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Harvesting resilience: Unveiling the transformative impact of NICRA on rural livelihood security in Chikkaballapura, Karnataka

Charitha V Gopal, YN Shivalingaiah, Sagar S Pujar and Mutteppa Chigadolli

Abstract

This study investigates the impact of the NICRA project on rural livelihood security, focusing on technological, economic, and social dimensions among beneficiary and non-beneficiary farmers in Chintamani taluk, Chikkaballapura district, Karnataka. A total of 120 respondents, including 80 beneficiaries from S. Raghuttahalli and 40 non-beneficiaries from D. Nagarajahosahalli villages, were randomly selected. The data was collected by personal interview method. Appropriate statistical tools like frequency, percentage, mean, standard deviation, paired t-test, correlation and multiple regression were employed to analyze and interpret the data. The overall mean impact index for beneficiaries was 76.35, significantly higher than the non-beneficiaries, who scored 61.25. The salient findings of the study highlighted the following aspects.

Overall Impact: 47.50% of non-beneficiary farmers fell into the low overall impact category while 42.50% of beneficiary farmers were categorized under high overall impact.

Technological Impact: Mean impact indices for beneficiaries were 16.66 (low), 18.18 (moderate), and 41.75 (high) whereas for non-beneficiaries scored 12.30 (low), 14.50 (moderate), and 34.45 (high). 45.00% of non-beneficiary farmers had low technological impact, while 37.50% of beneficiaries experienced high technological impact.

Economic Impact: 45.00% of non-beneficiary farmers exhibited low economic impact. 43.75% of beneficiary farmers reported high economic impact.

Social Impact: 52.50% of non-beneficiary farmers fell into the low social impact category. 41.25% of beneficiaries were categorized under high social impact. The NICRA project demonstrated significant positive impacts on beneficiary farmers, particularly in technological and economic dimensions, highlighting the project's effectiveness in enhancing rural livelihood security.

Keywords: Impact, technological impact, economic impact, social impact, rural livelihood security beneficiary & non-beneficiary

Introduction

In the face of escalating global temperatures, projected to surge by 1.4-5.8 degrees Celsius, the agricultural landscape stands poised for a substantial reduction in yield by the close of the 21st century (Misra, 2014) [5]. Regions heavily reliant on precipitation, particularly those arid and semi-arid, are anticipated to bear the brunt, encountering erratic and extreme weather events leading to increased instances of droughts and floods (Solomon *et al.*, 2007) [8]. The alarming rise in both the frequency and intensity of droughts worldwide accentuates the looming threat of climate change on water and food security (Wheeler and von-Braun, 2013) [12].

As countries grapple with the challenges posed by climate change, the farming and research communities have tirelessly developed resilient practices to mitigate its adverse effects and enhance vulnerability (Wezel *et al.*, 2014) [11]. Mitigation and adaptation emerge as pivotal strategies in response to climatic peculiarities, with mitigation aiming to curtail climate change by reducing greenhouse gas emissions, while adaptation seeks to alleviate adverse impacts through systematic adjustments in ecological, social, and economic systems (IPCC 2001; Fussel and Klein 2002) [3, 1]. Resilience, defined as a system's capacity to maintain organizational structure and productivity post-perturbation (Holling 1973) [2], becomes a cornerstone in the quest for sustainable agricultural practices.

India, with its high dependence on agriculture, grapples with the ramifications of climate change, prompting significant negative impacts and a predicted reduction in yields by 4.5 to 9.0 percent by 2039 (Thornton *et al.*, 2011) [9].

This necessitates a strategic response, and in this context, the Indian Council of Agricultural Research (ICAR) launched the National Innovations on Climate Resilient Agriculture (NICRA) project in 2011 with an extensive budget of Rs. 350 crores. The project, spanning 121 vulnerable districts, emphasizes the development of location-specific contingency plans and deploys technology demonstrations through Krishi Vignyan Kendras.

As part of the comprehensive evaluation of NICRA's interventions, this study delves into the technological, economic, and social impacts of the project on both beneficiary and non-beneficiary farmers in Chikkaballapura district, Karnataka. Through rigorous analysis and comparison, the study aims to provide quantitative insights into the success and challenges of NICRA interventions, offering valuable data for informed decision-making and future program development.

