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Zero budget natural farming: A comparative study of farmers' socioeconomic contexts

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Abstract

The present study on the socio-economic profile of farmers was conducted in two districts of Northern Karnataka. Respondents were categorized into planners, adopters, and non-adopters, with 25 respondents from each category in each district, resulting in a total of 150 farmers being studied. An ex-post-facto research design was adopted for this study. The study reveals that 60.00 percent of planners and 42.00 percent of adopters were middle-aged, while 38.00 percent of non-adopters were young. In terms of education, 40.00 percent of planners, 28.00 percent of adopters, and 30.00 percent of non-adopters had completed senior secondary school. Regarding land holdings and herd size, 30.00 percent of planners, 32.00 percent of adopters, and 44.00 percent of non-adopters had semi-medium land holdings, with most planners (70.00%) and non-adopters (66.00%) having small herds, while 70.00 percent of adopters had medium-sized herds. About half of the planners and adopters, and 44 percent of non-adopters, had medium farming experience. A significant majority of planners (66.00%), adopters (70.00%), and non-adopters (56.00%) had farming as their sole occupation. Most planners (62.00%), adopters (68.00%), and non-adopters (68.00%) had medium annual incomes. Social participation was high among 48 percent of planners, low among 46.00 percent of adopters, and medium for 50.00 percent of non-adopters. Extension participation was medium for 58.00 percent of planners, with 34.00 percent of adopters having medium and high participation, and 44.00 percent of non-adopters having low and medium participation. In terms of extension contact, 56.00 percent of planners had medium levels, while half of the adopters and non-adopters had high and medium levels, respectively. Low mass media exposure was noted among 40.00 percent of planners, 42.00 percent of adopters, and 62.00 percent of non-adopters. Lastly, half of the planners had medium innovativeness, 46.00 percent of adopters were highly innovative, and 54.00 percent of non-adopters had low innovativeness.

Keywords: ZBNF, Profile characteristics, planners, adopters, non-adopters

1. Introduction

Over the past five decades, global agricultural productivity has seen an overall increase, but climate change has impeded this growth, creating a complex relationship between agriculture and climate change. Agriculture significantly contributes to greenhouse gas emissions, which, in turn, negatively impact agricultural productivity. In 2019, agriculture, forestry, and other land use sectors were responsible for approximately 22.00 percent of global greenhouse gas emissions. These emissions have exacerbated food and water security issues by altering warming patterns, precipitation trends, and the frequency and intensity of extreme weather events. As a result, achieving the Sustainable Development Goals has become more challenging. There are various adaptation and mitigation strategies within the agriculture, forestry, and other land use (AFOLU) sector. Adopting sustainable agricultural practices can help reduce ecosystem conversion, methane and nitrous oxide emissions, and free up land for reforestation and ecosystem restoration. Effective adaptation strategies include cultivar improvements, agroforestry, community-based adaptation, and farm and landscape diversification. When implemented sustainably, AFOLU mitigation strategies can result in substantial reductions in greenhouse gas emissions and enhanced carbon dioxide removal. However, the success of these measures is dependent on the integration of socioeconomic, biophysical, and other enabling factors. Addressing challenges such as food security, livelihoods, complex land ownership and management systems, and cultural aspects is crucial for the successful implementation of sustainable agricultural practices (IPCC, Synthesis Report, 2023) [1]. Understanding the socioeconomic factors affecting farmers is vital for the successful implementation of sustainable agricultural practices.

Zero Budget Natural Farming (ZBNF) is a natural farming technique that was first introduced by Masanobu Fukuoka, a Japanese farmer and philosopher, on his family's farm on

the island of Shikoku. In India, Subhash Palekar has been promoting ZBNF for many years, particularly in Maharashtra. Palekar's formulation of ZBNF comprises four essential elements: Beejamrit, Jeevamrit, Acchadana, and Waaphasa, which focus on rejuvenating soil health. The Government of India has been actively promoting Zero Budget Natural Farming, now renamed as Bhartiya Prakritik Krishi Padhati (BPKP). Several states have started adopting ZBNF variants, with Andhra Pradesh leading the way. Andhra Pradesh's goal is to convert the entire 80 lakh hectares of agricultural land in the state to natural farming by 2027 (NABARD, 2024) [3]. Karnataka has initiated a pilot implementation of ZBNF across 2000 hectares, facilitated by the efforts of state agricultural and horticultural universities in each of its 10 agro-climatic zones (PIB, 2019) [4]. These institutions are conducting scientific field trials and demonstrations as part of an Operational Research Project mode (MoAFW, 2019) [2].

