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ECONOMIC PERFORMANCE OF NATURAL AND CONVENTIONAL PADDY FARMING IN ANDHRA PRADESH

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ABSTRACT
This study evaluates the economic performance of Natural and Conventional paddy farming systems in YSR Kadapa district of Andhra Pradesh. Primary data were collected from 80 farmers, comprising 40 natural farming and 40 conventional farming households, through purposive sampling. The study assessed the status of the Andhra Pradesh Community Managed Natural Farming (APCNF) programme and compared input use, cost of cultivation, returns, resource use efficiency, and production constraints using descriptive statistics, cost concepts, the Cobb-Douglas production function, and Garrett's Ranking Technique. The APCNF programme recorded a compound annual growth rate of 54.74 per cent in farmer participation and 38.74 per cent in area. Natural farming reduced the total cost of cultivation to Rs. 82,312 per hectare compared with Rs. 91,001 under conventional farming. It also produced a higher paddy yield of 60 q/ha and generated net returns of Rs. 104,063 per hectare. Resource use efficiency analysis indicated that seed rate significantly influenced yield under natural farming, whereas both human labour and seed rate were significant under conventional farming. Farmers identified initial yield reduction, price fluctuations, pest and disease incidence, and inadequate technical knowledge as the major constraints. Overall, the findings indicate that natural farming is a profitable and environmentally sustainable alternative for paddy cultivation.

KEYWORDS: Natural farming; Conventional farming; Cost of cultivation; Net returns; Input use; Constraints.

INTRODUCTION

Agricultural systems aim to increase productivity while maintaining economic sustainability and economic viability. Conventional farming, though increased in production, has led to continuous use of chemical fertilizers and pesticides resulted higher cultivation costs, declining in soil fertility and environmental sustainability. This concerns led to created a need for alternative production systems which increased the need for sustainable practices that can maintain farm income while protecting natural resources.

Natural farming is an approach which focuses on minimizing the external inputs and strengthens the natural based inputs. Evidence from experimental studies indicates that natural farming enhance soil properties like nutrient status, organic carbon and microbial activity, it supports the stabilized production and environment (Liao et al., 2019). These enhance the soil health for sustainable production and it forms the ecological foundation.

In economic perspective, natural farming is primarily characterized by reduction of dependence on purchasing inputs. Empirical studies revealed that decline in external inputs which will reduce the cost of cultivation results in more profitability. Bharucha et al. (2020) documented higher income under natural farming due to low expenditure on chemical inputs, while Jaacks et al. (2022) reported that it increases the net returns by efficient resource management and diversified cropping systems. Similarly Bharathi, Anjugam and Suresh (2023); Bharathi, Anjugam, et al. (2023) highlighted the differences in yield also exist, low cost of cultivation and price advantage for naturally produced yield improves the profitability.

However, the productivity of natural farming is not as same as in all conditions. Simulation based evidence by Smith et al. (2020) suggests that low nutrient availability in soil effects the yield. This shows that output depend on level of adoption, local environmental conditions and soil management practices.

Natural Farming has received more importance in discussions and suggestions in policies due to its potential in reduction of usage of chemical inputs and maintain sustainable agriculture. Field based studies from Andhra Pradesh revealed that after practicing of natural farming it lowers use of synthetic inputs (Jaacks et al., 2022).Under natural farming environmental benefits also reported with the evidence of decline in greenhouse gas emissions Rosenstock et al. (2020).

In this context, a comprehensive analysis on comparison of Natural and Conventional Farming systems is essential to understand their relative performance. Paddy cultivation, being both a major staple crop and a resource-intensive enterprise, provides an appropriate basis for such analysis. Therefore, the present study aims to examine

the input use pattern, cost of cultivation, returns, resource use efficiency and constraints in paddy in Andhra Pradesh under natural and conventional farming systems.

Natural farming is conceptually defined by various organizations emphasizing its ecological and economic dimensions. According to the National Mission on Natural Farming (2024), Natural Farming is a chemical-free farming, involving livestock (preferably local breed of cow) integrated natural farming methods and diversified crop systems rooted in the Indian traditional knowledge. NF recognises the interdependence of the natural ecosystem amongst soil, water, microbiome, plants, animals, climate and human requirements.

