B4EST

Adaptive BREEDING for productive, sustainable and resilient FORESTs under climate change

Deliverable D4.2

Overview of current rules and legislations for deployment of improved FRM

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1 Summary

The aim of this deliverable was to identify possible legislative and regulation obstacles, and opportunities for implementing trans-national use of improved forest reproductive material (FRM) based on biological and economical drivers. The work of the deliverable has been organized under Task 4.5 and focused on identifying national or EU-level regulations, legislation, certifications, and levels of stakeholder acceptance, affecting the practical implementation of new deployment recommendations through two earlier surveys of stakeholders and experts at national and EU levels.

An overview of the most relevant rules and regulations concerning the deployment of improved FRM in Europe are presented here, including relevant international and Pan-European guidelines and recommendations for the use of FRM. These directive and regulations only deal with the requirements for marketing FRM within EU or globally. This report also covers conventions and international agreements concerning the conservation of biological diversity and the sustainable and fair use of genetic resources, as well as national and international regulations which may have an indirect effect on the use of FRM, like nature conservation, landscape functions, land use etc.

The effects of regulations and policies and their perception within the forestry sector was investigated by a joint analysis of two stakeholder surveys: the GenTree survey on “the conservation and sustainable use of FGR”, and the B4EST survey on “adaptive tree breeding for productive, sustainable and resilient forests under climate change”, carried out 2017 and 2020, respectively. The results showed that there is an overall preference for using native/local FRM and that the use of non-local and exotic material is widely discouraged. The report finally provides an overview of the Swedish and Finnish Scots pine Planter's guide which is an already existing decision support web tool for the use of improved FRM in the two countries.

The main conclusions were:
a) that there is still large variation in the regulations that affect the use of FRM in Europe and that there are several national and international, that even though not directly addressing the use of FRM, still seem to have large effect on it,
b) that often national and regional policies promote the use of native/local FRMs and discourages the use of non-local and exotic material (thus prevents assisted migration),
c) that there is a need to adopt and reinforce common adaptation and mitigation measures (e.g. common regulations), promoting the use of (improved) FRM across borders/regions to support adaptation to climate change,
d) and that decision support tools to choose the optimal FRM (such as Planters Guide), that take into account regional and national regulations concerning biodiversity or other environmental aspects, should be developed further for other regions and tree species.

2 Introduction

The aim of this deliverable is to identify possible legislative and regulation obstacles, and opportunities for implementing trans-national use of improved forest reproductive material (FRM) based on biological and economical drivers. The deliverable is prepared under Task 4.5 that should identify national or EU-level regulations, legislation, certifications, and levels of stakeholder acceptance, affecting the practical implementation of new deployment recommendations through a consultation of stakeholders and experts at national and EU levels.

In chapters 3.1 to 3.5 the most relevant rules and regulations concerning the deployment of improved FRM are listed for different levels. In this report the rules and regulations have not been further described or analyzed, because this has been done recently in a number of published reports, such as the EUFORGEN report on "Use and transfer of forest reproductive material in Europe in the context of climate change" (Konnert et al., 2015). Also links to the relevant documents are given as footnotes.

In chapter 3.6 some relevant international guidelines and recommendations are listed and in chapter 3.7 other aspects that may affect the use of improved FRM are discussed. Chapter 5 gives an overview of already existing decision support tools for the use of improved FRM in Europe.

For the work with the consultation of stakeholders and experts presented in chapter 4, it was decided to use the results of a survey that was carried out within the GenTree project during 2016 and 2017, because it covered almost completely the type of information that was needed for this report, it covered almost all of Europe, it response rate was high and it was carried out recently. An additional survey, with a subset of questions from the GenTree survey, was sent out to countries that are of special interest for B4EST, but from which little or no response was received in the GenTree project. The outcomes of this survey are discussed in chapter 4.

In chapter 6 the effects of the regulations and their perception within the forestry sector on the practical implementation of new deployment recommendations are discussed.

3 Regulations, policies and guidelines

3.1 European regulations

Council Directive 1999/105/EC on the marketing of forest reproductive material[1].

Commission Regulations (EC) No 1597/2002[2]: laying down detailed rules for the application of Council Directive 1999/105/EC as regards the format of national lists of the basic material of forest reproductive material

These directive and regulations only deal with the requirements for marketing forest reproductive material within the EU, to guarantee the quality of the material, for those species mentioned in the annex of the directive. They do not provide any requirements or guidelines for the use of forest reproductive material and the choice of suitable species and/or provenance.

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:31999L0105&from=EN
[2] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32002R1597&from=EN

3.2 Other International regulations and policies

OECD

- OECD scheme for the certification of forest reproductive material moving in international trade[3]
- OECD forest seed and plant scheme: rules and regulations[4]

As for the EU-regulations the OECD regulations only deal with the requirements for marketing forest reproductive material, but here on a global level. In fact, the EU directive and regulations are based on those of the OECD. Thus, the OECD regulations do not provide any requirements or guidelines for the use of forest reproductive material and the choice of suitable species and/or provenance.

Convention on Biological Diversity (CBD)[5]

The Convention on Biological Diversity entered into force on 29 December. The CBD is one of the international agreements that have been ratified by nearly all countries of the world. The CBD has three main objectives: (1) the conservation of biological diversity; (2) the sustainable use of the components of biological diversity; and (3) the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. The CBD recognizes that countries have sovereign rights over their own biological resources and assigns them the responsibility for conserving biological diversity. It also urges countries to use the biological resources in a sustainable manner and highlights specifically the importance of genetic resources. Countries are also urged to enhance technical and scientific cooperation, training and information exchange on the conservation and sustainable use of biological diversity.

The Nagoya Protocol on Access and Benefit Sharing (ABS)[6]

In 2010, COP-10 adopted a legally binding agreement called the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization. This agreement entered into force on 12 October 2014. The aim of the Nagoya Protocol is to ensure that accessing and utilizing genetic resources is undertaken in a legal way and with the prior agreement of the holders of the genetic material. The access and mutually agreed terms (MAT) of sharing the benefits from the use of the genetic material should also be agreed by both parties (the owners and the users) prior to any form of exploitation. The Nagoya Protocol makes it obligatory for the Parties to implement appropriate legislative, administrative or policy measures, and set up operational administrative structures and procedures for providing access to genetic resources and for agreeing the terms of sharing the benefits. However, the protocol does not impose any ABS arrangements for the use of genetic resources for production purposes, such as buying seeds and growing seedlings for forestry purposes.

[3] https://www.oecd.org/agriculture/forest/
[4] https://www.oecd.org/agriculture/forest/documents/forest-scheme-rules-and-regulations.pdf
[5] https://www.cbd.int/
[6] https://www.cbd.int/abs/

The FAO Global Plan of Action for the Conservation, Sustainable Use and Development of Forest Genetic Resources[7]

The FAO Global Plan of Action (GPA) for the Conservation, Sustainable Use and Development of Forest Genetic Resources (FGR), was adopted by the FAO Conference at its 38th session in June 2013. This Global Plan of Action identifies 27 strategic priorities grouped into four areas: 1) improving the availability of, and access to, information on FGR; 2) conservation of FGR (in situ and ex situ); 3) sustainable use, development and management of FGR; 4) policies, institutions and capacity-building. The respectively long term goals of these four areas are: 1) Improve the availability and accessibility of knowledge and information on species and their genetic diversity, forest ecosystems and related traditional knowledge, to facilitate and enable decision making on sustainable use and management of FGR and to enhance their contribution to solving serious global problems such as food shortage, land and water degradation, the effects of climate change, and increased demand for various forest products and services. 2) Maintain genetic diversity and the evolutionary processes of forest species by better implementing and harmonizing measures to conserve FGR, both *in situ* and *ex situ*, including through regional cooperation and networking. 3) Enhance the sustainable use, development and management of FGR as a key contribution to environmental sustainability, food security and poverty alleviation. 4) Establish and review relevant policies and legal frameworks in order to integrate major issues related to sustainable FGR management and to strengthen institutional and human capacity to achieve successful medium- and long-term planning of the forestry sector in member countries, as well as for the long-term sustainable use, management and conservation of FGR.

The Global Plan of Action is voluntary and non-binding and should not be interpreted or implemented in contradiction with existing national legislation and international agreements where applicable. Implementation of the Global Plan of Action will strengthen the sustainability of the management of FGR while contributing towards the Millennium Development Goals, the post-2015 agenda and the Aichi Biodiversity Targets.

3.3 National regulations

In 2012 EUFORGEN carried out a survey on the legal framework, guidelines and recommendations concerning Forest Reproductive Material in European countries at national level. In total 23 countries responded to this survey. Annex 1 is a table initiated by EUFORGEN that shows the outcome of the survey per country. The table is a draft version because so far it has not been finalized or published by EUFORGEN.

The survey reveals that the national regulations vary much per country. In many countries the national regulations include regulations concerning the use of the right provenances and provenance and/or species transfers. This may include regulations concerning the use of non-native tree species (see chapter 3.4). Several countries have also some additional administrative limitations or requirements as regards to the international regulations. These are often concerning the list of species (number of species added), or further limitations to the use of material in the category “source identified”. Many countries have also specific requirements concerning minimal diversity criteria, such as a minimum number of trees to be collected in seed stands, a minimum number of clones or trees per clone to be included in seed orchards (or the number of clones or trees seed is to be harvested from per seed lot)

[7] http://www.fao.org/3/a-i3849e.pdf

or concerning the number of clones to be included in clone mixtures. These minimum requirements vary a lot between countries and also between species within countries. Some countries have national or regional regulations regarding subsidies that may affect the use of FRM. Subsidies are only provided when the forest reproductive material used compel with the national regulations or recommendations. In a few countries forest owners may be compensated after failure of reforestation. Such compensation is only applicable when appropriate reproductive material has been used.

3.4 Regulations considering non-native tree species

Already since the 19th century non-native tree species were introduced to European forestry, with various results. A number of species, mainly from the northern America have been very successful and are now more or less common practice, especially in central and Western Europe, and are of significant importance for the whole forestry sector. The five most used non-native commercial tree species in Europe are: Black locust (*Robinia pseudoacacia*), Eucalyptus / gum tree (*Eucalyptus sp.*), Sitka spruce (*Picea sitchensis*), Douglas fir (*Pseudotsuga menziesii*) and Lodgepole pine (*Pinus contorta* var. latifolia). However, since the end of the last century the use of non-native tree species in European forestry has been more and more criticized. They are now predominantly looked upon to as invasive species that may threat the distribution and regeneration of native species, and thus changing the natural ecosystems, or as not fitting into the landscape, like Sitka spruce in the UK and Ireland. There are several regulations that deal especially with non-native species:

- Council Decision 2008/971/EC on the equivalence of forest reproductive material produced in third countries[8].
- REGULATION (EU) No 1143/2014 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 22 October 2014 on the prevention and management of the introduction and spread of invasive alien species[9]. (None of the five most used species mentioned above occurs on the list of invasive species)

Concerning non-native tree species there has been a cost action FP1403 - Non-native tree species for European forests - experiences, risks and opportunities (NNEXT, 2014 - 2018). The NNEXT report on "Non-Native Tree Species for European Forests: Experiences, Risks and Opportunities. Country Reports" (Hasenauer et al., 2017) reveals that the perception of the use of non-native tree species varies very much per country, and in some cases also per species. The Flanders part of Belgium has probably the strictest legislation concerning the use of non-native tree species, even aiming for a strong reduction of the already area planted. Several other countries allow the use of non-native species with restrictions concerning regions, planted area, origin and/or species. Few countries have no restrictions at all.

Douglas fir is an example of a non-native tree species that has become a very much desired in European forestry, for reasons of both wood production and resilience in a changing climate (Spiecker et al., 2019). It was introduced to Europe already during the early 19th century. Presently it covers more than 800 000 ha of forests in Europe. However, this is still only 0,40% of the European forest area.

[8] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32008D0971&from=EN
[9] https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32014R1143&from=EN

3.5 Regulations with an indirect effect

There are regulations related not directly to FRM, but to forestry in a broader sense, nature conservation, landscape functions, land use etc. that may affect the use of improved FRM. In fact the GenTree survey (see chapter 4) revealed that, at least in some countries, these regulations may have a larger impact on the use of improved FRM than the direct regulations (GenTree Deliverable D5.4). These include both national and international regulations. For example, Nature 2000 seems to have quite some impact on the use of FRM.

