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Seeking Appropriate Legislation Regulating Access and Exclusive Rights to Forest Genetic Resources in the Nordic Region

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Abstract

The Nordic region is characterised by a simple and non-bureaucratic exchange of forest genetic resources (FGR) between countries, which generally is strongly associated with the Everyman's right within the countries. The smooth regime for international exchange of FGR is regarded as very valuable for the forestry sector across the country borders, as it secures access to seeds and breeding materials.

At the same time the status of the FGR has not been defined in domestic legal regimes. If FGR follow the development for crop plants, private property rights may be influential, which in turn may impede exchange of FGR across borders. Thus, the general background for addressing access and rights to FGR is the tension between the great ecological, monetary and social value of FGR and the fact that the legal status of the FGR has not been defined.

The aims of this Report are the following: Describe the present situation as regards access and rights to FGR in the individual Nordic countries. i) Identify issues and developments in international law that could negatively affect the present situation. Ii) Explore the legal status for breeding as a process and breeding materials with emphasis on patenting and recent developments in patent legislation. Iii) Address relevant case studies in which patenting is needed for commercialisation and how this could be combined with the general open exchange system. Iv) Explore the relevance of plant breeders' rights (UPOV) to the forest tree sector, and v) give applicable and relevant recommendations for decision makers as regards future challenges and FGR. If significant undesirable developments can be foreseen, legal steps to meet this should be suggested, given the premise that the Nordic countries wish to maintain the non-bureaucratic system as regards access and rights to FGR.

The main finding is that no crucial problems have been identified regarding ownership, access or exchange of FGR. There is a growing body of regulations at global and European regional levels, which is being implemented at national levels. Currently, patents have neither been a strong incentive for the forest sector nor entailed important obstacles for innovation in the field.

Key Words

forest tree genetic resources, patent law, Convention on Biological Diversity, Commission on Genetic Resources for Food and Agriculture, access and benefit sharing

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Executive Summary of the Report

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Preface

The simple and non-bureaucratic exchange of forest genetic resources (FGR) between the Nordic countries is regarded as very valuable for the forestry sector as it secures access to seeds and breeding material across borders. But as the status of the FGR has not been defined legally, there is a risk that future developments could interfere negatively with the present practice. The need to determine the legal status of FGR has been highlighted in several official documents of the Nordic Council of Ministers (NCM) from 2003 onwards, and in 2008 NCM granted NordGen Forest a project (Grant no 09-2) to explore these issues (2009-2010) in close collaboration with The Fridtjof Nansen Institute (FNI), Norway.

Morten Walløe Tvedt (FNI) has been the principal scientist in this work, and the Working Group (WG) for Forest Genetic Resources of NordGen Forest has been crucial both in elaborating the application to NCM, for provision of country specific information during the project, as discussion partner and for reviewing the present report. The contribution of the WG has been based on money in kind, and the persons involved were Mari Rusanen (Fi), Gunnar Friis Proschowsky (Dk, and partly Ditte Olrik), Henrik Hallingbäck (Se, replacing Sanna B. Samulesson), Øyvind M. Edvardsen (No), Tore Skrøppa (No) and Tor Myking (No).

1 Setting the scene for forest genetic resources

1.1 Background for this study

The emphasis on genetic resources follows directly from the Convention on Biological Diversity (CBD) and the efforts to secure conservation and sustainable use of biodiversity over the last decades. On 25 June 2003 the Nordic Council of Ministers (Fisheries, Agriculture, Forestry and Food) adopted a Nordic Ministerial Declaration on access and rights to genetic resources (GR) in Kalmar (Kalmar 2003), Sweden, which was approved by the Nordic Ministers of the Environment in Oslo on 28 October 2003. The Kalmar Declaration states explicitly that the Nordic countries should initiate a project aimed at providing a basis for the Nordic countries' decision on the legal status of their forest genetic resources (FGR). The goal of the current project is to respond to this ministerial declaration.

This study seeks to clarify whether it is necessary and possible to take legal steps to ensure that FGR 'remain under a viable public domain and open exchange system', as expressed in the project application. Existing differences between the countries may reduce the uniform value of this description of the situation, as not all FGR are in the public domain. The primary study target is the legal and political situation in the Nordic countries, but it is hoped that this work can be of broader interest in an international and global context.

There are differences between the countries in the Nordic region, but in general, the Nordic region has been characterised by simple and non-bureaucratic *access* to FGR, closely associated with 'everyman's right' ***(allemannsretten)***. 'Access' as used in the international debate denotes the situation where a user from one country takes or obtains a sample of genetic material from another country. 'Access to genetic resources' has in some jurisdictions, like the the South African one, been defined as the incident when the genetic material of a biological sample is been used for its units of heredity or the information contained in the genetic material. The Nordic term *allemannsretten* pertains to the general right of all to make use of forests and countryside areas which are not cultivated (more in section 4). The system for exchange among and between Nordic countries functions smoothly, and is regarded as very valuable for the forestry sector across national borders. However, the status of FGR has not been defined legally, and there is the risk that future developments might interfere negatively with what has become current practice. If the legal situation remains unclear, the situation for forest trees and intellectual property rights may well come to proceed along lines similar as those with development for annual crop plants: FGR will increasingly be subject to increased regulation and private property rights.

So why is it important to study law targeting access and rights to FGR? Firstly, there are ongoing changes in the general international situation, which the individual sectors need to be aware of so to adapt and react. This intensification in international law will with time become reflected

into the domestic legal situation of each country.[1] International law is general in scope and seldom targets the forest sector in particular; the consequences manifest in each sector. Therefore, there is a need to discuss how general genetic resources law applies to single areas as the forest sector. Secondly, changes in the world are responded to through the introduction of different legal tools, such as access and benefit sharing (ABS) under Convention on Biological Diversity (CBD), the United Nations Collaborative Program on Reducing Emissions from Deforestation and Forest Degradation in Developing Countries (REDD) and other mechanisms under the Climate Change Framework Convention. In this picture the branch of forest trees needs to be updated and perhaps also react to the changes of law. Third, in the work leading to the Kalmar Declaration, other sectors than the forest tree sector were in focus, and there was a call for a more specific look at this sector.

It has been a long standing Nordic tradition for cooperation in the area of genetic material, manifest in NordGen and the common genebank collections in the Nordic Gene Bank located in Alnarp in Sweden. In forest research the Nordic collaboration has been connected to SNS (Samnordisk skogforskning, www.nordicforestresearch.org) as the main funding body. This project is premised on the assumption that the Nordic countries wish to maintain their non-bureaucratic system for access and rights to FGR. This Report is a response to all these three justifications for looking at law and FGR.

1.2 Objective of studying FGR

The overall aim of the project was specified as to 'clarify whether it is necessary and possible to take legal steps to ensure that FGR remain under the public domain'. That entails describing the current situation regarding FGR, and identifying possible negative developments in this respect.

The partial and more concretely defined objectives of this study are as follows:

1. Describe the present situation as regards access and rights to FGR in the Nordic countries, as a reference (section 4).
2. Identify possible developments that could affect the present non-bureaucratic system of access to FGR (sections 5 and 6).
3. Identify and discuss relevant case studies in which patenting is needed for commercialisation, and how this could be combined with the general open exchange system (section 5).
4. Propose relevant and applicable steps in law or policy, and recommendations for decision-makers as regards future challenges and FGR (sections 6 and 7).

[1] For a thorough discussion of all aspects of Norwegian Genetic Resources Law, see *Norsk genressursrett*, Tvedt 2010.

If significant undesirable developments can be foreseen, legal or policy steps to meet this should be proposed, on the Nordic as well as the national levels. A possible Nordic accord might be discussed.

1.3 The scope of this study

The topic for this Report is access and rights to forest genetic resources (FGR) in the Nordic countries. The initial intention was to discuss all the five Nordic countries, but due to lack of practical experience from forestry in Iceland the work came to focus on four countries: Denmark, Finland, Norway and Sweden.

Forests have a broader importance for genetic resources and for maintaining biological diversity as a large number of non-timber species and genetic variety find their living conditions there. This report does however not examine the broad range of topics related to 'forestry' in its broadest and functional meaning. When discussing 'forest genetic resources' (FGR), the topic of this study is the resources in and diversity of the genetic material of the forest trees, and not the biological diversity in the forest of non-tree species. The relationship between 'sustainable forest management and access and benefit sharing' is dealt with in another international recent work and will not be dealt with comprehensively in this report.[2]

In the deliberations on the Convention on Biological Diversity (CBD), discussions often target the broad range of organisms living in the forest rather than limiting the scope to trees. Also the Nagoya Protocol under the CBD there are no special regulations for the different areas of use of genetic resources. This report uses the term 'genetic resources' in the same manner as it was defined in the Convention on Biological Diversity (CBD, see Article 2) (more about the specific detailed understanding in section 3.2). The term 'access' to genetic resources is a concept mainly developed in the CBD Article 15. It refers to the international movement of genetic material found under one jurisdiction brought to another country to be used under the jurisdiction of that other country. 'Rights' can, as we shall have a closer look at in section 3.3, be understood as the legal situation of one legal person in relation to one specific object. This will cover any exclusive rights and use rights of the object discussed.

[2] 'Sustainable forest management and access and benefit sharing: conflicts and potential synergies at the national and international levels'

2 Identifying relevant differences between forest trees and crop plants[3]

Forest trees are different from crop plants that are used in food production which until now have been the main object for discussion in international law. Foremost, trees differ from other crop plants in having long rotation times, up to 100 years. This has legislative implications, e.g. as the patent protection period is only 20 years. Furthermore, most forest trees have extensive gene flow and reproductive capacity. European aspen is a clear example: a single tree may host 40 000 catkins, each containing up to 2000 seeds.[4] Finally, and probably as a consequence of the pronounced gene flow, most forest tree species exhibit high genetic diversity compared to other organisms. Therefore, the needs for exclusive rights for different users of FGR vary from the breeding of a new crop variety.

In the Nordic region only a few tree species have commercial importance: these include Norway spruce, Scots pine and silver birch. Although the degree of domestication is modest, the use of bred material appears to play an increasing role. Many tree species that are not utilised commercially may still have potential value as a genetic resource. In the Nordic countries, most breeding is governmentally financed, but some is co-financed by commercial forestry.

Currently the aim of forest tree breeding is generally not to achieve a stable, uniform variety, unlike the case with the breeding of crop plants. However, this may not always remain so, international trends towards fast-growing and genetically uniform varieties in the tropics may have relevance for the Nordic region in the future, and fast-growing trees for the Nordic climate could be suggested as a solution for reducing emissions of CO_2. In fact, uniform tree varieties are already a reality in tropical plantations (e.g. Eucalyptus spp.). Also for some types of trees, like Christmas trees, selective breeding towards a more narrow and uniform genetic composition is already in use. Thus, there are some variations in this respect among areas of forestry within the Nordic region, as well as a difference from the Nordic situation to that elsewhere in the world.

The long rotation time makes investments in forest-tree breeding less attractive. Recouping an investment will take longer than in the plant breeding sector for food production, where rotation time is seldom above one year, and in some cases several harvests a year are possible. In some parts of the forest branch the rotation time is shorter; for example Christmas Trees and biofuel crops (e.g. *Salix* spp.), which might have rotation time between 3 and 15 years. For species and uses with shorter rotation time the economic value of the genetic material probably

[3] This section is partly written by Tor Myking and also draws upon the work conducted in the report 'A Nordic Approach to Access and Rights to Genetic Resources', section 4.5.

[4] Johnson, H., 1942. Generativ och vegetativ förökning av *Populus tremula. Svensk Botanisk Tidsskrift* 36, 177–199.

increases. Thus, there is a span between traditional forestry and newer uses of trees to create economic value.

Certification systems like the *Forest Stewardship Council (FSC)* and *Pan European Forest Certification (PEFC) for Ecologically, Socially and Economically Sound Forestry* will have an impact on the genetic resources in the sector.[5] Through the use of market mechanisms, the intention is for the public to participate in forest management. These labelling schemes are mainly not targeting the genetic resources of the trees but rather assess whether the management of the forest meets certain specific criteria.

To a large extent, international law has been developed the in the crop sector, where the situation is different from that of the forest tree sector. Such differences need to be taken into account; otherwise legal regulations may simply echo those of the crop plant sector without specifically identifying relevant similarities and differences.

[5] For a closer look at the relationship to labelling see Jorge Cabrera Medaglia, Olivier Rukundo and Frederic Perron-Welch 2010, p. 6–10.

