



UNECE



**Food and Agriculture
Organization of the
United Nations**

The future of the forestry and wood-based industries sector in the transition to a sustainable bioeconomy

UNECE/FAO Regional Forest Outlook Study 2020-2040

UNECE/FAO Forestry and Timber Section

UNECE/FAO National Forest Policy Dialogue Mechanism

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21-23 September 2023



Joint UNECE/FAO Forestry and Timber Section

56 member States

The forest in the UNECE
region covers:

- 41 % of the global total
- 80% global certified area
- 60% industrial roundwood



UNECE/FAO Forestry and Timber Section

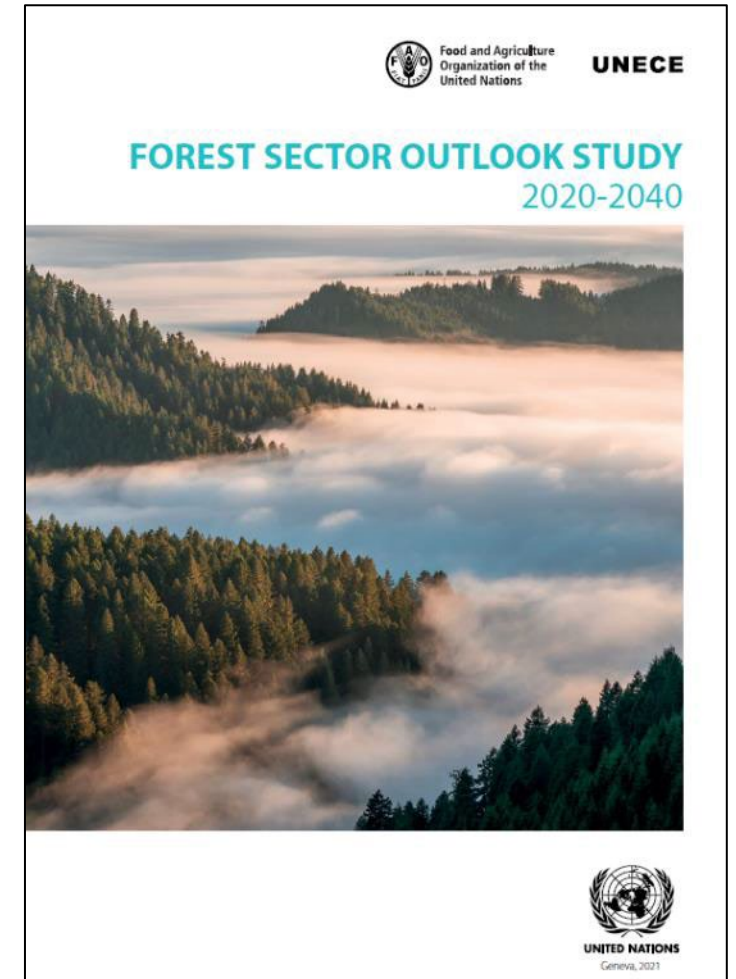
Work Areas:

1. Data, monitoring and assessment;
2. Policy dialogue and advice
3. Communication and outreach
4. Capacity building



Overview

- ❑ The 2021 **Forest Sector Outlook Study (FSOS)** is another in a series completed every 10 years
- ❑ Led by the **UNECE/FAO Timber Section** in Geneva
- ❑ Covering
 - ❑ Europe
 - ❑ United States and Canada
 - ❑ Russian Federation
 - ❑ Eastern Europe, Caucasus and Central Asia (EECCA)
 - ❑ (Rest of the World)
- ❑ Projections 2017-2040



Overview cont.

	UNECE Region	Percent of World
Population	1.29 billion	17
GDP	PPP\$ 46 trillion	52
Forest area	1.71 billion ha	41
Forest growing stock	206 billion m ³	37
Timber (IRW) production	1,171 million m ³	58
Sawnwood production	297 million m ³	63
Wood-based panels production	136 million m ³	38
Fiber furnish production	223 million MT	53
Paper & Paperboard Production	181 million MT	45



FSOS is **not a forecast**, but a tool for evidence based policy making.

It aims to be pragmatic, transparent and objective.

Through **scenario analysis and literature review**, it offers the possibility for stakeholders to evaluate possible long-term consequences of policy choices.

