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## Yield assessment of intercropping of bitter gourd (*Momordica charantia*) in coconut (*Cocos nucifera*)

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### Abstract

The experiment was conducted in the *rabi* season of 2022-23 at Regional Coconut Research Station, Bhatye, Ratnagiri to assess the yield performance of coconut and bitter gourd intercropping system. The experiment was conducted in 30 years old coconut plantation (Variety West Coast Tall). The highest yield of bitter gourd (1290 g/vine) was recorded in open field condition while least yield (1098 g/vine) was in intercrop grown in coconut. In Coconut + Bitter gourd system, the yield of bitter gourd was 0.712 t/acre. The coconut equivalent yield of bitter gourd was 1778.86 nuts per acre. The highest yield from the system was 8589.76 nuts/acre/year which realized Rs. 154615.70 per acre as against yield in coconut sole crop was 6776 nut/acre.

**Keywords:** Coconut, bitter gourd, intercrop, crop equivalent yield

### Introduction

Coconut is an major plantation crop grown mainly in coastal states of India and has great importance in economy of country. In Maharashtra state, Konkan region of is a leading area of coconut cultivation owing to favorable soil and climate. Traditionally coconut is grown in diverse but distinctive farming systems which is providing livelihood to millions of the region. Coconut is planted at 7.5 m X 7.5 m spacing and considering to its morphological features there is abundant scope for cropping in the inter-spaces. Only 23 per cent of the soil on area basis is effectively utilized by the coconut roots in a coconut plantation (Sahasranaman and Pillai, 1976)<sup>[4]</sup>. It is also estimated that as much as 56 per cent of the sunlight was transmitted through the canopy during peak hours (10-16 hours) in palms aged around 25 years. In coconut garden, so many region specific intercrops have been recommended like food crops, vegetables, fodder crops, spices, flower crops, etc. Among the vegetables, solanaceous crops, cucurbits can advantageously grown as intercrops in coconut. Nair *et al.* (2000)<sup>[2]</sup> stated that the growing of cucurbitaceous crop like cucumber, ridge gourd and snake gourd were the suitable intercrops in coconut gardens. Among cucurbitaceous group, bitter gourd is an important crop from medicinal properties and has demand in market. It is also grown better under Konkan Agroclimatic region. Hence, the present investigation was undertaken to assess the yield performance of coconut and bitter gourd intercropping system.

### Materials and Methods

The experiment was conducted in the *rabi* season of 2022-23 at Regional Coconut Research Station, Bhatye, Ratnagiri in coconut plantation. The block comprising 35 palms of 30 years old coconut (Variety West Coast Tall) was selected. The bitter gourd was grown as intercrop in two rows at 2.5 m distance from palm and the distance between two successive hills was 1.0 m. and consequently 12 vines were grown in the space of four palms. The bitter gourd was also sown as sole crop in open space to compare the performance with intercrop as well as a block of 35 palms were grown as sole crop to assess the yield performance of the systems. The recommended cultural practices were followed in both blocks. The observations on yield of coconut and bitter gourd were recorded. Their performance was tested with the paired 't' test. Coconut equivalent yield was calculated as per formula given below.

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Coconut equivalent yield = (Yield of intercrop x Price of intercrop)/Price of coconut

### Results and Discussion

The data regarding the yield of coconut and bitter gourd in different intercropping systems are presented in Table 1. It is revealed that the yield of coconut was not influenced significantly due to intercropping with bitter gourd. The average yield was 97.05 nuts per palm per year. The influence of bitter gourd intercropping on yield of coconut was not observed which may be due to one season cropping system. As coconut is perennial crop, the impact of intercrop can be observed after successive experiments.

The highest yield of bitter gourd (1290 g/vine) was recorded in open field condition while least yield (1098 g/vine) was in intercrop grown in coconut. The similar trend was observed in block yield indicating 14.50 kg/block in open field and 13.18 kg/block in intercropping system. In Coconut + Bitter gourd system, the yield of bitter gourd was 0.712 t/acre. The higher

yield of bitter gourd in open condition might be ascertained with the favorable climatic condition and space, etc. which was fairly not enough in coconut garden. The small reduction in yield of intercrops had been recorded by several authors which has been confirmed by Singh *et al.* (2014)<sup>[5]</sup>.

The data related to crop equivalent yield presented in Table 2 revealed that the coconut equivalent yield of bitter gourd was 1778.86 nuts per acre. However, the highest yield from the system was 8589.76 nuts/acre/year which realized Rs. 154615.70 per acre as against yield in coconut sole crop was 6776 nut/acre. This indicates that Rs. 32647.70 additional returns was gained due to Coconut + Bitter gourd. This might be attributed to economic advantage of intercropping. Basavaraju *et al.* (2011)<sup>[1]</sup> also reported increased economic returns in the intercropping systems of coconut with medicinal and aromatic plants. It is well accepted that inter cropping system under coconut is more profitable than mono cropping which promises to the farmers a lot besides generating additional employment opportunity (Nath, 2002)<sup>[3]</sup>.

**Table 1:** Yield of bitter gourd and coconut

Intercropping System	Average yield of coconut (Nuts/palm/year)	Bitter gourd yield (g/vine)	Bitter gourd yield (kg/block) (Block of 12 vines)	Yield (t/ acre) as intercrop
Coconut Sole crop	97.3	-	-	-
Coconut + Bitter gourd	96.8	1098	13.18	0.712
Bitter gourd Sole crop	-	1290	14.50	-
Paired 't' Test	NS	2.47*	-	-

(\* Significant at 0.05%)

**Table 2:** Crop equivalent yield of bitter gourd (Unit area: 1.0 acre)

Intercropping System	Yield of coconut (Nuts/acre)	Returns from coconut (Rs./acre)	Coconut equivalent yield of bitter gourd (No.)	Total yield of coconut (Nuts/acre)	Total returns from system (Rs.)
Coconut Sole crop	6776	121968.00	-	6776.00	121968.00
Coconut + Bitter gourd	6811	122598.00	1778.76	8589.76	154615.70

(Rate of selling: Coconut @ Rs. 18/- per nut; Bitter gourd @ Rs. 40/- per kg)

### Conclusion

From the present study, it is concluded that the bitter gourd is a compatible intercrop in coconut garden in terms of yield as it is a seasonal vegetable.

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