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Rajasthan's Socioeconomic and Climate change awareness profile and its impact on Emissions

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Abstract - This research presents an integrated approach to climate change mitigation and adaptation, emphasizing the necessity of a comprehensive strategy for sustainable development. Climate change poses significant threats to ecosystems, economies, and communities globally, necessitating urgent and coordinated responses. This study explores the interplay between mitigation actions aimed at reducing greenhouse gas emissions and adaptation strategies designed to manage the impacts of climate change.

Key factors influencing the effectiveness of these strategies include policy frameworks, technological innovations, and community engagement. The research highlights successful case studies that demonstrate how integrated approaches can enhance resilience while promoting sustainable development. For instance, the protection and restoration of coastal ecosystems not only mitigate climate impacts by sequestering carbon but also provide critical habitat and resources for local communities. Furthermore, the study identifies barriers to implementation, such as funding constraints and lack of awareness, and proposes solutions to overcome these challenges through collaborative efforts among governments, private sectors, and civil society. By aligning mitigation and adaptation efforts, this integrated approach not only addresses the immediate threats posed by climate change but also fosters long-term sustainability and resilience in vulnerable communities. The findings underscore the importance of holistic strategies that recognize the interdependence of mitigation and adaptation in achieving sustainable development goals in the face of a changing climate.

Keywords: Socioeconomic, environmental, Emissions and Climate Change Awareness

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INTRODUCTION

Climate change is defined by a number of environmental variables, such as patterns of precipitation, temperature, pressure, and humidity over extended periods of time. The melting of the polar ice caps, which leads to increasing sea levels, and an increase in the frequency and severity of severe weather events are among the most visible domestic and global effects of climate change. It was formerly believed that natural calamities such as earthquakes, forest fires, and volcanic eruptions were the primary causes of the atmospheric releases of CO_2, CH_4, N_2O, and H_2O that occurred before the industrial revolution. At the 21st Conference of the Parties (COP-21) in Paris on December 12, 2015, the United Nations Framework Convention on Climate Change (UNFCCC) and its member states came to a historic agreement to fight climate change and to raise and accelerate the investments necessary for a low-carbon, sustainable future. Continuing the momentum started by the Convention, the Paris Agreement brings all governments together to tackle climate change and adapt to its consequences. It also aims to help financially struggling countries rise to the challenge. The fight against climate change has reached a turning point. The main goal of the Paris Agreement is to strengthen the international reaction to the climate change crisis by ensuring that the world's average temperature does not rise more than 1.5 °C this century and does not rise more than 2 °C compared to levels before industrialization.

An additional objective of the agreement is to enhance the ability of governments to deal with climate change by coordinating financial resources with low greenhouse gas emissions and climate-resilient pathways. Mobilising and providing enough financial resources, establishing a new technology foundation, and enhancing capacity development are all essential to fulfil these ambitious aims. The most vulnerable and developing countries will be able to realise their national dreams because of this. As part of the agreement, a more transparent system of action and support is also established. To tackle climate change, each Party is required under the

Paris Agreement to make their "nationally determined contributions" (NDCs) and to work as hard as they can. Every Party is obligated to report its emissions and implementation activities on a regular basis. Each Party will be responsible for conducting their own global inventory every five years to evaluate the overall progress achieved towards the agreement's aim and to set goals for their future actions. The Paris Agreement was made available for signature at the United Nations Headquarters in New York on April 22, 2016, Earth Day. It didn't take effect until thirty days later, on November 4, 2016, when the so-called double threshold was met. More countries have joined since then, and as of early 2017, 125 have become Parties to the deal. To ensure the complete implementation of the Paris Agreement, a work programme was launched in Paris with the purpose of outlining policies, processes, and recommendations on many matters. The Parties' subsidiary organisations (SBSTA, SBI, and APA) and a number of newly formed firms have been collaborating since 2016. November 2016 saw the first Conference of the Parties gathering in Marrakesh as the Parties to the Paris Agreement (CMA), which was a component of COP22. During this conference, the first two resolutions were approved.

LITERATURE REVIEW

Gustafson, et. al (2020) The consequences of climate change and the intensification of competition for resources are making it harder for food systems to fulfil the rising demand for specialty crops. We analyse the supply chains of potatoes and tomatoes in the United States using a new integrated technique that incorporates LCA models for climate, crops, economies, and more. We evaluate the potential for relocating away from areas experiencing rising water shortages and the efficacy of shifting management practices to combat climate change. Through planting adaption tactics that avoid higher temperatures, we discover that the supply chains for two major processed foods in the US, French fries and spaghetti sauce, will be highly robust. Rising yields will eventually lead to smaller land and water footprints, and cutting down on waste and adjusting processes will help reduce greenhouse gas emissions. Decisions at many points in supply chains might be informed by our integrated technique, which is applicable to a wide range of crops and regions.

