

## A Study on attitude of Farmers towards Conservation Agriculture in Tamil Nadu

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**ABSTRACT:** Conservation Agriculture (CA) is a farming system that can prevent losses of arable land while regenerating degraded lands. It promotes maintenance of a permanent soil cover, minimum soil disturbance and diversification of plant species. This study explored the attitude of farmers towards conservation agriculture. An attitude scale consisting of 10 items was developed and administered to 233 farmers of Cuddalore, Villupuram and Tiruvarur districts of Tamil Nadu. The findings of the study revealed that nearly half (48.50%) of the farmers were found to possess moderately favourable attitude towards conservation agriculture followed by less favourable (36.48%) attitude. The farmers with highly favourable attitude towards conservation agriculture found to be least which was about 15.02 per cent. The detailed analysis of the above findings and suggestions to improve their attitude towards conservation agriculture are presented in this paper.

**Keywords:** Attitude, Conservation agriculture, Favourableness.

### INTRODUCTION

More than 70-75 percent of farmers in India are small landholders who continue to pursue conventional farming methods and are a substantial contributor to total food production. Conventional agricultural practises involve excessive fertilization, improper use of pesticides, burning of crop residues and the use of heavy machineries. Such practices might lead to severe impact on soil such as acidification, nitrification, desertification, decline in organic matter in soil, soil contamination, soil compaction and erosion resulting decline in sustainability of natural resources. Adding to this bleak scenario, climate change is another major cause of concern for agriculture. Climate change had a negative impact on India's food production system in recent years. Further, extreme weather events and rising temperatures are impacting food production and productivity.

The above scenarios have made all the stakeholders like farmers, scientists, Government and civil society organizations to search for an alternative which could be environmentally safe, ecologically sustainable and economically profitable. Therefore, it is necessary to recommend crop production techniques to farmers that address the above-mentioned problems particularly soil degradation, low soil fertility and vulnerability to climate change and variability so that agriculture may emerge as a source of farmers' prosperity.

Conservation agriculture refers to farming practices which reduce production costs and enhance yields while also reversing land degradation, safeguarding the environment, and adapting to climate change. Conservation Agriculture (CA) defined by FAO as minimal mechanical soil disturbance permanent organic soil mulch cover and species diversification through crop rotations and intercropping. Conservation agriculture practices offer a new way of effectively and efficiently managing agricultural environments and the natural resource base for multifunctional services to the farming community. Even though there are numerous benefits of conservation agriculture system in terms yield, reduction in production cost, sustainability of land use, improved incomes, timeliness of cropping practices, ease of farming and eco-system services etc., the farmers are hesitating to adopt conservation agriculture practices. The prime barricade towards the adoption of conservation agriculture practices is the lack of awareness and knowledge about conservation agriculture that needs to be strengthened. Also, it is necessary to know the attitude of farmers towards conservation agriculture. It can be useful in developing better CA technologies in the future to reinforce its adoption among farmers. In this context, a study was formulated to analyse the attitude of farmers towards conservation agriculture.

## METHODOLOGY

Tamil Nadu is one of India's best performing states in terms of agricultural productivity, with farmers who are more sensitive to changing technologies and market fluctuations. The study was conducted in the selected three districts of Tamil Nadu. Three districts, namely Villupuram, Cuddalore and Thiruvavur of Tamil Nadu was purposively selected based on the fact that the selected districts have more cultivable area under food and non-food crops than any other districts. Further, major annual crops are predominately cultivated throughout the year with intensive agricultural practices. In this study, four blocks have been selected from each district based on maximum area under cultivation. Similarly, from each block two villages were selected based on more cultivable area under cultivation. The proportionate random sampling technique was used in selecting farmers and the total samples selected was 233 farmers.

A reliable and validated attitude scale was constructed to measure the attitude of farmers towards conservation agriculture (Ramu, 2021). The scale consists of 10 statements, of which seven were positive statements and the remaining three were negative statements. The data was collected with a five-point continuum from strongly agree to strongly disagree. The scoring procedure used was 5, 4, 3, 2 and 1 for the positive

statements and it was in reverse for the negative statements.

