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1 EUROPEAN POLITICAL FRAMEWORK

The EU has almost 182 million hectares of forest and wooded land, covering 43% of its land area. European forests offer a wide range of benefits for the environment, society and the economy. Resilient forests maintain valuable ecosystem services and support biodiversity. They can mitigate the effects of climate change by storing carbon, providing clean air and better water flows, and controlling erosion. Wood and by-products also offer opportunities for producing energy and bio-based materials.

European forests currently also face a number of challenges, including the effects of climate change. Foresters, forest owners and public authorities are looking for sustainable solutions to storm damage or drought, pest and diseases, or the increasing occurrence of forest fires. (EIP-AGRI, 2019: Innovation for European forestry, Creating resilient and multifunctional forests)

As most of the ROSEWOOD countries (except Switzerland and Norway) are part of the EU, a short general introduction on different EU-regulations and organizations is provided:

The *European Structural and Investment Funds* (ESI Funds), especially the *European Regional Development Fund (ERDF)*, the *Cohesion Fund (CF)* and the *European Agricultural Fund for Rural Development (EAFRD)*, play an important role in terms of financial support for the member states.

The ERDF is one of the key instruments of EU supporting cooperation across borders through project funding. Within the *Rural Development Program*, even concrete forestry and wood industry related issues are mentioned in most of the countries:

- Projects safeguarding sustainable forest management (e.g. forest regeneration, forest roads, forest recovery after catastrophes) and wood mobilisation
- Projects towards strengthening rural areas (e.g. improvement of infrastructure, jobs, tourism, added value)
- Advisory systems of the federal state chambers of agriculture and forestry

For the upcoming period of the EAFRD 2021+, the related measures and funds are currently discussed on EU level (until end of 2020). The overarching question is: How much money will be available for forestry issues, as the bulk of the funds will be allocated to agriculture?

To promote a European programme on forest structures that tackles the question of ownership structures, dimensioning forest holdings of adequate size for sustainable management, with adequate access, should be highly considered.

Within the Eastern and Southern Hub, especially the *EU Cohesion Policy* plays an important role in encouraging economic development and reducing regional disparities within the countries. Sustainable growth, fostering of research and development, boosting the innovation potentials of small and medium sized enterprises (SMEs), promotion of resource efficiency and reduction of environmental pressures are further targets.

Additionally, the *EU Strategy for the Alpine Region (EUSALP)* plays an important role within the Alpine countries, especially mentioned by Austria and Slovenia. Action 2 (to increase the economic potential of strategic sectors), Action 6 (to preserve and valorise natural resources, including water and cultural resources) as well as Action 9 (To make the territory a model region for energy efficiency and renewable energy) are the most relevant chapters related to forestry issues.

EUSTAFOR (European State Forest Association), established 2006 in Brussels, represents a strong well-coordinated voice for sustainability and the use of forest resources at EU and pan-European



level (Strategy 19-21) committed to sustainable forest management and the guiding principles of the *EU Forest Strategy*. EUSTAFOR promotes the active use of renewable raw materials and related ecosystem services for the bio-based circular economy. Therefore, the revised European Forest Strategy should be included in the *European Green Deal* (2019) fostering this economy in each Member State. The “*multipurpose sustainable forestry*” (economic, environmental, social value of forests) is a pre-condition for the implementation of the EU Green deal. Challenging factors in the future forestry will be to accomplish these various demands, which are spread over different EU regulations (e.g. *Renewable Energy Directive (RED II, 2018)/ Natura 2000/ Financing Sustainable Growth 2018*).

Within the framework of the *European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI)*, launched by the European Commission, practice and research activities towards competitive and sustainable agriculture and forestry are fostered by means of innovation and knowledge exchange (e.g. brochures, workshops, projects). In this context, the EIP contributes to achieving all nine specific objectives of the Common Agricultural Policy of the EU (CAP). Different forest related topics are covered: forest management, inventory, forest products and services, land management, biodiversity and nature conservation, climate change, ecosystem services, pest & diseases, agroforestry (silvo-arable, silvo-pastoralism). The share of forest related funded projects by Rural Development Programmes is quite low (about 5%), but has increased slightly during the last years.

A big challenge in the future will be the development of the *new EU Forest Strategy* (built on the *2030 Biodiversity Strategy*), which shall have as its key objectives effective afforestation, forest preservation and restoration in Europe to help to increase the absorption of CO₂, reduce the incidence and extent of forest fires, and promote the bio-economy, in full respect for ecological principles favourable to biodiversity. (European Green Deal, 2019) But some aspects are seen very critically by the ROSEWOOD consortium, for example in terms of mitigation of “forest fire risk” adequate forest management has to be conducted instead of leaving deadwood in these prone areas. Therefore broad communication processes between NGOs and forest managers/experts have to be boosted for the further development of the new EU Forest Strategy.

The *Blueprint for Sectoral Cooperation on Skills* (EU, 2018) fosters sustainable partnerships among stakeholders to translate a sector’s growth agenda into a comprehensive skills strategy to address skills needs. Thus, ROSEWOOD experiences and Best Practices in terms of forest related sectors (green technology and renewable energy, construction, paper-based value chain) should be considered in the further development of this paper.



2 CENTRAL HUB

2.1 EUROPEAN POLITICAL FRAMEWORK

For both Austria and Germany, the *Rural Development Program* of the European Union plays a major part in the forestry and agricultural sector. The European political framework does not tackle **Switzerland**, as there is no free trading agreement for the forest industry between the European Union and Switzerland.

- **Austria:**
projects safeguarding sustainable forest management and wood mobilization, projects towards strengthening rural areas, counseling systems
- **Germany:**
Fostering of afforestation and agroforestry systems, investments to strengthen the resilience and environmental value of forest ecosystems as well as forestry techniques, processing, mobilization and marketing of forestry products, conservation of forests

Both countries realize the *EU Timber regulation* (EUTR) respectively the *EU Forest Law enforcement, Governance and Trade* (EU-FLEGT) and trace the origin of their wood. In **Austria**, an additional certification was installed for economically, ecologically and socially operating forest enterprises (ZÖFU – Zertifiziertes Österreichisches Forstunternehmen). By means of these certificates, an active and climate-fitting forest management and wood processing shall be forced.

Further, the *EU Strategy for the Alpine Region* (EUSALP) plays an important role fostering bioeconomy and the use of local wood for buildings and wooden products across all stages of the value chain. In Austria, the usage of wooden constructions has gained importance during the last 20 years combined with information campaigns, trainings and seminars for architects or planners.

2.2 NATIONAL POLICIES (INCLUDING FINANCING INSTRUMENTS)

2.2.1 CURRENT SITUATION (INCLUDING BARRIERS & CHALLENGES)

All three countries base their legal framework on their respective *national forest act*. In Germany and Austria, there are national and/ or regional associations that coordinate the exchange of information and promote the use of timber (e.g. proHolz Austria, ProHolz Schwarzwald).

In **Austria** the *cooperation platform "Forest-Timber-Paper" (FHP)*, comprising representatives of the Agricultural Chamber, forestry operations, association of the timber and paper industry, highlights the importance of the value chain for economy, policy and society. Every year, a "Timber Dialogue" is conducted to exchange ideas between Central European representatives of forestry, wood and sawmills industries as well as wood processing industry.

While **Austria** fosters measures for merchandising and marketing of wood products with the "*Timber promotion fund*", **Switzerland** has a strong offer of program agreements (differentiated between the cantons) to support the forestry sector with subsidies. Additionally, the *Forest and Timber Action Plan* provides subsidies for research, development and innovation projects. The main targets are the use of natural resources, renewable energy promotion and climate change mitigation issues. The *Forest and Wood Research Fund* supports practice- and implementation-oriented forest research promoting the development and competitiveness of forestry and



timber industry. In **Germany**, the German Centre of Forest Work and Forest Technology (Kuratorium für Waldarbeit und Forsttechnik e.V., KWF) supports the sustainable forest development by providing applied research and knowledge transfer. The focus lies on safe forest work, innovative forestry technique, ecologically friendly and biocompatible methods and a highly efficient supply-chain. The *Timber construction offensive Baden-Württemberg* supports wood construction to achieve the climate protection goals. *UNIQUE forestry and land use GmbH* is a leading, international consulting agency for forestry and sustainable land usage developing sustainable strategies on how to use different kind of lands.

When it comes to **barriers and challenges** in national policies, Austria, Switzerland and Germany have differences and similarities to each other. In all of the named countries, the *small ownership structure* and the increasing distance of forest owners to their properties are challenging issues, as the motivation and mobilization for forest management is very difficult. Furthermore, there are more *damaging events* in Austria and Switzerland and both countries face the problem of comparably high wages and the struggle to make profit from forest management. In Austria, this may lead to the employment of less expensive, unskilled workers. The *lack of skilled workers* is also a challenge for the German forestry sector. Named countries all suffer from climate change effects (e.g. drought, windthrow, landslides, rock falls, forest fires) and related pests like bark beetle or fungal diseases on ash trees. Experts expect that in the future non-native insect pests could increase, to which the ecosystem forest is not sufficiently adapted. In addition, spruce, the most common tree species in all these countries, will increasingly lose importance, whereas deciduous tree species will increase. Therefore, a *conversion of the forest industry* will be necessary. Additionally, there is also a large problem in Austria with *unnaturally elevated wild ungulate densities* due to trophy-hunting activities, causing severe damages in the forest.