Another example, for Sweden, is that on agricultural land one may plant trees, but after 20 years the land will be considered no longer agricultural land but as forest. As a result of this short rotation (< 20 years) forest tree plantations with species such as hybrid aspen or poplar may be favorable for a landowner.

3.6 Guidelines and recommendations

FOREST EUROPE[10]:

FOREST EUROPE (the Ministerial Conference on the Protection of Forests in Europe) is the pan-European voluntary high-level political process for intergovernmental dialogue and cooperation on forest policies in Europe. FOREST EUROPE develops common strategies for its 47 signatories (46 European countries and the European Union) on how to protect and sustainably manage their forests. Several of FOREST EUROPE's resolutions also affect the use of FRM, the most important ones being:

- Strasbourg Resolution S2 (1990)[11] The conservation of forest genetic resources. : 1) the use of genetically-improved materials is of great importance for afforestation and restocking, in particular where this is for the purpose of the production of timber and 2) countries are requested to keep records, at least for public forests, of the exact identity of the reproduction materials used for planting and regeneration.

- Helsinki Resolution H1 (1993)[12] General Guidelines for the Sustainable Management of Forests in Europe: In the management of existing forests and the development of new forests, the chosen tree species should be well suited to local conditions and be capable of tolerating climatic and other stresses, such as insects and diseases, and potential climate changes, throughout the growing period. Genetic selection, which is commonly practiced in Europe, should not favor performance traits at the expense of adaptive ones, except in particular cultures where intensive care may protect them against damage. (from General Guideline 8) Native species and local provenances should be preferred where appropriate. The use of species, provenances, varieties or ecotypes outside their natural range should be discouraged where their introduction would endanger important/valuable indigenous ecosystems, flora and fauna. Introduced species may be used when their potential negative impacts have been assessed and evaluated over sufficient time, and where they provide more benefits than do indigenous ones in terms of wood production and other functions. Whenever introduced

[10] https://foresteurope.org/
[11] https://www.foresteurope.org/docs/MC/strasbourg_resolution_s2.pdf
[12] https://www.foresteurope.org/docs/MC/MC_helsinki_resolutionH1.pdf

species are used to replace local ecosystems, sufficient action should be taken at the same time to conserve native flora and fauna. (from General Guideline 9)

OECD Guidelines on the Production of Forest Reproductive Materials[13]:

During its 2012 Annual Meeting the OECD Forest Seed and Plant Scheme approved the Guidelines on the Production of Forest Reproductive Materials. These guidelines primarily focus on production procedures of forest reproductive materials for moderate climate zones. They will be revised at a later stage to include procedures that are typical to tropical countries. The application of these guidelines is not obligatory, but they provide guidance on the implementation of procedures. They are particularly useful for new member countries, or countries in the process of developing a national certification system for forest reproductive materials.

3.7 Other aspects

One important aspect may also still be the higher price of improved FRM. According to the EUFORGEN report on use and transfer of forest reproductive material in Europe in the context of climate change (Konnert et al., 2015) many forest owners think of FRM as a cost to be minimized rather than as an investment for which they should be seeking better returns and that lack of knowledge, market forces and trade mechanisms often work against the use of high-quality FRM (in terms of both genetic and physiological quality). On the other hand, at several countries the use of improved FRM is stimulated by linking funding via forest subsidies with the use of recommended FRM.

Konnert et al. (2015) state that, at that time, the EU directive on the production and marketing of FRM within the European Community, as well as many national legislations do not take account of climate change. In order to secure the correct use of FRM, some Member States have included in their national laws recommendations to forest owners on the use of FRM.

In other countries forest administrations make recommendations for the use of provenances in different regions. They mostly rely on the concept of provenance regions, which are areas within which reproductive material can be transferred with little risk of being poorly adapted to their new location. Provenance recommendations often have the role of a decision support and forest owners are not obliged to follow them. However, they can be binding in some countries under subsidiary schemes. The EUFORGEN report gives an overview of national provenance recommendations and support tools.

Konnert et al. (2015) also state that although FRM is increasingly traded across borders the national recommendations rarely offer help in deciding where the imported material should be used. Therefore transfer recommendations should have a pan-European perspective and should also include climate change considerations.

4 Perception of Regulations and Policies

This chapter analyses the perception on regulation and policy influencing the sustainable use and management of Forest Reproductive Material (FRM), aiming to generate new knowledge on improvement of forest genetic resources (FGR). The outcomes presented are based on the joint

[13] https://www.oecd.org/agriculture/forest/documents/oecd-guidelines-on-the-production-of-forest-reproductive-materials.pdf

analysis of two stakeholder surveys: a) the GenTree[14] survey on "the conservation and sustainable use of FGR" (GenTree, 2020), and b) the B4EST survey on "adaptive tree breeding for productive, sustainable and resilient forests under climate change", carried out in 28 European countries[15] collectively. Although the investigations had different focus, they used common survey methods and involved similar target groups (more details below).

The GenTree survey was conducted online using the Survey Monkey platform, from October 2016 until February 2017 and addressed forest managers, forest owners, tree breeders, tree nursery or seed harvesting/processing companies, industry and policymakers. The survey was advertised by posting announcements online and using social media accounts by the project partners. The questionnaire targeted 26 countries[16], obtaining a total number of 334 responses. Responses classified with "unknown" country and "international", as well as the responses collected from Russia and responses from the industry were not included in this joint analysis as not relevant for the report purposes. The total amount of responses extracted from the GenTree survey as pertinent for this analysis was 292.

The B4EST survey was meant to complement the results from the GenTree project and to increase the robustness of the overall outcomes by collecting additional responses from countries that had only low coverage in GenTree. It aimed to highlight the opinions and expectations of different forest sector stakeholders on policy aspects related to the sustainable use of FGR for the advancement of improved FRM. The survey focused on collecting responses form Estonia, Latvia, Lithuania, Portugal England, Sweden, and United Kingdom (i.e. countries that in the GenTree survey were missing responses or with a very low rate, but were considered relevant for the B4EST goals). The stakeholder groups involved are the same as the GenTree survey, except for the industry category being not relevant for the B4EST project. A set of questions were designed as general questions for all stakeholders, and more specific ones posed only to a particular group. The content of the questions was the same as in the GenTree survey, whereas the design was modified for few questions[17]. The online survey was carried out using Survey Monkey, from April until May 2020. The survey was promoted via email or social media by the B4EST project partners, and reminders were also delivered.

The combined reach of the surveys included 28 European countries with a total amount of 335 responses analyzed (including 292 and 43 survey responses from GenTree and B4EST, respectively). The amount of responses varied among countries and stakeholder groups (see combined data in Table 1). In the joint analysis only a specific subset of questions was extracted from the GenTree survey as considered relevant for the B4EST project. Those responses were translated (when submitted in different language then English), and the project data sets combined, as the questions structure and content were the same; the only difference was that in the B4EST survey, some questions were sent to a wider group of stakeholders.

[14] GenTree is the acronym for the project: "Optimizing the management and sustainable use of forest genetic resources in Europe", a Horizon2020 project (GA no. 676876), running from March 2016 - Feb2020.

[15] Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Serbia, Slovenia, Spain, Sweden, United Kingdom (combined GenTree and B4EST datasets).

[16] Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Macedonia, Netherlands, Norway, Poland, Portugal, Romania, Russia, Serbia, Slovenia, Spain, Sweden, United Kingdom .

[17] For those questions the form was modified from yes/no to a positive and negative scale-rating option in the B4EST survey.

A threshold was applied to restrict the analysis to policies that received sufficient numbers of responses (equal or major to 5) at the European level. Policies that were mentioned less often were not considered in the analysis of the overall policy perception. The analysis of policy perception by stakeholder group as well as regional interpretations are shown only for the three most mentioned policies per country and stakeholder group to avoid misleading results. A qualitative approach was utilized to select and interpret responses to open-ended questions based on the relevance of the topics mentioned, necessary to be in line with the objectives of the survey.

An overview of the number of survey responses per stakeholder group are illustrated in Figure 1.

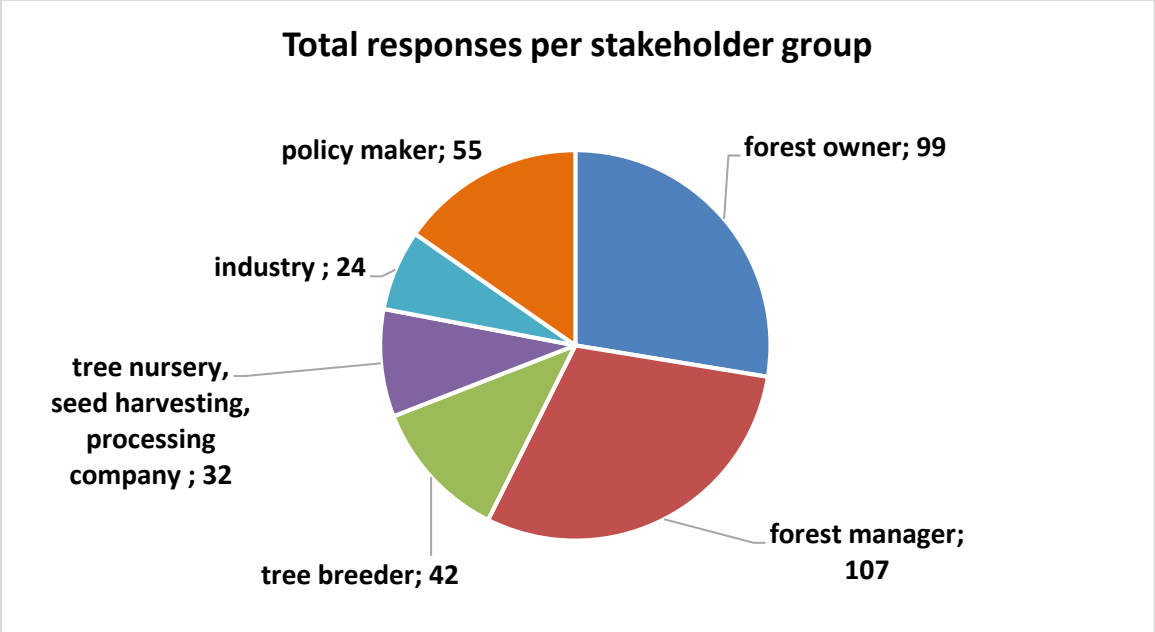

Figure 1: Composition of survey responses per stakeholder group. Data extracted from the GenTree and B4EST surveys. Responses from industry were not analyzed in this report.

A more detailed description of the composition of GenTree and B4EST surveys' responses by country and stakeholder group is presented in Table 1.

Table 1: Survey responses per country and stakeholder groups. Data extracted from the GenTree and B4EST datasets.

Country	Tot responses	Forest owner	Forest manager	Tree breeder	Tree nursery*	Policy maker
Austria	44	19	21	1	0	3
Belgium	8	2	2	0	2	2
Bosnia	1	0	0	1	0	0
Bulgaria	3	0	0	1	1	1
Croatia	2	0	0	1	0	1
Denmark	3	0	1	1	1	0
Estonia	2	1	0	1	0	0
Finland	9	2	3	1	0	3
France	79	32	26	7	2	12
Germany	26	5	14	2	3	2
Greece	1	0	0	0	0	1

Country	Tot responses	Forest owner	Forest manager	Tree breeder	Tree nursery*	Policy maker
Hungary	3	0	0	1	0	2
Iceland	5	1	1	1	1	1
Ireland	0	0	0	0	0	0
Italy	17	0	7	1	7	2
Latvia	12	9	0	2	0	1
Lithuania	7	3	3	1	0	0
Macedonia	1	0	0	0	0	1
Netherlands	2	0	0	0	1	1
Norway	49	10	18	4	7	10
Poland	4	0	0	3	0	1
Portugal	9	1	3	2	0	3
Romania	10	3	2	2	1	2
Serbia	3	0	0	2	0	1
Slovenia	5	2	1	1	1	0
Spain	12	6	2	2	1	1
Sweden	12	1	2	2	4	3
UK	6	2	1	2	0	1
All countries	335	99	107	42	32	55

*Tree nursery, seed harvesting and processing company.

4.1 Policy perception by stakeholder group

Respondents were asked to indicate the most relevant policies or regulations with an impact on the work related to sustainable use and management of FRM. The policies and legislations selected in this study are considered to have a direct and/or indirect effect on the sustainable use of FRM. The selected answers were clustered based on the thematic context and ranked according to the frequency of mentioning. Forestry law[18] and nature conservation legislation[19] clusters are indicated as the most relevant ones, followed by Council Directive 105/99/EC and related FRM law[20]. Forest subsidies and agricultural and rural policy were mentioned less frequently. Other policies/legislations were occasionally listed, including for example hunting regulations, certification standards, urbanization and infrastructure laws. Those were not considered relevant for the purposes of this study.

