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## A comparative study between natural farming and conventional farming in Udupi district of Karnataka

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### Abstract

The present study was carried out in Udupi district of Karnataka. Farmers following Conventional farming as well as natural farming are purposively selected in 110 numbers and data was gathered from their respective fields. The main aim of this study is to analyze whether natural farming system was economically better with sufficient economic returns to the farmers against Conventional farming practices. The study was confined only to major crops of the study area; Paddy, Coconut and Areca nut. The comparative analysis results revealed that natural farming is a viable option for farmers under the prevailing semi-arid conditions with significant yield gap and higher benefit cost ratio against Conventional farming in the year 2019–2020. Efficient use of available natural resources as a key inputs for farming was found economically attractive enough to trigger wide spread adoption of Natural farming system in the study area.

**Keywords:** conventional farming, natural farming, income, benefit cost ratio

### Introduction

Udupi district is essentially an agriculture dominated district with majority of population depending for their livelihood as well as primary source of family Income. Agro-climatic condition of the district influences farming which is mainly confined to the traditional cultivation practices depending on the monsoon. High rainfall cause extensive leaching of soil constituents and the farmers are left with no choice except growing plantation crops on raised lands and paddy at low lands. Paddy is the main cereal crop raised in 49,608 ha of the cultivated area followed by Plantation crops, which includes Cashew (19,687 ha), Coconut (15,009 ha) and Arecanut (5,290 ha) of land area [1]. But Paddy, Areca nut and Coconut are the most common crops being cultivated by the farmers in the study area. Due to indiscriminate use of fertilizer, pesticides and poor water management, farmers are facing loss in soil fertility, health, poor yield and increased cost of production resulting in decreased margin of profit for the growers. To overcome this situation, innovative methods like natural farming were being practiced by some farmers in Udupi district under the guidance of Natural Farming project taken by Zonal Agricultural and Horticultural Research Station, Brahmavara.

### Sampling process

The study is based on primary data. Udupi district has 3 taluks; Kundapura, Karkala and Udupi which are selected for the study. Data was collected during the year 2019-2020 for Paddy, Arecanut and Coconut crops through well-structured schedule with sample size of 110 farmer respondents.

### Tools and techniques

**Cost of cultivation:** Includes operational costs, material costs and other costs in crop production calculated at prevailing wage rates and prices in the study area on hectare basis.

**Under conventional farming:** In operational costs, the cost of hiring human labour, machine power, bullock charges have been estimated. Imputed value of the family labour was also calculated using the prevailing wage rate. In case of material costs; cost of seeds, manure, chemicals, fertilizers, irrigation charges, pesticides, were calculated.

**Under natural farming:** In operational costs, the cost of hiring human labour, family labour was calculated. In case of material costs; cost of seeds, zero budget preparations like Jeevamrutha, Ghanajeevamrutha, Shuntiastra, Neem astra, Brahmastra, Agni astra, Irrigation charges, Mulching material were calculated.

Other costs includes land revenue, interests on fixed assets, interest on working capital, depreciation and rental value of the land. Simple interest was calculated on the working capital at a flat rate of 7% per annum as it prevailed at the time of investigation. This remains same for both conventional and natural farming. Only for plantation crops maintenance cost and amortized even establishment cost are taken into account.

**Gross returns:** Total revenue obtained from the sale of crop including both main product and by product

**Net returns:** Gross returns- Total cost of cultivation

**Benefit cost ratio:** Gross returns / Total cost of cultivation

**Test of significance:** Paired t-test was performed in excel sheet.

### Results and Discussion

Red rice paddy variety is well suited for highly acidic natured red lateritic soil condition of the Udupi district. Since rainfed paddy is the major crop, there is much scope to grow a second crop through irrigation. For the present study only kharif paddy is taken into account. Poor yield and low net Income has demotivated farmers to continue with paddy cultivation, to overcome this situation farmers are advised to adopt natural farming practices for crop cultivation as follows.