2.2.2 GOOD PRACTICES

As good practices, the three countries identified strategies that foster the *sustainable forest development* in their country and aim at *adapting it to climate change*. For Austria, it is the Austrian Forest Strategy 2020+, Switzerland named the Swiss Confederation's Forest Policy 2020 and Baden-Württemberg in Germany identified the "Strategy for Adaptation to Climate Change in Baden-Württemberg". Precondition for the development of these strategies was the preceding dialogue with all relevant stakeholders and interest groups.

Supplemented to these processes, adequate coordinated *funding systems* were developed and foreseen in each country. Also, the recent enormous damages, for example caused by bark beetle infestations, and the caused financial losses for private forest owners, shall be compensated as far as possible. Additionally target oriented *advisory services* are offered towards climate fit forests with good quality timber and mixture of tree species.

2.3 EDUCATION AND TRAINING

2.3.1 CURRENT SITUATION (INCLUDING BARRIERS & CHALLENGES)

To put it into a nutshell: Austria, Switzerland and Germany offer a *broad range* of education opportunities on all educational levels (non-formal training, basic vocational training, professional training and at University degree level). Some are more practice oriented and other more theoretical, especially in the higher education and at university level. While Austria puts a special focus on the multifunctional requirements of their forest stands, Switzerland highlights the high permeability of their education system. Baden-Württemberg concludes that there is already a high level in the educational field and thus, does not see the education as an obstacle to timber



mobilization. But, it is important that all parties communicate with each other and find a common way to promote and strengthen timber mobilization.

Lastly, the **barriers and challenges** that these countries have in common, and that is most likely the main issue, are the *private forest owners* that live *in urban areas*. They live far away from their forests and especially the young generation lacks knowledge about the importance and needs for active forest management. Both Austria and Germany share the issue that they have a *shortage in skilled workers*. For Austria, this is particularly true in case of crisis regions (e.g. after bark beetle infestations). In contrast, for Switzerland the *high wages* are problematic, as they lead to very low profits after deduction of harvesting costs. Switzerland and Germany experience that new knowledge and skills are needed on how to deal with *climate change*. Furthermore, there is generally a necessity to improve the *communication* throughout the timber value-chain.

2.3.2 GOOD PRACTICES

The good practices in the educational system for Austria are the safety-conscious working techniques, *comprehensive advisory services* for all company sizes and the center for forestry worker's training for whole Europe, the *Forest Campus Traunkirchen*. In Switzerland, it is possible to change jobs even after choosing a profession through appropriate further training and there is *high permeability* between individual professions. The educational system has a strong focus on *lifelong learning*. The dual apprenticeship of Germany, which connects *theory and practice*, is the most successful part of the German forestry educational system. All three countries feel that they have very high training standards and excellent expertise in forest management at various levels. Moreover, they all offer a broad range of different training courses and information campaigns for all forest owners at all levels in the field of forestry.

2.4 RECOMMENDATIONS

Austria:

Forestry in Austria is the second most important economic sector after tourism. Nevertheless, some issues regarding sustainable “wood mobilisation” should be improved in the future, but also various good practices can be mentioned:

About 82% of the forest is privately owned and mostly small structured. The share of forest owners far away from their property is increasing, thus also the motivation for management is lacking behind. They should get basic information about adequate forest management and be introduced to the wide range of training opportunities provided by the Chamber of Agriculture and Forestry or the Forest Campus Traunkirchen, the largest, most modern and advanced competence centre for forestry in Europe. Especially for private forest owners the Federal Research Centre for Forests and Landscape (BFW) developed two video clips on YouTube channel providing some instructions which steps are necessary if someone inherits a forest („Günther hat einen Wald geerbt¹“). A third video clip is already in progress.

¹ <https://www.youtube.com/watch?v=vcTqTUQpDGo>; <https://www.youtube.com/watch?v=VX4T06cUXIs>



The spruce, the main tree species in Austria, will increasingly lose importance in a changing climate. The damaging events due to bark beetle infestations increased during the last years, so that the wood sale is stagnating. Some of the forest owners already recognized, that the selection of tree species has to be changed in the future, but the timber trade and industry still prefer spruce timber. The solidarity between forest industries, sawmills and forest owners has to be improved in the future. *Awareness raising* activities towards adapted tree species selection as well as necessary thinning and tending measures have to be conducted addressing all involved stakeholders. For an economically, ecologically and socially sustainable operation of forest enterprises, certain certificates are issued and thus an *active and climate fitting forest management and wood processing* should be forced. In Upper Austria, for example, excursions to certain testing areas for forest owners are organised to demonstrate tailored forest management and also brochures pointing out adequate tree species related to the respective area were developed. Additionally, *research* activities regarding climate change adapted tree species should be further boosted.

A big problem in Austria is the trophy-oriented game management causing unnaturally elevated wild ungulate densities, which lead to severe damages and impedes the regeneration of trees. Therefore, *balanced forest and game conditions* have to be achieved and not only the hunters, but also the forest owners have to be informed adequately.

The importance and sensitization for timber and relevant usage for various wooden products as well as buildings have to be increased. *Flagship wooden projects* (e.g. Forest Campus Traunkirchen, wooden sky scraper in Vienna) should be fostered further. A natural understanding of nature and the product “wood” should become a matter within society, of course, to embed the wood value chain more firmly within the general public. Wood is also an emotional message that reaches far beyond the pure product value: related *tourism and health* aspects are also very important.

The cooperation platform “*Forest-Timber-Paper*” (FHP) can be seen as a *best practice example* as it boosts the importance of the timber value chain for economy, policy and society by supporting private forest owners while providing a clear social mandate and appreciation of action by politics. The term “wood mobilization” is seen quite critically and after several discussion processes, a better expression was created: “continuous timber flow from the small scale forest” as the focus should be laid on the “mobilization of forest owners”. Also, *proHolz Austria* is a professional marketing organization for timber application including also target-oriented seminars, information campaigns etc. By means of the timber promotion fund of the Chamber of Agriculture, measures for merchandising and marketing of wooden products and general promotion campaigns are fostered.

At authority level, an attempt is made to create synergies between forest supervisors and marketing channels through appropriate education and training. *Forest industry associations* and other association structures (e.g. machinery rings) are becoming increasingly important, also in the direction of “wood mobilisation”.

The *Austrian Forest Strategy 2020+* was jointly developed in the framework of the “Forest Dialogue” with all forest-relevant and forest-interested stakeholders serving as a guideline for a short-, mid- and long-lasting forest-political development. It highlights the promotion of wood as a building material, raw material and energy source as well as the importance of public services of the forest and the related, necessary measures in this context. These issues are also part of the Rural Development Fund LE 2014-2020: collaborative timber marketing, incorporate labor and machine organizations, stronger networking towards innovation, research and development as well as strengthening of ecological and economic resilience and further apprenticeship possibilities taking into consideration also new challenges (due to climate change).



Switzerland:

The forest area in Switzerland is very small structured. In addition to the approximately 3.500 public forest owners, there are around 245.000 private forest owners. Although efforts have been and are being made to mobilise wood from private forests, the mobilisation is difficult. Many private forest owners have lost their connection to the forest and its management or are no longer able to manage it. The current difficult timber market situation due to bark beetles and storm-damaged timber has an aggravating effect. It is important to continue the efforts for *timber mobilisation from private forests* and to show the benefits of forest management.

Locally, the game density in Switzerland is at a very high level. The natural regeneration of the forest can only be guaranteed by protective measures. Many cantons have recognised the problem and are making efforts to improve the situation. However, cooperation between forestry and hunting is proving difficult in many places and progress is slow. For the forest to fulfill the multifunctionality, *game management* must be improved.

In recent years, the effects of climate change on Swiss forests have become clearly visible. Drought periods, storms and subsequent calamity have had a particularly severe impact on spruce. Various studies have already dealt with the *adaptation of forests to climate change*. In the future, the transfer of knowledge into practice will be important and as well the communication between forests and the processing industry. In summary, it is necessary to adapt the forests to climate change and to find solutions for the changing tree species supply with the sawmill industry. In connection with the last point, it is also important that we continue to research and promote alternative ways of using wood.

Campaigns for Swiss timber such as “Woodvetia” or labels like “Swiss timber” and “Radius20” can be cited as best practices of timber mobilization and marketing for the value of local timber. Advertising for wood as a raw material will remain important in the future and various campaigns to *raise public awareness* are important. This can be seen from the success of the previous campaigns and the fact that they will be continued.

The *well-established education and research sectors* should be continued as they show their manifold assets and contributions to a sustainable, efficient, economical potent forestry and addressing all the widespread topics of multifunctional forests which can best provide all the envisaged services for the population. In order to continue to guarantee this, it is important to train and recruit competent specialists. The attractiveness of forest professions should be maintained or increased.

A steady reevaluation, verification and validation ensure a steady and close *controlling*. This guarantees permanent learning, the implementation of latest management tools and new technical developments in various fields of the wood value-chain. Clearly defined future aims (like the forest policy 2020) help in this framework to have a *clear strategic scope*, thus providing a solid foundation, enhancing the planning security and encouraging investments of the stakeholders working in the forestry sector. These points should be (and will be) continued as they carry the potential to overcome existing and mitigate the development of new barriers.

In the frame of *climate mitigation*, Switzerland is about to design and implement a tool for determining and additionally remunerating the CO₂ sink services of forests in the scope of different projects and forest management measures according to the Kyoto-protocol. Thus, such kind of ecosystem services might provide a new domain of revenue for the forestry.

Germany:

The forest in Baden-Württemberg has many owners. In addition to the state and the municipalities, more than 200,000 private individuals own almost 40 percent of the forest area. This represents one of the biggest barriers to timber mobilization, as many of them live far away from their forests and do not know how to manage it.



