

PROJECT INFORMATION

Evaluation of natural farming practices under plantation crop based system

PROJECT OVERVIEW

Funding Agency	Institute
Total Outlay	42 lakh
Duration	5
Single / Multi-Institutional	Single
Principal Investigator	Paramesha V
Co-Investigators	Shripad Bhat, N Bommayasamy, Rahul Kumar

RATIONALE

Plantation crops are perennial production systems with considerable potential for biomass recycling, soil carbon sequestration and biodiversity conservation; however, their long-term productivity and sustainability are influenced by soil degradation, rising input costs and climatic variability. Natural farming offers an opportunity to strengthen ecological processes and reduce dependence on external inputs, but its effects on crop productivity, soil health, ecosystem services and economic viability under plantation-based systems require systematic scientific evaluation.

RESEARCH GAPS

Lack of standardized natural farming protocols, Limited long-term scientific evidence, Inadequate location-specific validation.

OBJECTIVES

To develop and standardize crop-specific natural farming modules for major plantation crops under coastal agroecosystems. To assess the effects of natural farming on crop growth, yield, produce quality, soil health and nutrient dynamics. To quantify the ecosystem services associated with natural farming, particularly carbon sequestration, biodiversity, nutrient cycling and greenhouse-gas mitigation. To evaluate the economic feasibility, resource-use efficiency and climate resilience of natural farming systems relative to conventional farming practices.

ACTIVITIES

Baseline characterization of plantation crops, soil health, existing management practices, biomass availability and farm economics. Development and standardization of crop-specific natural farming modules for coconut, cashew and arecanut. Establishment of long-term field experiments comparing natural farming with conventional and organic production systems. Evaluation of crop growth, yield, produce quality and productivity stability under different management systems.

EXPERIMENTAL DETAILS

Treatment:	Natural Farming Experimentation
Fertilizer Doses	0
Variety	Mixed Farming System
Replications:	1.0
Observations:	Crop growth and productivity: Vegetative growth, flowering, fruit set, yield attributes, annual yield, produce quality and yield stability. Soil physicochemical properties: Soil pH, electrical conductivity, bulk density, soil organic carbon, available macro- and micronutrients, and soil moisture. Soil biological properties: Microbial biomass carbon, microbial population, soil enzyme activities, earthworm abundance and microbial diversity. Nutrient dynamics: Nutrient availability, plant nutrient uptake, nutrient-use efficiency, nutrient balances and contribution of biological inputs. Biomass production and recycling: Quantity of crop residues, litterfall, green manure, mulch and recycled biomass, along with their nutrient contributions. Ecosystem services: Soil carbon stocks, carbon sequestration, greenhouse-gas emissions, biodiversity, soil moisture conservation and nutrient cycling. Pest and disease incidence: Incidence and severity of major pests and diseases, natural enemy populations and effectiveness of botanical and biological management practices. Resource-use efficiency: Water-use efficiency, energy-use efficiency, external input dependence and labour requirements. Economic indicators: Cost of cultivation, gross returns, net returns, benefit–cost ratio, input savings and economic viability during the transition to natural farming. Climate resilience and sustainability: Yield stability under climatic variability, soil-health improvement, resource conservation and composite sustainability indices.
GPS Coordinates:	15.4964° N, 73.9167° E

EXPECTED OUTPUT

Crop-specific natural farming modules for coconut, cashew and arecanut. Standardized natural farming protocols for coastal agroecosystems. Scientific evidence on crop productivity, produce quality and soil health. Improved understanding of nutrient cycling and biomass recycling under natural farming. Quantification of ecosystem services, including carbon sequestration and biodiversity conservation. Assessment of greenhouse-gas mitigation and climate resilience.

EXPECTED OUTCOME

Scientifically validated, economically viable and location-specific natural farming modules for major plantation crops, supported by evidence on productivity, soil health, ecosystem services and long-term sustainability.

FIELD INFORMATION

When the field was developed:	2011
What are crops being cultivated season-wise:	Mixed cropping system
Soil type:	Laterite
Soil pH, EC, OC:	pH - 5.9, OC-1.22%
Soil depth:	30 cm
Soil NPK and Micronutrient status:	N- 139 kg/ha, P205 - 33 kg/ha, K20 - 193 kg/ha
Common pests and diseases:	Rhinoceros beetle, Pepper foot rot, Red palm weevil, Budrot in coconut