

NOVEL GREEN FOREST JOBS IN PAN-EUROPE

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1. INTRODUCTION



The forestry workforce in Europe has traditionally been associated with conventional roles that involve timber harvesting, logging, and forest management. The FAO/ECE Report published in 2018 discusses how Green Jobs are an opportunity for the forest sector and contribute to the achievement of many Sustainable Development Goals. The da Silva & Schweinle (2022) report “Green Forest Jobs in the Pan-European Region”, which provides an in-depth analysis of the current state and prospects of the forest sector workforce, illustrates how the number of employees in the sector is shrinking and aging in the last ten years, just 21% of workers are women, and in general, earnings in the forest sector are not competitive to other sectors with higher added value. Further, health risks associated with the job, physical intensive working conditions, seasonal and informal employment and shift to multi-purpose management are among the general causes of workforce shortage in the European region (ECE/FAO, 2019). Indeed, the perception of the forest sector as a traditional and static one is challenged as the sector is undergoing a profound transformation (ECE/FAO, 2018). Exactly for this shift towards multi-functional forest management and attention on bioeconomy, the numbers illustrated in these reports might be an underestimation given the fact that we are witnessing in the pan-European region a shift in the nature and modalities of Green Jobs in the Forest sector. Indeed,

the number of people occupied in the broader forest sector might be expanding, if we account for people dealing with forest ecosystem management, wellbeing and recreation (ECE/FAO, 2018).

To be able to give more accurate representation and accounting, FOREST EUROPE fine-tuned a description of Green Jobs specific for the forest sector, namely “Green Forest Jobs (GFJ) provide forest-related goods and services while meeting the requirements of sustainable forest management and decent work”. Further, decent jobs are those that “are productive, provide adequate income and social protection, respect the rights of workers and give workers a say in decisions which will affect their lives” (ILO, 2013).

Meanwhile, the sector is also going through a transformation in line with a more general transition in the workforce at European level. The main trends and drivers affecting GFJ in Europe are linked to just transition and bioeconomy concepts and policies, technological and mechanization advancements, the widening of consulting services in the sector, the increasing interest in cultural ecosystem services of forests and health and wellbeing, and public perception of forestry and role of nature (da Silva & Schweinle, 2022; ECE/FAO, 2019).

Just Transition and Bioeconomy concepts stand out as a pivotal opportunity to broaden the traditional forest-based sector. This involves transitioning towards a more sustainable, bio-based economy, emphasizing the integration of renewable resources and reducing environmental impact. daSilva & Schweinle (2022) also emphasizes the importance of attracting a **younger workforce** to the sector, underlining the need for educational initiatives focused on environmental and forest studies.

Technological advancements and mechanization play a significant role in reshaping the forestry workforce. Automation and innovative technologies are transforming traditional tasks, requiring workers to adapt and acquire new skills. **Digitalization** is also thriving in the sector. Cutting-edge technologies for monitoring, acquiring data, analysis and management are available to be used in the application of real-time monitoring of health and risks and improve efficiency in management and decision. Digitalization and integration of technology also serve the purpose of integrating data from the sector. (Singh et al., 2022; Panyavina et al., 2021; ECE/FAO, 2019).

Consulting services emerge as a crucial component, providing expertise in sustainable forest management, conservation strategies, and ecological restoration.

Cultural and wellbeing ecosystem services provision represents an evolving trend in GFJ. This involves recognizing the broader value of forests beyond economic aspects, incorporating cultural and wellbeing elements into sustainable forest management practices (FOREST EUROPE, 2019).

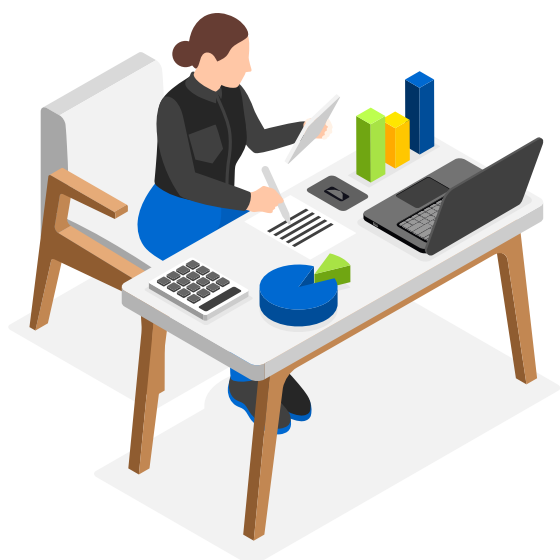
Public perception of forestry and role of nature - people in contemporary societies, especially in developed countries, often change their views on nature and its role. Role of nature, including forests, for biodiversity protection, climate change mitigation, recreation and other cultural and amenity values is gaining higher importance for the public, while the importance of nature and forests as a source of raw materials is declining. The changes in attitudes are also reflected in recent policy developments and new policy objectives related to forests.

Box 1: Summary of the main trends in GFJ in Europe reported by literature.

These trends might show how the sector is subject to a redefinition of existing jobs and the need to welcome the creation of new ones.

Further, new working models are spreading globally and need to be considered also in regard to the forestry workforce:

- 1. Hybrid and Remote Work Models:** A study by the International Labour Organization (ILO, 2021) titled "Working from Home: From Invisibility to Decent Work" discusses how, especially after COVID-19 pandemic, there is a growing prevalence of remote work across various industries. Applying this to the forestry sector, flexible work arrangements can enhance work-life balance and attract a more diverse workforce. Adapting arrangements to the specific needs and challenges of the forestry sector might be an efficient solution to be able to attract a young and female workforce.
- 2. Part-Time Positions and Training:** The integration of part-time positions combined with part-time training is an innovative approach to skill development in the forestry workforce. Research on flexible training models can shed light on effective strategies for upskilling and reskilling workers while accommodating diverse work schedules (OECD, 2023). This trend reflects a commitment to continuous learning and adaptation in the face of evolving job requirements.
- 3. Family-Friendly Jobs:** The concept of family-friendly jobs in the forestry sector responds to the changing dynamics of work and family life. A report by UNICEF (2019) provides insights into the importance of family-friendly policies especially for attracting, retaining and ensuring fair workplaces for women and men. This literature source may emphasize the positive impact of such policies on employee well-being and productivity, also within the forestry context.



- 4. Inclusive Work Environments:** Creating inclusive and diverse work environments is a key trend in various industries, and the forestry sector is no exception (UNECE, FAO, FOREST EUROPE, 2020; ILO, 2022).

These trends respond to societal shifts and aim to create a more adaptable and diverse forestry workforce. Therefore, an evolution of the forestry workforce in this sense is not isolated but aligns with broader workforce trends and best practices across different sectors.

The main trends and drivers in GFJ in Europe briefly listed here, might indicate a shift towards novel opportunities for the sector. On one side, new skills are required and new opportunities emerge; on the other side, also the traditional employment structures are challenged by new work models.

To try to capture such changes, FOREST EUROPE captured various clusters and descriptions that categorize jobs into traditional, restorative, and Novel Green Forest Jobs (da Silva & Schweinle, 2022). The traditional roles involve activities like timber extraction, while restorative jobs focus on ecological rehabilitation and biodiversity conservation.