Especially young forest owners often inherited their forests from their grandparents. It is quite common that they live further away in the city and do not have the time and/or knowledge to take care of their forest. On the other side of the age spectrum, there are the grandparents, the old generation of forest owners. They often still have the expertise, but as they get older, they lose the physical possibility to look after the forest. Nevertheless, neither of them wants to sell their forest as they have an emotional bond with it. To sum it up, the private forest owners need to be educated and motivated to actively manage their forest.

As interest is a main driver for learning, we need to raise the interest of the forest owners on what they can do with their forests. The communication needs to contain various arguments, as some people get motivated by e.g. monetary incentives, others like to act environmentally friendly and some want to ensure that they can enjoy the forest for sports in the future. One idea is a campaign that shows facts, needs and current issues of the forest in a simple and fun way. This would also be useful to reach out to **society** as they likewise have a lack of knowledge about forests. It should be distributed and shared in traditional media like TV and modern social media like Instagram and Twitter. To satisfy the created interest in the forests afterwards, there should be local, informative events (like an evening event) for forest owners and interested public.

Another solution that was discussed in the Central Hub's Business Idea Creation workshop was the idea to found a joint-stock company. It works locally: Forest owners from neighbored forest corridors unite and establish a stock cooperation. Each member receives the amount of shares in the company according to the size of his forest brought in. They then jointly take care of the big forest and profit from the scale effect. Alternatively, they could also commission a contractor to do so. This idea has definitely advantages and potential, but it only works if all adjacent forest owners agree.

Like private forest owners, society nowadays has less knowledge about the forest, its importance and needs, than a few generations ago. There is a lack of understanding for the connection of the forest (e.g. to climate change) and production methods. The wood mobilization is not generally seen positively, but many people think it is better to let forests develop on their own. Moreover, few people understand that further usage of the wood conserves the stored carbon dioxide and this is better for the environment than letting the timber decay. Basically, there is a need to find ways to motivate forest owners to use more wood.

Moreover, forest management in Germany has to deal with two main issues: Firstly, Germany's shortage in skilled workers. Although, according to the "Qualification Requirements 2015 and 2030 in BW" by the Ministry of Economic Affairs, the shortage of skilled workers in forestry is relatively low compared to other industries (source: MOE 2009), the situation for vacant training places looks somewhat different. The share of vacant vocational training units in the timber trade and woodworking industry was between 6.5% and 12.6% in 2017/2018. Therefore, it would be helpful to bring this profession back to the young people (source: Timber Charter 2019).

Secondly, climate change is also clearly noticeable and therefore an important subject to tackle. Only the silver fir defies the climate change. The rest of the tree species reacts differently. 38 percent of the forests in the country were clearly damaged; the average needle and leaf loss has increased over the previous year by almost 3 % and is just under 25 %. Pine, beech and oak are severely affected. Thus, an increased planting of silver fir should take place. Especially the spruce, the most common tree species in Baden-Württemberg, has clearly exposed crowns. The pine tree is also worse off. However, the biggest worry is the ash; a fungus from East Asia has infected 95% of these deciduous trees. Thus, the focus should be laid on the silver fir (Stuttgarter Newspaper 2018). There is a need for knowledge on how to best deal with those mentioned problems.

The educational system in the forestry in Baden-Württemberg, Germany has a very high level and standard regarding form and content of the education. This should be continued. However, forestry plays a strong role for



the public authorities in Germany, as a quarter of the forest area is state forest. This means that many young foresters are educated by state institutions and therefore have a different point of view on the forest (stronger focus e.g. on recreation) than forestry enterprises. This can lead to problems when starting to work for a private company afterwards. It would be helpful for the forestry sector to tackle this issue.

Summary:

The *educational systems* in Austria, Switzerland and Germany are at a very high level. This should be maintained in the future and further adapted to the changing environment like climate change. Moreover, all three countries see their *political strategy* as a helpful solution in the present and call for intelligible aims and political frameworks in the future.

Furthermore, to enhance the sustainable *timber mobilization* in the central Hub countries, it is necessary to first *mobilize the private forest owners*. This can be done by providing them with basic information about the advantages and possibilities about basic forest management. Introducing them to the wide range of training opportunities in their respective country is another useful measure.

On top of that, not only the forest owners, but also the *society* needs to be sensitized for the importance of the forestry and for the benefit, like sustainability and health, of using wooden products and buildings. Improving the *communication* between the different stakeholders *along the value chain* of the wood is another measure to enhance the whole sector.

All these measures shall ensure the maintenance of a healthy, climate friendly forest and a sustainable wood mobilization to foster and support the upcoming, sustainable bio-based economy.



3 EASTERN HUB

3.1 EUROPEAN POLITICAL FRAMEWORK

As member states of the European Union, Croatia, Slovenia and Romania are obliged to align national legislation with the *acquis communautaire*. The European *acquis* is constantly evolving and national regulations must be harmonized accordingly. The National Parliaments adopt the annual legislative alignment plan, which is an integral part of the Government's programme for incorporating and implementing the *acquis* and is the basic document in the process of incorporating and implementing EU law in national legislation. Respecting the above mentioned, all three East Europe Hub partner countries are adjusting national laws, even though the processes are sometimes not improved in sufficient manner and there is a need for further development. Especially for the control systems as well as in the implementation of the instructions received from the practitioners, more efforts are required to enforce the regulation. Within the *Rural Development Programme*, even concrete forestry and wood industry related issues are mentioned in each country:

- **Croatia:**
recommendations for improvement of the quality of management, building and restoring of forest roads, increasing of production and mobilization of forest biomass, improvement of resistance, environmental and long-term economic values of private forests
- **Slovenia:**
acceleration of knowledge transfer and information activities; investments in the development, modernization and adaptation of forest and wood processing infrastructure; investments in the establishment and development of non-agricultural activities; elimination of damage in forests by forest fires, natural disasters and catastrophic events; investments in forestry technologies and processing, mobilization and marketing of forest products; establishment of producer groups and organizations.
- **Romania:**
investments in forest area development and improvement of the sustainability and viability of forests, afforestation of agricultural and non-agricultural lands, investment support for new and efficient pollution and soil erosion reduction technologies (production and use of bioenergy from forestry – several local initiatives and biomass value chains have been developed in close relation with local wood manufacturing companies)

Slovenia is involved in several political frameworks at the EU level that have an influence on the wood mobilization and represent good practice examples, which should be continued. As a part of the *EU Strategy for the Alpine Region (EUSALP)*, Slovenia aims to promote circular and bio-based economies in the Alpine timber sector. More than 50 % of forests in Slovenia are included in *NATURA 2000* sites. Forest management planning ensures a strict observation of defined adapted use of natural resources. Measures to achieve conservation objectives are incorporated in forest management plans. Through the Rural Development Plan Slovenia, the forest service is implementing several measures related to forestry. European Structural and Investment Funds (ESIF) are important mechanism in the forest-wood sector, playing an important role in economic development and supporting cross-sectoral and transnational collaboration.

3.2 NATIONAL POLICIES (INCLUDING FINANCING INSTRUMENTS)

3.2.1 CURRENT SITUATION (INCLUDING BARRIERS & CHALLENGES)

In **Croatia**, several strategies are existing (e.g. *Smart Specialization Strategy* fostering research, development and innovation, *Industrial Strategy* boosting of high value-added wooden products, *Energy Strategy* improving wood biomass production), but implementation is quite lagging behind.



In **Slovenia**, several Acts, Decrees and Rules are regulating the area of forestry. *Slovenian Smart Specialization Strategy (S4)* is a strategy for enhancing the economy's competitiveness through improving innovation capacity, diversification and growing new business. Strategic Development Innovation Partnerships (SRIP) Smart Buildings and Home with Wood Chain are derived from S4 and operated in a wide area of sustainable building and homes. The *Action plan "Wood is beautiful"* defines wood as a strategic raw material of Slovenia and sets out the objectives, measures, indicators and deadlines for intensifying forest management and for the revitalization and development of wood processing and the energy use of its residues. *National Forest Programme* defines conservation and multi-functional role of forests and includes also a long-term vision of forest management. The *strategy for the development of Slovenia for 2030* sets important goals for the development of the country, defining low-carbon circular economy and sustainable management of natural resources as key objectives. In recent years, Ministry of Economic Development and Technology launched two public tenders for the development of personnel in wood processing industry.

In **Romania**, the current national political framework in forest sector is changing year by year, due to political instability. Due to the slow process of forestland restitution, sustainable forest management cannot be provided. Nevertheless, the *New Forest Code regulation* is very ambitious and several forest related *associations* exist. In the last decade, a few *clusters* (e.g. PRO WOOD Regional Wood Cluster) have been established as bottom-up initiatives to emphasize the cooperation within the forest-based industry, SMEs, universities, local and national public authorities and R&D entities by offering and pushing trainings, technology transfer, access to new markets, innovation and internationalization of business.

The sustainable wood mobilization in all East Europe Hub regions is facing **problems** related to an inadequate management of fragmented and small-sized *private forest properties*. The knowledge base on sustainable silviculture and climate change is quite low and not considered as important issues. *Forest management plans* are insufficient and the logging is unpredictable. Moreover, the *wood processing industries* are not competitive and struggling with problems of *resource availability*. Low levels of high *value-added products* in the production scope are further obstacles for the future development.

Nevertheless, the forestry and wood industry sectors realise a significant impact in national economies which could be improved through the systematic approach to identified development opportunities with a strong emphasis on the collaboration of stakeholders from the tree in the forest to the final products i.e. along and across the value chain.

