Bio-Fencing: An Eco-Friendly Approach to Boundary Management

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Introduction

Bio-fencing, also known as biological fencing, green fencing or living fences, is a way of establishing a boundary by planting a line of tree or shrubs at relatively closed spacing and by fixing threads (made from jute or petiole of palm or plastic wire) to them (Choudhuri *et al.,* 2017). It is an innovative and sustainable method of creating boundaries using living plants. Unlike conventional fencing methods that rely on materials like wood, metal, or plastic, bio-fencing utilizes the natural growth and properties of certain plant species to form barriers. This method not only serves the primary purpose of marking boundaries but also offers several environmental, economic, and social benefits (Sharma and Devi, 2013).

Advantages of Bio-Fencing: Bio-fencing is crucial for preventing wild animals from entering residential areas, protecting agricultural crops, and safeguarding livestock in adjoining areas and forests. This helps to avoid animals wandering into agricultural land and causing damage (Paul *et al.,* 2022).

⇒ Environmental Benefits: Bio-fences can provide habitat for various species of birds, insects, and small mammals, promoting biodiversity.

⇒ Erosion Control: The roots of bio-fencing plants help in holding the soil together, reducing erosion.

⇒ Carbon Sequestration: Plants absorb carbon dioxide, thus helping in mitigating climate change.

⇒ Cost-Effective: Once established, bio-fences require minimal maintenance compared to conventional fences.

⇒ Resource Efficiency: Reduces the need for non-renewable materials like metal and plastic.

⇒ Multipurpose Use: Certain bio-fencing plants can provide additional resources like fruits, fodder, and fuel.

⇒ Community Engagement: The process of establishing and maintaining bio-fences can foster community participation and cooperation.

⇒ Ethnomedicinal Use: Number of species of Biofencing are medicinally important and use to care various ailments, where as a whole plant or parts of plant such as

stem, leaves bark are used to treat stomach disorder, fever , joint pains, skin complaints, jaundice, snake bite etc (Sharma & Devi, 2013).

Types of Bio-Fencing Plants

1. Thorny Plants:

- Bougainvillea - A thorny shrub that forms a dense, colorful barrier.
- Agave - A succulent plant with sharp leaves that deters intruders.

2. Fast-Growing Trees and Shrubs:

- Eucalyptus - Known for its rapid growth and aromatic leaves.
- Leucaena - A fast-growing leguminous tree that can also improve soil fertility.

3. Climbing Plants:

- Ivy - A climbing plant that can cover walls and fences, adding greenery.
- Passion Fruit Vine - Provides both a barrier and edible fruits.

4. Hedge Plants:

- Privet - A commonly used hedge plant that forms a dense, evergreen barrier.
- Boxwood - An evergreen shrub that can be trimmed into formal hedges.

Classification of Biofencing (BF) by type of use (Mishra *etal*, 2011).

BF Type	Planting material	Design	Set- up	Process and maintenance
Homes gardens/ homesteads	Vertical: Acacia catechu, Erythrina variegate, Jatropa curcas, Moringa oliifea and Spondias pinnata Horizontal: Agave sisalana, Aloe vera and Opuntia sp. Outer layer: Dioscorea alata or Abrus precatorius	Height, width and density, ability to repulse animals and clarity of bounadary line , demarcation are desired qualities in BF. Arrangement of fast growing, erect and taller plants species as a post on outer bounadary with small bushy plants in between and shorter plants in presiding kines whcish will not cast shade on the crops and also leave less gap for unwarranted.	Major investments in the establishment of live fences are seed and labour for nursery, establishing fence and pruning hedge. Live fences require dead fences to protect them during first 2-3 years of establishment.	Cutting, pruning and pollarding schedule of plant species. If this is maintained as the farm amanagement strategies or agricultural policies, management of BF would also become easier.
Crop land	Trees are generally planted around boundaries or bunds to demarcate plots and live fences are erected only on the sides of the field touching the road or cattle path			
Plantations	Multiple species in several rows and gaps filled by placing dry thorny twigs o species like Zizyphus mauritiana, Acacia nilotica, etc.			
Garden , park and building	Ornamental and aesthetic value besides their protective role using plant species like Bougainvilla, Duranta repens, Putranjiva roxburghii, Caesalpinia crista, Lawsonia alba etc			

Bio-fencing is an eco-friendly and sustainable alternative to conventional fencing methods. By utilizing the natural properties of plants, bio-fencing offers numerous benefits, including environmental conservation, economic efficiency, and social engagement. With proper planning and care, bio-fencing can serve as an effective boundary management solution that aligns with the principles of sustainable development.

References

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