The data was collected directly from the farmers by personal interview method. After data collection, it was tabulated and analysed with statistical tools such as percentage analysis and the cumulative square root of frequency method. Based on the total score, the respondents were categorized into three levels *i.e.*, less favourable, moderately favourable and highly favourable attitude and the results were presented.

## RESULT AND DISCUSSION

Attitude towards conservation agriculture supports the level of adoption of conservation agriculture practices by the farmers. Thurstone (1946) defines an attitude as the degree of positive or negative affect associated with some psychological object. By the psychological object, Thurstone means any symbol, phrase, slogan, person, institution, ideal or idea toward which people can differ positively or negatively. In this study, attitude is defined as "the degree of positive or negative opinion, feeling, belief and disposition towards conservation agriculture principles by the farmers". The statement-wise distribution of the respondents according to their attitude towards conservation agriculture was presented in Table 1.

**Table 1: Statement-wise distribution of the respondents according to their attitude towards conservation agriculture (n=233) \***

S.No.	Statements	SA		A		UD		DA		SDA	
		No.	%	No.	%	No.	%	No.	%	No.	%
1.	Conservation Agriculture (CA) claimed to be a viable option for sustainable agriculture	133	57.08	88	37.77	2	0.86	10	4.29	0	0.00
2.	CA practices ensures the use of inorganic fertilizers in an optimum level which does not disrupt the biological processes	22	9.44	180	77.26	19	8.15	12	5.15	0	0.00
3.	CA practices improve the physical properties of the soil	39	16.74	115	49.36	62	26.60	15	6.44	2	0.86
4.	CA practices ensures soil carbon sequestration	23	9.87	68	29.18	62	26.61	78	33.48	2	0.86
5.	CA practices increases farm profitability in the long term	35	15.02	60	25.75	48	20.60	86	36.91	4	1.72
6.	CA practices conserve water resources compared to conventional agriculture practices	29	12.45	131	56.22	46	19.74	26	11.16	1	0.43
7.	Conservation agriculture does not offer potential for food security	42	18.03	104	44.63	40	17.16	42	18.03	5	2.15
8.	CA practices are very difficult to adopt due to increased land fragmentation	25	10.73	116	49.79	43	18.45	40	17.17	9	3.86
9.	CA practices does not improve the livelihood status of the farmers	48	20.60	82	35.19	39	16.74	52	22.32	12	5.15
10.	Farmer's decisions to adopt CA practices seem to be influenced by their neighbour's behaviour.	34	14.59	98	42.06	46	19.74	38	16.31	17	7.30

\*Multiple responses obtained

It was observed from Table 1 that the statement 'Conservation Agriculture (CA) claimed to be a viable option for sustainable agriculture' was strongly agreed and agreed by 57.08 per cent and 37.77 per cent respectively. Further 4.29 per cent of the respondents disagreed the statement. Only meagre per cent (0.86%) of the respondents was unable decide about the statement.

The statement 'CA practices ensures the use of inorganic fertilizers in an optimum level which does not disrupt the biological processes' was agreed by 77.26 per cent followed by strongly agree (9.44%), undecided (8.15%) and disagree (5.15%).

The statement 'CA practices improve the physical properties of the soil' was agreed by 49.36 per cent followed by undecided (26.60%), strongly agree

(16.74%), disagree (6.44%). Only meagre (0.86%) of the respondents strongly disagreed the statement.

The statement 'CA practices ensures soil carbon sequestration' was disagreed by 33.48 per cent followed by agreed (29.18%), undecided (26.61%) and strongly agreed (9.87%). Only meagre (0.86%) of the respondents strongly disagreed the statement.

The statement 'CA practices increases farm profitability in the long term' was disagreed by 36.91 per cent followed by agree (25.75%), undecided (20.60%), strongly agree (15.02%) and strongly disagree (1.72%).

The statement 'CA practices conserve water resources compared to conventional agriculture practices' was agreed by 56.22 per cent followed by undecided (19.74%), undecided strongly agree (12.45%) and strongly disagree (11.16 %). Only meagre per cent

(0.43%) of the respondents strongly disagreed the statement.

The statement 'Farmer's decisions to adopt CA practices seem to be influenced by their neighbour's behaviour.' was agreed by 42.06 per cent followed by undecided (19.74%), disagree (16.31%) and strongly agree (14.59%). Only meagre per cent (7.30%) of the respondents strongly disagreed the statement.

