Addressing the *'Concerns of society in relation to tree breeding in Europe'* ; Treebreedex meeting report, 12-14 October 2010 Limoges, France.

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Background

Tree breeders have their main objective to increase the economic value of trees while at the same time ensuring that the genetic diversity of their breeding material is maintained and enhanced by their work.

The economic and environmental functions of forests is well understood in the tree breeding community. European forests cover 44% of the land area, represent 25% of the world's forest resources and employs 4.3 million people. Forests are reservoirs of genetic diversity of the tree species they contain as well as being reservoirs of all the associated biodiversity among the accompanying flora and fauna (Forest Europe). Functionally they provide an economic output in the form of timber which is in constant or increasing demand. In addition, forests provide important ecosystem and amenity services, combating natural hazards such as floods or soil erosion.

Approximately 10% of European forests are designated for the specific function of protecting the quality of fresh water. The value of non-wood products and services such as cork mushrooms, berries and hunting may rival or exceed the value of timber produced.

The means of addressing the concerns of society in relation to tree breeding

Society may be defined as large social groupings which share interests in a social network. The prevailing public opinion on breeding plants and animals is generally one of suspicion. Society in general may associate all breeding activities as being connected with genetic modification and with being dangerous for health and the environment.
In relation to forests, there is a wide range of stakeholders and groups which have an interest in all aspects of forests from afforestation to management and wood supply.

Society as a whole may be regarded as a 'consumer' of the goods and services derived from forests. As a consumer it will have formulated views on forests and the breeding of trees. Forests occupy land and this form of land utilisation may be on conflict with land requirements for agricultural production in some regions. The environmental, economic and amenity functions of forests are well appreciated by society but there is little appreciation or understanding that forests require regular management operations. Management practises such as thinning, harvesting and re-planting may be seen as interfering with the naturalness of the forest and may be regarded as having negative impacts.
There are many levels at which the concerns of society are considered and expressed. These levels range from international agreements to local or regional levels of action. At government level, official bodies endeavour to find a broad agreement on the best policy and implementation frameworks to ensure that European forests are sustainably managed. The Ministerial Conference for the Protection of Forests in Europe

(MCPFE) convened in 2007 and passed 19 resolutions at governmental level. It has a major objective to inform and educate, policy makers and the broader society about the goods and services provided by forests plus the necessity for sustainable management. This Conference will re-convene in 2011 and will be informed by the initiative of 'Forest Europe' which consists of 46 countries together with the EU states. Its aims to provide a pan-European policy and strategy for forest development and to develop guidelines to safeguard the sustainable management of forests. Special attention is given to maintaining forest biodiversity and water quality with climate change effects as a priority.

Individual governments also take into account the needs as well as the concerns of society in developing their policies and programmes to develop the forest sector of their economies. This is reflected in policies concerning land use options, employment generation, conservation aims and the needs to protect vulnerable regions (water supplies, river basins) and minimising forest fires. At a more local level of society the concerns of forest communities in regional areas may be expressed. They may focus on the forest as a 'crop' which simultaneously provides environmental services. Forest managers will express an interest in the selection of most appropriate species, the growth rate of trees, the quality of the wood and the adaptability/plasticity of local genetic resources.

At a local level the wider society has a personal interaction with forests mainly as an amenity. Since seven out of every 10 Europeans now live in urban areas, these forest users focus on recreational aspects. While they can appreciate the employment and environmental potential of forests, they also believe that pure forests should be biologically diverse. This group in society is very subject to being influenced by sensational environmental stories in the media. In addition, they may have a negative view of tree breeding and consider it as a manipulation of nature that will have negative consequences.

At national level many countries consider tree breeding as very important to ensure that well adapted genetic material is used to generate and sustain viable forests. Depending on the country, natural regeneration provides 3-85% of forest trees for future forests. However reproductive material which is genetically improved is becoming more important for economic and environmental sustainability. The percentage of forest reproductive material (FRM) which is derived from improved sources varies from country to country. It is only 6-20% for Switzerland, Ireland, Austria, Russia, Hungary, Serbia, Bulgaria and Romania and 20-40% for Spain, Denmark, Germany, Norway, France, Belgium Lithuania, Sweden, Poland, Portugal. Countries which use a high proportion of improved genetic material (40-60%) include Latvia, Finland, Netherlands, Czech Rep. and Italy.

