

News Release

Freising-Weihenstephan, October 28th, 2008

Forest risk management

Learning from the financial market crisis

In their full autumn splendor mixed forests are a treat for the eye. Yet, to forest economists mixed forests are low-yield when compared to pure forests, e.g. spruce monocultures. Scientists at the Technische Universität München (TUM) have now debunked this widely held misconception: Mixed forests have the edge not only from an ecological perspective, but also economically. In forestry spreading risk is every bit as important as in the world of finance.

With marvelous palettes of yellows, reds and greens, mixed forests are not only a beautiful sight. They are exceptionally hardy. A blend of broadleaved and coniferous trees is less susceptible to extreme weather conditions, pests and disease. Even though these advantages are well established, many forest managers still plant monocultures because, according to conventional wisdom, these provide higher yields. But old adage this is about to change: TUM researchers have shown that mixed forests are not only more resilient – they are also profitable.

In classical forest management timber yield, timber quality and speed of growth are the primary considerations when selecting trees. However, when assessing long-term investment perspectives, financial risk must be factored in. This is not limited to the world of financial trading. It applies just as much when deciding on whether to plant a mixed or mono-species forest. Pure spruce stands, for example, are particularly vulnerable to bark beetles and storms. They are also poorly adapted to the increasingly arid conditions brought on by climate change. In the past these risks were frequently ignored for a lack of good evaluation mechanisms. Professor Thomas Knoke and his staff from the Institute of Forest Management at the Center for Life and Food Sciences Weihenstephan of the TUM have now succeeded in incorporating these risk factors into the assessment of forest economics.

To this end the scientists developed a novel simulation model. What makes this approach so unique is that it considers both ecological and economic aspects. With this model more realistic risk assessments and prognoses for forest development can now be made. The forest scientist Knoke took a clue from finance theory for mathematically mapping risks in models. The concept of “risk distribution” has a long history there – although, as the current crisis shows, the principle is not always adhered to.

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Applied to forestry, risk distribution implies that mixing a variety of tree properties will reduce the economic risk the forest manager is exposed to: In the growth period, the coexistence of spruce and beech stabilizes stands during storms, prevents the mass breakout of disease or affliction with pests, and the owner of the mixed forest becomes less dependent on a specific market. Broadleaved trees are used primarily in the production of furniture and veneer while coniferous trees are used for construction lumber (or in the production of paper and particle board).

Prof. Knoke's novel, combined ecological-economical model, which also incorporates the results of associated forest scientists at the TUM, shows that there is no justification for the widely-held perception that mixed forests are uneconomical. Forest owners who want to leave their children and grandchildren a productive forest are well advised to transform their spruce monocultures into mixed forests. Not only will they stand up to climate change better, they will also fare better in the unpredictable timber market.

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[borkenkaefer.jpg](#): Bark beetles can wreak financial havoc on spruce monocultures. (Picture: TUM / Th. Knoke)

[mischwald.jpg](#): Mixed forests are not only beautiful, but also a solid investment. (Picture: TUM)

Technische Universität München (TUM) is one of Europe's leading technical universities. It has roughly 420 professors, 6,500 academic and non-academic staff (including those at the university hospital "Rechts der Isar"), and 22,000 students. It focuses on the engineering sciences, natural sciences, life sciences, medicine, and economic sciences. After winning numerous awards, it was selected as an "Elite University" in 2006 by the Science Council (Wissenschaftsrat) and the German Research Foundation (DFG). The university's global network includes an outpost in Singapore. TUM is dedicated to the ideal of a top-level research based entrepreneurial university. <http://www.tum.de>

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