**Table 1:** Comparison between treatments under Natural farming and Conventional farming in Paddy cultivation

Particulars	Natural farming	Conventional farming
Seed treatment	Beejamrutha 20 litre per acre of seed requirement	No seed treatment
Fertilizers used	Ghanajeevamrutha 400 kg per acre before final ploughing and Jeevamrutha at 200 litres per acre for every 15 days	Imbalanced or absence of fertilizers application
Plant protection	Agniastra /Neemastra/Sour buttermilk	Indiscriminate use/ absence of chemical pesticide
Irrigation requirement	Rainfed	Rainfed

**Table 2:** Yield and Economics of paddy under natural farming and Conventional farming in the study area

Particulars	Natural farming	Conventional farming	t value	p value	Result
Grain Yield (q/ha)	48.59	47.32	1.76	0.03	Significant
Straw yield (q/ha)	63.06	61.54	1.64	0.05	Significant
Cost of cultivation (Rs./ha)	56,614	61,158	4.89	0.00	Significant
Gross Income(Rs./ha)	1,00,472	98,134	1.59	0.05	Significant
Net Income(Rs./ha)	43,859	41,520	1.41	0.08	Non Significant
Benefit Cost ratio	1.90	1.75	1.13	0.12	Non Significant

### Yield and Economics

The results in the table 2 depicts that natural farming practice has recorded significant t value of 1.76 and 1.64 with an increased average grain yield of 48.59 quintals with straw yield of 63.06 quintals against average yield of 47.32 q per ha with 61.54 quintals of convention farming system respectively. Increase in yield indicates the advantage of efficient nutrient management over the existing conventional practice toward enhancing the farm gross income with significant t-value of 1.59 which could be attributed by seed treatment with Beejamrutha, use of Ghanajeevamrutha, and Jeevamrutha as plant nutrients. The incidence of pest (stem borer and Gundhi bug) and disease (False smut) in paddy is very less in the study area however application of Neemastra, Brahmastra and Agniastra for pest control and Sour butter

milk, Shuntiastra for disease management found helpful. The economics results revealed that natural farming with an average investment on cultivation of Rs. 56,614/- per ha was found significant t value of 4.89 as compared to average investment of Rs.61,158 /- under conventional practices during Kharif 2019. Under natural farming, the net income generated with mean value of Rs.43,859/- per ha and benefit cost ratio of 1.9 was found non-significant against mean value of Rs. 41,520/- with benefit cost ration of 1.75 under Conventional farming. However majority of farmers, after meeting their home consumption need they offer to sell their left over produce for nearby rice processing industries at normal prevailing price and very few farmers with high marketable surplus offer their produce to premium price.

**Table 3:** Difference in treatment between natural farming and Conventional farming in arecanut cultivation

Particulars	Natural farming	Conventional farming
Fertilizers used	Ghanajeevamrutha 0.75 kg per palm in the month of June or September and Jeevamrutha at 200 litres per acre for every 15 days	Imbalanced or absence of fertilizers application
Plant protection	Agniastra/Neemastra/Neem paste/ Brahmastra	Indiscriminate/no use of chemical pesticide
Mulching	Using dry leaves	No mulching

**Table 4:** Yield and Economics of Arecanut under natural farming and Conventional farming in Udupi district

Particulars	Natural farming	Conventional farming	t value	p value	Result
Yield (q/ha)	12.77	12.07	2.7	0.003	Significant
Cost of cultivation (Rs./ha)	1,62,008	1,76,634	14.33	0.00	Significant
Gross Income (Rs./ha)	4,85,536	4,58,767	2.69	0.003	Significant
Net Income (Rs./ha)	3,23,529	2,82,132	4.11	0.00	Significant
Benefit Cost ratio	3.0	2.6	6.41	0.00	Significant

