

Agroforestry - Cultivation of Mungbean in Guava based Agri-horti system for Agriculture Sustainability

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Agro-forestry is not a new system or concept. This practice is very old, but the term is certainly new “Agro-forestry” means cultivation of agriculture (crops) and forestry (trees) on the same land. Agroforestry is a sustainable management system for land, which increases overall production, ties together agricultural crops and animals.

Agroforestry systems offer new ways for farmers to respond to the need for more food and fiber and for diverse, renewable sources of energy as well as the challenges of climate change. Working trees can serve multiple functions and help to meet increased demands on limited agricultural land. Here are some possible strategies that can make use of agroforestry systems:

- Incorporate multiple vertical levels of crop production in the same space
- Grow perennial crops to use more seasons of the year for production
- Use the same cropping system to perform several functions

Agri-horti system markedly increases the return per unit of land mainly during early stage of horticultural fruit trees. Fruit tree based Agroforestry involves intentional and simultaneous association of annual or perennial crops with perennial fruit producing trees on the same land unit.

Mungbean (*Vignaradiata* L. Wilczek) is a self pollinated leguminous crop which is grown during kharif (rainy) and summer seasons in arid and semi-arid regions of India. It is tolerant to drought and can be grown successfully on well drained loam to sandy loam soils in areas

of erratic rainfall. Mungbean is primarily a rainy season crop but with the development of early maturing varieties, it has also proved an ideal crop offspring and summer seasons. Mungbean is an excellent source of protein (24.5%) with high quality lysine (460 mg/g) and tryptophan (60 mg/g). It also has remarkable quantity of ascorbic acid and contains riboflavin (0.21 mg/100 g) and minerals (3.84 g/100 g) when sprouted (1). Being a short duration and leguminous crop, Mungbean fits well in various multiple and intercropping systems and enriches soil by fixing atmospheric nitrogen. After picking of pods, its plants may be used as a good quality green or dry fodder and green manure.



Mungbean cultivation between the rows of guava tree

Cultivation of Mungbean between the rows of guava tree increases the overall income of farmers and also better utilization of land resource. This system markedly increases the return per unit of land mainly during early stage of horticultural fruit trees. Fruit tree based Agroforestry involves intentional and simultaneous association of annual or perennial crops with perennial fruit producing trees on the same land unit. Mungbean (*Vigna radiata* L. Wilczek) is a self pollinated leguminous crop which is grown during kharif (rainy) and summer seasons in arid and semi-arid regions of India. It is tolerant to drought and can be grown successfully on well drained loam to sandy loam soils in areas of erratic rainfall.

Plants of Mungbean were thinned to maintain the desired plant population within 15 days of sowing and two hand weeding were done at 20 and 40 after sowing. As the crop was raised under rainfed conditions, no irrigation was given because the crop received well distributed rains during the season.



In recent years, several changes in cropping system been observed. The sole cropping has been shifted to intercropping system which has proved to be productive, economically feasible and sustainable. Alleys of guava sowing of the certified seed of Mungbean was done with the required seed at 5 cm depth in open furrows made with a manual row drilled at a spacing of 45×10 cm and it was immediately covered with soil.

As we know Gauva is a long duration Fruit plant with its sowing with spacing of 6×6 m and 8×8 m. Its efficient root system helps to tap plant nutrients and moisture from the soil deep layers allowing the intercrops to feed at the top layer of soil.

In Guava, the wide space of inter-row 6m and 8m available between 2 rows of Guava, long duration for bud sprouting, initial slow rate of growth and its ability to compensate for any loss of tillers due to intercrop competition have helped in successful intercropping of grain legumes, oilseeds, potato and maize, in plant crop and forage legumes in winter initiated ratoon. The major objectives of intercropping are to produce an additional crop, to optimize the use of natural resources and to stabilize the yield of crops. In order to meet the growing demand of diverse crop and to arrest further decline in factor productivity and to make the sugarcane production system more viable, it is necessary to enhance the productivity of the system as a whole. The companion cropping of sugarcane with high value medicinal, oilseeds and vegetable for seed purpose were found remunerative rather than growing the sole crop of sugarcane.

Intercropping is the best method of land utilization that focus on growth of two or more crops. It is not only to increase fertility of soil but also suppress weed germination and reduce the sustainability to diseases/ pests. The guava growers can get the double profit by cultivation many crops in there orchards. As winter is starting, different crop such as carrot, radish, grams and beans can be sown among the row of tree. Similarly in summer, okara, egg plant and tomatoes, etc can be grow in intercrop.