Dynamic forest typification Styria

Research shows the impacts of climate change on forest stocks and provides solutions.

EAFRD-funded projects

Location: Styria, Austria
Programming period: 2014-2020
Priority: P4 – Ecosystems management
Focus Area: Biodiversity restoration, preservation & enhancement
Measures: M07 – Basic services & village renewal
Funding:

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EAFRD	3 212 166 (EUR)
National/regional	3 286 248 (EUR)

Timeframe: 03.2018 to 09.2023
Project promoter: AMT der Steiermärkischen Landesregierung, ABT10-Landesforstdirektion (Styrian Provincial Government, Department of Forestry)
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Summary

Climate change will lead to rising uncertainty and instability of forest stocks in future. In Styria, Austria, it is expected that natural forest vegetation will be affected due to temperature change and extreme climatic conditions, such as summer droughts. The 'Dynamic forest typification Styria' research project investigated the effects of climate conditions on specific forest sites. New, relevant maps needed to be developed based on a new methodological approach that would take into account anticipated varying climate conditions.

Project results

- A detailed, practical description and mapping of forest types was produced.
- A practical tool was developed that provides concrete recommendations for the selection of tree varieties. The recommendations serve forest owners primarily in making silvicultural decisions especially about the selection of a suitable, resilient type of tree.
- The project has created a comprehensive digital database that takes climate change into account. All data is available to users at any time and free of charge.

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Key lessons and recommendations

- The establishment of a control group with landowner representatives was highly effective because of its specific goal-oriented focus.
- Clear responsibilities were essential for the successful implementation of the project.
- To convey information in a targeted manner and to reach target groups effectively, good and comprehensive public relations work is vital.

Context

It is anticipated that climate change will lead to substantial uncertainty and instability for forest stocks in future. The predictions are that the temperature will change by 2-4°C over the next 100 years. In Styria, Austria, the expectation is that natural forest vegetation will shift uphill by around 400 to 800 meters. Although precipitation might remain the same overall, an increase in rainfall away from summertime towards wintertime is forecasted. As a result, a significant increase in climate extremes, including extreme drought periods in summer, are anticipated.

The idea for the 'Dynamic forest typification Styria' project originated from the need to gain access to better information, build more knowledge about the effects of climate change on

specific forest habitats and find relevant and practical solutions.

The lack of relevant forest site maps in Styria was a key problem in this context. A new methodological approach was required to develop reliable technical foundations to create a new forest type map that would be able to integrate changing climatic conditions and scenarios. There was also a need to join up general prediction models on climate change with location-specific statements on forest management. These data were necessary to produce a new forest map and derive practical forest engineering measures that would support forest owners in making silvicultural decisions, especially regarding the selection of tree types.

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Objectives

The main objective of the project was to determine those forest types that would be most resilient and suitable to plant in view of the current climate change predictions in Styria. The intention was to develop a practical instrument that would help to illustrate the impact of different climate scenarios on various tree and forest types (descriptive, cartographic).

The project promoters were also keen that the project results should be made widely accessible through the national Geo-Information-System (WEB-GIS system Styria) to effectively support the decision-making process for silvicultural management.

The project was, therefore, primarily aimed at forest owners and forestry advisory services who required a better technical foundation for their operational forest management decisions.

Activities

The project featured the following activities:

- Creating the project team. The project was implemented by leading experts in Austria, ranging from science and research to specialised private sector companies.
- Preparing the basis for modelling. Geological maps were improved and new sub-maps were created. As a result, basic geological data was expanded immensely and provided the basis for extensive modelling of forest sites.
- Researching climate change scenarios. As part of the project, climate data and climate models were regionalised. Three climate scenarios were calculated for the entire region of Styria and prepared for the near and distant climate future.
- Data presentation and forecasting. The effects of the climate scenarios were presented on a grid of 10x10 meters for the period from 1989 to 2100. The data was then generalised to areas of 30x30 meters. This made it possible to produce forecasts and forest management recommendations with a high degree of accuracy.
- Piloting the models. 116 main forest sites and 69 special forest sites were selected. For these locations, the heat, water and nutrient balance was determined along the ecological axes. A modelling and comprehensive description of selected main and special forest sites was realised concerning their development in times of climate change.
- Developing and specifying corresponding silvicultural treatment concepts. This included descriptions of alternatives for the transition from site-inappropriate to 'climate adapted' forest situations in line with different future climatic scenarios.
- Developing a practical tool that can provide concrete recommendations for the selection of tree varieties.

Main results

- The project produced a detailed, practical description and mapping of forest types.
- A concept was developed to provide forest owners with concrete recommendations for their forest management as to how to adapt to climate change. The recommendations were designed in a user-friendly and detailed manner. Non-native tree species were also considered when preparing the forest management recommendations to enable long-term planning as there is uncertainty as to whether native tree species can continue to grow on all sites in future climate conditions.
- A practical tool was developed that can provide concrete recommendations for the selection of tree varieties. The tool enables

forest owners to access information about the effects of climate change on their forests. The recommendations serve forest owners primarily in making silvicultural decisions, especially the selection of a suitable and resilient type of tree.

- The project has created a comprehensive digital database that takes climate changes into account. The data can be downloaded from GIS-Styria and then directly integrated into internal information systems. Forest owners and advisory services thus receive useful information for their management decisions.
- The project provided specialists with a comprehensive database that they can use, for example, when preparing expert reports. Thus, everyone working in the natural area benefits from the fact that extensive data for decision-making is available for download at any time and free of charge.

Key lessons and recommendations

- The establishment of a control group with landowner representatives was highly effective because of its specific goal-oriented focus.
- Clear structures and responsibilities were essential for the successful implementation of the project. Careful planning and selection of project partners was of great significance. Errors in data collection in forest areas can lead to incorrect results. In such cases, no cost savings regarding expertise would be made.
- Regular meetings and ongoing communication about the progress of the project are important to stay goal-oriented. The honest and open handling of information created trust and understanding between partners. By dealing well with each other, common solutions were found and barriers were overcome more easily.
- To convey information in a targeted manner, good and comprehensive public relations work was of great importance. It was crucial to reach the target group effectively and to provide all relevant information.

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