Similarly, the FAO (2018) describes Zero Budget Natural Farming as a holistic agroecological approach that integrates traditional knowledge with scientific principles to reduce input costs, enhance resilience to climate change, and support sustainable agricultural livelihoods.

MATERIALS AND METHODS

Sampling

The study was carried out in YSR Kadapa district in Andhra Pradesh which has the largest area of under Natural Farming. A list of farmers practicing natural farming was obtained from the Rythu Sadhikara Samasta (2025) (RySS), it is not-for-profit organization established by the Government of Andhra Pradesh (under Department of Agriculture). Its main role is to empowering farmers and transform agriculture from using chemical inputs to natural inputs to improve farmer livelihoods and soil health. Purposive sampling method was used to select the sample respondents. The total sample size was 80, consisting of 40 paddy farmers under Natural farmers and 40 paddy farmers under Conventional farming were selected. Farmers under Conventional farming within nearby of natural farming fields were contacted for the study. Data on sample respondents, input use pattern, costs and returns, constraints were collected from the sample farmers through farm survey by using a pretested interview schedule.

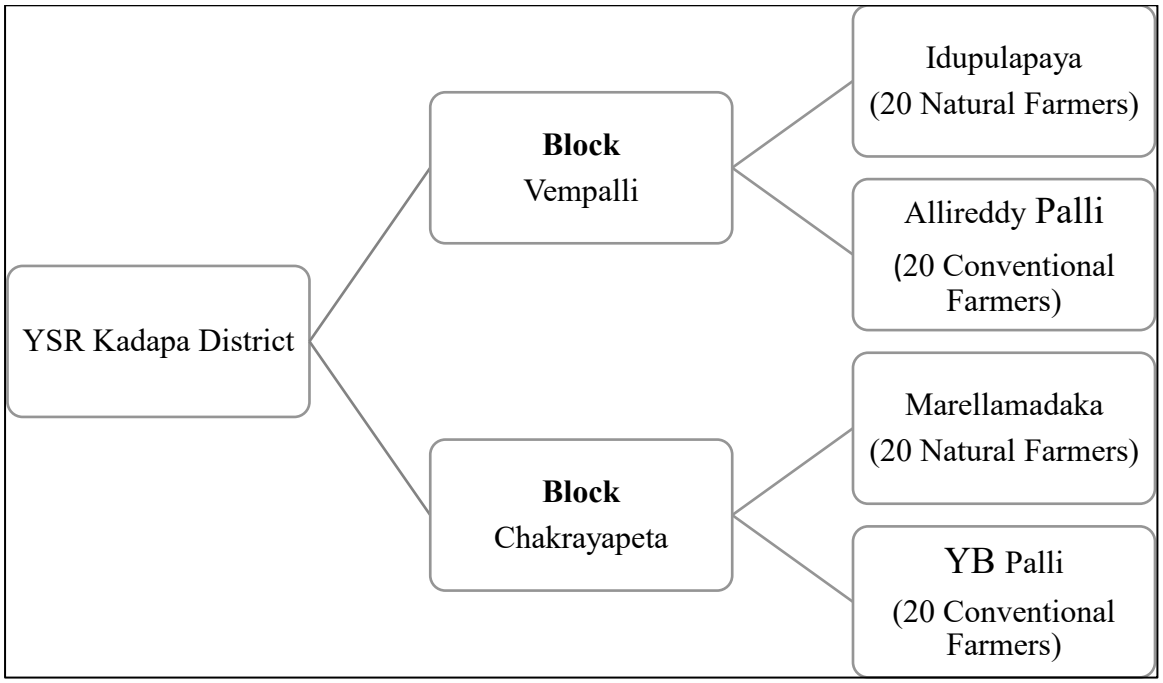

Fig 1. Sampling Framework

Analytical Tools

Descriptive Analysis

The collected data were analysed using descriptive statistical tools such as percentage and average analysis were used to analyse input use pattern, cost and returns of paddy under Natural and Conventional production systems.