The above statements were positive statements. Out of seven statements five statements found to have high agreement among the respondents and two statements were found high disagreement among the respondents.

'Conservation agriculture does not offer potential for food security' the statement was agreed by 44.64 per cent followed by equal per cent (18.03%) of the respondents strongly agreed and disagreed. Further, 17.17 per cent of respondents had no idea about the statement and meagre (2.15%) had strongly disagreed.

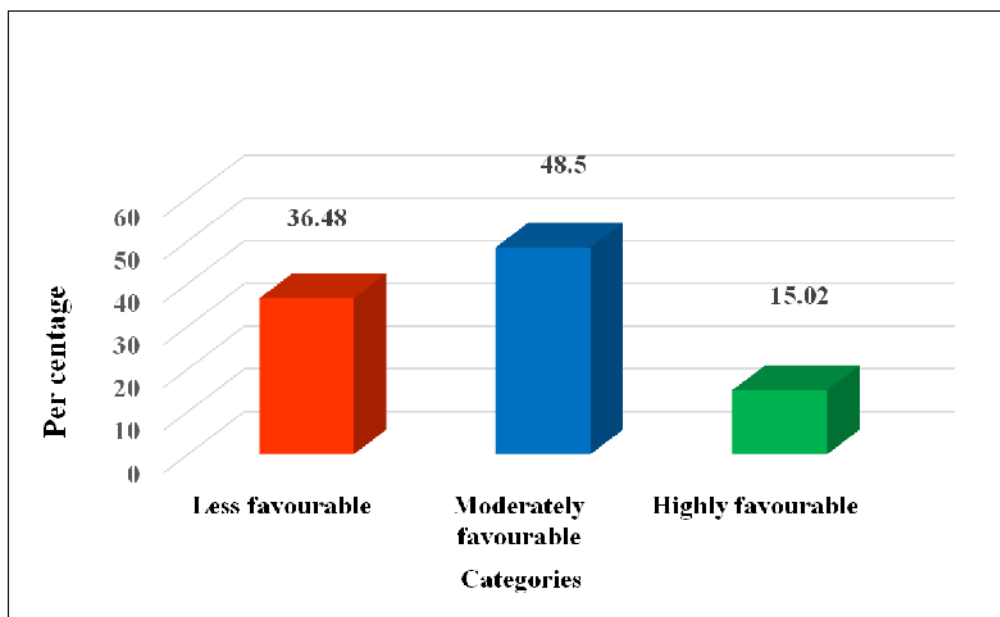
Nearly half (49.79%) of the respondents had agreed the statement 'CA practices are very difficult to adopt due

to increased land fragmentation' followed by undecided (18.45%), disagree (17.17%) and strongly disagree (10.73%). Only 3.86 per cent had expressed strong disagreement for the statement.

'CA practices does not improve the livelihood status of the farmers' was agreed by 35.19 per cent and disagreed by 22.32 per cent. Further, 20.60 per cent of the respondents had strongly agreed followed by undecided (16.74%) and 5.15 per cent of farmers strongly disagreed with the statement.

The above statements were negative statements. The respondents had shown agreement with the above statements. This shows that the farmers had negative attitude towards some aspects of conservation agriculture.

**Overall attitude.** Further, the scores of the respondents on each statement were added to obtain an overall attitude score. Based on the overall attitude score each respondent was categorized into three levels as shown in Table 2 and depicted in Fig. 1.



**Fig. 1.** Distribution of the respondents according to their overall attitude towards conservation agriculture.

The results depicted in Table 2 pointed that almost half (48.50%) of the farmers were found to possess moderately favourable attitude towards conservation agriculture followed by more than one-third (36.48%) of the farmers with less favourable attitude and less than one-fifth (15.02%) of the farmers had highly favourable attitude towards conservation agriculture.

It is clear from the above findings that majority (84.98%) of the farmers had moderately to less

favourable attitude towards conservation agriculture. The main reason behind the findings was the lack of awareness and knowledge among the farmers about the concept of conservation agriculture. Minimum mechanical soil disturbances, permanent soil organic mulch cover and species diversification are the three main principles of conservation agriculture.

