand for seed materials over the longer term – but without limiting farmers' right to save, use and exchange seed.

With the exception of Felleskjøpet Agri, all stakeholders were cognisant during the 'prohibition era' of the urgency of changing the regulations on plant variety and propagating material to regain for farmers the right to save, use, exchange and sell seeds – as long as plant health and quality considerations were also addressed. Since the regulations were amended to include conservation varieties and traditional vegetable varieties, attitudes are somewhat more hesitant. Time will tell how the changes will turn out.

²⁰² This section is based on a letter from Jon Atle Repstad, Product Director, FK, to the author, 6 March 2006.

²⁰³ Consultation response from Felleskjøpet to the Norwegian Food Safety Authority, 30 November 2009, and available at: http://www.mattilsynet.no/mattilsynet/multimedia/archive/00053/Felleskj_pet_Agri_53948a.pdf

4.5 Preliminary conclusions on farmers' rights to save, use, exchange and sell seeds

Norwegian authorities have gone further than the authorities in most countries in Europe to accommodate farmers' rights to save, use, exchange and sell seed materials. Farmers in Norway are still allowed to save seed of varieties protected by plant breeders' rights, and they can use the seed in the following season and exchange it among themselves. This opportunity is limited in most countries in Europe, where farmers may not exchange seed materials among themselves, and where saving seed of such varieties and using it in the following season is partly forbidden and partly requires a licence.

At the moment, patents have little impact on farmers' rights in this area because they are seldom used on seed for sale in Norway. There is still reason to be wary of a possible increase in the use of patents in this area: several patent applications under consideration at EPO could affect plant varieties by limiting farmers' rights to save, use, exchange and sell seed materials. Since the patents could also restrict the plant breeding industry's access to breeding material, they would affect the supply of seed to farmers, thereby adversely affecting farmers' rights (access to seed is an important good, see Chapter 6).

As regards the rules governing recognition of plant varieties and sale of seed and seed potatoes, Norwegian authorities have also gone further than most other governments in Europe. Farmers are allowed in Norway to sell (i.e. exchange and sell) seeds (except seed potatoes) on a non-commercial basis among themselves, according to the legislative history of our regulations. Although such practice is customary in most EU countries, it remains a banned practice in most of them. The reason different countries have different practices has to do with different interpretations of the conservation varieties directive, in particular with respect to the definition of 'marketing'. This was taken up at a working group meeting with the Standing Committee on Seeds and Propagating Material for Agriculture, Horticulture and Forestry under the European Commission,²⁰⁴ where it was established that, under the current regulations, farmers may not exchange seed or vegetative propagation material, as farmers per definition are considered to be commercial businesses and the rules include all seed material.²⁰⁵ Inasmuch as the Norwegian regulations were adopted prior to this clarification, the Norwegian interpretation will presumably stand until further notice. If Norway were to tighten these rules, it would represent a serious setback for farmers' rights to exchange and sell seed materials among themselves.

It has become easier for farmers to set up seed retailing businesses for the sale of conservation varieties. The initiative facilitates the commercial sale of seed of the varieties on the official Norwegian official list. Although it is relatively easy, it is not within the gift of everyone to start

²⁰⁴ Division for Plant Health and Materials for Plant Reproduction (Unit E7).

²⁰⁵ According to the minutes of the meeting penned by Torgun Johnsen at the Norwegian Food Safety Authority, and available at the Authority's website: http://www.mattilsynet.no/mattilsynet/multimedia/archive/00066/110411_Referat_Worki_66333a.pdf

and run a seed shop. Not all good agronomists are good at bureaucratic procedures. The first seed shop for conservation varieties has been set up, and lessons learned here will be of great value in assessing objective possibilities in this area.

Seeds of plant varieties sold commercially still need to be on the official Norwegian list. And for several varieties, the seed also needs certification. The requirements are less stringent when it comes to conservation-worthy plants, but the Norwegian Food Safety Authority has signalled it will be exercising a high degree of flexibility. What impact this will have, is still too early to tell, since only seven conservation varieties have been registered so far. If all the varieties with applications pending can be registered on the list of varieties, it would not impede the commercial marketing of the seed from said varieties. This is an unlikely outcome, however, since some varieties are genetically very heterogeneous, while others will have originated in other countries and problems could arise related to land of origin. The Norwegian Food Safety Authority is likely to go as far as possible to get as many varieties approved as possible, and NordGen and the NGRC will help with preparing variety descriptions and other information likely to increase approval chances. Time will tell what the approval percentage will be, the bureaucratic costs involved, and whether the varieties are approved quickly enough in relation to demand and the interests of farmers – to prevent them sustaining economic losses and enable them to promote diversity at their preferred pace. Time will also tell whether quantity restrictions will be applied and whether regional restrictions on cultivation and seed production will have any effect. Last but not least, time will reveal the impact of the requirement to save varieties in the form in which they were registered. Is it possible to comply with these requirements when they are applied to varieties with relatively large genetic uniformity and varieties which are still evolving naturally? Will the rules be followed? Or will they make it less attractive for farmers to promote crop genetic diversity, when they stop growers from contributing to the development of genetic diversity and adapt varieties to current needs and *environmental* conditions? Will the rules on traditional varieties of vegetables affect the number of varieties on the Norwegian market and how many of these varieties will it be lawful to sell to users?

It's too early to say anything about the consequences as yet. Instead, we have indicated factors that could impinge on farmers' rights to save, use, exchange and sell seed, thus limiting their ability to save and utilize genetic diversity in the future. There are many warning signs in the current regulations. If these warnings come true, it would significantly constrain the opportunity to preserve crop genetic diversity, use it and not least offer it to users. So far, the Norwegian Food Safety Authority has done its utmost to prevent this scenario from materializing. Whether it will manage to continue this effort depends on developments in the EU. The Fridtjof Nansen Institute is active here with a new research project on Norway's seed legislation at the crossroads between the Plant Treaty and EU, and will be monitoring and analyzing developments until the end of 2013.²⁰⁶

²⁰⁶ Follow the project at: www.fni.no/projects/norwegian_seed_policy.html.

5. Rights linked to relevant traditional knowledge

Knowledge of the properties, cultivation, uses and history of domesticated plants is essential if we want to use them. Traditional knowledge about the old plant varieties, development of varieties and conservation and use of plant genetic diversity in agriculture is therefore crucial to our ability to maintain this diversity. Since farmers traditionally have been carriers of this knowledge, their rights in this context are relevant. This is why they are covered by the Plant Treaty's provisions on farmers' rights. Under Section 9.2 [a], the protection of traditional knowledge related to plant genetic resources in agriculture is listed as a proposed measure to ensure and promote farmers' rights. The Plant Treaty does not specify what this means, though it has been studied in different contexts in connection with the Fridtjof Nansen Institute project on farmers' rights (www.farmersrights.org). It was also discussed during the informal international conference on farmers' rights in Lusaka in 2007²⁰⁷ and the global consultations on farmers' rights in Addis Ababa 2010.²⁰⁸

Originally, the wording 'protection of traditional knowledge' prompted associations with intellectual property protection. There was concern in a number of developing countries that it had to be about how you made sure that no one could profit from this knowledge unless those who possessed the knowledge had a share in some of the proceeds. This was a response to a fast growing tendency to seek intellectual property protection for plant genetic resources in the form of patents and plant breeders' rights. It was the developed countries which had the expertise and capital to exploit these potentials, while the developing countries ended up again as suppliers of raw materials – without any form of remuneration. It was therefore important to ensure that knowledge about plants did not fall into the hands of unauthorized parties and that systems were created to ensure benefit-sharing from the use of traditional knowledge. This was important, not least, as an element of the implementation of the Convention on Biological Diversity.

This notwithstanding, it soon became clear that the impact of the approach varied in relation to different categories of genetic resources. In terms of plant genetic resources in agriculture, the outcome was negative. Farmers who engaged with these questions were growing increasingly reluctant to share their knowledge, a step which harmed the farmers themselves first and foremost. Farmers in some areas of the Andes refused to share knowledge about potatoes with each other, fearing the others would pass it on.²⁰⁹ There was also evidence that representatives of

²⁰⁷ Andersen, Regine and Gunnvor Berge (2007): *Informal International Consultation on Farmers' Rights, 18 - 20 September 2007, Lusaka, Zambia*, Report M-0737 E (Oslo, Norway: Norwegian Ministry of Agriculture and Food), see: http://www.farmersrights.org/pdf/farmers_rights_lusaka_consultation_final_report.pdf

²⁰⁸ Andersen, Regine and Tone Winge, with contributions from Bell Batta Torheim (2011): *Global Consultations on Farmers' Rights in 2010*, FNI Report 1/2011 (Lysaker, Norway: The Fridtjof Nansen Institute), see: <http://www.farmersrights.org/pdf/FNI%20Report%201-2011%20Farmers%20Rights.pdf>

²⁰⁹ See i.a. Andersen, 2005b.

gene banks were directed not to talk to the locals while they were gathering samples in case the information fell into the wrong hands. Application procedures were almost insurmountable. Thus, it was not possible to document the knowledge and preserve it and there was little point in collecting plants for gene banks without the knowledge associated with them. Many of those who have been involved in various consultations on farmers' rights are saddened that it's become so hard to preserve traditional knowledge because local communities are afraid of losing control over it. It adds to the difficulties of preserving plant genetic diversity in agriculture and the knowledge associated with it.

Against this background, a new understanding of what the protection of traditional knowledge can mean has emerged. 'Protecting by sharing', or the protection of knowledge by sharing it. Informing this approach is the fact that there have been very few documented cases of improper use of knowledge related to plant genetic resources in agriculture. The risk of losing the knowledge is far greater on balance therefore than the risk of it being used unlawfully. Partly it is because it is important to share knowledge so that it does not disappear. Partly it is about the several ways of protecting knowledge legally to prevent improper use. For example, including the documentation of old varieties and related traditional knowledge in catalogues is a way of establishing 'prior art', i.e. it can be shown that this variety or knowledge exists and therefore cannot be patented or granted plant breeding rights. This still provides no protection if the recipients of the variety material and knowledge use it to make new varieties. These resulting varieties would then be eligible to intellectual property right protection if they met the formal requirements. New varieties increase plant genetic diversity generally and what is available to farmers, but benefit-sharing issues are not resolved, which under the Plant Treaty are dealt with in connection with the multilateral system of access and benefit-sharing. We will return to this in Chapter 6 on benefit-sharing.

Since unauthorized use is very uncommon problem when it comes to food plants while the loss of traditional knowledge is an acute challenge, most of those who have spoken out in various international consultations are now concerned that all of this traditional knowledge must be documented, shared and disseminated to prevent its disappearance. They are also calling for steps to strengthen the Plant Treaty's benefit-sharing mechanism.

5.1 Farmers' traditional knowledge of genetic resources in Norway

As was mentioned earlier in the report,²¹⁰ only a few traditional varieties of the different food plants are still grown in Norway today, and they are maintained and developed by groups and individual farmers who, for the most part, practise an organic or biodynamic form of agriculture. They are typical carriers of the traditional knowledge of what plant genetic diversity we have left in Norway. In the case of meadow plants, farmers who still take care of natural pastures and hay meadows are some of the

²¹⁰ See also Asdal, 2008, p. 14.

people preserving knowledge in this field. Many hobby gardeners and 'plant clubs', museums with plant collections and other institutions with field gene banks / plant collections, are also helping to keep this traditional knowledge alive.

Books on domesticated plants in Norway, semi-natural meadows and historical agriculture also contain information. A classic in this context *Planter og tradisjon – Floraen i levende tale og tradisjon in Norway 1925–1973 (Plants and Tradition – Flora in Live Speech and Tradition in Norway 1925–1973)* by Ove Arbo Høeg (1974), an impressive work of 750 pages that includes all kinds of crops, including cultivated plants, wild food crops and meadow plants, and information on their attributes, habitats, cultivation methods and uses in different parts of the country.²¹¹ The three-volume *Norges jordbruk i nyere tid (Norwegian Farming in Recent Times)* by Paul Borgegdal (1966) is important for documenting traditional knowledge of agricultural plants, especially Volume I which deals with plant production from the 1700s.²¹² Important traditional knowledge of meadow plants, pastures and hayfields of many kinds features in the book *Skjøtselsboka for kulturlandskap og gamle norske kulturmarker (On the Management of Cultural Landscapes and Old Norwegian Cultural Land)* edited by Ann Norderhaug et al. (1999).²¹³ Newer books on specific plant species are symptomatic of the growing interest in traditional knowledge of domesticated plants. On the occasion of FAO's international year of the potato, 2008, Landbruksmuseet (Norwegian Museum of Agriculture) and NGRC published *Det var en gang en potet... Jord og gjerning 2008 (Once Upon a Time There Was a Potato...)*.²¹⁴ Another book, *Potet i Norden – En beskrivelse av gamle potetvarieteter i den Nordiske Genbanken (Potatoes in the North – A Description of Old Potato Varieties in the Nordic Gene Bank)*, reviews ancient potato varieties and traditional knowledge of them and of potato growing as such.²¹⁵ Åsmund Bjørnstad's two books *Korn – frå steinalder til genalder (Cereals – From Stone Age to Gene Age, 2006)* and *Vårt daglege brød (Our Daily Bread, 2010)*, should also be mentioned in this regard.²¹⁶

Interest in traditional knowledge of old varieties appears to be growing. A two-day seminar on the value and use of old cereal varieties organized by farmers Johan Swärd and Anders Næss in July 2008 attracted more than 50 participants, including from the other Nordic countries.²¹⁷ Participants included farmers, millers and bakers. A subsequent seminar at Anders

²¹¹ Hoeg, Ove Arbo (1974): *Planter og tradisjon – Floraen i levende tale og tradisjon in Norway 1925–1973* (Oslo: Universitetsforlaget) .

²¹² Borgegdal, Paul (1966): *Norways jordbruk i nyere tid*, Bind I-III (Oslo: Bøndernes Forlag) .

²¹³ Norderhaug, Ann, Ingvild Austad, Leif Hauge and Mons Kvamme (eds) (1999): *Skjøtselsboka for kulturlandskap og gamle norske kulturmarker* (Oslo: Landbruksforlaget).

²¹⁴ Bjørnstad, Åsmund, Vegard Lie and Tore Skrøppa (ed. committee) (2008): *Det var en gang en potet... Jord og gjerning 2008* (Ås: Norsk Landbruksmuseum).

²¹⁵ Veteläinen, Merja (red) (2001): *Potet i Norden – En beskrivelse av gamle potetvarieteter i den Nordiske Genbanken* (Alnarp: Nordisk Genbank)..

²¹⁶ Bjørnstad, Åsmund (2005): *Korn – frå steinalder til genalder* (Oslo: Landbruksforlaget).

²¹⁷ The seminar was called "Fremtidens brød fra fortidens korn" (Bread of the Future from Cereals of the Past), and was held at the farm of Johan and Kristin Swärd in Brandbu, 14–15 July 2008, with the support of OIKOS, Norwegian Genetic Resource Centre, Oppland and Buskerud county governors.

Næss's farm in the summer of 2011 drew 60 participants from Norway, Sweden and Denmark.²¹⁸ More bakers are experimenting with traditional cereal varieties after discovering their unique qualities, nutritional value and fine taste.²¹⁹ Traditional varieties of other plant species have also grown in popularity, not least through new marketing opportunities based on place of origin, geography and traditions (see Section 5.3). We need to see all this in connection with the rising popularity of niche products which combine unique attributes such as taste with historical uses and local traditions. These products can fetch a high price in small, specialized market segments.²²⁰ Traditional knowledge, in other words, has economic potential.

The traditional knowledge held by farmers is evident to a degree in the preservation of genetic material. Collected seeds and plants are as far as possible tagged with information on the varieties given by donors.²²¹ The main institutions in this context are NordGen and NGRC who work in collaboration with certain museums and botanical gardens.²²² It is also possible to find information in old lists of varieties and reports on experiments. This information is relatively fragmented and not very accessible.

5.2 Measures to document and spread traditional knowledge²²³

The Norwegian Genetic Resource Centre (NGRC) is an advisory and executive agency under the Ministry of Agriculture and Food, mandated to ensure effective and sustainable management of national gene resources. The agency's work includes implementing the National Programme on the Conservation and Use of Plant Genetic Resources for Agriculture and Food Production. The programme is a component of Norway's work to implement the Convention on Biological Diversity, the International Treaty on Plant Genetic Resources for Food and Agriculture (the Plant Treaty) and the Global Plan of Action for the Conservation and Sustainable Utilization of Plant Genetic Resources for Food and Agriculture. NGRC initiates and coordinates action aimed at preserving and using genetic resources in Norway, and concentrates on genetic resources of plants, livestock and forest trees. We can mention the following efforts to facilitate documentation and exchange of traditional knowledge about plants.

²¹⁸ See article on the seminar: <http://www.skogoglandskap.no/nyheter/2011/oekokorn>

²¹⁹ For example, Baker Hansen, Godt Brød and Dinkelbakeriet, all represented at the mentioned seminar.

²²⁰ See also Asdal, 2008, p. 15.

²²¹ Asdal, 2008, p. 43.

²²² The Norwegian Genetic Resource Centre has collected a great deal of information and made it available on their website: <http://www.skogoglandskap.no/temaer/planter>

²²³ I would like to thank Åsmund Asdal, senior advisor at the Norwegian Genetic Resource Centre and the driving force behind many of the important measures to preserve plant diversity in Norway, for valuable comments and suggestions for this chapter.