[18] The forestry law cluster includes national and regional laws related to forest management such as a national forest act or forest strategy, state forest law, regional forest regulation etc.

[19] Nature conservation legislation includes acts and regulations related to nature conservation and environmental matters in the country of interest, e.g. Habitat and Bird Directive, Nature 2000 framework, national biodiversity act, nature conservation act, environmental code/act etc.

[20] Council Directive 105/99/EC and related FRM law includes the Council Directive 105/1999/EC and related FRM laws and policies at the international, national and regional level e.g. national legislation/act on the trade of FRM, Nagoya protocol, national act/law on seed and reproductive material, national rules on the use of local FGR, OECD schemes, etc.

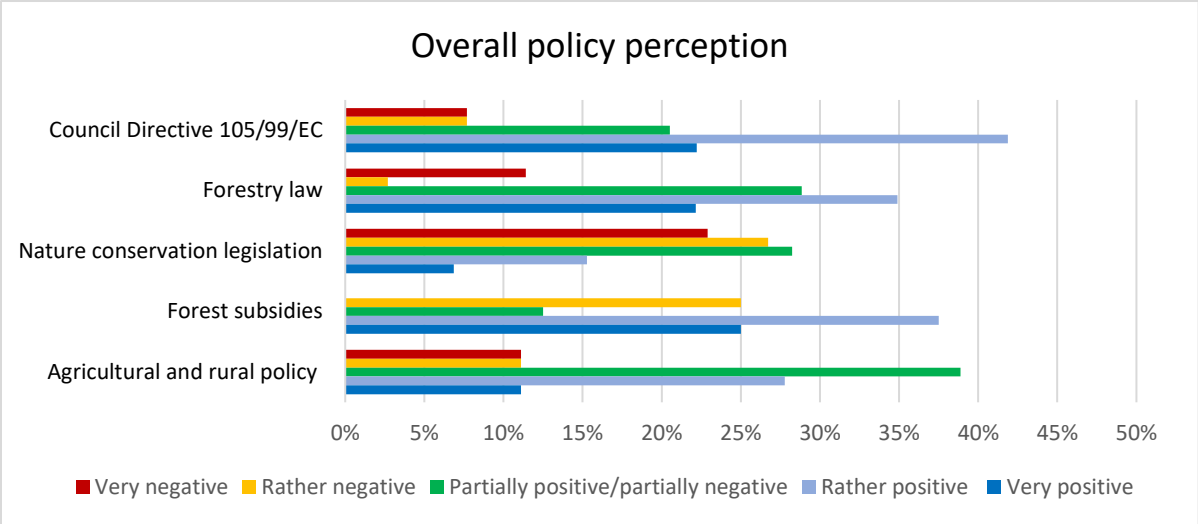

Figure 2 Overall policies perception reported for the most relevant policy/legislation of this study. Data expressed as relative values and extracted from B4EST and GenTree surveys.

In another question, respondents were asked to classify their perceptions for each policy/legislation previously indicated, using a positive and negative scale (see outcomes in Figure 2). Rather positive perception is reported of Council Directive 105/99/EC and related FRM law and forestry law (approx. 40% of relative share). Nature conservation reports the highest "very negative" perception among the main policy clusters (with a relative value of 22%), while overall, in this cluster "partially positive/negative" and "rather negative" observations were dominant. Forest subsidies were perceived "rather positively", and agricultural and rural policy "partially positive and negative" (relative values of 38% and 37% respectively).

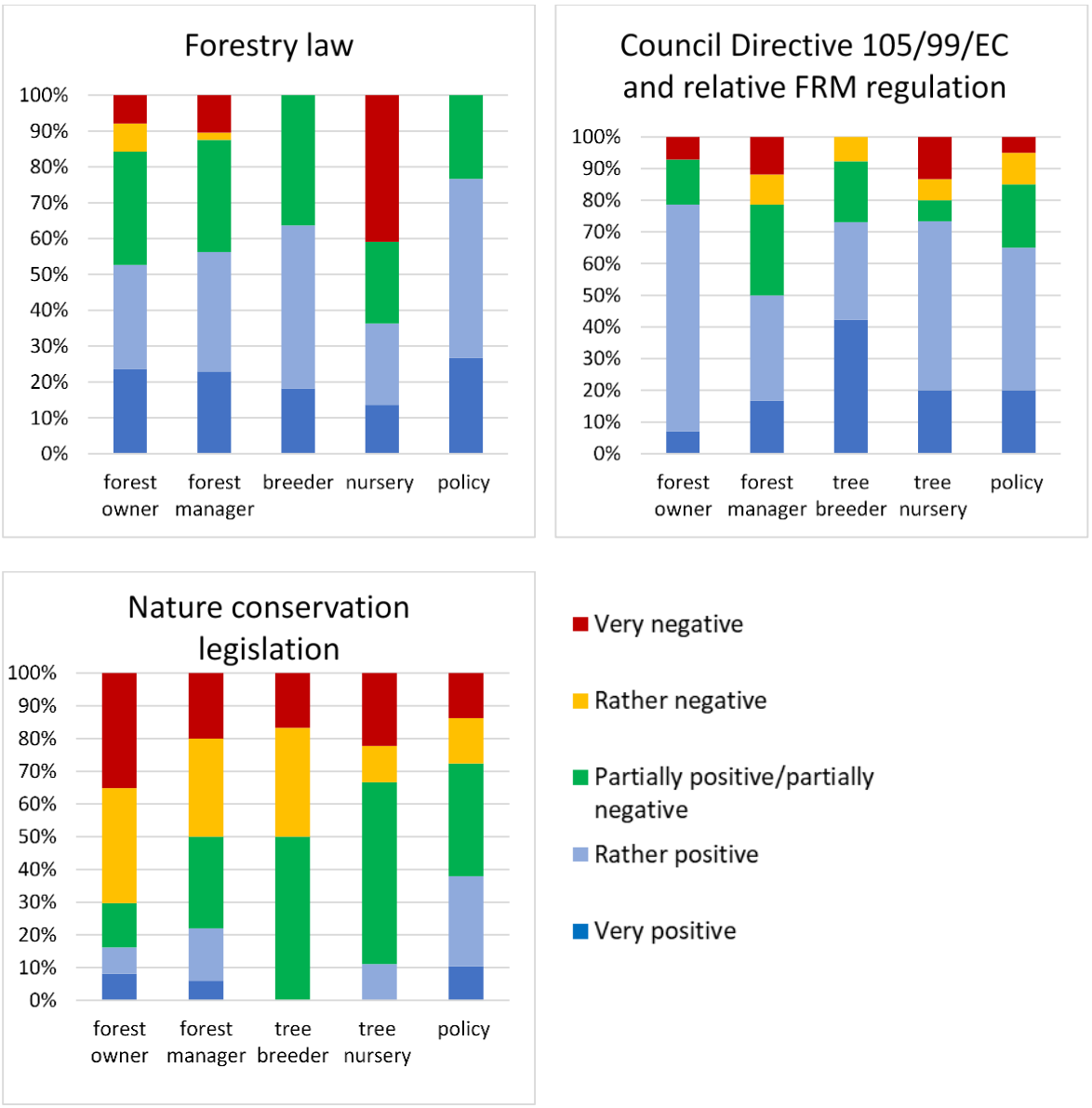

Figure 3: Stakeholder groups perception for the three most mentioned policy and legislation clusters. Data expressed as relative values and extracted from B4EST and GenTree surveys.

A detailed overview of the stakeholder group perceptions for the earlier mentioned three most relevant clusters: forestry law, nature conservation legislation and Council Directive 105/99/EC, is presented in Figure 3. The perception by nurseries differed noticeably from other groups, reporting the highest "very negative" perception for the forestry law policy (relative rate 41%). Meanwhile policy makers, breeders, owners and managers expressed a generally positive opinion for the forestry law cluster. A positive perception of the Council Directive 105/99/EC was predominately expressed by forest owners (more 90% relative value), followed by breeders and the nursery sector (both approx. 70% relative value). A considerable share of negative perceptions for this cluster (more than 10%) was expressed by tree nursery respondents. The perceptions on the nature conservation cluster vary among stakeholder groups; owners, managers and breeders expressed negative views, with relative values equal or major to the 50% relative rate. A more positive perception of for the nature conservation cluster characterized policy and tree nursery groups (approx. 70% relative rate). Policy

makers and forest owners showed very contrasting perceptions, dominated by positive and partially positive/negative classes for policy makers and by negative ones for forest owners.

The next question posed in the survey assessed the impact of policies (e.g. regulations and subsidies) on the respondents' work, compared to other factors (e.g. markets, forest management practices, and extreme weather events), using a scale from very strong to weak (Figure 4). Forest owners, forest managers, policy and tree nursery classified the overall impact of policies as "strong". Meanwhile, tree breeders reported a "medium" level as dominant response. The only stakeholder groups with a noticeable share of responses indicating only weak policy impacts were forest owners and forest managers (25% and 14% respectively), but also for these stakeholders the majority of responses suggested strong or very strong impacts. That is, the general perception seems to be that policies, in comparison with other factors, have a high importance on the respondents' work.

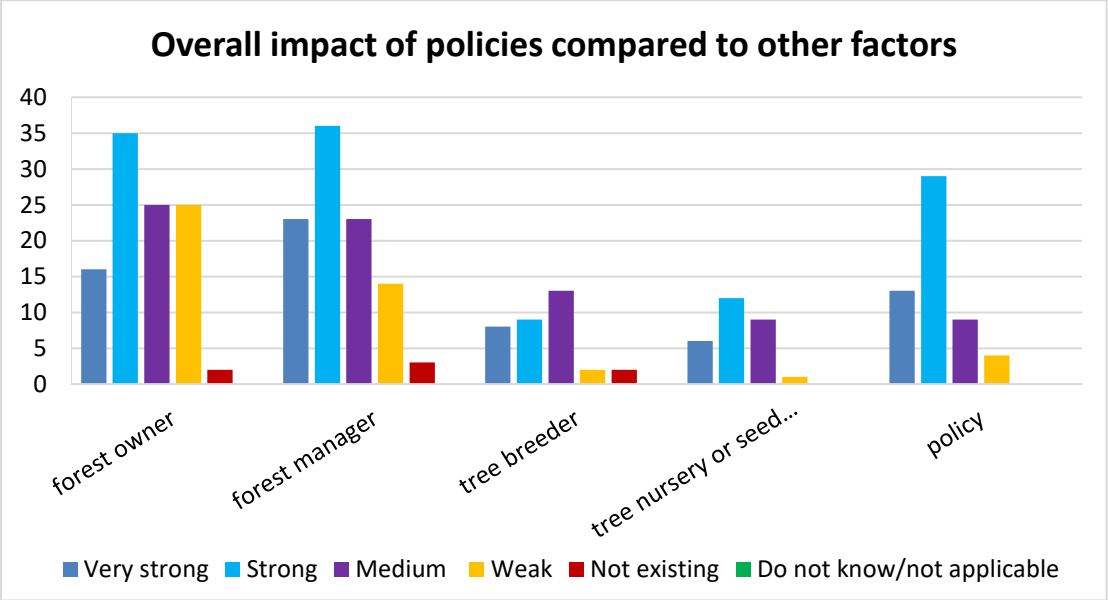

Figure 4: Overall impact of policies compared to other factors. Absolute values extracted from GenTree and B4EST surveys.

A set of specific questions were then posed to forest owners and managers to investigate about specific aspects such as for example forest management practices and the occurrence of extreme weather events. The most common management regime practiced by the respondents corresponded to a medium level[21], that implies combined objective multifunctional management. The choice of forest reproductive material in the case of artificial regeneration methods (for conifers and broadleaves), expressed by both respondents' groups, focused mostly on the quality aspects (e.g. best provenance. They also reported that a proper choice of forest reproductive material can help mitigating potential future threats (responses with relative values > 90 % respectively). Forest owners perceived pests and diseases as main threats followed by droughts and windstorms. Meanwhile, forest

[21] Medium level REFERS TO "Combined objective forestry"/"site adapted forestry". This type of forest management is an approach that assumes that various objectives can be combined in a manner that satisfies diverse needs. Generally, both economic and ecological concerns play a major role in this type of management. Aside from timber production, additional objectives can include habitat, water, and soil protection; mushroom production; game management and nature protection.

managers appointed pests and diseases as main natural disturbance, followed by drought and windstorm events.