Cost of Cultivation of Paddy was calculated using Total cost approach

a) Fixed Cost: It includes land revenue paid, depreciation on fixed capital, interest on fixed capital and rental value of owned land.

b) Variable Cost: It includes the cost of inputs such as seed, natural inputs and fertilizers, insecticides and herbicides, value of owned/hired machinery, value of hired/family labour, cost of machine power and interest on working capital.

c) Total Cost: It includes both fixed cost and variable cost.

d) Gross Return: It includes value of main product and by product produced on farm. The value of main product was computed by multiplying the quantity of output obtained per hectare with respective prices.

$$\text{Gross Returns (Rs per Hectare)} = \text{Quantity} \times \text{Price}$$

Where, Q = Quantity of Main and By Product, P = Price of Main and By Product

e) **Net Return:** It is the difference between gross return and total cost accrued by the farmers.

$$\text{Net Return (Rs./ha)} = \text{Gross Return} - \text{Total Cost}$$

Cobb-Douglas Production Function

To assess resource use efficiency of Paddy, Cobb-Douglas production function was used.

The Cobb-Douglas function can be presented as

$$Y = AX_1^{\beta_1}X_2^{\beta_2}X_3^{\beta_3}X_4^{\beta_4}X_5^{\beta_5}X_6^{\beta_6}e^{u}$$

For estimation, the function was transformed into a log-linear form:

$$\ln Y = \ln \beta_0 + \beta_1 \ln X_1 + \beta_2 \ln X_2 + \beta_3 \ln X_3 + \beta_4 \ln X_4 + \beta_5 \ln X_5 + \beta_6 \ln X_6 + u$$

Where,

Y= Yield of paddy (Rs./ha)

X_1= Human labour (man-days/ha)

X_2= Machine labour (hours/ha)

X_3= Seed rate (kg/ha)

X_4= Organic based inputs (litres/ha) (for Natural Farming)

X_5= Irrigation (hours/ha)

X_6= Fertilizers (kg/ha) (for Conventional Farming)

X_7= Plant protection chemicals (lit/ha) (for Conventional Farming)

β_0= regression constant

$\beta_1 \ldots \beta_7$= Elasticities of respective inputs

u= Error term

The Resource use efficiency of Paddy was estimated by computing the ratio

RUE = MVP/MFC

Where,

MVP = Marginal Value Product

MFC = Marginal Factor Cost

MVP = bi*Yi / Xi

Where,

bi= Estimated regression coefficient of input Xi

Yi= Geometric mean value of paddy output.

Xi= Geometric mean value of i^{th} resources used in paddy cultivation.

Decision rule

MVP/MFC = 1 it is denoted as Efficient use of resource, MVP/MFC >1 it is denoted as Underused of the resource and, MVP/MFC < 1 it is denoted as Overused of the resource.

RESULTS AND DISCUSSION

General Characteristics of Sample farmers

The profile characteristics of the sample farmers revealed that the mean age of the respondents was 43 for natural farmers and 47 for conventional farmers. The mean family size of the respondents was 3.82 for natural farmers and 3.32 in case of conventional farmers.

About 30 per cent of the natural farmers were educated up to the level of secondary education in the study area, whereas, 15 per cent of the conventional farmers were educated up to secondary level of education. Mean experience on natural farming was 4.1 years among natural farmers. The average value of livestock was marginally higher among natural farmers (Rs.1,47,975) than conventional farmers (Rs.1,45,850).

Status of APCNF Programme in Andhra Pradesh

The growth of the Andhra Pradesh Community Managed Natural Farming (APCNF) programme in terms of farmer participation and area coverage from 2016-17 to 2022-23 is illustrated in Table 1. The results revealed a increase in both the number of farmers adopting Natural Farming and the area brought under cultivation during the study period. The number of farmers increased from 0.40 lakh in 2016-17 to 8.00 lakh in 2022-23, while the area under Natural Farming expanded from 0.80 lakh acres to 9.00 lakh acres. A rapid expansion was observed during the initial years of programme implementation, followed by a steady growth in subsequent years. The compound annual growth rates of 54.74 per cent for the number of farmers and 38.74 per cent for the area further indicate the strong expansion of the programme across the state.