The benefits of tree breeding need to be communicated more effectively to policy makers, politicians and the wider public. One approach may be to give some consideration to the consequences that would follow without any breeding. What would the effects be on: the stability and viability of European forests, employment potential, the quality of wood entering the processing sectors, the overall productivity potential of the land and the potential losses in carbon sequestration. Tree breeding would be better appreciated by promoting a more extensive use of timber as a substitute for more polluting industrial products such as concrete, aluminium and coal. Promoting tree breeding will help Europeans countries to achieve their biodiversity targets in the most sustainable way and as a result will help in reducing

imports of tropical hardwoods to Europe. Breeding trees is an important activity to enhance the tolerance to environmental stresses and for developing material which better facilitates the planning and rotation of commercial forests. As management strategies for forests become more complex there is a need to develop germplasm for more specific purposes and tree breeders are best equipped to provide the knowledge which supports these strategies. Germplasm which is genetically improved gives more options to forest owners and planners.

Results from a questionnaire of stakeholders present at the Treebreedex meeting Limoges, France

The Treebreedex meeting in Limoges allowed tree breeders to discuss the way in which they understand that society regards their work. In addition it provided the opportunity for tree breeders to obtain the views of various stakeholders from the wider society who participated in the meeting. A survey was undertaken by questionnaire of the audience of 33 stakeholders in which they expressed their opinions on the role of tree breeding in Europe, the main benefits derived from tree breeding, the important challenges which tree breeders face, the research priorities which tree breeders should address and their views on what they see as the best ways for tree breeders to communicate their messages.
The respondents were asked to describe their area of work and they could mark all categories which applied to them. The choice of work categories given were: industry, research forester, tree breeder, silviculture/ management, government and or 'other'. The details of the questionnaire are in appendix 1. Nine respondents described themselves as exclusively 'tree breeders' and a further 10 as a combination of 'research forester' with 'tree breeder'. Four respondents described their work as exclusively 'research forester'. From the remaining group of 10 respondents, five described their work as a combination of 'government' with either tree breeding or some other type of work. The last five consisted of people who worked in the forest industry, education or non governmental agencies.

In relation to the answers supplied, each respondent gave several answers to each question and these were evaluated and are summarised below.

The main results from the questionnaire were as follows:

Q1.
What is the role of tree breeding in the future development of forests & forestry in Europe ?
For the future development of European forests and forestry, the most important role proposed was to provide germplasm which is better adapted to existing and future environments (15/33). The second, most important role was identified as ensuring the greatest efficiency in wood production (10/33).

Q2
What are the main benefits you can identify which come from tree breeding ?

Respondent cited that an improvement in the productivity (quantity and quality) of the forests from tree breeding was the most important benefit (22/23) followed by

ensuring that forests can be managed in a more sustainable way by using the material derived from tree breeding (16/33) .
Other benefits cited were over several subjects including in order of priority; developing material to accommodate climate change, ensuring forest stability and resistance to biotic and abiotic stresses.

Q3
What do you see as the most important challenges which tree breeders face ?

The greatest challenge was seen as the capacity to breed trees which would continue to produce sufficient volume and quality of wood in the circumstance of predicted climate changes (9/33). Respondents also cited a shortage of staff time and funds for breeding work as an important challenge (8/33). In addition they placed equal importance on the challenge of collaboration and the exchange of information, knowledge and materials among the tree breeding communist in Europe (8/33). Furthermore they cited an important challenge was to improve the general perception of tree breeding and the uptake of improved FRM by foresters and landowners (7/33).

Q. 4.
What do you think are the most important research priorities for tree breeders ?

The respondents indicated that greatest priority of tree breeders should be oriented towards evaluating the genetic diversity and plasticity of the main forest species so that stable germplasm can be identified and exploited (9/33). The next most important research priority was identified as breeding for stress resistance (biotic and biotic) to ensure that breeding delivers material which is most adaptable (8/33). A further, through less important priority for research was given as developing systems to incorporate molecular methods into practical breeding scheme (5/33).

Q.5.
What is the best way(s) for tree breeders to communicate their messages ?