FSOS is structured around six questions:

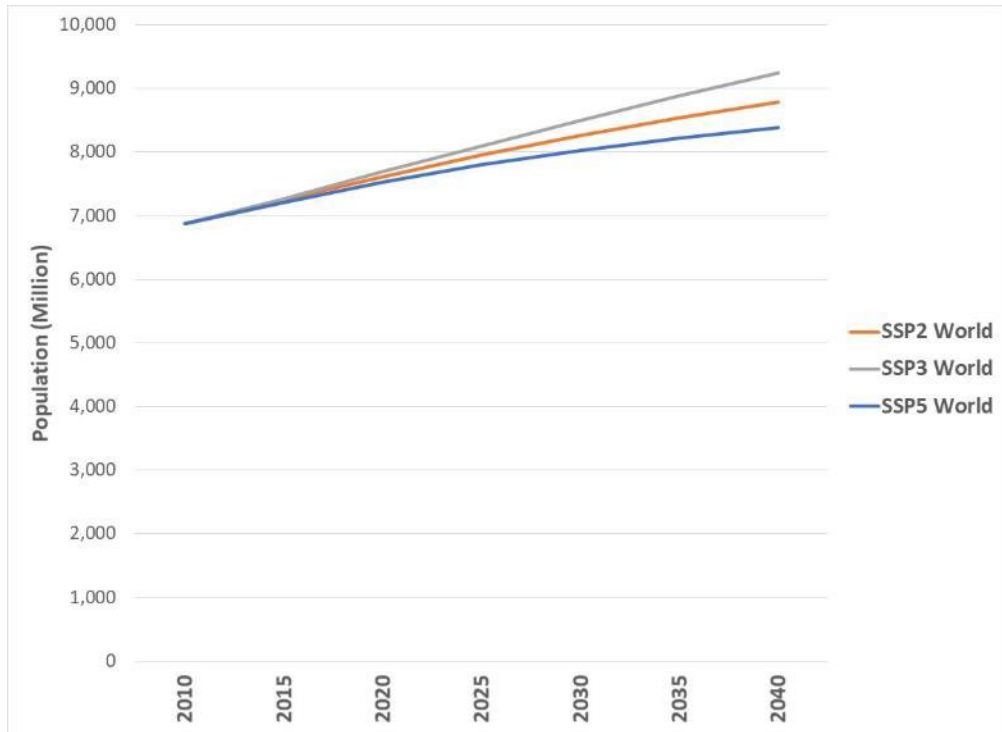
Three address structural change in the forest sector

Three address climate change.

