Biological Forum – An International Journal **14(2): 1004-1009(2022)**

ISSN No. (Print): 0975-1130
ISSN No. (Online): 2249-3239

Assessing the Socio-Economic Profile of Farmers in Adapting CRA Practices, Odisha- A Comparative Approach

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(Received 22 March 2022, Accepted 18 May, 2022)
(Published by Research Trend, Website: www.researchtrend.net)

ABSTRACT: To combat the changing climatic conditions, it is necessary to adapt agricultural practices in accordance with the frequent changes and in response to the actual impacts. Though resilient agricultural practices have been introduced, an assessment of the socio-economic profile will help better understand the compatibility amidst the given conditions. For that matter, this research was conducted in the Ganjam district of Odisha among 200 respondents (100 men and 100 women farmers) using an ex-post facto design to determine how different factors affect the extent of CRA practices in Odisha. The findings revealed women to be more actively involved as compared to men farmers in training exposure and social participation. It is also seen that women had poor access to education as compared to men farmers, though it is found that innovativeness had almost equal importance for both the categories. Some of the major challenges of this study are that the farmers had scarce knowledge about the potential CRA practices that could be adopted in the area and are still in the process of realizing the importance of combining their local knowledge with modern agricultural practices and technologies. Therefore, this paper stresses on the importance of personal, economic, and social profiles while also elaborating on their compatibility in adopting new CRA techniques.

Keywords: Climate-resilient agriculture, Socio-economic profiles, Innovativeness, Adaptation.

INTRODUCTION

With the onset of fluctuating climatic conditions, the agriculture and the lives of the farmers across the nation have taken a toll, thereby destroying their livelihoods primarily. Research findings have shown that agriculture in developing countries is currently being affected by climate change (FAO, 2007; IFPRI, 2009). In recent years, farmers in the state have been faced with the problems of crop failure, or low yield arising from climate variability particularly the delayed onset of rains and the increasing length and frequency of dry spells during the growing season. In addition, the problem of flood, high temperature and incidences of pests and diseases have also aggravated the famers' loss which consequently increase the incidence of poverty and malnutrition in the state (Adebayo *et al*., 2012). Over the years farmers have adopted measures such as a shift in crop rotation in accordance to the changing climate, thus growing less water-intensive crops, growing high-yielding variety seeds, etc. (Rupan and Ansari, 2016). Altering with the new practices is not an easy affair, it involves certain influences to be effective in the long run. (Jasna, 2014) stated that in the absence of planned adaptation, the consequences of long-term climate change could be severe on the livelihood security of the poor. Therefore, it is of utmost importance to enhance the resilience of Indian agriculture to climate change.

Resilience is the tendency to overcome a particular situation, that is extremely important to bring in advanced technologies that are compatible with a given situation and can be adjusted ecologically, socially, and economically to respond to actual impacts. Perennial crop cultivation is difficult to relocate when a region's climate changes owing to a variety of socio-economic issues such as extended re-establishment times, proximity to processing factories, labour availability and market accessibility (Glenn *et al.*, 2014). Climate change and agriculture are inherently tied in numerous ways, as climate change is the primary cause of biotic and abiotic pressures, both of which have negative consequences for a region's agriculture (Raza *et al.*, 2019). It is thus crucial to introduce climate-resilient agricultural practices to cope with this unsteady condition and rebuild back better.

IPCC conceives vulnerability as degree of a system which liable and incompetent to cope with, adverse effects of climate variability and extremes (Parry *et al.*, 2007). Vulnerability is defined as an internal risk factor

of a subject or system exposed to a hazard that corresponds to the subject's or system's intrinsic inclination to be impacted or exposed to damage (Cardona, 2003). Vulnerability is the destruction from exposure to stresses connected with environmental and social change with absence of dimensions to adapt (Adger, 2006). It describes a community's physical, economic, and social susceptibility to destruction in the event of hazardous natural or manmade circumstances (Emrich and Cutter 2011). This research aims to comprehend how the adaptation of CRA practices could be more effective when it is compatible according to personal, economic, and social profiles. Adaptation strives for well-managed natural resources, enhanced food security, social and human capital development, and strengthened institutional systems (Adger *et al.*, 2003). Practically the efficacy, attitude, and perception of the farmers are decisive when it is to emphasizing adapting to a new condition. The fourth assessment report of the Inter-governmental Panel on Climate Change (IPCC) also notes that gender differences affect the vulnerability and adaptive capacity of women and men (Adger *et al.*, 2007). After decades of being gender-blind, international climate negotiations for the first time recognised in December 2010 that gender is integral to actions on both mitigation and adaptation in the UNFCCC text.

