



International Journal of Advanced Research in Arts, Science, Engineering & Management

Volume 10, Issue 2, March 2023



INTERNATIONAL
STANDARD
SERIAL
NUMBER
INDIA

Impact Factor: 6.551



Traditional Methods for Conservation of Forest with Special Reference to Rajasthan

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ABSTRACT: Forest Conservation is a branch of forestry which is concerned with the preservation or improvement of a forest and prevention and control of damage to forest by natural or man made causes like forest fires, plant pests, and adverse climatic conditions (global warming). Forest conservation also has a legal status and rather than protection from only people damaging the forests is seen to be broader and include forest pathology too. Due to the different emphases there exist widely different methods forest protection. In German-speaking countries, forest protection would focus on the biotic and abiotic factors that are non-crime related. A protected forest is not the same as a protection forest. These terms can lead to some confusion in English, although they are clearer in other languages. As a result, reading English literature can be problematic for non-experts due to localization and conflation of meanings. The types of man-induced abuse that forest protection seeks to prevent include:

- Aggressive or unsustainable intensive farming and logging
- Pollution of the forest soil
- Expanding city development caused by population explosion and the resulting urban sprawl

There is considerable debate over the effectiveness of forest protection methods. Enforcement of laws regarding purchased forest land is weak or non-existent in most parts of the world. In the increasingly dangerous South America, home of major rainforests, officials of the Brazilian National Agency for the Environment (IBAMA) have recently been shot during their routine duties

KEYWORDS: forest conservation, global warming, forest pathology, population, environment, protection

I. INTRODUCTION

One simple type of forest conservation is land acquisition by the state or conservation organisations in order to secure it, or for reforestation / afforestation¹. It can also mean forest management or the designation of areas such as natural reservoirs which are intended to be left to themselves.² However, merely purchasing a piece of land does not prevent it from being used by others for poaching and illegal logging. A better way to conserve a forest, particularly old growth forests in remote areas, is to obtain a part of it and to live on and monitor the purchased land. Even in the United States, these measures sometimes don't suffice because arson can burn a forest to the ground, leaving burnt areas free for different use.³

Another issue about living on purchased forest-land is that there may not be a suitable site for a standard home without clearing land, which defies the purpose of protection. Alternatives include building a treehouse or an earthhouse⁴. This is being done currently by indigenous people in South America to protect large reservoirs. In former times, North American Native Americans used to live in tipis or mandan earthhouses, which also require less land. An undertaking to develop modern treehouses is being taken by a company from Germany called "TrueSchool treehouses". A number of less successful methods of forest conservation have been tried, such as the trade in certified wood. Protecting a small section of land in a larger forest may also have limited value. For example, tropical rainforests can die if they decrease in size, since they are dependent on the moist microclimate which they create. There is an excellent article in National Geographic October issue concerning redwood forest in California and their effort to maintain forest and rainforest.⁴

A compromise is to conduct agriculture and stock farming, or sustainable wood management. This ascribes different values to forest land and farmland, for which many areas are clear felled. Two conflicting studies on the idea that conserving forests only relocates deforestation. This is called 'neighborhood leakage'.⁵ According to the paradox of forest protection³ protected areas such as rural settlements near protected zones grew at twice the rate of those elsewhere. The IUCN implements such



protocols that protect over 670 eco-regions. 46% of the eco-regions had less than 10% forest protection. Which means that these areas are not being monitored as they should and the protection is not working. Considering forest protection within global priority areas was unsatisfactory. An example given was that the average protection of 8.4% in biodiversity hotspots. Results have policy relevance in terms of the target of the Convention on Biological Diversity, reconfirmed in 2008, to conserve in an effective manner that “at least 10% of each of the world’s forest types”.^[5] The Forest (Conservation) Act, 1980 an Act of the Parliament of India to provide for the conservation of forests and for matters connected therewith or ancillary or incidental thereto. It was further amended in 1988.^[1] This law extends to the whole of India. It was enacted by Parliament of India to control further deforestation of Forest Areas in India. The act came into force on 25 October 1980. It has five sections.⁶

Forest conservation can be classified in several ways:

1. Maintenance of sacred forests, sacred groves and sacred trees.
2. Strict rotation of 15 to 20 years of Jhuming cycle.
3. Forest area setting aside for perennial source of water.
4. Constructive method of controlled burning over shifting cultivation.