Table 1. No. of Farmers and Area under Natural Farming in Andhra Pradesh

S.No	Year	No. of Farmers (Lakhs)	Annual changes (%)	Area (lakh acres)	Annual changes (%)
1	2016-17	0.40	-	0.8	-

2	2017-18	1.63	3.07	3.5	3.37
3	2018-19	5.82	2.57	7.0	1.00
4	2019-20	6.30	8.25	7.5	0.07
5	2020-21	7.00	0.48	8.0	0.06
6	2021-22	7.50	0.07	8.5	0.06
7	2022-23	8.00	0.06	9.0	0.05
	CAGR%	54.74		38.74	

Source: IDSAP (2018-19), IDSAP (2019-20),IDSAP (2020-21), IDSAP (2021-22), IDSAP (2022-23)

The upward trend shown in Figure.1 confirms the continuous growth in both farmer participation and area under Natural Farming. The trend lines closely follow the observed values, indicating a stable and consistent growth pattern over the years. The increasing adoption of Natural Farming reflects the growing confidence of farmers in the system and the effectiveness of the APCNF programme. The observed growth attributed to sustained institutional support, awareness creation, extension services, and the economic as well as environmental benefits associated with Natural Farming practices.

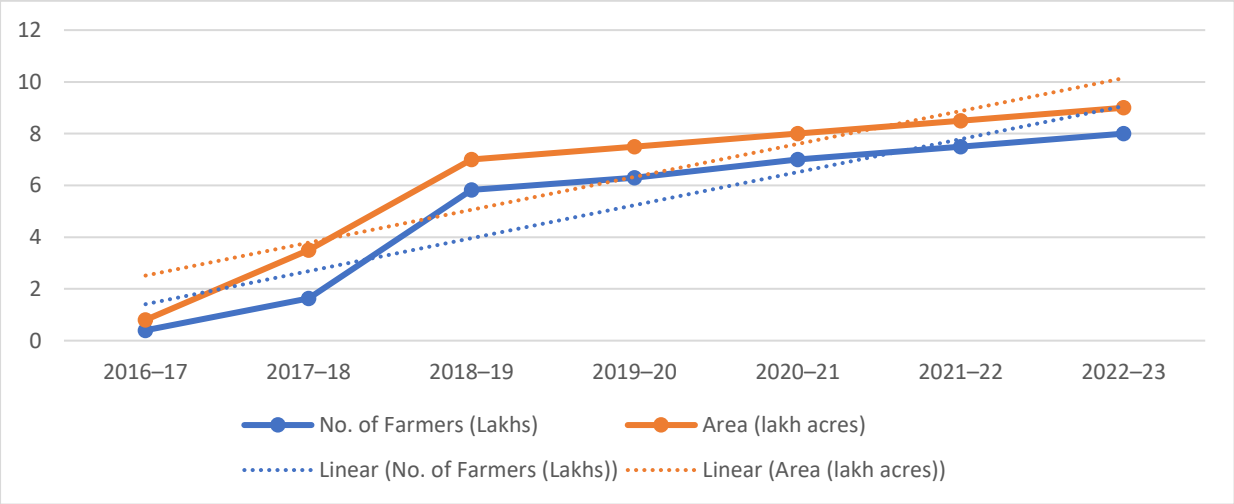

Fig.2 Trend in Number of Farmers and Area under Natural Farming in Andhra Pradesh

Input Use Pattern

The input use pattern adopted by sample farmers under natural and conventional paddy farming systems is presented in Table 2. Majority of the farmers in natural farming used Neemasthram (100 per cent) which acts as a natural pesticide to protect crop, Beejamrutham (100 per cent) for seed treatment to protect seeds from soil borne diseases and to enhance germination, FYM (100 per cent) which helps to increase soil fertility. Other organic based inputs like Ghanajeevamrutham, Dravjeevamrutham, azolla, egg amino acid were used by them. However, conventional farmers used only chemical fertilizers (100 per cent), plant protection chemicals (100 per cent) and herbicides (95 per cent) for controlling pests and diseases and to increase the yield.