- Plant Heritage Project and labelling scheme PLANTEARVEN® (PLANTHERITAGE) and Plant Heritage Prize
- Websites hosting information about plant varieties, including a database on fruit varieties
- Support schemes for projects in this area

The Plant Heritage Project serves as an information channel and a place where traditional varieties and knowledge thereof can be marketed.²²⁴ Its purpose is to collect and convey information on Norway's plant heritage and encourage its use with the motto: if you want to preserve old varieties, eat them!²²⁵ The main features of the project are a web page with information about the old varieties and how to obtain and cultivate them, and a specially designed trademark. A user who buys plants or other products labelled PLANTEARVEN® buys both the commodity and an important slice of Norway's cultural history, one that has been adapted to the country's climate down the years. The buyer becomes part of a network working to keep genetic resources and cultural history alive by using them.²²⁶

The Plant Heritage Project comprehends all plant species for which there are varieties, landraces and/or genotypes of a certain age and where there exist genetic resources that are adapted to Norwegian conditions and in need of preservation. This includes both food and ornamental plants.²²⁷ The project provides information on the properties and use of these plants, how they can be obtained and how to cultivate them. Preserved plants are available in the form of seed from NordGen or of cuttings for propagation from the national field gene banks.

Most of the plants marketed under the PLANTEARVEN® trademark are described on the project's website along with what is known about them, including traditional knowledge.²²⁸ Most of these plants are decoratives. Similar information could be made available for agricultural plants to facilitate plant exchange and transfer of traditional knowledge associated with them. The Plant Heritage Project is well placed to promote the exchange of plant genetic resources and related knowledge.

NGRC's website contains presentations of plants and plant varieties along with historic and traditional knowledge. There is, for example, a series articles on 'heritage plants', prepared in connection with the 2009 Cultural Heritage Year. The first article in the series is about a nearly forgotten variety of pea, Jærerta; it contains important information about the plant, its history, growth conditions and use, as well as references to other sources of information.²²⁹

²²⁴ See: <http://www.plantearven.no/>

²²⁵ According to the project description: <http://www.plantearven.no/tilgjengelige-planter/>. The slogan comes from the 'Slow Food' movement.

²²⁶ From the project description: <http://www.plantearven.no/varemerket>

²²⁷ From the project description: <http://www.plantearven.no/plantene>

²²⁸ See for example, description of the tree onion (*Allium cepa* L. 'Viviparum'): <http://www.plantearven.no/flora-pa-nett/enkeltarter/allium-cepa-l-viviparum-luftlok/>

²²⁹ See: <http://www.skogoglandskap.no/Artsbeskrivelser/jaerert>

The Plant Heritage Prize was introduced by NGRC as a mark of recognition of stewards of plant genetic diversity and associated traditional knowledge. The prize is awarded annually to individuals who have excelled in the field with a view to encouraging the preservation and use of plant genetic resources and to promoting greater awareness.²³⁰ The first prize was awarded in 2006 to Erling Olsen, former farmer and plant breeder. He won the prize for preserving more than 170 old potato varieties, which he grows on his farm in Snertingdal and gives to farmers and gardeners to help sustain diversity. He has lectured on genetic diversity, conservation and use of old varieties. By inaugurating the Plant Heritage Prize, the authorities have a means of recognizing farmers, gardeners and others and the work they do to preserve and develop plant genetic diversity.²³¹

The *Fruit Database* provides an overview of existing varieties of apples, pears, plums and cherries that are considered valuable for conservation purposes. As of November 2011, the number of varieties is 336.²³² Traditional knowledge of these varieties (going back as far as possible) is accompanied by images of the varieties and information about where they are sold and preserved. If expanded, the database could help convey traditional knowledge of other species. At the moment, though, the NGRC lacks the funds to expand into other species.

Financial support schemes for projects promoting conservation and sustainable use of genetic resources are also important instruments for NGRC, which to some extent also helps promote documentation and exchange of traditional knowledge. The Centre's action plan does not mention traditional knowledge as such, but it is all the same an important aspect of many of the supported projects. The Centre devotes some of its time and energy to developing user-friendly documentation systems and providing information of benefit to users of the old plant varieties.²³³

The annual budget is approximately 1.5 million Norwegian kroner.²³⁴ In 2008, approximately 50% of that amount was spent on projects related to food and fodder plants.²³⁵ The other half was used on ornamentals and for the maintenance of extant plant collections. Ornamental plants are given relatively high priority because they are not covered by NordGen.²³⁶ In the period from 2001 to 2010, the Centre oversaw the collection and registration of a large number of old plant varieties, including food and fodder plants. It has also organized efforts to preserve living plants in field gene banks and supported numerous groups and institutions in their efforts to preserve live plants in active use.²³⁷ The Centre is looking to set

²³⁰ This section is based on information from Andersen and Winge, 2008, pp. 52–54.

²³¹ For a list of prize winners, see: <http://www.plantearven.no/plantearvenprisen/>

²³² See: http://www.skogoglandskap.no/seksjoner/sortsdatabase/hent_fruktsort

²³³ According to the Action Plan for 2007–2019, p. 8, see: http://www.skogoglandskap.no/filearchive/handlingsplan_planter.pdf

²³⁴ *Ibid.*, p. 2.

²³⁵ Personal communication by email between the author and Åsmund Asdal, senior advisor, planter, Norwegian Genetic Resource Centre, 20 January 2009.

²³⁶ *Ibid.*

²³⁷ Formerly the Committee on Genetic Resources for Plants (Genressursutvalget for planter).

up and support more groups to underpin the maintenance of the plant genetic heritage.²³⁸ Although traditional knowledge is not specified in as many words, support is also available for projects in this area. A more explicit focus on traditional knowledge in the Centre's action plan for the conservation and use of plants²³⁹ and funding announcements could increase the number of projects in this area or projects with a stronger focus on traditional knowledge.

NGRC has a limited budget to fund its activities. The Centre has therefore chosen to support first of all communities and projects in the plant sector which are addressing problems and issues related to the conservation of genetic resources and associated knowledge. A large, active network of people and communities has emerged, producing excellent results. So far, the budget hasn't allowed the Centre to order specific, more comprehensive projects, although it would have been desirable in the priority areas.

Thanks to its expertise, wide-ranging contacts and strategic project support, NGRC has succeeded in reviving and sustaining traditional knowledge in Norway. The extent to which this potential can be further exploited is a question of financial resources, or in other words, political will.

NordGen maintains a collection of *ex situ* genetic material from food plants. The institution has a documentation system for plant gene banks, SESTO, developed as a tool for users of the gene pool. It also provides access to information about the collections,²⁴⁰ that is, taxonomic, geographic, breeding and donor information for each cultivar. There are images and links to relevant pages providing additional information, as well as information on traditional knowledge. NordGen is a vital element in efforts to spread traditional knowledge of plant genetic resources in agriculture.

Farmers, groups and organizations initiate schemes to exchange traditional knowledge among themselves and with others. The initiatives are both formal, such as seminars and documentation activities, and informal, where information is given at meetings and gatherings. NGRC supports some of these initiatives, such as the seminars mentioned at the beginning of the chapter. The Vestfold branch of the Norwegian Farmers' Union piloted a project on organic seed materials with a view to increasing production and use of Norwegian organic seed materials. Many meetings were held, and brochures were prepared and published on a website. Old varieties were central to this work and the project mediated traditional knowledge by means of its collections and

²³⁸ From a summary of achievements 2001–2006:

http://www.skogoglandskap.no/fagartikler/2007/resultater_handlingsplan

²³⁹ See Norwegian Genetic Resource Centre (2011): *Bevaring og bruk av plantegenetiske ressurser*.

Aktivitetsplan kulturplanter, Norsk genressurscenter 2011 – 2014, prepared in cooperation with

Genressursutvalget for kulturplanter (Gene Resource Centre for Cultivated Plants), available

[:http://www.skogoglandskap.no/filearchive/aktivitetsplanngsrplanter_2011_14.pdf](http://www.skogoglandskap.no/filearchive/aktivitetsplanngsrplanter_2011_14.pdf)

²⁴⁰ See: <http://www.nordgen.org/index.php/skand/Folder/Innehaall/Sesto>

publications.²⁴¹ Biodynamic farmers organize gatherings to exchange traditional knowledge of plant varieties.

Seeds of genotypes of meadow plants from all over the country are collected by and preserved at NordGen. In the case of fodder and other useful plants in meadows, the important thing here is the effort to preserve and develop them *in situ*, inasmuch as the plants are still living and evolving in the agricultural landscape. Surveys and knowledge of diversity and how the cultural landscape should be managed are investigated and documented over several decades, by i.a. Sogn og Fjordane University College and Bioforsk.

2010 saw the launch of the Action Plan for Hay Meadows by the Directorate for Nature Management. The plan clearly links the maintenance and management of permanent grassland to the preservation of genetic resources. In mid-November 2011, a seminar entitled *Humanity and the Natural Heritage - Traditional Knowledge About the Use of Nature* was organized in Tjøme by the Directorate for Nature Management and Norwegian Nature Inspectorate.²⁴² Numerous courses, festivals, competitions, tours and field days with flowering meadows, scythe-mowing and hay-drying as themes. There is insufficient space to examine all of this here, but one important example may be mentioned. The Buskerud branch of Friends of the Earth Norway organizes scything courses at a summer grazing farm, Ryghsetra, in the municipality of Nedre Eiker. This is one instance of transmitting old knowledge down the generations and creating an environment for this type management. Ryghsetra is classified as a cultural landscape of national importance and the annual mowing exercise is the most important form of management. The 2011 event was the seventeenth time in a row.²⁴³ In light of the scythe-mowing course at Ryghsetra, Hans Petter Evensen from Torpo created a website featuring this type of traditional knowledge (www.slaattekurs.no). The website is run on funding from the Norwegian Non-Fiction Writers and Translators Association. Another interesting initiative is Bent Nilsen's business, whose services are based on traditional knowledge and which focuses on the management and restoration of cultural landscapes where farming activity, past and present, has left its mark.²⁴⁴

5.3 Relevant regulations on traditional knowledge

The Nature Diversity Act²⁴⁵ was adopted in 2009 with the purpose of protecting biological, geological and landscape diversity and ecological

²⁴¹ Final Project Report: Svein Solberg (ed.) (2006): *Nasjonalt Pilotprosjekt Økologisk Formeringsmateriale 2003–2006*, Fagrappport – Engfrø, SÅkorn, Settepotet, Urter, Grønnsaker, Frukt og bær (Stokke, Vestfold: Nasjonalt Pilotprosjekt Økologisk Formeringsmateriale), and Eivind Brendehaug (2005): *Følgeevaluering av nasjonale pilotprosjekter innen økologisk landbruk*, VF-Notat 1/05 (Sogndal: Vestland Research).

²⁴² See the seminar's website: <http://www.dirnat.no/mennesketognaturarven>

²⁴³ For a description of the 2011 scythe mowing course, see: <http://naturvernforbundet.no/buskerud/slaattekurs-paa-ryghsetra/slaattekurset-paa-ryghsetra-2011-article14582-2036.html>

²⁴⁴ Bent Nilsen's website: www.kulturlandskapspleie.no

²⁴⁵ LOV 2009-06-19 nr 100: Lov om forvaltning av naturens mangfold (Naturmangfoldloven)

processes through conservation and sustainable use through sustainable use, and in such a way that the environment provides a basis for human activity, culture, health and well-being, now and in the future (§ 1). The law contains no explicit provisions on traditional knowledge, but states that genetic material obtained from the natural environment is a common resource belonging to Norwegian society as a whole and managed by the state (§ 57). It shall be utilised to the greatest possible benefit of the environment and humankind in both a national and an international sense, while attaching importance to appropriate measures for sharing the benefits arising from the utilization of genetic material and in such a way as to safeguard the interests of indigenous peoples and local communities. When it comes to the collection and utilization of genetic material obtained from the natural environment (§ 58), under the law the King may decide that a permit is required from the Ministry and regulations are necessary specifying the information the application shall contain, including information on the use of the knowledge of indigenous peoples or local communities. Such regulations may also state how the interests of landowners and indigenous peoples and local communities can be reasonably safeguarded. Currently, no such regulations have been forthcoming.

With regard to genetic material from other countries, the Act states that importation must proceed in accordance with the laws on consent in the respective countries (§ 60), and the King may make regulations requiring information to accompany genetic material if its utilization involves use of the traditional knowledge of local communities or indigenous peoples.²⁴⁶

Another type of legislation looks to safeguard products developed from traditional knowledge, among other things. The regulations on the protection of designations of origin, geographical designations and designations of traditional characteristics of foodstuffs was adopted in 2002 and revised in 2004 and 2007.²⁴⁷ Regulations were adopted pursuant to the Food Act and are meant to ensure protection with a view to fair trading (§ 1). Designation of origin may be granted for food with a place name when the product demonstrably originated in this place, has acquired its distinctive quality in this area and is produced there (§ 5). For geographical designations, the same conditions apply more or less, but here it is not only the unique quality of the area that matters; reputation or characteristics attributable to that geographical origin may also apply (§ 5). A designation for the traditional characteristics of a food can be protected if the product is made of traditional commodities, has a traditional composition or production method reflecting the traditional manner of production (§ 11). In addition, the name itself must be distinctive and traditional.

²⁴⁶ Whenever material covered by the Plant Treaty is used in Norway for research or commercial purposes, it shall be accompanied by information about the material in line with the Treaty's standard contract (§ 60).

²⁴⁷ Forskrift om beskyttelse av opprinnelsesbetegnelser, geografiske betegnelser og betegnelser for tradisjonelt særpreg på landbruksbaserte næringsmidler, fisk og fiskevarer (FOR 2002-07-05 nr. 698, last amended FOR 2007-05-18-526).: <http://www.lovdata.no/for/sf/ld/xd-20020705-0698.html>

Applicants whose designations of origin, geographical designations or designations of the traditional characteristics of the foodstuffs are awarded protection enjoy exclusive rights to market the product with these designations and a certificate guaranteeing the label's authenticity. A Norwegian example is *Ringerikserter* (Ringerike peas). This pea variety comes from Røyse, a small place in the Ringerike area north of Oslo, and would have been lost had it not been for a farmer who found a small bag of pea seed in an attic and began cultivating it in 1950s. A small organization consisting of a few local farmers secured exclusive rights to the use of the name *Ringerikserter* in the marketing of these peas and use of the product label is certified.²⁴⁸ Only the designation is protected. The peas themselves – and the knowledge associated with them – remain freely available for anyone who wants to grow them in areas other than Røyse, provided they are not marketed as *Ringerikserter*. The system provides in other words exclusive rights on designation, but without limiting access to and use of the genetic resources and associated knowledge.

This approach has both beneficial and detrimental sides. Farmers outside the area, to the extent they exist in this example, may lose interest in cultivating the particular variety if they can't market it under the familiar name, *Ringerikserter*. Since farmers with an exclusive right to the use of this designation have no obligation to ensure the variety's survival and use in the future, the pea variety could disappear from active use should the farmers decide to wind up the operation. This could also happen if the pea variety succumbed to disease, pests or climate-related harm in the small area where it is grown. In the worst case, the Ringerike pea could disappear from active use altogether. NordGen would in this case be the last line of defence for this tasty, easily digestible pea variety.

On the other hand, this type of protection is supposed to facilitate the marketing of niche products based on traditional knowledge, in this case, a product from an old variety, which is important to ensure the continued use of these genetic resources. The system could well be the salvation for this pea variety.

When farmers in the Ringerike area applied for protection of the designation *Ringerikspotet* (Ringerike potato), it became a harder process than anticipated because farmers elsewhere in the country were already cultivating the variety and using the name.²⁴⁹ The potato was eventually approved under the name of *Ringerikspotet fra Ringerike* (Ringerike Potato from Ringerike).²⁵⁰ The potato variety 'Gulløye from Northern Norway' (Golden Eye) was approved because of its distinctive origin and growing conditions in northern Norway.²⁵¹ Designation protection has been awarded the potato variety 'Fjellmandel from Oppdal' and different

²⁴⁸ Forskrift om beskyttelse av produktbetegnelsen Ringerikserter som Beskyttet opprinnelsesbetegnelse (FOR 2004-06-01 nr. 819): <http://www.lovdata.no/for/sf/ld/xd-20040601-0819.html>

²⁴⁹ See *Nationen*, Tuesday 7 February 2006, p. 9.

²⁵⁰ See description : www.beskyttedebetegnelser.no/godkjente-produkter/bb/16

²⁵¹ Forskrift om beskyttelse av produktbetegnelsen Gulløye fra Nord-Norway som beskyttet opprinnelsesbetegnelse (FOR 2007-09-14 nr 1094)

varieties of fruit of four species from Hardanger, named Hardanger apples, Hardanger pears, Hardanger cherries and Hardanger plums.²⁵²

5.4 Farmers' reflections on traditional knowledge

In the opinion of biodiversity farmers interviewed for this report traditional knowledge is indispensable. It is used to select varieties in accordance with needs and demand, to grow old varieties in accordance with their growing conditions and to develop varieties. Knowledge is also important from a marketing perspective, since it concerns how products can be used and also puts them in a wider historical context. This is important in a niche market for traditional food. Although there is mounting interest in traditional food, not many people with traditional knowledge of crop genetic diversity in Norwegian agriculture remain. Most of them are at an advanced age. Farmer Erling Olsen put it in words when he received the 2006 Plant Heritage Prize. He was now over 80, he told, and wondered who would take over his collection of 170 potato varieties and everything he knew about them if and when he became infirm.²⁵³

Given the rapid loss of traditional knowledge, farmers who were interviewed for this study believe it is particularly important to collect, document and convey this knowledge to wider groups of interested farmers and other users in the value chain from farm to table, such as millers, bakers and other processors of cereals, vegetables, fruit and berries. It is also important, they say, to establish links with farmers in other countries with similar growing conditions so as to exchange knowledge with them, thus ensuring that knowledge is kept alive. There are several joint initiatives in the Nordic countries to this end. Biodiversity farmers in Norway are not concerned with improper use of the knowledge they possess, since no one seems to know of any instances of its occurrence.²⁵⁴ What they fear above all is the eventual disappearance of the knowledge altogether.

