

Economic evaluation

Particulars	Value
Cost of inputs in BMP	Rs 32.25 per standard
Total additional investment for adopting BMP	Rs 60475 per hectare (2018-19 prices)
Incremental output	299.2 kg/ha
Average additional income	Rs 59504/ha
Incremental Benefit Cost Ratio (IBCR)	1.98

#Labour valued at Rs 500 per manday



Recommendations

- For soil acidity amelioration: If the soil pH is < 6.0, apply 500 g dolomite lime + 500 g gypsum at the base during May-June at the onset of monsoon, every year. For the soil pH > 6.0, this may be applied during alternate years.
- Apply nitrogen, phosphorus and potassium fertilizers at the rates recommended based on soil test values: 150 g urea, 150 g factamfos and 420 g muriate of potash in two equal splits (rates based on NI of Kozhikode District).
- Enrich 100 kg of FYM: Neem cake mixture (mixed in 9:1 proportion) with Trichoderma harzianum or Pochonia chlamydosporia formulation @ 1-2 kg/ 100 kg and apply enriched mixture @ 5-10 kg to the basin of black pepper vines at the onset of monsoon.
- Remove and destroy completely dried vines and drench the basins with copper oxy chloride (0.3%) with the onset of monsoon.
- Apply foliar spray of IISR Black pepper micronutrient mixture - @ 5 g/ litre of water, twice, first during the flowering stage and second during the berry development stage.

Conclusion

The yield was enhanced by 36.6% through adoption of the site specific nutrient management technology, thereby unlocking a part of the latent yield potential of the crop in the state. It is estimated that the adoption of the technology across the crop growing regions of the state can enhance the crop output in the state by 15-20% in the medium term.

Prepared by: V Srinivasan, R Dinesh, Praveena R & Lijo Thomas

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Marikunnu PO, Kozhikode, Kerala

Email: director.spices@icar.gov.in www.spices.res.in

Enhancing sustainability of spices under coconut based land use systems through site specific nutrient management

BLACK PEPPER

Multi Institutional Collaborative Project



Sponsored by

Kerala State Planning Board



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Background

Black pepper is one of the major spice crop commonly grown as an intercrop in coconut gardens. The current levels of output of black pepper from coconut/pepper intercropping system is low despite its high potential.

Our studies on agro-ecology and soil qualities pointed to the fact that factors like strong soil acidity, extensive deficiency of secondary nutrients like calcium and magnesium and wide spread deficiency of micro-nutrients tend to limit the productivity of black pepper in coconut gardens. Therefore, site specific nutrient management in the black pepper-coconut intercropping system was attempted which was expected to mitigate the limitations arising from soil related factors.

Objectives

To demonstrate that productivity of coconut–black pepper farming systems in Kerala can be substantially enhanced through appropriate external inputs and site specific nutrient management at minimum cost and effort, while maintaining plant health at optimum levels.

Key Project milestones

- Scientific documentation of soil related constraints in cultivation of black pepper as an intercrop in coconut garden.
- Development of Best Management Practices (BMP), from scientific study based on analysis of soil nutrient status and plant tissue samples from 7 agro-ecological units across the state for black pepper grown as intercrop in coconut gardens.
- Successful validation and demonstration of the BMP for enhancing crop production in farmer's fields in the selected agro-ecological units

Elements of Best management Practice

Lime/ Dolomite (based on soil analysis) – 1000 g/vine

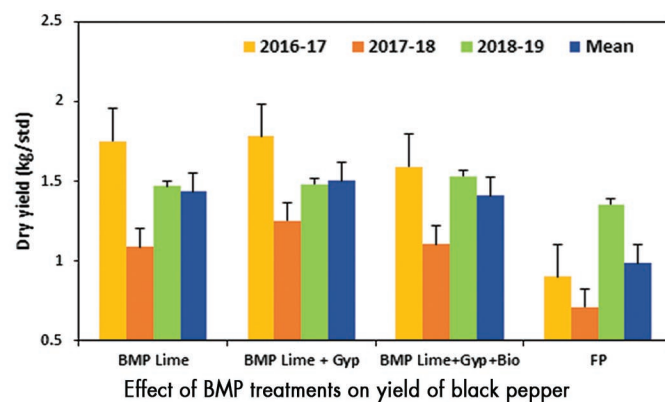
NPK Fertilizer inputs – based on the soil test and yield of vines on per vine basis

Micronutrient – spray twice (May/June and Aug/ Sept - @ 5 g/ L)

Drenching of COC / carbosulfan (for nematodes) / Bordeaux mixture spray / neem oil spray – twice (at onset & post monsoon)

Key findings on soil reaction and nutrient status

- The soil pH in both surface layer and subsurface soil improved significantly over the initial value.
- The initial status of soil exchangeable Al, which was 5.9 mg/kg could be brought down to 0.4-0.5 mg.kg.
- Application of amendments and SSNM helped in better utilization of the added organic manure, which enhanced the nutrient uptake and yield. The addition of amendments and SSNM treatments recorded higher organic carbon than farmers practice.
- The available phosphorus content in surface and subsurface soil layers increased by nearly 2.5 times over the experiment period.
- The SSNM helped in buildup of K as compared to the farmers practice.
- Soil available Ca improved significantly from the initial status of 324 mg/kg to 864 mg/kg with the addition of lime in the surface layer.



The yield of black pepper has increased over years with the application of site specific soil test based nutrient recommendation and addition of amendments. The yield increase recorded in BMP was 36.6 per cent higher than the yield obtained under farmers practice. The quality of the produce also showed improvement.