Alemaw, B. & Simatele, Mulala. (2020) Adapting to the effects of climate change and reducing emissions of greenhouse gases are intertwined in the present debate around sustainable development (SD) and climate compatible development (CCD) ideas, which aim to promote equitable and sustainable social and economic development in Africa. Using examples from Botswana, Malawi, Tanzania, Zambia, the Democratic Republic of the Congo, Ethiopia, Ghana, and Nigeria, this chapter aims to show how SD- and CCD-guided interventions were implemented and the value they brought at the national and regional levels. To gauge how well-known the idea of sustainable development planning is on a national level, we looked at the results of analyses of policy documents at the federal, state, and regional levels that dealt with adaptation and mitigation strategies for climate change as part of development planning processes. This was done in an effort to determine how well-prepared each country was to deal with these issues in the energy, water, agriculture, and forestry sectors. Case study nations' plans and actions to achieve maximum national adaptation, mitigation, and development opportunities were also studied in the research. In order to better integrate adaptation and mitigation practice with sustainable development planning processes, important lessons in policy and implementation were also examined across several sectors and levels of government (local, national, and regional).

March, Antaya & Woolley, Megan & Failler, Pierre. (2024) This research examines the integration of climate change adaptation and mitigation into the Blue Economy (BE) strategies of coastal and island African nations. It examines the strategies taken to reduce greenhouse gas emissions, protect coastal and marine ecosystems, and grow seaweed as a crop. Despite the existence of BE policies and action plans in Africa, only three of the twelve nations have prioritized adaptation and mitigation measures. The BE growth drivers are more focused on addressing social and economic demands, rather than ecological and environmental concerns. The research highlights the need for BE strategies that leverage synergies between adaptation, mitigation, growth, and development, and investigate the possibility of starting positively reinforcing cycles of benefits. Regional bodies in Africa are strongly pushing for the development of BE strategies and plans, emphasizing the importance of understanding how they work together with BE to incorporate climate change solutions in a meaningful and relevant manner. The study emphasizes the need for BE strategies that leverage synergies between adaptation, mitigation, growth, and development, as regional bodies in Africa are heavily pushing for the development of BE strategies and plans.

Feierabend, Izabella. (2011) There are a lot of ways in which climate change impacts economies and societies throughout the globe. Consequently, global and regional measures need to be implemented with precision. Various strategies for adapting to climate change and measures to reduce its impact are examined in this research. In my analysis, I will zero in on three key areas: adaptability, innovation, and cost-effectiveness.

Codemo, Anna & Favargiotti, Sara & Albatici, Rossano. (2021) In order to combat climate change, cities must take the lead in implementing low-carbon and environmentally friendly policies, and in reshaping the built environment via the use of resilient and inclusive strategies. This article explores the potential for integrating adaptation and mitigation measures in planning policy and design practices by examining their connection. In order to achieve this goal, we will look at current research and policy in Europe to evaluate how adaptation and mitigation methods work together, and how much of an integrated strategy is anticipated for city-wide changes. Green urban infrastructure and climate-sensitive design are two examples of win-win solutions that are highlighted in the study, which also allows for an evaluation of the synergies, trade-offs, and conflicts between mitigation and adaptation in urban practices. But the data shows that there isn't enough direction or coordination, thus adaptation and mitigation are often treated independently in policy and practice. With the hope of encouraging a more coordinated strategy on a regional scale and facilitating the efficient implementation of low-carbon and adaptable solutions, the research will survey the interconnections and highlight the gaps in existing procedures.

RESEARCH METHODOLOGY

Data Collection

In order to gather information from agricultural homes, a purposeful random sampling method was used. A structured questionnaire for households, focus groups, and individual interviews were all part of the research.

Quantitative Data: Climate records, records of greenhouse gas emissions, and other pertinent statistical data should be named as sources of quantitative data. Give an account of the databases and datasets that will be used.

Qualitative Data: Interviews, questionnaires, and document analysis are some examples of qualitative data sources. Outline the ways in which these techniques will help fill in the gaps in our knowledge of the study issue.

Instruments For Data Collection

Specify the methods and equipment that were used to get the data. Sensors, surveys, or standardized tests might fall within this category for quantitative data.

Data Collection Procedures

Give detailed instructions on how to gather data. Details on the time, place, and methodology of data collecting should be included.