Discussions with farmers in different situations, revealed a high degree of consensus on what they believed lay behind the loss of traditional knowledge. The modernization of agriculture has sparked a high degree of specialization within the sector among breeders, seed retailers, agricultural consultants and farmers. As a result, farmers are hardly involved in the selection of seed materials anymore. Most farmers seem to trust the advice handed out by seed merchants and agricultural consultants, and generally choose to follow it. Indeed, most farmers have welcomed this development, since they get a total plan tailored to the conditions on their own farm, consisting of seed materials, fertilizer, pesticides and advice on how to use them. It eases the work on the farm, offers more stable harvests, which have grown thanks to improved

²⁵² For more information on see the homepage of the Protected Designation Scheme (Beskyttede Betegnelser): www.beskyttedebetegnelser.no

²⁵³ The Norwegian Genetic Resource Centre began a project in 2009 to preserve the most valuable varieties in Erling Olsen's collection.

²⁵⁴ None of the study's interviewees had heard of any instance of misuse.

modern varieties. In sum, the farmer earns more.²⁵⁵ At the same time, however, much of their knowledge of crop genetic diversity and processes related to the cultivation, use and development of the old ones has already been lost, and what remains is in danger of dying out with the older generation of farmers. The situation is also undermining people's appreciation of the value of genetic resources and genetic diversity. Organic and biodynamic farmers who were interviewed in connection with this study believe that farmers have also lost confidence in their own knowledge and become increasingly dependent on external expertise.²⁵⁶

Another point underlined by the biodynamic farmers,²⁵⁷ is that seeds are often coated and can cause skin irritation. Farmers have to use protective gear when handling the seed. This robs them of an opportunity to 'commune' with the seed. There's a special feeling that comes from holding the seed in your hand, they say; it fills you with with a deep sense of reverence for creation.²⁵⁸ The use of coated seed material eliminates this basic feeling that connects them directly to the plant genetic diversity, they feel.

The argumentation of conventional farmers follows along some of the same lines.²⁵⁹ Three generations ago many farmers had a deep understanding of the value of plant genetic diversity on their land and its importance for future generations of farmers. With the emergence of new, modern varieties, the old varieties became obsolescent and farmers found them unattractive. It was no longer necessary, they believed, to preserve the old varieties on farms. What was important was gaining access to the new varieties and the technology to farm them. The current generation of farmers has thus lost much of what older generations knew about preserving and using plant genetic diversity in a sustainable fashion. And as knowhow has declined, so also has awareness of this issue.

Biodynamic farmers believe conventional modern agriculture is a very recent phenomenon in the history of agriculture and biodynamic systems today are actually the ones which represent continuity in a historical perspective. This does not mean that their methods are old-fashioned, but that they bring old knowledge and traditions to bear in conjunction with new knowledge and experience. When they talk about continuity they mean the old agricultural techniques and traditions, the culture associated with those traditions and knowledge of plant genetic diversity in agriculture. Along with a number of organic farmers, these farmers, too, possess an increasingly rare type of knowledge.

²⁵⁵ Farmer Torleif Hallingstad from Ål in Hallingdal has observed this development over more than seven decades. He emphasizes the importance of working conditions and income among farmers (interview in Ål, July 15 2006).

²⁵⁶ This has been expressed in several contexts, including during the telephone interview with farmer Johan Swärd, 20 December 2006, and the 'phone interview with Kari Bysveen, consultant in organic agriculture at the research ring Fabio, 15 December 2006.

²⁵⁷ Group interview at Fokhol Farm, Stange, 7 April 2006.

²⁵⁸ This point was articulated with great clarity by the biodynamic farmers Aksel Melbye from Strange and Svein Helge Storødegård from Lillehammer during a group interview at Fokhol, 7 April 2006. Aksel Melby emphasized this point by recounting an old Norwegian tradition. Farmers should not sow with their hat on, as a mark of respect. Biodynamic farmers still observe this custom.

²⁵⁹ This is based on the interview with Pia Borg, then senior advisor at the Norwegian Farmers' Union, 8 March 2006.

According to most of the interviewed farmers, traditional knowledge is an important aspect of our ability to preserve plant genetic diversity for the future and thereby to adapt Norwegian agriculture to changing climatic and environmental conditions and user preferences. Some also point to the usefulness of knowledge to farmers trying to improve profitability in agriculture by setting up a niche production of traditional food products. Traditional knowledge is an important element for the development of entrepreneurship and earning opportunities for farmers. Society has an important task, say the farmers' organizations in Norway, to promote the wider use of genetic diversity and associated traditional knowledge (see also Chapter 7).

5.5 Preliminary conclusions on traditional knowledge

The rights of farmers pertaining to traditional knowledge of crop genetic diversity is above all about preserving this knowledge and ensuring its survival. Documentation, exchange and active use are crucial. As we have seen, traditional knowledge in the opinion of biodiversity farmers is indispensable and essential to efforts to conserve and maintain crop genetic diversity on farms, and to achieve an economically sustainable production with this diversity. As we also have seen, knowledge disappears quickly; urgent measures are therefore required to save what's left and pass it on.

All the same, there is no integrated plan on how this cultural treasure should be maintained and transmitted. Several measures are being implemented by various parties which reinforce traditional knowledge of selected plants, cultivation methods, and applications. But, apart from the 2010 Action Plan for Hay Meadows, there is no strategic approach to this work. This is a very serious matter in light of how quickly the knowledge is disappearing.

NGRC, we note, has taken important strategic steps to make Norway's plant heritage better known and to encourage the use of traditional Norwegian plants. In this connection, information has been made available on the Centre's websites, and it is ensuring that people can obtain the plants and knowledge associated with them. This is a valuable contribution to the preservation of this knowledge. Nevertheless, the measures tend to privilege ornamental plants, fruit and berries, and to a certain extent potatoes. This is because these plants fall outside NordGen's remit, or in the case of potatoes, because Norwegian users cannot obtain the NordGen varieties.²⁶⁰ Given the Centre's tight budget, they therefore give precedence to these plants. If the Centre had the necessary funds, the Plant Heritage Project and fruit database could have been expanded with the addition of more edible plants and information about them could be made more widely available. It would also be possible to concentrate more on traditional knowledge, and to make funds available for the purpose. Several projects could be supported and work in this important area could be strengthened.

²⁶⁰ Because of the seed potato regulations, see Section 4.2.

Recent years have seen the emergence of fresh opportunities; see for instance the Action Plan for Hay Meadows and the choice of hay meadows and wetlands as Selected Habitat Types under the Nature Diversity Act – which results in more generous funding and greater activity to conserve them. These are reasons for hope, and perhaps one can also learn lessons from this initiative with a view to efforts to maintain food plants and associated traditional knowledge.

All in all, many excellent initiatives are under way to maintain and pass on traditional knowledge of food plants, something which contributes to the realization of farmers' rights in this area. But a lot remains to be done and there is no systematic, comprehensive plan to save and pass traditional knowledge on. There are some useful tools, and an apparatus is in place that can initiate a targeted push in this area, but there is no funding. Whether funds will be made available depends on political priorities.

And political priorities are in turn a result of policy-makers' perceptions of the importance of different policy areas and needs, and how they balance these areas and needs with adopted policy at any given time. Insofar as the Norwegian government has set itself the task of being best in the world in conserving genetic resources, and a number of measures have been taken to implement the Plant Treaty, lack of awareness of the importance of traditional knowledge is probably one of the main reasons why it is difficult to attract funds.

The hypothesis finds some confirmation in the interviews with farmers for this study. There is little general awareness of the importance of traditional knowledge of crop genetic diversity in agriculture, they believe. To get the authorities to allocate the necessary funds for this work, there needs to be greater awareness of the problem.

Traditional knowledge of food plants is a thankful subject in this respect. There are masses of fascinating stories about people and traditions, about difficulties and solutions, about surprising rediscoveries of old plant varieties,²⁶¹ cultures, tastes, aromas and colours. By telling these stories at meetings, seminars, on websites and in newspaper articles, etc., where information is shared, awareness of traditional knowledge and related needs will grow. The NGRC has done a great deal in this area already. However, there is obviously a need to do significantly more.

²⁶¹ The story of how svedjerug was rediscovered is often told. It was the Finns who originally brought this tasty rye variety to Norway, back in the 1600s. Ten grains were found lying between the floorboards of an old *rie* (a sauna for drying grain). They had probably lain there for more than 100 years. Surprisingly, seven of them germinated. They proved to be the old svedjerug one assumed had disappeared from Norway. The plant is a two-year variety, it can reach 2.5 meters, have up to a 100 straws with about 50 grains each. It is grown today several places in Norway and is coveted by bakers. See: www.skogoglandskap.no/Artsbeskrivelser/svedjerug/ (in Norwegian).

6 Benefit-sharing and the use of genetic resources

One of the key measures to protect and promote farmers' rights, as referred to in the Plant Treaty, is the right to participate in the distribution of benefits from the use of the plant genetic resources in agriculture (Art. 9.2 [b]). It is about recognizing and compensating farmers for their contribution to the global pool of genetic resources and thus to world food security. As Art. 9 on farmers' rights does not make further specifications, the question is therefore what it will mean in practice. Elsewhere in the Plant Treaty, under Art. 13 on the multilateral system of access and benefit-sharing, the main benefits are described as: (1) access to plant genetic resources for food and agriculture; (2) exchange of information; (3) access to and transfer of technology; (4) capacity building; and (5) sharing of financial and other benefits that have arisen as a result of commercialization.

While these points all have to do with the multilateral system and are not directly linked to the article on farmers' rights in the Plant Treaty, they reflect a mindset that is also relevant to the interpretation of Art. 9.2 [b] on the sharing of benefits as a means to protect and promote farmers' rights.

Another important point for understanding Art. 9.2 [b] is the preparatory work, that is, the negotiations leading up to the Plant Treaty. As early as in the second half of the 1980s, farmers' rights featured in negotiations on what was the predecessor of the Plant Treaty, the International Agreement on Plant Genetic Resources (1983). The impetus was that farmers had to be recognized and compensated for their contribution to the global pool of plant genetic resources for food and agriculture; this was important to ensure their continued contribution in this area (Andersen, 2005b). Recognition and compensation would be granted the great numbers of the world's farmers for preserving and developing genetic diversity. In a resolution adopted by the FAO in 1989 (FAO Resolution 5/89), farmers' rights were seen as a means to ensure the conservation of plant genetic resources, generate economic funding to this end, reward farmers and their communities for their efforts to conserve and improve participate in the benefits derived, at present and in the future, from the improved use of plant genetic resources, and to ensure that farmers in all regions should share in the benefits from the further development of plant varieties. This resolution has remained the most important decision in the prehistory of Plant Treaty for understanding farmers' rights.

On this basis, and in light of the interviews conducted for this study, we can operationalize benefit-sharing for the Norwegian case as follows.

- Incentive structures to facilitate the preservation, use and development of plant genetic diversity in farmers' fields, so that farmers do not suffer financially compared to farmers involved in conventional food production, and that they achieve recognition and support for their efforts;

- Access to plant genetic diversity for farmers, including the conservation of this diversity;
- Exchange of information, capacity building and transfer of technology to reinforce farmers' efforts in respect of plant genetic diversity.

Norway is also obliged under the Plant Treaty to ensure benefit-sharing with developing countries and countries with so-called transitional economies through three mechanisms: the benefit-sharing mechanism under the multilateral system (Art. 13); the financing strategy (Art. 18); and international collaboration, including on technical assistance (Arts 7 and 8).

6.1 Incentive structures and support for conservation work

Incentives can be understood as factors likely to motivate a particular behaviour. They tend to take the form of economic motivation. Incentive structures in industrial policy concern rules, subsidies and other economic motivational factors influencing the decision making of industrial stakeholders. Incentive structures can have both positive and negative impacts in different areas, depending on their design. Measures to reinforce the incentive structure are therefore essential to achieve specific targets. Here, the longer view is often an important criterion, i.e. making sure measures remain stable over time.

The purpose of Norwegian agricultural and food policy is to maintain a viable farming industry across the country, promoting wealth creation and quality of life based on sustainable agriculture and rural community resources, to ensure food safety, economic growth, employment, habitation patterns and sustainable utilization of resources.²⁶² Key objectives include the protection of biodiversity, good plant health, innovative and sustainable food production and diversity of food products to users.

When it comes to genetic resources, the government's Environment Strategy, 2008–15 set out as the government's goal to maintain food security and sustainable agriculture through the use and protection of genetic resources in agriculture.²⁶³ Applying this strategy, the government aims to increase diversity of species and varieties that are cultivated, and promote the conservation and sustainable use of wild relatives and other varieties of utility plants, while embedding respect for genetic resources in the management of cultural landscapes and management plans for protected areas.

²⁶² Ministry of Agriculture and Food (2008): Ministry of Agriculture and Food's Environmental Strategy 2008–2015 (Oslo: LMD), p. 6:
http://www.regjeringen.no/upload/LMD/Vedlegg/Brosjyrer_veiledere_rapporter/Miljostrategi_2008_2015_M_0739_B.pdf

²⁶³ Ministry of Agriculture and Food (2008): Ministry of Agriculture and Food's Environmental Strategy 2008–2015 (Oslo: LMD), p. 37.

In 2008, the Ministry of Agriculture and Food's total budget for genetic resource management in Norway was 6.6 million kroner.²⁶⁴ The money was spent on measures related to agricultural plants, genetic resources of livestock, and forest genetic resources, including a gene bank for poultry and support for farmers with old cattle breeds. The money also covered Norwegian participation at relevant international negotiations, including on the Plant Treaty and international efforts to realize farmers' rights. The allocated funds to genetic resources also covered Norway's voluntary contributions to the sharing mechanism under the Plant Treaty's multilateral system (see below).

According to the environmental strategy, the NGRC is tasked with encouraging the active use of genetic resources relating to domesticated plants (in addition to the livestock and forest tree areas) by providing information, ensuring availability, brand/labelling schemes and advice, while the environmental authorities are responsible for monitoring protected areas to facilitate management and care.²⁶⁵ Economic incentives are not mentioned as a policy instrument by the Ministry of Agriculture, other than in connection with livestock. We will examine the incentive structure in agriculture with regard to the conservation and sustainable use of crop genetic diversity.

Important premises underlying Norway's agriculture and food policy include import restrictions that safeguard the national production, and a national subsidizing system combining budget transfers and extensive regulations. The main elements of this framework are the subject of negotiation between the government and farmers' organizations, the outcome of which forms the basis of the annual agricultural agreement. The participating organizations are the Norwegian Farmers' Union (Norges Bondelag) and the Norwegian Farmers' and Smallholders' Union (Norges Bonde- og Småbrukarlag).

The 2008 settlement²⁶⁶ seeks to facilitate higher average incomes for farmers²⁶⁷; give priority to grassland-based livestock production²⁶⁸; diversity of agricultural systems; environmental measures; and organic production.²⁶⁹ The financial incentives put in place by the agricultural settlements which come closest to supporting farmers' efforts to maintain plant genetic resources in recent years are funding schemes for organic agriculture, especially cereals production, peas, oleaginous plants and

²⁶⁴ Ministry of Agriculture and Food (2008): Ministry of Agriculture and Food's Environmental Strategy 2008–2015 (Oslo: LMD), p. 37.

²⁶⁵ Ministry of Agriculture and Food (2008): Ministry of Agriculture and Food's Environmental Strategy 2008–2015 (Oslo: LMD), p. 38.

²⁶⁶ Proposition to the Storting No. 1 (2008–2009), from the Food and Ministry of Agriculture, 12 September 2008: <http://www.regjeringen.no/nb/dep/lmd/dok/regpubl/stprp/2008-2009/stprp-nr-1-2008-2009-1/2.html?id=530137>

²⁶⁷ Whether this happens in practice has been the subject of heated debate in recent years, not least in the newspapers *Nationen* and *Klassekampen*.

²⁶⁸ Unlike fodder-based.

²⁶⁹ Source: St.prp. nr. 69 (2007–2008): Om jordbruksoppgjøret 2008 – endringer i statsbudsjettet for 2008 m.m. (Proposition to the Storting No. 69 (2007–2008): On the 2008 Agricultural Settlement – Changes in the State Budget for 2008 etc.) (Oslo: Ministry of Agriculture and Food), p. 38: <http://www.regjeringen.no/pages/2082967/PDFS/STP200720080069000DDDDPDFS.pdf>

beans, as well as organic meat and milk production.²⁷⁰ The settlement includes grants to facilitate the conservation of cultural landscapes, old cattle breeds, pastures and highland dairy products. Incentives to farmers to conserve and use plant genetic diversity in food plants sustainably on farms have so far not been addressed. The 2008 agriculture settlement stipulates an increase in support for the maintenance of old livestock breeds at 1,300 kroner per animal. The underlying argument is that the industry has a responsibility to sustain biological diversity, and the support has been instrumental in bringing the number of animals of old breeds up to a sustainable level.²⁷¹ This support is estimated to amount to about 2.5 million kroner per year. There is no similar scheme for ensuring plant genetic diversity on farms.

The closest thing to an incentive structure aimed at the conservation and sustainable use of domesticated plants on farmland is the project funds allocated annually by the NGRC to stimulate activity in this area. In 2010, these funds probably amounted to 1.7 million kroner. They were divided among fourteen projects of which six dealt with food plants. The others addressed ornamental plants (four projects on roses, one on dahlias) and meadow plants (two projects on timothy, in addition to the *Arvesølv* ('Silver Heritage') project.²⁷² There is an important difference between project support and what we call incentive structures, in that project support is limited in terms of measures and time, while incentive structures apply to anyone implementing the defined activities and meeting the requirements for such support. Incentive lifetimes tend to be longer. Project funds can be important for launching activity in specific areas, while long-term incentive structures are better suited to maintaining and targeting or directing activity in desired areas over time. NGRC project funds cannot replace long-term incentive structures.

The *Regional Environment Programme* and *Special Environmental Measures in Agriculture* (SMIL) schemes are managed by the Norwegian Agricultural Authority, the former through the county authorities, the latter through local authorities. Funding the management of hay meadows has been a priority of both schemes in recent years.²⁷³ The schemes allow for additional grants based on the quantity of farmland in use for the maintenance of pastures and funding for projects in this area. The Norwegian Agricultural Authority also manages funds for organized grazing and a national grazing project. The Authority oversees three other mechanisms of relevance to biodiversity farmers²⁷⁴: pilot projects for organic agriculture; marketing strategies for organic agriculture; and advisory and development projects in organic agriculture. Several

²⁷⁰ Ibid., p. 63.