Novel green forest jobs can be identified as emerging economic activities related to new forest-based products and services, often creating connections with non-forest sectors such as education, health, IT and so on. Novel GFJ encompasses emerging opportunities that align with contemporary environmental and social priorities. The trends and drivers of change mentioned, highlight that there is a redefinition of existing jobs and the creation of new ones, making training and re-skilling imperative for a successful transition (UNECE/FAO, 2019; 2019b; da Silva&Schweinle, 2022).



2. SCOPE OF THE ANALYSIS



The cluster on Novel Green Forest Jobs in Europe is particularly interesting because it tries to capture this transition of the forestry workforce which reflects both worldwide and local environmental and societal demands. Nevertheless, the FOREST EUROPE working group identified some generalized challenges towards the identification and monitoring of the novel GFJ:

- Novel GFJ is an emerging concept, so the knowledge about it is still fragmented, and there might be a lack of awareness around it.
- Connected with previous point, Novel GFJ are difficult to define precisely and to capture, also given the different local and regional differences within the forest management sector and employment conditions;
- Novel GFJ are changing and adapting at different pace within the pan-European region;
- Novel GFJ can be alternative or complementary to the traditional forest sector;
- Novel GFJ often involves disciplines outside the forest sector (e.g. wellbeing, sustainable tourism, bioeconomy, pedagogy) and might be multi-disciplinary which makes them difficult to identify.

Therefore, the **aim of this document** is to capture the Novel GFJ in Europe and understand better the opportunity they present for the forestry sector

and for advancing Sustainable Forest Management (SFM), as well as challenges and good practices for their mainstreaming. Starting to gather systematic knowledge about these themes is crucial as Novel GFJ may have great potential to lead to a just transition of the sector. The International Labour Organization (ILO) defines just transition this way: “Greening the economy in a way that is as fair and inclusive as possible to everyone concerned, creating decent work opportunities and leaving no one behind.”

To achieve this aim, several international experts were consulted with different methodologies in order to be able to provide a preliminary picture on Novel GFJ. Given the challenges for capturing these NGFJ, this research focused on deepening the knowledge on a few Novel GFJ, relying on regional and national experts’ experience and knowledge. The research includes insights on how they relate to SFM, the framework in which they operate, opportunities that these may generate, and lessons learned.

This document is the result of a cooperative effort of the members of the sub-group Analysis of the Expert Working Group on Green Jobs under FOREST EUROPE initiative and FOREST EUROPE Liaison Unit Bonn.



3. METHODOLOGY



Methodologies and sources of information used are the following:

- A. Literature review sourcing for both scientific and gray literature
- B. Online questionnaire to international experts
- C. FOREST EUROPE Expert meeting Workshop's results

Relying on expert knowledge means having a subjective and partial view on the subject, but in the absence of verified data sources, expert knowledge is a good way to get an exploratory overview and navigate the topic.

Following, the methodology used for the online questionnaire (B) and the workshop (C) are further expanded on.

(B) Online questionnaire

Design: The questionnaire was structured to be completed within 15/20 minutes, emphasizing qualitative exploration and description. Data was categorized into six main thematic sections:

- a. Description of Green Forest Jobs
- b. Relationship to Sustainable Forest Management, Protected Areas, and Strictly Protected Areas
- c. Benefits for Forest Owners from Novel Jobs and Businesses
- d. Number of Jobs/Opportunities Generated
- e. Political, Institutional, and Legal Framework
- f. Other Requirements/Lessons Learned

Each respondent filled one questionnaire focused on a specific typology of novel or emerging GFJ. The survey was open from April to September 2023.

Target Audience: key experts at the country level in the pan-European region.

Distribution Method: dissemination was conducted through representatives of FOREST EUROPE Signatory Countries, via LinkedIn and enriched through direct contacts of the members of the sub-group Analysis.

Inclusion Criteria: surveys not completed or completed with GFJ that are not considered novel or emerging were filtered out. As well, surveys answering for Novel GFJ emerging outside the pan-European region were excluded for this analysis.

Analysis Approach: Due to the limited number of respondents and the lack of sound quantitative data, a mixed qualitative-quantitative approach was adopted for analysis.

(C) FOREST EUROPE Expert meeting Workshop's

The workshop was held on 10/11 October 2023 in Istanbul, Türkiye during a FOREST EUROPE Expert Meeting on Green Forest Jobs, organized by the sub-group Transition.

The aim of the workshop was to identify the differences of how country-representatives and experts perceive GFJ (among which Novel ones), where a common understanding exists and where there might be regional differences. Another aim of the workshop was to enhance participants' awareness and knowledge about Novel GFJ.

There were 26 of participants from 6 countries, namely Czech Republic, Germany, Greece, Ireland, Switzerland and Türkiye.

The workshop was divided in four sections, as follows:

1. Informative section: 20 minutes dedicated to illustrate to participants which are the (I) traditional; (II) restorative; and (III) Novel Green Forest Jobs
2. Clustering section: 30 minutes dedicated to a clustering exercise performed by participants. The guiding question was "Where do participants see the different jobs located? As restorative, traditional or novel?". Each participant received a number of jobs (e.g. forester, sawmill manager, pedagogue in a forest kindergarten) and was asked to sort these jobs according to his/her knowledge and perception in his/her country. Additionally, each participant received blank papers as well, so they could add other jobs and sort them accordingly.
3. As a third step, participants were asked to assign a color to each Novel GFJ according to the number of jobs they thought it generated in their country. This step, although subjective in nature and unrepresentative given the differences in population of the participating countries, was then useful to discuss any similarities and differences between the countries. The thresholds given were the following: 1-9 jobs, 10-100, 101-1000, 1001 or more.
4. Discussion section: 90 minutes dedicated to discussing the results. Questions that are addressed were, among others: Which jobs are seen as similar,

where are differences? If someone added a new job, it can be discussed if these jobs exist in other countries as well or if it is a new type of job. What does the transition mean for the countries, and how can we ensure it is a just transition?



4. RESULTS

4.1 GENERAL

In regard to the Online Survey, we had received 21 answers, of which 4 invalid and one out of our scope (describing the rising of agroforestry jobs in Ghana), leading to a dataset of 16 valid responses.

Insights from 3 different countries (Italy, Austria, Türkiye) and 2 responding with a picture at European level. A total of 14 different types of Green Forest Jobs were described by the respondents.

The results gathered allowed us to explore and get a better understanding on how each job type contributes to sustainable forest management, protected areas, and strict conservation zones. This made it possible

to outline main development patterns, benefits, and challenges associated with the described GFJ.

For what regards the in-presence Workshop results, we can also derive some general observations keeping in mind our particular sample. Participants were asked to discuss 39 Novel GFJ pre-identified by the FOREST EUROPE team. They were asked to indicate whether according to their perception the Novel GFJ was present in their country and give an estimation of the number of jobs provided at national level. Participants also added 4 new job typologies to the list provided. Results of this exercise are summarized in Annex 1.