3 Legislation pertaining to forest tree genetic resources

Forests create various different types of values. In some forests there is a short term and monetary focus, in others there is a long term perspective on value-creation. In any case, law is becoming increasingly important to capture value which rests in the genetic material.

3.1 Current international regulation of access and utilisation of GR

The most comprehensive international legal instrument pertaining to FGR is the Convention on Biological Diversity (CBD).[6] The CBD is based on countries having the competence to regulate and set conditions for the use of genetic material from one country under the jurisdiction of another country. The background for regulation of the access to genetic resources in the CBD was to establish a mechanism for sharing benefits arising from the commercial and other uses of genetic resources. This is often referred to as the great bargain of the CBD. Access and benefit sharing (ABS) is mainly an international mechanism where the use of genetic material from one country in another country shall be followed by a sharing of a fair and equitable proportion of the benefits arising from such use. For this end, CBD Article 15 reaffirms the sovereign rights of countries over its genetic resources, including the competence to regulate access to its genetic resources (CBD article 15, paragraphs 1-6) and the obligation resting upon countries to implement legal, administrative and policy measures to ensure that benefit sharing happens (CBD article 15.7). The sovereign right of a state to 'genetic resources' includes competence to regulate ownership and access to specific resources, among other legal relevant questions connected to such resources. CBD Article 15 reads like this:

> Article 15. Access to Genetic Resources
>
> 1. Recognizing the sovereign rights of States over their natural resources, the authority to determine access to genetic resources rests with the national governments and is subject to national legislation.
>
> 2. Each Contracting Party shall endeavour to create conditions to facilitate access to genetic resources for environmentally sound uses by other Contracting Parties and not to impose restrictions that run counter to the objectives of this Convention.
>
> 3. For the purpose of this Convention, the genetic resources being provided by a Contracting Party, as referred to in this Article and Articles 16 and 19, are only those that are provided by Contracting Parties that are countries of origin of such resources or by the Parties that have acquired the genetic resources in accordance with this Convention.

[6] The Convention on Biological Diversity was agreed at the Rio Summit in 1992 and entered into force on 29 December 1993. It currently has 193 members.

> 4. Access, where granted, shall be on mutually agreed terms and subject to the provisions of this Article.
>
> 5. Access to genetic resources shall be subject to prior informed consent of the Contracting Party providing such resources, unless otherwise determined by that Party.
>
> 6. Each Contracting Party shall endeavour to develop and carry out scientific research based on genetic resources provided by other Contracting Parties with the full participation of, and where possible in, such Contracting Parties.
>
> 7. Each Contracting Party shall take legislative, administrative or policy measures, as appropriate, and in accordance with Articles 16 and 19 and, where necessary, through the financial mechanism established by Articles 20 and 21 with the aim of sharing in a fair and equitable way the results of research and development and the benefits arising from the commercial and other utilization of genetic resources with the Contracting Party providing such resources. Such sharing shall be upon mutually agreed terms.

'Access' is mostly understood as the act of collecting or receiving samples of genetic material, whereas benefit sharing is a later step, when the outcome from the use of genetic material is supposed to be shared. The access side of the ABS was developed further in the non-binding Bonn Guidelines. Increasingly, this view that access happens when the sample is taken from the wilderness is under challenges. South Africa has for example defined 'access to genetic resources' as to be at the point of time when the biological material is being used for the purpose of exploring or exploiting the genetic material and/or information. These rules are based on disregarding the point of time when the material was collected, but focuses rather on the point of time when the genetic material becomes a genetic resources and is being utilized. Despite the long time since the CBD entered into force, no European country has implemented a fully working regulation of access to its genetic resources, nor have many countries taken measures to ensure benefit sharing according to Article 15.7. The essence of access regulation is that one country (the *provider* country or country of *origin*), is entitled to regulate conditions for accessing its resources. A country may employ its sovereign rights by choosing not to impose any regulations – that has been the approach of the Nordic countries thus far. One developed country which has implemented a set of rather severe access regulations is Australia. Non-Australian users of GR must sign a 30-page contract, setting the conditions for access to genetic or other material from the Great Barrier Reef.

The benefit-sharing aspect of the CBD includes an obligation upon countries to take legal, administrative and policy measures to ensure that benefits from genetic resources are shared, from the user to the provider of those resources, in a fair and equitable way. What is 'fair and equitable' has not been specified in the CBD itself, nor is it further specified in the Nagoya Protocol.

A key to solve the ABS balance when implementing the Nagoya Protocol into national legislation, is to make the concept 'utilisation of genetic resources' a viable legal instrument, obliging all who use genetic resour-

ces from another country to share a fair part of the benefits arising from that use back to the providing country.[7] Very few typical user-countries have implemented measures clearly aimed at obliging the users of GR from another country to share a fair part of the benefits created to that country.[8] The wording of Article 15.7 uses the term 'as appropriate' as a qualifying term for the obligation upon user-countries. That does not imply that countries are free to decide not to implement any regulations – but it does indicate considerable discretion in how each country chooses to meet this obligation. If a country takes some measures, but fails to ensure benefit sharing, the user country would be obliged to seek other, more effective measures. Also there are very few success stories reported as where there has been benefit sharing claimed to be fair and equitable. Under the general principle of sovereignty, the legislation of one country is without legal effect under the jurisdiction of another country. For benefit-sharing obligations to have any effect, they must change behaviour among the private companies and other entities using genetic resources found outside their home-state's jurisdiction. Such benefit-sharing systems might have effect on the future regulation of FGR.

The Earth Summit (Rio +10) in Johannesburg in 2002 recognised the lack of implementation of ABS regulations to meet the standards set out in the CBD. The recommendation from the Earth Summit was an important step leading to the establishment of an Ad Hoc Working Group on Access and Benefit-sharing at the seventh Conference of the Parties to the CBD (COP-7) in Kuala Lumpur in 2004. A time-limit was set to deliver its final report at the COP-10 in Nagoya October 2010. These long lasting negotiations lead to a protocol to the CBD being concluded in Nagoya, marking a temporal milestone for the way towards a global system for ABS.

The work of the CBD now moves to another phase of implementation of rules regarding access and benefit sharing at the national level. These regulations embedded in the Nagoya Protocol are described in section 6.1. Here the next topic is to develop a better understanding of the subject matter which is regulated by the CBD: genetic resources.[9]

3.2 The legal concept: Forest genetic resources

From a practical and applied perspective, the resource of interest is forest reproductive material, for replanting and regeneration of forests. In production of Christmas Trees and in biofuel production, selective breeding makes genetic material of more actual and direct value than regular management of forest. In the various discussions connected to biology, biotechnology and related areas, the term 'genetic resources' is

[7] For a most recent analysis, see Tvedt and Rukundo 2010, section 7.

[8] Norway is one of the few countries to have implemented obligations upon users of genetic material in Norway when these resources are found under the jurisdiction of another country.

[9] For a discussion of the legal and biological concept 'genetic resoruces', see Schei and Tvedt 2010, *'Genetic Resources' in the CBD - The Wording, the Past, the Present and the Future*, FNI Report 4/2010.

used in a range of contexts with somewhat differing meanings.[10] In the context of CBD, Article 15 and Article 3 are the main ones where the term 'genetic resources' is employed. To understanding the 'genetic resources' as a legal term is not always an easy task. When it was developed it has an objective to target all species and capture all industries or branches utilizing genetic material in their value chain. There are, however, large differences among species and industries and branches used them. By using one general legal criterion there is a large change for it to lose out on the interesting details. A general legal definition runs the risk of not being sufficiently adapted to the capture all the details and different situations in which genetic material is used in the value chain.

3.2.1 CBD definition of 'genetic resources'

To achieve a system of Access and Benefit Sharing (ABS) under the CBD, it is crucial to specify and develop a common understanding of the existing definition of 'genetic resources' in an easily interpretable, implementable and enforceable way.[11] The CBD Article 2 defines 'genetic resources' as follows:

> 'Genetic resources' means genetic material of actual or potential value.
>
> 'Genetic material' means any material of plant, animal, microbial or other origin containing functional units of heredity.

Prior to the CBD,[12] 'genetic resources' was not a commonly used legal concept, nor did it refer to clearly defined objects of ownership. The term has spread since its inclusion in the CBD, and appears in numerous international treaties, discussions and documents,[13] and in many national laws. The term 'genetic resources' has also after the conclusion of the CBD been used with various differently expressed or implied meanings. Lack of consistency creates legal uncertainty in ABS.[14] The effectiveness of ABS will hinge, at least in part, on the parties having a common understanding of its coverage and definitions throughout all stages of each individual ABS transaction.

'Genetic material', as understood in the CBD, may have any biological origin – 'plant, animal, microbial or other origin'. As has been expressed elsewhere, 'genetic resources are a subset of biological resources'.[15] The

[10] Schei and Tvedt 2010, section 6.2.
[11] For an analysis of the functionality of the draft ABS Protocol, see Tvedt and Rukundo 2010.
[12] Tvedt and Young 2007, p. 56, n. 3, save from a rather specific use in the plant sector, where the term 'plant genetic resources' was often used as synonymous with accessions of seeds for plant breeding.
[13] *See*, e.g., the Intergovernmental Commission on Genetic Resources, Traditional Knowledge and Folklore (IGC), the discussions in the WIPO Standing Committee on Law of the Patents (SCP), in FAO and the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA) and in the TRIPS Council of the WTO.
[14] See UNEP/CBD/WG-ABS/7/2, paragraph 5.
[15] UNEP/CBD/WG-ABS/7/2, Annex paragraph 3.

wording of the definitions requires discussing two elements in further detail: *functionality* and *value*.

3.2.2 Functional units of heredity – criterion for being 'genetic material'

The qualifying element in the definition is the specification that 'genetic material' is any material containing 'functional units of heredity'. This is not further specified in the wording of the CBD. Thus the language must be interpreted according to the principles of international law and in the different contexts and branches where genetic resources are being used. The term 'functional' has several meanings in English, two of which are relevant here: '1 ... relating to, or having a function. ... 3 working or operating. ...'[16] To have a function is thus a broad concept. This broadness is also reflected in the words 'working or operating', which refers to any way of having a function or operating. 'Functional' includes a dynamic element, as the state of knowledge and technology necessarily develops through history. Thus, a dynamic element is included in the wording of the definition. Functionality is used in connection to the term 'units of heredity'. As the term 'units of heredity' relates to biology, knowledge and technology, the biological and biotechnological functions are essential for its understanding. From this, 'genetic material' can be understood to refer to material from any biological source where units of heredity are operating or have a function. This way of understanding genetic material is linked to the physical micro-biological material.

Units of heredity can be functional also at an information level. Here the information in the DNA molecule has been transferred to a digital form and occurs as information in a computer. The fact that this information has been transferred to another form does not change that fact that it still has biological origin and thus covered by the scope of the CBD.

3.2.3 'Genetic resources' is 'genetic material' with actual or potential value

The criterion for genetic material qualifying as a 'genetic resources' is that it has 'actual or potential value'. This definition seeks to capture both current and future aspects of the functional units of heredity. 'Value' is a broad term, and includes 'social, economic, cultural and spiritual in nature.'[17] Non-economic values of 'genetic material' have been identified as relevant to ABS on numerous occasions. There is, for example, a strong emphasis on non-monetary benefits in Appendix II to the Bonn Guidelines, which lists ways of sharing benefits. In consequence, any type of value might be relevant in determining whether something is to be regarded as 'genetic resources' or not. This leaves to term 'value' with only restrictive effects on the scope of the definition.

The definition uses both *actual* and *potential* to describe the value aspects of 'genetic resources'. This could be read as a reference to the technological state of the art: the *actual value* would then concern the value of genetic material in combination with the techniques known and devel-

[16] Compact Oxford English Dictionary on web, www.askoxford.com/concise_oed/functional?view=uk .
[17] UNEP/CBD/WG-ABS/8/INF/3, p. 28.

oped as of the time of access, with *potential value* as the possible new, future techniques that might realise the potential value of the functional units of heredity in the future. Potential value entails also a reference to knowledge and technological developments: the material may well be recognised as having new values as knowledge and technology change.

3.2.4 Applying the definition in the CBD to the forest sector

From a practical perspective the definition of 'genetic resources' seeks to capture all activities where the DNA, genes and other hereditarian elements of the organism and the information found there are used. This suggests a dynamic definition of the applicability of ABS linked to the always and rapidly evolving knowledge and technological state of the art.