The impact of EU legislation on stakeholders' work was also assessed with a classification on a scale from very strong to weak (Figure 5). Tree nursery, owner and manager opinions expressed a "medium" impact, while policy reported a "strong" one. Tree breeders had equal level for the "medium" and "weak" classes.

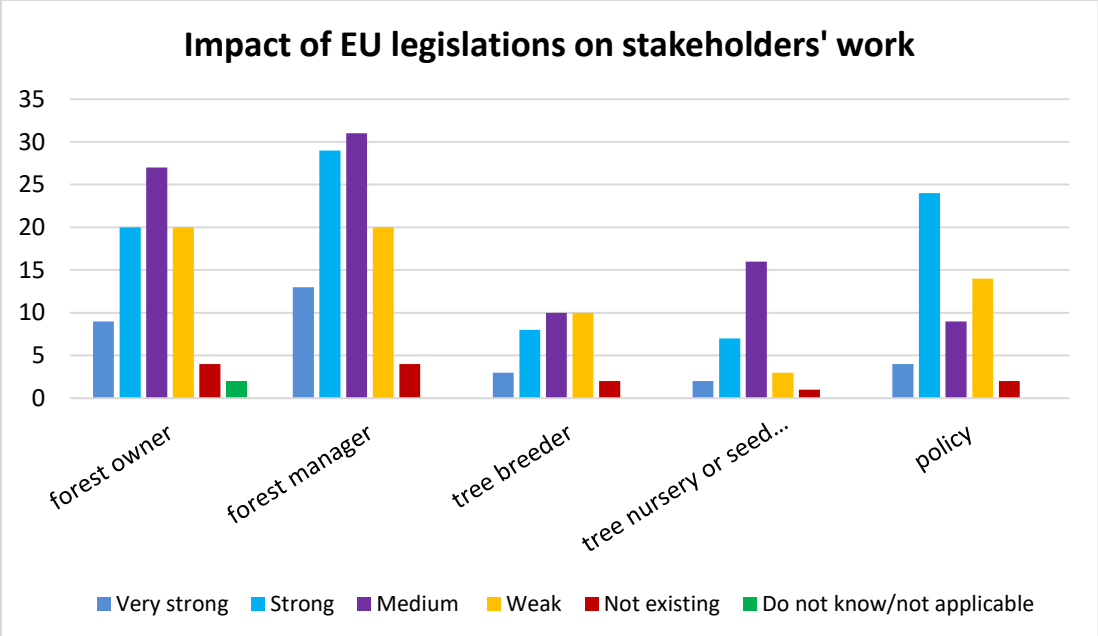

Figure 5: Impact of EU legislation on stakeholders' work. Absolute values extracted from the GenTree and B4EST surveys.

Specific questions posed to the nursery and breeder groups tried to reveal if gaps in the regulations are affecting the working activities, and if regulatory measures at the EU and national level constrain stakeholder activities.

The nursery's responses presented a balanced split between positive and negative choices for both questions. Individual responses included specific statements, for example "We want a better Communication and understanding for breeding at the Swedish forest agency. The number of clones we can use in a clone mix isn't evaluated and determined. We need regulations that gives us possibilities to act on the same forest plant market as other countries with less restrictions for chemical use in their nurseries" (quote by a nursery from Sweden). Another answer from Spain highlighted the complexity in the choice and use of FRM, and related implications for the legal and research aspects.

Tree breeders were asked in specific to express the degree of constraint on their working activities related to existing regulations (i.e. choose between high, some, little degrees or absence). The outcomes report the same response rates for the "little" and "some" degree levels. Specific individual answers underlined the presence of a low amount of resources allocated to forest selection (i.e.

genetic improvement considered/seeing negatively), and the absence of a proactive policy promoting forest production, harvesting and timber use (respondent from France[22]).

The managers and owners reported both positive and negative responses regarding the presence of gaps in the regulations which are affecting the working activities**.** In detail, a respondent from Lithuania specified that the climate zoning technique within the country seems to be outdated due to climate change. Meanwhile, "[…] mixing native and exotic trees in the same plot would be a preparatory measure to face future challenges […]" is the opinion by Belgian forest owner. "Regulations must focus more on traceability of reproductive material rather than on the technical data for using FRM", was the opinion of a forest owner from France". The Norwegian law was generally considered too strict for the use of foreign processed plant material, as noted by an owner. Those comments by forest owners and managers highlight the presence of obstacles for climate change adaptation in the use of FRM.

4.2 Regional differences in perception of policies

The B4EST regional grouping is based on answers' similarities and geographical borders. The response rates vary among regions and stakeholder groups. Only the three most mentioned groups of policies/legislation, i.e. nature conservation legislation, the Council Directive 105/99/EC and forestry law, are reported in this section.

Note: Some countries of interest for the B4EST project include several ecological and geographical regions within their borders, but the data did not allow to distinguish these regions.

Scandinavia/Nordic region (Norway, Sweden and Finland)

In Scandinavia the Council Directive 1999/105/EC and forestry law reportedly had dominantly positive effects on stakeholders' work activities, meanwhile nature conservation was stated to have a partial positive/negative or rather negative perception (see Figure 6). None of the policies in Scandinavia received a "very negative" vote.

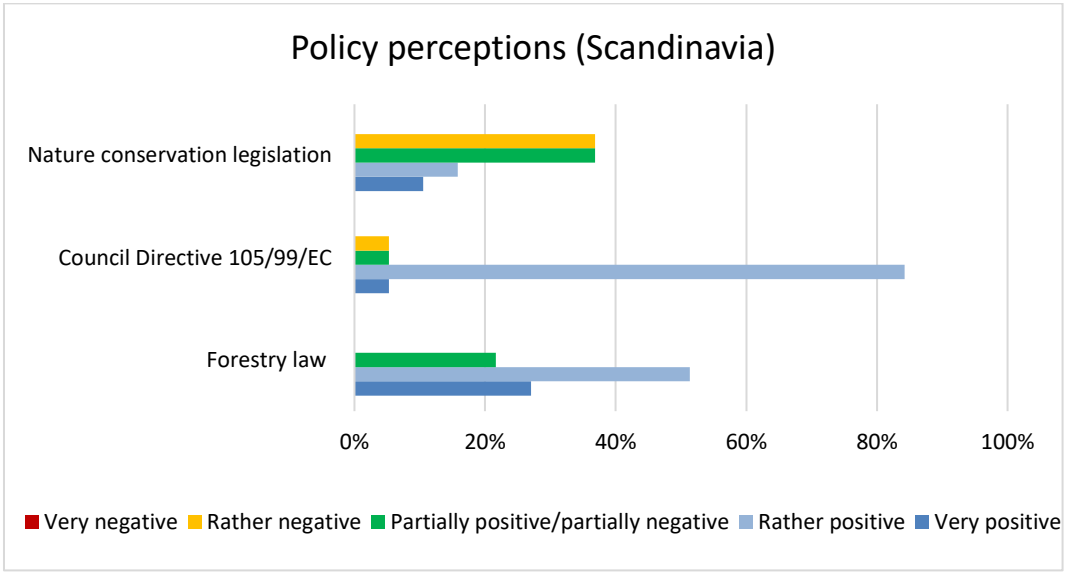

Figure 6: policies perception in Scandinavia/Nordic region (value corresponding to relative percentages).

[22] In this analysis France is the country reporting the highest number of tree breeders.

In detail, respondents from Norway and Sweden often reported the need to promote the introduction of foreign species, as well as to reinforce bio-economy strategies (e.g. to improve effectiveness of the wood industry). Finnish respondents on the one hand highlighted a positive approach related to the national forestry laws focusing on sustainability aspects; on the other hand negative considerations were expressed in relation to the LULUFC and EU policies affecting Finnish forestry (i.e. ownership right is not respected). OECD schemes were stated to reinforce the development of harmonized regulations with trading countries, and the national regulations on FRM guide the national transfer, ensuring climate adaptation and plant health (opinions by Norwegian policy maker and breeder).

North-West region (UK, Ireland, Iceland)

In the North-West region a small number of responses were received and therefore the graphical representation is not reported.

The respondents from these three countries pointed out different limitations. UK respondents highlighted: A) the need to use FRM across borders to support adaptation processes (policy-maker), B) the necessity to improve biological diversity in managed forests, and C) a demand to adopt grant schemes to promote multi-functional forest strategies (by forest owners). The Birds Directive reportedly creates limitations in Iceland, as it creates conflicts and limits the scope of forestry (opinion of a policymaker). Another expressed limiting factor was free grazing as an obstacle for forest regeneration (by manager from Iceland).

Central-East region (Denmark, Germany, Belgium, Netherlands, Austria and Slovenia)

In the Central-East region nature conservation legislations have often been perceived to have negative impact based on stakeholders' personal experience/work. The Council Directive 1999/105/EC was predominantly seen as “rather positive”, and the forestry law cluster was indicated to have “partially positive and negative” impacts.

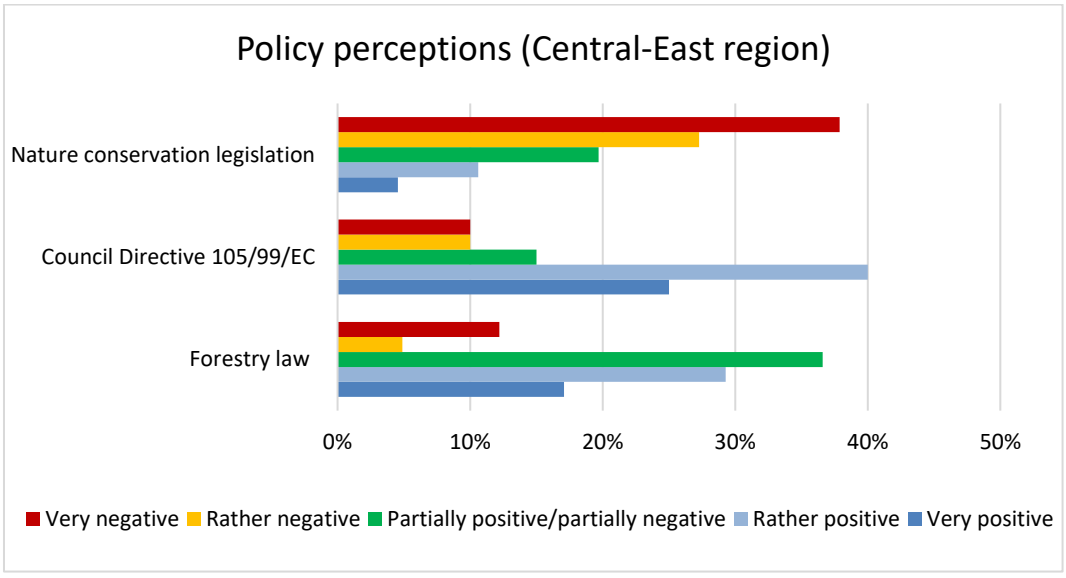

Figure 7: Policy perceptions in Central-East region (expressed as relative percentages).

The promotion of bioeconomy strategies (e.g. towards sustainable wood production) is highlighted by respondents from Austria, Belgium and the Netherlands. Belgium, the Netherlands and Germany

reflect a strong regional power/decentralization. The respondents from Austria (with the highest response rate in this region) indicated a negative perception for the nature conservation legislation (e.g. due to increased costs, bureaucratic burden and lack of compensation guidelines). Tree species selection was stated to be very limited by funding guidelines and conservation policies (expressed by a forest owner from Germany). National forestry legislation sets a framework for the state forestry in Denmark, attention should be given to research and development activities (stated by breeder), while in Slovenia the national laws regulates the choice of species and provenances, as reported by a forest owner.

South-West region (France, Italy, Spain and Portugal)

The impact of nature conservation legislation on stakeholders' work activities received a dominantly rather positive perception, but it is also characterized by the highest negative effects in the region. Council Directive 105/99/EC and forestry law were stated to have a predominately positive effect.