The age group, educational qualification, farming experience, landholding, income, etc. play a major role in bringing in the changes. (Acevedo *et al*., 2020) reported similar findings from their study that the most important determinants of adoption of climate-resilient crops are the availability and effectiveness of extension services and outreach, education level of heads of households, including some awareness of climate change and adaptation measures, and farmers' access to inputs, especially seeds and fertilizers. Intermediate and higher education in agriculture continues to play a decisive role in rural development and sustainable agricultural production. An increasingly interdependent world, however, is producing new challenges for institutions where agriculture is taught (Kabir, 1995). Over the years, the world has changed and, in any of the developing countries, agricultural education and training have failed to adapt and respond to the realities of rural societies (Mitchell, 1998). The nation's aims as it enters the twenty-first century are accelerated economic growth, human resource development, and self-sufficiency. Poverty reduction, rural development, and women's participation in all national activities will be at the heart of all efforts to meet those goals. Creating a well-educated, healthy nation capable of facing the challenges ahead up to the difficulties of a rapidly changing technological context global society has progressed.

These days, education is an increasing trend and unemployment rate amongst primary and secondary graduates are higher (Alam and Shahjamal, 2008). So currently, many primary, secondary and even tertiary graduates without jobs are forced to join as workforce to agriculture sector (Alam *et al.*, 2009). As the childhood of these graduates was passed under the shadow of school building, they cannot cope with heavy sun, rain and thunder involved with the cultivation process at field under the open sky. This motivates them to search an alternative form of agriculture. This may provide them employment allowing country to earn a little foreign currency, but production of food and crops are seriously being affected resulting food crisis for the country (Alamand Khalifa, 2009). Smallholder implementation of CRA practices were challenging, owing to the huge capital and intensive extension requirement, market linkage and local institutions for governance (Gentle and Maraseni, 2012; Howden *et al.*, 2007; Issaka *et al*., 2016). Rural areas also face labor shortages as a result of migration. As certain farming practices demand high labor inputs, the initiation of farmers' groups may contribute to labor being exchanged between farm households.

METHODOLOGY

This study was conducted using an Ex-post facto design to assess the socio-economic profile of the men and women farmers in adapting the climate-resilient agricultural practices. The research was conducted purposively in November 2021, at two villages *i.e* Chikarada and Sasanpadar from Brahmapur Subdivision of Ganjam District as those villages were exposed to some climate-resilient agricultural practices. A sample of 200 respondents (100 males and 100 females) respectively was selected for the study. A structured schedule was constructed to collect the information on the respondents' personal, economic, and social profiles on CRA practices from their homes, fields, etc through personal interviews. The collected data were analyzed using various statistical tools like Range, Average, Frequency, and Percentage and they have been categorized based on the Ranges and Mean±S.D. One of the important limitations of this study must be that although the research identifies good practices, co-benefits, and interactions between different CRA strategies, the application of synergies might not be possible under all climate and socio-economic scenarios, and across other production sectors. This is because mitigation and adaptation practices may be site specific, and influenced by the adaptive capacity of farmers (Lipper *et al*., 2014). The development of CRA practice should also consider market risk; access to financial institutions, extension services and farm inputs; and improved governance of services through farmers' organizations to enhance their effectiveness (Gentleand Maraseni, 2012; Howden *et al*., 2007; Issaka *et al*., 2016).

RESULT AND DISCUSSIONS

For conducting this research, twelve parameters had been taken to assess the socio-economic profile of the farm respondents. These parameters had been classified as Personal, Economic, and Social Profiles.

- **Personal Profile.** The personal profile serves as an introduction to the respondents, it defines one's private information, emotions, perceptions, and thoughts. For our study, we had taken Age, Education, Farming

Experience, Type of Family, Size of Family, and Innovativeness under the personal profile.

The respondent's ages had been categorized as Young, Middle, and Old, out of which 75.00 percent and 69.00 percent are middle-aged males and females respectively who fall under 36-60 years of age, followed by the young mass (10.00%)males and (15.00%) females aged between 18-25 years, which shows involvement of young women more than men in climate-resilient activities. Similar findings have been reported by Raghuvanshi *et al.* (2018) that the majority of the respondent (54.5%) belonged to the middle age (46 to 67 years) group followed by 31 percent of those who belonged to the young age(less than 46 years) category.

Educational qualifications had been divided into eight categories based on the level of education achieved by the respondents. The findings revealed that (18.00%) of men and (27.00%) of women have not received any formal education and they are unable to read and write, though 39.00 percent and 27.00 percent had attained primary education. Overall, it was observed that (23.50%) and (13.50%) had acquired middle and high school education respectively. However, only 1.00 percent of females had attained post-graduation, which depicts poor access to higher education.