²⁷¹ Ibid., p. 62.

²⁷² Information on the project can be found here:
<http://www.skogoglandskap.no/artikler/2010/prosjekterplanter2010>

²⁷³ LMD (2011): *Rogaland tar vare på slåttemarker*. (Rogaland takes care of hayfields) . News item on the homepage of the Ministry of Agriculture:
<http://www.regjeringen.no/nb/dep/lmd/aktuelt/nyheter/2011/sept-11/rogaland-tar-vare-pa-slattemarker.html?id=654520>

²⁷⁴ See:
http://www.slf.dep.no/portal/page?_pageid=53,418462&_dad=portal&_schema=PORTAL&p_d_i=301&p_d_c=&p_d_v=2259&p_d_i=583&p_d_c=&p_d_v=2259

projects in this category received funding to look at the preservation and development of plant genetic diversity on farmland. This funding has been of some considerable importance in stimulating and initiating activities in the area, rather than long-term incentives for this type of work. We see that the government's agricultural administration, abiding by the premises set out in the agricultural settlement, is making relatively extensive commitments to hayfields and grazing land, while there is no commitment of a similar nature to genetic diversity in food plants. Such funding as has been forthcoming for projects in the latter category is awarded as an element of the government's organic commitment.

Support for the preservation of hay meadows comes from another quarter as well. The Biodiversity Act provides authority to designate specific habitats to ensure habitat diversity within their natural range, with the crop genetic diversity and ecological processes that characterize these habitats. In May 2011, the government issued regulations on five selected habitats, including hay meadows and marshlands.²⁷⁵ A special grant scheme under the Ministry of Environment has been put in place to fund activity aimed at preserving the selected habitats and diversity of species that characterizes them. These grants are allocated by the Directorate for Nature Management and are available for a variety of tasks, such as clearing, logging, harvesting, burning, tree care, ring barking (stripping a circular strip of bark to kill the tree), lopping (collecting leaves for livestock fodder), adapted farming and forestry operations, adapted grazing, restoration, for example clearing of scrub and trees, fencing, information and surveys in connection with measures. The target group is landowners, clubs and associations nationally and regionally, but private individuals, national organizations, local authorities and institutions can also apply for grants. In 2010, 7 million kroner was allocated for the care of selected habitats, increasing to 14 million in 2011. The budget for 2012 is 14 million.²⁷⁶ This money will pay for projects in all five selected habitats, two of which are hay meadows and marshlands.

All in all, we see that the efforts of farmers (and others) to care for semi-natural meadows appear more interesting to the authorities in light of the grant schemes that are in place, than corresponding efforts to preserve the genetic diversity of food plants. There are good reasons to focus on semi-natural meadows, such as hay meadows and grazing meadows, not least because they contain a significant pool of valuable genetic diversity and many of them are endangered. A great deal has been lost in terms of food plants. Nevertheless, we have not lost all of the genetic diversity we used to have in our food plants. Several businesses have started to try to re-establish genetic diversity suited to Norwegian growing conditions. They are also involved in commercial activities based on preserved and available diversity and genetic resources. They have obtained their plant varieties mainly from NordGen and NGRC collections. Some of these businesses have received seed financing from the NGRC and/or the

²⁷⁵ FOR 2011-05-13 nr 512 from the Ministry of the Environment: Regulations on selected habitats in pursuance of the Nature Diversity Act. See: <http://www.lovdata.no/cgi-wift/lides?doc=/sf/sf-20110513-0512.html>

²⁷⁶ Proposition to the Storting 1 2011–2012 from the Ministry of the Environment, item 82. See: <http://www.regjeringen.no/nndep/md/dokument/proposisjonar-og-meldingar/proposisjonar-til-stortinget/2011-2012/prop-1-s-20112012/8.html?id=657578>.

Norwegian Agricultural Authority, but there is far less interest in the incentive structures for this aspect of the policy to preserve genetic diversity.

On the other hand, incentive structures can adversely affect certain types of commercial activity. In general, conventional plant production has so far been more profitable than production based on a multitude of – often old – plant varieties. Some attempt to make it more profitable, such as Norsk Spezialkorn and Holli mølle (see Chapter 2), and they may succeed for some varieties and products. Having said that, more probably needs to be done to compensate income lost in preserving and sustainably using plant genetic diversity in agriculture, compared with conventional farming.

Investing in genetic diversity on farmland tends to come with a greater risk attached. Although the harvest, according to many biodiversity farmers, is more stable from year to year than on conventionally run farmland, if things go wrong, the consequences can be far more serious: the harvest can be lost or lack the quality demanded by the market. This is because biodiversity farmers usually do not deliver produce to the government depots (e.g. Felleskjøpet), and have sometimes to create their own alternative value chain from farm to table.²⁷⁷ If they miss a season, or deliveries are too small, market shares can be lost for several years.

There is insufficient space to explore in detail the entire grant structure for agriculture and its impact on biodiversity farmers. We content ourselves with an example: the compensation system for weather-related damage to harvests. Farmers tend to deliver their produce to the government depots, such as Felleskjøpet, and there is a reasonably easy way of applying online for compensation for damage caused by weather events, since the application system holds readily accessible key data. For farmers who do not deliver their products to these depots, it is far more difficult to calculate compensation because it needs to be done manually and can be quite demanding for the individual farmer. The application system is designed for online use, based on information from the receipts. On top of this, compensation is only granted if a harvest is lost, not for loss of quality (with the exception of certain types of fruit and berries, where loss of quality does entitle growers to compensation). Working with the Gene Resource Centre for Cultivated Plants, the NGRC has called for the compensation scheme for weather-related harvest damage to compensate biodiversity farmers for quality loss.²⁷⁸ The reasoning is that farmers who cultivate crop genetic diversity perform an important service to society and help in Norway's implementation of its international commitments. It is, moreover, extremely difficult to run these farms with a profit and loss of quality one year can easily result in lost market shares for several years ahead. The risk taken by these

²⁷⁷ The market in Norway is dominated by a handful of food retailers which tend to avoid niche products – creating a major barrier for many farmers, of course. Several conventional depots report that they don't accept grain for milling from biodiversity farmers.

²⁷⁸ Consultation submission on regulations concerning the calculation of compensation for climate-related damage, submitted by the Norwegian Genetic Resource Centre to the Norwegian Agricultural Authority, dated 12 October 2011.

farmers is quite a lot higher than those taken by many other farmers. This statement was made in connection with a hearing on the grant scheme at the Norwegian Agricultural Authority.

Although much has been achieved with incentive structures and support schemes for semi-natural meadows, much remains to be done in creating incentive structures able to encourage the conservation and sustainable use of genetic diversity in food plants. This shortfall indicates a gap between agricultural policy goals in this issue-area and the practical mechanisms that have been used so far. An important question therefore is what is needed for this issue-area to be given priority. The parties involved in the annual accord between government and farmers' organizations agree on the importance of genetic resources, to which funds are budgeted year on year. A further question is whether these parties can agree on the adoption of specific measures and support schemes designed expressly to compensate farmers and encourage their active contribution to the conservation and use of crop genetic diversity in plant foods. In addition to targeted project support, additional land grants and other more permanent subsidies could be important measures to strengthen the incentive structure in this area – along with compensation schemes which reduce the risks of conservation work.

6.2 Farmers' access to crop genetic diversity, and conservation measures

Having access to plant genetic diversity in agriculture means in practice having access to seed and other propagation material from the plant varieties we want to grow. We investigated in Chapter 4 the 'lie of the land' in this issue-area, with its very restrictive rules in the 2004–10 period, with a subsequent relaxation of the rules allowing farmers to exchange and trade seed materials among themselves as long as they do so on a non-commercial basis, and in such a way that permits the sale of approved conservation varieties in addition to traditional vegetable varieties. As shown in Chapter 4, the situation is not optimal when it comes to incentivizing farmers to continue to preserve and use sustainably plant genetic diversity in agriculture, because the leading farmers in this field need to seek recognition of plant varieties and set up retail businesses to market seed of old varieties on a commercial basis. This in itself is an extra burden. How, specifically, the rules will affect the conservation and sustainable use of plant foods over time will depend on how the Norwegian Food Safety Authority practises them and their capacity to deal with applications seeking recognition for conservation varieties, traditional vegetable varieties and creation of new seed retailers. It is important to keep a close eye on progress here and consider which steps can be taken if the rules hamper access to plant genetic diversity by interested farmers.

But if people are to access to this material, it has to be preserved. NordGen is probably the main source of old plant varieties for farmers in Norway – in addition to the NGRC. NordGen stores more than 30,000 unique specimens of seed materials in its gene bank. They are held under

a joint Nordic system of management and control.²⁷⁹ The seed materials stored at NordGen are freely available on request to plant breeders, plant scientists and other *bona fide* users. No charge is made for materials and it is easy to file an application. Recipients must sign an agreement on the transfer of material in line with the multilateral system under the Plant Treaty. There are two types of agreements.

- A fully developed and relatively comprehensive contract for recipients intending to use material included in Annex 1 of the Plant Treaty for research, breeding or training purposes. This option is in line with the standard agreement under the multilateral system and is suitable for breeders, researchers and consultants.
- A simplified contract for recipients not intending to use the material for research, breeding or training in food and agriculture, or who want to use materials that are not included in Annex 1 of the Plant Treaty. This option is suitable for, i.a. farmers and hobby gardeners.

Since the focus of this report is on farmers' rights to access genetic resources, the second option will be presented in more detail.²⁸⁰ Under this agreement, the recipient agrees to use the material only for the purpose for which it is specified in the application. If the material is to be used for other purposes, a new transfer agreement must be concluded. On receipt of the material, the recipient is responsible for it under the terms of the agreement and may not apply for intellectual property rights to the material or components of it, in the form in which it was received. It is debatable what this means in practice and how much a variety needs to be modified before it can be said to differ from the form in which it was received. For many farmers, it is still probably a moot question, since they are usually concerned with free access and exchange.

There is another, more problematic, condition: the recipient must agree not to distribute the material to a third party. The intention here is to ensure that the material remains in the public domain. But in practice it means that farmers, if they want to adhere to the terms of the agreement, cannot exchange materials among themselves. Now while this is a logical consequence of the standard agreement, it can also be said to run counter to the intentions underlying the multilateral system, which was designed to ensure access to genetic material. The exchange of seed materials among farmers is a long-standing right under common law, and it was almost certainly not the intention of the Plant Treaty's makers to stop this tradition. What can be done to resolve this conundrum is unclear, as the premises are given by the Plant Treaty, not NordGen. In practice, though, the rule would appear to have little importance, inasmuch as farmers who have received material from NordGen continue apparently to share it among themselves, as they have always done, and no one at NordGen seems to be concerned.

²⁷⁹ NordGen reports to the Council of Ministers and works with international partners on the protection and sustainable use of plant genetic resources.

²⁸⁰ See the simplified transfer contract :

http://www.nordgen.org/ngdoc/plants/the_nordic_gene_bank_mta.doc

Another important matter to do with NordGen is the financial problems facing the organization in recent years. The reasons are complex, but one is that not all of the Nordic countries contribute equally to the fund. Norway has generally met its commitments, but extensive cuts have been made and there are particular challenges related to the regeneration of old seed specimens and to ensure the satisfactory maintenance of incoming collections. In the worst case, genetic material could be lost, and other material could become unavailable because NordGen lacks the capacity to record and characterize it. There is good reason, therefore, to monitor NordGen closely. To enable the organization to fulfil its mandate in a satisfactory manner, it will be essential to take steps to strengthen the common Nordic funding procedure. Alternatively, Norway may have to consider other options to secure Norwegian material.

Working with institutional partners, NGRC has taken various steps to conserve plant genetic resources, such as collecting and registering old varieties for conservation purposes, and coordinating efforts to make these resources available (see Chapter 5). In connection with the *Arvesølv* ('Silver Heritage') project, seed specimens have been collected for *ex situ* conservation. From the perspective of farmers' rights and access to genetic resources, projects like this are a significant contribution to increasing genetic diversity available to farmers now and in the future. The regulations must therefore be designed to facilitate this in practice. The Nature Diversity Act regulates activities of this kind. According to § 58 on the extraction and use of genetic materials from nature, parties can be required by law to obtain permission from the ministry to extract genetic material. Nevertheless, also according to the law, the collection of material for public collections, and use and breeding in agriculture and forestry, do not require such permission.²⁸¹ The activities of the NGRC in this respect centre on collecting specimens for public storage and it is in the nature of things that any future use will mean agricultural use. The NGRC will therefore be able to continue its activities without having to apply for a permit from the environmental authorities.

Graminor should also be mentioned, moreover, in a conservation context. Plant breeding is one way of preserving genetic diversity. True, commercial plant breeders want genetically uniform and stable varieties, but a variety can still be developed on the basis of a broad genetic basis. Graminor works mainly on varieties intended for large-scale production. But the company can still facilitate access to rare seed material and multiply it for customers.²⁸² This has happened before. On the other hand, they lack the capacity to breed these varieties if the commercial potential is small. Graminor has, nonetheless, worked with NordGen²⁸³ and helped document some of the varieties in the gene bank. Since Graminor itself has neither a gene bank nor facilities to conserve its own breeding material, the company reportedly dispatches specimens of its approved varieties, including some of its breeding material, to NordGen for storage.

²⁸¹ With regard to the removal of genetic material covered by the Plant Treaty, the standard conditions pursuant to the agreement shall apply (§ 59, Nature Diversity Act).

²⁸² According to information given at a meeting with Graminor AS, 4 January 2007.

²⁸³ This section is based on information obtained at a meeting with Graminor AS, 4 January 2007.

Some Graminor employees are involved in conservation work out of personal interest.²⁸⁴

All in all, access to existing seed and vegetative propagation material is quite good for Norwegian farmers. Seed material regulations do make it harder to sell the material commercially than if it had been possible to sell them freely. Whether this affects efforts to conserve and use crop genetic diversity sustainably on farms needs therefore to be monitored carefully. NordGen and the NGRC are the key agents for biodiversity farmers, and facilitate increased use of genetic diversity in agriculture. NordGen's material transfer agreement prohibits the transfer of material to third parties. This could have negative consequences for farmers if the rule were obeyed. But the purpose of this regulation was to keep the material in the public domain, and if farmers exchange seed among themselves, then it is fully in line with this intention. The regulation has not created problems so far, since it is not enforced among farmers, who exchange the material freely among themselves in Norway. Graminor has supported conservation work in partnership with NordGen. There is a potential in this partnership that could possibly be harnessed and exploited.

6.3 Information, capacity-building and technology transfer

This section focuses on farmers' access to information about plant varieties, cultivation methods, and other information of importance to the conservation and sustainable use of plant genetic diversity. It is also about capacity-building in this context, in other words knowing how to expand capacity in practice. Not least, it is about transferring technology, which is very popular in many developing countries, particularly through what is often called farmer-managed participatory plant breeding (as opposed to researcher-driven participatory plant breeding). We have looked at aspects of these areas earlier in this report.

- **Information is exchanged** largely via websites, such as those belonging to NordGen, NGRC and Directorate for Nature Management. There are other interesting websites with useful information on, for example, traditional knowledge, e.g. www.slåttekurs.no. Seminars have been held at the initiative of different groups of farmers, and they too have facilitated the transfer of information (see Chapter 5). Information is also exchanged at more or less informal meetings of biodiversity farmers
- **Capacity-building** starts with learning, but continues with specialization and training. Field hikes, which take place in conjunction with seminars (see above), and field trials are important in this respect. Two of the regional branches of the Norwegian Agricultural Extension Service (Norsk landbruksrådgivning) have been conducting field experiments with varieties from NordGen over

²⁸⁴ According to Petter Marum, grass and fodder breeder, at a meeting at Graminor AS, 4 January 2007.

several years.²⁸⁵ This work has been important for the preservation of these varieties as well as for the selection of varieties of potential use to organic farmers, breeders, bakers and users

- **Technology** facilitating the conservation and sustainable use of plant genetic diversity is mostly shared on an informal basis among farmers in Norway, and to a lesser extent among researchers and plant breeders. But there are exceptions here too, especially with regard to semi-natural meadows. We have several examples of researchers, breeders and farmers working together, and instances in which technology is transferred to wider groups, such as the courses on scythe mowing.

Here, however, we will focus on the role of research given its importance for the exchange of information, capacity-building and transfer of technology. We will look at the programmes and projects run by the Research Council of Norway (Norsk forskningsråd – NFR) with respect to studies of practical use in the management of plant genetic resources for food and agriculture. NFR is funded by government ministries and disseminates money to the individual research projects under its various programmes. Research features in the annual agreement between the government and farmers' organizations, and each year a certain amount is budgeted for agricultural research, and dispensed mainly through NFR's Food Programme. In 2010, the research budget was 44 million kroner, while allocations increased to 48 million for 2011.²⁸⁶

The following NFR programmes are relevant in our context.