Whereas, in modern days man has mercilessly chopped off trees without paying any attention o the destruction he is causing to his own life and future. Hillsides have been stripped off its vegetation cover which has become a major cause for the earthquakes and landslides, deforestation not only diminishes the natural beauty of any place but also upsets the ecological balance of that place.⁷

Wildlife is at the brink of destruction! Due to destruction of forests, pollution, climatic changes nd extensive hunting of animals, many species of wildlife have become extinct. With extinction, 'hen a species disappears, it is gone forever! Wildlife destruction has upset the whole mechanism f natural regulation and balance, which could endanger our very existence.The day is not far away when sighting a Hornbill/Tiger/Sangai/Samber will be a rare occurrence in our state.some of the facts that are urgently needed to save our national wealth are:

A national survey in India in 1980s revealed that humans inhibited 69% of Protected Areas.' It is believed that an area of tropical forest 4 times the size of Switzerland disappears every year!Forest lands in the developing countries have declined to half of the original. Destruction of forests leads to the destruction of wildlife.There was a time when 40% of the land on earth was covered with forests. Unfortunately, only 1/3rd part of the land is now covered with forests and the rate of decreasing green cover is increasing day by day.The way in which man exploits and destroys nature may definitely bring some short-term fit but it harms him in the long run. The survival of the human race is possible only with the survival of our environment as a whole. A person may think that killing animal or a bird won't matter much. But what is worth considering is the fact that there are millions of people out there doing such attitude, thereby killing just one animal or bird every now and then!It is a threat to wildlife that makes it mandatory for every person to understand the relation between organisms their environment. We have to make serious efforts toward wildlife conservation campaign.To prevent the inhuman slaughter and hunting of these wild animals and birds, voluntary organisation should come forward and fight for this cause. We should protest if trees are being cut down. The only way to protect endangered animals from extinction is by increasing awareness.⁸

Ecological and Environmental Value

Trees contribute to their environment by providing oxygen, improving air quality, climate amelioration, conserving water, preserving soil, and supporting wildlife. According to the U.S. Department of Agriculture, "One acre of forest absorbs 6 tons (6000 kg) of carbon dioxide and puts out 4 tons (4000 kg) of oxygen. This is enough to meet the annual needs of 18 people.'1 Trees, shrubs and herbs filter air by removing dust and absorbing other pollutants like carbon monoxide, sulphur dioxide and nitrogen dioxide. After trees intercept unhealthy particles, rain washes them to the ground.Trees control climate by moderating the effects of the sun, rain and wind. Leaves absorb and filter the sun's radiant energy, keeping things cool in summer. Trees also preserve warmth by providing a screen from harsh wind.A 50 year old tree generates oxygen worth 5.3 lakh rupees. Fallen leaves make excellent compost that enriches soil.⁹



Tourism:

Today tourism is one of the largest industries in the world and accounts for more than 10% of total employments and ecotourism is the fastest growing sector in tourism industry. More than 700 million peoples travel internationally every year spending more than 300 billion US dollar. Our state being a hilly terrain the only source of income will be from tourism,¹⁰