4.2 WORKSHOP RESULTS

Looking at the results of the exercise, we need to consider that they may not picture the real state of green employment in the forest sector. In addition, the countries under examination exhibit different population sizes, thus rendering direct comparison of absolute numbers of jobs created unfeasible. Therefore, it is not possible to draw conclusions that can be generalized, rather we have some insights to guide future research on the topic.

Taking into account the aforementioned, it is noteworthy to observe a certain uniformity in perception, leading to the estimation that the majority of listed jobs generate between 1 to 100 positions. This allow to suppose that they are perceived as still small niches in the forestry job market. There are few Novel GFJ perceived by some, as widely present in their country, providing more than 1000 jobs, namely Forest data analysts, marketing and communication manager, forestry consultant and phytosanitary specialist. The exercise helps us to identify that the development of Novel GFJ is not homogenous throughout the pan-

European region, as there are some jobs thriving in a country while they seem to provide very few job opportunity in another (see Food forestry expert, forest data analyst, funeral forest manager or phytosanitary specialist, as examples).

Notably, there are some cases in which representatives of the same country have quite different perceptions of the number of jobs created by the same Novel GFJ. This suggests that there might be a lack of shared knowledge and awareness.

In the Figure below (Figure 1) there are listed the typologies of Novel GFJ that were indicated more frequently by participants as present in their country. On the top, there are the less present (light blue) among the participants' countries and to the more common in the lower part (blue). Interesting to notice that if these are the most mentioned by the Workshop participants, they are mainly related to cultural and provisioning ecosystem services.



Figure 1: List of the Novel GFJ more frequently perceived as present in the represented countries.

During the facilitated discussion, it was noticeable that participants expressed astonishment at the number of Novel GFJ already identified by the FOREST EUROPE team. Nevertheless, they highlighted how differences in understanding and cultural background of the audience can make it hard to unanimously define the GFJ and have a common understanding of their features and tasks. Indeed there was some overlap in the clustering exercise, especially between restorative and traditional and restorative and novel jobs. As illustrated in Figure 2, from the plenary discussion emerged the idea that restorative jobs are at the intersection of the more traditional GFJ and the ones that are emerging and evolving (Novel GFJ). Therefore, in the clustering exercise, some GFJ were clustered in more than one typology.

Also, it was observed that these Novel jobs are likely to change and adapt, in relation to climate change and

the directions of future environmental policies.

When discussing the increasing typologies of Novel GFJ, participants of the workshop perceived that, especially in some countries, they will incentivize skilled people to go back to the roots and return to rural areas. On the other hand, some jobs that can be digitized will require less contact with the forest. However, participants recognize at which Novel GFJ are developing may vary significantly among the countries, especially related to lack of skilled workers and incipient digitalization, but also lack of markets/demand for new products and services. It is also reported by participants that Novel GFJ seems to be highly related to SFM, therefore they suggested this might be a sign that intensive timber production will be less and less attractive in some countries, while integrative forest management practices may bring opportunities for diversification of job opportunities.

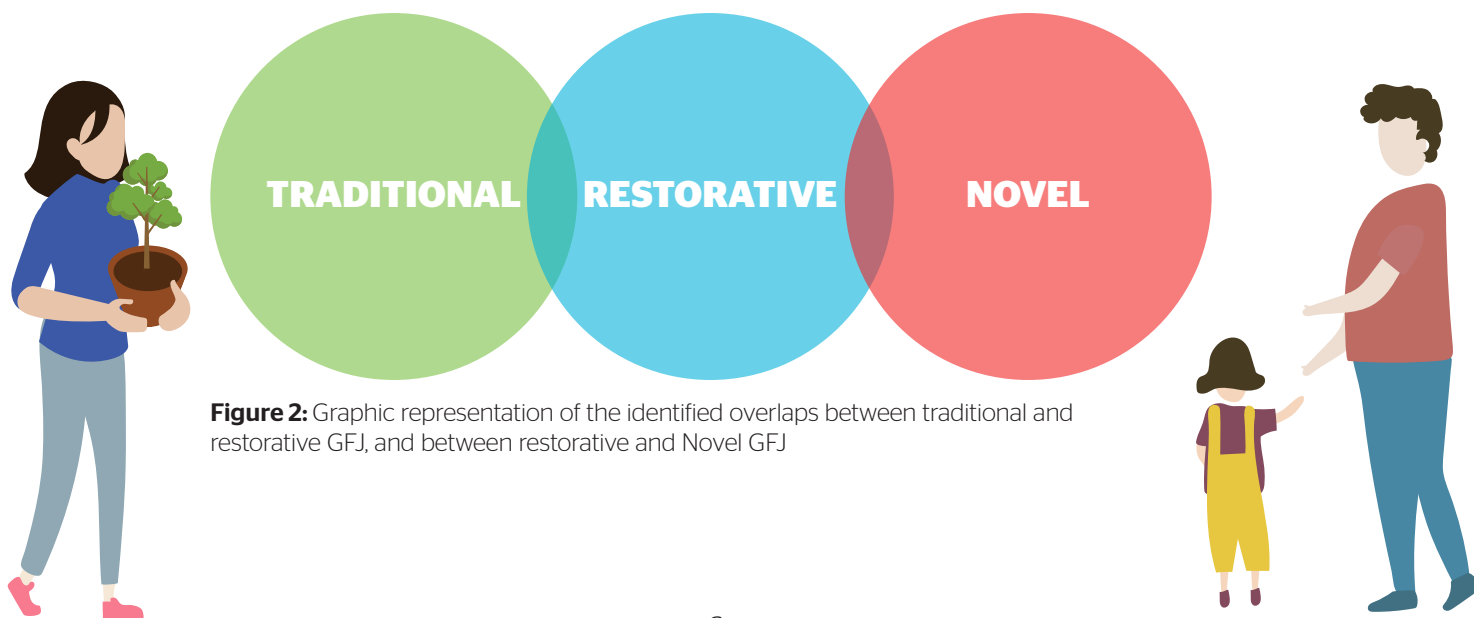


Figure 2: Graphic representation of the identified overlaps between traditional and restorative GFJ, and between restorative and Novel GFJ

4.3 SURVEY RESULTS

4.3.1 DESCRIPTION OF THE NOVEL GREEN FOREST JOBS FROM THE SURVEY

Following, we report the Novel GFJ identified by the Survey respondents clustered in 7 main typologies. In Table 1 you find the main clusters of Novel GFJ identified and the countries to which the job description is referring to. In the third column we report

the specific name and description of the 14 Novel GFJ, as reported by the respondent, and the main societal or sectorial need the GFJ is answering to (according to respondent's opinion).

