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Review Paper on Forest Conservation Model and Modern Techniques for Sustainable Wilderness

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ABSTRACT

Conservation of forest is a continual process that requires a well-designed strategies and approaches that fulfill the desired goal, with a scope to include new ideas within a given framework. The modifications in global greenery are a matter of great concern in front of forest managers that can be tackled with an efficient outcome in protecting forest ecosystem. The models designed for the protection of wilderness of a given region is efficient but the challenges are large enough that require retrieving and reorganizing these structures to enhance the green shades in the globe. The new scientific tools and techniques have potentiality in reclamations of the wilderness but require an extensive testing in all distinguished forest biomes and geographical regions. This research is attempted to assess various working models and modern and traditional forest conservation practices that are more relevant for a sustainable wilderness.

Keywords-sustainable wilderness; conservation model; modern scientific techniques

INTRODUCTION

Forest ecosystems are fundamental sources of services and global biodiversity, their capacity to maintain these benefits in the future is potentially threatened by anthropogenic impacts such as climate change, land use, and unsustainable management practices (Vizzarri et al, 2015). Tropical deforestation is a multi-faceted threat to the international climate change crisis anddespite increasing awareness of the link between deforestation and climate change; tropical deforestation rates are accelerating dramatically thus requires creative and flexible regulatory solutions(Abate and Wright, 2010).The natural resource such as forests and forest products were found as a basic source of survival for living organisms during the initial period. Later, the natural resources started degrading slowly and steadily due to increased human activities. In the beginning, natural resources were the primary assets for the growth of agriculture, industry, urbanization etc. Subsequently, increased anthropogenic activities started degrading the forest cover on a large scale through extending the agricultural land scape and other developmental activities in the country. The importance of traditional knowledge regarding resource conservation, protection of sacred grooves, endangered species etc. started declining (Babu and Nautiyal, 2015)

Around 80% of the earth's land area is not formally protected and consists of 'multi-layered' forested landscapes that support people, biodiversity, agricultural activity and industry, making them highly productive (IUCN).Nearly two billion ha of forests globally need

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restoration and the future need will increase and the prospect of changing climate with increasing frequency of extreme events argues for approaching restoration from a functional and landscape perspective. The distinction may be that extra-ordinary activities are required in the face of degraded, damaged, or destroyed ecosystems. Restoration is driven by the desire to increase sustainability of ecosystems and their services and restoration is likely to have multiple goals arising from the motivations of those involved (Stanturf et al, 2014).A change of the forestry management approach where semi-natural forests are re-created after logging instead of tree plantations will contribute to a sustainable forestry. Such a change will increase resilience to damages on trees, thus contributing to a more reliable supply of wood, improve reindeer husbandry, and reduce climate-driving gases (Holm, 2015).

CONSERVATION STRATEGIES

Forest Conservation Models

Designing of models for forest conservation have potential in saving the primary and secondary vegetation alongwith the ecological components of the nature. Sample (2005) reported that the multiple-use forest management model should be flexible, versatile, and useful in accommodating a growing array of forest uses and evolving social values regarding forest conservation and stewardship. The need to protect biological diversity in forest ecosystems presents a difficult challenge to this model, however, due to its importance and to the fact that adequate protection of many threatened or endangered species is not compatible with even moderate levels of resource development. Moreover they have responsibility to: (a) protect their own globally significant biodiversity hotspots, and (b) minimize externalities by more intensive utilization of productive forest areas with relatively low biodiversity values. Brouwers et al (2010) gave special emphasis on spatial modelling approaches as they are increasingly being used to direct forest management and conservation planning for the landscape scale and among these the use of buffer-radius methods, which create buffers around distinct forest habitat patches to assess habitat connectivity within anthropogenic landscapes, is the most popular approach. Host and Pastor (1998) advocated the use of LINKAGES, a forest growth model that simulates changes in composition and soil characteristics over time, to parameterize the sample plots of a given geomorphic regions using climatic, forest composition, and soil data. The differences in measured soil properties and predicted late-successional composition indicate that ecological land units incorporate some of the key variables that govern forest composition and structure. For developing forest management strategies that incorporate the spatial and temporal dynamics of forest ecosystems the value of ecological classification and modeling is significant.

Forest management model suggested by Kaspar et al (2015),is mainly concerned with forest harvest planning to maximize economic benefits and also consider additional criteria such as the biodiversity functioning of the managed forest. The biodiversity requirements are determined by the size, shape, and distribution of harvest units and forest stands. Multiple criteria programming and integer programming techniques are used to find an optimal program

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of forest harvesting with respect to both economic and environmental requirements. The observation concludes that the spatial pattern and other spatial demands affect the harvest possibilities and there should be a compromise solution from both forest management and nature conservation.