Importance of wildlife

Living and non-living bodies are closely tied together and form the quite intricate system called the ecosystem. Man get wealth, food drugs and medicine, life support or anything which we think from this ecosystem. The plants we grow and the animals we rear at our farm or home, all came from wild. Plants and animals in wild are gene-pool. In the event, one domesticated plant or animal or bird is wiped out due to an epidemic, the only source to replenish is the plant and animals in the wild. Plants and animals play an important role in biogeochemical, energy flow, food chain, ecological succession, pollination, environmental pollution and so on. For instant if the bees are wiped out from our ecosystem, many of our food plants will not bear food due to the absence of pollination. Due to depletion of vulture and snakes, we are facing the menace of rats everywhere.¹¹

Alternative to Jhuming:

1. Cultivation of horticultural plants - orange, lemon, pineapple, jackfruit, guava, papaya etc.
2. Conserving biodiversity and tapping the produce,
3. Undergrowth medicinal plants.
4. Planting trees and bamboos.
5. Nursery creation of forest and floriculture.
6. Mushroom cultivation.
7. Poultry, goatery, cattle rearing etc¹²

II. DISCUSSION

Forest conservation methods can be defined in various ways. In this article, the focus is on mitigating climate change and biodiversity loss and keeping ecosystems intact. Some of the most popular methods of forest conservation are controlled deforestation, sustainable land management, forest fire prevention, reforestation, and improvement of farming practices. Other ways to conserve forests include involving local communities, regulating overgrazing, Indigenous forest conservation methods, and land sparing. Proforestation is letting existing forests keep growing so they continue to be or will become huge carbon sinks and home to a lot of biodiversity. Proforestation could be a game changer in forest conservation. "In the past decades, much emphasis has been given to afforestation and reforestation. A recently proposed concept provides a promising, complementary approach to both: proforestation." —Massimiliano Sanfilippo, Senior Carbon and Natural Climate Solutions Expert at Single.Earth Proforestation can significantly and immediately reduce forest loss. Because existing trees are already growing and sequestering more carbon more rapidly than newly-planted and young trees, proforestation is a powerful forest conservation method and a great way to protect biodiversity all over the world. "It's not that we shouldn't do afforestation and we shouldn't do reforestation. We should. But recognize that their contribution will be further in the future, which is important. But in order to meet our climate goals, we have to have greater sequestration by natural systems now." —William Moomaw, Professor Emeritus of International Environmental Policy at Tufts University¹³

William Moomaw is one of the main advocates of proforestation. He proposes paying forest owners, even for small plots of land, so the "ecosystem services of storing carbon and promoting old-growth biodiversity and the resiliency to climate change that these forests provide" can continue. This would be a huge step in forest conservation. Forest fires are a huge problem across the world. In the US alone, there have been 1.5 million wildfires since 2000. Even small fires have a huge impact on forests by eradicating ground vegetation, shrubbery, saplings, and small trees. Preventing and protecting against wildfires is one of the most important forest conservation methods, as:

- Natural forest fires occur in forests across the world, even rainforests.



- When a forest fire starts, it's difficult to get it under control.

Forest fires can be caused by natural conditions or human actions. In the US, only 16% of wildfires are caused by natural forces, while 84% of wildfires are caused by humans.

Weather conditions that can cause forest fires include:

- High temperatures that raise flammability
- Strong winds that speed up wildfire spreading
- Forest fire seasons prolonged by climate change and droughts
- Lightning¹⁴

Human actions that can cause forest fires include:

- Agriculture
- Forestry
- Vehicles, equipment, and machinery misuse
- Debris burning and use of flammable liquids
- Arson

Prevention of forest fires includes actions humans can take in their everyday and work lives, like following rules of where and when not to make fires and being careful in using vehicles, equipment, and machinery. There are also bigger schemes like wildlife prevention projects. These actions are all a part of forest conservation efforts crucial to preventing and protecting against forest fires worldwide.¹⁵

Sustainable land management includes:

- Measures and practices adapted to biophysical and socio-economic conditions aimed at the protection, conservation, and sustainable use of resources (soil, water, and biodiversity)
- The restoration of degraded natural resources and their ecosystem functions