CLUSTER OF NOVEL GFJ	COUNTRY	NAME OF THE NOVEL GFJ AND MAIN NEED THE GFJ RESPOND TO
Forest-based R&D	Türkiye	<p><u>Wood technology in biobased wood materials</u> “The negative impact of the construction industry on the environment and the scarcity of non-renewable resources had raised concerns to develop more sustainable building materials made of renewable and recyclable resources. Therefore, wood has been demanded in order to improve sustainability in construction, especially in lesser-developed countries. To do so, research and development on bio-based building materials is increasing and demanding an educated workforce to do so.”</p>
Specialized (climate/ ecosystem) Forester	Türkiye	<p><u>Mediterranean Coastal Forestry</u> “Mediterranean Coastal Region Forests have unique climatic and growing conditions. Foresters who know these and similar conditions should work in these regions throughout their professional life.”</p> <p><u>Mediterranean Inland Forestry</u> “Semi-arid areas begin when one goes from the Mediterranean coastal regions to the terrestrial regions / towards the central Anatolian regions. Forestry activities carried out in these areas can be called Mediterranean Inland Forestry as a novel green jobs. In these regions, it is necessary to grow plants in the form of trees and shrubs suitable for semi-arid areas. Mediterranean inland forestry knowledge and Mediterranean coastal forestry knowledge are completely different from each other. Foresters working in this region should have information about semi-arid regions. However, foresters who work in these shadows for a while (5-10 years) can go to other parts of Türkiye. Knowing about these regions requires spending a professional period here.”</p> <p><u>Drought Resistant Forest Management Specialist</u> “Droughts occur in the southeastern and southwestern sub-regions of the FOREST EUROPE region, for example every 5-10 years. In this direction, forest fires can be excessive. Starting from the selection of tree species suitable for this region, genetic studies, application of appropriate silviculture methods and maintenance studies are required. Therefore, there is a need for experts with the ability to establish and manage drought-resistant forests.”</p> <p><u>Integrated Watershed Management Specialist</u> “To plan for agriculture, forest and pasture land use in a watershed and to manage the related catchment according to this planning.”</p>

Food forestry expert	Türkiye South Europe	<u>Food forestry expert</u> We believe that there is a need for a professional group that will make planning in forested areas (including agriculture and pasture areas) and follow animal and plant production with a focus on food supply for people. <u>Truffle and mushroom production management</u> "The needs come from the demand. There is a high demand for products (mushrooms and truffles) which are far behind to be satisfied."
Arboriculturist	Türkiye	<u>Herbal Doctor (Phytosanitary and Therapeutic Methods Specialist)</u> "In urban forests, for example, there are plane trees, there are monumental trees. These trees need to be taken care of and kept alive. Some trees need to be made to stand by placing supports. Some trees need to be placed in concrete supports. Sick branches of some trees need to be treated. I think there is a need for a job, a new green forest job, that will do all these and similar treatments. It may be called Herbalist or Herbal Doctor."
Ecosystem restoration specialist	Türkiye European Union level	<u>Ecosystem restoration specialist</u> "There is a need for experts who will comprehend the forest areas, agricultural areas and pasture areas as a whole and plan and implement the restoration and rehabilitation works to be carried out on the lands in these regions." <u>Natura 2000 manager</u> The need to manage protected areas designated pursuant to the Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and of wild fauna and flora.
Facilitator of stakeholder engagement & capacity building processes for (the co-creation of) nature-based initiatives/projects	Italy	"Need for specific expertise (the one of the facilitator) to: - build capacities and empower social innovators (like Green Care practitioners) who work at the interface of different sectors (e.g. agriculture/forestry and social and health care), but are unable to make effective impact because of disabling structural and institutional conditions. -connect and create bonds across sectors (apparently very distant from each other), by facilitating dialogues, knowledge exchange, co-creation of solutions. - communicate in more effective, accurate, but also more creative ways the potential benefits of the initiatives brought forward by these social innovators. - act as knowledge broker and net-weaver, giving leverage to these initiatives at higher levels of governance"
Forest-based Care (cultural ecosystem services) providers	Austria Italy	<u>Forest and Health Practitioners</u> "healthy adults looking for recreational offers in nature especially in forests." <u>Forest-based care provider (health and wellbeing)</u> "Need to connect with nature, recover from stress and anxiety, and have meaningful experiences in nature. Therefore, there is a need for people able to provide these services and forests suitable for these uses." <u>Educational Forest Manager</u> "Mainly to diversify the income for forest owners and managers. Additionally, to spread the culture of sustainable forest management across a different target of people."

Table 1: Novel GFJ identified by the respondents clustered by wider typologies.

Some of the jobs identified by the respondents might be considered closer to a traditional GFJ in some countries or existing GFJ conducted in an innovative manner, adapted to new climatic or socioeconomic conditions, than a novel GFJ itself. In other cases, we can notice how the Novel GFJ described is rather an application and adaptation of other disciplines, often traditionally non communicating with forestry, into the forest sector. This is the case for example of the Facilitator of stakeholders engagement and capacity building expert, or again of the forest-based care

provider, connecting the health and wellbeing sector with forestry. These kind of connections activated through Novel GFJ highlight how the forest sector is dynamic and might be at the forefront of Transition process.

Nevertheless, we may observe how the jobs described are quite in line with the characterization proposed by the ECE/FAO Report (2018) in regard to the future Green forest jobs in forestry (see Table 2 below).

7 THEMATIC AREAS	19 FIELDS OF ACTIVITY
Wood and energy production	<ul style="list-style-type: none"> • Wood production • Energy production
Agroforestry and mountain forestry	<ul style="list-style-type: none"> • Agroforestry • Mountain forestry and soil bioengineering
Social and urban development	<ul style="list-style-type: none"> • Urban forestry and arboriculture • Culture and forests
Forest management, inventory and planning	<ul style="list-style-type: none"> • Forest inventory and forest monitoring • Planning, governance, sustainable forest management • Pests, disease and forest fires • Risk management and contingency planning
Biodiversity and ecosystem functioning	<ul style="list-style-type: none"> • Biodiversity conservation and nature protection • Climate change • Forests and water • Mycoforestry
Health and recreation	<ul style="list-style-type: none"> • Forest ecotherapy • Recreation, leisure and sports
Education and research	<ul style="list-style-type: none"> • Education, further training and knowledge transfer • Forest research
	<ul style="list-style-type: none"> • Other new fields of activity

Table 2: fields of activities for future Green Forest Jobs. Source: ECE/FAO Report (2018)

Which is the main contribution of Novel GFJ to ESS and SDGs?

We can analyze the Novel GFJs according to the contribution to ecosystem services (ESS), so here we have started to group them accordingly. This is a rough analysis based on the main contribution identified by the respondents. The picture resulting is that most of the GFJ are aimed at enhancing regulating and supporting services, 3 of them mainly support the enhancement of provision services (food and

materials) and three of them are mainly focused on the enhancement of cultural ecosystem services.

It is to be noticed that, according to respondents' opinion, most of the Novel GFJ described help deliver and enhance multiple ecosystem services at once. Another level of analysis might be the contribution of these GFJ to the Sustainable Development Goals. As we can observe in Figure 3 the Novel GFJ described widen the set of SDGs addressed by traditional forestry jobs.