Methodology

The study, conducted in S. Raghuttahalli and D. Nagarajahosahalli within Chintamani taluk, Chikkaballapura district, offers a comprehensive assessment of the impact of the National Innovations on Climate Resilient Agriculture (NICRA). S. Raghuttahalli, deliberately chosen as an NICRA implementation site since 2011-12 with the support of Krishi Vignyan Kendra (KVK) Chintamani, served as the focal point for understanding the outcomes of climate-resilient agricultural interventions. In contrast, the neighboring village of D. Nagarajahosahalli, devoid of NICRA implementation, was selected for comparative analysis. The sample size comprised 80 farmers from S. Raghuttahalli (NICRA beneficiaries) and 40 farmers from D. Nagarajahosahalli (non-beneficiaries), randomly selected to form a total sample size of 120. The study adopted an ex-post facto design, a robust research methodology suitable for evaluating the effects of interventions after their implementation. Data collection involved personal interviews, ensuring qualitative insights into the experiences and perceptions of the farmers.

To derive meaningful conclusions, the study employed a range of statistical tools, including frequency analysis, percentage calculations, mean computation, standard deviation assessment, paired t-tests, correlation analyses, and multiple regression models. These analytical methods provided a nuanced understanding of the data, allowing for a comprehensive interpretation of the impacts of NICRA interventions. The research design and methodology were meticulously chosen to facilitate a rigorous assessment and comparison of the livelihood security of farmers in NICRA-beneficiary and non-beneficiary villages. By adopting this scientific approach, the study contributes valuable insights into the efficacy of climate-resilient agricultural practices, offering a basis for informed decision-making in sustainable agricultural development and policy formulation.

In this study Rural Livelihood Security was operationally defined as the farmers' capacity to confront climate change

challenges by adopting climate-resilient practices.

This involves efficient utilization of assets to augment income, enabling sufficient expenditure and facilitating a decent quality of life.

By employing this methodological framework, the study sought to provide scientifically sound insights into the impact of NICRA interventions on rural livelihood security of beneficiary & non-beneficiary farmers in the selected villages.

Results and Discussion

1. Impact of NICRA on rural livelihood security of beneficiary and non-beneficiary farmers

The results of 't' test from Table 1 indicates that the overall mean impact index of beneficiaries was 76.35 as compared to non-beneficiaries, who got 61.25. The difference in mean value was significant at one per cent level. This clearly indicates that beneficiary farmers of NICRA had higher level of impact than non-beneficiaries. The mean impact indices of beneficiaries for identified components technological, economic and social impacts were 16.66, 18.18 and 41.75 respectively. The non-beneficiaries mean impact indices in respect of these dimensions were, 12.30, 14.50 and 34.45 respectively. The impact observed among beneficiaries was superior compared to non-beneficiaries and it was found to be significant at one per cent level.

From the results it was clearly visible that the overall impact of NICRA on the rural livelihood security of the beneficiaries was significantly higher than the non-beneficiaries. The visible favourable impact of NICRA on its beneficiaries might be due to the need-based components of NICRA because the NICRA programme tackles all the aspects of development of dry areas in a holistic approach coming with ridgeline. In the first instance, soil and water conservation works taken up on free of cost by the agency where, one check dam, two nala bunds, eight farm ponds, 13 percolation ponds, trench cum bunding in 15-hectare area, were constructed in the NICRA village. This has maximized the rain water storage and conservation. Further, the introduction of high yielding, drought tolerant and early maturing varieties like MR-6, ML-365, BRG-2, etc. have made the beneficiaries to attain higher yield and increased cropping intensity by intercropping systems, availability of water throughout the season through rain water harvesting structures have made them to achieve diversified farming, establishment of fodder banks have made the beneficiaries for higher livestock possession. Hence the high milk yield than the non-beneficiaries, which has made significant impact on the economic aspects of the farmers. The establishment of the custom hiring centers has made the beneficiaries to take up timely operations related to production. These interventions along with convincing of the beneficiaries through series of extension educational activities have made them to increase their income over the years, resulted in better infrastructure facilities and resources, which might have resulted in higher social status as well.

Table 1: Impact of NICRA interventions on rural livelihood security of beneficiaries and non-beneficiaries N=120

SL. No.	Changes	Beneficiaries n ₁ =80		Non-beneficiaries n ₂ =40		'T' Value
		Mean	Sd	Mean	Sd	
1.	Technological	16.66	3.51	12.30	4.18	5.73**
2.	Economical	18.18	3.47	14.50	3.12	5.90**
3.	Social	41.75	7.50	34.45	9.89	4.14**
4.	Overall	76.35	11.07	61.25	15.58	5.59**

**at 1% level of significance

Hence, the said approach seems to have jointly influenced the beneficiaries to adopt the climate resilient practices pertaining to soil and water conservation, crop production, fodder and animal health. This approach has made them to attain higher technological impact in turn higher economic as well as social impact than the non-beneficiaries. The study conducted by Narayana Gowda (1992) [6] support the above findings.