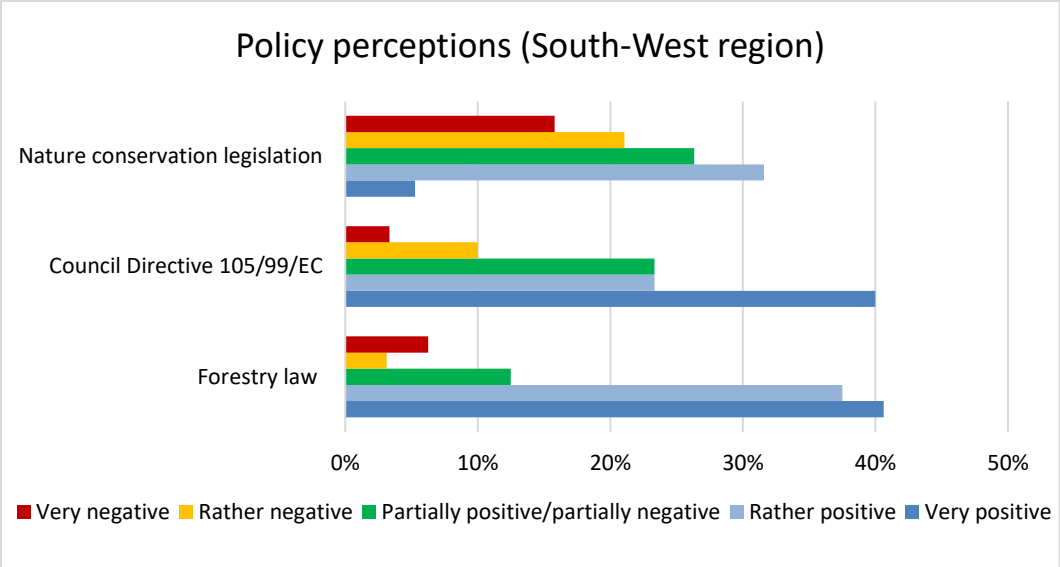

Figure 8: policy perceptions in South-West region (expressed as relative percentages).

Respondents from France, Italy, and Spain highlighted the importance of promoting reforestation practices, and improving the control procedures for the type of genetic material utilized. Nature 2000 framework implies limitations and prohibition to forestry activities with a poor compensation system (by forestry owner from Spain). The Council Directive 105/99/EC harmonizes regulatory practices at the European level which functions as a common market (opinion of a policymaker from France).

The Baltic region plus Poland (Estonia, Latvia and Lithuania plus Poland)

In the Baltic region plus Poland, the impact of nature conservation legislation was perceived rather negative or partially positive/negative values (same response rates). Impacts from the Council Directive 105/99/EC was stated rather positive, meanwhile, forestry law was predominantly perceived very positive. The Council Directive and the forestry law were not reported to present negative impacts influencing the stakeholders' work activities of this region.

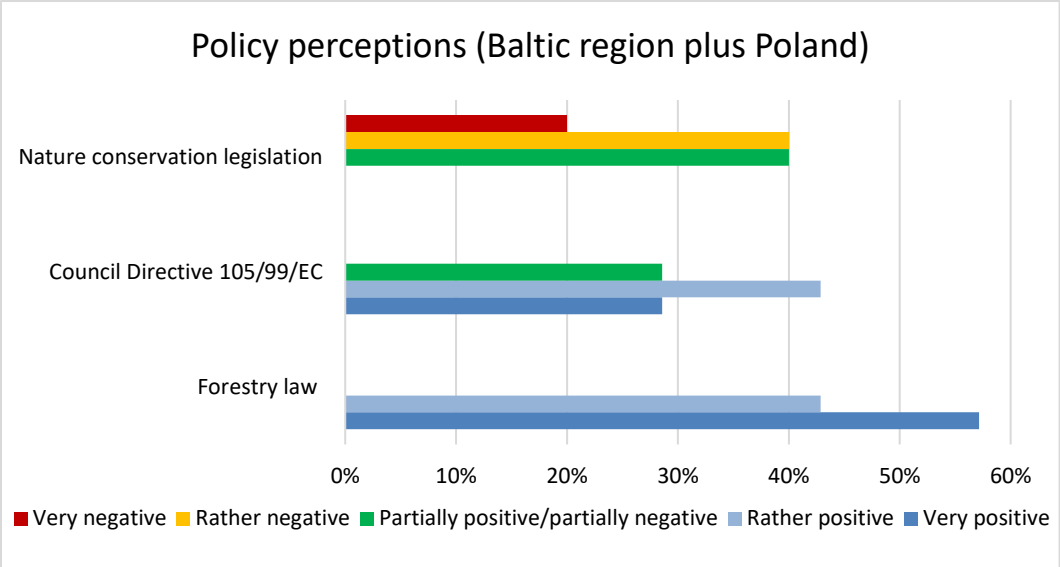

Figure 9: policy perceptions in the Baltic region plus Poland (values espressed in relative percentages).

There was no more detailed argumentation from this region in the open questions.

South-East region (Bulgaria, Bosnia, Croatia, Greece, Hungary, Macedonia, Romania, Serbia)

Nature conservation, Council Directive 105/99/EC, and forestry law policies have commonly rather positive impacts in the South-East region.

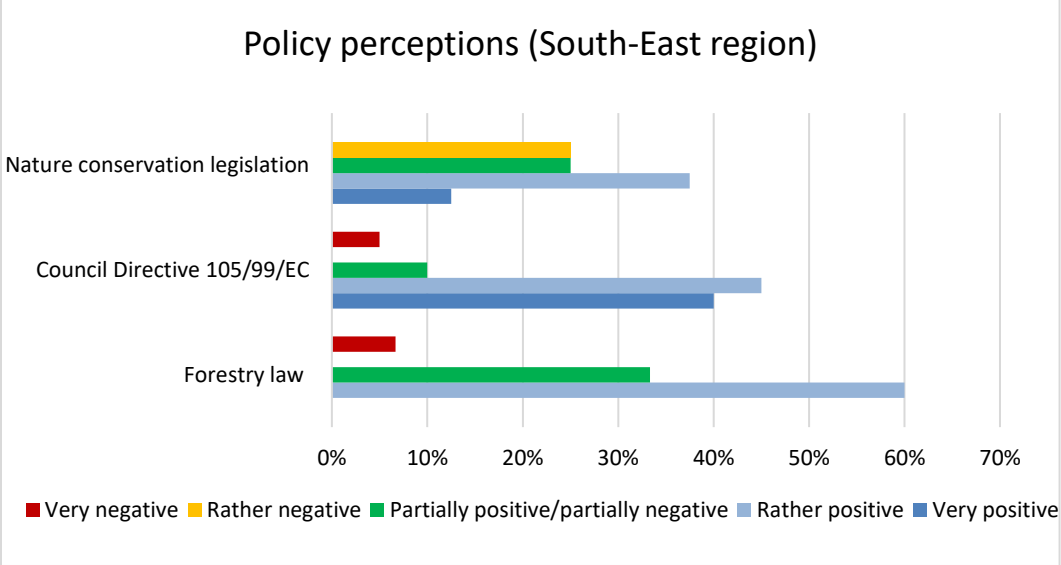

Figure 10: policy perception in the South-East region (value expressed as relative percentages).

There was no more detailed argumentation from this region in the open questions.

Regional comparison of policy perception

The perception of nature conservation policies differed noticeably across regions. Whereas the perception of this policy was very negative or rather negative in the Central-East region, in the Baltic region plus Poland equal rates were expressed for the rather negative and partially positive/negative

classes, and no positive rates. Scandinavia showed dominantly rather positive and partially neg/pos opinions. In the South-West and South-East regions, rather positive perceptions dominated.

The overall perception of Council Directive 105/99/EC was generally rather positive or very positive. Very negative opinions were reported sporadically (with low relative percentage) by respondents from the South-East, South-West and Central-West regions.

Forestry law also had generally a positive perception. It ranged from predominately very positive in the South-West and Baltic region plus Poland, over rather positive in Scandinavia and the South-East region, to prevailing partially positive/negative opinions in the Central-East region. In the Central-East, South-West and South-East low shares of percentages expressed also a very negative perception (negative opinions were absent in Scandinavia and the Baltic region plus Poland).

4.3 National and regional policies that promote the use of local and non-local FRM

In order to assure that also for the future climate the optimal adapted FRM is used, it may be necessary to use material from an origin that presently grows in a climate similar to the one that is projected for the site in the future (assisted migration[23]) or even to change tree species. This means that the regulations concerning the use of FRM should allow these methods. For larger countries assisted migration may be dealt with mainly within the country, except for some border areas, and thus this can be regulated at a national level. For smaller countries it may mean that most of its FRM should be imported from neighboring countries, which may require additional regulations.

A group of specific questions were posed to part of the respondents[24] to investigate the presence of legal or policy instruments in a country/region that: A) promote the use of native or local species, B) that discourage the use of non-local or exotic FRM, and C) that require consideration of the origin of FRM in afforestation/reforestation areas (Table 2).

The survey showed that the presence of regulation that promotes native species was most common and reported by 84% of the respondents. Only 6% reported that such regulation does not exist in the country or region. Regulation that promotes the use of local species was less common than for the use of native species but was nevertheless reported by more than half of the respondents. The opposite type of legislation or policy instruments to discourage the use of exotic or non-local species was reported with somewhat lower frequency (72 % and 37 % relative values, respectively). Nevertheless, it is noteworthy that two/thirds of statements did report discouragement of exotic species, so this affected a clear majority of cases. However, it should be noted that the variable representation per country may have affected the relative importance of such legislation and policy instruments, as only few responses were collected for example from the UK and Ireland, i.e. from countries with a strong history in planting exotic tree species. Policies or legislations regulating the origin of FRM for afforestation and reforestation activities was widespread and reported by 59% of the responses.

[23] Assisted migration is an important method to mitigate climate change. It is the transfer of material from its original area to an area where the expected future climate may be similar to that of its original area (Aitken and Bemmels, 2016).

[24] These questions were asked only to policymakers in the GenTree survey, whereas in the B4EST survey, all targeted stakeholder groups were addressed (a total of 94 responses were received).

Table 2: Summary of questions which investigate the promotion or not of local and non-local FRM. Data extracted from the GenTree and B4EST surveys.

Questions: "Are there legal or policy instruments in your country/region that promote […]"	**Yes (relative %)**	**No (relative %)**	**Do not know (relative %)**
Use native	84	6	10
Use local	51	34	15
Discourage use exotic	72	24	4
Discourage use non-local	37	59	4
Consideration of the origin FRM for afforestation and reforestation	65	18	17

Table 2 clearly shows that there is an overall preference for using native and/or local FRM and that the use of non-local and exotic material is widely discouraged. This may thus hinder climate change adaptation through using assisted migration. It also has consequences for the development of the decision support tools in B4EST for choosing the optimal source of FRM. The tools must include the possible limitations caused by the regulations. This may be especially difficult when validating the tools for larger regions, including more than one country.

4.4 Survey responses interpretation related to regulation of FRM use and management

Policy and legislation limitations/gaps related to FRM related policies

In the part of the survey with open questions, stakeholders were asked: "In your opinion, how do you think the listed legislation affects your work?" In the following we present responses that are relevant to the B4EST project.

The perceived negative/rather negative impact of nature conservation legislation in several regions was reported already in section 4.2. Several responses showed that the Natura 2000 framework[25] influence on stakeholders' activities was perceived as causing excessive constraints, especially for forest owners and managers. The stated reasons include high bureaucratic burden and increasing costs (respondents from France, Croatia, and Austria). Another opinion with high relevance for the B4EST was raised by an interviewee from France, stating that the Habitat Directive is "obsolete" because it prohibits the use of new species or species from different origins, which are seen as a necessity under climate change. This stresses the fact that FRM choices can be constrained by national and regional nature conservation legislation, and consequently preventing opportunities to select better adapted FRM for already altered and projected further changes in climatic conditions. Considering the wide influence this directive seems to have on the use of FRM, it may be a surprise that this was brought up only once. However, similar concerns were reported by breeders from Latvia and Hungary, who reported that the forestry law may include limitations in selecting the most suitable tree species and constraining the use of improved material and decisions on the regeneration choices. These

[25] Natura 2000 is the European binding framework on protected areas. It aims to ensure long-term survival of the Europe's most valuable and threatened habitats and species, listed under the Bird and Habitat Directives (European Commission, 2020) Natura 2000 official website.

constraints limit climate adaptation and mitigation measures unduly and regulations should instead be based on stand conditions, adaptation purposes and resilience principles.