FGR refers to propagating material that is used for forest regeneration (i.e. growing trees) and for breeding. This includes aspects of plantations of trees to capture carbon, for production of biofuel or even breeding uniform Christmas Trees. Although that is currently the most relevant application, it does not imply that uses of *functional units of heredity* in more direct forms should be left out of discussions of FGR. Such functional units of heredity may have an undisclosed *potential* value. However, important practical uses should remain the main perspective of discussions on future regulation.

3.3 FGR and property rights

There is an emerging thinking regarding property rights and ownership to 'genetic resources', which is based on an assumption that it is legally and conceptually possible to separate the ownership to the biological material and the genetic resources therein – its informational components.[18] Ownership and rights to genetic resources are not frequently discussed in the context of CBD, although in the discussions of CBD and in several national legislations implementing the access-side of ABS there is generally a distinction made between ownership to the biological resources (the tree) for bulk purposes, and its genetic material. This distinction is crucial to establish rights to the genetic material. If such a distinction is not made, the right to the genetic material easily ends up being accessorial to that of the biological material.

From a technical point of view, the distinction is not very easily drawn without the use of law. Also to enforce or operationalise such a distinction in law, raise a number of technical difficulties as the genetic material occurs in the biological material. The interlinkage between the biological material and the genetic material calls for particular challenges when it comes to separate the right to them as two different objects for property.

There are three types of legal rights that could be relevant for establishing property rights or use rights in genetic material from forest trees. Ownership to forest tree genetic material can be based on a *tangible* right

[18] For a comprehensive discussion, see Tvedt 2010 chapter 2.

to the biological material; it can be based on an *intellectual property* right: that is a patent or plant breeders' right granted by the right authority over a new invention or a variety; and finally such a right can be based on a *contract* between the rights-holder and one purchasing a right. These alternative ways to establish ownership to FGR are further explored:

3.3.1 Rights to genetic material as a consequence of ownership to specimens

Tangible rights are the prevailing way to own things other than real estate. Ownership of tangible goods involves *possession* of the thing. A tangible right, marked by the possession of the goods, will leave the right to genetic material as accessorial to the one who has property in the tree or the seed; the right to the genetic material follows the right to the biological material where it is found. The limitation of *possession* as the way of owning genetic material is that it follows the right to the biological material, making it difficult to establish any particular rights to the genes as such. Any new holder of the biological material will also acquire the right to the genetic material.

The accessorial character of such a right will lead to the question of who owns the tree and its inherited genetic material, which depends on national specific legislation in each of the Nordic countries (see also section 4 below). If the legal situation recognises that each owner of the biological material where the genetic material is found has exclusive rights to the genetic material, there is a great chance of that right being parallel to the right of others to equal or similar genetic material. This probability would be even greater if biological material with the same or similar genetic combinations happened to grow over large forested areas.

One particular issue to explore is the relationship between the owner of the land and the rights to the genetic material from the trees growing on that land. In some of the Nordic countries there is a longstanding tradition of 'everyman's right of access' *(allemannsretten)*. The essence of this legal system is that everyone has a right to walk also in privately owned forests, and to pick certain biological material (like berries). One could say that this everyman's right delimits the exclusive right of the landowner to material that can legally be gathered. The everyman's right (*allemannsretten*) is however limited in some respects. If the right to genetic material is accessorial to the right to the biological material, the everyman's right (*allemannsretten*) might become an important mechanism for establishing rights to genetic material. The finder of a resource based on this traditional right could be appropriating a right to the genetic material. On the other hand, it cannot be taken for granted that the everyman's right (*allemannsretten*) extends into the genetic material of forest trees, as it has previously been demonstrated that the right to genetic material does not necessarily follow the right to the biological material. We explore this issue for the Nordic countries in section 4 below.

For a society which desires to encourage investment in improving forest genetic material, there might be a need for establishing a right to the genetic material – a right detached from the property right to the biological material where it occurs. If the right to the genetic material is accessorial, meeting this need becomes difficult.

3.3.2 Intellectual property rights: Patents

A patent is one way to achieve legal protection of an immaterial object. An inventor can apply for a publicly granted exclusive right to time-limited commercial use of an invention. For the Nordic countries there are two ways to get patent protection: by applying via the national patent office, or by applying for a European Patent through the European Patent Organisation (EPO). For the national patent systems, each country retains the discretion to determine whether a patent shall be granted or not. In the EPO, the common-European bureau determines whether a patent shall be granted for all or a selection of its member-states, by one administrative decision. EPO membership counts 35 European countries, including all the Nordic ones, now that also Norway has joined.

To be granted such a time-limited exclusive right, the patent applicant must demonstrate that his *invention* meets the following criteria: It must be *novel* in the sense defined by patent law, involve an *inventive step* and have an *industrial application*. In addition, the described invention must not be exempted from patentability. Normally, patent are granted to *inventions* and not to *discoveries*. However, the dividing line between what constitutes an invention and what should be seen as a discovery has become blurred and amended quite far from the normal understanding of the terms when applied in the field of biotechnology. This comes to expression in the EU Directive on Biotechnological Inventions, Article 3:

> 2. Biological material which is isolated from its natural environment or produced by means of a technical process may be the subject of an invention even if it previously occurred in nature.

Thus, *novel* in patent law is not synonymous with absolutely non-pre-existing: it implies a technical assessment of whether the object of the invention has been *described* in an identical form prior to the patent application. Both novelty and inventiveness are assessed and determined in a technical way by comparing what has been previous published prior to the patent application with what the *patent claims* describe as being the new invention. This baseline for the comparison is called *prior art*. Hence, when granting a patent the facts are two written sources: the patent claims and the relevant prior publications. If the invention is almost identical to previously published information, then the novelty criterion is not met. Each written item of prior art is considered individually. The patent examiner is not allowed to look at two written articles in conjunction (unless they refer each other).

For the *inventive step* the total body of all items of prior art is considered together. The assessment here is whether the invention contributes sufficiently to the art to merit an exclusive right. This is also carried out by comparing technical written sources. In the EPO, this assessment has been reformulated in case-law to be whether the invention is 'non-obvious'. The content of something being 'non-obvious' is quite different from the wording in e.g. the Norwegian Patent Act, which uses the term 'differs substantially from what is known'. How these patent criteria are practised and (re-)interpreted is crucial to how the system will work in specific areas of innovation. Interestingly enough, this re-interpretation of inventive step has not been done by law-makers, but by the patent authorities and later confirmed by courts.

In patent law, the legal basis of the exclusive right lies in the public authority and its competence to create a new right that did not exist prior to the granting of that patent. Considerations as to whether a patent shall be granted are detached from any rights to genetic material as an accessorial right to the biological material.

In all the patent systems of the Nordic countries, it is possible to patent invention, both formulated as a *process* and a *product* related to the forest sector. This makes patent law potentially relevant for the area of forest trees, both through patents on objects like DNA, cells and entire organisms (still subject to the patent criteria), and on methods for breeding or management (processes). Both a gene or DNA and cells may be patentable subject matter, if isolated and described in a way which meets the general patent criteria (EU Directive on Biotechnological Inventions, Article 3.2). Also, it is possible to patent an invention which targets more than *one tree variety*. For processes in breeding or other processes relevant for growing forests patent protection is available, except those regarded as *essentially biological* ones. The protection conferred by a patent to a method or a process extends the exclusive right to the products obtained by applying the method.

Recently, two important cases have been decided by the EPO's enlarged board of appeal: concerning a process patent on methods for breeding respectively a new broccoli variety and a new tomato variety. The result from the fairly common breeding process is a broccoli plant variety with an unspecified, but higher level, of one particular substance which has an anti-carcinogenic effect for humans. The difficult legal topic in this case is whether this method is covered by the exception from patent protection because it is an 'essentially biological process'. The legal basis for this is further defined in Article 2.2 of the EU Directive 98/44/EC: 'A process for the production of plants or animals is essentially biological if it consists entirely of natural phenomena such as crossing or selection.' The more specified definition of the exception includes some level of contradiction; the reference to consist 'entirely of natural phenomena' indicates that only when no step in the process is manmade, then the method is not possible to patent. Whereas, the reference to 'crossing or selection' as examples on what is entirely natural phenomena, includes some elements of human activity. The conclusion from the enlarged board of appeal includes four elements:

1. A non-microbiological process for the production of plants which contains or consists of the steps of sexually crossing the whole genomes of plants and of subsequently selecting plants is in principle excluded from patentability as being 'essentially biological' within the meaning of Article 53(b) EPC
2. Such a process does not escape the exclusion of Article 53(b) EPC merely because it contains, as a further step or as part of any of the steps of crossing and selection, a step of a technical nature which serves to enable or assist the performance of the steps of sexually crossing the whole genomes of plants or of subsequently selecting plants.
3. If, however, such a process contains within the steps of sexually crossing and selecting **an additional step of a technical nature**, which step by itself introduces a trait into the genome

> or modifies a trait in the genome of the plant produced, so that the introduction or modification of that trait is not the result of the mixing of the genes of the plants chosen for sexual crossing, then the process is not excluded from patentability under Article 53(b) EPC.
>
> 4. In the context of examining whether such a process is excluded from patentability as being 'essentially biological' within the meaning of Article 53(b) EPC, it is not relevant whether a step of a technical nature is a new or known measure, whether it is trivial or a fundamental alteration of a known process, whether it does or could occur in nature or whether the essence of the invention lies in it.[19]

The question of what is an 'essentially biological process' has been determined temporarily, leaving the criterion to be whether the process includes 'an additional step of a technical nature'. To sum up this decision: a process which includes gene technology is patentable subject matter; whereas a method which concerns traditional breeding will fall under the exception and not be eligible for patent protection. There are going to be grey areas between two extremes also for the future: One such can be the patentability for marker-aided selection (MAS) techniques, where no new traits are introduced, merely being a biotechnological step in order to enhance genotypic selection precision.

This has implications for the forest tree sector, as this might create an incentive for using gene-technology combined with a patenting strategy. Whereas, on the other hand, the patent system will not create for incentives for more traditional breeding as such methods will not be eligible for patent protection. Such an incentive would be most relevant for species and products produced in the forest with shorter rotation time than 20 years, such as for example a method for new Christmas Trees and for crops for biofuel production.

To better understand the consequence of these decisions, there is a need to first understand the scope of a granted patent: In a situation where either product patent protection is granted for a gene, cell or a tree (not tree variety) or a process patent covers a method to breed a new tree or to a new variety of trees, then the question is which actions this right confers to the holder of the patent. The TRIPS Agreement Article 28.1 establishes a minimum scope of protection to the patented process and the product thereof which all member countries must provide for in their legislation, specified as follows:

A patent shall confer on its owner the following exclusive rights:

a) where the subject matter of a patent is a product, to prevent third parties not having the owner's consent from the acts of: making, using, offering for sale, selling, or importing [...] for these purposes that product;

b) where the subject matter of a patent is a process, to prevent third parties not having the owner's consent from the act of using *the*

[19] T 0083/05 - 3.3.04 (emphasis added).

> *process* and from the acts of: *using, offering for sale, selling, or importing* for these purposes at least the product obtained directly by that process. (Emphasis added)

This implies that the patentee has either an exclusive rights to the *product* or to the *process* as it is described and interpreted in the claims. Exclusive rights also extend to products which are a direct result of the patented process. This so-called 'indirect product protection' covers all products obtained by the patented process. The TRIPS Agreement does not, however, set specific rules regarding the extent of protection in cases where the material is capable of self-reproduction. The scope of protection is extended also to cover *at least the product obtained directly by that process*. This means that the scope of process patent protection in the TRIPS Agreement requires countries to provide for indirect product patent protection that covers the outcome from the use of a patented method.

Details regarding how far the indirect protection extends in the forest sector are still left open under the TRIPS Agreement. For example, as for how many generations does the exclusive right extend and how much the later product can be changed and still fall under the exclusive right? These questions were sought solved for Europe in Article 8(2) of the EC Biotech Directive, which states:

> The protection conferred by a patent on a process that enables a biological material to be produced possessing *specific characteristics* as a result of the invention shall: *extend to biological material directly obtained* through that process and to**,** *any other biological material derived from* the directly obtained biological material *through propagation or multiplication* in an identical or divergent form and possessing those same characteristics. (Emphasis added)

This sets more specific criteria for the scope of protection. According to the first alternative in the wording, the protection is practically identical to that of the TRIPS Agreement. Article 8(2) adds to this by establishing that the scope of protection for the first generation of an applied breeding method, and further includes 'any other biological material' obtained through multiplication of this material. For processes in forestry, the product would be trees, as would any material derived from the process. The term 'any' thus seems to indicate that also the seeds and other propagating material of the trees produced according to the patented method are covered by the exclusive right. It is, however, required that the material has been 'derived from the directly obtained biological material'. As noted by Kamstra et al., in a contextual interpretation, 'the term 'derived' is given a broad meaning through the use of the words 'through propagation or multiplication in an identical or divergent form'' (Kamstra et al. 2002, p. 49). Legal certainty seems possible in relation to what is meant by 'identical form', but the Directive provides no guidance as to what is meant by 'divergent form'. According to one standard dictionary definition, things that are 'divergent' are 'very different, or opposing, in attitudes or characteristics' *(Compact Oxford English Dictionary,* 2005). For processes in forestry, this might appear to be a rational solution as it would allow for natural genetic variation and still remain under the scope of the patent. On the other hand, 'divergent' could imply that the protec-

tion would cover almost any tree that had some connection to the applied process, and holding the core characteristics from that process, even though the tree beyond those characteristics are fairly different. That would indicate a very broad scope of protection.