The present study has been carried out to understand the socio-economic characteristics of farmers within the context of Zero Budget Natural Farming (ZBNF). The profile of these farmers provides valuable insights that can aid administrators, policymakers, and researchers in developing effective interventions and validating the ZBNF approach based on the existing conditions of farmers.

2. Material and Methods

North Karnataka was deliberately chosen for the study because the 'Zero Budget Natural Farming' (ZBNF) movement first started in this area of the state. Additionally, a large number of farmers in North Karnataka are aware about and actively practicing ZBNF. Specifically, two districts - Belagavi and Haveri - were randomly selected for the study. Three taluks were randomly selected from each district: Hukeri, Kittur, and Belagavi from Belagavi, and Haveri, Savanur, and Hirekerur from Haveri. The respondents were grouped into three categories - Adopters, Planners, and Non-adopters - and selected based on the criteria outlined in Table No.1. Twenty-five farmers were chosen from each category in each district, resulting in a total of 150 respondents for the study. An ex post facto research design was used, and a structured interview schedule was developed to collect data. The data was analyzed using statistical methods such as the mean, standard deviation, frequency, percentage, and the cumulative square root method.

Table 1: Selection Criteria of the Respondents

Adopters	Planners	Non-adopters
▪ Minimum of 3 years' experience in ZBNF ▪ Minimum 2.5-acre area under ZBNF	▪ To be registered under ZBNF training programme since 2019 ▪ Practising ZBNF in a minimum of 0.25 acre	▪ Should not be practising ZBNF ▪ Be well aware of ZBNF ▪ Residing in the same village of adopters and planners.

3. Results and Discussion

1. Age

The age distribution of respondents varies across different groups as shown in Table No. 2. A large percentage of planners (60.00%) fell into the middle-aged group (36-50 years), with 36.00 percent being in the age group (under 35 years), and only 4.00 percent in the age group (over 50 years). Among adopters, 42.00 percent were middle-aged, 32.00 percent were older, and 26.00 percent were young. For non-adopters, the largest group (38.00 percent) was young, followed by 34.00 percent in the middle-aged group, and 28.00 percent in the older age group.

Table 2: Distribution of respondents according to their age

Age (in years)	Planners (n=50)		Adopters (n=50)		Non-adopters (n=50)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Young (Up to 35)	18	36.00	13	26.00	19	38.00
Middle aged (36-50)	30	60.00	21	42.00	17	34.00
Old (> 50)	2	4.00	16	32.00	14	28.00
Mean	43.6		45.68		42.46	
Standard deviation	10.68		11.44		10.86	

2. Education

The education distribution results in Table No. 3 reveal varied education level of planners, adopters and non-adopters. A significant portion of planners (40.00%) had studied up to senior secondary level, followed by those with secondary education (16.00%) and diplomas (16.00%). Notably, 20.00 percent of planners were illiterate. Among adopters, 28.00 percent had senior secondary education, 26.00 percent had secondary education, and 14.00 percent held diplomas, with 18.00 percent being illiterate. This distribution suggests that adopters with a wide range of educational backgrounds, including those without formal education. Non-adopters exhibited a balanced distribution, with 30.00 percent each having senior secondary and secondary education, and smaller percentages having diplomas (14.00%) and higher education (8.00%). The presence of 8.00 percent illiterates among non-adopters further emphasizes the diverse educational landscape. Overall, the data indicate that there is significant participation from various educational levels, highlighting the importance of practical knowledge and experience alongside formal education.