The input use per hectare, in paddy under Natural Farming revealed that on an average Dravajeevamrutham was used upto,1976lit in paddy. Whereas, inputs like FYM, Neemasthram, Egg amino acid Beejamrutham, Azolla, Panchagavya, were used to the extent of 6.17 tons, 247 litre, 247 litre 152 litre, 32 kgs, 9.8 litre per hectare, respectively. However, conventional farmers used 654.81 kgs of fertilizers, 247.24 litres of plant protection chemicals, 5.8 litres of herbicides per hectare. The amount spent on natural inputs for paddy under the natural farming, was Rs. 14226 per hectare, whereas, it was Rs. 22624 in case of conventional farming. It is found that the amount spent on chemical inputs by conventional farmers were found to be higher than natural inputs spent under natural farming by Rs.8398 per hectare. It is also found that farmers under natural farming used only on farm produced natural inputs for the controlling of pests and diseases, weeds in paddy cultivation.

Table 2. Input Use Pattern in Paddy under Natural and Conventional Farming (per hectare)

S.No	Inputs	Natural farming			Conventional farming		
		Nos. (N=40)	Qty.	Value (Rs.)	Nos. (N=40)	Qty.	Value (Rs.)
1	Neemasthram (lit)	40 (100)	247.1	741.3	-	-	-
2	Beejamrutham (lit)	40 (100)	152	304	-	-	-
3	Ghanajeevamrutham (kg)	35 (87.5)	988.4	2964	-	-	-
4	Dravajeevamrutham (lit)	38 (95)	1976.8	3953.6	-	-	-
5	Azolla (kg)	37 (92.5)	32.1	321	-	-	-
6	Panchagavya (lit)		9.8	600	-	-	-
7	Egg amino acid (lit)		247.1	400	-	-	-
8	FYM (tonne)	40 (100)	6.17	4942	38 (95)	3.70	3706.5
9	Fertilizers (kgs)	-	-	-	40 (100)	654.81	13837.6
10	Plant protection chemicals (lit)	-	-	-	40 (100)	247.24	2979.6
11	Herbicides (lit)	-	-	-	38 (95)	5.8	2100
	Total			14225.9			22623.7

Source: Field Survey, 2024-25
(Figures in parentheses indicate per cent to total)

Cost of Cultivation and Net return of paddy under Natural and Conventional farms

The details on cost of cultivation and net return of paddy under both Natural and conventional farming are presented in Table 3. Independent 't' test was performed between the natural and conventional paddy farm. The results showed that the values of human labour, seeds, total variable cost, total fixed cost, Total cost, gross return, net return were found to be significant at 1 percent level of significance and value of machine power was found to be significant at 10 per cent level of significance. The results revealed that the total cost of cultivation of paddy per hectare in Natural Farming was found to be Rs. 82312 and in case of conventional farming it was Rs. 91002. The total variable cost was Rs. 65113 and Rs. 72828 per hectare under natural and conventional paddy cultivation.

Table 3. Cost of Cultivation and Net Return of Paddy under Natural and Conventional farming (Rs/ha)

S. No	Particulars	Natural farming (N=40)	Conventional farming (N=40)	Difference over Conventional fields
A.	**Variable Cost**			
1.	Human Labour	26249	21242	5007***
2.	Machine Power	18278	19167	-889*
3.	Seeds	2450	2964	-514***

4.	Organic Bio Inputs and Bio fertilizers	14225.9	-	14225.9
5.	Plant Protection chemicals	-	2979.6	2979.6
6.	Fertilizers	-	13837	13837
7.	Irrigation	750	988	-238***
8.	Herbicides	-	2100	2100
9.	Interest on Working capital	3160	3743	583
A.	Total Variable Cost (TVC)	65112.9	72827.7	7714.8***
	Fixed Cost			
1.	Land Revenue	256	274	18
2.	Depreciation	275	386	111
3.	Rental Value of Owned Land	14826	15567	741
4.	Interest on Fixed Capital	1842	1947	105
B.	Total Fixed Cost (TFC)	17199	18174	975***
	Total Cost (A+B)	82311.9	91001.7	8689.8***
	Paddy Yield (q/ha) Paddy straw Yield (q/ha)	60 75	50 61	10*** 14***
	Paddy Price (Rs/q) Paddy straw (Rs/q)	3000 85	2500 83	500 2
C.	**Returns**			
	Gross Return (Rs.)	186375	130063	-56312 ***
	Net Return (Rs.)	104063.1	39061.3	-65001.8***

The higher price of Paddy realized by Natural Farming farmers i.e Rs.500 higher than conventional farming is attributed to the premium received for chemical-free produce in the market. Growing consumer demand for safe and residue-free food enabled the farmers to sell their produce at a higher price compared to conventionally produced paddy.