Article 8(2) imposes another qualifying term – 'same characteristics' – which raises the question of how substantial the differences can be between trees for them still to be covered by the scope of the patent. Considering that the patent could cover material in a *divergent form*, the answers to these questions seem to depend on how the courts will interpret the term 'possessing those same characteristics', and the specific differences and similarities of the said tree gene or tree itself. The courts will have to determine what the specific characteristics are biologically, compare these with the alleged infringing products, and then determine whether this tree has 'lost' its identity or still possesses the specific qualities.

Despite the formal possibility of using patent law, it is hard to say whether patent law will become a relevant tool in the forest sector. If technical developments go in direction of more biotechnology, or if recombinant gene-technology becomes more widespread in the forest tree sector, then the number of patents may well increase in the future. Since patents give exclusive rights only to commercial use of an invention, the patent system can provide incentives to innovate only in those sectors where there exists a *market* able and *willing to pay* a higher monopoly price for the patented invention than for other conventional techniques. This is probably a limiting factor for the applicability of patents to the forest tree sector. To what extent patents have been applied for and granted in the forest sector in the Nordic countries will be further discussed in section 5 of this report.

3.3.3 Intellectual property rights: Plant variety protection

There exists a system more relevant for protection of new varieties of crop plants, including trees: *plant breeders' rights*. The Convention of the Union for Protection of Plant Varieties (UPOV Convention) is a harmonised international system for its members to grant exclusive rights to commercially new *plant varieties*. This system for intellectual property right is particularly well-suited to the needs of the breeding industry, mainly for crop plants to food production. The core of the system is the competence of a public authority to grant new exclusive rights.

The criteria for granting plant breeders' rights differ from those of patent protection. They have been developed with a particular view to the crop plant sector for the purpose of creating incentives to breed new 'plant varieties'. To what extent plant breeders' rights can be used to protect innovative activity in the forest tree sector will probably depend on whether the result of breeding qualifies as a 'forest tree variety'. If breeding and selection are *not* aimed at creating 'varieties' that meet the criteria of being uniform and stable, then the applicability of the plant breeders' rights can be assumed to be low.

Plant variety protection is most relevant for plants with a short rotation time. Therefore for inventions related to new Christmas Trees, biofuel and plantation wood for capturing carbon this system for establishing exclusive rights might prove to become more accurate and relevant for commercial actors.

3.3.4 Contracts: Transferring rights to a contracting party

Accessorial right to genetic material through the biological material as well as intellectual property rights can be traded, sold or otherwise transferred to other legal persons. A rightholder may enter into a contract or a licensing agreement transferring a use right or a transfer of his right to another person. For intellectual property rights (IPR) it is normal to refer to this as a 'license'; otherwise the terms 'contract' or 'agreement' are mostly used. A contract or a license is based on the assumption that the seller already has the right that he transfers. Should he not have that right, the contract will probably be void. Contracts as a legal tool is best suited for regulating a two-party relationship, as a contract cannot be enforced and give legal effect for third parties to that contract.

ABS according to the CBD is partly based on the user entering into a mutually agreed terms (MAT), which is a contract with the country providing the genetic material. This has been the system for regulating the transfer of genetic material since the entry into force of the CBD. There has however been limited experience with the use of contracts in this field, and since 1993 not one single ABS contract has been taken to court in any country of the world. Also the number of successful ABS-contracts being enforced in courts is reported to be limited.

3.3.5 Finders keepers as regulating the right to genetic material

In the debate on rights to genetic material, one alternative which has been discussed is that the person who finds an interesting resource, keeps it. In that case, the property situation could be termed *res nullis:* that there are no general rights of property rights to the genetic material, but that it is open for inclusion under the right of the finder. That would leave the material open for appropriation by the use of intellectual property rights. If the result of work on the genetic material found is not protected by an IPR, the right which the act of 'finding' a resources will be non-exclusive in the sense that if someone finds the same resources afterwards, then the right of this second finder will not be hindered by the first one. Regarding FGR, this way of regulating property rights is pertinent because much of the relevant biological resources are to be found in the wildness and not in areas where a land-owner has effective measures to prevent others from collecting.

3.4 Regulation of 'marketing' of forest reproductive material

One type of regulation governs marketing of 'forest reproductive material' (FRM), including trading cross borders for the purpose of marketing. In Europe, this is extensively regulated in Council Directive 1999/105/EC of 22 December 1999. One important rational for this Directive is according to recital 6 in its preamble stating that 'it is

necessary to remove any actual or potential barriers to trade which may hinder the free movement of forest reproductive material'. In recital 17 a general and important point of departure is taken: 'Reproductive material satisfying the requirements of this Directive should be subject to no marketing restrictions other than those provided for in this Directive.' This imposes a general limitation upon the member countries in their flexibility for regulating the aspects of FRM. The general notion in the Directive is that marketing inside the EU and EEC shall be on best terms, countries are given discretion to impose stricter regulations on activities taking place under their jurisdiction, but cannot make a more favourable system at home restricting FRM from other EU countries (preamble recital 19). FRM from outside this area, called 'third countries' can be required to meet the same standards as that of origin from within (preamble recital 30).

Reproductive material is defined in Article 2 to cover seed unit, parts of plants and planting stock. Each of these main groupings are defined more in details. From the point of view of exchange of FGR, it is worth noting that the scope of the Directive is both marketing and production with a view to marketing (Art. 1). Thus, the extent to which exchange of FGR is regulated by the Directive depends on what is included in the term 'marketing'. This is defined more in detail in Article 2 (i) to be 'display with a view to sale, offering for sale, sale or delivery to another person, including delivery under a service contract.' If reading production with a view to marketing in the light of delivery as part of the activities covered by the regulation, also the growing of FRM for the purpose of exchanging outside the commercial system by principle falls within the scope of the system. To what extent this entails a challenge for the current situation has not been investigated empirically in this study.

It is also worth noting that there are established four categories of FRM based on their collection, control and quality: 'source-identified, selected, qualified and tested'. All the categories are further developed in the annexes to the Directive and can be amended according to the procedures in the Directive. The basic conclusion is that this system is not meant to be an intellectual property right. It becomes important to get your FRM into these lists as this is a criterion for marketing of it in Europe.

4 Current situation for regulation of access and ownership to FGR in the Nordic countries

This section describes the situation concerning access and rights to FGR for each of the four Nordic countries studied here, to reveal similarities and differences. These discussions are then used as a reference for examining whether there is a need for more detailed regulations to maintain the present open exchange system, and to what extent new alterations in the international legal situation might be conducive for the sector, or not.

4.1 Method for this comparison

A short questionnaire was developed to explore the rules and regulations pertaining to access and rights to FGR in the individual countries. Responses from the national representatives were thereafter compared, to enable inferences about differences and convergences.

There are factual differences among the Nordic countries in how the forest tree sector is organised, and that influences the rules regulating the sector. Also the four countries have opted for rather different legal approaches to genetic-resources issues in general. Consequently, we find differences in how much information is available, and how detailed it is.

4.2 Techniques for breeding

The first question was whether the forest sector is based mainly on 'traditional' phenotype-based breeding, or also breeding aided by biotechnology or genetic markers with potential for process-based patenting. All four countries responded that breeding today is based on measurement of metric traits, progeny trials and selection. The near future, one potential trend might be some increase in the use of genetic markers for identification of parent trees and/or use of marker-aided selection (MAS). If increased application of MAS becomes the situation, one could assume that the sector will be subject to increased use of process patents to methods, but perhaps limited to short rotation crops such as Christmas trees. Molecular markers are currently important in crop breeding. Short rotation time might also be an important factor in changes for the forest tree sector.

In an even longer perspective, tree varieties that are genetically modified by biotechnological methods might come into use. The likelihood of genetically modified trees (GM trees) to be planted commercially in nature is still not very high and forthcoming. There are regulations of the open use of genetically modified organisms (GMOs) in nature and even field trail of GMOs often requires a separate approval. For example EC Directive 1999/105/EC establishes in Article 5 requiring that for a GMO to be accepted, then: 'such material shall only be accepted if it is safe for human health and the environment'. Techniques like this are still under development, and none of them are yet applicable in commercial forestry. Additionally, Sweden commented that future patenting is unlikely for methods like MAS, but perhaps for somatic embryogenesis or on genetically modified trees. Sweden also commented that there soon will be a few field trials with GM-aspen in Sweden.

4.3 Defining the relationship between private property and public domain

The issue of ownership was discussed as a topic of tangible rights in section 3 above. Only one of the four countries responding to the questions, Norway, has implemented and established clear regulations of property rights or ownership to genetic material separate from that of the trees where the genes are found.

In Denmark, private property contains the physical FGR, which is the sample of breeding material. There is no defined right to the genetic resources, so the Forest and Nature Agency and the University must request permission to collect and use seeds from privately owned areas. Ownership of the ground and/or the biological resources where the genetic material has been found thus becomes important for the accessorial rights also to the genetic material. The combined purpose of collecting samples is gene conservation, testing, research (e.g. mating patterns) and seed production.

In Finland there is no state-level ownership of genetic resources. A growing plant belongs to the owner of the land, according to the Constitution.[20] Wild animals in nature do not belong to anybody, but property is established when the wild animal or fish has been caught or shot (*res nullius* – which means that a goods is open for appropriation). Then the person capturing gains property.

For Sweden there is also no special legislation specifying property rights to the genetic material. Common for Sweden, Denmark and Finland is that ownership to the biological material is decisive for ownership/ rights to the genetic resources involved.

Norway has the most specific legal regulation of property rights to genetic resources in general. According to the Nature Diversity Act of 2009 § 57: 'Genetic material from nature is a common resource and belongs to the community of Norway, which is managed by the government.' The statement of genetic material from nature in general being a 'common resource' gives rise to some interpretative questions, for FGR in particular. The specific legal content of this legal concept is not clear from the 2009 Act itself or the preparatory works. What is clear, however, is that rights to genetic material are not conferred on private persons. But it is equally clear that this legal status does not leave FGR in a complete open 'public domain'.[21]

There are some criteria of limiting factors in the wording. The term 'from nature' indicates that when plants, including trees, are grown, the genetic material is a common resource. One example seems obvious: primary forests where the trees have not been re-planted would fall under 'from

[20] Geenivarojen saatavuutta ja hyötyjen jakoa koskevien Bonnin ohjeiden kansallinen toimeenpano. Taustaselvitys. Maa- ja metsätalousministeriö. Työryhmämuistio 2007:5. In Finnish, abstract in English.
[21] This impression is given in the Report from Treebreedex 2011, p. 12.

nature'. The defining line for when something is 'from nature' is however not clear. From this point of departure, towards selected or bred trees, we find a continuum from wild-growing to semi-cultivated. According to the Act, the relevant criterion for ownership is whether the genetic material is 'from nature', which would appear to refer to the place where the genetic material is found. If it is in nature, then it is a common resource.

Two questions arise: First, where there has been re-planting, where the genetic material has undergone some kind of purification or selection. However, the trees are still growing in nature, so the wording does cover this genetic material. The second question concerns artificially planted areas. These stands of planted trees are in *nature*, but the level of human intervention is higher and could be taken as an argument for seeing the genetic material as not being a *common* resource; however, as trees grow mainly 'in nature' in Norway, the genetic material would accordingly be a common resource .

The Nature Diversity Act refers to two limiting factors for the opportunity for everyone to take such genetic material from nature: where one has the right to deny access to what is grown or cultivate, and where one has the right to deny access to the biological material where the material is found (§ 58.2). Thus, the right to either the land or to the biological material entitle the rights-holder to restrict access also to the genetic material therein. Here the right to the genetic material becomes a consequence of the legal right to the biological material where it is found. In the meantime until the administrative regulatory decision has come in place, access to genetic material from Norway is open and unregulated for anyone to collect what they want without any obligations beyond respecting the rights to the ground and to the biological material.