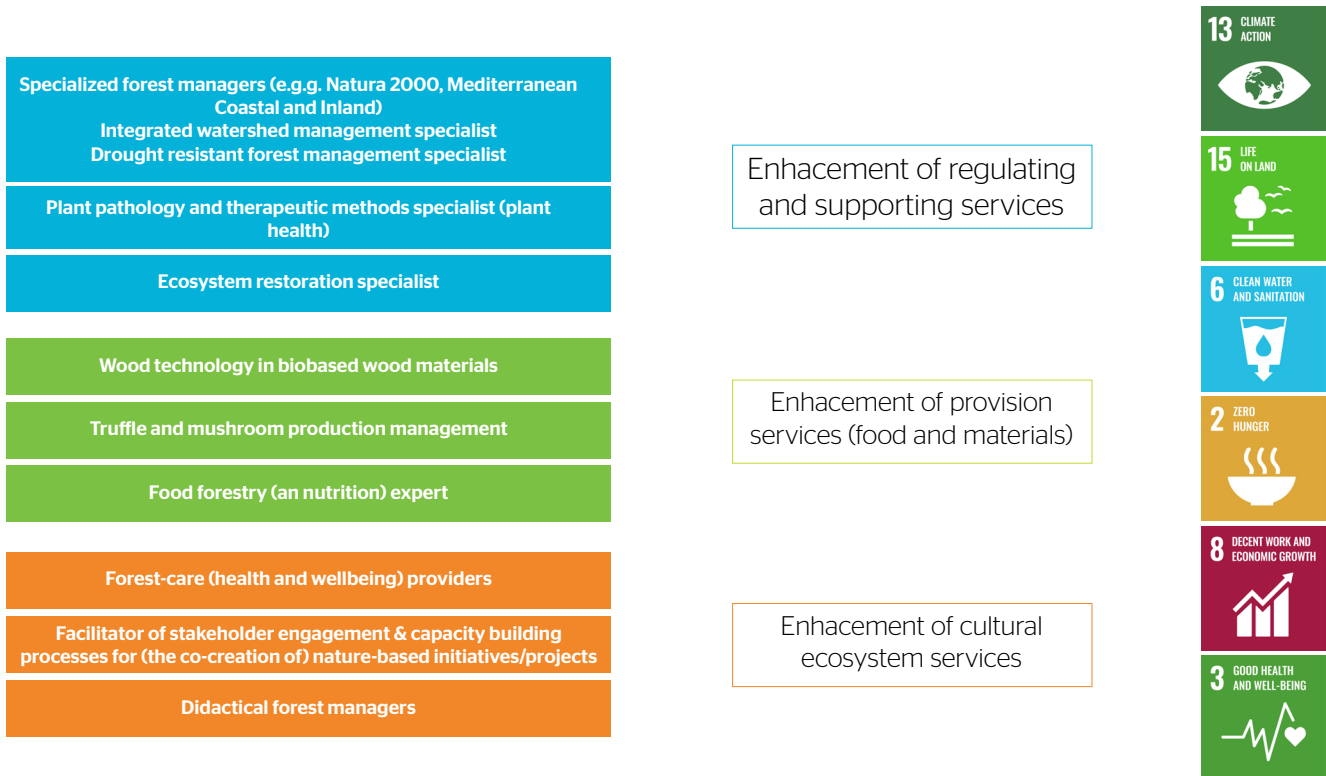


Figure 3: Novel GFJ analyzed are clustered according to the ecosystem services they mostly contribute to, and Sustainable Development Goals they contribute to achieve collectively.

4.3.2 HOW THEY RELATE TO SFM AND THE FORESTRY SECTOR

We then asked the respondents some questions to understand the average employment conditions in relation to the Novel GFJ identified, and which is the relationship with SFM and the forest sector in general. Again, given the nature of the questionnaire, the answers cannot be generalized geographically nor to the entire cluster. Rather, these answers might give a first overview of some existing dynamics and guide future research.

Following a synthesis of the findings:

- The Novel GFJ investigated are fairly divided between ones being paid by public and those paid by private sources (e.g. fees); management related jobs are mainly paid by the public while the ones connected to cultural ecosystem services provision and food are mainly paid by service fees.
- More than half of the Novel GFJ investigated are reported to be generally conducted as full-time jobs, the others are part-time or seasonal.
- The activities and services provided by the Novel GFJ investigated in this report are mostly compatible with both protected and timber production areas and no one is practiced in strictly protected areas. As far as timber production is concerned for example, there might be requirements needed for using sawmill by-products of waste wood for wood technology in bio-based building materials; the need for coherent planning and management when different ecosystems are involved such as for watershed management; for forest-based care activities there is the need for areas not recently harvested, a minimum size, an agreement on the area dedicated to the activity, first aid requirements and parking space;
- The Novel GFJs investigated within this survey mostly take place in managed forests, but this is not indicated as an exclusive condition. However, this finding may suggest that active forest management, if maintaining multifunctionality of forests, does not create barriers for diversification of job opportunities, but multifunctional and integrative approaches support the creation of Novel GFJ.
- The Novel GFJs investigated may represent a complementary activity and opportunity for additional income (or compensation mechanisms) for forest owners and managers, or for bringing opportunities for learning and capacity building.

4.3.3 INNOVATION PHASE AND QUANTITATIVE DATA

- The majority (70%) of the Novel GFJ analyzed here are reported to be in their growing phase.
- It turned out that the number of jobs created in the country or region was difficult to report or estimate for the respondents. Just in a couple of cases we have numbers reported. One case is for truffle and mushroom managers in Italy where the respondent stated that “1400 new companies have been created, and around 0.1 million people are commercially involved in truffles and mushrooms production”. The second case is for Natura 2000 site managers for which we know that “current expenditure on conservation measures in the Natura 2000 network support around 52,000 jobs directly and indirectly. The €5.8 billion needed for the full implementation of the Natura 2000 network has been estimated to support 104,000 direct jobs in protected areas management and conservation activities and 174,000 jobs in the EU if

indirect and induced jobs are included” (ten Brink et al., 2017).

- In regard to the Novel GFJ described here, it seems there are very few (or informal) networks/ associations.

The lack of official data and difficulties in doing estimations, added to the few networks and associations suggest that these Novel GFJ are still evolving and do not always have official recognition yet. Despite their growing phase, we might hypothesize that the numbers for these GFJ are not big since they appear to be very specialized jobs or innovative approaches of traditional GFJ. Nevertheless, this aspect should be considered since this can partially explain how jobs in the forest sector are changing and transitioning, which might be relevant for decision-makers.

4.3.4 BENEFIT AND SYNERGIES

In this next section, respondents were asked which are the main benefits that this Novel GFJ are able to provide.

According to respondents Novel GFJs investigated

may be a good opportunity to provide benefits in general, and especially to raise awareness on SFM and to diversify revenues for forest owners and managers (Figure 3).