The yield of paddy and straw per hectare was found to be higher by 10q and 14q respectively in case of natural farming compared to conventional farming. The gross return was found to be higher in Natural farms than conventional farms by Rs.56312 per hectare. Similarly net return in paddy cultivation under natural farms was higher than conventional farms by Rs. 65002 per hectare. The higher net returns were a result of both increased output and reduced dependence on costly chemical fertilizers and pesticides, which lowered cultivation costs and improved overall profitability.

Resource Use Efficiency

The resource use efficiency of paddy cultivation under natural and conventional farming systems was analysed using the Cobb-Douglas production function and the results are presented in Table 4.

In natural farming, the coefficient of determination (R^2) was 0.71, indicating that about 71 per cent of the variation in paddy yield was explained by the variables included in the model, while the adjusted R^2 was 0.67. Among the explanatory variables, seed rate recorded a positive coefficient (0.759) and was highly significant at the 1 per cent level, indicating that an increase in seed rate significantly enhanced paddy yield. Human labour (0.001) and natural inputs (0.036) exhibited positive coefficients but were not statistically significant. Machine labour (-0.006) and irrigation (-0.082) showed negative coefficients; however, their effects on yield were also statistically non-significant.

In conventional farming, the coefficient of determination (R^2) was 0.58, indicating that 58 per cent of the variation in paddy yield was explained by the explanatory variables, with an adjusted R^2 of 0.50. Human labour (0.252) and seed rate (0.641) had positive coefficients and were highly significant at the 1 per cent level, indicating their positive contribution to paddy productivity. Plant protection chemicals (0.170) also showed a positive coefficient and were significant at the 10 per cent level, suggesting a marginal positive influence on yield. Machine labour (-0.029) and fertilizers (-0.014) recorded negative coefficients, while irrigation (0.021) had a positive coefficient; however, these variables were statistically non-significant.

The results revealed that seed rate was the most important factor influencing paddy yield under natural farming, whereas both human labour and seed rate significantly influenced yield under conventional farming. Resource use efficiency analysis further revealed that seed rate and natural inputs were under-utilized under natural farming, while human labour, seed rate, irrigation and plant protection chemicals were under-utilized under conventional farming, indicating scope for improving productivity through more efficient allocation of production resources.

Tabe 4. Regression coefficient of Paddy in Natural and Conventional Farming

S.No	Variables	Natural Farming		Conventional Farming	
		Coefficient value	t - value	Coefficient value	t - value
1	Constant	0.604	1.478	0.043	0.050
2	Human labour (Man days/ha)	0.001	0.016	0.252*	2.759

3	Machine labour (hrs/ha)	-0.006	-0.153	-0.029	-0.340
4	Seed rate (kg/ha)	0.759*	6.991	0.641*	4.486
5	Natural Inputs (lit)	0.036	0.851	-	-
6	Irrigation (hrs)	-0.082	-0.989	0.021	0.235
7	Fertilizers (Kgs/ha)	-	-	-0.014	-0.090
8	Plant Protection chemicals lit/ha)	-	-	0.170*	1.966
	R^2	0.71		0.58	
	Adjusted R^2	0.67		0.50	
	F – value	17.20		7.74	
	N	40		40	

* Significant at ten per cent level , ** Significant at five per cent level level, *** Significance at one per cent level

Marginal value productivities of inputs used in paddy production in Natural and Conventional Farming

The efficiency of resource use in paddy cultivation under natural and conventional farming systems was assessed by comparing the Marginal Value Product (MVP) of each input with its Marginal Factor Cost (MFC). An MVP/MFC ratio greater than one indicates under-utilization of the resource, whereas a ratio less than one indicates over-utilization.

The results presented in Table 5 show that under natural farming, seed rate and natural inputs were under-utilized, with MVP/MFC ratios of 55.42 and 1.33, respectively, indicating that increased use of these inputs could enhance productivity and profitability. Among these, seed rate recorded the highest MVP/MFC ratio, suggesting considerable scope for increasing its utilization. In contrast, human labour, machine labour and irrigation were found to be over-utilized, with MVP/MFC ratios of 0.007, -0.067 and -19.86, respectively, indicating that additional use of these resources may not result in proportional increases in output.