In conclusion, although Norway's Nature Diversity Act of 2009 may appear more slanted towards 'common resource' than the other Nordic countries, the practical consequences for ownership may currently be insignificant. Another question is to what extent these differences will imply any relevant differences or even challenges for future access and use of FGR. That must be seen in conjunction with the next issues to be discussed:

4.4 Laws regulating access and exchange of GR

A central objective is to look at regulation of the access to FGR from each of the Nordic countries and the rules for exchange between the countries. There are two layers of law regulating access or exchange of genetic material. The international aspects of these issues were dealt with section 3.1 and 3.4. In the international debate the term 'access' refers mainly to the cross-border exchange of genetic material; here, terminology must be used with caution.

In the CBD, the term *access* does not necessarily refer to the marketing of reproductive material, but rather to genetic material in a less specific manner. Access may involve private parties or governmental institutions, or it may be between one private entity and a governmental institution. Which situation is most relevant may differ among the various tree

species, and in accordance with the structure of providers and users of FGR. This type of access regulation has as a main objective to share a fair and equitable part of the benefits created by the utilisation of genetic material with the ones conserving and providing the resources.

The other exchange issue is linked to phytosanitary regulations, for which the rational is different. Here the objective is to hinder the spread of diseases across national borders. A general observation is that the EU directive on the marketing of forest reproductive material (1999/105/EC) applies to the EU-member Nordic countries, as well as to Norway and Iceland through the EEA. These regulations have as the main objective as to regulate trade and exchange of breeding material for quality and disease control.

4.4.1 Denmark

The most relevant Danish regulation of access is the 'The Nature Conservation Act',[22] which deals mainly with the framework for public access to public and private forests. It is implemented in 'Announcement on public access and stay in nature'.[23] As specified in §28, it is not allowed to undertake commercial collection of branches, seeds or cones, whereas collection for private use is permitted to a restricted extent. In public forests it is legal to cut off branches of deciduous trees taller than 10 meters.[24] This mainly regulates taking samples of the biological material in a national perspective. Interrelated and in practical terms it targets the harvest of biological resources. That is an important aspect, and a necessary condition for access and exchange among countries.

As to whether there is unconditional access to FGR, Denmark reports that the distinction between commercial and private use is important, as follows from the Act quoted above. In the case of commercial seed collection, permission from the landowner is required.

The main law regulating exchange in Denmark is the 'Law on seeds, potatoes and plants, No. 261, 26. April 1999'.[25] This Act is reported to serve for implementation of the EU directive 1999/105. This means that it basically targets preparations for marketing and marketing propagating material for commercial sales.

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[22] Lov om naturbeskyttelse, jf. lovbekendtgørelse nr. 884.

[23] 'Bekendtgørelse om offentlighedens adgang til at færdes og opholde sig i naturen': https://www.retsinformation.dk/Forms/R0710.aspx?id=12938

[24] In Danish § 28 reads: '… i skove…er ikke tilladt følgende: …4) Tage grene af træer og buske samt omhugge, opgrave eller oprykke træer, buske eller anden vegetation. I skove, der ejes af staten, kommuner, Folkekirken eller offentlige stiftelser, er det dog tilladt at skære eller klippe kviste af løvtræer, der er over 10 m høje. … 5) Foretage erhvervsmæssig indsamling af nødder, bær, svampe, frø og kogler, blomster, urter, grene, kviste, mos og lav m.v. Indsamling i begrænset omfang til privat brug er tilladt. Kogler må dog kun tages fra skovbunden. Grene og kviste må ikke indsamles i bevoksninger, hvor der oparbejdes pyntegrønt.'

[25] 'Lov om frø, kartofler og planter'): https://www.retsinformation.dk/Forms/R0710.aspx?id=123423 Implented in 'Announcement about forestseeds and –plants' ('Bekendtgørelse om skovfrø og –planter'): https://www.retsinformation.dk/Forms/R0710.aspx?id=8760

4.4.2 Finland

A basic observation concerning the situation in Finland is that no laws regulate the status of genetic resources specifically. However there are several laws that are indirectly regulating access and exchange of GR (not FGR). Article 15 of the Constitution regulates the general protection of property, including a rule regarding expropriation; however, it does not specify the object for private property rights. The Nature Conservation Act (1096/1996) is reported to contain regulations on protecting or conserving plants and animals, but no general rules about genetic material in particular.

The report from Finland refers to two acts of legislation which implement EU Directive 1999/105/EC (presented above): the Act on Trade in Forest Reproductive Material (FRM) (241/2002) and the Decree on Trade in FRM (1055/2002).

As to whether access to FGR is unconditional, our Finnish sources responded that there is a problem of separating genetic resources from other type of resource. Unless otherwise stated, 'everyman's right' (as noted, corresponding to the Norwegian *allemannsretten)* implies that berries, cones etc. are freely available. However, live branches, such as cuttings, may not be collected. These regulations target the biological material where the genetic material is found, and do not include any specific regulation of the genetic material as such.

4.4.3 Norway

For Norway, the main act regulating access and exchange of GR is the Nature Diversity Act as previously referred. The government is vested with competence to implement an administrative system requiring authorisation for access to genetic material in Norway, but this has yet not been done. That leaves §58.2 as the most relevant regulation, whereas control over either the biological material or the land/ground may restrict persons from having access to the genetic material as well. Collection for the purpose of using genetic material follows two other types of rights: a) the right to the ground where the biological material exists; and b) the right to control access to the biological material where the genetic material is to be found. Both these two types of legal rights, gives to respective rightholder a remedy to stop access to the genetic material. Until the government has used its competence according to the Nature Diversity Act, access to genetic material is for any practical reasons open also in Norway, subject to rights to the ground and the biological material.

The legal basis for non-commercial and commercial harvesting of berries and mushrooms etc. is found in the General Civil Penal Code §400, where it is specifically treated as a public right. In addition, the right is emphasised in a circular issued by the Ministry of the Environment.[26]

[26] 'T-6/97, www.regjeringen.no/nb/dokumentarkiv/Regjeringen-Bondevik-I/md/232935/1997/T-697-Friluftsloven.html?id=108155

There has also been an initiative to include these rights in a separate paragraph in the Outdoor Recreation Act.[27] In practice, the same rights apply to genetic resources as these acts open the collection of biological material in limited quantities, of e.g. cones and seeds, although this is not specifically mentioned in these laws.

In principle, the right to collect and sample genetic material in Norway is unregulated subject to the restrictions on the biological material and the ground. The government (Ministry of the Environment) has competence to require permission for export of genetic material to other countries for foreign users. This competence has however not been taken in use. When that is done, one can assume that access to Norwegian genetic material for Nordic users will require some kind of a license or authorisation.

4.4.4 Sweden

Sweden reports that it has no specific acts regulating access to FGR. The reported act targets biological material and concerns the right to pick or take products from nature. The penal act refers the issue of illegal collection of various biological materials.[28] The article referred to seems, however, to presuppose that the prohibition follows from another regulation, as this article refers only to the situation where it is illegal to take material: then the reaction could be penalties. In that section acorns are mentioned, but not cones. Other products from nature, if not protected (such as cones) may be collected without need to compensate the landowner.

The Environmental Act imposes restrictions concerning area protection which includes plant genetic resources; and chapter 8 of the act deals with the protection of biological (not specifically genetic) resources of animals and crop plants.[29]

Sweden reports the same EU Council Directive 1999/105/EG on the marketing of forest reproductive material, but no other regulations specifically concerning FGR. Reference is made to the OECD certification scheme of forest reproductive material in international trade.

4.5 *Allemannsretten:* the everyman's right and access to biological material

As noted, the (Nordic) term *allemannsretten* (literally: 'everyman's right') concerns the general right to access certain public or privately owned land for recreation or other purposes. This is highly relevant for forests, which serve as important areas for recreation. Denmark is, as we shall see, the one country that differs significantly on this point.

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[27] Friluftsloven.

[28] 'Brottsbalken' 12 kap. Om skadegörelsebrott 2 § '... Den som i skog eller mark olovligen tager växande träd eller gräs eller, av växande träd, ris, gren, näver, bark, löv, bast, ollon, nötter eller kåda eller ock vindfälle, sten, grus, torv eller annat sådant, som ej är berett till bruk, dömes för åverkan (böter / fines)...'. This is however reported to be out of date as 'nobody today would be fined if they picked acorns (ollon)'.

[29] 'Miljöbalken'1998:808: 7 chap. §1 is about 'general environmental considerations'; 7 chap. §§ 2-12.

4.5.1 General challenges for acquiring material

For taking material in the area where the everyman's right applies, different situations apply, which might give rise to different types of legal question. To give some examples: picking of biological material can have different purposes; a main difference goes between commercial and non-commercial intentions with the picking. Another dimension is what the material is going to be used to e.g.: re-sowing, further breeding, as a point of departure for gene-technology, these examples are not necessarily dealt with in equal manners in the national everyman's right.

4.5.2 Finland

Generally, 'everyman's right' holds a strong position in Finland. It is subject to very strict practice, and in general both members of the public who use the outdoors and the landowners respect these rights. The legal basis in Finland is constitutional practice, not any specific law. The rights are old, well-established practices, and the restrictions are enumerated in several different laws:

> **The Nature Conservation Act 1096/1996, Section 36**
>
> *Outdoor advertising and prohibition notices*
>
> No sign prohibiting trespassing, mooring and landing or otherwise restricting free public access is to be erected on land or water unless there are legal grounds for doing so.

The Penal Code defines criminal trespass and makes it a criminal offence.[30] From this general statement of criminal offence, an exception is made for *allemannsretten*:

> The legal restrictions in this chapter do not apply to the collection of dry twigs and branches, cones and nuts found on the forest floor, or to the picking of wild berries, mushrooms, flowers or other naturally growing products, with the exception of mosses and lichens, on other people's property.[31]

Picking plants and flowers is controlled in nature reserves, and certain rare plants are extensively protected under the Nature Conservation Decree. In general, conifer seeds are seen as being abundant, so no special value has been attached to conifer seeds at a tree, even in specifically selected seed stands. The commercial value of seed is created by collection and management. However, for commercial collections the practice has always been to ask permission from the landowner. The *allemannsretten* could not be used as legal basis for large-scale commercial collections.

Oaks are special, since in the past they used to belong to the king (of Sweden during the double monarchy), the wood was/is valuable and the acorns were used as fodder. In general, natural stands of noble hardwoods have special status in the Forest Law, and people are generally careful

[30] The Penal Code 769/1990, Chapter 28, Section 11.
[31] The Penal Code 769/1990, Chapter 28, Section 14.

about collections concerning noble hardwoods. No cases where land-owners have been paid for collections of seed or twigs on their land have been reported.

4.5.3 Norway

In legal terms, the everyman's right *allemannsretten* is dealt specifically with in the Outdoor Recreation Act of 1957. Elements of this right are positively defined and refer mostly to open movement across the land of a private landowner. The Act secures explicit access of individuals to nature, with certain exceptions. An important distinction is made between domesticated ground *(innmark,* §2), such as cultivated land, grazing land for livestock, the land around private dwellings and fenced areas: here general access is prohibited or restricted. Land to which everyone has access (non-cultivated/non-domesticated ground, *utmark,* §3) is then that which is not defined as domesticated ground. That means that the land to which *allemannsretten* applies is negatively defined, so that one must prove cultivation/domestication to establish a legal basis for preventing the public from moving about on the land. The right to move around on non-cultivated land applies all year around, as long as care is taken. There are restrictions on the use of motorised vehicles, but no specific restriction applies to genetic resources. *Allemannsretten* has a very strong position in Norway, and resolves to some extend the question of access to FGR where the Nature Diversity Act: When having legal access to collecting biological material according to the everyman's right, no one has the right to hinder access to the GR as specified in §58. Basically, the property to non-cultivated land cannot hinder anyone from collecting biological material also for the use of its genetic material. The Everyman's right is negatively defined by the Criminal Act, which states that some types of collections are illegal and connected with criminal sanctions.

The relationship between the Nature Diversity Act establishing genetic material as a common resource and the everyman's right is obviously not clear. In the Treebreedex Report this is understood as: 'For instance in Norway, forest biological resources are in the public domain and therefore seen as accessible to everyone for use (Everyman's Rights).'[32] When the Ministry of Environment finalises the administrative regulation to the Nature Diversity Act, this will not be an accurately description of the legal situation. In the time before such a regulation of access in place, the actual legal situation continues to be blurred. There is no general legal reason for saying that the FGR generally are in the public domain and open for everyone. The relationship between the right to the ground and to the biological resources versus the right of the public according to the everyman's rights is for the time being not quite clear.