3.2.2 GOOD PRACTICES

In Croatia and Slovenia, great efforts are put on *promoting* and increasing use of wood as well as increasing competitiveness of the entire forest-wood value chain considering a sustainable and ecosystem-based way of forest managing. In Slovenia, Forest fund was established for financing several operations related to public forests. The *National Forest Program* is a fundamental strategic document aiming to define a national policy for the sustainable development of forest management. "*Action plan Wood is beautiful*" is an operational document for increasing the competitiveness of the entire forest-wood value chain. In Romania, the EGGER Group, a foreign direct investment enterprise, invested in resource saving technologies. Suitable recycled wood is used for chipboard production or environmentally friendly heat and electricity generation. This represents a *secondary sustainable life cycle* of materials based on wood. Additional, *foreign investments* are promoted by the Romanian government.



3.3 EDUCATION AND TRAINING

3.3.1 CURRENT SITUATION (INCLUDING BARRIERS & CHALLENGES)

East Europe Hub countries face changes and challenges which are influencing education systems, especially higher forestry education and science with repercussions on the basic activities of education institutions which are confronted with two major challenges: *less interest of young people* in studying and increased intensity of *climate change* and its impact on ecosystems. Forests are the most widespread and important natural wealth in the East Europe countries. Therefore, smart and sustainable management of the resources will result in opportunities in forestry and urban forestry, as well as in nature and environmental protection, and this trend will continue to rise in the future.

The challenges of forestry research include a *lack of capacity* among scientists for implementation of research studies, *lack of modern facilities* including high-technology equipment and *insufficient research funds*. These challenges could be addressed by increasing the capacity of research through training/ workshops, increased funding from various donors, strengthening communication and institutional collaboration.

The task of the education institutions and related policy makers is to adjust itself and programs, sector regulations, to the new conditions in the management of forest ecosystems and adequately respond to the new challenges. Forestry practice, forestry education and science must work together to ensure persistence of the definition: forestry is a science, profession and art of managing and preserving forest ecosystems for the permanent benefit of man, society, environment and economy.

3.3.2 GOOD PRACTICES

Croatia conducts *e-learning programs*, which were developed through cooperation with Austria, Slovenia and Croatia. These courses (implemented in all 3 countries) provide for example sustainable forest management and forest protection (e.g. pests) issues.

In *Slovenia*, a *competence centre* for the development of staff in wood processing industries was developed with the aim to increase the skills and competitiveness of employees, companies and industry and to integrate partner companies with research and educational institutions as well as young students. Furthermore, a new project was initiated to develop personnel in the wood processing industry with an emphasis on marketing and digitization. The desired result is to encourage companies to educate themselves about effective marketing strategies and to train them for digitization.

In *Romania*, within the last five years, the *dual education program* (combining theory and practice) has started, which is very successful. Moreover, the Transylvania University of Brasov is the best faculty of wood engineering in Romania, training specialists in engineered wood products, combined with creative industry and sustainable construction approaches (e.g. “Restoration of furniture heritage”).

3.4 RECOMMENDATIONS

Croatia:

The Croatian education system is constantly developing and improving, and education has been intensively promoted as the main base for the overall development of Croatian society and economy. One of the challenges the education system in Croatia is facing within the last decade is the depopulation crisis, which will be reflected in years to come. Development of measures which will tackle the identified challenges is strongly recommended to related ministries. Also, according to the National statistics bureau, educational level of people active in the



agriculture sector is very poor. Because of the mentioned barriers, it is recommended to modernise the vocational education and promote adult learning. Adult learning is the weakest link in the Croatian education system, but a planned new law should introduce improvements. The 2016-2020 lifelong career/ vocational guidance strategy aims, among other things, at raising participation in adult learning through guidance, counselling and offering up-skilling opportunities, particularly to the unemployed. Under an Erasmus+ project, the Ministry of science and education is developing a new basic adult education curriculum based on the key competences concept.

Examples of best practices which gathered Croatian partners present actions related to the formal vocational education and training, specially the implementation of knowledge into practice and on the other hand analysis of programs and development of modern program for formal and informal education.

Recommendations are as follows:

- mobilising the private forest owners by providing them with basic information about the advantages and possibilities about basic forest management and training opportunities
- digital solutions for improving links in the entire value chain of forestry and wood industry
- joint publicity campaigns for promotion of Lifelong Learning and adult learning
- publicity campaigns for promotion of vocational occupations
- modernisation of curriculums and regulations
- development of measures for improvement of knowledge base on sustainable silviculture and climate change
- development of measures for pests and diseases
- increasing the capacity of researchers through training/ workshops
- raising awareness of society for the importance of the forestry and using wooden products
- determining and additionally remunerating the CO2 sink services of forests in the framework of climate mitigation
- increasing of public funding for forestry
- knowledge transfer about measures for strengthening communication and institutional collaboration
- knowledge transfer on education institutions and related policy makers adjustment (itself and programs) to new conditions in the management of forest ecosystems and adequately respond to the new challenges
- development of measures for tackling depopulations crisis inflicting forestry and wood industry
- ensure benefits which forestry should provide for the local community and the population of rural areas, as one of the main principles of the EU Forestry Policy and Strategy,
- strengthening local value chains and local circular economy by promoting and implementing cascading use of wood

Slovenia:

To improve sustainable mobilisation of wood in Slovenia, several issues need to be addressed:

The structure of forest ownership needs to be improved. A potential solution would be the establishment and promotion of platforms for bringing together owners of small and fragmented forest properties, also in terms of cooperative or company formation. That would enable better grounds for implementation of silviculture works and common appearance on the market. Private forest owners, who are not interested in managing and/or possessing the forest should be given a reflection and proposition for buying-in forest properties to ensure formation of compact and well-managed forests.

A well organized, sincere and deliberate press campaign at national level would be needed to raise the awareness on the strategic importance of forests, silviculture and wood for the country and its habitants. The importance



and benefits of wood as renewable, local, versatile and user-friendly material should be more recognized to fully enter general public consciousness. In planning of renovation of old buildings or construction of new public buildings, projects based on wood as a main construction material should be given preference. Also rising the share of wood in green procurement regulation represents a good opportunity for promotion of wooden products.

Through the educational programs of Slovenia Forest Service, private forest owners have several options to improve their knowledge of silviculture, however, only few take advantages to participate in offered programmes. Higher share of private forest owners would need to be reached and informed about the options of attending workshops and seminars through various communication channels.

The primary wood processing industry in Slovenia needs to be modernised and the establishment of advanced and market-adapted sawmills is needed. Currently, there are several measures fostering investments in wood processing industry, however more measures and funds are needed to improve the sector.

Within the curriculum in the field of forestry, there is a lot of space for improvement. Greater emphasis should be put on programming, modelling, remote data acquisition, as well as integration of new technologies and methods. The educational programme needs to promote creativity and innovativeness while considering social and environmental responsibility. Connections between students and future employers should be established in terms of obligatory internships at all levels of educational programs.

It is crucial to strengthen the forestry and wood industry collaboration among different stakeholders within entire forest-based value chain, as well as to foster the linkage of forest-based industry with other relevant sectors. The concept of cooperation should be integrated already in the education system and supported at the national level by policy makers. Tight cooperation between schools and faculties from different fields (forestry, wood technology, design, architecture...) is of high importance and should be promoted through scholarships and funded interdisciplinary projects.

Romania

In Romania, the dual training system started a few years ago and, thanks to local industries, the dual-training approach offers a sustainable education system for the young generation. In the last few years, circular economy principles and the bio-based economy sector is a widely discussed topic in Romania, and a few investments in domestic bio economy facilities have been done already. Such best practices have to be followed by other business stakeholders as well as from the forest-based industry.

It is necessary to improve, however, the Romanian education system: the curricula have to be updated at schools, new workshops and equipment are required at the schools' workshops, and knowledge about state-of-the-art technology is essential for teaching staff. Better stability and predictability in education systems are expected by professionals, teachers, students, and other stakeholders as well.

Summary:

The importance of the forestry in East Europe hub countries had been rising due to the significant role of forests in addressing various emerging global issues. The *forestry education* is crucial for the future development of forest related sectors. Modernisation of the forestry education must consider the changing social, economic and political frameworks. Challenges in forestry related education include declining quality of education and number



of students, obsolete curriculums, low employment opportunities, discrepancy of the industry needs and quality of produced work force, lack of practical learning opportunities.

The education system is crucial for mobilisation of resources and stakeholders throughout the whole forestry and wood industry value chain. Changes in the education institutions and systems are necessary in order to become more relevant in the future. Recommended changes should be implemented through collaboration with different forest sectors, which should include the modernisation of curriculums, development and strengthening of field training, awareness raising campaigns to raise popularity among students, equipping of classrooms with modern technology and equipment, training of students to become a working person with high level of competence.



4 NORTHERN HUB

4.1 EUROPEAN POLITICAL FRAMEWORK

The European Cohesion Policy and its Structural and Investment (ESI) funding for Finland affects wood mobilization primarily through *European Regional Development Funding* (ERDF). Its Thematic Objective 4 (Supporting shift to low-carbon economy in all sectors) covers more than 24% of ERDF funding in the country. In Finland, this highlights the importance of renewable energies and especially energy wood in achieving Objective 4 goals. Target for renewable energies in Finland should reach 38% of final energy consumption by 2020.

ERDF projects supporting wood mobilization vary a lot, including road and terminal network development, energy wood business development, various digital solutions, and investments to forest industries.

The Common Agricultural Policy CAP and its funding through the *European Agricultural Fund for Rural Development* (EAFRD) have been used for projects developing wood industries of SMEs, energy wood use, and wood related business development and e.g. information sharing.