Table 3: Distribution of respondents according to their education

Education	Planners (n=50)		Adopters (n=50)		Non-adopters (n=50)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Illiterate	10	20.00	9	18.00	4	8.00
Primary	4	8.00	2	4.00	5	10.00
Secondary	8	16.00	13	26.00	15	30.00
Senior Secondary	20	40.00	14	28.00	15	30.00
Diploma	8	16.00	7	14.00	7	14.00
Graduate and above	00	00	5	10.00	4	8.00

3. Family Size

The family size distribution results presented in Table No. 4 reveal distinct trends among planners, adopters, and non-adopters. Among planners, half (50.00%) have small family sizes, and 30.00 percent come from large families, while 20.00 percent have medium-sized families. In the case of adopters, a majority (48.00%) have large family sizes, followed by those with small family sizes (40.00%), with only 12.00 percent having medium-sized families. For non-adopters, half (50.00%) have small family sizes, similar to planners, while 34.00 percent have large families and 16.00 percent have medium-sized families. These results indicate that while small family sizes are prevalent among both planners and non-adopters, large family sizes are more common among adopters, highlighting the varying household sizes across these groups.

Table 4: Distribution of respondents according to their family size

Family Size	Planners (n=50)		Adopters (n=50)		Non-adopters (n=50)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Small (Up to 5)	25	50.00	20	40.00	25	50.00
Medium (6-8)	10	20.00	6	12.00	8	16.00
Large (>8)	15	30.00	24	48.00	17	34.00
Mean	6.18		7.04		6.04	
Standard deviation	2.11		2.57		1.99	

4. Family Type

The family type distribution results in Table No. 5 reveal differences among planners, adopters, and non-adopters. Among planners, the majority (54.00%) belong to joint families, while 46.00 percent are from nuclear families. Adopters show a similar trend, with 58.00 percent coming from joint families and 42.00 percent from nuclear families. In contrast, non-adopters are evenly split, with 50.00 percent each in nuclear and joint families. These results indicate a slight preference for joint family structures among planners and adopters, while non-adopters do not show a clear preference between family types.

Table 5: Distribution of respondents according to their family type

Family Type	Planners (n=50)		Adopters (n=50)		Non-adopters (n=50)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Nuclear	23	46.00	21	42.00	25	50.00
Joint	27	54.00	29	58.00	25	50.00

5. Land-holding

The land-holding distribution results in Table No. 6 highlight the different patterns among planners, adopters, and non-adopters. Among planners, 30.00 percent possess semi-medium land-holdings, followed by 26.00 percent with medium land-holdings, 20.00 percent with large land-holdings, 14.00 percent with marginal land-holdings, and 10.00 percent with small land-holdings. Adopters show a similar trend, with 32.00 percent possessing semi-medium land-holdings, 24.00 percent medium land-holdings, 22.00 percent large land-holdings, 12.00 percent small land-holdings, and 10.00 percent marginal land-holdings. Non-adopters predominantly possess semi-medium land-holdings (44.00%), followed by 22.00 percent with medium land-holdings, 14.00 percent with small land-holdings, 12.00 percent with marginal land-holdings, and only 8.00 percent with large land-holdings. These results indicate that semi-medium land-holdings are the most common across all groups, but a higher proportion of non-adopters have these holdings, while planners and adopters have a more balanced distribution among different land-holding sizes.

Table 6: Distribution of respondents according to their land-holding

Land-holding (in ha)	Planners (n=50)		Adopters (n=50)		Non-adopters (n=50)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Marginal (<1 ha)	7	14.00	5	10.00	6	12.00
Small (1-2 ha)	5	10.00	6	12.00	7	14.00
Semi-Medium (2-4 ha)	15	30.00	16	32.00	22	44.00
Medium (4-10 ha)	13	26.00	12	24.00	11	22.00
Large (>10 ha)	10	20.00	11	22.00	4	8.00
Mean	7.76		9.5		6.24	
Standard deviation	4.76		12.58		2.78	

6. Herd size

The data from Table No. 7 illustrates significant differences in herd-size among planners, adopters, and non-adopters. Among planners, the majority (70.00%) possess a small herd-size, with 22.00 percent having a medium herd-size and 8.00 percent a large herd-size. In contrast, adopters show a different distribution, with 58.00 percent possessing a medium herd-size, 30.00 percent a large herd-size, and 12.00 percent a small herd-size. Among non-adopters, the majority (66.00%) also possess a small herd-size, followed by 32.00 percent with a medium herd-size and only 2.00 percent with a large herd-size. These findings indicate that while planners and non-adopters predominantly have small herd-sizes, adopters are more likely to have medium to large herd-sizes, reflecting potentially different economic or operational needs and capabilities among these groups.