1. The **Food Programme** ('Norwegian Food from Sea and Land') supports industrial and administrative research throughout the value chain from consumer to primary production for both agricultural food products and seafood.²⁸⁷ The programme seeks, among other things, to support a competitive and market-aware food industry which gives due consideration to health, quality, ethical values, sustainability and environmental concerns, and a public food administration body whose management practices and work on devising national and international regulations are informed by research and up-to-the-minute information. The Food Programme allocated 236.8 million kroner to 222 projects in 2009.²⁸⁸ A review of the project database from its inception to 2011 shows that several projects were related to plants, about ten

²⁸⁵ Silja Valand of the Buskerud branch of NLR and Kari Bysveen at Fabio; See: <http://www.fabio.no/Default.asp?WCI=ViewNews&WCE=8782&DGI=811>

²⁸⁶ See *Jordbruksforhandlingene 2010 – Sluttprotokoll fra forhandlingsmøte 15. mai*, (Agricultural Negotiations 2010 – Final Minutes of the Negotiation Meeting, 15 May) p. 5, : <http://www.bondelaget.no/getfile.php/Dokumenter/Jordbruksforhandlinger/Sluttprotokoll%2015%2005%202010%20-%20ENDELIG.pdf>

²⁸⁷ Food Programme homepage: http://www.forskningsradet.no/prognett-matprogrammet/Home_page/1222932060249

²⁸⁸ Research Council of Norway (NFR) (2010): *Food Programme's Annual Report*. (in Norwegian) available : <http://www.forskningsradet.no/servlet/Satellite?c=Page&cid=1222932060296&pagename=matprogrammet%2FHovedsidema>

of which concerned research of immediate relevance to the conservation and sustainable use of plant genetic diversity.²⁸⁹ The Revised Work Programme 2010–15 does not mention biodiversity in agriculture or genetic resources in so many words. However, projects addressing these questions can apply for funding under the various thematic priority areas.

2. The **Nature-based Industry Programme** builds on several former NFR programmes.²⁹⁰ The aim is to support the sustainable development of economic opportunities from the use and exploitation of forest, coastal and other land resources associated with the natural environment and areas of cultural significance, including agriculture. The budget for 2009 was 98 million kroner, of which the Ministry of Food and Agriculture provided 73 million and 10.7 million was transferred as part of the agricultural settlement.²⁹¹ The 2009 project portfolio numbered 110 projects. A review of the project database over all projects completed or begun under the Nature-based Industry Programme found three projects on the cultural landscape, but none, it seems, of immediate concern to the conservation and sustainable use of plant genetic diversity in agriculture. The work programme emphasizes the need to maintain a focus on the conservation of genetic resources in agriculture and on biological diversity through utilization and protection in a situation with changing and increasing removal of biomass, as well as underlining the importance of cultural landscapes.²⁹²
3. The **Environment 2015 Programme** (Norwegian Environmental Research Towards 2015) continues earlier research programmes on pollution, biodiversity, landscape, wild salmon, and regulatory and economic factors for sustainable development.²⁹³ The programme also addresses new requirements and challenges facing science in the various areas. The programme covers basic research and applied research, and aims to address relationships in environmental research, including physics, chemistry, biology, and social and cultural studies. The budget for 2009 was 90

²⁸⁹ This figure applies to all projects in the project database, including those that had finished before 2009 or had started in 2011. The projects deal with issues such as organic apple varieties for Norway; improving quality of strawberry production and marketing of organic blackberries, currants and gooseberries; plant metabolism in fruits and vegetables; health effects of the *Brassica oleracea* species (cabbage, broccoli etc.) in light of climatic and harvesting conditions; Norwegian wheat with durable resistance to downy mildew; mycotoxin resistance in wheat and oats; genetic and physiological basis for adaptation of fodder plants to climate change; grass and clover seed production; and improved access to climate-adapted seeds of fodder plants.

²⁹⁰ Research Council of Norway (NFR) (2008): *Natur og næring 2008–2013 – økt bærekraftig verdiskaping fra skog og andre naturbaserte verdikjeder. Programplan 10. september 2008.*

²⁹¹ *Ibid.*, p. 23.

²⁹² Research Council of Norway (NFR): *Natur og næring 2008–2013. Programplan 10. september 2008*, p. 10, available : <http://www.forskningsradet.no/servlet/Satellite?c=Page&cid=1222932066574&pagename=naturognaering%2FHovedsidemal>

²⁹³ See: <http://www.forskningsradet.no/servlet/Satellite?c=Page&cid=1224697848226&pagename=miljo2015%2FHovedsidemal>

million kroner divided among 85 projects.²⁹⁴ The project database has a number of projects studying biodiversity in nature. Three of the projects study cultural landscapes and one investigates Norwegian seed legislation in light of EU and international environmental agreements.²⁹⁵ According to the 2009 Action Plan, research must address natural diversity, semi-natural ecosystems and genetic resources in agriculture.²⁹⁶

As we see, the annual budgets of the three research programmes of greatest relevance to our theme are well over 400 million kroner. Only a small proportion of projects of interest to conservation and sustainable use have so far received funding. Among them, projects on food plants are relatively poorly represented. This may be a result of too few interesting and well-written applications or because priority is directed elsewhere. In this context, one may ask whether the issue-area is given sufficient prominence in programme plans and policy documents, or whether research needs in this area should be examined with greater care so as to target funding more precisely to projects on the conservation and sustainable use of crop genetic diversity. Research in this area could offer an important means of sharing information, building capacity and transferring technology to biodiversity farmers as a step in the realization of farmers' rights – and thus in efforts to preserve and develop this plant heritage.

6.4 Norway and benefit-sharing with the South

Norway contributes in different ways to benefit-sharing with countries in the South, both through the benefit-sharing mechanism under the multilateral system and in other ways under the Plant Treaty.

The benefit-sharing mechanism is tied to the standard genetic material transfer agreement. This requires the recipient of genetic resources to pay an amount to the multilateral system according to a set allocation formula if the material from the multilateral system is developed and subsequently patented. If it is commercialized without being patented, any contribution is voluntary. The money paid will be transferred to farmers in developing countries and countries with economies in transition that contribute to the conservation and sustainable use of genetic resources. The important question is whether the mechanism will succeed in creating equitable benefit-sharing in accordance with its purpose. This issue will be raised at the next meeting of the Governing Body of the Plant Treaty in 2013. Norway has taken several initiatives to speed up progress in this issue-area. The most important was Norway's unilateral decision to pay an annual voluntary contribution to the multilateral system, corresponding to

²⁹⁴Research Council of Norway (NFR) (2008): *Programplan for Miljø 2015 – Norsk miljøforskning fram mot 2015* (2006-2016) (Environment 2015 – Programme Plan. Norwegian environmental research towards 2012), adopted by the Environment 2015 Programme Committee, February 2007, approved by Divisional Board, large-scale projects, April 2007, revised version, March 2008, approved by Divisional Board chair, March 2008. p. 28.

²⁹⁵ The latter is a project headed by the author of this report.

²⁹⁶ Research Council of Norway (NFR) (2009): *Action Plan 2009 for Environment 2015*, p. 3, : <http://www.forskningsradet.no/servlet/Satellite?c=Page&cid=1224697848208&pagename=miljo2015%2FHovedsidemal>

0.1% of the sale of seed in the country. In 2009, that amounted to 0.5 million kroner.²⁹⁷ Norway has called on the other OECD countries to do likewise. If all these countries did so, the fund would raise about USD 200 million over a decade, significantly boosting efforts to conserve and use plant genetic resources for food and agriculture sustainably. So far, no other countries have followed Norway's lead, though some have paid lump sums to the benefit-sharing fund.

The most famous example of Norway's contribution under the Plant Treaty²⁹⁸ remains the Svalbard Global Seed Vault, which opened in 2008.²⁹⁹ The Svalbard Global Seed Vault is located in a cavern excavated into the permafrost in the Svalbard mountains. It is designed to hold seed duplicates from seed collections around the world. Many of these collections are in developing countries. If seeds are lost, for example due to natural disasters, war or simply lack of resources, it should be possible to resurrect the seed collections from seeds deposited at Svalbard. All countries may deposit security samples of their plant varieties in the vault, which is remote from most of the world's hazards, and at no charge. It adheres to a so-called black box principle: countries or international, regional and national gene banks send their seeds for storage in a black box, and only those who deposited the seeds are allowed to withdraw them. The safe storage of seeds at Svalbard has therefore no effect on property rights to the seeds. The seed vault will eventually be able to store 4.5 million different seed types.³⁰⁰ Since each specimen consists of about 500 seeds, storage capacity will amount to about 2.25 billion separate seeds, enough to store all the unique types of seed currently stored in the approximately 1,400 gene banks in the world and to store new types of seed to be collected in the future. The Svalbard Global Seed Vault is paid for by the Ministry of Foreign Affairs, Ministry of the Environment and Ministry of Agriculture and Food, in conjunction with the Global Crop Diversity Trust.³⁰¹ The physical vault was built and is maintained by Statsbygg (Norwegian Directorate of Public Construction and Property) while NordGen is responsible for vault operations and oversight. The Global Crop Diversity Trust provides advice and undertakes the shipment of seeds to Svalbard, in addition to financing some of the operating expenses. The Governor of Svalbard is responsible for vault security and the FAO Commission on Genetic Resources for Food and Agriculture (CGRFA) and the Governing Body of the Plant Treaty define the global framework for the seed vault. The Svalbard Global Seed Vault is an important contribution to benefit-sharing across the world in providing a unique opportunity to ensure twice over the preservation of plant varieties that are conserved *ex situ*.

²⁹⁷ See: <http://www.regjeringen.no/en/dep/lmd/Whats-new/News/2008/norway-contributes-to-plant-breeding-in-norway-contributes-to-plant-breeding-in-.html?id=501711&epslanguage=EN-GB>

²⁹⁸ Norway paid the Plant Treaty Secretariat 411,393 kroner for the two-year period 2010/11, in addition to its annual contribution to the FAO.

²⁹⁹ See: <http://www.regjeringen.no/en/dep/lmd/campain/svalbard-global-seed-vault.html?id=462220>

³⁰⁰ According to the Ministry of Agriculture and Food's presentation: http://www.regjeringen.no/nb/dep/lmd/kampanjer/svalbard_global_frohvelv/sporsmal-og-svar.html?id=462221

³⁰¹ According to the Ministry of Agriculture and Food's presentation : http://www.regjeringen.no/nb/dep/lmd/kampanjer/svalbard_global_frohvelv/partnere.html?id=462232

It should also be mentioned that Norway contributes to the *ex situ* conservation of the world's domesticated plants and related research through the Consultative Group on International Agricultural Research (CGIAR), which receives around 100 million kroner per year. Norway also donates substantial amounts to the Global Crop Diversity Trust; over a ten-year period, 300 million kroner was donated to aid the collection and preservation of seeds of wild relatives of important food crops, such as wheat, rye, barley, oats, rice, potatoes, beans, peas, lentils, and bananas.³⁰² These contributions are also important in a benefit-sharing context and a further facet of Norway's implementation of the Plant Treaty.

Norway also assists, however, in the implementation of the Plant Treaty and benefit-sharing through voluntary organizations. The main Norwegian organization here is the Development Fund of Norway, which supports projects through local partners in Asia, Africa and Central America. In 2011, the Development Fund spent about 10.6 million kroner on various projects addressing biodiversity in agriculture.³⁰³ Funding comes from the Ministry of Foreign Affairs via Norad (Norwegian Agency for Development Cooperation). These projects focus on farmers' rights to use and maintain genetic resources and biodiversity in agriculture.³⁰⁴ They are often large-scale regional programmes involving organizations in both the southern and northern hemispheres. They combine practical field work with advocacy at the local, national and international level. It is important that farmers, research institutions and relevant authorities work together, with participatory plant breeding, local seed banks and field schools for farmers among the key instruments. Farmers' participation in political processes is underlined and the Development Fund helps farmers in partner organizations to participate in international negotiations by providing some of the funding.

As we see, Norway gives considerable amounts to efforts to implement the Plant Treaty and facilitate benefit-sharing. An important question in this context is what proportion of the funds should, ideally speaking, be routed through the Plant Treaty as opposed to other channels. It is puzzling that Norway transfers nearly a million kroner to the Plant Treaty annually, including the benefit-sharing fund, while well over 120 million kroner p.a. goes to other institutions working for the same goals. It is puzzling given that the Plant Treaty – the international instrument the world has established to enable the management of plant genetic diversity – is struggling because of chronic under-funding and because the benefit-sharing fund falls short in terms of expectations and challenges. On the other hand, Norway cannot shoulder responsibility for financing the Plant Treaty and benefit-sharing system alone. The question is whether Norway could do more to persuade other countries to honour their commitments, getting more stakeholders to work together, bringing efforts to implement the Treaty up to an acceptable level.

³⁰² See press release from the Global Crop Diversity Trust (2010): <http://www.croptrust.org/documents/Press%20Releases/Crop%20Wild%20Relative%20Program%20Press%20Release%20Final.pdf>

³⁰³ Personal communication with Bell Batta Torheim, 10 November 2011 (e-mail).

³⁰⁴ See: http://www.utviklingsfondet.no/Utviklingsfondet_-_forsiden/Temaer_vi_jobber_med/Biologisk_mangfold/

Another important question concerns the balance in funding between *ex situ* conservation and *in situ* management of crop genetic diversity. So far, *ex situ* conservation and research receives most of its funding from Norway, while the implementation of the Treaty's Art. 6 on the sustainable use of plant genetic resources is hampered by insufficient funds. In a benefit-sharing perspective, both are important. The problem is the almost absence of funds for the work *in situ*. It is also important to remember that the benefit-sharing mechanism was intended to support farmers in developing countries and countries with economies in transition who conserve and sustainably utilize plant genetic resources for food and agriculture (Art 13.3). There is therefore reason to ask whether support for *in situ* purposes should be increased in the future.

6.5 Farmers' reflections on the right to benefit-sharing

Most of the farmers who were interviewed for this study were interested in market incentives as well as grant and subsidy schemes. Most biodiversity farmers believe market mechanisms make it harder to get produce based on crop genetic diversity onto the market. The market power of the leading food retailers in Norway is quite overwhelming. Although there are examples of success in this area (Holli Mølle supplies the *Meny* food retailer, for instance), the market for the most part is 'colour blind' as far as plant varieties are concerned. We buy flour without knowing which varieties have been ground together in the bag we take home. As farmer Håkon Tørrestad said when he compared Norwegian flour with wine production in France: It's like mixing all the different grape varieties in France into a single wine, and calling it 'French Red'.³⁰⁵ It would be unthinkable for wine connoisseurs. It's the technology, he believes, that prevents diversification of the market for varieties. In light of the difficulties many farmers face trying to make a living from farming, more should be done to help develop niche products and niche marketing, with diversification as a necessary adjunct to that effort, he believed.

Another subject discussed during the interviews was what some organic and biodynamic farmers called the 'economism' informing the current approach to policy.³⁰⁶ The seed industry has to obey market principles to satisfy its owners' desire to make a profit, industry representatives said. It is therefore impossible to stock every variety for which there might be a demand. Only if demand makes production and sales profitable, will the industry act. But they exaggerate, say some of the farmers. The seed sector in Norway cannot be governed by that kind of principle, they insist, and for two reasons. (1) If the sector is not profitable and has to rely on government funding, then the principles obviously don't work; (2) following these principles will only exacerbate the loss of genetic diversity and associated knowledge, making it even harder to find alternative production opportunities to survive as a farmer in a difficult market, and avoid farm closure. It becomes a vicious circle that benefits no one.

³⁰⁵ Organic farmer from Tørrestadgrenda, Vestfold, at the Vestfold Seed Days, 25 January 2006.

³⁰⁶ Discussed at the Vestfold Seed Days, 25 January 2006.

The problem with getting material from NordGen, many farmers pointed out, is that you only get a handful of seeds of a variety and it takes years of hard work to multiply them. This creates a need for farmers willing to multiply the material in something like a gene bank on their farms. But given current seed material regulations, it is difficult and unlikely under any circumstances to be profitable. Those who do make the effort do so out of a purely idealistic commitment to the cause.

Some farmers believe the importance of seed sector, given the need for diversification, to Norwegian agriculture, food sovereignty and food security, should spur the authorities to allocate funds from the 'oil fund' (Government Pension Fund) to ensure diversity. Although the decision and action rule (Handlingsregelen) restricts the use of the fund, crop genetic diversity is such an important factor in ensuring food security in the future, when Norway may well have to produce more of its food at home, use of these funds is merited now, these farmers insist.

A recurring theme in many interviews was the need to divide the market into two general categories: (1) the commercial market premised on the rules of the market economy; and (2) efforts to conserve crop genetic diversity. Commercial production will be possible for the most popular traditional varieties and will help encourage the use of these plants while raising customer awareness of, and pleasure obtained from, crop genetic diversity. But this won't help all the other plants that are not – or not yet – on the market. If we want to preserve this diversity, we cannot let ourselves be governed by commercial principles. It should be a public responsibility to ensure the continued use of these materials by allocating money from the public purse. The two models do not need to run counter to each other; they can be developed as complementary elements of a strategy to ensure the conservation and sustainable use of crop genetic diversity in Norwegian agriculture.

Biodynamic farmers³⁰⁷ suggested a subsidy system similar to the one for old livestock breeds, to ensure conservation and sustainable use of crop genetic diversity on farms. Land grants could be estimate on the basis of estimated revenue loss compared with the commercial production of the same species. This support would not necessarily have to come from the Ministry of Agriculture and Food, some suggested, but could be taken from the Ministry of the Environment or Ministry of Culture, since we're talking about Norway's cultural heritage.

Many farmers also dispel the impression that it was about their need for financial support. It is about what society needs to maintain its plant heritage and pass it on to future generations. Food security of future generations must be the overriding principle, and in light of this, supporting conservation work on farms is a public responsibility. What is more, nutritional quality is an important aspect of food security and its significance might be even greater and affect many more people in the future. That is another reason, say the biodynamic farmers, to conserve crop genetic diversity.³⁰⁸

³⁰⁷ Interviewed at Fokhol Farm, 7 April 2006.

³⁰⁸ Interviewed at Fokhol Farm, 7 April 2006.

6.6 Conclusions on farmers' rights to benefit-sharing

Farmers' right to share benefits is about compensating farmers for taking social responsibility, and constitutes a recognition of their contribution to the global pool of genetic resources and thus to world food security. It also seeks to enable them to continue these efforts for the community.

Many of the farmers interviewed for this study want to see the benefit-sharing system based on society's needs to ensure Norway's plant legacy and pass it down to future generations. The market for crop genetic diversity can be divided into two main areas, they suggested: first, the commercial market that follows the dictates of the market economy, and two, the conservation of crop genetic diversity. The traditional varieties with the highest popularity can be produced and marketed commercially, but not all the other plants which are not – or not yet – commercially viable (profitable). If we want to safeguard this pool of genetic resources, commercial principles won't do. The work should be seen as a national responsibility, and the necessary funds allocated.