In the South-West region statements underlined that the lack of control in the plant production and use may diminish the transparency of the sector and that improved legislation is desirable to regulate the trade and control for the correct use of FGR through the nursery supply chain (nursery from Spain and breeders from Italy). Moreover, it was stated that lacking rigor in pest and disease control puts production at risk (nursery from Spain). The Nagoya protocol is indicated as a well-structured framework but having a complex reviewing process, and hindering exchanges of genetic resources between improvement programs (by a breeder from France). In fact, the Nagoya protocol should not prevent the use of foreign genetic resources in breeding, but it may come with additional administrative burden. This was exemplified by a nursery respondent from Sweden who stated that the development of plant passports creates administrative burdens for forest plant producers.

Needs for changes in policy and legislation affecting stakeholders' work activities

Below are highlighted the main policy and legislation needs reported by stakeholders in the question "Please describe shortly where (and how) you see the biggest need for change and/or adaptation about policies affecting your work".

Several stakeholders from multiple countries underlined the necessity to adopt and reinforce common adaptation and mitigation measures; such as A) improve and modernize the use and transfer of FRM (by a breeder from Norway), B) the unification of the region of origins across borders and breeding zones (by a manager from Austria), C) and also the need to use genetic material across borders within species to support adaptation to climate change (by policymaker from the UK).

In relation to assisted migration practices and regulations, on one hand assisted migration is promoted in few cases by France and Sweden, aiming at enhanced adaptation to climate change, species survival and to establish mixed species plantations (by owner and policy stakeholders). On the other hand, some reluctance was reported for example from Sweden and Poland, stating that assisted migration was difficult to put in place due to limited resources availability.

In the South-West region as well as in Bulgaria and Belgium, national, regional or state authorities do not support the establishment of plantation, afforestation and reforestation areas (reported by nursery, breeder, policy maker, manager). As shown in Table 2, the planting of foreign species is not encouraged in several countries and a policy maker from France stated a strong political will against this. In contrast, nursery and breeder responses stated the need to include this practice in the environmental laws, for example (from Germany, Latvia, Portugal and France).

Perceptions' similarities and differences among stakeholder groups

Nursery, breeder and policy maker groups seem to encourage the establishment and control of the FRM utilized for afforestation, reforestation and restoration practices, and called for the design of genetic improvement programs to guarantee sustainable European forests and plantations with sufficient adaptive capacity and high productivity.

Forest owners and managers[26] are quite reluctant towards conservation legislations, stating that those have objectives which are in contrast with sustainable forest management, and do not present clear compensation schemes (by Latvia, Lithuania, Austria). In contrast, the policy and nursery's opinions are quite positive, focusing on the importance of protecting and enhancing biodiversity in forest ecosystems. However, forest owners, managers, breeders and nurseries report a positive perception pattern toward forestry law and Council Directive 105/99/EC and related FRM law. Those policies regulate the use and trade of FRM (in Europe and at the national level), promote sustainable forest management, and guarantee the supply of FRM within the European and national economic framework. Nursery respondents had more negative perception expressed for the Council Directive 105/99/EC compared to the other stakeholders. It could probably be related to the statements which highlighted the need to develop recommendations for the use of FRM from non-local provenances for adaptation and mitigation purposes.

Note: the distinctive negative perception for the forestry law cluster by nurseries was not supported with open statements to articulate and discuss this pattern.

5 On-line decision support tools to choose the most optimal origin of FRM

Scots pine Planter's guide (PG) is a decision support web tool for selecting Swedish and Finnish forest regeneration material for a given location in either of the countries and can be seen as a common platform where commercial seed sources of Scots pine in Sweden and Finland can be compared. The common Swedish /Finnish version tool has been available online since September 2019[27] . The development of Planters guide was based on a long-standing collaboration between Swedish and Finnish tree breeders and climate scientists, with the aim of developing for both countries common Scots pine transfer models (Mats Berlin et al. 2016). The regeneration material is ranked according to a performance index that combines survival and growth into an estimate of area production over a rotation. The deployment zones for the seed orchards are shown as maps delimited by both biological transfer limits and national legislations. The climate data used in PG are based on information from climate scenarios, which makes it possible to predict the performance of seed sources in simulated future climates. Prior to the introduction of PG, the Finnish Scots pine transfer recommendations were revised based on the report of Ruotsalainen et al. 2016 and the new transfer legislations were implemented in the spring of 2017[28]. With this legislation in place, Swedish Scots pine FRM can be used in Finland. However, for Finnish Scots pine FRM to be allowed for use in Sweden, they must be assigned a standardized latitudinal origin according to methods required by the Swedish Forestry Board (SFB). Skogforsk has therefore asked SFB to provide a formal approval of the methods used in PG, enabling the use of Finnish FRM in Sweden. Additionally, to make the Swedish and Finnish seed sources comparable in PG, common standards for definitions and methods of calculation of gain predictions etc. were developed (Berlin et al., 2019).

[26] The majority of responses collected are from Austria, therefore the dominant negative perception and opinions might be biased as limited to a specific country.

[27] https://www.skogforsk.se/english/products-and-events/software/planters-guide-pine/

[28] https://www.ruokavirasto.fi/sv/odlare/vaxtproduktion/fro--och-plantproduktion-av-skogstrad/frokalla/anvandningsomraden/grunder-for-tallfroplantagernas-anvandningsomraden/).

Within WP 4 of B4EST the aim is to expand the Planters guide to Norway spruce, not only for Sweden and Finland, but also including Norway and possibly the Baltic countries. It will also be investigated if and under what conditions similar decision support tools could be developed for other tree species in other European regions.

In WP 1 of B4EST[29], with additional support from the UK Forestry Commission, a so-called Climate Matching Tool[30] has been developed for selecting forest reproductive material suited to current and future climates to maintain forest resilience. The tool provides a visualization of regions with a similar climate to the climate projection for any location in Europe. It gives an indication of the climate that trees are likely to experience in the future. This can help forestry practitioners understand future climate conditions for forests in Europe and to consider the selection of better suited material from environments that their region may experience in the future (the tool was described in the confidential deliverable D1.1).

6 Discussion and Conclusions

The results of earlier surveys by EUFORGEN and the GenTree project have shown that there is still large variation in the regulations, especially between countries, that affect the use of improved FRM in Europe. Another, maybe somewhat surprising, outcome was that there are several regulations, both national and international, that although they do not directly address the use of FRM still seem to have large effect on it. Especially regulations concerning nature conservation may have a rather large effect which stakeholders often percept as negative. It should also be noticed that the regulations and policies are almost always regarding FRM in general, and rarely make a distinction between improved and unimproved FRM. Only the EU and OECD regulations on the marketing of FRM are exceptions.

Two important measures to mitigate forests and forestry to climate change involve the use of better adapted FRM, assisted migration and the introduction of new tree species to certain areas. However, the surveys revealed that often national and/or regional policies only promote the use of native and local FRM and discourages the use of non-local and exotic material. Several stakeholders from multiple countries expressed the necessity to adopt and reinforce common adaptation and mitigation measures, promoting the use of (improved) FRM across borders to support adaptation to climate change. One could argue that improved FRM should be preferred for cross border transfers, because it should be more reliable due to testing and selection and because the origin is well-known. Because of the common goal of sustainable forestry in a changing climate and because of the need for cross-border transfers of FRM, a broader international attempt to come to common regulations is needed.

Forest owners and managers, but also nurseries have a need for guidelines and regulations to find the optimal balance between wood production and the request for conservation of the biodiversity (including genetic diversity) when choosing the most optimal FRM. Decision support tools, such as Planters Guide, should be developed further for other regions and tree species to choose the optimal FRM for the area of interest that take into account regional and national regulations concerning biodiversity or other environmental aspects.

[29] http://b4est.eu/climate-matching-tool-to-help-forestry-practitioners-understand-how-the-climate-will-change-over-time-across-europe#post-1155
[30] https://www.forestresearch.gov.uk/tools-and-resources/climate-matching-tool/

7 Dissemination plan

The results and outcome of this deliverable will be integrated in the upcoming work in developing deployment guidelines and decision support tools (in particular D4.6, D4.8, D4.9) but also in both EU-level and national policy briefs under development in the B4EST-project.

8 Partners involved in the work

Skogforsk, Luke and EFI.

9 Acknowledgements

We would like to thank the GenTree project (Horizon 2020 research and innovation programme under grant agreement No 676876) consortium for allowing us to use the results from their survey for further analyses for this deliverable and the EUFORGEN network for allowing us to include the results from their 2012 “Survey on Forest Reproductive Material in European countries – legal framework, guidelines & recommendations” to assess legislations at national level.

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Annex 1. Survey on Forest Reproductive Material in European countries – legal framework, guidelines & recommendations

This table was initiated by EUFORGEN and shows the outcome of the EUFORGEN 2012 survey per country. The table is a draft version because so far it has not been finalized or published by EUFORGEN. For this reason, this table may only be used within the B4EST project.

Member states	Legal framework				Guidelines & recommendations
	a) additional controls or limitations 1. Additional limitations regarding the production of FRM (basic material, collection, breeding, controls…) 2. Additional controls regarding the commercialization of FRM	**b) minimal diversity criteria** 1. Number of trees to be collected in seed stands 2. Other …	**c) national regulations of use of FRM in the forest** 1. Limitations regarding the use of species and/or provenances in the forest 2. Limitations regarding the transfer of species and/or provenances 3. Other…	**d) national or regional regulations regarding subsidies**	1. Transfer of species or provenances 2. Use of species by ecological regions 3. Use of provenances by ecological regions 4. Other…
Belgium	**Wallonia** : No additional limitations, but only the implementation of the articles 8 and 17 § 4 of the directive authorising Member States for some limitations a) Admission of basic material and the commercialization to the end user of the category "source identified" is not permitted for 20 species of high sylvicultural importance (*Fagus sylvatica, Quercus sp,Picea abies,*	1. Seeds must be collected from at least a minimum of 20 trees well spread in the stand. Derogation may be granted for some specific cases. Specific trees to be collected could be imposed by the official control body or its delegate.	The forest Act of 2008 requires the plantation of well adapted species to site conditions in accordance with an official ecological guide ("Fichier écologique des essences"). This guide includes also the necessity to use a provenance recommended for afforestation in the Walloon territory. This document is called « Dictionary of provenances recommended for sylviculture ». It is established on the basis of ecological similitudes or sylvicultural and genetic trials.	No information	Recommendations are provided by publication of the « Dictionary of recommended provenances for sylviculture ». It is also available on the website of the public Forest Tree Seed Center of the Department of Nature and Forests. Since 1996, this institution gives advices to all foresters and nurseries on forest genetic topics in order to promote the right use of FRM in the long term perspective of sustainable forest management taking into account global climatic changes.

	Pseudotusuga menziesisi, ...). b) Two species (*Sorbus torminalis* and *Thuja plicata*) are added to the list of species concerned by the EU rules on the Walloon territory.		There are also restrictions or prohibitions for the use of exotic species in Natura 2000 sites.		
Bulgaria	1. Higher and more precise requirements for trees and stands for grade of site quality, adaptability etc. The minimal area and minimal age for seed-production stands are defined for 7 conifers and 20 deciduous tree species. Stand density is to be reduced to 0.5-0.6 for light-demanding, and to 0.6-0.7 for shade-bearing species. 2. Control is carried out at three different levels. At national level by the Executive Forest Agency, at regional level by the Regional Forest Office, and at local level by the respective State Forestry. Additional control is implemented by the Forest Seed Control Stations in their respective region of work.	1. Tentative recommendations included in the new project of Instruction for Forest Seed Production (Ministry of Agriculture, 2012). Collection of reproductive materials intended for trade from basic units of categories “selected”, “qualified”, and “tested” is accomplished from a minimum of 20 trees, and for rare tree species or in cases when the area of the source is smaller than 1 ha, from a minimum of 5 trees distributed in different parts of the approved basic source. 2. According to established practice in Bulgaria, one provenance is represented from 5-10 up to 25-30 mother individuals that are separated by distances from 20 up to 100 m.	1. Limitations for the use of FRM in the forest are determined by “The list of tree and shrub species used for afforestation”, which includes 76 indigenous and 44 introduced species (Ministry of Agriculture, 2009, Instruction №2, State Gazette No 15/24 Feb. 2009). 2. Additional documents concerning the place of utilization and regions for transfer of FRM are as follows: - Scheme on the use of FRM produced in Bulgaria from sources of categories "identified" and "selected", depending on their provenance. - Rules and specific exceptions for transfer of FRM into and between regions of provenance.	No information	Regulations, instructions, classification schemes etc. regarding the transfer and the use of species and provenances by ecological regions were developed on the base of a series of scientific and applied studies carried out by the Forest Research Institute in Sofia and Forestry and Technical University. In 2011, a comprehensive material for the state of forest genetic resources in Bulgaria was developed by the Forest Research Institute in Sofia.