Data Analysis

Statistical analysis was performed on all data using the IBM-SPSS version 17 program. A two-way ANOVA was used to examine the data on soil bulk density, SOC%, floral variety, soil carbon density, standing biomass, and carbon. The data were collected from five land uses in six blocks, and each block included five villages that served as replications for the sample site. Multiple measurements were taken to determine the variations between the 0-30 cm, 30-60 cm, and 60-90 cm soil layers. In order to test for within-subject effects on soil bulk density, SOC, and soil carbon density, we used analysis of variance (ANOVA). We controlled for land uses and blocks to account for between-subject effects.

- **Quantitative Data Analysis:**

In order to examine quantitative data, please specify the statistical techniques that will be used. Justify your choice of modeling approaches, descriptive statistics, or inferential statistics.

- **Qualitative Data Analysis:**

Describe the process for doing so. Qualitative approaches such as theme or content analysis might be used for this purpose. Talk about how you organized and understood the data via coding and categorization.

- **Integration of Quantitative and Qualitative Data:**

Outline the steps that will be taken to ensure that the research topics are fully understood by combining quantitative and qualitative assessments.

ANALYSIS

Rajasthan's Emissions Profile

In 1990, there were 18.6 million tons of CO_2, 827.9 thousand tons of CH_4, and 6.6 thousand tons of N_2O released into the atmosphere in Rajasthan as a result of human activities. There were 38.0 million tons of CO_2 equivalents released. Anthropogenic activities in Rajasthan were estimated to have released 27.0 million tons of CO_2, 1044 thousand tons of CH_4, and 10.5 thousand tons of N_2O in 1995, according to comparable calculations. Emissions in 1995 were 52.2 million tons4 of carbon dioxide equivalent. With 3.7% of India's emissions in 1990 and 4.2% in 1995, Rajasthan was placed 10th and 9th, respectively, for emissions in India. Emissions from land-use, land-use change, and forestry, as well as from energy, agriculture, industrial processes, and waste disposal activities, were calculated on a sectoral basis. In 1990, some districts had significant levels of emissions. These were Ganganagar, Jaipur, Ajmer, Jodhpur, Nagaur, Udaipur, Chittaurgarh, and Kota. The district's total emissions were more over 1.5 million tons of CO_2 equivalent. Bhilwara, Alwar, and Sawai Madhopur were all included into one group in 1995. The emissions for these two years are summarized by district in Table 1. With this first national statement to the UNFCCC, these estimations were deliberated. The only other source for up-to-date GHG emission estimates is the INCCA paper India's Greenhouse Gas Emissions 2007, which covers the year 2007. According to these projections, the compound annual growth rate (CAGR) in 2007 was about 3% higher than in 1994. Unfortunately, comparable numbers for Rajasthan are not available since the research does not provide estimates for each state separately. In order to help the state take advantage of current international mechanisms like CDM, this section discusses some of the current trends in activities that contribute to GHG emissions.