Other interventions by the EU that contribute to wood mobilization include e.g. the *Energy Union Strategy* by the Commission and the emerging *EU Arctic policy*.

4.2 NATIONAL POLICIES (INCLUDING FINANCING INSTRUMENTS)

4.2.1 CURRENT SITUATION (INCLUDING BARRIERS & CHALLENGES)

Besides the updated *National Forestry Strategy 2025*, implementing the UN Agenda 2030 goals for the Finnish forestry the *National Rural Policy Programme* (2014-2020) includes elements that are linked to wood mobilization: maintaining transport networks and terminals for forestry and bioeconomy needs, availability of forestry workforce and related training, as well as ecosystem services. *Lapland Forestry Programme* (2016-2020) supports bioeconomy investments, full use of forest resources, transport infrastructure development, education and RDI development, land use planning, watershed management and biodiversity conservation. The *Finnish law for sustainable forestry (KEMERA)* outlines the practical financial support for private forest owners that can be used for promoting forestry and wood mobilization.

Due to different opinions and development goals of each *government* (*changing* every fourth year), Finnish forestry is not so attractive for foreign and domestic investors. The use of renewable natural resources and related investments are decreasing as government subsidies are not available and actual EU forest politics seem to be confusing related to *renewable energy*. Furthermore, information on forestry is fragmented as there are different forest companies in Finland, which makes the forest operations quite inefficient. Therefore, a new digitalization system (Metsään.fi) was developed to channel all the *forestry data* to one system. Each stakeholder has access to this system, so further development of this application will add to efficiency of forestry operations.

4.2.2 GOOD PRACTICES

Government subsidies or loans and tax policies as well as European funding aim at *new innovations* and interdisciplinary cooperation. *Environmental issues* are of increasing importance, thus funding is being channeled for instance to advancing measures of circular economy. The *regional forest program* in Lapland is developed by means of several workshops with all relevant interest groups including NGOs, reindeer herding livelihood and



other groups related to land use issues. Provincial forestry councils are in charge of preparing the regional forestry programs in cooperation. As the educational institute and the University of Lapland are having representatives in the council, the quality of training in the forest is safeguarded. Additionally, there exist different *financial support systems* from the State, but also from Finnish Forest Foundation – one of the most renowned independent developers and supporters of the forest sector in Finland – for advancing the well-being, abilities and human capital. Furthermore, the Finnish Forest Association is granting funding for the means of youth education in the forestry sector.

4.3 EDUCATION AND TRAINING

4.3.1 CURRENT SITUATION (INCLUDING BARRIERS & CHALLENGES)

In Finland, a *broad range* of educational possibilities is provided: vocational forest education, forestry engineer studies, universities and Finnish Forest Centre with a good selection of courses for forest owners and forest operators. There is a huge demand for forest owners' training and the need will even grow in the future due to ageing of forest owners and changing trends of forest ownership.

Due to *increased harvesting volumes*, the sufficiency of forest machine operators and other forest workers is very important and new educated operators are needed in the future. *Seasonal variation* is one of the biggest challenges in the operational forest management sector. There is a need for closer cooperation between the various forest actors and concrete measures have to be intensified. Combining two seasonal occupations could be a solution: work in forestry sector in summer time and work in tourism sector in winter time. Furthermore, the *ageing and passiveness of forest owners* will reduce wood sales and forest management in the future. The adequate training for those people creates its own challenges. Besides, an increasing number of forest owners live far from their forests and are not financially dependent on their forestry assets, which leads to passive forest ownership.

From the political point of view, it is essential to guarantee the funding for different levels of forestry education. The funding from the Ministry of Education and Culture needs to be channeled also to development projects of teaching and learning environments. In addition, the regional funding from EU is vital for educational development in cooperation with forestry operations and research institutes.

4.3.2 GOOD PRACTICES

Research, development and innovation (RDI) activities are almost unique in scope among Finnish universities of applied sciences.

Retraining/upgrading of qualifications from engineers to experts of bioeconomy and circular economy has been running since 2018 in the universities of applied sciences in Finland. In autumn 2019, ten Universities and Universities of Applied Sciences have agreed to provide *bioeconomy specialization training*. Teaching focuses on forestry biomass, products and circular economy as well as field biomass, recycling and energy. *The secondary education pathway and its pathway studies* are aimed for upper secondary students or graduates.

Politicians are fostering the teaching of forestry and forestry-related branches. *Funding* from the Ministry of Education and Culture is being channeled to educational institutes to create studies that advance *lifelong learning*: specialization studies, upgrading studies and smooth transition from vocational schools and high



schools to universities and universities of applied sciences. Also, the *regional funding from EU* is being channeled to development of forestry education.

4.4 RECOMMENDATIONS

The Northern hub had a Wood to Excellence seminar and workshop 17.12.2020. Results from this event point out clearly a need for promoting sustainable forest policy thinking at European Union. A long-term support for forestry and bioeconomy is needed in order to support and promote investments in Finland. The most essential issue right now is the Green Deal, the European climate agreement, which aims at ensuring carbon neutrality by 2050.

Petri Sarvamaa is a Member of European Parliament and the head negotiator for the preparation of a new forestry strategy for the European Union. In the seminar, he highlighted the role of forests, which covers a wide range of sectors, rational use of forests and the jobs it provides, forest protection and biodiversity conservation, as well as the role of forests as carbon sinks.

Concerning politics in Finland, there is a need for a long-term support for forestry and bioeconomy. Nowadays, the visions and opinions change every fourth year, when a new government is elected. This shortsightedness is not advancing the acceptability, support and investments of forestry.

In the Wood to Excellence seminar, the County Governor Mika Riipi from the Regional Council of Lapland emphasized the importance of forests to Lapland from three perspectives: the role of forests as a source of income, their role in restraining climate change and protecting biodiversity, as well as a source of future prosperity. However, the new forest investments in Lapland would also bring challenges. The role of forests in the region is growing and it increases the need for open discussion between different forest users. Further, there were several participants from different forest organizations who made a SWOT analysis on the forestry innovations and R&D activities in Finland. The main result was that big companies have the knowledge and the desire to develop innovations. In smaller companies and, for example, forestry associations, R&D activities are quite limited. Although larger companies have different R&D systems, not all of them may be motivating enough for employees to come up with new ideas. One recommendation is that all companies should put more effort to develop the R&D activities where all their employees can participate.

Another topic of the workshop was to discuss what political and strategic measures are needed to promote the mobility of wood. As a result, the participants agreed that there should be more political support measures especially for rearrangements of forest estates and for establishment of joint forests and forest consolidations. Both of these arrangements lead to more productive forest ownership and forest management that benefit all stakeholders in the wood mobilization chain. Especially in western Finland, there are plenty of forest estates rearrangement projects going and the results have been positive. However, both of these arrangements require further information for forest owners and more training for both forest owners and operators. Especially the establishment of joint forests often involves disputes between generations and families, requiring an external property manager. Forest management associations provide these services, but there would be space for new forest service entrepreneurs as well.

Strategic measures to promote the mobility of wood include carbon sinks, new technology and increasing know-how between all the operators. Finland has committed to be carbon neutral by 2035 and this task will require a great deal also from forestry industry and management. Carbon emissions and their impacts are quite a new



challenge for all, but especially forest owners will need more information and guidance in the future. New technologies create opportunities to take carbon emissions into account, e.g. in forest machines.

Finland is one of the countries that is warming faster than other countries on average due to climate change. This means that there is a rapid need to develop new technologies that are suitable for harvesting forests when the ground is unfrozen. Climate change is also putting more pressure on moving to year-round felling, which underlines the importance of a well-maintained lower road network. Even though forest road network is seen as strength in Finland, there is a crucial need for developing the expertise of forest road construction and maintenance. Especially in Lapland the new investments by forest industry will require constant maintenance of roads and other infrastructure.

Recommendations for education and finance:

A quarter of the forest industry workers in Finland will retire within the next ten years. Retirement, combined with new investments, will create more jobs in the forest industry. This will give pressure for educational institutes to educate enough work forces. The importance of education as a success factor for Finland's forest sector will grow further in the future. The availability of a skilled workforce requires an excellent training system that responds to changing needs of industry. Also, there is a need for more efficient cooperation and networking between different forest education institutions, research institutes and companies.

One solution for meeting the lack of workforce is to increase the number of foreign labor in the forest sector. The government has a goal of easing the granting of work permits in Finland to speed up the immigration of foreign workers.

Education providers need to develop more flexible ways to study and the education needs to be made more accessible to everyone. This requires developing the various paths to enter the educational institutes. Also, the transfer from one educational institute level to another one needs to be made simpler.

Development today is really fast in every area and that is why all the workers need continuous training. Educational institutions should pay special attention to these needs and invest in providing the necessary courses for operators in the field. Finnish Forest Centre already offers many courses but their focus is on forest owners. Altogether, the supply of forestry training should be increased also for operators.

The currently fragmented forest data should be available in one operational system, Metsään.fi. Each stakeholder has access to this system, so further development of this application will add to efficiency of forestry operations. Finnish forest expertise is of high quality. However, the main challenge is to maintain and still increase the level of basic technological research, knowledge and education in interdisciplinary networks.

Finland has a wide range of different funding channels and most of them can offer funding for forestry and bioeconomy activities. The application process and project implementation should be made simpler: nowadays, they are seen as very difficult and heavy processes, unless you have a big organization with a lot of specialized people for project management and financing.



