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# Editorial: Recent advances in restoration, preservation, and eco-morphophysiology of plants under integrated management approaches and current climate change

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## Editorial on the Research Topic

[Recent advances in restoration, preservation and eco-morphophysiology of plants under integrated management approaches and current climate change](#)

Integrated forest management has become a critical strategic action considering forests' multiple roles in nature conservation, renewable energy strategies, climate change mitigation, and adaptation policies (Sotirov and Arts, 2018). It generally involves considering the totality of interactions of various sub-systems (social, economic, and ecological) within the biosphere and integrating goals set for such management (Aggestam et al., 2020).

Ecological drivers for tree restoration and preservation include biotic and abiotic factors, such as climate, type of substrate, and site aspect (Santoyo et al., 2017) and interactions with other species of a given plant community, animals or soil microorganisms (Asbeck et al., 2021). Morphological and physiological approaches seek to understand better how species cope with variations in given conditions and resources and how organisms' responses affect their distribution and abundance patterns, community structure, and ecosystem processes (Walthert and Meier, 2017; Marchi et al., 2018).

The ecological integrity of natural ecosystems significantly impacts social well-being and sustainable development. Therefore researchers pay more and more attention to restoration and preservation approaches (Bolte et al., 2009; Nagel et al., 2017). Forest and agriculture resources could considerably support sustainable development while ensuring that natural ecosystems are restored, resilient, and protected. Therefore, understanding how various integrated management approaches affect forest ecological and morphophysiological responses is fundamental to any sound prediction regarding restoration and preservation across all the terrestrial biomes worldwide. This Research Topic gathers different contributions emphasizing advances in conservation and

restoration and methods to deal more efficiently with simulated and factual data, highlighting the different approaches concerning sustainability and the integrated management of forest resources. Understanding the basis of the interaction of restoration-integrated management approaches is imperative for sustainable agriculture and forest productivity.

The articles published in this Research Topic include: 1. “Root system-rhizosphere soil-bulk soil interactions in different Chinese fir clones based on fungi community diversity change” by [Cao et al.](#); 2. “Impact of land use change on habitat quality and regional biodiversity capacity: Temporal and spatial evolution and prediction analysis” by [Li et al.](#); 3. “Deficit irrigation scheduling with mulching and yield prediction of guava (*Psidium guajava* L.) in a subtropical humid region” by [Jat et al.](#); 4. “A sequential game-play modelling on forest-title mortgage loans based on Chinese forester resource and assets valuation” by [Xu et al.](#); 5. “Phosphorus extractability in relation to soil properties in different fields of fruit orchards under similar ecological conditions of Pakistan” by [Bibi et al.](#); 6. “Combined evaluation of corporate ecological and environmental responsibility: Evidence for forest preservation from Chinese forestry companies” by [Long et al.](#); 7. “Interactive effects of intercropping and mulching under conservation tillage as sustainable agriculture increased cotton productivity” by [Adil et al.](#); 8. “Effects of nitrogen addition and seasonal change on arbuscular mycorrhizal fungi community diversity in a poplar plantation” by [Peng et al.](#); 9. “Longitudinal section cell morphology of Chinese fir roots and the relationship between root structure and function” by [Li et al.](#); and 10. “Role of different organic and inorganic amendments in the biofortification of iodine in *Coriandrum sativum* crop” by [Tianyi et al.](#) These articles suggest various local, national, or regional transformative integrated management approaches for sustainable development.

[Cao et al.](#) found that the arbuscular mycorrhizal fungi (AMF) richness and abundance of root and rhizosphere soil within the same Chinese fir clone plantations were significantly higher than that of bulk soil. It indicates that root exudates might activate AMF in the root system and rhizosphere soil. Based on the impact of AMF diversity and the difference in symbiosis with different clones, AMF diversity can be artificially increased. The screening of different Chinese fir clones depicts that Chinese fir clone P17 has high richness and abundance, which may be a nutrient-efficient clone of Chinese fir. [Jat et al.](#) inferred that applying deficit irrigation at 75% ETC (ETC is the crop evapotranspiration mm/day) using silver-black mulch imposed the required levels of water stress on *Psidium guajava*. This improved the yield, fruit quality, and irrigation water productivity. It could be a superior option for *Psidium guajava* cultivation in Uttarakhand's subtropical, humid Tarai conditions and in regions with similar agro-climatic conditions.

