



<http://www.casestudiesjournal.com/>

Impact Factor: 4.428

## Impact of Agroforestry on Livelihoods of Rural People in Sindh: A Case Study of Larkana Sindh-Pakistan

### Author's Details:

<sup>(1)</sup>**Fritz Bohmler**

Junkersstr.60, 88250 Weingarten Germany

<sup>(2)</sup>**Muhammad Zafar Wassan**

Conservator Forest -Larkana

<sup>(3)</sup>**Dr.Faiz Muhammad Shaikh**

Professor-SZABAC-Dokri-Larkana-Sindh

Email:faizs045@gmail.com

Rasool Bux Junejo - Director Agri.Extension Government of Sindh

### Abstract:

*Impact of agroforestry on Livelihoods of rural people in Sindh: A case study of Larkana Sindh-Pakistan. Data were collected from 2000 rural households who are either live in forest or cultivating crops in forest. It was revealed in group discussions that the AF Practices improved the livelihood of communities aboding around the Reserved Forests.The policy allowed the cultivation of short term Agriculture crops on the reserved forest lands. This short term cultivation given them good monetary returns, as the productivity of these soils are quite higher in comparison with other lands of the area.The Agroforestry Practices generated additional job opportunities, as the trees were grown as additional crop.These livelihood improvement paved the way to alleviate and reduce the poverty among the forestry communities.It provided a peaceful atmosphere for the investors from other areas which increased economic activities in the area.In the backdrop of these activities local people got their share in income generating opportunities other than forestry.This colossal impact caused by the Agroforestry Practices caused the Socio- economic uplift of the area.*

**Key words:** Impact, agroforestry, Livelihoods, rural people, Sindh

### Introduction

Agroforestry has been universally acknowledged as the best mean to mitigate climate change and mean to improve the fertility of the soils. The use of diverse tree species and other practices employed in agroforestry systems can represent alternative forms of increasing soil fertility and maintaining agricultural production, with important practical applications for the sustainability of tropical agriculture.( Rachel C Pinho et al 2012 )

Growing trees in association with the short rotational Agriculture crop gives monetary returns in a shorter time to meet the demands of livelihood. Where as trees are considered as carbon sink with it's biological ability to convert emitted Carbon from other industrial emissions in the biomass of tree's trunk.Various physiological processes and biochemical reactions given the way to sequesterate Carbon by the nature. In addition to sequesterate Carbon trees belonging to the leguminous crops has a specialty feature to improve the fertility status of the the soil by converting atmospheric Nitrogen into the available nitrate form.This study is focussed around the areas where Agriculture crops were cultivated in association with Tree crops.The area of study was the reserved forest lands in Hyderabad Division.Threse combination of tree and Agriculture was the backdrop of Agroforestry Lease policy implementec by the government of Sindh.This study is meant to understand the effects of Agroforestry practices in terms of fertility improvement It will focus to

observe the increase in crop yield by addition of trees and their role to improve the nutrient and its efficient reactions by microbial activities in soil.

Based on these findings, it is recommended that, farmers should practice agroforestry systems especially the agrosilvopastoral and agrisilvicultural systems, for they have huge potentials to enhance soil fertility, thereby improving crop productivity and food security

(Azembouh et al 2021)