**Table 2: Distribution of the respondents according to their overall attitude towards conservation agriculture (n=233).**

Sr. No.	Category	Number	Per cent
1.	Less favourable	85	36.48
2.	Moderately favourable	113	48.50
3.	Highly favourable	35	15.02
<b>Total</b>		233	100.00

The practices under minimum mechanical soil disturbance comprises no-tillage which includes no-till direct seeding and no-till weeding and minimum tillage which involves less than 25.00 per cent of the cropped area to be tilled and finally no periodic tillage. It was observed that majority of the farmers were not accepted the possibilities of minimum mechanical soil disturbances could be adopted by them. The probable reasons behind the observation were the farmers having a strong belief towards intensive ploughing and they are not willing to reduce the tillage practices in field preparation even though higher the land preparation costs. The farmers further expressed that minimizing the ploughing could leads to difficulties in intercultural operations, high emergence of weeds and increased infestations of pests and diseases. Further, the farmers expressed that ploughing being a traditional practice was followed for generations by their fathers and fore fathers and that cannot be avoided overnight.

The second principle of conservation agriculture is permanent soil organic mulch cover. The mulch cover of left-over stubbles of previous crop over the soil could be benefited in number of ways. The farmers usually burnt the crop residues into the field after the harvest leading to environmental pollution and loss of huge organic biomass to the soil. Again, farmers expressed that burning is much easier, zero cost with no labour requirement than mulching. Further, mulch cover might cause difficulties in intercultural operations, become a breeding tract for insect pests and takes longer period for decomposition.

The third principle of conservation agriculture is species diversification through crop rotation and intercropping. Crop rotation and intercropping practices are most widely practiced by farmers as it could provide additional income to the farmers. This could be a reason for 15.02 per cent of highly favourable attitude towards conservation agriculture. Further, farmers expressed that no trainings were conducted and no technologies were diffused in adopting all the three principles simultaneously to achieve the real benefits of conservation agriculture.

## CONCLUSION

From the study, it could be concluded that the majority of the respondents had a moderately to less favourable attitude towards conservation agriculture. This clearly shows the lack of awareness and knowledge among farmers about the principles of conservation agriculture. Several practices were miss judged by the farmers and those practices were scientifically proven as a successful conservation practices. Generally, as tillage is reduced, the number of insect pests increases. However, reduced tillage also tends to increase diversity of predators and parasites of crop damaging insects (Stinner and House, 1990). Similarly, under conservation agriculture, crop rotations can help break insect pest, diseases and weed cycles. The minimal soil disturbance and soil cover will protect the biological component of the soil and help with biological tillage, keeping pests and disease under control through

biological diversity processes (Hobbs and Govaerts, 2010). According to FAO (2001), adoption of conservation agriculture practices might enhance biological activity and diversity and increase competitors and predators leads to natural pest and disease control. For instance, most nematode species (especially the pathogens) can be significantly increased by application of organic matter, which stimulates the action of several species of fungi attacking nematodes and their eggs. Reduced tillage indirectly defines the species composition of the soil microbial community by improving retention of soil moisture and modifying soil temperature (Krupinsky *et al.*, 2002). Crop rotation is crucial to neutralize the tendency under zero till to increase pathogen numbers (Barker and Koenning, 1998). Crop rotations may reduce pathogen carryover from one season to next season.

It could be concluded that continuous intensive ploughing is undesirable that might leads to soil degradation, compaction and environmental pollution through release of fossil fuels while running tractors and other machineries during the process of ploughing. Therefore, farmers would reconsider ploughing and its relevance for successful crop production. Further, retaining crop residues as mulch and using crops in rotation leads to multiple benefits includes prevention of soil degradation due to water and wind erosion, depletion of organic matter and nutrients from soil, runoff losses of water, labour shortage and could address the negative consequences of climate change on agricultural production. However, crop production without tillage, retention of crop residues as mulch, crop rotation with unfamiliar crops and changes in needed implements, all may pose great operational and financial uncertainty to farmers. Now, it is the role of the stockholders in agriculture to involve and come up with new technologies that could employ all the three principles of conservation agriculture and the role of extension scientist is to ensure that the farmers participate fully in all the stages of technology development, diffusion and adoption. Thus, conservation agriculture is a resource saving technology could be designed to reduce production costs and make agriculture more profitable for even small holders farmers.

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**Conflict of Interest.** None.

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