Table 7: Distribution of respondents according to their herd-size

Herd size	Planners (n=50)		Adopters (n=50)		Non-adopters (n=50)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Small (Up to 4)	35	70.00	6	12.00	33	66.00
Medium (5-11)	11	22.00	29	58.00	16	32.00
Large (>11)	4	8.00	15	30.00	1	2.00
Mean	4.74		9.66		4.34	
Standard deviation	3.50		7.36		3.13	

7. Farming Experience

The data displayed in Table No. 8 shows distinct patterns in the farming experience of planners, adopters, and non-adopters. With regard to planners, the majority (48.00%) possess medium farming experience of 13-20 years, while 28.00 percent have low farming experience (up to 12 years) and 24.00 percent have high farming experience (more than 20 years). Adopters exhibit a preference for medium farming experience as well, with 50.00 percent falling into this category, followed by 28.00 percent with low farming experience and 22.00 percent with high farming experience. Non-adopters, on the other hand, show a similar trend to planners, with 40.00 percent having medium farming experience, 34.00 percent with low farming experience, and 26.00 percent with high farming experience. These findings suggest that while medium farming experience is prevalent across all groups, there are notable variations in the distribution of low and high farming experience levels, which may have an impact on adoption behaviors and agricultural practices among different segments of farmers.

Table 8: Distribution of respondents according to their farming experience

Farming Experience (in years)	Planners (n=50)		Adopters (n=50)		Non-adopters (n=50)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Low (Up to 12)	14	28.00	14	28.00	17	34.00
Medium (13-20)	24	48.00	25	50.00	20	40.00
High (>20)	12	24.00	11	22.00	13	26.00
Mean	16.68		16.20		15.62	
Standard deviation	7.67		8.38		7.46	

8. Occupation

Table No. 9 presents data on the occupational makeup of planners, adopters, and non-adopters. Approximately two-thirds (66.00%) of planners concentrate solely on farming as their occupation, while the remaining third (34.00%) engage in a combination of farming and business activities. A majority (70.00%) of adopters focus exclusively on farming, with a smaller proportion (26.00%) involved in both farming and business, and a very small percentage (4.00%) working in farming and service sectors. Non-adopters display a similar pattern to planners, with 56.00 percent dedicating themselves solely to farming, 30.00 percent combining farming with business, and 14.00 percent integrating farming with service-related occupations. These findings suggest that a substantial portion of planners and adopters rely heavily on agriculture for their livelihood, and also reveal the diverse occupational approaches adopted by farmers, which may play a role in their decisions regarding agricultural practices or technologies.

Table 9: Distribution of respondents according to their occupation

Occupation	Planners (n=50)		Adopters (n=50)		Non-adopters (n=50)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Only farming	33	66.00	35	70.00	28	56.00
Farming+ service	00	00	2	4.00	7	14.00
Farming +business	17	34.00	13	26.00	15	30.00

9. Annual Income

A critical examination of Table No. 10 reveals significant differences in annual income categories among planners, adopters, and non-adopters. Among planners, the majority (62.00%) fall into the medium category of annual income, with 36.00 percent in the low-income category and a small 2.00 percent in the high-income category. Adopters, on the other hand, predominantly (68.00%) belong to the medium-income category, followed by 26.00 percent in the high-income category and 6.00 percent in the low-income

category. Non-adopters mirror a similar trend to adopters, with 68.00 percent in the medium-income category, 24.00 percent in the low-income category, and 8.00 percent in the high-income category. These findings suggest that adopters generally have a higher representation in the medium and high-income categories compared to planners and non-adopters, highlighting the potential influence of economic factors on the adoption of new agricultural practices or technologies.