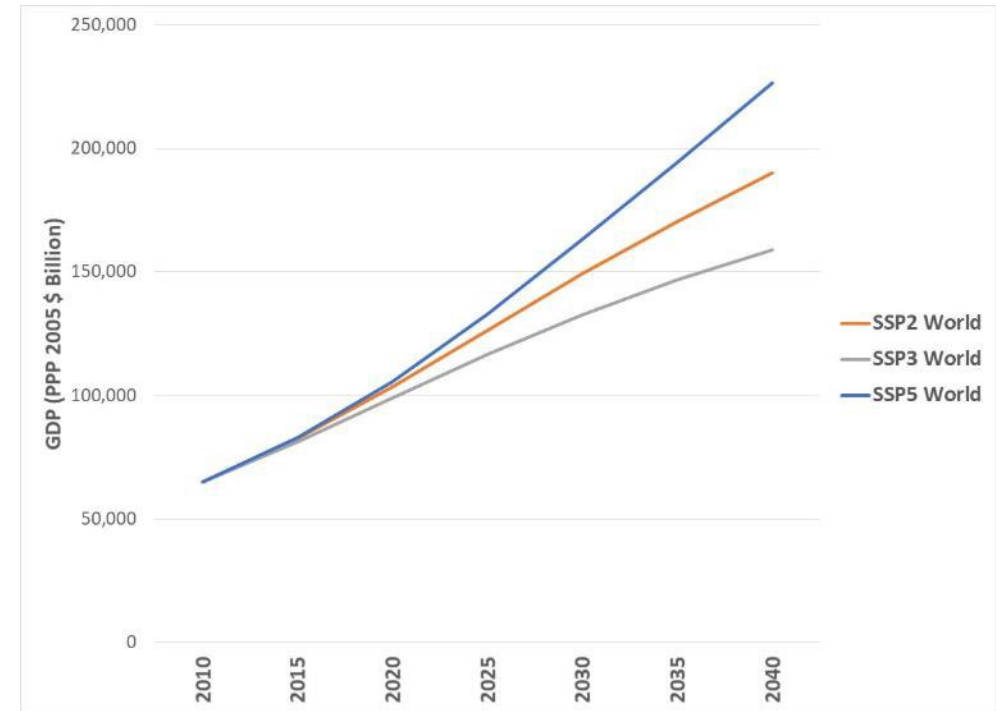
Quantitative Modeling Setup

- New Version of the Global Forest Products Model (GFPM)
- GFPM Updated to Include:
 - Planted Forest Projections
 - Climate Projections
- Harvested Wood Products Carbon and Forest Carbon Tracked
- Generally, we compare one of our three reference scenarios with an alternate scenario built from the same SSP
 - Most: Reference SSP2 versus SSP2 with a structural change assumed
 - Climate only: Reference SSP5 versus SSP5 with strong warming

Shared Socioeconomic Pathways (SSPs)



World Population



World GDP

Structure

Three Reference Projections:

- **SSP2: Middle of the Road (Business As Usual)**
- **SSP3: Regional Rivalry**
 - low economic growth, high population growth
- **SSP5: Fossil-Fueled Future**
 - high economic growth, lower population growth

Six What-If Alternative Scenarios:

- **Three Structural Changes in Timber (Wood) Demand**
- **Three Structural Changes in Timber Supply**

Two Special Issues:

- **How would significant trade restrictions affect forest product markets in the UNECE?**
- **How will the UNECE be affected by Climate Change?**

Possible effects of **structural** changes on UNECE forest product markets

1

Increase wood-based construction in China:

- ❑ This is an external (to UNECE) demand increase for structural wood
- ❑ 10% of houses in China made with wood frame construction by 2040

2

Increase wood use in construction in Europe:

- ❑ This is an internal UNECE demand increase for structural wood
- ❑ To a rate matching 2017 US per capita lumber and panel consumption

3

Increase production of wood-based textiles:

- ❑ This is a global demand increase for fibre (competing with paper pulp)
- ❑ Wood fibre replaces 30% of global textile industry fibre needs by 2040

Structural Δ - China High Wood Consumption

Results: Compared 2040 Outcome with the SSP2 Reference Case

- ❑ Price impacts felt in the Russian Federation, China, and globally, but not appreciably elsewhere in the UNECE
- ❑ Prices for IRW up 21% in China, 8% in Russia, up by 5 to 10% in Russia, China, and globally for products, not significantly elsewhere in the UNECE
- ❑ Production up by double digit percentages for most wood products, not paper (slight decline)

Structural Δ - Europe High Wood Consumption

Results: Compared 2040 Outcome with the SSP2 Reference Case

- Price impacts felt in the Russian Federation and globally, but not appreciably elsewhere in the UNECE
- Prices for IRW up 2% in Russia, 4% globally
- Product prices up by less than 2% in Russia and globally.
- Production is up in the UNECE overall in wood products, down in paper overall and globally.

Structural Δ - Textile High Wood Fiber Consumption

Results: Compared 2040 Outcome with the SSP2 Reference Case

- ❑ Price impacts felt in the Russian Federation and globally, but not appreciably elsewhere in the UNECE
- ❑ Prices for IRW up 2% in Russia, 3% globally; product prices up by less than 2% in Russia and globally.
- ❑ Production is up for roundwood, down for sawnwood by less than 1% globally, though impacts are larger in the UNECE (-6 to -15%).
- ❑ Note: no directly modelling of the impacts on the paper sector, though one would presume them to be negative.

Possible effects of **supply** changes on UNECE forest product markets

Scenarios:

- **Global forest area +10% by 2040 (in line with official commitments)**
 - higher harvests, higher growing stock, lower prices
- **More plantations (outside ECE Region)**
 - higher harvests, consumption and production, higher growing stock, lower prices
- **High global warming and associated CO2 rise (RCP 8.5) = Increased disturbances**
 - higher share of salvage harvests, lower prices, but global markets tend to dampen fluctuations due to local disturbances, even if they are severe. If disturbances constrain wood supply over long term, prices would rise.