5 SOUTHERN HUB

5.1 EUROPEAN POLITICAL FRAMEWORK

The ROSEWOOD Southern Europe Hub covers Spain, France and Italy. Forestry in the South Europe Hub comes with unique conditions and challenges due to its climate. With global warming at the forefront, fires, pests and diseases occur more often and pose a serious threat to wood mobilization in the South. In addition, low prices for wood significantly reduce the profitability of harvesting in the region. Another prominent problem is the increasing abandonment of rural areas, which not only leads to idle, unutilized forest stands, but also puts other tended plots of land at risk with the expansion of coppice, a natural accelerant in case of wildfires. Potential alleviation could offer introduction of taxation on the abandonment of land or abolishing fiscal regimes that penalize companies offering management services to forest owners. On the contrary, more and better skilled professional agents are needed to serve forest owners living far from their forest estate.

European Structural and Investment Funds (ESI Funds) should be the main financial support, in particular, the *European Regional Development Funds (ERDF)*. But the EU Commission contribution is rather small, as stated in the “Evaluation study on the forestry measures under Rural Development” (Nov.2017) and in the “Report on the progress in the implementation of the EU Forest Strategy” (Dec.2018). The *CAP (EAFDR)* contribution represents € 6.4 /ha/year or € 1.17 bill/year. On the average it is less than 5% of RDP budget.

The *EU Cohesion Policy* plays an important role in encouraging economic development and reducing regional disparities in the countries. Sustainable growth, fostering of research and development, boosting the innovation potentials of small and medium sized enterprises (SMEs), promotion of resource efficiency and reduction of environmental pressures are further targets.

The overall EU funding for R&I in the forest-based sector in Europe is € 88 mill/year or approx. €0.5 /ha/year. But, despite the small amount, the EU RDP forest measures have a strategic character, first of all, for the Southern Countries, which suffer most of the forest fire problems. For the upcoming period (EAFRD 2021+) the related measures and funds are currently discussed on EU level (until end of 2020) and hopefully, the funds will be better distributed between agriculture (or better said: farming) and forestry.

The *EIB “European Investment Bank”* support is another important pillar, which is increasing and now provides € 6.7 /ha/year or €1.22 bill/year. The Bank offers a wide variety of products:

- Loans for the public sector
- Framework loans for the public sector
- Loans for the private sector
- Intermediated loans for SMEs, mid-caps and other priorities

In 2014, the EIB and the Commission created a new instrument: the *NCF (Natural Capital Financing Facility)* to conserve and restore ecosystems through projects of 2 to 15 M€.

There are around 15 million forest owners in Europe (more than farmers), but there is not a Forest Accountancy System similar to FADN for farms and many countries do not know the level of investment in forestry!

Recently, some regions from the Southern Europe Hub (such as Sardinia and Castile and León) joined the *EUSTAFOR Network (European State Forest Association)*, established 2006 in Brussels. It represents a strong, well-coordinated voice for sustainability and the use of forest resources at EU and pan-European level (Strategy '19-21) committed to sustainable forest management and the guiding principles of the EU Forest



Strategy. Also, the *European Innovation Partnership for Agricultural Productivity and Sustainability (EIP-AGRI)*, contributes to achieving all 9 CAP (Common Agricultural Policy of EU) specific objectives.

The *EU Green Deal* offers a great opportunity to boost forestry and the role of forests and the forest sector in a new, more sustainable economic European model. The new *Forest Strategy* should take into consideration other policies with influence on forests and the forest-based sector. The crucial point is the **coherence among policies** and Southern regions consider highly relevant for the sector the new **Biodiversity Strategy**, the Land Use, Land Use Change and Forestry agreements and other climate change and energy related regulations.

In Southern Europe, there are still millions of hectares of degraded forests and bushlands with no specific biodiversity values that could and should be reforested in the next decades, to increase carbon fixation and future forest resources. An ambitious goal of annual **reforestation** should be established and financed, with European support: 500,000 hectares/year is a reasonable objective, that would contribute to the Global Forest Goals for 2030.

A strong effort should be dedicated to increase and improve **communication and education** on forest issues, since urban societies do not understand the role of forests for society and the need and possibilities of intervening on forests. The number of people that prefer not to use the forests or avoid hunting, in order to supposedly better protect biodiversity and increase carbon sequestration is increasing. It is therefore rather important to guide general public perception based in sound science and knowledge, avoiding fake messages.

The relevance of **tourism** in Southern Europe, that is the world most attractive tourist destination, should be used in order to strengthen tourism in nature and forest services value chains that are perfectly compatible with other forest products value chains, and particularly with Non Wood Forest Products Value chains, that are synergistic.

5.2 NATIONAL POLICIES (INCLUDING FINANCING INSTRUMENTS)

5.2.1 CURRENT SITUATION (INCLUDING BARRIERS & CHALLENGES)

In New Aquitaine, financial aid does cover the needs of foresters on some points (aid from the region, ADEME, some departments such as Gironde, Lot-et-Garonne, Dordogne and Pyrénées-Atlantiques). A significant proportion of aid is allocated to problems related to the mobilization of wood, such as the cable plan (to mobilize more wood in the mountains) or aid for the provision of services. Research also benefits from a lot of financial support from Europe, the State and the region, in particular for the Scientific Interest Group named Group Pin Maritime of the Future (GIS GPMF), which includes the National Institute for Agricultural Research (INRA), the technological institute Forest Cellulose Wood-Furniture (FCBA), the CRPF of New Aquitaine, the Productivity and Action in Forestry of Aquitaine (CPFA) and the ONF on issues such as the adaptation of maritime pine forests to new economic and environmental contexts. Also, the DFCI (organism of forest fire protection) is well covered by financial aid. Financial assistance is no longer sufficient for reforestation. The forestry services of the Regional Directorates of Food, Agriculture and Forestry (DRAAF) conducted a survey on planting dynamics, whose results for 2017 and 2018 are negative: an 11% decrease in the number of plants sold compared to the previous season (source: DRAAF-IRSTEA). This example illustrates the usefulness of aid for reforestation work.

In Tuscany (Italy), the whole wood mobilization value chain is covered by calls for proposal in RDP and we can say that all forestry sectors are involved. So, all the forest activities are covered and all the EU Regalement measures are implemented, except for the equipment not directly involved in economic interventions (i.e. the



purchase for fire protection are not covered). Nevertheless, the wide range of typology of interventions and beneficiaries may allow improving the performances about forest management and wood mobilization. Also, investments on innovation and new technology should improve the sector.

In Castile and León (Spain), there is a serious problem of forest fragmentation, affecting 1 million hectares, distributed among more than 600,000 owners that have around 1.5 hectares each. There is an insufficient knowledge of private forest owners and there is not a specific institution to provide support for private forest owners, like in France (CNPF) or Finland (Metsäkeskus). The same situation could be observed in Tuscany. Most private forest owners have not implemented Sustainable Forest Management. They have their forests abandoned and do not participate in active management. The risk for forest fires is especially high in these lands that are not considered valuable or useful. An adequate regulation of agroforestry systems would be very useful to develop Sustainable Forest Management in the region, but CAP rules and definitions, especially related to permanent pastures, admissibility criteria and similar ones, generate discomfort and misunderstanding.

5.2.2 GOOD PRACTICES

In France, many of the forestry issues are taken into account in the aid scheme: consolidation of properties, creation of services, forestry work, reforestation, improvement of stands and carbon storage. With the European Agricultural Fund for Rural Development (EAFRD), the following measures are receiving European funding: training of forestry sector assets, information and dissemination of scientific knowledge and innovative practices, support for forest servicing, assistance with equipment for ETFs, improvement of existing stands, conversion or transformation of old coppices, sub-forestry coppices or low quality forests into forests, assistance for the restoration of forest stands, preservation of mountain forests and improvement of their protective role, defence of forests against fires, non-productive investments in forest environments, preparation and animation of Natura 2000 objective documents, conservation and enhancement of the natural heritage, first afforestation of agricultural land, support for the first installation of agroforestry systems on agricultural land and local strategies for the development of the forest-wood sector, promotion of tourism activities.

The most interesting tools to mobilise wood, dynamise forestry and the forest sector in France and Nouvelle Aquitaine are presented in the policy framework analysis and are the following:

- 1.-*CNPF*: Centre National de Propriété Forestière or National Center for Forest Ownership
- 2.-*GIEEF*: Groupements d'intérêt économique et environnemental forestier or Forest Economic and Environmental Interest Groups
- 3.-*ASLGF*: Association Syndicale Libre de Gestion Forestière or Free Union Association for Forest Management
- 4.-*OGEC*: Organismes de gestion et d'exploitation en commun" or Joint Management and Operating Organizations
- 5.-*DEFI*: Dispositif d'Encouragement Fiscal à l'Investissement en Forêt or Tax Incentive Scheme for Investment in Forests
- 6.-*CIFA*: Compte d'Investissement Forestier et d'Assurance or Forest Investment and Insurance Account
- 7.-*SODEF*: Société de Développement de l'Économie Forestière or Forest Economy Development Society
- 8.-*Fonds Forestier en Limousin*
- 9.-*Low-Carbon Label* or "Bas Carbone Label"
- 10.-*La Forêt Bouge* platform for forestry
- 11.-*The "Fond Stratégique de la forêt et du bois" (FSFB) and the previous FFN*
- 12.-*The promotion of forest cooperatives*



13.-DFCI, the regional association to defend forests against fires

In Italy (Tuscany), rather than the lack of subsidy, it is the lack of animation that is the limiting factor. Good advice is better than a sprinkling of funds. Increasing subsidies from organizations such as the French CRPF would therefore contribute to a better articulation of forest management and an increase in mobilization. The recent creation of the low-carbon label could lead to an intensification of wood mobilization. Through this label, owners will be able to benefit from private funding for the management of their stands. The financing of services is not fully utilized every year. This is due to a difficulty in mobilizing stakeholders. The same problem exists with the financial aid allocated to Forest Economic and Environmental Interest Groups (FEEIGs).