Table 10: Distribution of respondents according to their annual income

Annual Income (in lakhs)	Planners (n=50)		Adopters (n=50)		Non-adopters (n=50)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Low (Up to 2.79)	18	36.00	3	6.00	12	24.00
Medium (2.80-4.23)	31	62.00	34	68.00	34	68.00
High (>4.23)	1	2.00	13	26.00	4	8.00
Mean	2.88		4.05		3.14	
Standard deviation	0.88		1.32		0.83	

10. Sources of Information

According to the data presented in Table No. 11A, it was found that a significant majority (60.00%) of planners seldom sought information from informal sources such as friends, relatives, or neighbours. Additionally, 44.00 percent of planners occasionally sought advice from progressive farmers, while an equal percentage of planners rarely consulted family members. When it came to formal sources of information, 44.00 percent of planners occasionally participated in field visits or tours. Similarly, 40.00 percent of planners relied on farmer organizations, agricultural officials, and scientists as sources of information. In terms of mass media, newspapers and television were occasionally used as information sources by 48.00 percent of planners. Furthermore, 44.00 percent of planners infrequently utilized farm literature, and 40.00 percent occasionally listened to the radio for information. The results indicate a clear preference among planners for certain types of information sources over others. Informal sources such as friends, relatives, and neighbors are rarely approached, suggesting that planners might perceive these sources as less reliable or less relevant. The occasional consultation with progressive farmers and family members indicates a selective reliance on personal networks, possibly when specific expertise or experience is required. Field visits and tours are the most frequently used formal sources, highlighting their importance in providing practical, hands-on knowledge. The equal reliance on farmer organizations, agriculture officials, and scientists suggests that planners value diverse expert opinions. Overall, the findings reveal a mixed approach to information gathering among planners, balancing informal, formal, and mass media sources to meet their informational needs. This diversified strategy likely helps planners stay informed and make well-rounded decisions in their work.

Table 11A: Distribution of Planners according to their sources of information (n=50)

Sl. No.		Frequently		Occasionally		Rarely		Never	
		F	P	F	P	F	P	F	P
I	**Informal sources**								
1	Family members	0	0	10	20.00	22	44.00	18	36.00
2	Friends/Relatives/ Neighbours	0	0	8	16.00	30	60.00	12	24.00
3	Progressive farmers	6	12.00	22	44.00	20	40.00	2	4.00
II	**Formal sources**								
4	Farmer organizations	10	20.00	20	40.00	18	36.00	2	4.00
5	Agriculture officials	6	12.00	20	40.00	16	32.00	8	16.00
6	NGO Personnel	0	0	4	8.00	14	28.00	32	64.00
7	Scientists	2	4.00	20	40.00	14	28.00	14	28.00
8	Field visits/Tours	2	4.00	22	44.00	16	32.00	10	20.00
III	**Mass Media**								
9	Newspaper	4	8.00	24	48.00	10	20.00	12	24.00
10	Radio	2	4.00	20	40.00	16	32.00	12	24.00
11	TV	6	12.00	24	48.00	12	24.00	8	16.00
12	Farm literature	2	4.00	14	28.00	22	44	12	24.00
13	Internet	0	0	0	0	0	0	50	100.00

(F= Frequency P= Percentage)

Table No. 11B reveals that a majority (60.00%) of adopters rarely sought information from informal sources such as friends, relatives, or neighbors. Additionally, 54.00 percent of adopters occasionally consulted progressive farmers, and the same percentage rarely turned to family members. Among formal sources, 60.00 percent of adopters occasionally relied on farmers' organizations for information, while 52.00 percent equally utilized agriculture officials, scientists, and field visits/tours. In terms of mass media, newspapers were occasionally used by 54.00 percent of adopters, followed by television (46.00%), radio (42.00%), and farm literature (40.00%). These findings indicate that adopters prefer formal and mass media sources over informal ones, suggesting a tendency to seek more structured and diverse information for decision-making.