			- Map of the regions of provenance in Bulgaria. 3. The share of Bulgarian and Balkan endemic forest tree and shrub species towards total number of native species is 7.3%. Parts of endemic species are included in the list of forest tree and shrub species that are used for afforestation in Bulgaria e.g. *Pinus peuce Griseb.* Macedonian (Balkan) pine. This pine is a relict and endemic species as well as the most valuable conifer species of the Balkans.		
Croatia	No additional controls or limitations	1. For category "Source identified" and very rare species or group of trees: minimum of 25 flowering /seed trees. For category "Selected": minimum of 50 flowering seed trees. For category "Qualified": a) minimum of 20 clones for clonal seed orchard but recommendation is 50 clones and minimum of 10 ramets per clone for the clonal seed orchard; b) minimum of 30 plants (half-sib or full-sib progenies per clone/hybrid	Limitations regarding the transfer of provenances according to the delineation of forests into eco-geographic seed region and zones for the 16 economically valuable species. Private forest owners must also follow the rules and limitations regarding the transfer of provenances.	No information	There are no specially developed guidelines, only maps of seed regions and legal obligations for the use of FRM according to the Ordinance (Region of Provenances) for the main forest tree species.

		combination) for seedling seed orchard.			
Cyprus	No additional controls or limitations	Only one category of FRM is used, the "Source Identified". Cones and seeds are collected from a large number of trees, well distributed within the area. Ex-situ plantations have been established for conservation and seed production purposes of the most important species. At least 100 families represent each plantation. Natural regeneration is preferable and promoted in natural forests.	There is national legislation and policy regarding FRM. There are limitations regarding the transfer FRM among eco-geographic regions for the most important forest species. Exotic species are not used in natural forests. Exotic invasive species have been determined and they are not produced in forest nurseries.	Rural Development Plan, of 2007–2013, includes funding for afforestation / reforestation activities. The funding is eligible only if the FRM follows the national legislation/policy.	Principles in using FRM are included in Forest Policy which is available on the website of the Department of Forests. Recommendation and Guidance in using FRM for private owners is provided by the local forest officers of the Department of Forests.
Denmark	No additional controls or limitations	Selected FRM seeds must be collected from a	No limitations.	Based on the results from provenance trials and growing experiences, the	Guidelines through the web portal www.plantevalg.dk. Entering geographical position,

		minimum of 50 individuals per seed stand.		University of Copenhagen has made a 'positive list'.	planting site conditions and planting purpose the system generates a list of species and provenance recommendations. Furthermore, guidelines promoting and motivating use of genetic diverse FMR in close to nature forestry has been developed.
Estonia	i. No additional requirements ii. No additional controls	i. No ii. Not allowed to use seeds from seed orchards where less than 10 clones in the composition	i. The Forest Act regulates the delineation of provenance regions for Pinus sylvestris and Picea abies as well as the use of different provenances in Estonia. There is also a list of introduced species allowed to use in the forest as well a list of native tree species allowed to use for reforestation by different site types. ii. It's allowed to transfer only *Pinus sylvestris* and *Picea abies* FRM (for forestry use); FRM from other species, including introduced tree species, shall be originate from Estonia.	No	There are no guidelines or recommendations. Use and transfer is strictly regulated by law.
Finland	i. No additional requirements ii. No additional controls	ii. The minimum number of clones in a seed orchard is an important consideration by lower level regulations (not legal framework in strict sense).	The Forest Act (which is currently under revision) lists the species to be used. Native species are used with two exotic exceptions, namely *Larix sibirica*	No subsidies guiding the use of FRM. However, there is a support mechanism for private forest owners, providing state funding for re-	Recommendations for seed orchard material: specific utilisation area for each seed orchard. Recommendations for

		Also for clonal material there are guidelines for the number of clones in a commercial mixture, depending on the level of tests behind the material. The total maximum number of replicates of a clone is also regulated.	(close to native) and *Populus tremula x tremuloides*. The act states that the geographic area of origin and other characteristics of the used material must be suitable for the regeneration area in question.	regeneration in cases where forest regeneration has failed due to some unpredictable reason, not dependent on the forest owner's acting and if the material used was recommended for the site conditions.	transfer (distances, south-north consideration) of stand seed.
France	1. Production: 5 species and 3 hybrids were added to the annex 1 list of directive 99/105. Identified category basic material is only authorized for 32 species (59 regulated). Specific national rules for approval of basic material to the national register. A national regulation defines minimum requirements for seeds and seedlings. Specific national rules for seed harvests in seed sources. 2. Marketing: Trade of identified category FRM is forbidden in France for 20 species. Marketing of some iberic pinus pinaster provenances	1. Guidelines, but no regulation on a minimal number of trees to be collected. 2. Evaluation of each seed orchard's harvests: obligation to get harvests with good representation of the seed orchard's diversity.	. Sustainable forest management guidelines impose that forest management plans shall include FRM according to official national recommendations (species, provenances, seed orchards) 2. Possible transfers of species and provenances are authorized by means of regional administrative orders that have to be taken in account into the management plans. No obligation for forests without management plan and/or subsidies.	All forest subsidies dealing with sowing or planting FRM have to compel with FRM regional administrative orders that define the authorized FRM, in some cases for each sub regional area. More information at: http://agriculture.gouv.fr/graines-plants-forestiers and http://agriculture.gouv.fr/gestion-durable	- Guidelines for transfer follow the principle of "the local region of provenance is best" and if material is not available, the closest region of provenance is next best. Other FRM may be chosen based on common garden results, detailed in the "National guidelines for FRM use" registrar for nearly 50 species, and available at: http://agriculture.gouv.fr/Conseils-d-utilisation-des 2- National and regional forest management guidelines are based on ecological region delineation. The recommendations on the use of species are grounded on autecology, national and regional soil, climate and genetic information.

	is note authorized in France (out of the Mediterranean region				
Germany	i. Commercialization of basic material of the category “source identified” for forest purposes is not permitted. ii. Voluntary additional control and certification systems (ZüF, FfV) for FRM based on reference samples and genetic controls; organized on a private basis	i. Generally minimum 20 trees have to be harvested per harvest unit. In special situation (border of the natural distribution range) this number can be reduced to 10 for some species (e.g. Abies alba, Acer pseudoplatanus). In seed orchards minimum 20 clones have to be harvested. The total maximum number of replicates of a clone is not regulated. ii. the minimum age of a stand at the moment of approval as basic material is regulated depending on the species. Regulated is also the number of mature trees in a stand and the minimum reduced surface of a basic unit (0,25 ha) .	No limitations	In nearly all federal states provenance recommendations are binding for EU or state funding.	Recommendations (guidelines) for the use of provenances by provenance regions. Guidelines are regional (every land or federal state has his own guidelines).
Greece	1. Basic FRM for 23 coniferous species and 44 broadleaved species is handled and transported by the National Seed Store. 2. For collection and transportation (import or export) of FRM control	. The minimum surface of the seed stands identified as 'selected' is regulated. For coniferous species the surface should be ≥ 4-5 ha and for broadleaved species ≥ 1-2 ha. Isolation	.In the case of reforestation the use of local FRM is required. 2. In the case of natural disaster and elimination of the local autochthonous population, FRM of the best well-adapted	According to the EU Directives.	Use of local, autochthonous FRM is recommended. 2. In case of necessity to use non local FRM, it is recommended that the FRM of the nearest provenance is used or of provenance that has been

	and inspection is carried out by the Forest Service. Protocols/certificates of inspection and origin of FRM are issued. 3. For production or marketing of FRM a license should be issued by the Ministry Agriculture and Rural Development (Ministerial Decision 60308/224/95)	zone should be at least 100m. 2. From seed stands characterized as ' source identified' seeds should be collected from 10-15 mother trees well spread in the stand	provenance should be used. 3. In Natural Parks and other forest protected areas only the use of local autochthonous FRM is permitted. 4. Use of exotic species should be approved by the Forest Service and the Ministry of Environment. 5. No use of Genetically Modified FRM		evaluated for adaptation in the local conditions.
Hungary	1.a. There are 15 additional tree species/genus listed in Annex 1. of 110/2003 (X. 21.) FVM Ministerial Decree to be inspected and certified as required by 1999/105/EC Council Directive. 1.b. The use of FRM of *Robinia pseudoacacia* and *Pinus sylvestris* in category "source identified" is generally prohibited in Hungary. 2.a. Annual control/inspection, as a minimum requirement, of all the nurseries and basic materials in category Qualified and Tested is mandatory.	1. No criteria required by national legislation. 2.a. The minimum size and minimum age of basic materials (seed stands) are prescribed by tree species/genus as specified in Annex 5. of the 110/2003. (X.21.) FVM Min. Decree. 2.b. The minimum isolation distance, minimum size and number of clones/genotypes/families (at least 30 genotypes) used in (clonal or seedling) seed orchards are prescribed in Annex 5. of the 110/2003. (X.21.) FVM Min. Decree.	1. Generally, there is no limitation/regulation for FRM. Exotic tree species are not allowed to use in forests on protected areas (national parks, Natura 2000 etc.) as prescribed by the Act for nature protection. 2. No limitation/regulation. 3. There are recommendations listed in Annex 2. of 110/2003 (X. 21.) FVM Ministerial Decree and detailed in the final column.	There are no genetic limitations regarding use of FRM in the forest. In case of afforestation only the tree species (beech, sessile oak, hybrid poplar etc.) and minimum number of trees are prescribed but no specification for any category / provenance / variety of the species. In all cases the afforestation shall be granted if the prescribed trees are existing in a minimum number on the area	1-3. In case of imported FRM there are recommendations for Hungary (Generally, the country as one region of ‚provenance') listed in Annex 2 of 110/2003 (X. 21.) FVM Ministerial Decree - to use of FRM specified by provenances of conifers which have already been tested in Hungary - to use of FRM from specified ecological zones in Europe, generally for broadleaves - and generally, not to import and use of FRM from specified ecological zones 4. A general recommendation has been published by National Gene Bank Council to preserve and use of forest genetic resources specified both for the

	2.b. All the transported FRM lots moving between member states, both exported and imported material, shall be (re)inspected by inspectors. The inspections shall be documented by a field protocol issued and additionally the supplier's documents shall be stamped by the inspector.	2.c. Basic material (stool beds) for clones/clonal varieties shall be registered by breeding classes ‚pre-basic', ‚basic' and ‚commercial'. A stool bed in class "commercial" shall be only established by FRM originated from a stool bed in class ‚basic' or ‚pre-basic'. 2.d. Stool beds shall be individually registered and listed on the national List of Basic Materials by its individual register code.			most common and the endangered tree species.
Italy	No additional controls or limitations than those listed in EU directive 105/1999. All issued rules concerning FRG are based on EU directive and adopted .	A minimum of 20 trees, with tolerance for very scattered or rare tree for a minimum of 5 trees chosen in different parts of the approved basic source. For social species it requested to collect to 25-30 mother individuals at distances from 50 up to 100 m.	No limitation in general. Forest clones (included those for biomass production) are also regulated by a specific legislation connected with the Directive 1999/105/CE. Limitation can be considered by the Regions in order to protect valuable local populations. Source identified materials are allowed, but only when fructification is lacking in selected stands and material cans be used in their provenance region only.	Subsidies for plantations can be supplied only if the FRM used are certified and used properly. Controls are done in the field.	Supplied by species according to needs. Regions and research institutions collaborate for that, especially for spreading information and guidelines on legislation, provenance regions and materials.