Much has been achieved with respect to incentive structures and grant schemes for semi-natural meadows, but much remains to be done to develop incentive structures that promote conservation and sustainable use of genetic resources in food plants. This suggests lack of coherence between the ultimate goals of agricultural policy in this area and the practical steps adopted so far. Parties to the agricultural settlement agree in their assessment of genetic resources as an important concern, and the settlement includes funding for the purpose each year. An important question is whether the parties can agree to introduce concrete measures and grant schemes aimed at compensating farmers and stimulating active conservation work on their part and using crop genetic diversity in plant foods. In addition to targeted project support, land grants and other, more permanent, grant schemes could probably strengthen the incentive structure in this area – along with compensation schemes that take some of the risk out of this type of work.

Access to seed and vegetative propagation material is an important good, and therefore of central importance to the benefit-sharing system. Access is relatively good in Norway, even if the assortment offered by the major seed suppliers is limited in relation to demand. Profitability is a guiding principle, and it favours the most popular varieties at the expense of diversity. Biodiversity farmers manage nonetheless to get hold of the seed in other ways, but have to depend on one another to exchange and sell the seed. The regulations on seed materials make it harder to sell the seed commercially than if people could sell them freely. We need therefore to monitor closely the impact on farmers' efforts to conserve and use crop genetic diversity sustainably. NordGen and the NGRC are central contributors to our biodiversity farmers, and both seek to stimulate the use of genetic resources in agriculture. NordGen's material transfer agreement prohibits the transfer of material to third persons, however, and would seriously affect the sale of seed among farmers if followed. But the prohibition has not caused problems as yet simply because it is not enforced; farmers in Norway exchange seed material among themselves freely. NordGen's financial situation gives cause for concern,

and cuts could detract from the maintenance of the collections. The situation needs careful monitoring. If the other Nordic countries are unable to meet their financial obligations, it may be necessary to consider other steps to protect the Norwegian material. Graminor has supported some conservation work in partnership with NordGen. There is potential here that could possibly be tapped into, such as help to multiply seed of old varieties.

The three research programmes of greatest relevance to our theme have annual budgets of well over 400 million kroner. Only a small proportion of projects of relevance to conservation and sustainable use have so far received funding, and of them, projects on food plants are relatively poorly represented. This could be a result of a low number of relevant and sound applications being filed with the programme administrators, or because other questions have greater priority. We need to ask if the issue-area is given sufficient prominence in the programme plans and policy documents, and whether we should examine research needs in this area so as to target the funds with greater precision so as to stimulate the conservation and sustainable use of crop genetic diversity. Research in this area could provide an important conduit for information sharing, capacity-building and technology transfer to biodiversity farmers and improve the realization of farmers' rights – and, in consequence, efforts to preserve and develop this plant heritage.

Norway donates considerable sums to efforts to implement the Plant Treaty and facilitate benefit-sharing. An important question in this context is what proportion of the funds should, ideally speaking, be routed through the Plant Treaty compared to other channels. It is puzzling that Norway transfers nearly a million kroner to the Plant Treaty annually, including the benefit-sharing fund, while well over 120 million kroner p.a. goes to other institutions working for the same goals. It is puzzling inasmuch as the Plant Treaty – the international instrument established by the world to manage plant genetic diversity – is struggling with a critical lack of funding and because the benefit-sharing fund is far below expectations and challenges. On the other hand, Norway cannot shoulder responsibility for funding the Plant Treaty and the benefit-sharing system alone. The question is whether Norway could do more to persuade other countries to honour their commitments, getting more stakeholders to work together, bringing efforts to implement the Treaty up to an acceptable level.

Another important question concerns the balance in funding between *ex situ* conservation and *in situ* management of crop genetic diversity. So far, *ex situ* conservation and research receives most of its funding from Norway, while the implementation of the Treaty's Art. 6 on the sustainable use of plant genetic resources is hampered by insufficient funds. In a benefit-sharing perspective, both are important. The problem, though, is the almost total lack of funds for the work *in situ*. It is also important to remember that the benefit-sharing mechanism was intended to support farmers in developing countries and countries with economies in transition who conserve and sustainably utilize plant genetic resources for food and agriculture (Art 13.3). There is therefore reason to ask whether support for *in situ* purposes could be increased in the future.

7 The right to participation in decision-making processes

The final measure proposed under Art. 9 of the Plant Treaty to promote and ensure farmers' rights, is the right to participate in making decisions, at the national level, on matters related to the conservation and sustainable use of plant genetic resources for food and agriculture (§ 9.2 [c]). There are no further pointers to help in operationalizing this particular provision. We will first look at what it might mean in practice. Who are the farmers who are entitled to participate? What decision-making processes are relevant to participation? What forms of participation in decision-making processes are appropriate? And on what terms is participation permitted? On the basis of this operationalization it should be possible to analyze the status of farmers' participation in relevant decision-making processes in Norway.

Who should participate in decision-making processes?

Representation can be a difficult subject. Who should be represented and how should they be represented? Farmers in general or biodiversity farmers in particular? In surveys and consultations conducted by the Fridtjof Nansen Institute of late (Andersen, 2005b; Andersen and Berge, 2007; and Andersen and Winge, 2011), these were some of the questions discussed. There is broad agreement, above all, that biodiversity farmers should have representation. In a number of countries, representation takes place through farmers' organizations, but they are often the major organizations whose insight into matters concerning conservation and sustainable use of genetic resources is limited, and are therefore largely unable to mount a case for this area of agriculture. In what follows, the focus will therefore be on biodiversity farmers.

The challenge is to find legitimate forms of representation. Inviting a biodiversity farmer to join a decision-making process is all well and good, but it does not make this representation of biodiversity farmers legitimate in a formal sense. For this to occur, farmers must organize themselves through affiliation with an existing organization or by creating groups, associations or networks for themselves. While there are huge differences in the degree of organization among biodiversity farmers around the world, organization levels tend to be relatively low – and the farmers therefore lack adequate representation. In situations where adequate representation are lacking, legitimate participation in decision-making processes is difficult to achieve.

What kinds of decision-making processes are relevant?

In the first instance, making laws and designing regulations affecting farmers' work to preserve and utilize plant genetic diversity in agriculture sustainably are key areas where participation is useful. Laws and regulations on biodiversity, traditional knowledge, and approval of plant varieties, sale of seed, plant breeders' rights, patents and other intellectual rights are important in this context. But other laws and regulations

governing conventional agriculture can be significant, because they can result in incentive structures that affect conservation and sustainable use in different ways. The rules governing land grants and the regulations on compensation for climate-related damage (see Chapter 6) are examples in this regard.

Political processes, such as the drafting of the new agriculture white paper by the Ministry of Agriculture and Food, is another typically relevant decision-making process. Likewise, there are the agricultural negotiations and other decision-making processes involving budgets and allocations. They create incentive structures and entail important decisions which affect biodiversity farmers' financial action radius and that of others who might consider taking part in this type of work.

Farmers' involvement is also important with regards to the development of plans and programmes that affect the conservation and sustainable use of genetic diversity in agriculture. Examples include NGRC's Action Plan and the Action Plan for Hay Meadows (see Chapter 5). Programmes and activities bearing on the work of biodiversity farmers are further areas of relevant participation. Examples here include the design of *Arvesølv* project and other mechanisms promoting conservation on farms, in gene banks and other collections. Research programmes are important in this context, too.

How can farmers take part in decision-making processes?

There are various ways of accommodating farmers' participation in decision-making processes. Soundings and consultation processes in connection with the drafting of laws and regulations are perhaps the most important ways of facilitating participation. It is therefore of the essence that affected organizations and groups set up consultative bodies and are invited to play a part in the proceedings. Beyond this, they can attempt to influence decision-making and processes of various kinds by making their opinions known in the media, at meetings and seminars, and various forms of lobbying.

Another important decision-making arena comprises governing boards and reference groups for institutions and businesses of importance to the conservation and sustainable use of genetic diversity in agriculture. Here, opportunities are manifold, e.g. NordGen, NGRC and germane NFR programme committees, to name a few. An important question then is how the delegates are elected. If a single farmer is invited to take part, s/he could bring important information and ideas to the table, but this would not necessarily be a legitimate form of representation. On the other hand, biodiversity farmers may like being represented by this particular individual, despite the absence of a formal election process, if the individual shares more or less the same views as those other farmers. There is no standard answer to these questions. The important thing is to be aware of the challenges involved in ensuring legitimate representation of biodiversity farmers in relevant decision-making processes and try to meet them.

What are the prerequisites for achieving satisfactory participation?

An important prerequisite for achieving good participation is that policy makers are aware of the role of biodiversity farmers in the management of plant genetic resources in agriculture. The skills and experience of these farmers could be a value to certain decisions and we as a society are dependent on their continued efforts if we want to be able to conserve plant genetic diversity on farms. Given such awareness, it should be easier to see where participation is required and to optimize our ability to utilize their input in the best possible way.

There is another important precondition: farmers themselves must be in a position to participate in a meaningful and efficient manner. This assumes they have the time and opportunity to familiarize themselves with the issues and are adept at making the best of opportunities to participate in decision-making processes. This in turn depends on the ease with which documents and other policy documents can be understood by the public, on transparent decision processes, and on whether the farmers are sufficiently conversant with these matters and have the capacity to articulate their views.

7.1 Organizations representing farmers in Norway

Compared to the situation in other countries, the participation of farmers in Norway in decision-making processes is generally high. This is more a result of democratic practices and a culture that has evolved over time, than of laws and rules, as we will see below.³⁰⁹ But it is also because farmers in Norway are well organized. We will first look at the main farmers' organizations in this regard and their positions in relation to genetic resources in agriculture.

The *Norwegian Farmers' Union* is the biggest trade union for farmers in Norway. It aims to “unite everyone involved the farming industry, or feel an affiliation to the industry; promote matters of general concern; put agriculture on a secure footing; and support rural communities' economic, social and cultural interests.”³¹⁰ The Farmers' Union works to improve the regulatory environment for agriculture and raise awareness of agriculture's importance to society. It is politically independent, has 62,000 members, about 580 local and 18 regional branches, and is one of the two farmers' organizations participating in the annual negotiations on terms and conditions with the government (see also Chapter 6). Under the motto “We Get Norway Growing”, the Farmers' Union works to promote a varied and appetizing food experience; foster viable rural communities; beautify the country; and enhance wealth creation on the farm. In its vision and values, the Farmers' Union stresses the importance of

³⁰⁹ A watershed event in the history of farmers' participation in decision-making was the so-called Hitra Uprising of 1975. Facing a harsh economic climate, Sverre Hansen, a farmer on the island of Hitra, refused to pay his taxes in protest. More than 100 farmers on Hitra followed suit and joined the campaign. The media reported and discussed the rebellion and forced the authorities to revise their position. Parliament decided to raise farmers' income to the level of industrial workers. In the years after the Hitra rebellion, Norwegian farmers' earnings rose appreciably.

³¹⁰ See Norwegian Farmers' Union homepage: <http://www.bondelaget.no/om-bondelaget/category7.html>

maintaining and renewing national traditions in respect of production methods, consumption habits, building customs, crafts and cultural expression, and of directly or indirectly nurturing a diverse, popular cultural life around the country. It is also important to curate, enhance and provide information on the natural environment and safeguard it through active and sensible use. Although biological diversity and genetic resources are not mentioned as such in the Union's statement of visions and values, there seems to be an implicit awareness in the Union's work. This was reflected, for example, at the seminar *Self-sufficient or Self-inflicted*, at Litteraturhuset (Literature House), Oslo, September 2011, which explored the consequences of how food is produced today and how Norwegian genetic resources are managed in light of future food security. The seminar was organized by the Norwegian Biotechnology Advisory Board and the Norwegian Farmers' Union.

The *Norwegian Farmers' and Smallholders' Union* is the second largest organization for farmers in Norway. It has 7,000 members, 280 local and 18 regional branches.³¹¹ It is the second of the two organizations which negotiate with the government to fix the annual agricultural settlement. Membership is open to all farmers irrespective of farm size or approach to farming. As an organization the Union addresses government policy and issues affecting the industry so as "to promote professional, cultural, social and economic interests".³¹² Its vision reads: "With a love of the Earth, together we create value." The Union is particularly concerned to prevent farm closures and help small farms survive by securing production subsidies for the smallest farmers. Organic agriculture is another important concern of the Union, and one in which it is actively involved. Climate-related and environmental questions are taken particularly seriously. Food sovereignty based on local skills is another important issue, and the Union works in an alliance with the Development Fund of Norway and other organizations to promote the right to one's own produce.³¹³ The Union does not include plant genetic resources and biological diversity in agriculture on its list of prominent issues, but they are implicit in the organization's values and ideals. They are also reflected in the Union's partnership with the Development Fund, which is largely about genetic resources in agriculture, and in the organization's membership of the international umbrella organisation *La Via Campesina*, which is active in the field.³¹⁴

Oikos – Organic Norway (Oikos – Økologisk Norge) is an organization open to all with an interest in organic agriculture and organic produce. It takes its name from the Greek word *oikos*, meaning household, from which the word *ecology* also stems. *Oikos* arose in 2000 when the Norwegian Organic Farmers' Association (NØLL), Norwegian Organic Herb Society (NOU) and Eco-Producers (Øko-produsentane) decided to merge. It has about 1,800 members, eight regional groups and 25–30

³¹¹ See Norwegian Farmers' and Smallholders' Union homepage: <http://www.smabrukarlaget.no/sider/tekst.asp?side=64>

³¹² NBS: Important issues for the Norwegian Farmers' and Smallholders' Union. Brochure available at: <http://www.smabrukarlaget.no/smabrukarlaget/vedlegg/Viktige-saker-for-NBS.pdf>

³¹³ NBS: Important issues for the Norwegian Farmers' and Smallholders' Union. Brochure available at: <http://www.smabrukarlaget.no/smabrukarlaget/vedlegg/Viktige-saker-for-NBS.pdf>

³¹⁴ See: http://viacampesina.org/main_en/index.php

local branches.³¹⁵ Besides individuals, organizations can also be members. The point here is to unite the organic movement and give it a recognizable, coherent voice.³¹⁶ Oikos is a non-profit organization working to promote the goals and philosophy of organic agriculture and strengthen the organic movement in Norway by working for the best possible regulatory framework for organic farming methods, access to marketing organizations and markets for organic produce, raise awareness about organic agriculture, encourage more farmers to run their farms organically, and strengthen cooperation between farming and environmental organizations.³¹⁷ Biodiversity is a central theme at Oikos. As the organization itself says,

Organic production contributes to the conservation of species and natural habitats through reduced use of pesticides, higher grass land percentages in crop rotation, and wider use of indigenous varieties and plants. Many organic farmers take responsibility to preserve, restore and refine old animal breeds and plant varieties.³¹⁸

The organization seeks in practice to promote “farmers’ undisputed and time-honoured right to exchange and give away seeds enabling the preservation, utilization, exchange and development of plant genetic diversity”. Oikos is a member of IFOAM, the International Federation of Organic Agriculture Movements, which address the same issues.³¹⁹

The *Association of Biodynamic Farmers (Biologisk-dynamisk Forening)* is a membership organization that works to educate and stimulate interest in biodynamic farming methods, nutrition and nature management from a holistic cultural perspective. It has 350 members. The Association’s vision includes promoting a vigorous farming culture characterized by a sense of ecological responsibility; biodiversity; and high nutritional standards.³²⁰ It formulates guidelines and develops the biodynamic approach to farming, promotes training and internships, public awareness, market and consumer-related work, and encourages research into the biodynamic method. In its Strategy and Action Plan for 2008–2012 the Association points to the decline in crop genetic diversity in cultivars and the threat to global and local food security. It has a particular responsibility to help Norway implement its obligations under the International Treaty on Genetic Resources for Food and Agriculture, since the country’s farmers “do the majority of the work of *in situ* conservation of plant genetic diversity in agriculture”. This statement reflects the conjoined effort of biodynamic farmers to preserve and maintain crop genetic diversity on farms and the fact that the new interest in crop genetic diversity in cultivars is largely the result of this group’s

³¹⁵ See Oikos’ homepage: <http://www.oikos.no/newsread/news.asp?DOCID=10123&wce=dokument>

³¹⁶ For example, Biodynamic Association (see next section) is an Oikos member organization, and was one of the founding organizations of its forebear, NØLL.

³¹⁷ See Oikos’ political platform, adopted at the national congress, March 2010: <http://www.oikos.no/newsread/news.asp?n=5503&wce=>

³¹⁸ See Oikos’ political platform, adopted at the national congress, March 2010: <http://www.oikos.no/newsread/news.asp?n=5503&wce=>

³¹⁹ See: <http://www.ifoam.org/>

³²⁰ According to the Association’s Strategy and Action Plan for 2008–2012. See: <http://www.biodynamisk.no/files/2011/10/strategiplan.pdf>

efforts (see also Chapter 2). The Association is also a member of IFOAM, the International Federation of Organic Agriculture Movements.

This summary demonstrates the commitment of the four organizations to the conservation and sustainable use of plant genetic resources for food and agriculture. While that commitment is strong and has been for a long time in the two smallest organizations, the two major organizations are becoming increasingly active in this field as well. There are several examples of the organizations working together to draft joint consultation responses and organize/take part in events.

7.2 Legislation on farmers' participation in decision-making processes

Norwegian legislation is not very explicit on participation in decision-making processes. The closest we get to actual rules in this area is the Public Administration Act.³²¹ According to § 37, public and private institutions and organizations for enterprises, professions and skilled trades or interest groups which the regulations concern or will concern, or whose interests are particularly affected, shall be given an opportunity to express their opinions before the regulations are issued, amended or repealed. Opinions shall be submitted in writing. In an individual case, the administrative agency may consent to opinions being given orally. When so warranted by the nature of the case, the administrative agency may decide that negotiations shall take the form of meetings. We shall look at how this works in practice.

