

Sustainable Agriculture Through Agro-forestry

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Introduction

Increase in population over the last 200 years has main reason to extension of agricultural area. By 2011, approximately 38% area of total terrestrial surface of the Earth's was utilized under the agricultural productions. (Figure 1), and rest areas being engaged by forests and other natural habitat. (Foley *et al*, 2011).

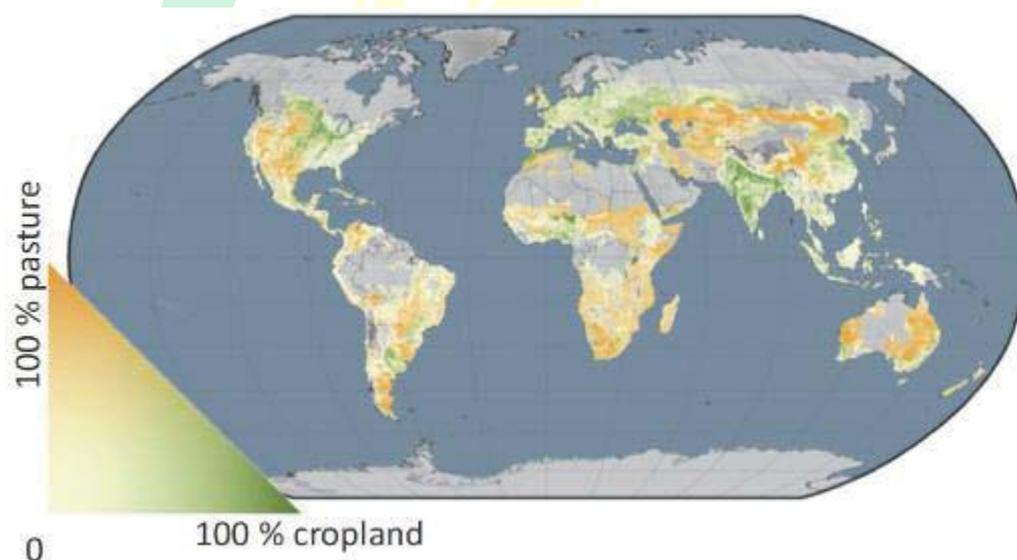


Figure 1 Areas under Utilized to Pastures and Agriculture Land Throughout the World

Conserve the ecological biological diversity is not limited up to the natural habitat of the flora and fauna it is also extended to farmlands as well. Therefore, lots of parts of agricultural biodiversity great importance in present day's *i.e.* sustainable livelihood security, agriculture production and protection of natural ecosystem. Conventionally, farmers maintain the biological diversity within the crops to fulfil the basic livelihood demand like food, fodder, fuel wood, timber wood, shelter, fruits and other source of additional income generation. (Atta-Krah *et al.* 2004). Agro forestry is a traditional production system consists

with forest and agricultural crops, which is an option to produce the food and conserve the biological diversity. In agroforestry addition of trees into the farm with the only agricultural crops or also live stock component. Agroforestry involved to agriculture biological diversity with increasing the number of different flora on the agriculture field. Perennial trees on agricultural field increase the biodiversity like prey and predators, pollinators, soil biology etc. (Chittapur *et al.* 2017). At the present time and from the recent years, agroforestry is promoted for the conservation of the natural resource, sustainable agricultural production, soil and water conservation, carbon sequestration and biodiversity conservation (Nair, 2011). Agroforestry systems are able to conserve the biodiversity in natural habited of tree. (Quinsavi *et al.* 2005).