Supply Δ - Global forest area +10% by 2040

Results: Compared 2040 Outcome with the SSP2 Reference Case

- Impacts felt in the Russian Federation and globally, but not appreciably elsewhere in the UNECE
- Prices for IRW down 3% and for products by -0.5 to -1.7% overall globally
- Production up by low single digit percentages

Supply Δ - Climate Change Impacts (Quantitative)

Results: Compared 2040 Outcome with the SSP2 Reference Case

- ❑ IRW prices fall globally due to overall larger timber supply, although drops are 3% globally and range from about -2% to -6%
- ❑ Product prices drop by less than that, most for sawnwood (-2 to -4%), panels (-1%) and papers (-1%)

How will UNECE forests

be **affected by climate change?**

Climate change and forest ecosystems are both extremely complex. FSOS reviewed the state of the art for:

- Forest productivity (increasing, but uncertain future trends and limits)
- Species distribution ranges (moving towards poles and mountains). Concern about speed of change
- Natural disturbances have increased in number and severity, often in combination
- Storms cause significant and long-lasting economic damage in the region affected
- Droughts have also increased in number and severity, and increase vulnerability of trees
- Significant damage from fire is reported all over the UNECE region. The number, size and intensity of fires are expected to increase
- Insects and pathogens are also causing increased damage, most recently in central Europe and by the mountain pine beetle.
- Snow and ice cause damage, but may increase or decrease in intensity
- Warmer winters may cause problems for harvesting operations

How could UNECE forests

adapt to climate change?

- **Adaptive forest management** uses ecological understanding regarding future climate change impacts to create a resilient forest, one that is able to cope with a range of future conditions while still providing the main services requested by society.
- **At the stand level**, there are many possible opportunities, including change of species, of thinning regime, of forest type, or treating natural disturbance as an opportunity to take a new direction.
- Given the **uncertainty about future climate and about forest ecosystems' reaction** to the changed circumstances, the effectiveness of management choices must be monitored and strategies adapted if necessary.

How could UNECE forests contribute to climate change **mitigation**?

- **Carbon sequestration in forests** through changes in forest management, afforestation and reforestation (IPCC: + 1 billion ha globally to keep below 1.5°C)
- **Increasing the carbon pool in harvested wood products**
- **Avoidance of emissions by fossil- and carbon-intensive materials** (but reductions in forest carbon pool roughly equivalent to avoided emissions)
- **Wood energy use is driven by policy** and the subject of intense debate at present.

Possible effects of **trade** restrictions on UNECE forest product markets

- Tariff and non-tariff barriers have declined. Nevertheless, trade disputes occur
- Interests vary by group, not only by country: for instance producers v. consumers, importers v. exporters
- Analysis confirms that higher trade barriers, with retaliation, lower overall welfare.

Conclusions

- ❑ Rising demand for wood outside of the UNECE would drive up prices and increase net exports from the UNECE region, but stocks continue rising into the future
- ❑ The paper sector sees limited prospects due to declining demand for graphics paper, but sustained GDP growth means more demand for other paper
- ❑ New demand for wood fiber by the textiles sector would drive up prices, but its effects would be small overall under the scenario we considered
- ❑ Effects of climate change will differ by country and region of the world
 - Using one projection, we found that certain countries benefit or are harmed more than others
 - Effects are small by 2040, would increase with time
 - Our analyses ignore effects of climate change on forest disturbances besides wildfire

Food for further thought

Disturbances and the forest sink

- UNECE forests continue as a carbon sink in all scenarios
- Disturbances are expected to become more frequent and their GHG emissions are roughly comparable to the forest sink
- Mitigation and adaptation are intimately linked
- **Questions:**
 - How to combine mitigation and adaptation strategies?
 - What silvicultural solutions minimise risk, while optimizing both mitigation and resilience, over the whole cycle?
 - How to measure and monitor disturbance and resilience?

Demand for land for increased carbon sequestration by forests

- **Increased carbon sequestration (forests/biomass or carbon capture) is part of all mitigation strategies.**
- **There are calls for huge areas (0,4-1 billion ha, 10-25% of global forest area) to be afforested. This presents many challenges:**
 - land availability
 - silviculture
 - social adaptation and land tenure
 - financial resources
 - forest management objectives

Questions:

- Is it possible to increase forest area by the amounts called for in the climate strategies?
- How much land is realistically available in the UNECE region for mitigation of climate change?
- How to resolve the inevitable conflicts and trade-offs which would accompany such a significant change in land use?
- How can forest managers find the optimum balance between carbon accumulation and wood production?

Putting substitution in a wider context

- Increased consumption of forest products, including for substitution of carbon intensive products, avoids emissions.
- However, this pathway also reduces the global forest biomass carbon stock compared to the reference scenario
- The avoided emissions (substitution factors) depend crucially on the detail of the substitution: what is substituted, by what?

Questions:

- How to develop strategies which both encourage substitution for carbon-rich materials and minimise reduction to the forest growing stock?
- Which carbon-intensive products and pathways to substitute?
- How to minimise carbon emissions in the wood value chain?
- How to encourage the circular use of wood and forest products?