Table 11B: Distribution of Adopters according to their sources of information (n=50)

Sl. No.		Frequently		Occasionally		Rarely		Never	
		F	P	F	P	F	P	F	P
I	**Informal sources**								
1	Family members	0	0	9	18.00	27	54.00	14	28.00
2	Friends/Relatives/ Neighbours	0	0	7	14.00	30	60.00	13	26.00
3	Progressive farmers	3	6.00	27	54.00	17	34.00	3	6.00
II	**Formal sources**								
4	Farmer organizations	7	14.00	30	60.00	11	22.00	2	4.00
5	Agriculture officials	11	22.00	26	52.00	9	18.00	4	8.00
6	NGO Personnel	1	2.00	4	8.00	9	18.00	36	72.00
7	Scientists	4	8.00	26	52.00	9	18.00	11	22.00
8	Field visits/Tours	5	10.00	26	52.00	11	22.00	8	16.00
III	**Mass Media**								
9	Newspaper	4	8.00	27	54.00	12	24.00	7	14.00
10	Radio	2	4.00	21	42.00	21	42.00	6	12.00
11	TV	3	6.00	23	46.00	17	34.00	7	14.00
12	Farm literature	3	6.00	20	40.00	18	36.00	9	18.00
13	Internet	0	0	0	0	0	0	50	100.00

(F= Frequency P= Percentage)

Table No. 11C shows that 56.00 percent of non-adopters occasionally consulted progressive farmers and the same percentage rarely sought advice from friends, relatives, or neighbors, while 44.00 percent turned to family members for information. Among formal sources, 54.00 percent of non-adopters occasionally relied on farmers' organizations, 36.00 percent occasionally consulted agriculture officials, and 32.00 percent rarely approached scientists or participated in field visits/tours. Regarding mass media, television was used occasionally by 52.00 percent of non-adopters, followed by newspapers (44.00%), radio (34.00%), and farm literature (26.00%). These findings suggest that non-adopters have a mixed approach to gathering information, showing a preference for occasional consultation of formal and mass media sources while rarely relying on informal networks.

Table 11C: Distribution of Non-adopters according to their sources of information (n=50)

Sl. No.		Frequently		Occasionally		Rarely		Never	
		F	P	F	P	F	P	F	P
I	**Informal sources**								
1	Family members	2	4.00	16	32.00	22	44.00	10	20.00
2	Friends/Relatives/ Neighbours	2	4.00	14	28.00	28	56.00	6	12.00
3	Progressive farmers	4	8.00	28	56.00	17	34.00	1	2.00
II	**Formal sources**								
4	Farmer organizations	5	10.00	27	54.00	17	34.00	1	2.00
5	Agriculture officials	5	10.00	18	36.00	18	36.00	9	18.00
6	NGO Personnel	0	0	3	6.00	10	20.00	37	74.00
7	Scientists	3	6.00	14	28.00	16	32.00	17	34.00
8	Field visits/Tours	1	2.00	16	32.00	14	28.00	19	38.00
III	**Mass Media**								
9	Newspaper	3	6.00	22	44.00	14	28.00	11	22.00
10	Radio	1	2.00	17	34.00	19	38.00	13	26.00
11	TV	4	8.00	26	52.00	13	26.00	7	14.00
12	Farm literature	1	2.00	13	26.00	20	40.00	16	32.00
13	Internet	0	0	2	4.00	4	8.00	44	88.00

(F= Frequency P= Percentage)

11. Social Participation

Data from Table No. 12 shows that nearly half (48.00%) of the planners had a high level of social participation, with 30.00 percent exhibiting a medium level, and 22.00 percent demonstrating a low level. In contrast, a significant portion (46.00%) of adopters had low social participation, followed by 38.00 percent with a medium level, and only 16.00 percent with a high level. Among non-adopters, half (50.00%) had a medium level of social participation, while 28.00 percent had a high level, and 22.00 percent had a low level. These findings suggest that planners are more socially engaged compared to adopters, who predominantly have lower social participation, whereas non-adopters tend to have a balanced medium level of social involvement.