In Spain the cadastral system can be considered a good practice, as it functions really well, even if its information on forest property is not well maintained, and an effort to revise forest plots is really needed, as basic information for forestry. Forest associations are well established, since the eighties, and have also been very active attracting forest owners. Still, they only represent less than 20% of forest owners. Subsidies for private forestry were implemented in the '80 and are well established since the first Regional Rural Development Plan in 1993. Subsidies for reforestation have been very well implemented and successful. More than 250.000 hectares of new forests have been created, and after 25 years, they are beginning to provide some resources and revenue.

More recently, the "[Regional Program for Forest Resource Mobilisation in Castilla y León \(2014-2022\)](#)", the "[Action Plan for Bioenergy in Castilla y León: 2011-2015](#)" and the [2011 EIB loan to SOMACYL](#), the regional environmental public enterprise, to prevent forest fires and install heating facilities in public buildings fed with biomass are other good practices that are increasing wood and biomass mobilisation.

5.3 EDUCATION AND TRAINING

5.3.1 CURRENT SITUATION (INCLUDING BARRIERS & CHALLENGES)

The education system in the Southern Hub has a similar structure in the three regions:

University: Graduate, Master and PhD titles with at least one main University in the region (Bordeaux, Florence and Valladolid)

Professional training: There are diverse institutions devoted to professional/vocational titles and certificates related to forest and wood

Counseling systems: Several institutions in the 3 regions provide advice, training or information, for example, Forestry Management Training (FOGEFOR) for forest owners in New Aquitaine and Aprofomo Training course in Tuscany.

Regarding the **barriers** and limitations, each region faces different **challenges**:

CASTILLA Y LEÓN

- With the deep and structural depopulation of the territory, an important difficulty of finding operative personnel is being noticed
- The training is dispersed in three different Departments (Development and Environment, Industry and Agriculture) and without clear coordination. It is necessary to reorganize the current division of



Departments and strengthen the involvement of Environment in the instruments that can serve for the promotion of business sector in forestry. There should be an instrument for coordination between the Departments

- The majority of industries in the wood sector are located in rural environments (not attractive, especially for young people)
- Companies do not trust the professional qualification systems that are being developed, they are extremely complex, unconnected with sector realities and it is considered that they do not seek to solve the needs of companies or improve the employability of workers.
- It is necessary to work towards a more competitive, modern, resilient primary sector that favors generational change and produces sustainably and healthily.

NEW AQUITAINE

- 93% of the area is privately owned; Around 650,000 forest owners in the region. Only 14% of owners have more than 4 ha, which represents 78% of the forest area. The remaining 22% are small properties
- Forest Work Companies are generally very small in size. This leads to a problem of access to training, workers do not have enough time for it.
- The poor image of the forest-wood sector makes initial training unattractive to young people. In addition, there is the difficulty of access to appropriate continuing training for forest work companies. The result is a loss of skills and a lack of manpower that hinders the mobilization of wood.
- The offer of initial and continuing training is varied and covers the whole sector. It is necessary to modernize training to support the sector in the quick evolution. To do this, the actors must unite and express their needs.
- Finally, a communication strategy on the upstream side of the sector must be implemented in order to enhance the image of the sector, so that it gains in attractiveness. This involves training actions for elected officials, forest owners and awareness-raising actions for the general public.

TUSCANY

- There is limited connection between education, training system and forest companies yet.
- The application of innovation and new technologies is specially missing.
- The university educational offer is excellent, but the region suffers instead from the general discontinuity of the activation of specific courses for forest workers. There is therefore a large gap between technicians and consultants who have a high level of education and forestry workers who are often not properly trained.
- Public opinion considers forest management negative, exchanging the necessary forest care for deforestation, and often influences the choices of administrators and politicians.
- In Italy, it is still wrongly believed that experience is worth more than education and school career. This creates unprepared staff. This is a key factor that slows down the possibility of access to new technologies, and therefore the possibility of a sustainable rural economic development.



5.3.2 GOOD PRACTICES

Among all the best practices related to education, the following ones have been selected as the most relevant inside the Southern Hub:

COOPWOOD project (Spain-France)

- This project aims to foster cross-border cooperation between actors involved in vocational training in the field of wood and its business: <http://coopwood.eu/>

European Forestry and Environmental Skills Council (EFESC)

- EFESC is a membership organization of industry representatives and organizations which manage and monitor the skills and competence certification processes on national level (Chainsaw, Tree felling, Damaged trees...). Actually there are 8 member countries including Spain and Italy: <https://efesc.org/>

Xyloforest

- A research, innovation and service platform for cultivated forest systems, products and materials. Its objective is to contribute to the adaptation of forest resources to climate change: <http://www.xyloforest.org/>

Futurobois

- A registered association, operating by voluntary membership since 1993. The objective of this interprofessional association is to unite professionals in the forest-wood-paper sector within an association to exchange and meet: <https://www.futurobois.net/>

5.4 RECOMMENDATIONS

Recommendations are related to the work done in WP3 for the Deliverable 3.2 (use of the public funds in the wood sector across Europe), as follow:

1. Public funds for wood mobilization should also consider other ecosystem services.
2. There is a need to improve the estimates of forest values and consider together:
 - The forest sector added value;
 - The ecosystem services value.
3. There is a need of a common Forest Accountancy System and to improve the information on economic policy, that is not very reliable.
4. Forest holdings and forest contractors are the key links for forest resource mobilization.
5. There is a wide variety of instruments to support the forest sector, but the budget lever is inoperative for lack of sufficient funds. They support highly valuable goods and services with very limited public contribution.
7. To increase future forest values we need to increase investment in forestry and more public support is justified.



6 GENERAL RECOMMENDATIONS (VALID FOR ALL HUBS)

6.1 FOREST OWNERSHIP

➤ **Motivation for management, mobilisation of private (small/fragmented/urban) forest owners:**

Training opportunities (basic information about adequate forest management: tree species, thinning and tending measures...), information campaigns, events etc. for private forest owners

Best Practice examples:

Youtube video clip of the Federal Research Centre for Forests and Landscape (BFW) in Austria „Günther has inherited a forest“ (<https://www.youtube.com/watch?v=vcTqTUQpDGo>; <https://www.youtube.com/watch?v=VX4T06cUXls>) providing some instructions which steps are necessary if someone inherits a forest

➤ **Establishment and promotion of Forest Association/Cooperation structures**

for harvesting (e.g. machinery rings), for silvicultural treatments and other improvements (e.g. joint merchandising) or for forestry consultancy (planning, management and advisory); Since they maintain the contact with forest owners these structures are considered as key factor for wood mobilisation.

Best Practice examples:

Constitution of “Alliance Forêt Bois” is the largest French forest cooperative with more than 50 years of history

In Baden-Württemberg, forest cooperatives were installed and these institutions take care of very small forest owners, which are partially financially supported by the government. About half of the private forest owners are involved in these cooperatives for joint merchandising.

In Tyrol and Vorarlberg, forest management is conducted through public authorities, forest rangers are integrated within the Forestry Services (→ less personnel demand)

“Forest Association Graz Surrounding Area” is a project, which is funded by EAFRD and which offers its members an exemplary comprehensive service from the identification of forest locations to marketing.

BlueBiloba (developed by the University of Florence): an online communication platform (www.forestsharing.com) was developed for private forest owners to manage their forests adequately (implementation of sustainable forest management considering the different ecosystem services of forests, sharing economy: companies, new innovative market, sharing platform)

In Finland, associations with more than 100 forest owners are strongly interrelated with sawmills etc. for several years

➤ **Land consolidation of small parcels and eventually also joint leasing of land**

Like in agriculture, also within forests land consolidation processes of fragmented and small parcels could be envisaged, so that for example joint leasing of this consolidated area is possible.



Best Practice examples:

In Baden-Württemberg, such consolidation processes were conducted successfully.

➤ **Foundation of joint-stock-companies on local level:**

Forest owners from neighboured forest corridors unite and establish a stock cooperation. Each member receives the amount of shares in the company according to the size of his forest brought in. They then jointly take care of the big forest and profit from the scale effect.

➤ **Identification and quantification of forest owners:**

National authorities should improve and revise the cadastral system that in many countries does not cover forest areas or is not properly maintained. The creation of national or regional forest holdings registers should be considered.