Trade measures

- The global trading system for forest products may be about to experience fundamental change with the arrival of a new “layer” of trade measures focused on environmental and social governance (e.g. “deforestation-free” value chains)

Questions:

- How to use the developing trading system to promote sustainable forest management worldwide, and the achievement of the Sustainable Development Goals? And still minimise protectionism?
- What would be the long-term consequences of these changes to the rules of the international trading system for the forest sector of the UNECE region? If applied globally? Or only in some regions?

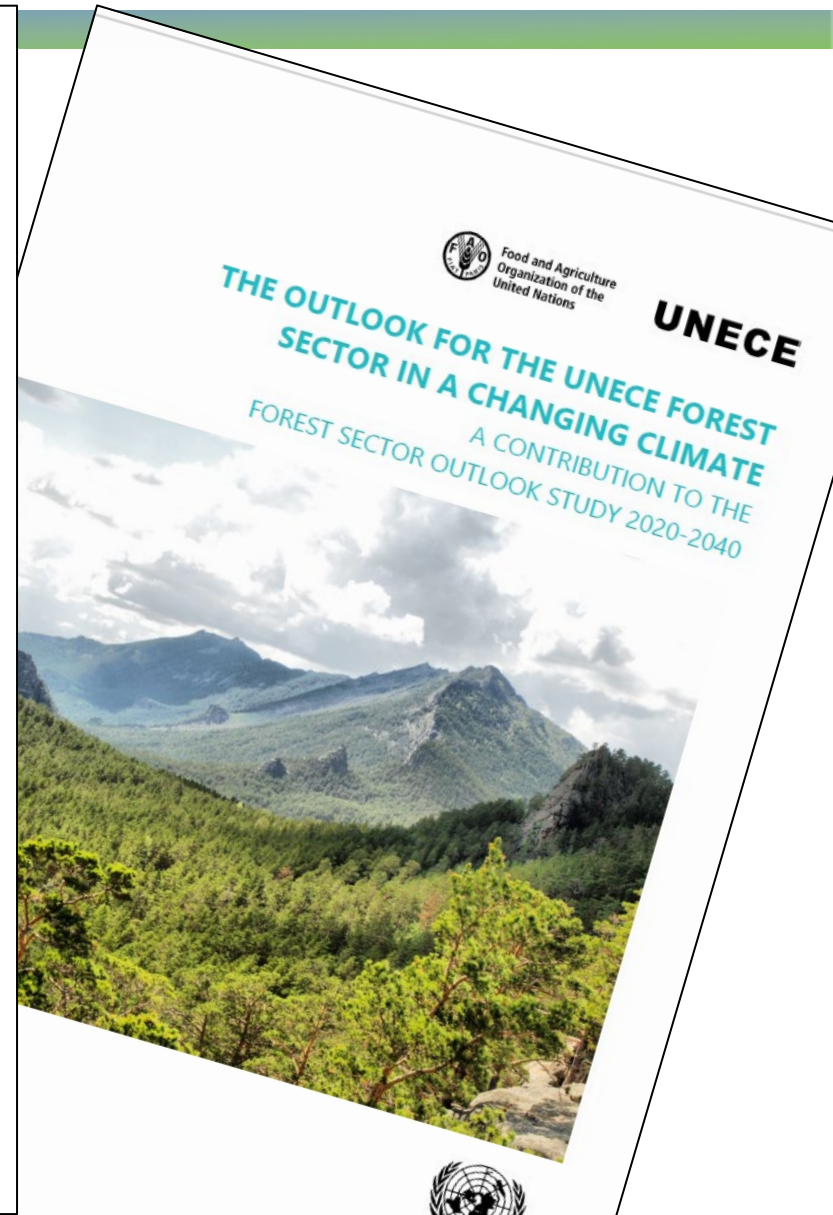
Need for a system-wide, holistic approach to strategies and policies

- This study has shown that policy choices made now, in one part of the world, may have consequences over long time periods and in far-distant regions, even for the global climate system
- Therefore, analysis based on a less than complete vision of the forest sector worldwide may be considered potentially misleading, if it fails to take a system-wide holistic approach.

Questions:

- How to develop analytical tools which reconcile the complexities of a system approach with the local realities of forest management and national or subnational policy formulation?
- How to help national and subnational policy makers take into account the system approach?

Publications and data





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Thank you!

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