			OGM are forbidden in most regional legislation documents.		
Lithuania	No additional controls or limitations	Limitations on area of seed stand, but no limitations on number of trees. Seed stand area shall be not less than 3 ha.	Limitations regarding use and transfer of FRM. Seed or planting material transfer is possible only from neighbouring region of provenances of appropriate species.	It is possible to use only native species for forest establishment, except European larch, when applying for public money.	Yes, Department of Forest Genetic Resources within State Forest Service.
Luxembourg	1. Admission of basic material and commercialization to the end user of the category "source identified" is not permitted for *Fagus sylvatica, Quercus robur* and *Quercus petraea*. 2. No additional controls.	1. The minimum number of trees to be harvested in a stand is 20 trees for species *Abies alba, Fagus sylvatica, Larix decidua, Picea abies, Pinus nigra, Pinus sylvestris, Quercus petraea, Quercus robur* and 10 trees for sepies *Acer pseudoplatanus, Alnus glutinosa, Fraxinus excelsior, Pseudotsuga menziesii, Tilia cordata, Prunus avium.*	No use of Genetically Modified FRM	Limitations for plantation subsidies: planted species must be adapted to site conditions according to a grid of parameters (altitude, ecological zone, topography, soil condition). No limitations for the use of provenances.	Guidelines for the use of species by ecological regions and site conditions. No guidelines for provenances.
Netherlands	No additional controls or limitations	i. No limitations for the actual collection of seeds. ii. A minimum of 30 genetically different individuals should be in the stand/population.	No limitations	No; regarding the species listed in the EU Directive only material can be used derived from basic material listed in the National List.	i. No; NL is considered to be 1 Region of Provenance; therefore transfer items are not really relevant in NL. ii.No iii.No
Norway (non EU-member)	No additional controls or limitations than those listed in the OECD Scheme.	Norway has limited the use of seed stands for	**Species:** The Nature Diversity Act (2009) and its regulation on use of		The responsible body is the Norwegian Forest Seed Centre

		commercial seed collection. For Norway spruce which is the economically most important species, there are no longer designated seed stands. For commercial seed collection in Norway spruce stands, seeds are collected from a large number of trees after logging to secure high genetic variation. Spruce seed orchards ensure a high clone number (ranging between 25 and 212 clones, but usually c. 60) to secure sufficient genetic variation in FRM. A project is running to conclude on minimum clone number in the next generation of seed orchards. In the case of planting clones, a regulation in the Forestry Act provides figures for minimum clone number to secure sufficient genetic variation.	exotic tree species requires application to approval from county authority. The regulation was endorsed in 2012, and obviously no precedent has been established. **Provenances**: A regulation mandated in the Forestry Act specifies rules for latitudinal and altitudinal transfer of Norway spruce, Scots pine and broadleaved tree species. The limitation is that the use of FRM should follow the regulations in the Forestry Act.		which has developed guidelines for the use of provenances. In addition, the Control Committee on Forest Reproductive Material has a superior responsibility for use and import/ export of FRM. No regulations at the species level. Not specifically ecological regions, but defined areas/regions based on experience and testing.
Poland	1. There are no special additional controls and limitations. However, in the act of forest reproductive material, Art.44 $1 says that import of FRM from non UE	Officially is not written in any document. This is relevant only to State Forest (80% of all forest in Poland). The general recommendation is that collection should be made	1. Yes, rules are defined in the set of regulations collected at http://bnl.gov.pl/akty,prawne.html. Generally local material is used. A few non autochthonous tree species	Forest are mostly public or state and they are have own budget and internal rules on managements. Private owners can apply for subsides only when they used appropriate seed	There are no recommendations, everything is in the regulations. In the context of climate change, there are no recommendations except very general concerning sustainable management. There

	countries requires permission of Minister. 2. No additional control. Commercialization is under the control of independent governmental agency http://bnl.gov.pl.	in years of good crop. The collections are made for some years, depend of year of good crop, it means that for collection it should be included many trees.	(e.g. Douglas fir, Black locust, Stone pine, Red oak) are not promoted. Forest management plans are obligatory for all forest owners and are in agreement with sustainable forest management. 2. For 9 main forest tree species (Scots pine, Norway spruce, Silver fir, European larch, Pedunculate oak, Sessile oak, Beech, Black Alder and Silver birch) detailed rules are elaborated. (http://bnl.gov.pl/img/33892242_przemiesz_2.pdf) The general rules are that local material can be used. Material from other seed regions can be used when its performance is checked in trials. For example Norway spruce from Istebna (small region 802) can be used almost in 1/3 territory of Poland.	sources according Polish law.	are particular recommendations under development.
Romania	No additional controls or limitations	For category „selected" and „qualified", harvesting has to be made on at least: - 20 trees for *Abies alba, Fagus sylvatica, Larix decidua, Picea abies, Pinus nigra, Pinus*	No limitations for the use of species or/and provenances in forests, except for the genetically modified organisms (GMO). Transfer of provenances is allowed, but there are no	No subsidies	Rules for transfer of FRM are regulated in the Act 107/2011 on marketing of forest reproductive material. Regulation and guidelines regarding use and transfer of forest reproductive material for main forest species have not been issued until now.

		sylvestris, Quercus petraea, Quercus robur. -10 trees for other tree species.	regulations on transfer rules.		Recommendations for the use of species according to forest management plans, based on technical rules, and/or approved by studies.
Slovakia	No additional controls or limitations	For the **category "selected"** the minimum number of trees from which seeds are collected is 20 for 7 main species (*P.abies, F. sylvatica, P.sylvestris, Q. petraea, Q. robur, A. alba, L. decidua*) and 10 for other tree species. For the **category "qualified"** - in seed orchards, a seed harvest is allowable if at least 50% of ramets bore seeds or flowered. regarding parents of families, the minimum number of trees from which seeds are collected is 20.	Limitations are imposed to forest owners by the law on nature conservation (Act on Nature and Landscape Conservation) which does not allow planting of exotic forest tree species in forests of national and landscape parks. Transfer of provenances is allowed only within the respective seed zone and the respective forest vegetation zone	No regular subsidies to forestry at all - and in the long term. Any positive motivation is therefore possible in few cases only. When forest reconstruction projects - after storms, due to air pollution, or for secondary forest with inappropriate species composition - are supported from the EU´s Rural Development Fund (through the national Agricultural Payment Agency), fulfilment of all legal requirements, including the use of appropriate FRM, is monitored.	**Species:** There are recommendations for forest management planning pursuant to the Forest Act and it's implementing Regulation on Forest Management Planning. **Provenances:** Transfer of provenances is the subject of the Act 138/2010 on Forest Reproductive Material and of Regulation 501/201 on production and marketing of forest reproductive material. Publication of guidelines has been envisaged in aforementioned regulation, it have not been issued up to now.
Slovenia	i) According to the 33 par. of the Act on Forest Reproductive Material - ZGRM (Off.gaz.RS, no. 58/2002 (85/2002 mod.), no. 45/2004-ZdZPKG) more stringent requirements are	In selected seed stands and 'source identified' seed objects FRM must be collected from 50 or minimum 25 trees for majority (stand forming) tree species (Norway spruce, silver fir,	i) According to 3 par. of Act on Forest Reproductive Material - ZGRM (Off.gaz.RS, no. 58/2002 (85/2002 mod.), no. 45/2004-ZdZPKG) this act is valid for FRM used in forests and in	i) According to the Forest Act (Off.gaz.RS, no. 30/1993, 13/1998, 67/2002, 110/2007) the Slovenian Forest Service is obliged to provide FRM for use in Slovenian forests; FRM for private	i) Recommendations are provided in the Regulation on delimitation of provenance regions (Off.gaz.RS, no. 72/2003) and its modification (Off.gaz.RS, no. 58/2012).

	demanded for the category „source identified“ ii) According to the Regulation on tree species and their artificial hybrids (Off.gaz. RS, no. 83/2002 (94/2002 mod.), which was replaced by the Decree on the list of trees and their hybrids (Off.gaz.RS, no. 4/2010) ZGRM regulates marketing of 77 forest tree species iii) According to the Regulation on proofs and master certificates for forest reproductive material (FRM) (Off.gaz.RS, no. 19/2004) and its modification (Off.gaz.RS, no. 55/2012), reference samples for possible genetic control need to be sent to the official body (SFI – Slovenian Forestry Institute) from every tree that FRM was collected from	pedunculate oak, sessile oak, European beech), and 25 or minimum 10 trees for all other species (written in each Decision on approval of forest seed object (= basic material) by the official body (SFI), based on par. 38 of the Act on Forest Reproductive Material - ZGRM (Off.gaz.RS, no. 58/2002 (85/2002 mod.), no. 45/2004-ZdZPKG) and the Regulation on criteria for approval of seed objects in categories ‚source identified‘ and ‚selected‘ (Off.gaz. RS, no. 91/2003))	plantations and protections belts of forest trees ii) According to Forest Act (Off.gaz.RS, no. 30/1993, 13/1998, 67/2002, 110/2007) seeds and seedlings used for planting or sawing in Slovenian forests need to be of appropriate provenance – source and of appropriate quality. The Regulation on delimitation of provenance regions (Off.gaz.RS, no. 72/2003) and its modification (Off.gaz.RS, no. 58/2012) Slovenia is delineated into 7 provenance regions with 4 elevation zones, and the appropriateness of FRM in each of these is defined in the Regulation. Additionally, with the modification in 2012, in the case of lack of FRM from Slovenian territory, certain material can be approved for use, originating in defined regions & stands in Austria, Hungary and Croatia.	forest owners is financed from budgetary sources (subsidies) if used according to the Decree on tending and regeneration of forest; for state owned forests the Slovenian Fund for Agricultural and Forest Lands provides financing for FRM written in the Decree, unless regeneration follows large disturbances (sanitary felling) when all FRM, also in state forests, are financed through the budgetary investments in forests. ii) Activities needed for sawing and planting according to the Decree (see above), as well as soil preparation, are subsidised to private forest owners depending on the function of forests. Planting and sawing after all disturbances (after sanitary fellings) are subsidized in part to all forests irrespective of ownership (Regulation on financing and co-investing in forests, Off.gaz.RS, no. 71/2004, 95/2004, 37/2005, 87/2005, 63/2010); iii) The same Regulation provides basis for co-	ii) The Slovenian Forest Genetic Resources Program (SIFORGEN) provides translation and modification of Technical Guidelines (prepared by EUFORGEN networks) as part of the civil forest service (financed to the SFI after the Forest Act (Off.gaz.RS, no. 30/1993, 13/1998, 67/2002, 110/2007)

				financing maintenance of seed orchards and selected seed stands, and investments in nurseries for production of forest tree seedlings.	
Spain	No limitations, but the use of FRM is regulated (see column c).	There are technical guidelines for the production of forest reproductive material of the different categories. They indicate the best practices for the production of forest reproductive material taking into consideration diversity, number of trees, number of ramets per clon, etc.	The use of FRM is regulated. There are national and/or regional recommendations for the use of forest reproductive material (source identified and selected material).	Yes, the type of material and/or the origin can be limited. But only few regions have applied this restriction.	i. yes ii. yes yes
Sweden	No additional controls or limitations	1. Stands: as required in 1999/105/EC annex III; Seed orchards: we generally require > 20 clones in more or less equal proportions; Clonal mixtures: generally a minimum of 5 clones.	1. Limitations concerning the use of alien tree species and of clonally reproduced material. FRM can only be used if it has the ability to give a satisfactory timber production. 2. Limitations concerning the transfer of FRM mainly for Pinus sylvestris and Picea abies, and to some extent also for Betula pendula, Fagus sylvatica, Quercus robur and Q. petrea. This legislation is based mainly on the latitudes of origin of the FRM and the latitude where it will be used.	No limitations. Forest subsidies are given for instance to promote the use of hardwoods. There are no additional requirements regulating which kind of FRM (eg FRM of a certain category or certain basic material) should be used.	i. Guidelines or recommendations have not been developed by the official body but by other actors in the forest sector. For instance the Swedish Forest Institute has a useful web based tool concerning several aspects of forest management, including the use of FRM. The Swedish Forest Agency has in co-operation with researchers developed for instance various publications concerning forestry which, to some extent, also treat the use of FRM. ii. & iii. The web tool by the Swedish Forest Institute.

					However this mainly concerns Pinus sylvestris and Picea abies.
United Kingdom	The Forestry Commission introduced a Voluntary Scheme for the Certification of Native Trees and Shrubs in 1999. The procedures in the Voluntary Scheme are the same as for those species controlled under the regulations.	Collections from stands should be made from balanced quantities of seed from at least 30 trees across the whole area. For Stands in the Selected category the guidance states that "plantations of coniferous species less than 4 hectares in area will not usually be considered." The Forestry Commission has their own internal suite of standard operating procedures which provide guidance to inspectors on assessments. For source identified material, collection must be made within the boundaries of a single region of provenance or seed zone.	Only certified material can be used for forestry purposes. UK has 24 native seed zones within 4 regions of provenance. No GMO's.	It is expected that all forestry work undertaken through use of a Forestry Commission grant scheme meets the requirements of the UK Forestry Standard which includes the FRM Regulations.	Guidance available through http://www.forestry.gov.uk/frm