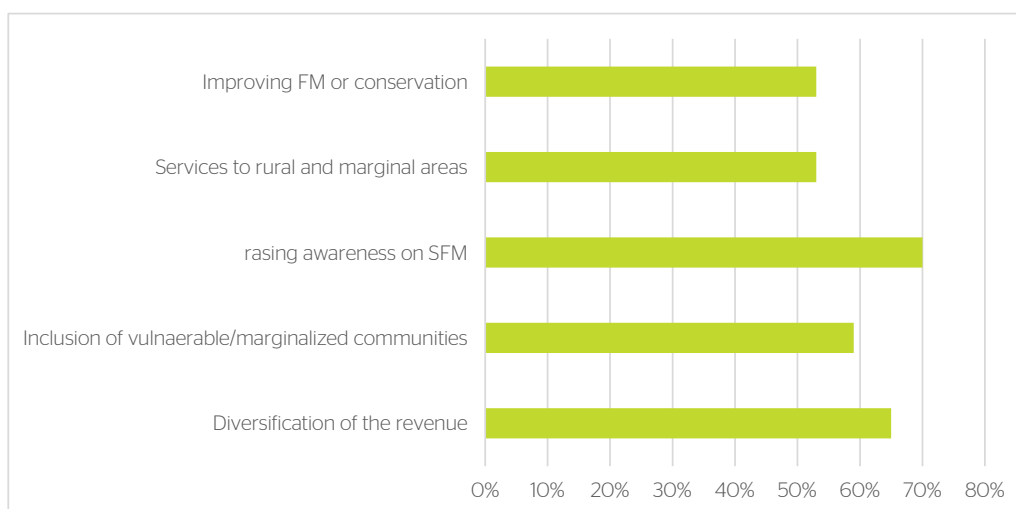


Figure 4: Main role and benefits of Novel GFJ described according to respondents perception

The experts interviewed recognize how the Novel GFJs may also represent an opportunity for employment for a range of different targets (Figure 4). When questioned, most of the respondents agree on the fact that these Novel GFJ can provide job opportunities for young professionals and people outside forestry. Then, for

example, if we look in the specific, we can extract some interesting insights such as that respondents see how NGFJs providing cultural ecosystem services (facilitation, forest care etc.) might be a good opportunity for employing women in the sector.

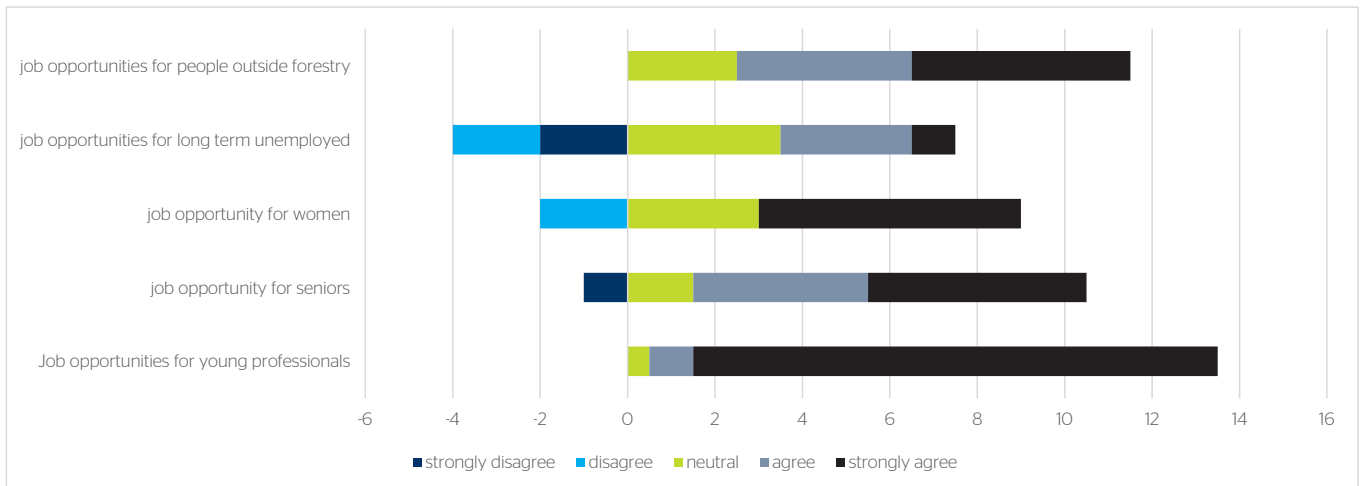


Figure 5: Perception on the opportunity Novel GFJ represent for specific target populations expressed through Likert scale

Another aspect stressed by the respondents is the capacity of these GFJ to create jobs in rural areas and promote synergies also beyond the forest sector (i.e.

water management, bio-based industry, wellness industry, health sector).

4.3.5 REGULATION, TRAINING AND CERTIFICATION LANDSCAPE

The realm of Novel GFJ presents a diverse and dynamic landscape, encompassing a wide array of roles related to the sustainable management and conservation of forests. One aspect we tried to investigate with the experts elicited revolves around the training and certification requirements essential for individuals to undertake specific Novel GFJ. As we delve into the Novel GFJ panorama, it becomes evident that the training and certification landscape is nuanced and multifaceted. At present, there are many Novel GFJ not regulated by binding requirements or legislation. The experts concur that specific regulations and job classification are often nonexistent for the Novel GFJ described, leading them to fall under the umbrella of general forest or park legislation. This regulatory and classification void can be attributed to the evolving nature of these jobs and the challenge of keeping pace with their rapid expansion. Consequently, individuals seeking to embark on NGFJs may find themselves navigating through a regulatory framework primarily based on broader forest or park-related statutes.

In such cases, professional and academic training emerges as the first step for acquiring the necessary skills and knowledge to practice Novel GFJ. Conversely, some Novel GFJ are subject to regulations at various levels, ranging from local to regional and even European scales. For instance, in Italy, the

management of truffles and mushrooms is regulated, necessitating specific training and certifications for individuals engaged in these activities. Similarly, at the European Union level, Natura 2000 area managers are subject to regulatory frameworks that mandate specific training and certification processes.

Generally, in cases where Novel GFJ are governed by regulations, there is typically a structured framework comprising compulsory training, examinations, and certifications. This regulatory approach ensures that individuals entering these fields possess the requisite skills and knowledge to perform their roles effectively. Examples provided in Box 2 highlight instances where regulations shape the training and certification landscape for Novel GFJ. This institutionalized approach to training and certification is crucial in maintaining the quality and standardization of skills within the Green Forest Jobs sector. However, it is essential to note that the effectiveness of these processes is contingent upon the adaptability of training programs to the evolving nature of Novel GFJ. Given the absence of specific regulations in many cases and the dynamic nature of Novel GFJ, a notable phenomenon within this sector is the informality of job titles and roles. As the field continues to grow and adapt, new roles emerge, and existing ones evolve, leading to a lack of standardized information and shared awareness regarding job titles.

- Mushroom and truffle management and commercialization in Italy (Law 752/1985), available at <https://www.gazzettaufficiale.it/eli/id/1985/12/21/085U0752/sg>
- The [Birds](#) and [Habitats](#) Directives set out the overall legal framework for protecting and managing Natura 2000 sites. General information can be found at this link (https://ec.europa.eu/environment/nature/natura2000/index_en.htm) More information about the specific training and competencies requirements for Natura 2000 managers can be found at this link (<https://www.europarc.org/library/project-archive/life-e-natura2000-edu-building-capacity-through-innovative-training-tools/competencies-for-management-of-natura-2000-report/>);
- In Italy there are now two Regions promoting Educational Forest to foster forest multifunctionality, revenue diversification and provision of cultural ecosystem services of forests: Apulia Region was the first one with the [regional law n.40 \(10/12/2012\)](#) to constitute the educational forests, with now more than 30 educational forest recognized in the region; Veneto Region has the [regional law n.14 \(4/5/2020\)](#), which also sets compulsory training targets, with courses provided by the region, to be included in the regional network.