In short, sustainable land management is the practice used to protect and sustainably use Earth's resources and make it possible to restore exhausted resources. "Sustainable land management is the only way to maintain healthy ecosystems while meeting the needs of humans. Biodiversity loss due to the land-use change is one of the biggest threats to our planet. Let's save the world by managing our lands differently." —Kaspar Pöder, Sustainable Forestry Manager at Single.Earth¹⁶

Sustainable land management practices include:

- Preventing land conversion
- Protecting vulnerable lands
- Preventing and mitigating land degradation
- Restoring degraded soils
- Controlling soil erosion



- Improving soil-water storage
- Managing soil organic matter for soil carbon sequestration
- Managing and enhancing soil fertility
- Rehabilitating and managing dryland environments
- Improving crop-water productivity and managing soil salinity¹⁷

Sustainable land management is an important forest conservation strategy with a huge impact. It should be on every landowner's mind, as all nature across the world is connected. If nature somewhere is destroyed, it creates a butterfly effect that affects nature near and far. Reforestation is bringing back forests to an area where they were destroyed. It can create amazing results if done right, but unfortunately, that's not always the case. It's expensive, difficult to plan, and hard to execute, so it's often done poorly. Moreover, the results may be complicated or ruined by weather, pests, weeds, and other factors. It can create amazing results if done right, but unfortunately, that's not always the case. It's expensive, difficult to plan, and hard to execute, so it's often done poorly. Moreover, the results may be complicated or ruined by weather, pests, weeds, and other factors.¹⁸

"If someone ruined the Mona Lisa painting and redid it poorly it wouldn't be perceived as art conservation. The original Mona Lisa would be destroyed and couldn't be replicated. It's often the same case with reforestation -- it can't replicate the forest that once stood with all the biodiversity that lived there and the ecosystem services it provided." —Remy Poncet, Chief Research Officer at Single.Earth. One of the main criticisms of reforestation is that sometimes there is a quantity over quality mentality — the emphasis is on planting trees, but not making sure they will last. If a project is planned without consideration for scientific, political, social, and economic matters, it may do more harm than good. Reforestation is commonly used for commercial reasons and to restore biodiversity:¹⁸

- Commercial reforestation is dictated by markets and soils. The best location is the one with the shortest transportation and highest productivity.
- For biodiversity purposes, it's more complex. The focus is usually on degraded areas within and around forested nature reserves or establishing forest corridors to link forest fragments.¹⁹

These purposes can overlap, but unfortunately, they often don't. Many programs aim to improve ecological services, but not restore biodiversity. The most beneficial programs do both, protecting nature and keeping the earth habitable for humans. That's when forest conservation is done well. Even though reforestation is vital and one of the solutions for halting rapid climate change, it's only needed when land is already destroyed. If forests already growing and thriving were protected in the first place there wouldn't be a need for reforestation. After all, reforestation is one of the most difficult forest conservation methods. Conservation agriculture is a farming practice that aims to prevent the loss of farm lands while regenerating degraded lands. In forest conservation, it means increasing the amount of food farmers produce while preventing or significantly reducing further clearance of forests. Conservation agriculture could be a win-win solution for farming and conservation. Commonly used farming practices for protecting forests include:²⁰

- No-till or zero tillage, a method where soil isn't disturbed before the seed is planted
- Fences around streams to prevent cattle from polluting the water
- Planting cover crops to stop soil erosion
- Collecting water runoff to prevent pollutants from reaching water resources
- Integrating crop and pasture rotations

The result is using fewer resources and having a smaller impact on the land, which is one aspect of forest conservation.²¹



Deforestation is the cutting, clearing, and removing of natural forests. Many argue that deforestation shouldn't be a part of forest conservation. "Most forestry experts say "selective logging" or prescribed burns can be considered as measures to preserve forest ecosystems. Other stakeholders see any "management" measure as interference to natural processes." — Massimiliano Sanfilippo, Senior Carbon and Natural Climate Solutions Expert at Single.Earth

