

# Multitier cropping system

## for enhancing profitability in cotton

**S Saravanakumar\***

ICAR – Krishi Vigyan Kendra, MYRADA Erode District, Tamil Nadu 638 452

*Multitier cropping systems are dynamic interactive practices aimed at better use of the production components such as soil, water, air space, solar radiation and all other inputs on a sustainable basis. Cotton is generally cultivated as a sole crop in many regions and has a slow growth nature during the initial stages. Ever increasing population level and reduction in cultivable area, forced to adopt recent techniques like intercroops and multitier crops in cotton for increasing productivity. Due to improper utilization of interspaces, crops growth has reduced and on the other hand the crop weed competition ratio has increased. Utilizing the interspaces and duration for maturity, it was advised to go for intercroops and multitier cropping system in cotton for sustaining income and improving the soil fertility status. The highest gross return, net return, per day profitability and weed smothering efficiency were obtained with the multitier system of cotton+radish+coriander.*

**Keywords:** Cotton, Inter crops, Income, Multitier crops, Vegetables

**M**ONOCROPPING is exception, while mixture (of species) is the rule of nature. In intercropping and multitier systems, the possibility of more efficient use of resources like sunlight, nutrients and water is leading to increased biological diversity and higher production stability. The introduction of non-competitive, short-duration, multiple intercroops into sole cotton has salvaged the risk perturbed by monocropping. In addition, the root systems of the component crops are also located at distinct zones so as to explore the soil for moisture and nutrients. Intercroops were observed to serve as an insurance against the menace of pest and disease, vagaries of weather, market fluctuation and help to increase the net profit to growers.

Since cotton is a crop of relatively longer duration, its slow initial growth offers a vast scope for the cultivation of suitable intercroops including short-duration pulses and vegetables. An ideal cotton based multitier vegetable intercropping should aim to produce higher

economic return and yields per unit area, offer greater stability in productions, and meet the domestic needs of the farmer. Based on the diverse features of the crops, the crops can be selected for increasing the profitability and better utilization of natural and applied resources in the cotton-based cropping system.

### Relative advantages multitier systems

- Increasing the production potentiality;
- Enhanced the effective utilization of natural and applied resources;
- Increased the input use efficiency
- Reducing the crop weed competition ratio;
- Ensuring income flow through periodical intervals;
- Sustaining the soil fertility;
- Creating additional employment opportunity for the family labourers.

### Suitable crops for multitier cropping system in cotton

Based on the duration, rooting behaviours, nutrient absorption level and different group of families, crop

can be selected for intercropping as well as for multitier cropping system. Some of the suitable crops for intercropping and multitier cropping are listed below :

**Pulses:** Crops like blackgram, greengram and cowpea can be selected for intercropping in cotton. This would help in reducing the weed growth, generating additional income and increasing soil fertility through root nodulations.

**Vegetables:** Profitable vegetable crops like beet root, radish, cluster bean, beans, coriander, greens and dolichos can be selected for intercrop as well as for multitier cropping system in cotton. This will ensure the regular income from the field at periodical intervals apart from reducing the weed growth.

### Economic feasibility of multitier cropping system in cotton: A case study

Cultivation of cotton crop along with different vegetable crops in a multitier system can be profitable and sustainable model for the farmers in the western zone of Tamil Nadu. Mr. K. Ramachandran



Diagnostic field visit by KVK scientists



Field view with farmer

a progressive farmer from Ramachiapalayam village of Erode District, successfully adopted multitier cropping system in cotton on his 2 acre land. According to his experience, intercropping with high-value vegetable crops is the viable option for reducing weed growth and increasing the productivity per unit area. He cultivated cotton crop during the *rabi* season with 120 cm row spacing. To utilize the interspaces effectively, he adopted multitier cropping system with crops like, beet root, radish and coriander. Foliar applications of vegetable boosters and cotton plus micronutrients were adopted according to the Tamil Nadu Agricultural University recommendations. Periodical harvest of intercrops; coriander 30 DAS (Days After Sowing), radish (50 DAS), and beetroot (90 DAS) led to less competition within the component crops which ultimately resulted in higher cotton yield and intercrop yield.

He harvested 18.78 q seed cotton yield in the sole crop whereas in the radish and coriander system he got an average yield of 18.69 q/ha with

**Table 1.** Yield and economics of multi tier cropping system in cotton

Cropping system	Yield of cotton (q/ha)	Yield of multi tier crops (q/ha)	Gross cost (₹)	Gross Return (₹)	Net Return (₹)	BCR
Cotton + Radish + Coriander	Cotton - 18.69	Radish - 47.75 Coriander - 32	93,920.00	2,06,767.00	109917.00	2.13
Cotton + Beetroot + Coriander	Cotton - 18.87	Beetroot - 46.38 Coriander - 30.20	96,850.00	1,92,548.00	98,628.00	2.05
Cotton sole crop	Cotton - 18.78	-	77,150.00	1,09,264.00	32,114.00	1.42

47.75 q radish and 32 q of coriander yield from one hectare area. Thus providing the highest net return of ₹1,09,917/ha with the benefit-cost ratio of 2.13 (Table 1). Similarly he got a net return of ₹98628/ha in the cotton, beet root and coriander system with the benefit-cost ratio of 2.05. Among the multitier systems tested in cotton, intercropping with radish and beetroot is found to be a more diversified and sustainable one.

#### SUMMARY

Vegetables having high-yield potential and short-duration in nature are the most suitable multitier

intercrops. It provide income, employment and enough food for consumption, better and sustainable use of the inputs, i.e. soil, water, air, space, solar radiation etc. It also reduces insecurity of monocropping. Higher production, economic return and resource utilization occur with this system. This system channelizes the dynamic energy of rural youth towards conventional farming for higher income generation and livelihood security.

\*Corresponding author's e-mail: [ankurchaudhary292@gmail.com](mailto:ankurchaudhary292@gmail.com)

#### Water

Even though households are relatively low consumers of water, population growth and expanded water use have outweighed the effect of water saving technology and behavior.

- Less than 3% of the world's water is fresh (drinkable), of which 2.5% is frozen in the Antarctica, Arctic and glaciers. Humanity must therefore rely on 0.5% for all of man's ecosystem's and fresh water needs.
- Man is polluting water faster than nature can recycle and purify water in rivers and lakes. More than one billion people still do not have access to fresh water.
- Excessive use of water contributes to the global water stress. Water is free from nature but the infrastructure needed to deliver it is expensive.

- See more at: <http://www.unep.org/wed/theme/water.asp#sthash.ki5vg3lB.dpuf>  
 Courtesy: United Nations Environment Programme website - <http://www.unep.org/wed>