According to Estrella et al (2014) three ideal point-based multi-criteria decision methods (MCDM), i.e., iterativeideal point thresholding (IIPT), compromise programming (CP) and a newly-proposed CP-variant, called balanced compromise programming (BCP), are best approaches for afforestation planning, and when optimization of land performance at a regional scale is at stake, CP-derived models emerge as the preferable option over IIPT, especially when balanced solutions are a requirement.Dal Seccoand Pirard, (2015) gave special concern on tree plantations that potentially support natural forest conservation. The main hypothesis for this effect is that tree plantations substitute natural forests for production, especially when plantations achieve high productivity.Continued production in natural forests, in a sustainable manner, might also help prevent deforestation, with wood products sold on niche markets and at a higher price owing to premiums.

Modern scientific techniques in forest conservation

Scientist and forest managers are working globally in utilization and implementation of modern scientific tools and technique in forest conservation program although these technique yet requires through test in all type of ecosystem.Bicknellet al (2015)promoted Reduced-impact logging (RIL) as best practice forestry that increases sustainability and lowers CO_2 emissions from logging, by reducing collateral damage associated with timber extraction and it will also expected to minimize the impacts of selective logging on biodiversity.Mizunaga et al (2010) gives special emphasis on the concepts of 'from homogeneity to heterogeneity', 'from simplicity to complexity', and 'from an agricultural system to a natural disturbance-based system' for alternative silviculture. Stand structure is closely related to microclimate, cycling of materials, quality and quantity of wildlife habitat, and other ecological functions. Therefore, stand structure determines the sustainability and resilience of forest ecosystems. Most forest services, such as timber production, wildlife conservation, maintenance of aesthetics, and hydrological values, are stand structure dependent. These services are influenced by the manipulation of stand structure.

PEOPLE'S PARTICIPATION IN FOREST CONSERVATION

In forest conservation, participation is often associated with community forestry, which refers to forest management or co-management by people living close to the forest. The proper use of forests, forest products, and sustainable management contribute to income and employment generation and thereby reduction in the level of poverty and also provide vital role for bio-diversity conservation, environmental protection and ecological balance of the nation (Ranjit, 2012).Although these people are all in some way dependent on forests, they have little else in common. In recent years, however, it has become much harder for forest-dependent people to use local forests and their products,

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owing to deforestation, logging, population pressure or legal initiatives such as the declaration of state forests, national parks or wildlife reserves. Thus local participation is important in forest conservation and often depends on additional factors such as institutional or legal frameworks, and the education or interests of local people and other stakeholders(Isager et al, 2001).

The participatory forest management (PFM) has shown impact on forest-adjacent household livelihoods and forest benefits exceed costs in PFM zones but the forest is a cost in non-PFM zones, and costs and benefits reduce with distance from forest edge and thus the PFM is a tool that can help the forest win the support of the adjacent local communities (Matiku et al, 2013). Several other researchers like Lilleso et al (2001) focuses on local participation and importance of tree seed centres in conserving and domesticating tree species which would otherwise fall between conservation in national parks and industrial tree improvement programmes. Therefore, 'use it or loose it', model seems relevant as large number of species cannot be protected by planting schemes either because they cannot be cultivated or because they cannot meet the needs of rural communities. Such species will require protection in a network of protected areas (model 1) or managed areas (model 2), or a completely different model, depending on what is technically and socially feasible and appropriate.

APPROACHES FOR SUSTAINABLE FORESTRY

During Earth summit of 1992, Canada has taken initiative for developing “Model Forests” to find real, practical and sustainable solutions to the great environmental challenges for the planet and has established Ibero-American Model Forest Network(RIABM)representing the Model Forests across the Caribbean, Latin American and Spain.The network has setup the platform for the exchange of experiences and the promotion of good governance, and in turn, increases regional knowledge and the development of strategic initiatives and also strengthens the link between regional and global forest policy initiatives and provides an avenue for international donors to fund conservation projects in each country.These types of activities for generating model forests and their conservation or allied working strategies should be given special emphasis in various eco-regions of the globe. Forest management practices may potentially undermine the capacity of forests to sustain biodiversity conservation and services in the future, especially outside protected areas (Vizzarri et al, 2015). According to (Holm, 2015) a change of the forestry management approach where semi-natural forests are re-created after logging instead of tree plantations will contribute to a sustainable forestry. Such a change will increase resilience to damages on trees, thus contributing to a more reliable supply of wood, improve reindeer husbandry, and reduce climate-driving gases.

People tend to be more inclined towards the utilization of natural resources rather than conservation therefore due attention be directed towards developing people-friendly and environment friendly conservation strategies (Babu and Nautiyal, 2015). Processes to develop criteria and indicators (C and I) for sustainable forest management are often expert driven. The local C and I focus more on environmental and

governance-related aspects than the official list, and the official list leaves much to the discretion of the evaluator. Development of a national level C and Ifor sustainable forest management could benefit from involvement of local forest users (Pokharel and Larsen, 2007).Holm (2015) advocated that re-creation of semi-natural forests will better secure biodiversity. Since adequate protection of many threatened forest species, however, is not compatible with even moderate logging, a functional conservation model also has to include total saving of parts of the forest landscape.

In context of these reviews it can therefore be concluded that the global forest managers have paved a right way in forest conservation program but still there are the probabilities to reshape and enhance these methodology and also to design new models that are more relevant and equally compatible for a sustainable ecosystem.

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