Table 1: Emissions inventory for districts of Rajasthan for 1990 and 1995

	District	CO_2	CO_2	CH_4	CH_4	N_2O	N_2O	NOx	NOx	SO_2	SO_2	CO_2 (Eq)	CO_2 (Eq)
	Year	1990	1995	1990	1995	1990	1995	1990	1995	1990	1995	1990	1995
	Unit	(MT)	(MT)	(Tons)	(Tons)	(Tons)	(Tons)	(Tons)	(Tons)	(Tons)	(Tons)	(MT)	(MT)
1	Ganganagar	0.81	0.65	46.9	63.4	0.63	1.36	6.3	7.1	7	4.1	2.03	2.43
2	Bikaner	0.33	0.38	27.1	35.1	0.09	0.09	2.5	3.6	2	2.3	0.93	1.16
3	Churu	0.26	0.22	26.5	37.5	0.13	0.12	2.2	2.5	1.7	1.5	0.86	1.06
4	Jhunjhunun	0.31	0.28	21.2	27.9	0.15	0.19	2.4	2.8	16.5	23.3	0.81	0.93
5	Alwar	0.41	0.5	34.5	43.7	0.34	0.54	3.9	5	3.1	4.5	1.26	1.61
6	Bharatpur	0.29	0.27	26.7	32.9	0.26	0.46	2.5	3	2	1.8	0.93	1.12
7	Dholpur	0.07	0.1	12.8	15.2	0.15	0.18	0.8	1.2	0.6	0.7	0.39	0.48
8	Sawai Madhopur	0.31	0.29	37.1	47.1	0.41	0.64	3.2	3.7	2.2	2	1.26	1.5
9	Jaipur	1.59	1.97	72.9	92.4	0.37	0.69	11.9	17.2	9.4	11.6	3.28	4.17
10	Sikar	0.3	0.29	29	36.1	0.16	0.26	2.7	3.1	2	1.8	0.96	1.14
11	Ajmer	1.26	1.63	30	40.3	0.15	0.23	4.8	7.1	5.5	7	1.94	2.57
12	Tonk	0.16	0.17	23	26.7	0.13	0.25	1.5	1.9	1.1	1.1	0.68	0.82
13	Jaisalmer	0.08	0.1	10.7	16.9	0.1	0.03	0.8	1.1	0.5	0.7	0.34	0.48
14	Jodhpur	0.81	0.98	32.9	44.9	0.24	0.32	6.3	8.4	5.5	6.9	1.57	2.04
15	Nagaur	1.01	1.17	38.1	47.3	0.21	0.39	4.4	5.2	4.4	4.8	1.9	2.31
16	Pali	0.32	0.44	29.4	36	0.23	0.38	2.7	4.4	2.3	3	1.01	1.33
17	Barmer	0.2	0.23	23	35.5	0.13	0.11	2.1	2.9	1.4	1.6	0.72	1.03
18	Jalor	0.22	0.33	19.8	24.3	0.15	0.28	2.3	3.8	1.5	2.2	0.68	0.94
19	Sirohi	0.66	0.87	10.4	12.4	0.09	0.18	2.1	3.6	2.5	3.5	0.9	1.19
20	Bhilwara	0.29	0.34	39.6	47.3	0.28	0.39	2.7	3.8	6.9	7.2	1.22	1.47
21	Udaipur	1.03	1.12	59.7	70	0.3	0.43	6.3	9.1	22.5	23.7	2.42	2.75
22	Chittaurgarh	3.24	4.44	38.5	43.2	0.54	0.58	6.4	9.3	11.3	15.1	4.22	5.55
23	Dungarpur	0.1	0.09	22	24.3	0.12	0.13	1.2	1.4	0.7	0.6	0.6	0.65
24	Banswara	0.14	0.13	28.6	30.9	0.34	0.4	1.8	2	1.1	1	0.85	0.91
25	Bundi	0.41	0.5	20.7	23.5	0.28	0.44	1.8	2.3	1.7	2	0.94	1.14
26	Kota	3.83	9.34	42.6	62.8	0.48	0.85	13	23.9	24.7	44	4.88	10.95
27	Jhalawar	0.14	0.14	23.6	26.8	0.18	0.35	1.3	1.8	1	0.9	0.69	0.83

Socio economy and climate change awareness

From an average of 9.1 bigha per HH in the Aburoad block to a maximum of 25.3 bigha in the Baap block, the region's land holdings varied widely. Approximately 57.3 percent of the households in the sample had less than 5 bighas of land, while 28.1 percent had between 5 and 20 bighas of land. Land was owned by around 14.3% of HHs, whereas 0.45% of HHs did not own any land at all. The average human population per HH was 5.6 across all blocks, with Sanchor having the lowest at 5.3 and Baap the most at 5.7. The blocks' average livestock population per HH was 5.0, with Sankara block having the greatest number of animals at 5.1 and Aburoad block having the lowest at 2.3. There was a significant difference in the level of climate change awareness across the various blocks. Across all blocks, around 61% of respondents were aware of the issue of climate change. Figure 4.10 shows that this differed greatly across the various blocks' residents, with 43% of the Bali block and 92% of the Baitu block reporting this. The percentage of individuals aware of climate change was 61.7% in the 25-45 age group, 22.8% in the >45 age group, and 15.4% in the <25 age group (Table 2).

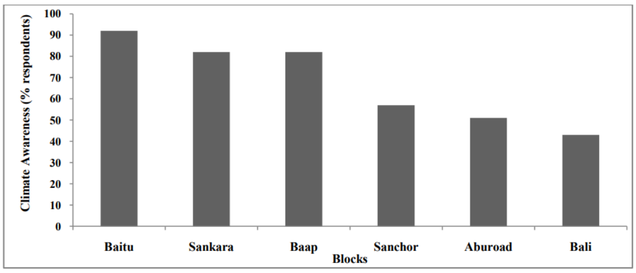

Figure 1: Climate change awareness in western Rajasthan as a percentage of the population.