In conventional farming, human labour, seed rate, irrigation and plant protection chemicals were found to be under-utilized, with MVP/MFC ratios of 1.507, 28.66, 2.759 and 4.594, respectively. Among these, seed rate recorded the highest MVP/MFC ratio, indicating substantial scope for improving productivity through increased utilization. On the other hand, machine labour and fertilizers were over-utilized, with MVP/MFC ratios of -0.195 and -0.129, respectively, suggesting that reducing the use of these inputs could improve economic efficiency without adversely affecting yield.

The analysis revealed that the distinct patterns of resource utilization between the two farming systems. Under natural farming, greater attention should be given to the optimum use of seed rate and natural inputs, while avoiding excessive use of machine labour and irrigation. In conventional farming, improving the utilization of human labour, seed rate, irrigation and plant protection chemicals, together with rationalizing the use of machine labour and fertilizers, would enhance resource-use efficiency and profitability.

Table 5. Marginal value productivities of inputs used in paddy production in Natural and Conventional Farming

Variable	Natural Farming			Conventional Farming		
	Regression Coefficient	MVP/MFC	Level of Resource	Regression Coefficient	MVP/MFC	Level of Resource
Human labour (Man days/ha)	0.001	0.007	Over Utilized	0.252*	1.507	Under Utilized
Machine labour (hrs/ha)	-0.006	-0.067	Over Utilized	-0.029	-0.195	Over Utilized
Seed rate (kg/ha)	0.759*	55.42	Under Utilized	0.641*	28.66	Under Utilized
Natural Inputs (lit)	0.036	1.33	Under Utilized	-	-	-
Irrigation (hrs)	-0.082	-19.86	Over Utilized	0.021	2.759	Under Utilized
Fertilizer (Kgs/ha)	-	-		-0.014	-0.129	Over Utilized
Plant Protection chemicals (lit/ha)	-	-	-	0.170*	4.594	Under Utilized

* Significant at ten per cent level , ** Significant at five per cent level level, *** Significance at one per cent level

Constraints faced by farmers in the adoption of Natural Farming

The constraints faced by under natural farming were analysed using Garrett's ranking technique and the results are presented in Table 6. Among the various constraints, initial yield decline emerged as the most serious problem

with a mean score of 82.00 and was ranked first. Farmers perceived a reduction in yields during the initial years of transition from conventional to natural farming, which discouraged wider adoption of the practice. Price fluctuation was ranked second with a mean score of 68.17, indicating that unstable market prices affected the profitability of natural farming. Pest and disease management was ranked third with a mean score of 56.07, reflecting the difficulties faced by farmers in controlling pests and diseases using natural methods without relying on chemical pesticides.

Table 6. Constraints faced by farmers in adoption of Natural Farming

S.No	Constraints faced by Natural Farming	Mean Score	Rank
1.	Initial yield decline	82.00	I
2.	Price fluctuation	68.17	II
3.	Pest & disease management	56.07	III
4.	Lack of technical knowledge	54.70	IV
5.	Labour intensity	44.30	V
6.	Certification issues	43.95	VI
7.	Non availability of bio-inputs	37.00	VII
8.	Market access problems	24.15	VIII
9.	Lack of credit	21.27	IX

Source: Field survey,2024-25

Lack of technical knowledge was ranked fourth (54.70), suggesting that many farmers require proper guidance and training to understand and implement Natural Farming practices effectively. Labour intensity was ranked fifth with a mean score of (44.30), as Natural Farming often requires more labour for activities such as preparation of bio-inputs and field management. Certification issues occupied the sixth rank (43.95), reflecting the difficulties involved in obtaining certification for natural products.

Non-availability of bio-inputs was ranked seventh with a mean score of (37.00). Some farmers reported challenges in accessing quality bio-inputs when required. Market access problems were ranked eighth (24.15), indicating that farmers face certain difficulties in finding suitable markets for their produce. Lack of credit received the lowest mean score of (21.27) and was ranked ninth, suggesting that it was comparatively a less serious constraint among the respondents.