7.3 Farmers' participation in relevant decision-making processes

The consultation system envisaged by the Public Administration Act is usually activated when laws and regulations are drafted, but it is used in other connections too: the new white paper on agriculture is one such example. The proposed amendments to the law on plant breeders' rights were the subject of an extensive consultation process in 2004–2005, which ultimately led to its withdrawal (see section 4.1). The proposed changes to the patent law were the subject of a major consultation process and significant media attention, though no major changes came out of that either (it did result in some mitigation measures).

With regard to regulations and regulatory amendments, the situation is changing. As Norway is a member of the EEA, the country receives a steady stream of directives and regulations that require the country to amend its domestic regulations. As a result, regulations are constantly changing. Some regulations are amended almost on a yearly basis. It presents the consultation system with some major challenges. First, it makes it difficult for government bodies to conduct hearings. But it is at least as demanding for the affected parties who barely manage to keep up with the flow of proposed amendments and understand how they themselves will be affected. The documents can be so complicated that

³²¹ Lov om behandlingsmåten i forvaltningsaker (forvaltningsloven): <http://www.lovdata.no/all/nl-19670210-000.html>

even experts fail to understand entirely what the proposals mean in essence. It all boils down to a significant challenge for democracy.

One instance of this situation is the 2004 change to the regulations on approval of plant varieties and sale of seed. Overnight, farmers were suddenly prohibited from exchanging, giving or selling seeds among themselves. But no one was aware of the amendments at the time, and none of the organizations consulted in connection with this study could recall having been invited to the hearing. Nor has it been possible to find invitations to present an opinion on the consultation lists on the homepages of the Norwegian Food Safety Authority or Ministry of Agriculture and Food. If steps were in fact taken to consult affected parties, we can conclude that none of them understood the implications of the amendments. It was not until nearly two years later that it became known in farming circles, in fact, it happened in connection with the start of this study (see Section 4.2), at which time it quickly became a topic of conversation and discussion at seminars, meetings and reports in the media. If the proposals were never sent to consultation partners for an opinion, it may be because of the large number of other changes that year in connection with the implementation of the new Food Act and a number of EEA directives. Perhaps there was insufficient capacity to send everything out for consultation.

Even more challenging for democracy is what happens when the consulted parties have substantive objections to statutory changes precipitated by EEA regulations. This has occurred in several consultations concerning the seed regulations, where the main consultation bodies were all in favour of certain proposals. In the event, however, these proposals could not be included in the regulations because they clashed with EEA regulations. In cases like this, the consultation system loses some of its force inasmuch as the opinions of the consulted parties carry little weight compared to guidance from the EEA.

Given these tendencies, the democratic effect of participation in consultation processes has probably declined since Norway joined the EEA. The current situation presents two key challenges: to ensure that relevant groups are aware of the processes of change and understand them; to ensure that participants in the consultation process are heard and sensible and useful suggestions taken into account.

Farmers can still exert influence through the negotiations on the annual agricultural settlement. Both of the two biggest farmers' organizations have a voice here, and a unique opportunity to shape agricultural policy, particularly the financial mechanisms. As we saw above, genetic resources are also a subject of negotiation, and there is acceptance that the management of these resources should be supported to some degree. Perhaps this opening could be exploited more effectively with respect to the incentive structures that are essential to strengthen the practical work on farms on conservation and sustainable use of genetic diversity. Perhaps too it would be sensible for the two major organizations to work with the smaller, more specialized organizations, to generate a more active, targeted policy on the conservation and sustainable use of crop

genetic diversity. There is a potential in the system to increase participation, and it should be exploited.

In other respects, it is usually quite easy to gain access to political decision-makers in Norway, compared to many other countries, and relatively easy to get the media to cover questions of interest. Both channels are important in terms of participation in decision-making processes.

How are things with regard to farmers' participation in governing and advisory bodies of relevant organizations?

The Norwegian Genetic Resource Centre (NGRC) answers to the Ministry of Agriculture and Food and, on the plant side, has an advisory body, the Committee on Genetic Resources for Plants. The committee has ten members, two of which are farmers.³²² One represents the Norwegian Farmers' Union, the other is a biodiversity farmer from a firm consisting of eleven biodiversity farmers: Økologisk Spesialkorn AS. While the Farmers' Union has had a seat on NGRC's advisory bodies earlier, the inclusion of biodiversity farmers was first instituted in 2010. The move can be seen in the context of this report, as the inadequate representation of biodiversity farmers was made known in 2009 at a seminar on the preliminary results of the study, after which the deficiency was amended. An important question is whether this solution gives legitimate representation. It obviously does for the Farmers' Union. But in the case of the biodiversity farmers, they are not organized to the same degree so far, but rather affiliated to various groups, organizations and associations. Selecting a farmer from perhaps the most extensive association is therefore probably the best way to ensure legitimate representation in the current situation. Should this advisory organ include biodiversity farmers, one may ask, as experts on diverse cultivars, e.g. vegetables, fruit and berries. It will be a question of balance in relation to other considerations that need to be taken into account when the committee's members are selected.

NordGen is a Nordic organization funded by the Nordic Council of Ministers. NordGen's Board of Directors answers to the Nordic Council of Ministers.³²³ The Board has a representative and deputy from each of the five Nordic countries, delegated either from the ministries or subordinate agencies. A representative of NordGen's staff has a seat on the Board, as does an observer for the Nordic Council of Ministers. 'Environmentalists' also have an observer. The latter comes from the Norwegian Biodiversity Centre at Trondheim (Species Database). There are no members or observers representing conventional or biodiversity farmers. NordGen has four working groups: (1) cereals; (2) fodder, root, oleaginous and fibrous plants and legumes; (3) vegetables, potatoes, herbs and medical plants; and (4) fruit, berries and ornamental plants. The working groups record, describe and evaluate NordGen material, they

³²² See committee's presentation:
http://www.skogoglandskap.no/artikler/2007/genressursutvalg_planter

³²³ See organization and board presentation:
<http://www.nordgen.org/index.php/skand/content/view/full/452> and
<http://www.nordgen.org/index.php/skand/content/view/full/460>

provide information on the material and practical assistance. Each group has one or more members from each of the five countries. They are experts in their particular areas and work in the fields of research, breeding or collecting genetic resources in their respective countries. As we see, farmers are not represented on the working groups, and NordGen lacks farmers' representation at both levels. This is strange for an organization of such importance to biodiversity farmers and their continued efforts to ensure *in situ* conservation and sustainable use of the resources NordGen cares for *ex situ*. NordGen is precisely the type of institution where one would expect biodiversity farmers to be represented to facilitate the implementation of Art. 9.2 [c] of the Plant Treaty on participation in decision-making. Collaborating with biodiversity farmers could have synergies and strengthen the all round effort to conserve and use these genetic resources sustainably.

7.4 Farmers' reflections on participation in decision-making processes

Although there is a strong tradition in Norway of participation in decision-making processes, most of the farmers interviewed for this study were worried about the democratic deficit resulting from Norway's EEA membership. Norway has to comply with so many decisions issuing from the EU, with implications for the conservation and sustainable use of crop genetic diversity, that farmers' involvement in drafting regulations in these instances in effect is more of a theoretical exercise than a practical reality. Admittedly, farmers' organizations can influence Norwegian policy in relation to EU, but since Norway has little impact on EU decision-making, this power is of little ultimate value.

When it comes to decisions concerning access to seed materials, the seed industry plays a central role. Much of the industry consists of farmer cooperatives or is partly owned by such cooperatives. The history of the cooperative movement in Norway is rather special.³²⁴ The movement emerged in response to problems affecting market access around the country caused partly by long distances and partly by poor infrastructure. Farmers joined forces to establish dairies, abattoirs and other cooperative ventures. These in turn bought farmers' produce at fixed prices which varied little across the country, and retailed the produce to consumers. Cooperatives enjoyed a monopoly in the market that was vital to their existence in that they had control over supply and prices. This role entailed a social responsibility both to farmers and consumers, the Norwegian public. For the system to work, it had to be sensitive and responsive to the needs of the market. Today's cooperatives, which are much more centralized, still have a regulatory role in the market, but are more exposed to market forces and subordinate to the demands of profitability. The problem with regard to crop genetic diversity is that it is not economically feasible to produce seed of small groups. The seed industry is therefore largely unable to meet the demand for crop genetic diversity. Farmers are well represented on the boards of all major seed businesses and could in theory influence decisions regarding crop genetic

³²⁴ This paragraph is based on information provided by Pia Borg, then senior advisor to the Farmers' Union, during an interview 8 March 2006.

diversity. But it would probably be to little avail as long as profitability remains the ultimate value. And this is unlikely to change any time soon. The ability of biodiversity farmers to influence the seed industry is therefore, in their own opinion, extremely limited.

On the other hand, the two main farmers' organizations exert considerable influence on agricultural policy-making as parties to the annual agricultural settlement negotiations. Some biodiversity farmers feel underrepresented in these processes, possibly because the agricultural settlement is such a complex process. Ordinary farmers are hard pressed to see how they could influence the organizations' policy and positions in the negotiations.

7.5 Preliminary conclusions on farmers' rights to participation in decision-making processes

The representation of conventional farmers in decision-making processes in Norway is generally satisfactory; that of biodiversity farmers is far less so, however. There are several reasons for this state of affairs, not least the organization of these farmers – or rather their lack of one. In theory, there are many ways to participate in relevant decision-making processes; in practice, opportunities are fewer in number. Although the consultation system is open to all with a view or opinion, Norway's EEA membership results in frequent consultations, and it is difficult for most involved parties to keep pace with developments. Those affected by the proposals about which consultations are held do not always manage to understand the legal documents. And, most importantly, the premises are decided in the EU anyway, and cannot be changed even if every consultation body were to recommend doing so. Norway has minimal influence over EU decisions. The only way farmers can influence the processes is by working alongside the farmers' organizations that are working on these issues within the EU.

As regards the financial instruments of agricultural policy, conventional farmers are well placed to influence decisions insofar as their organizations are party to the annual settlement negotiations. Biodiversity farmers lack that representation. There is room for improvement here. Biodiversity farmers could organize themselves better, mediate their views through an existing organization, or encourage the two large farmers' organizations to work more consistently with the smaller organizations, specialized in biodiversity in agriculture, to bring influence to bear on the negotiations.

While the NGRC is working to improve the representation of biodiversity farmers on their advisory bodies; NordGen, however, has yet to take this step. Here too there is clearly room for improvement. But farmers can express their opinions freely in public debates in the media and at meetings and seminars.

One of the important challenges facing biodiversity farmers is nonetheless to strengthen factors enabling participation, that is, by organizing themselves better and building capacity. Biodiversity farmers still lack an organization or a network of their own, and in that sense are a

relatively fragmented group. What's more, they often have more than enough to do on their farms, and lack the time and resources to acquaint themselves with complicated legal and juridical matters. Joining forces under a dedicated organization – either through affiliation with an existing organization or one they create themselves, or indeed a network – would greatly improve these farmers' ability to exchange information and take part in decision-making procedures.

8 Summary, conclusions and recommendations

'We aim to be the best in the world when it comes to taking care of genetic resources', Norway's previous Minister of Agriculture and Food, Lars Peder Brekk, said in the autumn of 2011.³²⁵ This report has analyzed where we stand, what has been achieved and what remains as gaps and needs with regard to Norway's management of its crop genetic resources and farmers' rights, in light of the Norwegian commitments under the International Treaty on Plant Genetic Resources for Food and Agriculture (Plant Treaty).

The report began by showing why plant genetic resources in agriculture are so important for food security and nutrition in the world: they constitute the bedrock for plant breeding and improvements, and therefore a central pillar of food production. It is the diversity of our plant genetic resources that determines whether we will be able to protect food production against disease, pests and the negative effects of climate change, enabling us to deal with shifting nutritional needs and the demand for more environmentally-friendly agricultural production.

The intention of the International Treaty on Plant Genetic Resources for Food and Agriculture (the Plant Treaty) is to ensure that crop genetic diversity is conserved and utilized sustainably, with the benefits accruing from the use of these resources to be shared in a fair and equitable manner. The challenges are considerable in a world that has lost much of its crop genetic diversity in the course of the past hundred years, and has yet to halt this negative trend. An important aspect here is to ensure that farmers will be able to continue their contribution to conserving, cultivating and further developing crop genetic diversity – a practice that over the past 10,000 years has provided the rich diversity found in the world today. To that end, the Plant Treaty has specific regulations concerning farmers' rights.

Norway has maintained a high profile in international efforts to maintain crop genetic diversity – as a driving force in the negotiations leading up to the final Plant Treaty; as a bridge-builder between North and South; as a financial contributor to international processes and tasks; and, not least, by realizing the Svalbard Global Seed Vault.

But how are things on the home front?

Status of crop genetic diversity and seed/propagation materials for farmers

Very few of the old Norwegian landraces of cereals, potatoes and vegetables have survived. Most of them are gone. On the other hand, some of the older commercial varieties still exist which probably contain at least parts of the genetic material of the previous landraces. As for fruit and berries, the picture is somewhat brighter, but plant breeding on this

³²⁵ During 'The Great Apple Hunt' arranged by the Norwegian Genetic Resource Centre. Source: press release, 6 September 2011. See: <http://www.skogoglandskap.no/nyheter/2011/brekkspelejak>

material is very limited, and thus this diversity is also under threat. In former days Norway boasted a wide range of local meadow plants, but also here, much has disappeared. Beyond doubt, the modernization of agriculture has meant greater production efficiency – but it has also led to genetic erosion across the board, in Norway as elsewhere. A series of measures have been implemented to preserve and stimulate crop genetic diversity, to which we return below.

Most of Norway's farmers are satisfied with the available assortment of seeds and propagating material – but many organic and most of the biodynamic farmers find that their needs are not met by supplies available from authorized seed shops, and seek out other channels. These farmers comprise the majority of biodiversity farmers in Norway today, but there are not many of them, perhaps no more than a few hundred. In this perspective, farmers' rights becomes particularly important, as they are about enabling these relatively few farmers to continue their work, perhaps also to encourage others to join the cause.

Why farmers' rights are important, and what they entail

There is broad agreement among all stakeholders that farmers' rights are important for the conservation and sustainable use of crop genetic diversity in Norway. It is nevertheless necessary to pay attention to plant health and seed quality issues, but most stakeholders agree that it is possible to combine these considerations. Biodiversity farmers in Norway see farmers' rights as an essential factor enabling them to continue to conserve and further develop crop genetic diversity.

Further, there seems to be general agreement among all stakeholders in Norway that these elements of farmers' rights are important for the country:

1. The right of farmers to save their own seed and propagating material on their farms, and to use and develop crop genetic diversity as wished, as well as the right to exchange seed with other farmers and sell seed that is not protected by plant breeders' rights, on the condition that plant health and seed quality are taken into account;
2. Measures to maintain and further develop knowledge related to crop genetic diversity;
3. The right to compensation for the extra costs involved in conserving plant genetic diversity for society and future generations, and for measures to support this work;
4. The right to participate in decision-making processes concerning crop genetic diversity.

By and large, these rights correspond to what is set out in the Plant Treaty.

The right to save, use, exchange and sell seeds

The Norwegian authorities have gone further than their counterparts in many other countries to ensure farmers' rights to save, use, exchange and

sell seeds and propagating material. Norwegian farmers are still allowed to save seed of varieties that are protected by plant breeders' rights: they may use these the following season and also exchange them with other farmers. Elsewhere in Europe these possibilities are limited, as farmers are generally forbidden to exchange seeds and propagating material among themselves; and saving seeds from protected varieties for use in the next season is usually either forbidden or subject to licensing.

As yet, patents have had scant impact on farmers' rights in this area, since they are rarely used in connection with the seeds sold in Norway. All the same, there is reason to be alert to a possible increase in the use of patents that will affect plant varieties. Patents can limit the rights of farmers to save, use, exchange or sell seeds and other propagating materials.

After the 'prohibition era' of 2004 to 2010, when all seed exchange among farmers was banned in Norway, the regulations for plant variety release and seed marketing as well as for seed potatoes has been relaxed. It is permissible to exchange and sell seeds on a non-commercial basis among farmers (except for seed potatoes) and it has become easier for farmers to establish their own authorized seed shops to sell conservation varieties and traditional varieties of vegetables. This makes it possible to sell seeds commercially from varieties on the official list, although subject to certain restrictions and limitations. It always involves a considerable amount of paperwork – and a good farmer is not always necessarily good at negotiating bureaucratic red tape. However, the first authorized seed shop for conservation varieties has been established, and lessons learned here will be of great value for assessing further possibilities in this area.

Still all seeds and propagating material that is marketed on a commercial basis must originate from released varieties from the official list. In addition, seed certification is required for several species. These requirements have been relaxed somewhat for conservation varieties, and the Norwegian Food Safety Authority has signalled its intention to employ considerable flexibility here. The question arising from all this is: will it be possible to achieve official recognition for all the varieties that Norway's biodiversity farmers wish to use in their work? That would necessitate extreme flexibility in some cases where the varieties exhibit very low genetic uniformity and would also involve considerable procedural work on the part of the Norwegian Food Safety Authority. Particularly cases where the varieties originate from other countries will present challenges. The Norwegian Food Safety Authority has signalled that it will do its utmost to grant official recognition to as many varieties as possible, and NordGen and the Norwegian Genetic Resources Centre will contribute descriptions and other relevant information. Thus the opportunities inherent in these regulations seem to be utilized to a maximum. Time will show how many varieties are officially released, what bureaucratic costs are entailed, and whether varieties will be released quickly enough in relation to farmers' demands and interests – to stave off financial loss on their part, and enable them to develop diversity at their own preferred pace. Time will also show whether other restrictions in the regulations will be invoked in practice (e.g. as regards

limitations of amounts, on regions, and the ban against further breeding of these varieties for sale).

