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Food and Agriculture Organization of the United Nations

GFPM in the Forest Sector Outlook Study

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Capacity Building: Forest Sector Outlook Modelling

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FSOS basics

- Scope: ECE Region, to 2040, forests and forest sector
- Six priority questions (structural change, climate change), chosen through consultative process.
- Pragmatic approach:
  - Customised GFPM what-if scenarios
  - GFPM scenarios prepared for other studies
  - Analysis based on literature (sometimes drawing on scenarios)
- No forecasts or recommendations

Key questions for FSOS

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STRUCTURAL CHANGES	
Demand for wood products	How would different demand changes affect the UNECE forest product market?
Wood supply	How would different supply changes affect the UNECE forest product market?
Trade	What would be the effect of massive restrictions to trade on the UNECE forest product market?
CLIMATE CHANGE	
Impacts	How will UNECE forests be affected by climate change?
Mitigation	What can UNECE forests and the forest sector contribute to climate change mitigation?
Adaptation	How will climate change adaptation with respect to forests look like in the UNECE region?

FSOS Reference scenario: background

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- Basis for «what-if» scenarios
- The projected future of the UNECE region assuming:
  - Continuation of market structures
  - No shifts in policies
  - Historical rates of technology change, and potential new products
  - Historical climate.
- Shared SocioEconomic Pathway SSP2 «middle of the road»: development pathway consistent with historical experience.

FSOS reference scenario projections

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- Increased forest area in ECE region, decrease elsewhere
- Increased growing stock in ECE Region, decrease elsewhere
- Modest price rises for roundwood, sawnwood panels
- Increases in production, consumption and trade for all products
- Separate projections for EU27, Other Europe, Russian Federation, Other CIS, North America, Rest of the world

What if:

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- Demand increased outside the ECE region (China):

  Increased harvests worldwide, marked increases in roundwood consumption and sawnwood production in China, more exports to China, prices rise worldwide, more pressure on growing stock than in the reference scenario, but harvest still at sustainable levels (even in China).

- Wood consumption in Europe and Russia increased: Europe increases production and consumption of roundwood, sawnwood and panels, and decreases net exports. Russia exports its roundwood to other regions, and imports more sawnwood. North American consumption is slightly lower, but its production and exports increase strongly, as it supplies the demand in Europe and Russia. Prices rise marginally, worldwide, for roundwood and products. Growing stock in the forest does not drop in absolute terms but is slightly lower than in the reference scenario.

What if:

- Significant volumes of wood were used to produce textiles: Roundwood production worldwide slightly higher, and growing stock marginally lower. Sawnwood production in the ECE Region would be notably lower as a reaction to higher wood prices and other structural shifts. Panel production would be slightly lower. ECE Region net exports of sawnwood and panels would be lower. Russia would significantly increase its net exports of industrial roundwood.
- Forest area expanded worldwide by 10% by 2040: Harvest of industrial wood expands world-wide, while growing stock increases even more. Increased supply of industrial wood lowers prices for both industrial wood and forest products. Production and consumption of roundwood and products increase, in all regions. Roundwood prices are lower than those in the reference scenario.

What if:

- Planted forest area expanded outside the ECE Region by 40% by 2040 (Nepal et al. 2017): Growing stock worldwide higher. Prices lower. Global production and consumption for all products higher. An increase in industrial roundwood production especially in in Africa and Asia.
- There are increased rates of natural disturbance (no formal scenario): roundwood enters market from salvage activities; if the share of salvage increases, it would dampen roundwood prices, locally and possibly nationally; if mortality increases, this would lead to longer-run price enhancements when the disturbance is large relative to total growing stock; effects of disturbances might be profound at national and subnational scales, global forest products markets would tend to register only dampened effects of those disturbances as trade adjusts to supply at a global level.

What if:

There are massive restrictions to trade in forest products (paper based on GFPM, addressing restrictions to US trade only): With US import restrictions and no retaliation, the welfare of US producers would rise but by less than the losses experienced by U.S. consumers. Outside of the United States, producers would lose more than consumers gain. With retaliatory measures imposed by trading partners, welfare of U.S. consumers rose due to lower prices and higher consumption, but their gains were outweighed by U.S. producer losses. In the rest of the world under that simulation (i.e. restrictions plus retaliation), consumer welfare decreased more than producer welfare increased, also a net loss. Trade wars cause decreased overall welfare (producer and consumer surplus) in the forest sectors of most countries.

How will UNECE forests be affected by climate change?

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- Climate change and forest ecosystems are both **extremely complex**, and their interaction cannot be described in a few simple statements.
- Climate change appears to have increased the **productivity** of forests. Highly uncertain whether these positive effects on productivity will continue in the future.
- **Species distribution ranges** and the associated forest types are moving towards the poles and higher elevations.
- Forest **disturbances** including wind, drought, fire, pathogens and snow and ice, have increased in number and severity and are expected to do so in the future.
- The changes in winter conditions might lead to **problems for logging**, for mobilizing timber all year round and for maintaining a steady demand for labour.
- Changes in productivity would change the **relative competitivity** of different producers.

Contribution to climate change mitigation

- Potential strategies:
  - Changed forest management
  - Afforestation and reforestation
  - Increase carbon pool in harvested wood products
  - Avoid emissions from fossil intensive materials, including textiles, and fuels by substituting with wood from renewable sources (but take into account carbon balance in the forest)
- In the reference scenario, carbon stored in forests and harvested wood products increases by 10% by 2040

Forest adaptation to climate change

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- Adaptive forest management utilizes ecological understanding about 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.
- The measures to be taken vary widely according to the circumstances of each forest stand, its site characteristics, possible future climate and management objectives and capacity.
- Managers may take a reactive or a proactive approach and may act on different timescales and geographic range (stand, landscape, national policy/governance).
- General recommendations for proactive adaptation aim to spread risks among stand members.

Need for a holistic approach

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- There remain large areas of uncertainty about climate change mitigation, and adaptation
- Forest management measures may increase the carbon sink in forests, but increased disturbance could offset part or all of these additional carbon gains. Adaptation and mitigation measures should be considered together.
- Scenarios aimed at increased production of wood to substitute fossil-based alternatives projected to be nearly carbon neutral to slightly negative. However, since the avoided emissions are permanent, these scenarios can be considered as being viable options.
- Disturbances can open the door to silviculture directed towards adjustments in species composition and increasing complexity within a context of increasing forest resilience.
- Societal debates may be necessary about how to balance the trade-offs among and between different and sometimes competing management objectives as well as mitigation and adaptation options

Climate-Smart Forestry?

- A holistic approach, linking adaptation and mitigation, enhancing resilience and meeting the needs of a growing population.
  - Increasing carbon storage in forests and wood products, in conjunction with the provisioning of other ecosystem services;
  - Enhancing health and resilience through adaptive forest management; and
  - Using wood resources sustainably to substitute non-renewable, carbon-intensive materials

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Thank you!

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