2. Overall impact of NICRA interventions on rural livelihood security of beneficiaries and non-beneficiaries.

The data in Table 2 provides the information on technological, economic, social and overall impact of NICRA interventions on beneficiary and non-beneficiary farmers. Significant percentage of (37.50%) beneficiaries belongs to high technological impact category whereas, 42.50 per cent of non-beneficiaries belongs to low- technological impact category. This was due to the adoption of climate resilient practices like insitu soil and water conservation methods, opening of percolation ponds for ground water recharge, use of early maturing ragi varieties like ML-365, opening dead furrow in dry land areas, cultivating fodder varieties etc. resulted in substantial technological changes in terms of cropping pattern, cropping intensity, crop and fodder yield in the project area. It also revealed that more than two-fifth (43.75%) of beneficiary farmers belongs to high economic impact category, where as 45.00 percent of non-beneficiaries

comes under low economic impact category. The reasons were that beneficiary farmers of project area gained adequate knowledge about the climate resilient practices in agriculture and allied activities that resulted in significant economic changes in terms of net income, household, material possession, savings and repayment capacity. More than two-fifth of (41.25%) beneficiaries come under high social impact category whereas only one-fifth of the non-beneficiaries belongs to high social impact category. The reasons were that since the beneficiaries availed the benefits and technologies under the project and these interventions has brought the significant changes in crop yield and economic conditions of beneficiaries that leads to the participation of farmers in social organization, extension programme, mass media etc.

Regarding overall impact of NICRA, it is observed that 38.50 per cent of beneficiaries comes under high overall impact category where as significant percentage of non-beneficiaries (47.50%) belong to low overall impact category. The results of the study revealed that the NICRA project has made significant impact on farm productivity, fodder yield and availability, change in cropping pattern, rain water harvesting, insitu soil and moisture conservation etc. in the project area. Hence, significant impact was observed in technological, economic and social components. The findings are similar to that of Narayana Gowda (1992) [6] and Mani (2016) [4].

Table 2: Overall impact of NICRA interventions on rural livelihood security of beneficiaries and non-beneficiaries N=120

SL. No.	Changes	Category	Score	Beneficiaries n ₁ =80		Non-beneficiaries n ₂ =40	
				No.	%	No.	%
1	Technological	Low	<15.34	22	27.50	18	45.00
		Medium	15.34-25.23	28	35.00	13	32.50
		High	>25.23	30	37.50	9	22.50
2	Economical	Low	<15.12	18	22.50	18	45.00
		Medium	15.12-18.79	27	33.75	12	30.00
		High	>18.79	35	43.75	10	25.00
3	Social	Low	<34.63	20	25.00	21	52.50
		Medium	34.63-43.66	27	33.75	11	27.50
		High	>43.66	33	41.25	8	20.00
4	Overall	Low	<64.03	20	25.00	19	47.50
		Medium	64.03-78.59	26	32.50	12	30.00
		High	>78.59	34	42.50	9	22.50

3. Technological impact of NICRA interventions on rural livelihood security of beneficiary and non-beneficiary farmers

The results presented in the Table 3 revealed that extent of adoption of climate resilient practices shows that more than two-fifth of the non-beneficiary farmers belonged to the low adoption category whereas significant per cent (36.25%) of the beneficiaries belonged to the high adoption category. Regarding the crop yield exactly two-fifth of the non-beneficiary farmers (40.00%) belonged to the medium crop yield category and 42.50 per cent of the beneficiary farmers belonged to the medium crop yield category whereas, significant per cent (41.25%) of beneficiary farmers belonged to the high crop yield category and one-fifth (22.50%) of the non-beneficiary farmers comes under high crop yield category. It was also found that 40.00 per cent of the non-beneficiary farmers belonged to the category of low cropping intensity and 46.25 per cent of the beneficiary farmers belonged to the category of medium cropping intensity whereas 41.25 per cent of the beneficiary farmers belonged to the category of high cropping intensity and only one-fifth (22.50%) of the non-beneficiary farmers comes under high