Recommendations

1. *The Norwegian Genetic Resources Centre, farmers' organizations and other relevant observers are recommended to monitor developments closely as regards practical implementation of Norwegian regulations on seeds and propagating material. Should these regulations prove to obstruct work on the conservation and sustainable use of crop genetic diversity, solutions will have to be sought immediately – in cooperation with the Norwegian Food Safety Authority, if possible within the EU regulatory framework – or otherwise at the political level in the Ministry of Agriculture and Food. There may be good reasons to seek exemption for Norwegian seed regulations from the EEA agreement if this should prove necessary. The broader European seed industry has scant interest in the Norwegian market, and an exemption for Norway would have minimal consequences for the European seed market. An exemption would make it possible for Norway to develop seed regulations more in line with the need to stimulate greater engagement in the conservation and sustainable use of crop genetic diversity – and thereby perhaps become 'best in the world' in this area.*
2. *Norwegian farmers' organizations are recommended to seek closer collaboration with European networks working to change EU seed regulations, one example being the all-European 'Let's Liberate Diversity' network.*
3. *The Ministry of Agriculture and Food is recommended to assess schemes enabling a longer-term financing of plant breeding activity as regards varieties in demand but not financially viable. Greater financial predictability in this area would eliminate much of the necessity to tighten up plant breeders' rights at the expense of farmers' rights.*

Rights related to relevant traditional knowledge

The main point of farmers' rights related to traditional knowledge concerning crop genetic diversity is to ensure that it is maintained and kept alive. Central measures here are documentation, exchange and active use. As we have seen, biodiversity farmers recognize traditional knowledge as invaluable and indeed decisive for their ability to conserve and develop crop genetic diversity on their farms, and for building up economically sustainable production based on this diversity. However, we have also seen that this knowledge is rapidly disappearing; it is therefore urgent to apply the measures necessary to save what still remains.

A wide range of measures has been employed to strengthen traditional knowledge of selected plants, cultivation methods and areas of use. The Norwegian Genetic Resource Centre has documented many older varieties on its website, and facilitates contact with holders and sources

for further information and learning. The Directorate for Nature Management is a driving force in the efforts to preserve knowledge about older pasturelands and meadows, and many voluntary groups and organization have worked in this area for some time now. All the same, there exists no comprehensive plan for maintaining this cultural heritage and passing it on to future generations. We still lack a unified strategic approach to traditional knowledge on agricultural plant genetic resources – and that is a serious deficiency, given the speed at which this knowledge is vanishing.

The Norwegian Genetic Resources Centre has a comprehensive mandate, but with highly limited resources. Given the division of labour whereby NordGen is responsible for the preservation of many food plants, a considerable share of the Norwegian Genetic Resources Centre's funding is used for plants not dealt with by NordGen, or only to a minor extent: this applies to ornamentals, fruits and berries, and since 2010 to potatoes. NordGen has little capacity for working on the traditional knowledge related to its material, and so this area has received scant attention. If the Norwegian Genetic Resources Centre could obtain the necessary funding, the Plant Heritage Project and the fruit database could be expanded to include these food plants, thereby making knowledge on them more broadly accessible. It would also be possible to focus more specifically on work to maintain and disseminate traditional knowledge. More projects would be supported, and work in this important area could be strengthened.

New chances have emerged in recent years, *inter alia* with the Action Plan for Hay Meadows and the choice of hay meadows and wetlands as Selected Habitat Types under the Nature Diversity Act – involving increased allocations and activities to protect these areas. There is reason for hope, and perhaps also lessons to be learned for the work on maintaining food plants and the traditional knowledge linked to them.

On the whole, we see there are many groups working to maintain and pass on traditional knowledge of food plants, which in turn helps towards the realization of farmers' rights in this area. However, a great deal remains to be done, and we still lack a systematic, unified plan for saving and enabling the dissemination of traditional knowledge. Useful tools are available, with the apparatus in place for implementing targeted work in this area. What is lacking is the necessary funding – and that is dependent on political priorities.

Recommendations

4. *The Norwegian Genetic Resources Centre is recommended to develop a unified strategy for work on traditional knowledge, as the basis for an application to the Ministry of Agriculture and Food for support. As part of the work on such a strategy, the Norwegian Genetic Resources Centre is recommended to emphasise why traditional knowledge is important, how it can contribute and what is necessary for passing on such knowledge.*

5. *All the involved parties are recommended to consider the measures they can contribute to increase awareness of the importance of traditional knowledge for the conservation and sustainable use of crop genetic diversity, for entrepreneurship on the farms, and what a cultural heritage this knowledge represents. Campaigns, seminars, media involvement etc. are all possible channels.*

The right to share benefits accruing from the use of genetic resources

Farmers' rights to benefit-sharing are about compensation to farmers and recognition of their contributions to the global pool of genetic resources and thereby to world food security, and about support to their efforts for the benefit of mankind.

Much has been achieved as regards incentive structures and support arrangements for semi-natural meadows, but much still remains in developing incentive structures that can stimulate the conservation and sustainable use of genetic diversity in food plants. The parties to Norway's annual agricultural agreement negotiations have agreed that genetic resources are an important issue-area, and funds are earmarked each year. However, predictable incentive structures are still lacking. Thus, an important question is whether the parties can agree to introduce concrete measures and support arrangements specifically aimed at compensating and encouraging farmers to continue their work in active conservation and use of crop genetic diversity in food plants.

Access to seeds and other propagating material is important, and thus a central issue in relation to the concept of benefit-sharing. Access is relatively good in Norway, although the selection available from the major authorised seed shops is limited when it comes to meeting the needs of biodiversity farmers. NordGen and the Norwegian Genetic Resources Centre are the main contributors as regards the needs of biodiversity farmers, facilitating increased use of genetic diversity in agriculture. However, the financial situation of NordGen gives reason for concern, with the danger that cuts may affect vital work in maintaining collections and dealing with valuable new accessions.

Graminor has supported some conservation work in cooperation with NordGen. There is potential for further development of such cooperation, for example with regard to multiplication of seed of older varieties for biodiversity farmers.

The three research programmes under the Research Council of Norway of greatest relevance to farmers' rights and food biodiversity have at their disposal well over 400 million kroner per year. As yet, only a small proportion of the projects of interest to conservation and sustainable use of crop genetic diversity has received support, and projects on food plants are poorly represented. This may be due to few relevant or scientifically well-formulated applications, or because priority has been accorded to other issues and themes. An important question is whether our theme has found sufficient response in programme plans and guidance documents, or whether one should re-assess the need for research in this area, so as to target funding more precisely to the conservation and sustainable use of

crop genetic diversity. Research in this area can form an important foundation for information dissemination, capacity-building and technology transfer to biodiversity farmers as an adjunct to the realization of farmers' rights – and thereby to the further work in conserving and passing on this invaluable plant heritage.

Norway contributes considerable sums to overall efforts to promote implementation of the Plant Treaty and ensure equitable benefit-sharing with the South. Still, it should be noted that whereas slightly less than 3 million kroner per year is allocated to the Plant Treaty, including the benefit-sharing fund, well over 120 million goes each year to other institutions working for the same goals. The Plant Treaty – the sole international instrument the world has established to facilitate the management of plant genetic diversity – remains critically under-financed, and its benefit-sharing fund is far from adequate to meet expectations and challenges. That said, Norway alone cannot assume responsibility for financing the Plant Treaty and the sharing of benefits.

Another important question concerns the balance between *ex situ* conservation and *in situ* management of crop genetic diversity in the distribution of funding. To date, most funding from Norway has gone to *ex situ* conservation and research, whereas implementation of the Plant Treaty's Article 6 on sustainable use of genetic diversity suffers from lack of financing. In terms of benefit-sharing, both are important. The problem is that funding for *in situ* work internationally hardly exists. It should also be borne in mind that the benefit-sharing mechanism was specifically intended to support those farmers in developing countries and countries with economies in transition who work to conserve and sustainably use plant genetic diversity for food and agriculture (Art. 13.3).

Recommendations

6. *The Norwegian Agricultural Authority is recommended to develop a support scheme to promote the cultivation of conservation varieties, traditional vegetables and plant varieties not included in the official list. Further, the current arrangement for compensation in the event of climate-induced damage should be expanded to include loss of quality in production based on such varieties.*
7. *The Ministry of Agriculture and Food is recommended to consider increasing its allocations to the Norwegian Genetic Resource Centre, aimed at enabling support to new projects dealing with diversity in food plants. Consideration should also be given to earmarking funding for an additional plant-focused position at the Norwegian Agricultural Research Centre, as all such work is currently the responsibility of one individual, entailing a heavy burden and increasing vulnerability.*
8. *The situation in NordGen should be followed closely. If other Nordic countries are not able to honour their financial obligations, it may prove necessary to consider measures for ensuring the maintenance of the Norwegian material.*

9. *Graminor has signalled its willingness to contribute to the work of conservation and multiplication of seeds from older varieties. The Norwegian Genetic Resource Centre is recommended to consider how this might be utilized so as to make available more of this material, which is already in high demand.*
10. *The Norwegian Genetic Resource Centre is recommended to continue its dialogue with the relevant instances in the Research Council of Norway with a view to mapping the need for research and developing a more targeted strategy for research on the conservation and sustainable use of crop genetic diversity within one or more of the Council's programmes.*
11. *The Ministry of Foreign Affairs and the Ministry of Agriculture and Food are recommended to consider measures for increased support to the Plant Treaty and its benefit-sharing fund. Such measures could include mechanisms triggering support from Norway, provided that several other countries contribute sums above a given amount. In this connection, the said ministries should also consider how to increase support to in situ work.*

The right to participate in decision-making processes

In general, Norway's farmers have good possibilities for participating in decision-making processes. However, biodiversity farmers have been less actively involved to date. There may be various reasons for this, not least their own way of organizing – or lack of such. In theory, there are many ways of taking part in relevant decision-making processes, although in practice the list may be somewhat shorter. For example, whereas the public hearings system is open to all views and contributions, in practice many hearings are called because of Norway's EEA membership, and here it can be difficult to follow developments in this rapidly shifting landscape; furthermore, the official documentation is often not easily comprehended by all the parties involved. Most important of all: the central decision-making bodies are to be found within the European Union itself. Here, no amount of consultations in non-EU member Norway has any effect – Norway has only minimal possibilities to influence EU decisions. The only avenue open to farmers is to attempt to exert influence on the decision-making processes through contacts with the farmers' organizations that are working on these issues within the EU.

As regards financial instruments in agricultural policy, farmers are strongly represented through the annual agricultural negotiations, although also here there is less representation from those engaged in biodiversity farming. Here lies a clear potential for improvement: for example, through better organization among biodiversity farmers; and if the major organizations could work together with the smaller ones specialized in agricultural biodiversity, on joint positions in the annual agricultural negotiations.

The Norwegian Genetic Resources Centre is currently working to improve the representation of biodiversity farmers in its consultative

organs. This, however, has not been the case with NordGen – so also here we note a clear potential for improvement.

An important challenge for biodiversity farmers remains to strengthen the preconditions for their participation through organization and capacity-building. As yet, Norway's biodiversity farmers lack an organization and/or a network of their own, and thus appear relatively fragmented. Indeed, they often have more than enough to do on their farms, and simply lack the capacity to delve deeply into complicated judicial and legal matters. Organization – whether within an existing body or in a separate organization or network – might be one way of facilitating a better flow of information, enabling the country's biodiversity farmers to become more actively involved in relevant decision-making processes.

Recommendations

- 12. Biodiversity farmers of all kinds are recommended to join together in a network, in a grouping with an existing organization or in an organization of their own. This will make it easier for them to achieve participation in decision-making processes, to promote their own interests and to ensure a better flow of information amongst themselves.*
- 13. NordGen is recommended to establish an observer position for biodiversity farmers on its Board, and to facilitate conditions for the participation of biodiversity farmers in its working groups.*
- 14. The Norwegian Farmers' Union and the Norwegian Farmers' and Smallholders' Union are recommended to invite Oikos – Organic Norway together with the Norwegian Biodynamic Association to develop a joint strategy for the next annual agricultural negotiations, aimed at establishing a targeted incentive structure for the in situ on-farm conservation and sustainable use of crop genetic diversity in food plants.*

Norway can make considerable progress in the efforts to conserve and use plant genetic resources in agriculture sustainably thanks to conducive framework conditions. The authorities have been actively engaged in these issues for several decades, and well-functioning structures have been established. The involved parties and stakeholders are broadly agreed that this is an important task, and that farmers' rights are central to progress here. Moreover, Norway is an affluent country, with many enthusiastic advocates of plant genetic diversity in agriculture. The recommendations given above have indicated some of the measures that could bring Norway several steps forward – thereby perhaps indeed becoming 'best in the world when it comes to taking care of genetic resources'.

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Annex: Interviews and meetings

This annex contains the interviews conducted in connection with this report, as well as some of the extensive personal correspondence, contacts and meetings involved. As work on this report gradually came to involve the exchange of great amounts of information, many meetings and seminars, it has not been possible to include everything here.

Personal contact: (interviews, correspondence by e-mail and post, telephone conversations, etc.)

10 November 2011: Bell Batta Torheim, project coordinator, the Development Fund of Norway (Utviklingsfondet) (e-mail)

14 October, 2011: Akse Østebrøt, senior adviser, Directorate for Nature Management (e-mail)

12 October, 2011: Svein Solberg, senior researcher, NordGen (e-mail)

25 March 2011: Johnny Andreasson, CEO, Runåbergs Frøer, (interview, Stockholm).

14 October 2009: Kees van Ettehoven, then head of Variety Testing Department, the Netherlands (interview, Marseilles)

20 March 2009: Svein Solberg, senior researcher, NordGen (telephone)

19 and 20 March 2009: Åsmund Asdal, senior adviser, NGRC (e-mail).

9 November 2009: Ann Norderhaug, head of research, Bioforsk Mid-Norway (telephone interview)

13 March 2009: Morten Rasmussen and Svein Solberg, (interview, NordGen, Alnarp)

20 January 2009 Åsmund Asdal, senior adviser, NGRC (e-mail)

4 November 2008: François Burgaud, GNIS (organization for producers of propagating materials), France (e-mail)

17 September 2008: Blanche Magarinos-Rey, lawyer (e-mail)

9 February 2007: Kjell Nyhus, division head, and Marianne Smith, Ministry of Agriculture and Food, letter to author (RA) (Ministry reference code: 200602968/MSM)

2 February 2007: Petter Marum, plant breeder, grasses, Graminor AS (Norwegian Cereal Breeding Ltd.) (telephone interview)

4 January 2007: Group interview at Graminor (Norwegian Cereal Breeding Ltd.):

- Magne Gullord, director
- Jostein Fjeld, head of marketing
- Stein Bergersen, barley breeder
- Petter Marum, meadow plants breeder
- Muath Alsheikh, strawberries breeder
- Trond Buraas, oats breeder
- Jon Arne Dieseth, wheat breeder

20 December 2006: Johan Swärd, Brandbu, farmer (telephone interview)

15 December 2006: Kari Bysveen, adviser, organic farming, Fabio (telephone interview)

24 November 2006: Anders Heen, , Norwegian Agricultural Extension Service (LFR), Ås (interview)

24 November 2006: Christian Brevig, project leader, Norwegian Agricultural Extension Service (LFR), Ås (interview)

15 July 2006: Torleif Hallingstad, Ål in Hallingdal, farmer (interview)

18 April 2006: Anders Næss, Sigdal, farmer (written response to interview guideline)

Group interview with biodynamic farmers, Fokhol Farm, 7 April 2006:

- Erik Evenrud, Hamar, then head of Association of Biodynamic Farmers
- Kerstin Pålsson, Frilund Farm, seed producer: vegetable seeds
- Jens Niebuhr, then of Alm-Østre, farmer: vegetables, potatoes, barley
- Heinrich Jung, Åmot Farm, farmer: vegetables and cereals
- Rune Myrseth, Fokhol Farm, farmer: cereals, potatoes, vegetables
- Aksel Melbye, Veflingstad Farm, farmer: potatoes and spelt
- Svein Helge Storøde Farm, Lillehammer, farmer: cereals and grasses

8 March 2006: Pia Borg, then senior adviser, Norwegian Farmers' Union (interview)

7 March 2006: Christian Brevig, project leader, Norwegian Agricultural Extension Service (LFR), Ås (letter)

6 March 2006: Jon Atle Repstad, head of production, Norwegian Agricultural Purchasing and Marketing Cooperative (Felleskjøpet Øst Vest), Holstad (letter)

Some of the meetings, seminars and conferences that informed this report (through information given on the occasion, and personal conversations with participants)

- Seminar on *Crop genetic diversity in Norwegian Agriculture and Gardening*, arranged by the Norwegian Genetic Resource Centre, at 'Skog og Landskap', Ås, 26 May 2011.
- *Let's Liberate Diversity*, conference at Szeged, Hungary, 25–26 February 2011.
- Concluding conference of the research project (under the EU's 6th framework programme) *Farm Seed Opportunities*, Marseilles, 14–15 October 2009
- Seminar on *Farmers' Rights to Crop genetic diversity and Genetic Resources in Norway*, arranged at Polhøgda by the Fridtjof Nansen Institute in connection with the presentation of the preliminary results presented in this report, 28 January 2009 (60 participants) see: <http://www.fni.no/news/090130.html>

- Meeting with the Norwegian Food Safety Authority, OIKOS (the organic farmers' and consumers' organization), the farmers' associations, and other involved parties, on plant variety and propagating material regulations, office of OIKOS – Organic Norway, Oslo, 20 November 2008
- Seminar on Bread of the *Future, Made with Grains from the Past*, hosted by Kristin and Johan Svärd, Brandbu, 14–15 July 2008
- Meeting on the conservation, characterization and use of older cereal varieties, 29 November 2006, Victoria Hotel, Hamar
- Organic Seed Days in Vestfold County, 25 January 2006, arranged by Fabio and Vestfold branch of the Norwegian Farmers' Union in cooperation with seed dealers and the Norwegian Food Safety Authority.

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