Benefits of Biodiversity

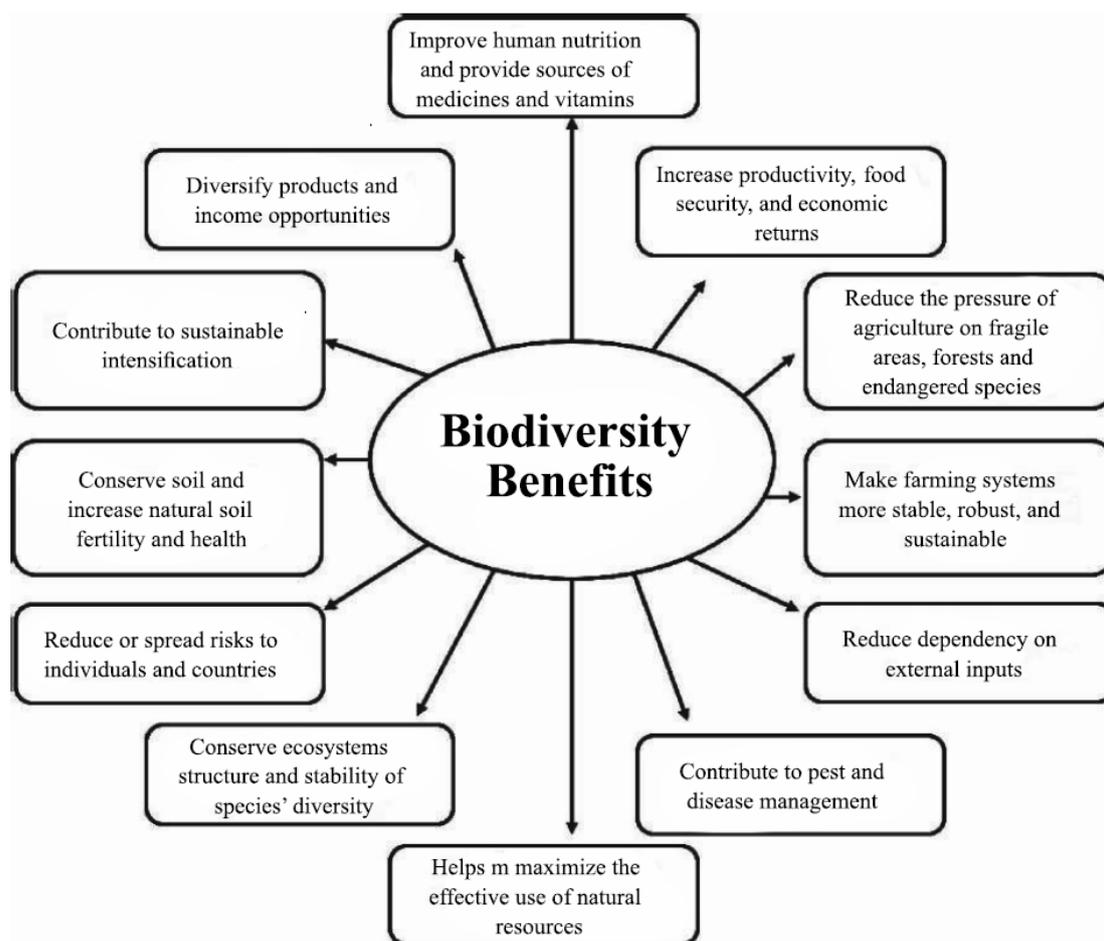


Fig-1 The Benefits Provided by Biodiversity

Causes of Biodiversity Losses

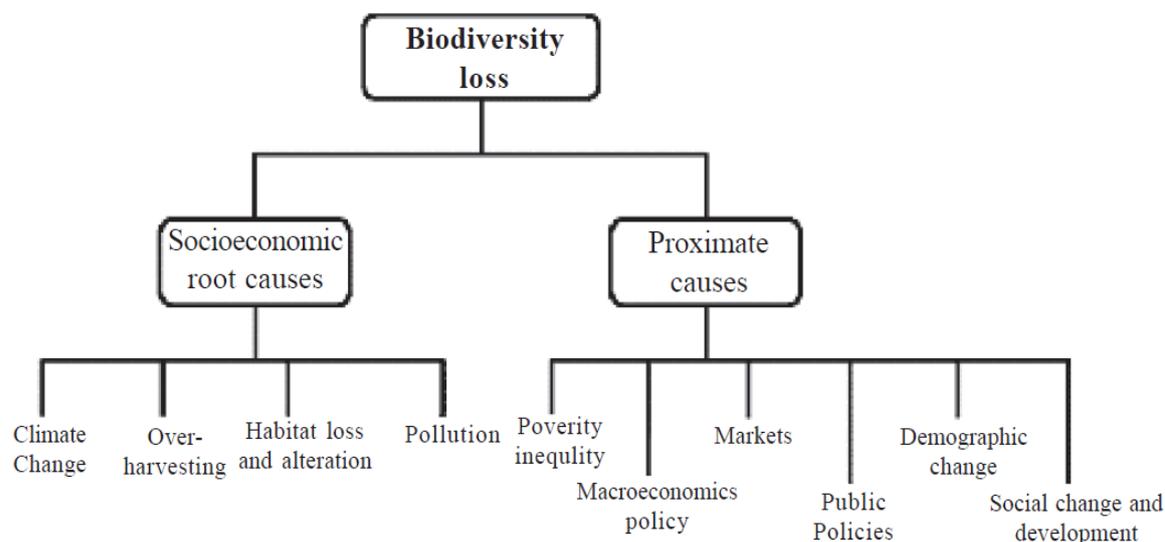


Fig.2: Socioeconomics Root and Proximity Causes of Biodiversity Losses

Role of Agro forestry for Conservation of Natural Biodiversity

Biodiversity variability is the basis of agriculture and the immense variety within each crop and livestock species. Number of trees and animals species contributes to the essential ecological services that are need for the agriculture, like soil services and water cycling. However, now a day's Earth's loss the biodiversity with very high rate, which is not good indication to sustainable ecosystem and sustainable agriculture. The sustainable use of biodiversity as well as conservation is very important for the future of agriculture and humanity. Conservation of biodiversity with agriculture production is very easy through agro forestry. Agro forestry involved in different five ways to conserver the biodiversity

1. Provides natural habitat to different floras and faunas that can sustain the some disturbance;
2. Agro forestry help in the conserve the germplasm of vulnerable and rate species
3. Agro forestry helps in reduce the deforestation rates and decrease the rate of conversion of natural habitat into agriculture fild by supporting the production system, sustainable agriculture to conventional agriculture;
4. Agro forestry provides the corridor between agriculture field and natural habitat, which may support the sensitive floral and faunal species

5. Agro forestry save the ecological diversity by supporting the other ecosystem services like control the soil erosion and water recharge, reduce the current of water. It is directly preventing the degradation and loss of adjoin habitat (Jose 2009). Agro forestry systems are consider as biodiversity conservation land use system pattern especially in respect of inter-species biodiversity as it grow together crops, shrubs, trees and livestock on the same piece of land (Atta-Krah *et al.* 2004).

Conclusion

Biodiversity is the foundation basis for the sustainable sustainability and at the present time biodiversity has been loss due to the increasing the population, agriculture intensification, habitat loss of wild life and fragmentation, introduction of exotic species, global climate change and increase in industrialization. Demands of world population in increase day by day result loss of biodiversity. There is only way to fulfil the demand is sustainable agriculture. It is possible through agro forestry. Agro forestry land use systems have great capacity to manage high levels of ecological diversity than conventional agriculture. Agro forestry systems are rich in biodiversity therefore, its help in the sustainable agriculture through enhance soil quality, increase the moisture content, increase in the water use efficiency, including carbon content and nutrient status, by addition leaf litter inputs and soil organic matter build-up. Agro forestry always provide the more than one output at a time Agroforestry establish good relationships between plant biodiversity and ecosystem services.

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