cropping intensity category. Similarly, 37.50 per cent of the non-beneficiary farmers belonged to the low cropping pattern category. Whereas, half of the beneficiary farmers belonged to the category of medium cropping pattern. Further nearly one-third (31.25%) of the beneficiary farmers comes under high cropping pattern category and less than one-fifth of the non-beneficiaries (17.50%) comes under high cropping pattern category. More than half of non-beneficiary farmers (52.50%) belonged to the low milk yield category. Whereas, 57.50 per cent of the beneficiary farmers belonged to the medium milk yield category and 27.50 per cent of the beneficiary farmers belonged to high milk yield category.

The results also revealed that more than two-fifth of the non-beneficiary farmers (45.00%) belonged to the low fodder yield category. Whereas more than half of the beneficiary farmers (52.50%) belonged to the medium category. With regard to the availability of ground water two-fifth of the non-beneficiary farmers belonged to the low category of ground water availability. Whereas 46.25 per cent of the beneficiary farmers belonged to the medium category of ground water availability. Further, more than one-third of the beneficiary farmers (36.25%) comes under high ground water availability

category whereas, more than one-fifth of the non-beneficiary farmers (22.50%) belonged to high availability of ground water category. From the results it can be found that the adoption of climate resilient practices, crop yield, cropping intensity, cropping pattern, fodder yield and availability of ground water has shown significant difference at one per cent level and milk yield was found to be significant at five per cent level with respect to beneficiaries.

This trend of results was observed because significant percentage of beneficiaries adopted climate resilient practices that resulted in change in cropping pattern, growing more number of crops and increased crop yield in rainfed farming. Introduction of high yielding, drought tolerant and early

maturing varieties have made the beneficiaries to attain significantly higher crop yield. The practices like intercropping ragi with redgram have made the beneficiaries to stand significantly higher in position in cropping intensity. The establishment of fodder banks and introduction of fodder varieties like CO-3, CO-4, DNH-4 and COFS-29 have benefited the beneficiaries to obtain significantly higher fodder yield. Higher fodder yield and animal health interventions resulted in increase in milk yield. The construction of percolation ponds and farm ponds resulted in have increased the ground water level. The findings are on par with the findings of Vinay Kumar (2012) [10].

Table 3: Technological impact of NICRA interventions on beneficiaries and non-beneficiaries N=120

SL. No.	Technological components	Category	Score	Beneficiaries n1=80		Non-beneficiaries n2=40		'T' Value
				No.	%	No.	%	
1	Climate Resilient Practices	Low	<20.72	18	22.50	19	47.50	3.07**
		Medium	20.72-30.45	33	41.25	14	35.00	
		High	>30.45	29	36.25	7	17.50	
2	Crop yield	Low	<12.84	13	16.25	16	37.50	3.20**
		Medium	12.84-14.73	34	42.50	15	40.00	
		High	>14.73	33	41.25	9	22.50	
3	Cropping Intensity	Low	<1.6	10	12.50	16	40.00	3.40**
		Medium	1.65-2.06	37	46.25	15	37.50	
		High	>2.06	33	41.25	9	22.50	
4	Cropping pattern	Low	<2.01	18	22.5	15	37.50	4.20**
		Medium	2.01-3.12	40	50.00	13	32.50	
		High	>3.12	25	31.25	7	17.50	
5	Milk yield	Low	<14.63	12	15.00	21	52.50	2.01*
		Medium	14.63-17.82	46	57.50	11	27.50	
		High	>17.82	22	27.50	8	20.00	
6	Fodder yield	Low	<4.5	20	25.00	18	45.00	3.21**
		Medium	4.5-8.8	42	52.50	15	37.50	
		High	>8.8	18	22.50	7	17.50	
7	Availability of ground water	Low	>324.6	14	17.50	16	40.00	6.64**
		Medium	172.34-324.6	37	46.25	15	37.50	
		High	<172.34	29	36.25	9	22.50	