### **Results and Discussions**

It was revealed by the farmers of these lands that the fertility of these soils was improved as it caused more productions in comparison with other adjacent lands in the area. This fertility improvement is attributed to Agroforestry Practices. The trees grown on the soil improved the microbial activities as the acacia trees are leguminous plants and nodules in the tree roots are the abode of microorganisms convert atmospheric nitrogen into nitrate. The nitrate is available form of nitrogen to the plant for the better growth and vitality. In addition, the deep roots of the trees grown in association with Agriculture crops improve the structure of the soil which increases the availability of nutrients available in deep layers of the soil. The review provided substantial evidence for amelioration of land degradation and creating a more closed nutrient cycling via deep nutrient capture, increased supply via N fixation, litter production and decomposition and increased soil biological activity in agroforestry than in annual cropping systems. (Arun Jyoti Nath et al 2020) In the same sequenc, the microbial activities by the rhizobium and other microlife present in the root nodules of the leguminous trees reacts with the unavailable phosphatic chemicals to make them available to the roots of Agriculture crops. The literature reviewed provides evidence that inoculating tree seedlings with appropriate N-fixing bacteria and mycorrhizal fungi, and application of phosphorus fertilizer ensures better tree establishment. Therefore, we strongly recommend the routine application of these inputs during tree planting in drylands to maximize nutrient cycling. ( Arun Jyoti Nath et al 2020). In addition, tree biomass production and seasonal shedding of leaves on soil develops a compost layers on the soil. The presence of compost in the soil improved the soil fertility; as it increases the organic matter content of soil. The compost also ameliorate the roots of plants more efficiently and effectively. Resultantl, the improved soil structure duly enriched with the biological actions of microbial life the output yield of tree and Agriculture crop increased in terms of financial and economic returns. It was revealed by some farmers that these tree plantations are grazing ground of our livestock. These grazing goats, cows and buffaloes add organic matter by their digested faecal matter. These dungs are rich in nutrients and it improve fertility status of the soil.

### **Conclusion**

It was concluded by the people who adopted Agroforestry Practices that tree association with Agriculture improved the fertility of the soil, ultimately increasing the productivity of the soil in terms of financial and economic returns. It has been reviewed from the different scientific studies that the trees belonging to the Legumincea family improve the nitrogen content by biological means. In addition, the microbial activities induced by the soil microbial life improve the structure to ameolieriate the roots for maximum uptake and availability of nutrients.

### **Recommendations**

This implies that, the practice Agrisilvo pastoral and Agrisilvicultural systems contribute towards improving soil fertility.

Azembouh et al 2021 Based on these findings, it is recommended that, farmers should practice agroforestry systems especially the agrosilvopastoral and agrisilvicultural systems, for they have huge potentials to enhance soil fertility, thereby improving crop productivity and food security

Azembouh et. Al. 2021.

### **References**

The Agroforestry practices were reviewed in terms of Fertility Improvement from different research publications which are available in different scientific journals. The references are given as under:

The use of diverse tree species and other practices employed in agroforestry systems can represent alternative forms of increasing soil fertility and maintaining agricultural production, with important practical applications for the sustainability of tropical agriculture.

Rachel C Pinho et al 2012

Agroforestry, defined as the growing of perennials (trees, shrubs, bamboos, and palms) with annual crops and/or livestock on the same piece of land, is believed to reverse land degradation, restore carbon and nutrient stocks, and improve soil fertility.

(Arun Jyoti Nath et al 2020)

The review provided substantial evidence for the amelioration of land degradation and the creation of a more closed nutrient cycling via deep nutrient capture, increased supply via N fixation, litter production, and decomposition, and increased soil biological activity in agroforestry than in annual cropping systems.

Arun Jyoti Nath et al 2020

Deep capture of nutrients by tree roots can also recycle nutrients leached from inorganic fertilizers applied to crops, thus improving nutrient use efficiency and potentially reducing negative environmental consequences.

(Arun Jyoti Nath et al 2020)

Agroforestry has recently been rediscovered by modern scientists and agronomists as an excellent tool for maintaining the long-term biological balance of agricultural and livestock production systems, especially, but not only, in the arid and semi-arid zones.

(HN Le Houérou et al 1980)

Agroforestry practices had an important effect on soil fertility, significantly increasing the content and cycling of Ca and P in the soils.

(Rodrigo Santana Macedo et al 2023)

Agroforestry systems represent a sustainable practice for soil fertility improvement and SOC sink in the highlands of the Brazilian Northeast.

(Rodrigo Santana Macedo et al 2023)

The results show significant differences in soil pH, aluminum content, base saturation, electric conductivity, organic matter, nitrogen content, and cation exchange capacity between AF and CS soils, indicating a higher

Niels Schwab et al 2015