NATURAL FOREST DISTURBANCES: A STUDY ON GLOBAL ECONOMIC SURVEY

Kyle Rustogi, Valdosta State University

ABSTRACT

Forest ecosystems have always been influenced by natural disturbances, modifying or disturbing the flows of products and services given by forests. As a result, people have had to change their economic actions and decisions to account for such risks and mitigate their effects. The world's forest area is rapidly shrinking, and the surviving woods' ecological health is deteriorating. As a result, forest management approaches must strike a balance between (1) human management designs based on forest homogenization to efficiently deliver economic values and (2) naturally emerging self-organized ecosystem dynamics that promote heterogeneity, biodiversity, resilience, and adaptive capacity. Such an approach is recommended to be natural disturbance-based management. It is based on the idea that disturbance is an important factor in preserving ecosystem diversity, including species, functions, and adaptive and evolutionary potential, all of which are linked to the long-term viability of ecosystem services that support human well-being.

Keywords: Economic, Forest, Ecosystems, Management.

INTRODUCTION

Natural ecosystem dynamics promote self-organized heterogeneity and variety, which are essential for keeping ecosystems healthy, diversified, and resilient. This differs from controlled ecosystems, which are often homogenised physically and functionally for high yields of specific commodities. This is the fundamental distinction between natural and human-made systems, and it represents the age-old conundrum of whether to use or protect. This means striking a balance in space and time between management system designs that promote the production of specific goods and services and natural ecosystem designs that are characterised by self-organized properties such as heterogeneity, biodiversity, resilience, and adaptive capacity in forest management. However, management is influenced by relatively short clear-cut harvesting cycles, as opposed to natural disturbance cycles, which are typically much longer and more diverse (Balvanera et al., 2006). Habitat loss and degradation leading to diminished structural variability and tree-species diversity over wide geographic areas are the core causes of challenges in forest biodiversity conservation. Secondary forests that have been subjected to intense management lack the natural abundance and range of heritage features, landscape connectedness, and species with unique habitat requirements that contribute to forest biodiversity. The so-called *"ecological memory"* of naturally dynamic forests is critical to their resilience and adaptive capacity during disturbance cycles. For example, a huge number and variety of dead wood, or enduring complex overstorey structures made up of massive trees, are examples of this (Fenton & Bergeron, 2012). Ecosystem-based methods to forest management are required due to the continued loss of global forest area and degradation of natural forest ecosystems, as well as the requirement to supply varied ecological and social values in forest landscapes. Forest disturbance ecology looks at how disturbance regimes affect structural heterogeneity, species composition and dynamics, and ecosystem adaptive capacity over large geographical and temporal dimensions (Angelstam et al., 2003).

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Natural disturbance-based forest management is based on disturbance ecology research and coincides with current policies that aim to create multifunctional forest landscapes. The goal is to reduce the detrimental effects of a narrow focus on wood and biomass production on forest ecosystems by identifying and maintaining critical habitats and heterogeneity features that are believed to promote biodiversity and, as a result, human well-being. Natural disturbance-based forest management is built on this ecological idea. It is based on the hypothesis that by simulating natural tree mortality patterns and forest structures at multiple scales in forest management, it is possible to maintain or restore key ecological structures, and thus sustain communities, processes, and biodiversity, as well as associated ecosystem services, in managed forest landscapes (Kuuluvainen & Berglund, 2021).

Disturbances in forest ecology relate to tree damage and death events that free up growing space and resources while also changing the microclimate. Factors including as fire, wind throw, insects, and fungus produce disturbances in natural forests, and they occur at various spatial dimensions, ranging from the deaths of solitary ancient trees to the mortality of groups of trees to large-scale impacts. The frequency and severity of disturbances also vary. Leaving retention trees in managed forests has become a typical strategy for balancing the competing goals of timber production and biodiversity protection (Warkentin et al., 2009).

CONCLUSION

In forest management, it is impossible to precisely replicate all aspects of natural disturbances. However, there are two ways we can use the growing body of knowledge about natural disturbances and their ecological consequences at multiple scales. As a first step, a holistic approach might be used, with the overall goal of minimising the gap between managed and natural habitat structures at many scales by simulating natural disturbances in harvesting operations. This is known as the *"coarse filter"* method. In the continuously changing global environment, natural disturbance-based management provides a comprehensive and ecologically sound paradigm for managing forests for human needs while protecting ecosystem health.

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