*at 5% level of significance, **at 1% level of significance

4. Economic impact of NICRA interventions on beneficiaries and non-beneficiaries

The Table 4 indicates the economic impact of NICRA interventions on beneficiary and non-beneficiary farmers. From the results it was revealed that 47.50 per cent of the non-beneficiaries belonged low annual income category while 47.50 per cent of the beneficiary farmers comes under medium annual income category. Further, more than one-third of the beneficiaries (35.00%) comes under high annual income category whereas 15.00 per cent of the non-beneficiaries belonged to high annual income category. With respect to type of house it was revealed that 42.50 per cent of the non-beneficiary farmers lives in Pucca house followed by 37.50 per cent and 25.00 per cent living in RCC and Kaccha house respectively. Whereas half of the beneficiary farmers followed by 43.75 per cent and 8.75 per cent lives in RCC, Pucca and Kaccha house respectively. With reference to material possession, more than half of the beneficiaries (56.25%) belonged to medium material possession category. Whereas, 45.50 per cent of non-beneficiaries come under medium category. Further, equal percentage of (27.50%) non-beneficiaries belonged to low and high material possession category. Whereas nearly one-third of the beneficiary farmers (31.25%) comes under high material possession category. With regard to the farm power less than half of the non-

beneficiaries (47.50%) comes under low farm power category. Whereas, more than two-fifth of beneficiaries (42.50%) belonged to the high farm power category. With respect to the financial inclusion, more than two-fifth of the non-beneficiaries (45.00%) comes under low financial inclusion whereas 43.75 per cent of the beneficiary farmers belonged to medium financial inclusion group. Further, nearly one-third of the beneficiaries (31.25%) belonged to high financial inclusion category whereas less than one-fifth of the non-beneficiaries (17.50%) comes under high financial inclusion category. The results also revealed that annual income, farm power, and financial inclusion has shown significant difference at one per cent level and material possession was found to be significant at five per cent level with respect to beneficiaries. Whereas type of house was found to be non-significant with respect to beneficiaries. Adoption of climate resilient practices with respect to crop production in rainfed situation resulted in significant higher crop yield, change in cropping pattern and cropping intensity, which gave the beneficiary farmers to obtain significantly higher crop productivity with respect to ragi and redgram. Adoption of intercropping practices and crop diversification practices provided an additional income to the farmers this resulted in obtaining significantly higher annual income. Further, beneficiary farmers due to increased annual income

they constructed or renovated their house as well as they purchased household materials and farm implements like T.V., vehicles, farm implements, etc. Compared to non-beneficiaries adoption of climate resilient practices in the

project area avoided the crop failures and helped the farmers to repay their loans. This resulted in achieving significantly higher economic impact compared to non-beneficiaries. The findings are similar to the findings of Mani (2016) [4].

Table 4: Economic impact of NICRA interventions on beneficiaries and non-beneficiaries N=120

SL. No.	Economic components	Category	Score	Beneficiaries n=80		Non-beneficiaries n=40		'T' Value
				No.	%	No.	%	
1	Annual income	Low	<66,000	14	17.50	19	47.50	4.60**
		Medium	66,000-1,20,00	38	47.50	15	37.50	
		High	>1,20,000	28	35.00	6	15.00	
2	Type of house	Kaccha	0	7	8.75	8	25.00	0.8 ^{NS}
		Pucca	1	35	43.75	17	42.50	
		RCC	2	40	50.00	15	37.50	
3	Material possession	Low	<3.68	10	12.5	11	27.50	2.30*
		Medium	3.68-4.84	45	56.25	18	45.50	
		High	>4.84	25	31.2	11	27.50	
4	Farm power	Low	<1.73	19	23.75	19	47.50	4.20**
		Medium	1.73-2.6	27	37.50	12	30.00	
		High	>2.6	34	42.50	9	22.50	
5	Financial inclusion	Low	<5.73	20	25.00	18	45.00	3.80**
		Medium	5.73-7.64	35	43.75	15	37.50	
		High	>7.64	25	31.25	7	17.50	

*at 5% level of significance **at 1% level of significance ^{NS}-Non-significant

5. Social impact of NICRA interventions on rural livelihood security of beneficiaries and non-beneficiaries

The results in Table 5 indicates that social impact of NICRA interventions on rural livelihood security beneficiaries and non-beneficiaries with respect to extension participation revealed that 37.50 per cent of the non-beneficiary farmers belonged to the low extension participation category. Whereas, more than two-fifth (42.50%) of the beneficiary farmers belonged to the high extension participation category. Similarly, nearly half of the non-beneficiary farmers (47.50%) belonged to the low extension contact category while more than two-fifth of the beneficiary farmers (41.25%) belonged to the high extension contact category. More than two-fifth (45.00%) of the non-beneficiary farmers belonged to the low social participation category whereas (40.00%) of the beneficiary farmers belonged the medium social participation category. With regard to the social status 42.50 per cent of the non-beneficiary farmers belonged to the low category of social status whereas 41.25 per cent of the beneficiary farmers belonged to the high social status category. 35.00 per cent of the non-beneficiary farmers belonged to the low category of mass media participation. Whereas, 47.50 per cent followed

by 36.25 per cent of the beneficiary farmers belonged to the medium and high category of mass media participation respectively.