[32] Treebreedex Report 2011, p. 12.

4.5.4 Sweden

The legal basis for *allemannsretten* in Sweden is a constitutional practice or law.[33] Since 1994, it is a part of the Swedish Constitution, specifying this as a law being superior to other regular Acts.[34] *Allemannsretten* is reported to be very strong standing in Sweden. However there are no statutes exactly defining the scope of *allemannsretten;* it is hedged around by various other laws that set limits as to what is allowed. The Environmental Act imposes the obligation on those using *allemannsretten* to take due care.[35]

Respondents reported that in Sweden *allemannsretten* give the public the right to access, walk, cycle etc. on any land except for private grounds and where such access itself may cause damage (e.g. on land planted with crops). There are also restrictions for nature reserves and protected areas. Also included is the right to pick wildflowers, mushrooms and berries, provided they are not legally protected. Moreover, *allemannsretten* allows persons to visit beaches (as long as they are not a part of private grounds) and swim in lakes. These acts do not concern access to genetic resources in particular.

4.5.5 Denmark

Denmark is the exception from the common Nordic pattern: as there is no legal right comparable to the 'everyman's right'. General access to private forests is restricted to existing paths and roads.[36] In public forests, access is possible everywhere.[37] Commercial collection of FGR is reported as not to be legal.

4.6 Drawing lessons from the Nordic countries: Gaps and convergences

A general observation is that the focus is on collecting biological material (and not genetic material) in the forest and how this is dealt with legally. Only Norway has implemented rules targeting genetic material as such; the regulations of the other countries deal with biological material. The term 'access' as understood in the CBD refers to cross-border transfer of resources, rather than the national regulations on the right to take samples within the country. There is however a change in the understanding of 'access' drifting to be reinterpreted as the point of time when a specific biological sample is being used to take advantage of its genetic material;

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[33] For further info, see www.naturvardsverket.se/sv/Att-vara-ute-i-naturen/Allemansratten--en-unik-mojlighet/Vad-ar-allemansratten.

[34] Regeringsformen 2 kap. 18 §: 'Alla skall ha tillgång till naturen enligt allemansrätten oberoende av vad som föreskrivits ovan. Lag (1994:1468)'.

[35] Miljöbalken 1998:808. 7 chap. Area protection. Allemansrätt m.m. 1 § : 'Var och en som utnyttjar allemansrätten eller annars vistas i naturen skall visa hänsyn och varsamhet i sitt umgänge med den'.

[36] The Nature Conservation Act, §23: 'I privatejede skove må færdsel til fods og på cykel kun ske ad stier og veje. Der er kun adgang fra kl. 6 til solnedgang, og ophold må ikke finde sted inden for 150 m fra beboelses- og driftsbygninger.'

[37] Ibid.,§23.

this international has however not yet been reflected into Nordic legislation.

The regulations mainly target biological material, and not genetic resources as defined in the CBD. One particular element of access regulations in the CBD is the right of the owner of the biological material to regulate the collection of samples.

In addition, one specific element is regulated: preparation for marketing and marketing of forest reproductive material. This regulation is more a mechanism for ensuring plant health and public control of the quality of reproductive material, rather than regulating access as such.

Notably, Norway is the only country which has implemented a general rule regarding the legal status of genetic resources. Furthermore, access to the land is an important prerequisite for access to the trees (biological resource) in all countries and thus for collecting genetic material. For this purpose, *allemannsretten* in Finland, Norway and Sweden becomes an important tool – however, it is not sufficient, as access to the biological material where the genetic resources are found must also be legal. Thus the restrictions on taking biological material indirectly regulate the collection of genetic resources. Once access to the biological resource is ensured we find no major practical differences among the countries as regards ownership of FGR, although legal systems vary or are not fully established.

4.7 The Nordic countries as user counties of GR from other countries

CBD requires the user who draws benefits from the utilisation of genetic resources to share a fair and equitable part with the provider country or the country of origin. User-country legislation is an important element in a functional legal system governing ABS.[38]

4.7.1 Denmark, Finland and Sweden

Denmark, Finland and Sweden have not introduced any regulations as user countries of genetic resources with foreign origin.[39] In the Nagoya Protocol the importance of user country legislation is reflected in several articles (notably Art. 15 and 16). If the EU and/or its member states decide to ratify the NP these three Nordic EU-members need to reconsider this absence of user country measures.

4.7.2 Norway

Norway has, as one of the very few countries worldwide implemented legislation to ensure that Norwegian users of GR with origin outside its territory, to comply with the laws of the providing country and country of origin. The core provision is §60.1 of the Nature Diversity Act:

[38] For a single volume dealing with the user-side of ABS, see Tvedt and Young 2007.
[39] For Denmark, see Veit Koester 2011, section 7.

> The import for utilisation in Norway of genetic material from a state that requires consent for collection or export of such material may only take place in accordance with such consent. The person that has control of the material is bound by the conditions that have been set for consent. The state may enforce the conditions by bringing legal action on behalf of the person that set them.[40]

This paragraph establishes a general obligation upon the one importing genetic material to Norway to comply with the regulations in the country from where the genetic material has been taken. The trigger of the obligation is the import of genetic material to Norway; the obligation rests upon the importer and the content of the obligation is to adhere to the legislation of the other country. Thus, the regulatory burden will still rest on the providing country, which needs to implement requirements upon foreign user; the Nature Diversity Act will give effect to that legislation under Norwegian jurisdiction. The Act presupposes that Norwegian courts and agencies will directly apply the terms and conditions set by the provider country. The preparatory document from the Ministry of Environment explains the background of this rule as: 'these measures [provided in the Act] do not alone fully solve the challenge of meeting the obligation of fair and equitable benefit sharing'.[41] They considered implementing a stand-alone obligation to share benefits, but another less substantive obligation was chosen: implementing support for the legislation of the other country.[42]

Although a huge step forward in ABS implementation, this approach has two weaknesses: 1) It creates uncertainty for Norwegian users and decision-makers, since access legislation will vary among countries, creating legal uncertainty as to whether and how each country's provider-side legislation will be legally transferred to the Norwegian legal situation; and 2) there is no specified minimum level for a share of benefits that will be recognised as 'fair and equitable.' This maintains a level of uncertainty for the providing country. As to the latter, the Act apparently assumes that Norwegian law will apply to determine the benefit-share in cases involving non-compliance with provider-side law, as well as situations in which the ABS contract might be challenged as 'inequitable' under Norwegian law.[43]

The Act also establishes procedural competence for the Norwegian 'State/government' to 'enforce the conditions and limitations' set for the access. This rule is a major addition to the former legal situation in

[40] § 60. (genetisk materiale fra andre land) Innførsel for utnytting i Norge av genetisk materiale fra en stat som krever samtykke for uttak eller utførsel, kan bare skje i samsvar med slikt samtykke. Den som rår over materialet, er bundet av de vilkår som er satt for samtykket. Staten kan håndheve vilkårene ved søksmål til fordel for den som har satt dem.

[41] Ot.prp 52, 2008-2009, p. 311.

[42] Ot.prp 52, 2008-2009, p. 312.

[43] For a study of enforcement of ABS in Norwegian legislation, see Tvedt and Fauchald forthcoming 2011.

Norway relating to ABS.[44] It gives the government specific competence to enforce either a contract or a national legal requirement of another country in the legal system of Norway. Also when the **import** of the genetic material is not legally challenged, the second paragraph of this provision extends the user's substantive obligation to the time when genetic material is 'utilised':

> When genetic material from another country is used in Norway for research or commercial purposes, the material shall be accompanied by information identifying the country from which the genetic material is received or collected (providing country). Where the providing country requires prior informed consent, information documenting such consent shall also follow the material.[45]

This assumes that genetic material may be followed by an informational 'passport' indicates that the government views 'genetic resources' as a physical resource, rather than an informational resource. The Act does not currently specify any consequences for a user who fails to meet this passport obligation.

A third section of the Article extends the obligations specified above to cover the situation where genetic resources have passed through multiple hands since being removed from the country of origin:

> If the providing country is not the [a] country of origin for the genetic material, then information regarding the country of origin shall also be disclosed. 'Country of origin' means the country where the material was found or accessed in its natural habitat. If the national law of the country of origin requires prior informed consent for access to genetic material, the disclosure shall contain information about whether such PIC has been received. If the information dealt with in this paragraph (section) is unknown, this fact also shall be stated.[46]

The last sentence indicates an obligation to state explicitly whether the information is unknown. When lack of information is made illegal through a general obligation to give correct information, it makes sense to also establish a duty to state the negative.

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[44] Tvedt, M.W. 'Elements for Legislation in User Countries to Meet the Fair and Equitable Benefit-Sharing Commitment', *Journal of World Intellectual Property* (2006) Vol. 9, no. 2, pp. 189–212.

[45] § 60. annet ledd: Når genetisk materiale fra et annet land utnyttes i Norge i forsknings- eller næringsøyemed, skal det følge med opplysninger om hvilket land det genetiske materialet er mottatt eller hentet fra (leverandørland). Hvis nasjonal rett i leverandørlandet krever samtykke til uttak av biologisk materiale, skal det følge med opplysning om slikt samtykke er innhentet.

[46] § 60. tredje ledd: Hvis leverandørlandet er et annet land enn opprinnelseslandet for det genetiske materialet, skal også opprinnelseslandet oppgis. Med opprinnelsesland menes det landet der materialet ble hentet ut fra sine naturlige omgivelser. Hvis nasjonal rett i opprinnelseslandet krever samtykke til uttak av genetisk materiale, skal det opplyses om slikt samtykke er innhentet. Er opplysningene etter dette leddet ukjent, skal det opplyses om dette.

These obligations upon the user of genetic material from another country will apply to the area of FGR. From the perspective of import from another Nordic country without special regulations or requirements to the access to their FGR, this obligation will not hinder such use. For countries requiring PIC and MAT, these regulations will have effect. They will also create a need for reflection with the user regarding material with less clear origin; such material can have as its source a country requiring PIC and MAT, so its import to Norway would be illegal without such permit or agreement. In these cases, the situation of the user of FGR might become less legally certain. These regulations need also to be viewed in the perspective of the ongoing ratification and implementation of the Nagoya Protocol (more on this topic section 6.1).

5 Commercially relevant examples in the forest sector

5.1 The relationship between the everyman's right and a patent right

In section 3.3.2, the topic patent law was introduced, one interesting question arises in the relationship between patent law and the everyman's right. The relationship between these two types of rights arises in two situations: 1) the relationship between the existing everyman's right and the right of a finder to patent his inventions based on the found material; and 2) once the patent is grated and thus the exclusive right established, a question arises regarding whether the patent or the everyman's right will prevail. These two situations resemble, but there is a marked difference: the time perspective is different. For the first situation the right to create a new right based on material held in common is at stake; for the second situation happens after the right has been granted versus the old legal situations.

There are no explicit regulations of any of these two important questions outside patent law. For the first question the relationship is fully regulated by the criteria for obtaining a patent, if they are met, the applicant has a right to get the patent granted. In the examination of the patent criteria, the legality of the biological material is not investigated as to determine the merit of the patent. For jurisdictions which have implemented a strong legal right for the community or even the government the legal basis for challenging such a patent is on firmer ground than compared to the situation without any legal regulation. This entails that the way Norway has implemented that genetic material from Norway is a common resources gives a somewhat stronger position. This legal situation becomes relevant if a patent is applied for on something some is already using. The way this legal conflict will come up is for anyone to challenge the grant of or validity of a granted patent.

The second situation comes up in a situation where the patentee claims that someone is or has been infringing the right he has because of the patent. This includes the question of what the scope of the object for the patent is. The question of interpreting the content of the right granted by the patent and the right which is covered in the everyman's right, the next step would be to interpret and determine to what extent these two rights would be completely or partially overlapping. In this situation the role of the government is less evident as an infringement case is normally invoked between two private parties. Here the point of departure will be interpretation of the patent right based on the patent claims seen the light of the general regulations specifying the scope of the patent right. If it is found to be an overlap between these two legal positions, the next question is whether the patent system recognises a right to so called 'prior use' of the invention. This is a manner to recognize previously developed practice which the user still has a right to continue despite the overlap of his right and that of the patentee. In a clear conflict, it is quite likely that the patent will trump the right to the prior use.