Table 12: Distribution of respondents according to their social participation

Social participation	Planners (n=50)		Adopters (n=50)		Non-adopters (n=50)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Low (Up to 8.30)	11	22.00	23	46.00	11	22.00
Medium (8.31-10.53)	15	30.00	19	38.00	25	50.00
High (>10.53)	24	48.00	8	16.00	14	28.00
Mean	9.84		8.96		9.54	
Standard deviation	1.76		1.65		1.69	

12. Extension Participation

According to Table No.13, the majority (58.00 percent) of planners exhibited a medium level of extension participation, while 26.00 percent had a low level, and only 16.00 percent had a high level. Among adopters, 34.00 percent had both high and medium levels of extension participation, with 32.00 percent showing a low level. For non-adopters, 44.00 percent had both low and medium levels of extension participation, with a mere 12.00 percent demonstrating a high level. These results indicate that planners are more likely to engage at a medium level with extension activities, while adopters show a balanced distribution across high and medium levels, and non-adopters tend to participate less frequently, with a significant portion at low and medium levels.

Table 13: Distribution of respondents according to their extension participation

Extension Participation	Planners (n=50)		Adopters (n=50)		Non-adopters (n=50)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Low (Up to 12.60)	13	26.00	16	32.00	22	44.00
Medium (12.61-15.69)	29	58.00	17	34.00	22	44.00
High (>15.69)	8	16.00	17	34.00	6	12.00
Mean	13.92		13.68		12.84	
Standard deviation	2.89		3.06		2.03	

13. Extension Contact

Table No. 14 reveals that the majority (56.00%) of planners maintained a medium level of extension contact, followed by 24.00 percent who had high levels, and 20.00 percent who had low levels. In contrast, half (50.00%) of adopters demonstrated high levels of extension contact, with 30.00 percent at a medium level and 20.00 percent at a low level. Among non-adopters, 50.00 percent had medium levels of extension contact, while 36.00 percent had low levels, and only 14.00 percent had high levels. These findings suggest that planners predominantly engage at a medium level with extension services, reflecting a moderate yet consistent interaction. Adopters are more likely to have higher engagement, indicating a proactive approach to accessing extension services. Conversely, non-adopters tend to have lower engagement, with the majority falling within medium to low levels, potentially highlighting a less active or less prioritized approach to extension contact. This variance in extension contact levels underscores the different strategies and priorities among planners, adopters, and non-adopters regarding agricultural extension services.

Table 14: Distribution of respondents according to their extension contact

Extension Contact	Planners (n=50)		Adopters (n=50)		Non-adopters (n=50)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Low (Up to 12.33)	10	20.00	10	20.00	18	36.00
Medium (12.34-15.21)	28	56.00	15	30.00	25	50.00
High (> 15.21)	12	24.00	25	50.00	7	14.00
Mean	4.74		9.66		4.34	
Standard deviation	2.04		2.74		2.31	

14. Mass Media Exposure

Table No. 15 shows that 40.00 percent of planners had low levels of mass media exposure, with 32.00 percent at medium levels, and 28.00 percent at high levels. Among adopters, 42.00 percent exhibited low mass media exposure, followed by 34.00 percent with high levels and 24.00 percent with medium levels. For non-adopters, a significant majority (62.00%) had low mass media exposure, while 26.00 percent had medium levels and only 12.00 percent had high levels. These results indicate that planners and adopters have a relatively balanced distribution of mass media exposure across low, medium, and high levels, although planners tend to have a slightly higher engagement. In contrast, non-adopters predominantly exhibit low mass media exposure, suggesting that they are less inclined to utilize mass media as an information source. This disparity highlights the varying degrees of reliance on mass media among planners, adopters, and non-adopters, potentially impacting their access to timely and relevant agricultural information.