[Xu et al.](#) stated that forest management had become a critical strategic action because of forests' diverse role in nature conservation and bio-economic benefits. Forest-title mortgage loan plays a crucial role in easing the shortage of funds that a forester might encounter, thus protecting forest resources. Their paper proposes particular suggestions about how to raise the loan limit for the forester. It includes (1) proposals pertinent to the governmental policy support, (2) introduction of innovative credit, and (3) elaboration on how

foresters could integrate their forest-resource assets by using cooperatives and launching scaled productions. [Bibi et al.](#) investigated phosphorous (P) extractability by seven extraction methods regarding soil properties in three fruit orchards. They found hydrochloric acid and diethylenetriamine pentaacetate extractants gave more extractable P than other methods. This study also indicated that soil organic matter inputs and turnover associated with orchard trees exhibited a substantial quantity of extractable P in soils. It is required to predict available P in relation to its bioavailability using these methods in contrasting soils.

[Adil et al.](#) indicated that straw mulching under conservation tillage produced better results for *Gossypium herbaceum*. However, soil analysis has shown that no-tillage and leguminous crop intercropping improved soil health indicators. Moreover, tillage, leguminous crop, and mulching interaction better responded to seed yield and harvest index. They recommended no-tillage and straw mulching to achieve higher *Gossypium herbaceum* productivity. [Peng et al.](#), using traditional morphological identification, analyzed the seasonal changes of the root Arbuscular mycorrhizal fungal colonization in poplar after six-year N addition. Using high-throughput sequencing, they detected the composition and diversity of AM fungal community in the rhizosphere soil. N addition largely influenced the root colonization rate. In contrast, seasonal change had a prominent effect on the diversity indexes of the AMF community.

[Li et al.](#) mentioned that the microwave paraffin section method combined with laser scanning confocal microscopy (LSCM) could observe the cell morphology of the longitudinal section of Chinese fir roots more clearly and precisely in a short time. This method can also provide technical reference for the observation and study of the cell morphology of other tree roots' longitudinal sections. However, the microwave treatment time needs to be adjusted accordingly. [Tianyi et al.](#) reported that the potassium iodide (KI)-fertilized soils accumulate higher iodine than the exogenous organic iodine (OI)-fertilized soils. Soil amended with wood ash increased the iodine concentration in plant tissues. Optimum iodine addition can speed up growth development; however, excessive accumulation might be detrimental to them. Therefore, a suitable soil amendment can enhance iodine availability in soil.

[Li et al.](#) studied how land use changes could affect habitat quality in Suzhou City, Jiangsu Province, China. The temporal and spatial distribution showed a habitat degradation trend from downtown to suburban areas of Suzhou. This degradation is most common in mountainous and forest areas with highly fragmented landscapes. The habitat quality of the city has changed over time and space due to socioeconomic factors, land use changes, spatial patterns, and the natural environment, with land use having the most significant impact. [Long et al.](#) carried out a study to define the content and the measurement of corporate ecological and environmental responsibility (CEER) and the role of forestry companies in forest preservation. They reported that the particularity of ecological and environmental responsibility of forestry enterprises originates from the duality of its impact on the environment. The negative externalities are caused by operating, and forest resources bring positive externalities. Therefore, forestry enterprises should bear the dual responsibility of pollution prevention and ecological construction.

The interaction of restoration and integrated management approaches is a key process that allows a forest and other natural resources to restock after a disturbance and sustain itself. It is an inclusive process that depends on collaboration among various stakeholders, including local communities, government officials, non-government organizations, scientists, and funding agencies. Its ecological success is measured in terms of increased biological diversity, biomass, primary productivity, soil health, and the characteristic of the target ecosystem.

## Author contributions

All authors listed have made a substantial, direct, and intellectual contribution to the work and approved it for publication.

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