The respondents agreed that the most important means of communicating the work of tree breeders was to demonstrate it via dedicated demonstration plots in diverse geographic regions (11/33). They also indicated there was a need for active and dedicated communication means to inform the public and industry about the tree breeding work by the involvement of many strands in society, i.e. participative breeding.

Conclusions

Following a general presentation of the context described above and the questionnaire; a discussion followed. The major points mentioned were:

- It should be recognised that tree breeders are a minority in the general forest community so they must convince their forestry colleagues firstly on the benefits of breeding and of using improved genetic material in their forests.
- A greater recognition of tree breeding may be possible by engaging with decision makers. Identifying appropriate contact points is important; they should include: associations of forest owners, wood energy companies and processors.

- An important means of promoting tree breeding may be achieved through inter-regional / country cooperation since neighbouring geographic areas often share the same challenges in relation to the tree species and sources of germplasm to deploy.
- The general public do not understand the basic features of wood production and the nature of forests. The many roles which the forests provide needs to be communicated in a structured and effective way. Similarly the expectations of the general public needs to be surveyed and analysed in relation to forestry and tree breeding.
- Breeders have much in common with public opinion in relation to their appreciation of the role of forests for carbon sequestration and as sources of renewable bioenergy. In addition, breeders and the public are very concerned to maintain genetic diversity in breeding populations. These points of mutual understanding form a good basis for further development.

Some characteristics of the main players affecting the perception of tree breeding in society

Treebreeders

- They want to produce germplasm which will produce timber more efficiently and of higher quality with resistance to biotic and abiotic stresses for the present and future climates. They make sure that genetic diversity is maintained and enriched for future tree breeding. Are a minority in the "Forestry Community" and they can work in any designated species.

Industry (Private Wood Producers)

- Industry knows what it wants i.e. a continuous supply of wood for their factories to make paper and construction materials

- Their factories/sawmills have a very high capital input so they need raw materials as cheaply as possible to maintain profitability and employment of workers

Broader Public

- Views forests as 'nature'; they resent any genetic manipulation
- They have little or no appreciation of the need for the management of forests and of using the best adapted germplasm which will result in stable forests which can make important economic contribution to society.
- Generally they view trees as 'good' for the environment but do not fully appreciate, that trees (and the products of trees) are a huge store of atmospheric carbon which needs to be increased to mitigate climate change.
- They do not appreciate there will be no forests for future generations of people if forest germplasm is not managed in such a way which ensures that only well adapted FRM is planted now.

Politicians & policy makers

- They take their views from the public 'Trees are good; we need to keep all the trees we have and plant more'

- They ask ‘What can we do to help’
- They make ‘policy’ and they support the implementation of policy.
- They support all business and services which provides employment (especially in rural areas)
- They like to believe they are acting for the ‘future’ good of society
- They support and encourage all forms of co-operation between different sectors in their own countries but they love to initiate, develop and support co-operation between states, regions countries.
- They are aware that CO_2 reserves now have an economic value.

How to improve the perception of and support for tree breeding in Europe ?

1. Tree breeders need to identify/Describe/Debate and Form a “Policy” on European tree breeding which can be agreed. In relation to sustainable forest management, this is already well developed and approved by the “Council of Ministers”. It is time to be specific in relation to developing adapted germplasm for future needs. Will there be any? , where will it come from? will it be ‘fit for purpose’, who will produce it? , how and where will it be produced ?.....

2. This general policy could be made more specific and highly developed for each species.

3. This policy must be developed with the full participation of all the forest ‘consumers’ – industry, forest owners, farmers, environmentalists, researchers, geneticists, all NGO^{s}, government agencies,

4. Tree breeders must propose a breeding strategy for each species not an a country/regional level but on a species level and European Scale.

5. ??????????????????????????

Appendix I
Treebreedex survey to inform Tree Breeders and the Stakeholders in society.

Your work/ interest: (please mark all that apply)

Industry:…….

Research forester:……...

Tree breeder:…….

Silviculture / Management:……

Government:……..

Q1

What is the role of tree breeding in the future development of forests & forestry in Europe ?

Q2
What are the main benefits you can identify which come from tree breeding ?

Q3 –What do you see as the most important challenges which tree breeders face ?

Q4
What do you think are the most important research priorities for tree breeders ?

Q5--
What is the best way(s) for tree breeders to communicate their messages ?