The results in the Table 5 revealed that extension participation, social participation, and social status of has shown significant difference at one percent level. Whereas, mass media participation and extension contact were found to be significant at five per cent level with respect to beneficiaries. Beneficiaries of NICRA have higher social impact than the non-beneficiaries. The probable reasons for higher social impact is continuous involvement of beneficiaries in various extension education activities, higher extension contact, high social participation, high mass media participation through the available newspaper, journals in the library of the NICRA village better knowledge and adoption of climate resilient practices, which resulted in the betterment of the economic conditions of the beneficiaries. Besides the additional income generated have created better relationship with the elites and living conditions resulting in elevated social status of the beneficiaries. The study conducted by Shashidhar (2003) [7] support the above finding.

Table 5: Social impact of NICRA interventions on rural livelihood security of beneficiaries and non-beneficiaries N=120

Sl. No.	Social components	Category	Score	Beneficiaries n ₁ =80		Non-beneficiaries n ₂ =40		'T' Value
				No.	%	No.	%	
1	Extension participation	Low	<8.45	14	17.50	15	37.50	5.60**
		Medium	8.45-11.79	32	40.00	14	35.00	
		High	>11.79	34	42.50	11	27.50	
2	Extension contact	Low	<2.92	30	37.50	19	47.50	2.75*
		Medium	2.92-4.26	33	41.25	14	35.00	
		High	>4.26	17	21.25	7	17.50	
3	Social participation	Low	<1.79	26	32.50	18	45.00	4.25**
		Medium	1.79-3.15	35	43.75	15	37.50	
		High	>3.15	19	23.75	7	17.50	
4	Social status	Low	11.71	19	23.75	14	42.50	3.50**
		Medium	11.71-15.58	32	40.00	16	37.50	
		High	>15.8	29	36.25	10	25.00	
5	Mass media participation	Low	<5.55	13	16.25	12	30.00	2.50*
		Medium	5.55-8.21	38	47.50	17	37.50	
		High	>8.21	29	36.25	11	32.50	

*at 5% level of significance, **at 1% level of significance

Salient findings

- **Technological Impact:** The study revealed a substantial difference in technological impact between NICRA beneficiaries and non-beneficiaries. Beneficiaries exhibited higher adoption rates of climate-resilient practices, resulting in improved soil and water conservation, increased crop yield, and enhanced livestock and fodder management. The construction of check dams, nala bunds, and percolation ponds, coupled with the introduction of high-yielding and drought-tolerant crop varieties, contributed significantly to technological advancements.
- **Economic Impact:** NICRA interventions had a profound economic impact on beneficiary farmers, surpassing their non-beneficiary counterparts. The economic benefits manifested in higher annual incomes, improved housing infrastructure, increased material possession, enhanced farm power, and greater financial inclusion. The adoption of climate-resilient practices played a pivotal role in averting crop failures, enabling timely operations, and positively influencing farmers' economic well-being.
- **Social Impact:** The social impact analysis revealed that NICRA beneficiaries experienced higher levels of extension participation, extension contact, social participation, social status, and mass media participation compared to non-beneficiaries. This heightened social impact is attributed to the continuous involvement of beneficiaries in extension education activities, greater access to mass media through NICRA initiatives, and improved economic conditions.

Conclusion

In conclusion, the findings of this study underscore the significant impact of the National Innovations on Climate Resilient Agriculture (NICRA) interventions on the rural livelihood security of farmers in the Chikkaballapura district. The research compared beneficiary and non-beneficiary farmers across technological, economic, and social dimensions, shedding light on the comprehensive influence of NICRA on the agricultural landscape. The study provides compelling evidence that NICRA interventions have significantly contributed to the technological, economic, and social dimensions of rural livelihood security. The need-based and holistic approach of NICRA, encompassing soil and water conservation, crop diversification, and livestock management, has empowered farmers to navigate climate challenges successfully. The findings underscore the importance of continued support and scaling up of such climate-resilient agricultural initiatives for sustainable rural development.

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