Box 2: Examples of existing regulation on NGFJ.

4.3.6 CHALLENGES AND DRIVERS IN NOVEL GREEN FOREST JOBS

In the last section of the Survey, we asked the experts to indicate any barrier and driver they have encountered in the establishment of the Novel GFJ they were describing. Several **challenges** hindering the growth and development of these Green Forest Jobs have been identified. One obstacle identified is the lack of specific classifications and up-to-date regulations which would provide a necessary basis for robust public support and skills recognition. Unlike traditional job sectors, many Novel GFJ operate within a regulatory void, making it difficult for professionals to find clear guidelines and for the public to understand the significance of these roles and overall, the contribution of the Novel GFJ for the sector.

The absence of supportive regulatory frameworks for Novel GFJ not only contributes to a lack of standardization in training and certification but also makes it challenging to develop the suitable conditions for innovation and develop new services and new markets. In general, the lack of public support and recognition are critical elements in fostering the growth of Novel GFJ, as they contribute to the legitimacy and perceived importance of these roles, services, products and markets within society. The informal framework some of the jobs are in, may pose challenges in terms of understanding the scope and requirements needed to perform the job. Stakeholders, including individuals seeking employment in the field and organizations looking to hire Novel GFJ professionals, may find it challenging to navigate in this dynamic landscape. While the absence of appropriate regulation poses challenges, existing policies and policy tools can also hinder the change needed for Novel GFJ to thrive. An illustrative example comes from Türkiye, where staff

rotation regulations act as barriers to specialization. Such a policy, designed with the intention of ensuring a broad skill set among employees, inadvertently hindered the development of specialized expertise crucial for certain Novel GFJ.

The lack of awareness surrounding Novel GFJ is mentioned by some of the respondents as a possible challenge. One respondent says that there is a 'close mentality' of individuals and organizations in accepting new figures in the forestry world and especially towards new roles that promote co-creation processes and services linked more to the cultural ecosystem services. In absence of public recognition and quality standards of the jobs, the role and potential contribution of Novel GFJ to sustainable management, conservation and valorization of forests may not be widely understood both within the sector and from the public. Educational initiatives and awareness campaigns are crucial in overcoming this challenge. Fostering a mindset shift and educating the public, policymakers, and businesses about the contribution of Novel GFJ to sustainable forest management and valorization of the forest ecosystem can contribute to greater recognition and acceptance of these roles within the broader socio-economic landscape.

Amidst the challenges, the experts highlight some **drivers** that can catalyze the growth and development of Novel GFJ. Experts have highlighted three primary drivers:

Improve legislation, provide training and education (including entrepreneurship), and foster cooperation. Given the challenges mentioned, it comes not as a

surprise that one of the drivers identified by experts is the need to improve legislation governing Novel GFJ. Establishing clear and supportive regulatory frameworks can provide the necessary structure for the growth of these occupations. This involves creating specific regulations that address the unique requirements of Novel GFJ, including training, certification, and job recognition. Efforts to establish standardized job titles and roles, as well as shared awareness within the industry might be a driver to foster a more cohesive and informed Green Forest Jobs community.

During the discussion with the **Workshop participants**, it was also mentioned that high-level policies and agreements such as the Paris Agreement or the European Green Deal could be a driver for the development of Novel GFJ and updating Traditional GFJ. Nevertheless, participants also stressed that European policies and international agreements need

to take into account equity and fairness at all levels, and possible impacts on the Global South.

Another element mentioned as key to upscale Novel GFJ is the provision of adequate training and education. It is suggested that training programs should be designed to address the evolving needs of Novel GFJ, incorporating elements of sustainability, innovation, environmental stewardship and entrepreneurship. More than one respondent mentioned “cooperation” both as a barrier and the driver needed for upscaling successfully the Novel GFJ. Addressing regulatory barriers for novel jobs that draws from multiple disciplines and often deal with complex ecosystem management and that foster forests’ multifunctionality, necessitates a collaborative effort between policymakers, sectors dealing with natural resource management, and relevant stakeholders to find appropriate solutions that promote both workforce versatility and specialization within Novel GFJ.

5. KEY FINDINGS AND MAIN LIMITATIONS

Through this exploratory survey we were able to identify some of the patterns, benefits, and challenges associated with the described Novel GFJ. Nevertheless, as mentioned, we recognize there are limits in this survey design and analysis. In particular, despite the fact that the survey was distributed thoroughly we received a low response rate, which might suggest that the survey structure and dissemination strategy need to be improved to be able to have more representative results. On the other hand, Novel GFJ are an emerging topic, still difficult to frame or even recognize which might lead to the oversight of the survey. All in all, we believe this was a worthy effort, but the tools can be fine-tuned and improved in future research. Further, the results gathered are non-representative (i.e. of an entire job category and its geographical cover) since they relied on individual respondent perspectives and since there is a lack of official data on the described jobs. Therefore, this is to be considered by the reader as an exploratory and preliminary work that has the aim to shed light on an emerging topic. For this reason, the results are reported in this paper in a cautious manner, always emphasizing their partiality and how they can instead be stimuli for future reflection and further study on the ongoing developments in Novel GFJ.

Further, this exercise questioned the Novel GFJ characteristics, it did not request information on job quality and decency. Therefore, we can consider them as potential Novel GFJ. But before, to be able to recognize them as Green Forest Jobs, their decency standards must be assessed.

Lastly, it might be debatable how to discern entirely new jobs from specialized roles within existing forestry domains. As already mentioned, the definition of novelty is difficult to establish and even more among different countries and regions.

Key Findings for further research

- Novel GFJ represent a lively and evolving panorama in Europe, nevertheless their definition is still fuzzy and there is a lack of awareness of them also within the sector.
- They often promote synergies with traditionally non collaborating sectors, and represent employment opportunities for a wide array of target. Yet, it is not always clear how forest owners benefit from the activities which take place on their properties. This could be a subject of further research.
- Jobs dealing with cultural ecosystem services provision and also those linked to food and nutrition seem to be perceived as important in the widening and increasing of Novel GFJ.
- Generally, active forest management, if respecting multifunctionality and applying integrative practices, does not create barriers for diversification of job opportunities, but multifunctional and integrative approaches seems to support creation of Novel GFJ.
- Often not supported by clear recognition and regulation, they might be either formal or informal, and the actual numbers of the workforce occupied in Novel GFJ are often difficult to retrieve.
- Quantification of changes (job losses and job gains)

are beyond the scope of this qualitative study, however, the limited information gathered in this survey suggests that the new jobs, even if growing relatively fast, cannot today compensate the losses of traditional jobs in the sector. Further research is

needed to assess the quality of the jobs provided, to quantify Novel GFJ created, categorize them and identify specific drivers and barriers to boost creation of new jobs in order to attract new workers to the sector.

