FORESTRY

Few forest enterprises in Switzerland today can make money producing and selling wood. And yet the forest is still expected to perform manifold services for the general public. These, however, are not to be had for free.

A forest for everything

Effective maintenance of the protection forest would not be possible without significant support from the federal government and the cantons.

WSL researchers are developing an IT-Tool for planning when to use cable crane systems quickly and easily.

Mountain forests must be maintained to ensure they provide sustainable protection against natural hazards. This involves using cable devices, such as this mobile tower yarder with a mounted processor, which is complex and expensive.

Rothenthurm (Canton Schwyz), April 2015.

Photo: Fritz Frutig, WSL

When forest owners inspect their forests, they need, at the same time, to envisage what they will be like in at least fifty to a hundred years. Today, a forest may contain many spruce trees of the same age, but these could die off during the next dry period. Should the owners harvest the trees now in order to get a still acceptable timber price, and plant more climate-resistant Douglas firs or – even better – species of oak? If the forest is close to nature, a bird conservationist may have spotted a rare white-backed woodpecker in it. Perhaps the forest could become a natural forest reserve and provide the bird a long-term home. In that case, should the forest owners give up harvesting the wood in future and apply for subsidies instead?

The measures adopted by a forest enterprise today will not only influence, for many decades to come, the development of the forest and its services for society, but also the enterprise's own economic survival. The sector is currently in difficulties, with more than half of Swiss forest enterprises running at a loss (see the Interview on page 7).

Since it first began, WSL research has supported forestry by developing planning tools for the ecological and cost-efficient use of forests. These include models that optimise the organisation, planning and implementation of forestry measures, such as: calculating timber growth, estimating the costs and yields for various timber-harvesting operations or efficiently planning complex operations like the use of temporary timber transport cableways. "We have designed these models to be good, simple, user-friendly and transparent," explains Janine Schweier, head of WSL's 'Sustainable Forestry' Research Group.

The challenges facing foresters and forest owners today, however, involve issues that are not just technical. This is why at WSL the research focus will, in future, increasingly go beyond the operational level. The forest can no longer be considered as just a supplier of timber and wood for energy. It should protect residential areas and infrastructure against natural hazards, provide a habitat for a wide variety of animal and plant species and enable people to spend their leisure time there unrestrictedly. It is also taken for granted that forests filter drinking water and remove CO_2 from the atmosphere.

All of these objectives are set out in the government's Forest Policy 2020, which forestry must abide by. WSL supports the implementation of the policy through research. It is a juggling act. "The more diverse the goods and services the forest is expected to provide, the more challenging the planning and decision-making becomes for forest enterprises," says Janine, who is a forest scientist. The magic formula is 'multifunctional forest planning'. WSL researchers have calculated exemplary ways of promoting biodiversity to achieve this goal in the former forest enterprise Wagenrain near Bremgarten (Canton Aargau). Simulations of four management scenarios over a fifty-year period suggest that the scenario where forest areas contain separated off nature reserves is the one that works best for biodiversity protection. It also fulfils other functions at the same time, such as making the forest more attractive for visitors.

The 'Resource Analysis' Research Group at WSL has a new project that is even broader in scope and aims to predict for entire regions how harvesting the wood impacts on forest services. Using data from the Swiss National Forest Inventory (NFI) and climate data, the model estimates how large the trees on the NFI sample plots will become over time. The effects of increasing or reducing the wood harvest on forest development can then be simulated. The calculations in the model show how the trees and forest stands will develop so that estimates can be made for various forest services, for example of wood volume, as well as of carbon in the soil as a CO_2 sink, or of deadwood, which is an important habitat for many animals. "When making management decisions, the model can help in opting for one or more of these objectives," explains Esther Thürig, the biologist who heads the Research Group.

Research group 'Sustainable Forestry': *www.wsl.ch/sustainable-forestry*

Storms and bark beetles

Careful long-term planning is, however, increasingly being drastically affected by unforeseeable events. Foresters and forest owners today already have to harvest about half of the annual timber yield in connection with emergencies, like storms and bark beetle infestations. 2018 was a dramatic year: the summer was extremely dry, and the storms Burglind and Vaia resulted in three instead of the usual two generations per year of bark beetles. Forest enterprises and sawmills worked to full capacity, and the price of spruce wood/timber fell by around a third.

"Unfortunately, years like 2018 are likely to become more frequent with climate change," says Janine. That's why Janine wants to support forestry in future research projects to help plan for the unpredictable, addressing questions such as: how best to cope with the immense quantities of windthrown wood; or how to drive with heavy machinery over difficult terrain where the

Storms and bark beetle mean Swiss sawmills are working to full capacity. This, together with competition from imported timber, means that the price of timber remains low.

Research group 'Resource Analysis': *www.wsl.ch/resource-analysis*

ground is still soft because warmer winters mean it is frozen for shorter periods.

In addition to these issues, Swiss timber is difficult to sell. In the past, it was assumed that exploiting the timber would more-or-less automatically co-finance all the other forest functions and thus enable their performance. This assumption was known as the 'Kielwassertheorie' ('wake' theory), which no longer applies. Prices for timber are low, and domestic timber suppliers are finding it hard to compete with timber that is often imported more cheaply.

Photo: Emanuel Ammon, BAFU

Foresters and forest owners are therefore requesting compensation for non-timber forest services – similar to the ecological subsidies in agriculture. In forests, the federal government currently provides support only for the maintenance of protection forests in mountain regions and specific measures to preserve biodiversity and adapt to climate change. "People in Switzerland consider certain forest services, such as clean drinking water and recreational opportunities, as 'public goods' for the general public and expect them to be provided free of charge," explains Roland Olschewski, Head of the WSL Research Group 'Environmental and Resource Economics'. "This makes it difficult to market ecosystem services."

'Premiums' for protection forests

The forest economist is investigating, among other things, how willing the public in Switzerland is to pay for forest services. As part of the National Research Programme 'Sustainable Economy', his team has asked households in various municipalities in the Grisons and Canton Valais whether they would be willing to pay for additional forest maintenance that would increase the protection of their homes against natural hazards such as avalanches. The result: the majority of households were very willing, in this case, to pay an extra 'insurance premium' for the protection forest. Other researchers have also found that people, especially in urban areas, would be quite willing to pay between CHF 80 and 200 per year to be able to visit the forest.

Research group 'Environmental and Resource Economics': *www.wsl.ch/environmental-resource-economics*

A few forest owners have detected an opportunity to sell various special forest services on a voluntary basis: tree or forest sponsorships, private natural forest reserves, or 'climate' forests for the long-term storage of the greenhouse gas CO_2. Other potential income sources could be renting forest huts or organising forest kindergartens. In forest cemeteries, the deceased can find their final resting place under trees.

Such opportunities cannot, however, compensate for the costs and risks involved in forest management, especially for private forest owners without tax revenues. In this situation, WSL research can help, for example by suggesting how the value of forest services can be expressed in Swiss francs or how to resolve conflicts between different forest management objectives. Roland is convinced that there is no way around having the public pay for some ecosystem services in the long term. "This is the only way to ensure their long-term viability." *(bki)*