The findings of farming experience revealed that (90.00%) of male and (74.00%) of female farmers had more than 5 years of experience in climate-resilient farming activities, whereas only 3.00 percent of female farmers are newly experiencing the climate-resilient farming activities, which shows male domination in farm works. The findings of the study can also be interlinked with that of Shankara *et al*. (2013) wherein it was found that the majority of the farmers had high levels of perception about climate change parameters such as temperature, rainfall and dry spells.

For the present study, the family has been divided into Type and Size, the Type of family had been further classified as Nuclear, Joint, and Extended. The size of the family had been categorized as Small, Medium, and Large depending upon the number of family members. The findings of Table 1 depict that 51.00 percent of men and 62.00 percent of women belong to nuclear families, followed by 47.00 percent and 34.00 percent respectively as joint families. Overall, only 3.00 percent belong to extended family. The size of the family was categorized as Small, Medium, and Large based on the number of family members. The findings revealed that 82.00 percent and 77.00 percent of male and female respondents belong to medium family size, followed by 9.00 percent and 13.00 percent of male and female respondents from small families respectively. However overall, only 9.50 percent belong to large families.

Table 1: Personal Profile of the respondents.

Sr. No.	Category	Ranges	n_1		n_2		N	
			Male		Female		Total	
			f	%	*f*	%	*f*	%
1.	Age	Young (18-35 years)	10	10.00	18	18.00	28	28.00
		Middle (36-60 years)	75	75.00	69	69.00	144	72.00
		Old (61yrs and above)	15	15.00	13	13.00	28	14.00
2.	Education	Can't Read and Write	18	18.00	27	27.00	45	22.50
		Can Read and Write	1	1.00	2	2.00	3	1.50
		Primary School	39	39.00	27	27.00	66	33.00
		Middle School	22	22.00	25	25.00	47	23.50
		High School	13	13.00	14	14.00	27	13.50
		Higher Secondary	4	4.00	3	3.00	7	3.50
		Graduate	1	1.00	1	1.00	2	1.00
		Post-Graduate	2	2.00	1	1.00	3	1.50
3.	Farming Experience	Up to 3 years	0	0	3	3.00	3	1.50
		3-5 years	10	10.00	23	23.00	33	16.50
		Above 5 years	90	90.00	74	74.00	164	82.00
4.	Type of Family	Nuclear	51	51.00	62	62.00	113	56.50
		Joint	47	47.00	34	34.00	81	40.50
		Extended	2	2.00	4	4.00	6	3.00
5.	Size of Family	Small (<3 members)	9	9.00	13	13.00	22	11.00
		Medium (>3≤7 members)	82	82.00	77	77.00	159	79.50
		Large (>7 members)	9	9.00	10	10.00	19	9.50
6.	Innovativeness	Low	12	12.00	11	11.00	23	11.50
		Medium	88	88.00	76	76.00	164	82.00
		High	0	0	13	13.00	13	6.50

Innovativeness in the present study means the idea or perception of introducing new ideas or the ability to adopt something new. We had categorized it as Low, Medium, and High. The findings show that (88.00%) of men and (76.00%) of women respondents had shown a medium level of innovativeness, followed by 12.00 percent and 11.00 percent of male and female respondents showing a low level of innovativeness.

• **Economic Profile.** Economics deals with individuals, businesses, governments, and nations making choices about how to allocate resources. For our study, the economic profile has been taken under two segments i.e land ownership and the respondents' annual income, which makes them independent and responsible to take decisions on adapting climate-resilient practices.

Landholding is defined as the total area owned by the respondents. The findings from Table 2 (A) show that 82.00 percent of men and 71.00 percent of women farmers come under the medium landholding range, followed by (13.00%) and (19.00%) in the large landholding range. Overall, only 7.50 percent of the respondents are small landholders.

Table 2: Economic Profile of the Respondents.

Sr. No.	Category	Ranges	n_1		n_2		N	
			Male		Female		Total	
			f	%	*f*	%	*f*	%
1.	Type of Land Owned	Small farmer (≤ 0.28 hac)	5	5.00	10	10.00	15	7.50
		Medium farmer (0.28-3.68 hac)	82	82.00	71	17.00	153	76.50
		Large farmer (≥ 3.68 hac)	13	13.00	19	19.00	32	16.00
2.	Annual Income	Low (≤ Rs 82,603)	0	0	19	19.00	19	9.50
		Medium (Rs 82,603-5,24,168)	83	83.00	62	62.00	145	72.50
		High (≥ Rs 5,24,168)	17	17.00	19	19.00	36	18.00

The annual income of respondents depicts the earnings from different sources including farming activities on per year basis. The findings reveal that most of the respondents *i.e* 83.00 percent and 62.00 percent male and females respectively fall under the medium-level income range. Whereas, 19.00 percent of females and none of the males fall under the low-income range. And overall (18.00%) belong to the high-income range section. On the basis of the findings it is suggested that socio-economic status of the farmers which are yet to adopt CRA practices can be encouraged and improved by adoption of similar practices that impart technical knowledge about the same by increasing their education level, social participation, awareness and innovativeness about the same.