Table 15: Distribution of respondents according to their mass media exposure

Mass media Exposure	Planners (n=50)		Adopters (n=50)		Non-adopters (n=50)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Low (Up to 13.38)	20	40.00	21	42.00	31	62.00
Medium (13.39-15.83)	16	32.00	12	24.00	13	26.00
High (> 15.83)	14	28.00	17	34.00	6	12.00
Mean	13.80		14.68		13.08	
Standard deviation	2.68		2.30		2.24	

15. Innovativeness

Table No.16 illustrates that half (50.00%) of planners exhibited a medium level of innovativeness, with 32.00 percent displaying high levels and 18.00 percent showing low levels. In contrast, a majority (46.00%) of adopters demonstrated high innovativeness, followed by 42.00

percent at medium levels and 12.00 percent at low levels. Among non-adopters, more than half (54.00%) had low innovativeness, while 36.00 percent had medium levels and only 10.00 percent had high levels. These findings suggest that adopters are generally more innovative compared to planners and non-adopters, as reflected in their higher percentages at the high innovativeness level. Planners predominantly fall within the medium innovativeness category, indicating a balanced approach to adopting new practices. On the other hand, non-adopters primarily exhibit low innovativeness, which may hinder their ability to implement new agricultural techniques and technologies. This disparity in innovativeness levels among planners, adopters, and non-adopters highlights the varying degrees of openness to innovation, potentially influencing their overall agricultural success.

Table 16: Distribution of respondents according to their innovativeness

Innovativeness	Planners (n=50)		Adopters (n=50)		Non-adopters (n=50)	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Low (Up to 15)	9	18.00	6	12.00	27	54.00
Medium (15.1-18.64)	25	50.00	21	42.00	18	36.00
High (> 18.64)	16	32.00	23	46.00	5	10.00
Mean	4.74		9.66		4.34	
Standard deviation	2.70		2.91		2.78	

4. Conclusion

The results of the study reveal significant differences in the demographic and socio-economic characteristics of planners, adopters, and non-adopters. Among planners and adopters, middle-aged individuals predominate, while non-adopters tend to be younger. Planners are predominantly secondary school educated, whereas adopters and non-adopters have a more balanced distribution of educational backgrounds. Semi-medium land holdings are common across all groups but are more common among non-adopters. Planners and non-adopters generally have smaller herds, while adopters tend to have larger herds. Farming experience is generally medium for all groups, with planners and adopters having slightly higher high-experience levels. Farming is the primary occupation for all groups, especially for adopters. Income levels are generally medium for all groups, although adopters have a higher proportion in the high-income category. Social and extension participation tends to be higher among planners. Mass media exposure is moderate for planners and adopters but low for non-adopters. Innovativeness is highest among adopters, moderate among planners, and lowest among non-adopters, indicating their receptiveness to new agricultural practices. Overall, adopters exhibit higher education levels, larger families, greater herd sizes, more diverse income sources, higher mass media exposure, and greater innovativeness compared to planners and non-adopters. Planners have balanced socio-economic characteristics but greater social and extension participation. Non-adopters exhibit lower innovativeness and mass media exposure, potentially hindering their adoption of new agricultural technologies. These findings emphasize the need for tailored agricultural extension services and targeted interventions to promote the of innovative practices among different farmer groups in the context of zero-budget natural farming.

5. References

1. IPCC. Sections. In: Climate Change 2023: Synthesis Report. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J Romero (eds.)]. IPCC, Geneva, Switzerland, 2023, 184. DOI: 10.59327/IPCC/AR6-9789291691647
2. MoAFW. Lok Sabha Unstarred Question No. 5011 - Zero Budget Natural Farming. New Delhi: Ministry of Agriculture and Farmers Welfare, Department of Agriculture, Cooperation and Farmers Welfare, Government of India; c2019.
3. NABARD. Zero Budget Natural Farming (ZBNF): Implications for Sustainability, Profitability, and Food Security; c2024. Retrieved from https://icrier.org/pdf/Zero-Budget-Natural-Farming.pdf
4. PIB. Zero Budget Natural Farming. New Delhi, India: Ministry of Agriculture and Farmers Welfare, Government of India. Press Information Bureau; c2019. Retrieved from https://pib.gov.in/PressReleseDetailm.aspx?PRID=1593123
5. Khadse A, Rosset PM, Morales H, Ferguson BG. Taking agroecology to scale: The zero budget natural farming peasant movement in Karnataka, India. The Journal of Peasant Studies. 2018 Jan 2;45(1):192-219.