➤ **Revise the levels of income, investment, other costs and profit in private European forest holdings, including regional differences, and improve future European forestry statistics with this type of data that nowadays is missing for many countries and regions.**

6.2 FOREST MANAGEMENT

➤ **Fostering active and climate fitting forest management and wood processing & research activities**

Best Practice examples:

Certificates for an economically, ecologically and socially sustainable operation of forest enterprises (installed by BFW in Austria, 2018)

Cooperation platform “Forest-Timber-Paper” in Austria: boosts the importance of the timber value chain for economy, policy and society by supporting private forest owners; “Timber Dialogues” for knowledge exchange with representatives of forestry, wood and sawmills industries as well as the wood processing industry

“Timber promotion fund” of the Chamber of Agriculture in Austria: to foster measures for merchandising and marketing of wooden products and general promotion campaigns

➤ **Fostering flagship wooden projects**

Best Practice examples:

Forest Campus Traunkirchen, wooden sky scraper in Vienna (the second highest in the world – 84 m) and in Hamburg

➤ **Fostering Forest industry associations**

Several cooperation platforms of timber and sawmill enterprises working in the field of lobbying the interests of timber processing industries especially in Central Europe and in Scandinavia



Best Practice examples:

Fachverband der Holzindustrie Österreichs (<https://blog.holzindustrie.at/>)

Deutsche Säge- und Holzindustrie (www.saegeindustrie.de)

Verband der Säge und Holzindustrie (www.vsh.de)

Swedish Wood (www.swedishwood.com)

Wood products (www.woodproducts.fi)

Finnish woodworking industries federation

(<https://lobbyfacts.eu/representative/eb182647a9be4a3cbc61697caf16b084/federation-of-the-finnish-woodworking-industries>)

- **Fostering alternative products of wood & research activities** (by means of structural and financial initiatives):

Optimisation of wood use while assuring the maximisation of resource efficiency along the value chain: life cycle analysis across the entire value chain (cascade use) – e.g. fibres, pulp, packaging, pellet and wood chip central heating devices

Enhancing additional income through several wild products in forests (e.g. cork, resin, fruits and mushrooms)

Best Practice examples:

SORA (From Waste to the New Product, Slovenia): circular economy and increase added value through waste wood collection and reuse/development of new products

“Food Forest” project in the Netherlands (Welna estate) funded by the Rural Development Programme: planting of “food products” (nuts, berries, herbs etc.) in the forests to increase biodiversity, production, experience, economic value (use through gastronomy)

- **Improvement of communication between different stakeholders** (forestry and wood industry) along the value chain of the wood (e.g. digital solutions)
The solidarity between forest industries, sawmills and forest owners should be improved in the future

Best Practice examples:

Austrian Forest Strategy 2020+ (developed in the framework of the “Forest Dialogue” with all forest-relevant and forest-interested stakeholders in Austria)

SIA Management of Latvian Roundwood measurement and accounting: Development of a uniform support system of wood flow management for more effective forestry development by applying innovative information and communication technologies to make forestry more effective for all market operators (wood seller, buyers, providers of services)

- **Forest data combined in one joint operational system**

With the cooperation of [JRC](#) (Joint Research Centre), a **European Forest Management Inventory**, based on remote information, like LIDAR, similar to the [Finnish Forest Management Inventory](#) of Metsakesus, should be carried out. This tool would be complementary to the National Forest Inventories and altogether would



make up the European Forest Inventory, once the coordination efforts of [ENFIN](#) (European National Forest Inventory Network) culminate.

LIDAR and satellite data should be funded and the access to these data must be regulated in an adequate way.

Best Practice examples:

Metsään.fi – new developed application in Finland, where each stakeholder has access to it; thus the efficiency of forestry operations will increase

Forest LidaRioja (in Spain): updating and enhancement of forest data in La Rioja region using remote sensing technologies (LIDAR and satellite data)

➤ **Balanced forest and game conditions** (especially in the Central Hub)

Hunting has to be conducted ecological sensibly, that means balanced forest and game conditions have to be achieved and not only hunters but also the forest owners have to be informed adequately (e.g. information campaigns and seminars for hunters and forest owners)

➤ **Funding systems (especially on EU level) for forest owners should be improved**

They should be made more user-friendly, so that also small or medium-sized forest owners can submit for funding.

The amount of financial support should be enlarged according to the ecosystem services provided by private forest owners (Payment for ecosystem services = PES and other forms of financing) → the existing funding through the Rural Development Programme (the 2nd pillar of CAP) should be improved and adapted accordingly (UNFF recommendation for the global forests: Brief study on funding and finance for forestry and forest-based sector – Tomaselli report 2006). When MAES project (Mapping and Assessment of Ecosystems and their Services) is completed it will be interesting to compare the value of ecosystem services from agricultural area and the value from forests, versus public funds for one type of area and the other.

Best Practice examples:

In Tuscany, a handbook was developed for the local and regional entities for promoting EU funds in forestry

MAES project

(https://ec.europa.eu/environment/nature/knowledge/ecosystem_assessment/index_en.htm):

Estimation of the value of all the most relevant ecosystem services provided by forests

➤ **Fostering the establishment and funding of forest advisory systems**

More efforts are needed to compare the different forest advisory systems across Europe and to provide recommendations to Member States and regions



- The **small and medium forest enterprises** established as forestry contractors for harvesting or silvicultural treatments are fundamental to maintain the **economic pillar of forestry in Europe**
- **Avoiding of illegal timber import in Europe**
30% of timber import in Europe is illegal and even the true origin of local timber is often uncertain as most of the transparency gets lost in the process steps.

Best Practice examples:

Xylene – Boosting Trust in Timber: fast risk assessment tool (based on satellite technology ESA) – a system that works with the blockchain to bring a new level of trust and transparency to the timber industry (end-costumers and sawmills).

PEFC (Programme for the Endorsement of Forest Certification Schemes)

- **Multifunctionality of forests and the need of forest management plans**

Forestry needs to be oriented towards multiple functions, but only resources with value for markets provide an income that could sustain future investments in the creation of added value from forests, for the future provision of different services.

Public funding is needed to sustain the investments in treatments and actions that would increase the future value of biodiversity conservation, clean water production, protection of infrastructures, climate regulation or recreation.

The only way to guarantee the provision of those multiple functions, now and in the future is foreseen, but no more than 50% of the European forest and woodlands have a management plan.

Public funds should support forest management planning and incentive certification processes that would provide additional guarantees of successful provision of public goods and services from forests.

Best Practice examples:

Forest Development Plan (WEP) in Austria: was drafted by experts and contains recommendations on the functions of the entire Austrian forest based on the Forest Law. It is a superordinate strategy to assess the forest conditions on a federal level, identify the key functions (utility, protection, welfare, recreation) of forests and to help maintain all forest functions for the long term through future-oriented planning.

6.3 FOREST EDUCATION/INFORMATION & RESEARCH

- **Awareness raising activities towards adapted forest management measures (considering climate change) & boosting research activities**
e.g. developing new technologies for harvesting on unfrozen ground due to climate change in Finland and research activities towards climate fitting forests

Best Practice examples:



Excursions to certain testing areas for private forest owners and development of brochures demonstrating adequate tree species according to the respective region (Upper Austria)

„Wald wird Mobil“ (<https://www.wald-wird-mobil.de/>) – an initiative in Germany towards sustainable silvicultural management (forest experts provide professional support for private forest owners)

➤ **Promotion of forests & wooden products**

Awareness raising of the different multi-functional values of wood (ecosystem services) in society and politics should be fostered: Forests are not only important due to their commercial value, but also tourism and health aspects as well as protection functions and the storage of carbon dioxide in case of wooden products are essential for the future. These aspects should be made known by means of different media channels (press articles, TV, social media....).

➤ **Fostering skilled forest workers and information of forest owners**

The programs of training and education for skilled forest workers should be reinforced, applying the European Dual System. Whereby online learning possibilities and actual training within the forests, especially focused on digitalisation, should be further boosted.

There should be an EU-wide recognition of programs and titles and the opportunity for the integration of immigrants in Europe. It is recommended to launch a [Forests Skills Blueprint alliance](#) for the forest sector, financed through ERASMUS +, to improve training and education for the structural changes taking place in the sector (DG Agri, DG Education and DG Grow should cooperate in this context). The one in construction (2019) might help a certain value chain, but not most of them.

Additionally the mobilization of young people through attractiveness of forestry (using new communication tools) should be envisaged in the future, whereby interdisciplinary (e.g. climate change and bio-economy) should be fostered in the provided training courses (like in Finland).

Best Practice examples:

Forest Campus Traunkirchen in Upper Austria is the greatest and most advanced competence centre for forests in Europe: provision of a wide range of training courses for the different needs from owners of small forest enterprises (one week training for new forest owners is obligatory) up to professional forest workers of large and state-owned enterprises (e.g. safety-conscious working techniques for the safe realization of difficult timber harvesting in mountainous regions); clearing house for chainsaw driver's license or forestry worker's training for the whole of Europe

Chamber of Agriculture in Austria: provides advisory services for very small and also medium-sized forestry enterprises for economically viable management (financed by the Rural Development Programme since 2007, extended in the current period)

Finland: upgrading of qualifications from engineers to experts of bio-economy and circular economy, bio-economy specialization training

- **Joint publicity campaigns for promotion of Lifelong Learning** and adult learning, vocational occupations
- **Efficient cooperation and networking between different forest education institutions, research institutes, universities and companies**

Best Practice examples:

EIP-Agri Operational Groups: bridging practice and research to foster a competitive and sustainable forestry (e.g. workshops, brochures, projects)



➤ **Precise information and transparency**

Information technologies provide a unique opportunity for a technological jump in forestry and the entire forest-based sector.

The most basic need for forest resources mobilisation is to have the relevant information. In this case the forest stakeholders need information on:

- Resources, improving the forest inventories, linking national and management unit inventories.
- Operations, logistics and forest roads networks.
- Resources, products, by-products and residues, linked through flux diagrams, like the [EUWood project](#), the [CASCADES project](#), and the recent [JRC Sankey biomass diagrams](#).
- Internal markets, including market operators, transactions and products by quality categories, prices, amounts and values.
- Trade, by type and quality of products, with amounts, destinies or origins and prices.

New info technologies and programs, like [Copernicus](#), have the potential for strong increments in productivity and substantial changes in the ways of working. For instance, applications to control harvesting, now incorporated in most wood processors, should be integrated with management records to revise and maintain forest holdings inventories.

There exist several platforms, [already mentioned](#) (e.g. “Wald wird mobil”), to connect forestry stakeholders and the provision of services, with a huge potential to open and integrate the markets, increasing transparency substantially.