These two situations which appear as to be rather theoretical. Both of them are rather practical, and might very well occur in the forest tree sector. One disadvantage for the forest tree sector is that the body of prior art not very comprehensive. The result of this is that it becomes easier to get the funding for the national structures.

5.2 Application of UPOV-based plant variety protection

In the crop plant sector, there is (as mentioned above) a specific system for the protection of one type of objects under intellectual property rights. UPOV applies to trees, as for example fruit trees valid for 25 years, subject to the criteria for being granted the right. All the Nordic countries are members to one of the UPOV conventions. Denmark, Finland and Sweden are all members to the latest version, that of 1991, whereas Norway is member to that of 1978. In the questioners none of the countries have responded that there are any known cases of plant variety protection being applied for in the forest sector.

It is foreseen that plant breeders' right could be relevant for the forest sector in four situations:

1. Christmas trees, where the rotation time is short and a narrow genetic base and uniform trees might be a desired breeding goal.
2. In breeding new plants for the production of biofuel. Here there is an important link between the work to prevent climate change and that of biological diversity.
3. Plantation of trees to capture and store carbon, also as a means to combat the challenges from climate change.
4. The introduction of new tree species or the introduction of new characteristics into well-known species and breeds, so to make them more resistant to changes n the climate.

In these four situations, the situation might prove that it becomes relevant for breeders who to work on developing new tree species. This would have changed the tradition of forestry as the situation currently is that plant breeders' right has not been a very useful option as genetic uniformity and stability as defined in UPOV has not been a breeding goal in the forest sector. A plant variety is defined:

> A plant variety is defined as: (vi) "variety" means a plant grouping within a single botanical taxon of the lowest known rank, which grouping, irrespective of whether the conditions for the grant of a breeder's right are fully met, can be
>
> - defined by the expression of the characteristics resulting from a given genotype or combination of genotypes,
>
> - distinguished from any other plant grouping by the expression of at least one of the said characteristics and
>
> - considered as a unit with regard to its suitability for being propagated unchanged;

For obtaining a plant breeders' right, there are, in a similar way as for patents, a set of criteria which must be fulfilled to obtain the exclusive right:

Novelty: The variety shall be deemed to be new if, at the date of filing of the application for a breeder's right, propagating or harvested material of the variety has not been sold or otherwise disposed of to others, by or with the consent of the breeder, for purposes of exploitation of the variety. A plant variety is not novel when it has either been registered in an official register of varieties or someone else has applied for a plant variety protection of any other country.

Distinctness: The variety is only deemed to be distinct if it is clearly distinguishable from any other variety whose existence is a matter of common knowledge at the time of the filing of the application.

Uniformity: The variety shall be deemed to be uniform if, subject to the variation that may be expected from the particular features of its propagation, it is sufficiently uniform in its relevant characteristics.

Stability: The variety shall be deemed to be stable if its relevant characteristics remain unchanged after repeated propagation or, in the case of a particular cycle of propagation, at the end of each such cycle.

The UPOV-based plant variety protection system has not been used to a large extent in forestry. There might be several reasons for this, but one explaining factor could be that the refined *forest reproductive material* has not qualified for meeting the criteria for protection, as seldom a uniform and stable variety is being developed. All types of intellectual property rights is based on an assumption that there is a market with willingness to pay for the protected product at a higher monopoly price. This might change in the future subject to any one of the three developments listed in number 1 to 4 above.

5.3 Special cases with commercial value

The topic for this section is to look at some cases with commercial potential, and to discuss to what extent law and legal mechanisms could serve as a legal tool to recapture investments and values.

5.3.1 Finland – Red-leaved birch[47]

Red-leaved birch, *Betula pubescens* f. *rubra* was found in the 1970s in Ylikiiminki, Finland.[48] In 1978 a school child brought a sample of the tree to her biology teacher, who contacted the researchers of the botanical department in the University of Oulu. In 1979 the researchers visited the spot, where one red-leaved tree with three trunks was growing in a dense

[47] This section is based on Pihlajaniemi, H. and Siuruainen, M. 2011.Punakoivu (*Betula pubescens* f. *rubra*) – hieskoivun punainen muoto. (*Betula pubescens* f. *rubra* – a unique red-leaved form of downy birch). – Sorbifolia 42(1):16-23. ISSN 0359-3568.

[48] *Betula pubescens* Ehrh. f. *rubra* Ulvinen, Betulaceae.

birch stand at the edge of a field. At that time the height of the tree was 3.5 m. At a second inspection in 1988 the height was 7 m and the age of the tree was estimated to be approximately 20 years.

In the spring, the newly flushed leaves are green with a reddish tinge at the edges. In two to three weeks the leaves turn dark red. The autumn colour is brighter type of red. The red colour is caused by *anthocyanins* as a result of a mutation.

In the beginning, the multiplication of the read-leaved birch was problematic. The mother tree did not produce any seed. In the botanical garden of Oulu University, several attempts were made to use cuttings, but they were not successful. In 1987 the botanical department started developing a micropropagation method (cell culture) for the red leaved birch. At that time micropropagation was a new method as such, but the protocol for silver birch was already known. In 1988 Hanna-Leena Tela performed the first successful propagation and since then tens of thousands of plants have been produced. The oldest micropropagated individuals have produced seed, with both red-leaved types and normal phenotypes.

The red leaved birch is described as a forma and not as a plant variety. If the birch had been described as one *plant variety*, based on a description of either a genotype or a phenotype one particular characteristic, then it could have been eligible subject matter for plant breeders' right, subject to the criteria described in section 5.2. The one particular plant variety described as based on one particular type of red-leaved birch, would be eligible for plant variety protection. The consideration would then have been to determine whether the said red-leaved birch would meet the criteria for being granted a plant variety right. The decisive criterion would be to what extent the same red-leaved birch had been offered for commercial sales before the application for the exclusive right. One advantage of protecting such a new forma by plant variety protection would be that the protection period is longer, e.g. 25 years, for trees. This would increase the return of the right-holder compared to the situation for a patent. To determine whether applying for a plant variety right to red birch would give a better return to the developer or not, would needed to be judged with respect to the market.

As one specific plant variety would be exempted from being eligible for patent protection, the same subject matter: the plant variety *red-leaved birch* could not be subject matter for a patent. This does however not exclude other elements of the innovative process of the red-leaved birch from being applicable for patent protection. The question becomes to what objective patent law could be applied. Under the EU Directive, inventions at the gene or cell level are eligible for patent protection, so if this new variety had rather been described at a gene or cell level, it would not per se be except from patent protection. Described on ly as a new plant variety, the red leaved birch would not meet the criteria for being a patentable invention. Also inventions that can cover several plant varieties can be granted in the EPO. Whether the red-birch related patent would meet the patent criteria is not easily determined without having a concrete patent claim described.

Drawing upon the case of Broccoli which is currently ongoing in the EPO, it seems that a method for breeding a new variety based on either phenotypic or genotypic selection can be patented. The ruling in the Broccoli case does not resolve this question completely and leaves for example MAS in a grey zone whether is eligible for patent protection or not.

To what extent such a patent would be useful to increase the economic return for the breeder is a question of whether there is a market for buying the patent product at a monopoly price which would cover the costs related to both patenting itself and to the enforcement of the patent. To give advice on this point, one would need to know more estimates about the market-structure for this product.

5.3.2 Denmark – using contract law

In a specific case a private company has signed a material transfer agreement with the Forest and Nature Agency. It gives the private company access to controlled crossings of selected plus trees. The purpose is research and production (based on somatic embryogenesis techniques). The agreement allows the private company to benefit from a public breeding program, and market the results using new technology. The intention is to establish a right for the private company to use the genetic resources, but still keep the ownership of the genetic resources in the public breeding programme. Since ownership to the biological material is regarded as decisive for rights to the genetic resources, it is stated, that the genetic material from the crosses (seeds/tissue) must not be transferred from the contracting firm to a third part.

At the same time the agreement does not exclude other companies from accessing the same genetic material in the collections or even in nature to the same type of crossings. The object of the agreement is not wild-growing trees but only the accessions transferred as part of that commercial transaction. Payment for the access is linked to the actual commercial use (the volume of future production). No controlled crossings have yet been conducted under the agreement. In a transparent market, the sales or licensing of a technique by the use of contracts can be a relevant alternative to seeking IPR-protection. A contractual approach however has its limitations as a contract only regulates the situation between the two parties, and establishes no rights or obligations for any third parties to that contract. This illustrates the use of private law contracts in use for the transfer of and use of FGR.

5.3.3 Norway – ornamental forms of conifers or other trees with commercial potential

According to our enquiries there are no patents so far on ornamental forms of conifers or other trees. There is, however, trademark protection of the trade name *(sortsnavn)* of certain selected clones of e.g. juniper (*Juniperus communis*) such as ‘Oskaladdden’. For instance, Tromøy Nursery uses the trade name Nona®, which gives a certain protection. The same nursery notes that if there was simpler and more reasonable means for stronger protection of clones and cultivars, it is likely that

selection and breeding would have been taking place to a much larger scale. In the present situation where the end product has a limited protection, this is a risky business. Basically a trademark does not protect the genetic material or the result from the breeding process, but reserves only the name under the exclusive right of the one having registered it.

A different approach is the E-plante system (www.eplante.no), a trademark protection of cultivars and seed sources specially adapted to the Norwegian climate. The aim of E-Plante is to secure such reproductive materials and thereby promote high quality in Norwegian gardens and green spaces. E-Plant is a consortium of 13 Norwegian nurseries devoted to testing, production and marketing of specific trees and bushes.

For trademarks, the object of protection is different from that of patents: In trademark, the commercial right targets the name as such and not the GR or even the plant variety. Thus, where the value rather is in the registered name than in the propagating material as such, then a trademark could be used effectively as a legal measure. In a market where the added value is connected to the name or reputation rather than in the genetic material only, a trademark is a very relevant way to protect any investments.

5.3.4 Sweden – patent protection of biotechnological methods

In three interesting patents the Swedish company SweTree claims patent protection for a wide variety of biotechnical methods for regulating the expression of a few certain genes or polypeptides which they have functionally characterised. Some of the claims include protection of breeding activities that would use the gene expression monitored by biotechnical means as a phenotypic quantitative trait. This might be of interest from the tree breeding or tree conservation point of view. Three patent applications have been identified as interesting for the purpose of this Report:

This first invention relates to the identification and characterisation of poplar PFT genes and their role in the induction of early flowering and repression of short-day induced growth cessation in perennial plant species. This has important applications for forestry, for example in tree breeding programs (EP20050805071 20050920).

A second invention relates to finding that plant growth is directly affected by alterations in the expression of amino acid transporters that mediate the uptake of amino acids from the environment. Methods of modulating plant growth by modulation of amino acid transporter expression are provided (EP20060765647 20060526).

The third invention explored relates to methods of increasing the growth and/or biomass of plants by partially suppressing the expression of a SHORT-ROOT (SHR) polypeptide, such as AtSHR or PtSHRl.[49] Manipulation of SHORT-ROOT expression may be useful, for example, in accelerating growth and increasing biomass production in transgenic plants.

[49] AtSHR and PtSHR1 denotes the species from which the SHR gene were isolated, in this case Arabidopsis thaliana (At) and Populus trichocarpa (Pt).

Common for these three patent applications is that they target rather methods than the genetic material itself. Thus, these patents would not hinder the free exchange of forest genetic resources as long as the genetic material in question has not been characterised with respect to gene sequences or gene expressions that are subject to the patent protection.

5.4 Legal tools and increased value created

This section has looked at different types of legal tools for increasing value to activities in the forest sector. Common for them is that they establish some type of legal exclusivity to items which could not be protected from the use of others if no legal system for excludability existed. To this end, legal tools might become increasingly useful for creating and capturing economical values in the forest tree sector. On the other hand, the application of law to a field which has been functioning well with a low degree of legal rights and regulations might create transaction costs as establishing these legal rights and to an even larger extent, enforcing them, might turn out to become an expensive solution. And there is a risk that the different actors in the forest tree branch will only 'exchange money' amongst themselves if such exclusive rights becomes increasingly used and enforced. If the introduction of law does not have actual consequences for increased production of products or a change in production towards a more sustainable practice, law becomes an added transaction cost rather than increasing the values. Different companies and other entities will probably regard these issues differently and opt for different solutions. It is therefore likely that countries might want to regulate these issues differently.