### Yield and Economics

Areca nut (white chali) is the main and best suited commercial crop being cultivated in the study area. The results in the table 4 depicts that natural farming practice has recorded increased average chali yield of 12.77 quintals against average yield of 12.07 quintals per ha of conventional farming system. The increase in yield in natural farming plots indicate the advantage of efficient nutrient and water management towards enhancing the farm income which could be attributed by the use of Ghanajeevamrutha, and Jeevamrutha as plant nutrients and use of live mulching material to reduce cost on irrigation. However the incidence pest (root grub) and disease (Koleroga and Sulikoleroga) is very common in the study area. An increase in earth worms count in the soil was found

increasing in the plots which are under natural farming practice. The Economics of the Areca nut cultivation in the established orchard revealed that natural farming with an average investment on production of Rs. 1,62,008/- per ha was found significant with the t-test value of 2.7 as compared to average of Rs. 1,76,634/- recorded in conventional practices during the year 2019-2020. The net income generated with mean value of Rs.3,23,529/- per ha was found significant with the t-value of 4.11 over Conventional farming (Rs. 2,82,132/-). The average benefit cost ratio of natural farming plot was 3.0 with significant t-value of 6.41 against benefit cost ratio of 2.6 recorded in Conventional farming. Similar results of economic advantage and increase in yield due to natural farming have been reported in arecanut [2].

**Table 5:** Difference in treatment between natural farming and Conventional farming in coconut cultivation

Particulars	Natural farming	Conventional farming
Fertilizers used	Ghanajeevamrutha 0.75 kg per palm in the month of June or September and Jeevamrutha at 200 litres per acre for every 15 days	Imbalanced or absence of fertilizers application
Plant protection	Agniastra/Neemastra/Neem paste/Brahmastra	Indiscriminate / no use of chemical pesticide
Mulching	Using dry leaves	No mulching

**Table 6:** Yield and Economics of coconut under natural farming and Conventional farming in Udupi district

Particulars	Natural farming	Conventional farming	t value	p value	Result
Yield (nuts/palm)	112	110	1.4	0.07	Non Significant
Cost of cultivation (Rs./ha)	87,876	97,053	4.5	0.00	Significant
Gross Income(Rs./ha)	1,60,268	1,53,647	1.7	0.03	Significant
Net Income(Rs./ha)	72,391	56,594	4.9	0.00	Significant
Benefit Cost ratio	1.8	1.6	4.69	0.00	Significant

### Yield and Economics

Coconut was found to be grown as solo crop as well as intercrop with Areca nut in the study area. The results in the table 6 depicts that under natural farming practice has recorded increased average nut yield of 112 per palm against average yield of 110 nuts per palm of convention farming system. The increase in yield in natural farming plots indicates the advantage of efficient nutrient and water management over conventional practice which could be attributed with application of Ghanajeevamrutha, and Jeevamrutha contributing increase in nut yield and reduced cost on buying chemical fertilizers. Use of live mulching material reduced cost on irrigation with increase in earth worms count. However the incidence of disease in coconut is very less whereas incidence of Rhinoceros beetle is very common in the study area. The Economical Comparative analysis of the coconut cultivation in the study area revealed that natural farming practice with average investment on production of Rs. 87,876/- per ha as compared to average of Rs. 97,053/- recorded in conventional practices during 2019-2020. The net income generated with mean value of Rs.72,391/- per ha over Conventional farming (Rs. 56,594/-). The average benefit cost ratio of natural farming plot was 1.8 compared to 1.6 recorded in Conventional farming. Therefore natural farming of coconut was found significant as compared against conventional farming practice. Similar results of economic advantage due to natural farming have been reported in coconut [3].

### Conclusion

The study conducted in the farmers field revealed that natural farming practices adopted in Paddy, Areca nut and Coconut performed better than conventional method of cultivation in yield parameters. Economic viability has potential for up-

scaling of production. However, availability of Neem leaves, trespassing by wild animals (peacock, monkey, wild pig) may face constraint at farmers level. Reduced cost of cultivation will substantially increase the income as well as the livelihood of the farming community. The favorable benefit cost ratio is self-explanatory of economic viability of the natural farming system against the conventional type. Economic Survey emphasized the importance of Zero Budget Natural Farming (ZBNF) as one of the alternative farming practices for improving the farmers' income, in the backdrop of declining fertilizer response and farm income [4, 5, 6].

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