**Agroforestry Models of South Gujarat**

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**ABSTRACT**

This paper based on survey shows that most of the farmers of the region are growing mainly Horti-silvi (HS), Agri-silvi-horticulture (ASH), Agri-silviculture (AS), Agri-horticulture (AH), Homegardens (HG) and Horti-pasture (HP) systems at their fields. Farmers of this region are mainly adopting Horti-silviculture system as teak main tree components on boundary with sapota or mango as main crops. Some farmers are also adopting teak based paddy agroforestry systems (Agri-Silviculture system). These exiting agroforestry systems provide more return per unit area as compared to other existing agroforestry practices in these regions and also require less amount of irrigation water. These two systems are mainly based on rain water.

**KEY WORDS**: Agroforestry systems, Farmers, Production, South Gujarat.

**Introduction**

Agroforestry practices come in many forms but fall into two groups viz., first, is those that are sequential-such as fallows and second, those are simultaneous-such as alley-cropping. Among all, some 18 different agroforestry practices have some infinite number of variations to each other. Agroforestry is generally practiced with the intention of developing a more efficient and sustainable form of land use that can improve farm productivity and the welfare of the rural community. The total area under Agroforestry in the world is 1023 mha (FAO, 2000). Maximum areas of Agroforestry in the world are found in South America (3.2 million square kilometre) followed by sub Saharan Africa that is 1.9 million square kilometre. However the area under Agroforestry is increasing continuously. In India, in 2007 it was reported 7.4 million hectare but in 2013 it reached upto 25.32 million hectare. Gujarat has 6.86% of total geographical area under the forest cover and supply only 13% of all timber, 5% of all small timber (pole), and 18% of all fuelwood consumption in the state. The rest is either imported from the adjoining states or gathered from wastelands, common grazing land and private holdings. The most wood based industrialised and thickly populated belt of South Gujarat region need more raw materials and wood to fulfil the demand of growing population and industries for this region, so there is an imperative need to increase production of food, energy, fodder and building materials to satisfy the rapidly growing population. However, forest resources are under such an enormous pressure to meet requirements for fuel and fodder that the current rate of removal of trees exceeds the annual increment of the forest and is causing a rapid depletion in forest cover. Taking all these factors into account, it is simply not possible to ensure the survival of remaining forests by taking action solely within the boundaries of these forests. The ultimate answer lies outside the forests and especially by the introduction onto peasant farms of agroforestry practices in which trees can be grown for food, fodder and fuelwood, e.g. along field boundaries and on unutilized and underutilized corners of farms, home gardens etc. The tree component of agroforestry systems can greatly contribute to the restoration of shattered domestic rural economies, becoming a prized capital asset for resource-poor farmers, compensating for seasonal shortages, providing recurrent flows of food, fuel, fodder and other useful materials for rural industries, and conserving soil, water and human energy.

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Methodology

The present study was conducted in the selected districts of south Gujarat. Information related to existing agroforestry models were collected through the farmers during the farmers field visit at their farms. Total four district viz., Navsari, Valsad, Surat and Dang were selected to record the practised agroforestry systems by the farmers of this region. Total forty villages were selected, ten villages from each district, to conduct this survey to fulfil the objectives of the present study.

Result and Discussion

The present study revealed that farmers of different district of south Gujarat having different economic status have adopted peripheral and mixed planting almost to the same extent, with the number of marginal farmers being the same as the number of large farmers. Most of the farmers have prominently adopted six types of agroforestry systems viz., Horti-silviculture (HS), Agri-silvi-horticulture (ASH) Agri-silviculture (AS) Agri-horticulture (AH), Homegardens (HG) and Horti-pasture (HP) systems according to household requirements and livelihood security of this region (Table). Similar results were conducted by others and reported that the farmers of Navsari district are growing all the six types of recorded agroforestry systems along with observed nine species - Neem (Azadirachta indica), Deshi babool (Acacia nilotica), Nilgiri (Eucalyptus spp.), Sharu (Casuarina spp.), Ardusa (Alianthus spp.), Teak (Tectona grandis), Subabool (Leucanea leucocephola), Bengali babool (Acacia auriculiformis) and Bamboo. These are dominant and economic species in agro-forestry plantations of south Gujarat region. Among the fruit species, Mango (Mangifera indica), Drum stick or Sargavo (Moringa oleifera), Sitafal or Custard apple (Annona squamosa), Aonla or Indian goose berry (Emblica officinalis), Bordi (Zizyphus spp.), Jamun (Syzygium cumini), Nariyal(Cocos nucifera), Chikoo (Acrus sapota), and Guava (Psidium guajava) are important tree species raised by the farmers for their basic needs and livelihood.

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Agroforestry system</th>
<th>Tree component</th>
<th>Agri./Horti. Crop</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Horti-silvi (HS)</td>
<td>Teak, Babool, Neem</td>
<td>Mango, sapota</td>
</tr>
<tr>
<td>2.</td>
<td>Agri-silvi-horticulture (ASH)</td>
<td>Teak, Sharu, Eucalyptus</td>
<td>Mango, sapota, Guava</td>
</tr>
<tr>
<td>3.</td>
<td>Agri-silviculture (AS)</td>
<td>Teak</td>
<td>Paddy, Mustard, Maize</td>
</tr>
<tr>
<td>4.</td>
<td>Agri-horticulture (AH)</td>
<td>-</td>
<td>Horti.- Mango, guava, sapota, jamun, coconutAgrig. Paddy, Mug, sugarcane, gram, pea, wheat</td>
</tr>
<tr>
<td>5.</td>
<td>Homegardens (HG)</td>
<td>Teak</td>
<td>Curcuma, cocus, banana, chilli, tomato, okra</td>
</tr>
<tr>
<td>6.</td>
<td>Horti-pasture (HP)</td>
<td>-</td>
<td>Horti.- Mango, sapota Pasture- Maize, Sorghum and lemon grass, vetiver, Napier grass Legume – Lucerne</td>
</tr>
</tbody>
</table>
Conclusion

Present study shows that the farmers prominently adopted six types of agroforestry systems viz., Horti-silviculture (HS), Agri-silvi-horticulture (ASH), Agri-silviculture (AS), Agri-horticulture (AH), Homegardens (HG) and Horti-pasture (HP) systems according to household requirements and livelihood security of this region. The common practised systems recorded in these regions are mango+rice (AH), sugarcane+teak (AS), vegetables crop+mango+teak (HG) and sapota+grass+teak (ASH). These Agroforestry practices also provide indirect benefits to the farmers as work soil improver and addition more organic matters to release more nutrients for main crops. Teak based (boundary plantation) agroforestry practices are more common in the major districts of south Gujarat.

References