• **Social Profile.** Social profiles deal with how well an individual relates with society, how they can contribute to the community, and their involvement as members. Social profiles or landholder classifications are typically being developed by rural sociologists and rural development personnel to better understand the variety of social (e.g. level of education, social networks) and economic (e.g. farm income, debt level) circumstances and value systems within a rural community, how this variation affects their land management attitudes and behaviour (e.g. uptake of a new technology), and how the differences subsequently lead to variation in the impacts of policies and programs across the community (Bohnet, 2008). For our study to understand the respondents' social profile, various parameters like Training Exposure, Information Source Utilization, Contact with Development Agents, and Social Participation had been taken into consideration.

The training exposure of the respondents shows that about 79.00 percent of men and 83.00 percent of women have been actively attending the training and workshops related to climate-resilient practices. Whereas, (21.00%) men and (17.00%) women had not been part of any training programs, which shows that women are more enthusiastic about participating and learning new technologies rather than men.

Information Source Utilization shows the frequency of respondents' exposure to the reading materials, and their access to television, radio, and AV messages on climate-resilient practices. The findings from Table 3(B) revealed that 65.00 percent of men and 66.00 percent of women have shown a medium level of utilization of the sources followed by (17.00%) of men and (19.00%) of women having low utilization of the information sources.

Contact with development agents shows the frequency of dealings between the respondents and NGO members, Farmers Friend, Panchayat members, KVK officials, ADO, etc. The findings revealed that (66.00%) of men and (62.00%) of women have medium contact, followed by 17.00 percent and 20.00 percent of men and women having low contact with the development agents. But overall 35.00 percent of respondents had a higher frequency of contact with development agents.

Table 3: Social Profile of the Respondents.

Sr. No.	Category	Ranges	n_1		n_2		N	
			Male		Female		Total	
			f	%	*f*	%	*f*	%
1.	Training Exposure	Yes	79	79.00	83	83.00	162	81.00
		No	21	21.00	17	17.00	38	19.00
2.	Information Source Utilization	Low	17	17.00	19	19.00	36	18.00
		Medium	65	65.00	66	66.00	131	65.50
		High	18	18.00	15	15.00	33	16.50
3.	Contact Extension Agents	Low	17	17.00	20	20.00	37	18.50
		Medium	66	66.00	62	62.00	128	64.00
		High	17	17.00	18	18.00	35	17.50
4.	Social Participation	Low	83	83.00	70	70.00	153	76.50
		Medium	16	16.00	26	26.00	42	21.00
		High	1	1.00	4	4.00	5	2.50

The emphasis of the respondents is to be involved in community-based activities, interpersonal interactions, resource sharing, active participation, and individual satisfaction. For our study, the respondents were given scores based on their participation, and the findings revealed that overall, there is low participation (76.50%). Further, it was observed that more women (26.00%) were active socially as compared to men (16.00%).

CONCLUSION

The study concludes that most of the respondents (72.00%) are middle-aged and the educational qualifications of men have obtained higher degrees as compared to women farmers, which shows that women should be encouraged to more education. The socio-economic profile of farmers becomes important in designing and development of various mitigation and adaptation techniques for farmers at grass root level. From the fact and findings, it can also be concluded that majority of farmers possess small landholding, educated up to high school and farming being their main occupation.Though men are less exposed to training programs and are less socially active, they are practically more experienced in the field as compared to women farmers.Women farmers are more socially active as they are members of SHGs, and also take interest in participating in different training programs, along with contacting development agents and also utilizing the information sources. Overall, it was observed that knowledge about climate change and resilient practices, and social and economic compatibility play a vital role in adopting new techniques.As a result, it is necessary for policymakers to examine the socio-economic profile of farmers before devising important adaptation and mitigation policies to deal with changing climatic conditions.

Acknowledgments. The author is grateful to the Department of Extension Education, Orissa University of Agriculture and Technology and especially her advisor, Dr Pradip Kumar Banerjee for allowing her to conduct this study and helping her throughout her research work.
Conflicts of Interest: None.

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How to cite this article: Angelina Patro, Pradip Kumar Banerjee and Debasmita Nayak (2022). Assessing the Socio-Economic Profile of Farmers in Adapting CRA Practices, Odisha- A Comparative Approach. *Biological Forum – An International Journal*, *14*(2): 1004-1009.