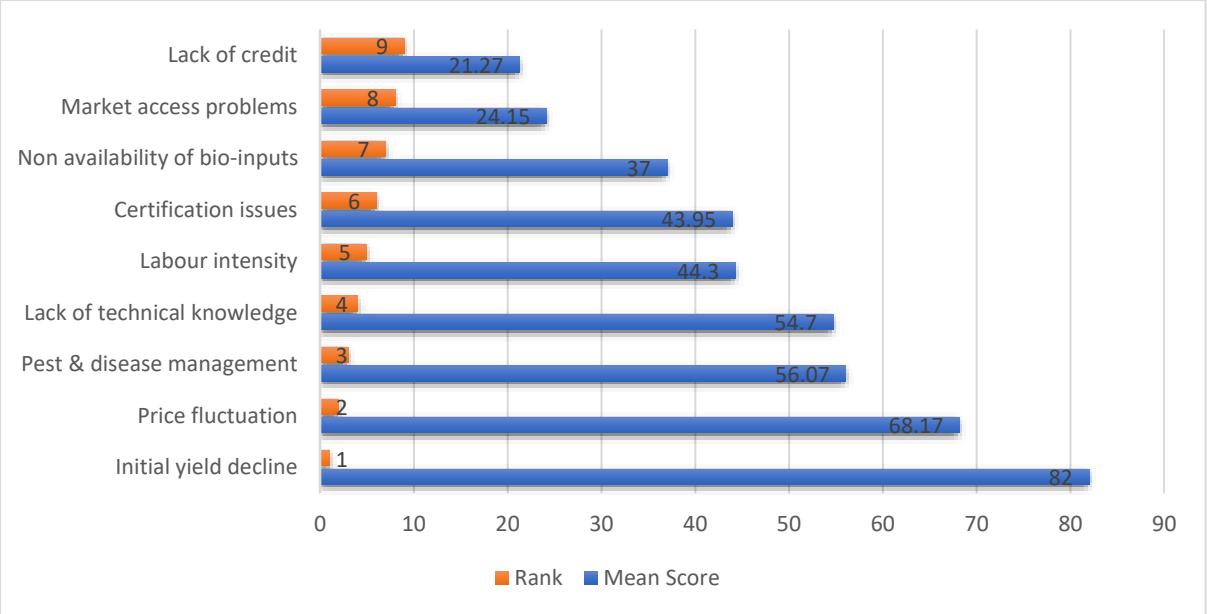

Fig 3. Constraints faced by farmers in the adoption of Natural Farming

CONCLUSION

The study revealed that the APCNF programme has expanded considerably in Andhra Pradesh, as evidenced by the increasing number of farmers brought under Natural Farming over the years.

It is concluded that the amount spent on natural inputs by natural farmers were found to be lower than chemical inputs spent by conventional farmers. The total cost of cultivation of paddy was lower in natural farming than conventional farming by Rs. 8689.8 per hectare. The yield was 10 q lower in conventional fields than natural fields. The high net return was observed in Natural Farming due to use of locally available natural inputs which reduces usage of chemical fertilizers and pesticides. Naturally produced paddy were sold at higher price due to increasing consumer demand for chemical free and safe food. It concluded that the Natural Farming is higher profitable than the Conventional Farming. Resource use efficiency analysis indicated that that seed rate was the only significant input influencing paddy yield under Natural Farming, whereas human labour and seed rate were

significant under Conventional Farming, with plant protection chemicals showing marginal significance. The analysis further indicated scope for improving productivity through more efficient utilization of production resources in both farming systems.

The study concludes that adoption of Natural Farming is constrained by issues such as initial yield decline, price fluctuations, and difficulties in pest and disease management. Related to yield reduction during the transition period, unstable market prices, and difficulties in pest and disease management are the major factors limiting the adoption of Natural Farming. Addressing these issues through technical support, capacity-building programmes, and better market opportunities could encourage more farmers to adopt Natural Farming practices.

The Andhra Pradesh State Co-operative Marketing Federation Limited (AP MARKFED) is a state-level cooperative agency involved in the procurement and marketing of agricultural produce and in providing market support to farmers. Marketing of produce was facilitated through AP MARKFED and other organized channels, which helped farmers access better market opportunities and realize relatively higher prices for their produce.

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