6. TAKE HOME MESSAGES



Policy and decision-makers

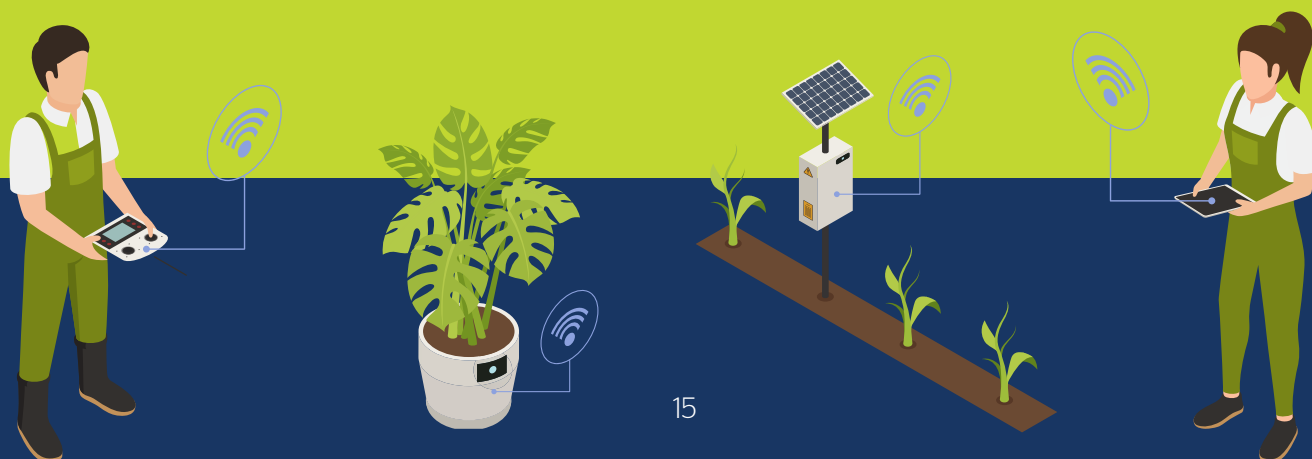
- **Make use of recent policy developments** (in the field of nature restoration, climate change mitigation, etc.) to promote and support integrative, climate-smart and biodiversity-friendly forest management approaches, in order to better integrate production of raw material for bioeconomy together with new job opportunities related to other ecosystem services, especially socio-cultural ones.
- **Develop supportive regulatory framework for GFJ** and create an enabling business environment.
- **Develop quality standards and certification of products and services** where appropriate, possibly enabling fair income sharing among new service providers (entrepreneurs) and forest owners.
- **Make use of development mega-trends and promote transition to new working models** as described in the introductory section, in order to increase attractiveness of work in the forest sector and motivate young people to live and work in rural areas.
- **Policies and international agreements need to take into account equity and fairness at all levels**, as well as possible impacts on the Global South including pressure on natural resources in developing countries.
- **Support systematic monitoring and data collection systems at national/regional level.**

Researchers (future studies)

- **Establish definitions and categorization**, also by assessing their characteristics, job decency and safety levels.
- **Quantify jobs created** and extensive study on drivers and barriers towards mainstreaming, including effectiveness of incentives.
- **Promote awareness and knowledge (transversal).**

Academia and education

- **Updating curricula to make them more responsive to changes** in the sector.
- **Develop new or adapt existing qualification profiles** and certification of compulsory skills.
- **Develop specialised programmes to support continuous learning, re-skilling and digitisation** (both for HEIs and VETs) in line with the new and adapted qualification profiles.
- **Build the culture of entrepreneurship and innovation, especially among young people**, through development of entrepreneurial skills, interpersonal competences and creativity.



ANNEX 1

Job description	Estimated number of jobs	Country
Natura 2000 manager	1-9	IRL
Forest and Health Practitioners	1-9	CZE
	10-100	GER
	10-100	IRL
Planting trees in agricultural farms	10-100	GER
	10-100	CZE
Ecosystem restoration specialist	10-100	TUR
	10-100	GER
	1-9	IRL
Integrated Watershed Management Specialist	1-9	GER
	10-100	GER
Ecological Nutrition and Food Specialist	10-100	GER
	10-100	GER
	10-100	TUR
	1-9	IRL
	101-1000	TUR
	101-1000	GRE
Local energy procurers	101-1000	TUR
	101-1000	GER
	101-1000	IRL
	10-100	CZE
Agro forester	10-100	GER
	10-100	GER
	10-100	CZE
Forest soil bioengineer	1-9	CZE
Project manager forest and protective structures	1-9	GER
	1-9	IRL
Urban permaculturist	1-9	IRL
	10-100	TUR
Forest historian	1-9	CZE
	1-9	IRL

Adventure park forester	10-100	TUR
	10-100	GER
	101-1000	TUR
	1-9	CZE
	1-9	IRL
Forest fire fighter	101-1000	GRE
Forest protection advocate and grassroots organizer	1-9	CZE
Forest interpretive guide	1-9	CZE
	101-1000	TUR
	10-100	IRL
Forest pedagogue (teacher)	10-100	GER
	10-100	TUR
	10-100	TUR
	10-100	IRL
	1-9	GRE
Civil science facilitator	10-100	GER
	10-100	CZE
Forest data analysts	1001 or more	GER
	1-9	GRE
Forest culture interpreter	1-9	GER
	1-9	GER
	1-9	IRL
	1-9	CZE
	10-100	TUR
	10-100	TUR
	Wood technology in bio-based building materials (e.g. wood plastic composites, wood geopolymer composites)	10-100
10-100		CZE
10-100		TUR
101-1000		GER
1-9		GRE
1-9		IRL
Facilitator of stakeholder engagement & capacity building processes for nature-based initiative/projects	1-9	IRL
	10-100	GER
	10-100	TUR

Food Forestry Experts	10-100	GER
	101-1000	TUR
	101-1000	TUR
	1-9	GER
	1-9	IRL
Truffle and mushroom production management	1-9	GER
	1-9	IRL
	1-9	CZE
	10-100	GER
	10-100	TUR
	10-100	GRE
Forest Mastercraft Men	10-100	CZE
Forest Entrepreneur	10-100	TUR
Forest Entrepreneur	10-100	TUR
Funeral forest manager	10-100	GER
	101-1000	GER
	1-9	CZE
	1-9	TUR
	1-9	IRL
Forest ecotherapy guides	1-9	GER
	1-9	TUR
	1-9	CZE
	10-100	TUR
	10-100	IRL
	101-1000	GER
Forest communicator	1-9	GER
	1-9	GER
	10-100	CZE
Marketing and communication manager	10-100	GER
	1001 or more	GER
Forest modeller	101-1000	GER
Forest software developer	1-9	GRE
	1-9	GER
	101-1000	GER
	10-100	TUR
Forest IT manager	101-1000	GER
	10-100	TUR
Forestry consultant (i.e., advisor for forest owners)	1001 or more	TUR

Herbal Doctor (Phytosanitary and Therapeutic Methods Specialist)	101-1000	GER
	1001 or more	TUR
	1-9	GER
	1-9	CZE
	1-9	IRL
Forest Birth Manager (midwife)	1-9	GER
Forest Biodiversity Hotspot manager	1-9	GER
Mushroom Museum Creator (+ natural history)	1-9	GRE
Forest guide for aromatic/medical plant learning	1-9	GRE

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