The main reasons for deforestation are:

- Clear-cutting
- Forest conversion for permanent agriculture
- Large-scale shifting cultivation
- Forest conversion for permanent pasture
- Mining operations
- Large roads and infrastructure projects for human settlements and to logging, oil, and mining sites
- Logging, oil, and other resources
- Urban expansion²²

Widely used deforestation methods include logging and clear-cutting with the aim to make a profit. There is debate about which method is more damaging to the environment, but they both harm it. That's why there are rules in place to control deforestation caused by logging and clear-cutting all over the world. With the extensive biodiversity loss and climate change, protecting as many forests as possible with forest conservation should be a top priority. According to Greenpeace, "Ending deforestation is our best chance to conserve wildlife and defend the rights of forest communities. On top of that, it's one of the quickest and most cost effective ways to curb global warming." Single.Earth was founded to solve one of the most critical challenges facing humankind: the destruction of natural ecosystems that support life. Protecting nature, including forest conservation, is at the center of everything Single.Earth does. Single.Earth aims to make carbon removal and biodiversity tradable³⁴ to help save nature. Clear-cutting a forest to earn money wouldn't be necessary anymore. Landowners and managers will receive money on a regular basis as carbon is sequestered on their lands. The new service will enable forests, wetlands, and other natural resources to generate profit without being sold as raw materials. In 2020, just 31% of Earth's land surface was covered by forests. Since the last ice age, one-third of the forest cover has been lost, 50% of it in the past century.²³

"Forests are not only crucial to stabilizing climate and helping us to tackle global warming, but they are also home to millions of species and provide uncountable services (e.g., climate cooling, water purification) that are essential for human well-being and survival. Forests are also home to several Indigenous and native communities³³ that depend on them for their livelihood. Protecting and conserving forests is one of the biggest tasks and challenges of our current time." — Arildo Dias, Senior Researcher of Natural Climate Solutions at Single. The earth's ever-growing population has demanded more and more resources in recent decades, meaning unbelievable amounts of forests have been lost and are still being destroyed. There is still hope, but forest conservation is needed immediately to keep Earth habitable for humans.²⁴

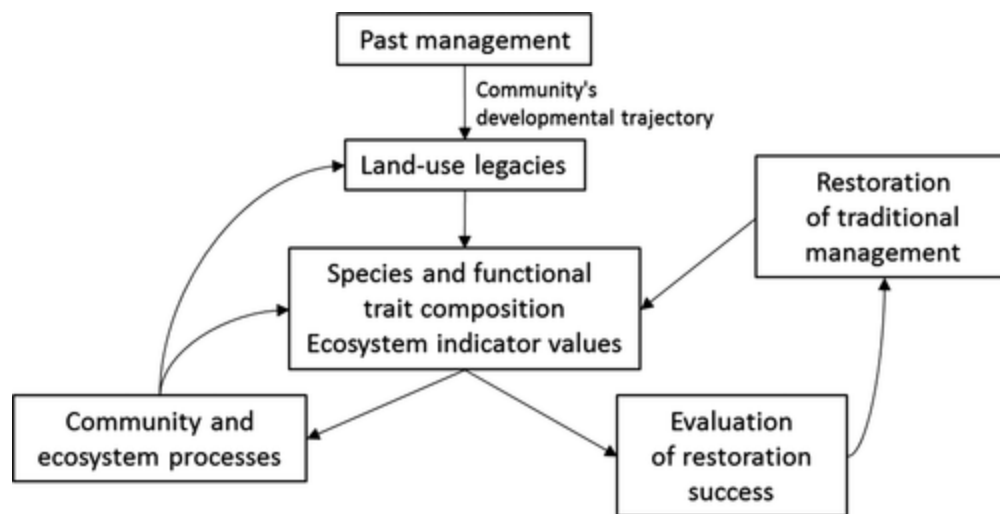
III.RESULTS

1. Past management practices may continue to influence ecosystem functions and processes for decades, centuries or even longer after they have been abandoned. Until now, few researchers have attempted experiments which test the effects of restoring some of these past management practices on long-term community developmental trajectories.
2. Strong evidence indicates that the diversity of various taxonomic groups declined in European lowland forests in the second half of the 20th century, following the abandonment of some traditional forest management practices.³² We carried out a five-year field trial in a lowland thermophilous oak forest to describe the effects of restoration of litter