6 Developments in International Law and Possible Development of Politics for FGR

Beyond the options of private entities to choose their strategy of law when securing rights to their innovation and options for companies when they choose their policies, there are some changes going on at the international level which also might have effect on the national and regional European legislation regards access and rights to FGR:

6.1 Access and benefit sharing in the Convention on Biological Diversity – the Nagoya Protocol

Section 3.1 and 3.2 introduced the CBD and its definition of 'genetic resources', in this section the topic is to explore the new development under the CBD – the Nagoya Protocol and forthcoming regulation in the perspective of FGR. Several elements in the Nagoya Protocol might become relevant for the forest trees, although the topic is not specifically addressed during the 6 years of negotiations. In the next phases, during ratification and more importantly when its rules are to be implemented in national and EU legislation, the more detailed consequences for the forest sector will become more evident. Also the need for the forest sector to be active in the implementation process for the Nagoya Protocol becomes important if the sector has special needs. It is, however, already possible to identify some effects the Protocol might have for the forest tree sector.

Even if the Protocol was intended to deal mostly with legislation in user countries and the system for making the benefit-sharing obligations of the CBD effective, it now covers both rules on access and on benefit sharing.

Even though FGR has not been a central topic in the debates, there are still no particular rules that would exempt forest-tree genetic resources from the scope of the Protocol (as was suggested for other sectors such as pathogens and marine genetic resources outside national jurisdiction). This implies that the rules apply – only that FGR are not specifically addressed in the negotiations leading up to Nagoya in 2010.

One element in the Protocol is 'special consideration', which means that 'In the development and implementation of its access and benefit-sharing legislation or regulatory requirements, each Party shall:'

> (a) Create conditions to promote and encourage research which contributes to the conservation and sustainable use of biological diversity, particularly in developing countries, including through simplified measures on access for non-commercial research purposes, taking into account the need to address a change of intent for such research.[50]

This includes that countries shall take into account the needs for the simplified measures for access to genetic resources for non-commercial purposes. It would be interesting to discuss how this regulation could be

[50] Nagoya Protocol Article 8.

implemented for exchange of FGR for non-commercial purposes. To what extent this is at all needed, will depend on whether the general rules for access which cover FGR will be complicated so there is an actual need for a more simplified procedure for access to FGR.

The general regulations in the Nagoya Protocol (NP) are neutral as to which species and organisms they regulate. The system for access and benefit sharing as embedded in Article 5 and 6, as well as the enforcement mechanisms in NP Article 15 and 18 will apply to FGR, regardless of which purpose the genetic resources have been taken. A strategic point becomes whether the forest tree sector should identify the potential regulations which could be conducive to a functional ABS system for these resources, or whether capacity should be mobilised only when there is a proposal for new legislation on the table. Waiting might prove to be a dubious strategy as it might be more difficult to achieve a change in the law-making process as time goes by and the proposal is made more concrete. However taking action before having a more detailed understanding of how an EU or national ABS system might look like, might lead to a waste of resources. The first alternative might prove to provide a stronger position for the forest tree sector to influence the overall law-making process as contributing at an early point of time. This could be an argument for taking an active role and feeding into the process a document about how the forest tree branch foresee useful and destructive ways to regulate ABS. To do this without basing the analysis on a concrete proposal is a more open and less focused manner to analyse and discuss consequences from a non-existing hypothetical proposal for future legislation.

One particular rule worth noting, which will receive much attention in other international forums than the CBD, is Article 4, number 2, which regulates the relationship between the Nagoya Protocol and other international instruments, which reads:

> 2. Nothing in this Protocol shall prevent the Parties from developing and implementing other relevant international agreements, including other specialised access and benefit-sharing agreements, provided that they are supportive of and do not run counter to the objectives of the Convention and this Protocol.

This formulation opens explicitly for the negotiation of 'international agreements' regulating ABS, which could set other rules or even exempt categories of genetic resources (specie-based or branch-based exemptions) from the Nagoya Protocol. This will be an issue for other international organisations than the CBD, whether they should develop a specific international agreement for specific types of genetic resources removing them from the general system and regulations of the CBD and NP.[51]

[51] For pathogens with negative effect for either humans, animal or plants, there will be discussions in other forums regarding the chance to exclude groups of GR from the scope of the CBD and NP.

6.2 FAO Commission on Genetic Resources and Forest Trees and the commissioned study

A sector approach to ABS is again an agenda item is the UN Food and Agriculture Organisation (FAO) at the 13th session in the Commission on Genetic Resources (CGRFA) July 2011. Under CGRFA there is already an ongoing discussion on taking on a branch- and species-based regulation of rights to and access of genetic resources and FGR has been on the agenda of the FAO Commission on Genetic Resources (CGR) the last years. There is an ongoing Technical working group on FGR, which reports back on its work to the Commission. FGR are generally not under the scope of multilateral system under the International Treaty on Plant Genetic Resources for Food and Agriculture (ITPGRFA), as these species are not Annex I list and are mainly not used for food production. However the CGR of the FAO has taken a more active role for FGR.

As a preparation for the 12th Commission meeting in 2009, FAO commissioned report on 'the use and exchange of FGR for food and agriculture'. Since this is one important studies of the international regulation of FGR, it is interesting to assess the relevance of this document for the purposes of the topics in this Report – access to and rights to FGR in a long-term perspective. In the main section 2, tendencies in international exchange of FGR are described. The analysis argues that there is a global lack of breeding material for forests. In contrast, when this topic was discussed in the reference group for this Nordic report, the reasons for lack of breeding material were rather identified as to be a problem of sufficient seed delivery to a low price and internal differences in parts of countries were reported. In the fact-finding parts of the FAO Report, the emphasis is at discussing difficulties to provide a sufficient amount of breeding material or propagating material for *plantation* forests. The regulatory issue in focus is phytosanitary rules as an obstacle for exchange. The conclusion of that FAO Report, in section 4 (in 4.4), states: 'Difficulties in moving forest reproductive material often arise from national and international rules regarding phytosanitary measures which differ from country to country and among types of plant material.'[52] And in the final conclusion it is stated that:

> Nonetheless, increasing difficulties are being experienced in the movement of forest reproductive material for research purposes with regards to, the high collection costs, lack of access to the genetic resources and the misinterpretation of the CBD provisions.

The FAO study, however, does not go further into explain what is meant by 'misinterpretation of the CBD provisions' or which undesired consequences those authors identified as following form those misinterpretations. 'Misinterpretation of CBD' as a cause for difficulties in exchange is presented for the first time in the conclusions, and not further explored there or elsewhere. When compared to the main impression of the report from an ABS-CBD perspective, it is striking to note the direct relationship to the CBD comes only towards the end, and with scant support in the empirical or document study provided in the substantive part of the study.

[52] FAO Background study paper No. 44 2009, p. 35.

Two main problems are identified in empirical parts of the report: the **lack of propagating material** and **phytosanitary regulations** as obstacle for the forest branch. These two challenges probably need to be addressed specifically, but none of them can be explained as consequences from the CBD, as the CBD is not talking about these types of regulations.

If the problem which the FAO study identified is a lack of propagating material, probably, the incentives for breeding and multiplying propagating material, needs to be discussed and probably be targeted by special measures. Thus the relevant issue to explore would be how the forest branch could be stimulated to produce and make commercially available more seeds. Two alternative or supplementing approaches could be taken on to help out this situation: The commercial incentives could be make stronger, so private sector would be motivated to produce more seeds; or public money could be invested in mechanisms to making more seeds available. The advantage of the latter is that, subject to the amount of money available, the price could be made generally affordable. The first option would also probably require stimulation of the market, as to become willing to pay a better price, so private revenues go up. Thus, also this alternative will probably require public funding. It might be interesting to explore more in detail the potential for law to be an effective tool for promoting more production of propagating material.

If the reason for reduced exchange is the phytosanitarian regulations becoming too strict, then one possible action is to look further into details in how this type of regulation could better accommodate the need for exchange. Such a review of phytosanitarian regulations perhaps therefore would require a re-discussion of the balance between the two objectives of making breeding material available with the need for controlling diseases.

6.3 The Treebreedex report

In March 2011 a report on ‘Options for access rules and benefit sharing on plant material within a future Treebreedex network’ was published. Its main perspective is to discuss rules for access and benefit sharing for biological collections of forest tree species within the consortium. The main approach of the report is to discuss different options for developing agreements either standard material transfer agreements (sMTA), default agreements or individually negotiated agreements for exchange. It suggests it to be too early to develop an agreement at this point of time. It orients itself more towards the Bonn Guidelines under the CBD rather than the Nagoya Protocol. This is an interesting choice of law as the discussions about ABS in the CBD the last year have not reflected around the Bonn Guidelines as they are generally recognised to be an important step towards the Nagoya Protocol. The fact is that neither the Bonn Guidelines nor the Nagoya Protocol themselves give very clear guidance to how a consortium like Treebreedex can develop a well-functioning agreement to capture the different objectives it is set to handle.

7 Conclusions and Recommendations

7.1 Conclusions

This study shows that there are different present legal situations in the four Nordic countries responding in this study with respect to e.g. ownership to FGR, the everyman's right and regulation of access. These differences exist but have so far not caused any hinders for exchange of and access to FGR. National phytosanitary regulations are more harmonised because of the EU rules on this matter. One element of law which has potential to alter the open exchange of FGR among the Nordic countries would be if Norway uses the competence to introduce an administrative decision establishing strict criteria for access to its GR in general. This has a potential to create an unequal legal situation and thus a potential to become a hinder to the open access to FGR which is the basis for the cooperation today. If Norway and perhaps other Nordic countries are to implement regulations of access to GR, one important feature would be to keep the administrative burden as small as possible.

Regarding the question of identifying developments which have potential to affect the present non-bureaucratic system of access to FGR, there are several developments in various international arenas: The developments under the CBD and the signing of the Nagoya Protocol suggests a more detailed system for regulating access and benefit sharing connected to genetic resources. Neither CBD Article 15 nor the Nagoya Protocol have any exceptions for forestry and would thus regulate access and exchange of forest reproductive material. Therefore, it is of interest to continue to follow the development in the ABS-CBD from the perspective of FGR.

The work on FGR in the FAO is still in an early phase. The ongoing process of the report on the state of the world's forest genetic resources (SoW-FGR) is one core element of this work. It is however too early to infer how the work of the CGRFA will influence exchange of FGR in the future.

The relationship between the CBD and NP and other international arenas is sought resolved in NP Article 4. How the work of CBD and CGRFA relevant for FGR will be implemented in a mutually supportive manner is still to be seen.

Patent law is applicable to forestry and there are a few experiences regarding patenting of breeding methods. The effects of such patents on access and exchange of breeding material is not yet easy to identify in detail. Patents and plant variety protection rights need however to be targeting inventions to which there is a market for selling or licensing to become conducive to forestry. One general observation might be that patenting would probably not pose a practical threat against the access to FGR, because in a Nordic climate the patent protection period of 20 years would expire before onset of seed production in most tree species of interest. The future use of patenting could be different for shorter rotation species, e.g. Christmas trees, biofuel crops (e.g. *Salix spp*) and patents on propagation methods (e.g. somatic embryogenesis) are likely. These

developments might require particular solutions for the future, but concrete steps that legislator needs to take today is not easily identified. Based on the experiences in section 5, it is not easy to see how these legal measures shall hinder access to and exchange of forestry propagating material.

The commercially interesting examples explored in section 5 indicates that no particular steps are currently needed to create better legal conditions for increasing commercial activity connected to FGR, such as e.g. Christmas trees, propagation methods and the red-leaved birch with the general open exchange system.

7.2 Recommendations

Two rationales for suggesting new regulations based on this study would be that either there are problems in the present situation, and/or that future developments could impede exchange of FGR among countries. No problem or obstacles for the forest sector caused by the current regulatory situations were identified. Therefore no specific legal steps are recommended in this study.

A general recommendation is that introducing new elements of law, being intellectual property rights, access legislation or any other type, there is a need for the law-maker to have a clear rational for such new laws and also for assessing the transaction costs. Transaction costs can occur both from property rights and from public regulations of FGR.

As there are changes happening in several international fora for negotiation, one recommendation is to follow them from the perspective of FGR and take adequate steps if the development seems to affect exchange of FGR.

In a climate change situation, where an important strategy is to promote adaptation, there is probably going to be a need for forest propagating material from countries with a warmer original climate. In such a situation, the sector might experience that there will be an increase in the demand for cross-border transfer of tree species. In a situation with strong bureaucratic restrictions on access to FGR from countries in the south, these regulatory issues might become hindering.

Also, if biotechnological methods become more commonly used in the sector, the influence of patents and private rights could increase. This might advocate establishment of a mechanism for monitoring the situation concerning access and rights to FGR in connection to patent and private rights in the future.

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