raking and grass cutting on the long-term developmental trajectory of species composition and the diversity of understorey vegetation. We used target species groups, that is species specific to thermophilous forests and dry grassland vegetation and plant functional traits to evaluate the restoration success using both compositional and functional outcomes.²⁵

3. Dissimilarity in species composition between the managed plots and controls increased significantly during the 5 years of the trial. Litter raking increased the richness and cover of the thermophilous forest and dry grassland species, whereas grass cutting increased the richness and cover of only the dry grassland species. We did not record any overall trends in divergence of functional trait composition between managed and control plots. In the litter raking plots, we recorded increases in community-weighted means of specific leaf area, in lateral spread and in Ellenberg indicator values for nutrients and soil reaction. In contrast, we found little evidence for predictability of species functional trait composition subjected to grass cutting.²⁶
4. Synthesis and applications. Following the restoration of traditional forest management practices, we were able to change the community's developmental trajectory towards higher richness and cover of target species. The evaluation of community developmental trajectories using species and functional trait composition supports the idea that restoration of traditional forest management practices should carefully distinguish among possible interventions.²⁷



IV. CONCLUSIONS

Local communities prepare their farmland by cutting an area of vegetation and burning the residues in a labour-saving approach to clearing large areas of land quickly, the most common form of non-mechanised farming worldwide.³¹ The process of burning reduces the germination rate of some weed seeds and the top layer of ash lowers soil acidity, enabling increased nutrient uptake by crop plants. After one or two seasons, however, the soil quality deteriorates again. This nutrient depletion, as well as a build-up of weeds, bacteria, fungus and pests in the soil, encourages the farmers to shift their agriculture to a new piece of land. Conservation agricultural technique, offering an opportunity for farmers to 1466ertilize their yield while 1466ertilizer their need to regularly expand into previously forested land, is based around three principles:²⁸

1. Minimum soil disturbance, allowing the soil structure to be preserved, thereby reducing soil erosion.
2. Maintenance of a permanent organic soil cover by layering organic plant material over the soil, helping to prevent soil erosion and maintain soil moisture. Additionally, this organic matter can reduce the need for chemical 1466ertilizers and weedkillers by providing a nutrient supply and suppressing the growth of weeds.



3. Crop diversification by rotating crops on different patches, thereby helping to prevent a build-up of pests and diseases in the soil.²⁹

We are encouraging farmers to apply these techniques to improve the production of staple crops such as groundnuts (peanuts), chilli peppers, okra and bitterball – a local variety of aubergine. Adopting these methods has enabled farmers to produce mulch to cover the soil, which in turn holds in moisture and prevents the germination of new weeds. Additionally, crops are now planted in rows – a practice that saves seed and gives plants extra room to grow. Farmers are now seeing and reporting the benefits, with 94% of those who have harvested crops under conservation agriculture reporting higher yields than when using traditional methods.³⁰ Conservation agriculture is a potential win-win solution for farming and conservation. We can work with farmers to increase the amount of food they produce, while preventing – or at least significantly reducing – further clearance of forest. It is still early days for this work and understanding any trade-offs associated with adopting new techniques is crucial. We promote principles of conservation agriculture with other communities around the world. We hope that this will form part of the solution to the challenge of achieving global food security while protecting important ecological areas.³⁵

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International Journal of Advanced Research in Arts, Science, Engineering & Management (IJARASEM)

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