Means of experiencing climate change

Rainfall patterns and heat waves were two ways in which locals in this area experienced the effects of climate change. Nevertheless, 39% of those polled (ranging from 8% in the Baitu block to 57% in the Bali block) couldn't articulate their stance on climate change. According to Table 2, around 26% of respondents (ranging from 1% in Bali to 74% in Baitu block) framed climate change as a combination of temperature changes, rainfall fluctuations, and drought occurrences. The next group of respondents connected climate change with an increase in droughts of different types, while 3% of respondents linked it to unpredictable rainfall and 7% to a rise in temperature (locally dubbed 'Tawada'). Approximately 3% of people in the area blamed climate change for the sporadic floods that has occurred, while 5% linked climate change to deforestation.

Table 2: Reasons why people in various parts of western Rajasthan are feeling the effects of climate change

Ways of Climate change	Block (% HHs)						
	Baitu	Sankara	Baap	Sanchor	Aburoad	Bali	Total
Temperature rise (heat waves)	-	1	-	4	19	10	7
Erratic rainfall	-	-	-	4	3	5	3
Temperature rise/erratic rain	-	3	-	13	5	14	7
Drought	18	1	14	17	6	8	10
Flood	-	-	-	2	9	2	3
Temp. rise/drought/erratic rain	74	68	67	9	7	1	26
Deforestation	-	9	1	8	2	3	5
Not aware	8	18	18	43	49	57	39

Sources of drinking water

The biggest issue in the area is water shortage. Table 3 shows that almost one-fifth of the respondents relied on their own tankli, a rainwater collection system also known as a tanka or tankli in the area, to provide them with potable water. A further 6.3% relied on both private and public tankli, with percentages ranging from 7% in Bali to 21% in Sanchor. In the Aburoad and Baap areas, however, 12.2% of respondents relied on brackish water (Khara kua + khara tube well) for drinking. In the Aburoad (24%) and Bali (42%) blocks—where around 14.8% of respondents relied on hand pumps—this was especially true. Meetha kua, literally "good quality well," is the water source for about 23% of Bali residents and 7% of Aburoad residents. Approximately 14% of the participants relied on their own tanka in addition to the government's water supply or tanki. Of these, 52% were from the Sankara block, 35% from the Baap block, and 26% from the Baitu block. Nearly seventeen percent of Sankara residents and eleven percent of Baap residents relied on tubewells for their water supply. In instance, 9.5% of people in the Sankara (17%) and Aburoad (21% of the total) blocks relied on shared tube wells. It was found that the region's drinking water supply was severely lacking in the areas supplied by government tanks and hand pumps.

Table 3: Different sources of drinking water supply used by households in different blocks in western Rajasthan

Source	Block (% HHs)						
	Baitu	Sankara	Baap	Sanchor	Aburoad	Bali	Total
Own tankali	41	9	31	63	-	1	21.8
Sarkari tanka	14	1	-	-	-	-	1.0
Sarkari tanka/own tankli	14	-	-	-	-	-	0.9
Handpump	-	-	-	-	-	2	0.5
Public handpump	-	-	-	-	24	40	14.3
Public handpump/ river	-	-	-	-	2	-	0.4
Meetha kua	-	-	-	-	7	23	6.8
Khara kua	-	-	-	-	25	-	5.2
Neighbour tanka	2	-	1	-	-	-	0.2
Meetha tubewell	-	-	-	-	2	1	0.8
Khara tubewell	-	16	20	10	-	-	7.0
Own tankli/govt tanki	-	-	-	21	-	7	6.3
Sarkari tanka/govt tanki	5	-	-	-	-	0	0.4
Own/sarkari/govt tanki	-	42	31	-	-	1	10.4
Own tankli+govt supply	26	10	4	-	-	-	3.6
Sarkari tanka+govt supply	-	5	-	-	-	-	0.9
Common tubewell	-	17	11	6	5	-	6.2
Common well	-	-	-	-	16	-	3.3
Govt tanki +handpump	-	-	-	-	19	25	9.8

Sources of irrigation

Table 4 shows that the majority of the region's households (HHs) relied on rainfed agriculture, which accounts for around 66% of the total.

Table 4: Households' (HHs') reliance on various irrigation sources throughout western Rajasthani districts and blocks

Source of irrigation	Block (% HHs)						
	Baitu	Sankara	Baap	Sanchor	Aburoad	Bali	Total
Rainfed	89	75	62	81	38	64	66
Diversion based irrigation (DBI)	-	-	-	-	2	-	0
Rainfed + DBI	-	-	-	-	5	-	1
Tube wells of others	-	-	-	-	5	-	1
Own well	-	-	-	0	33	20	12
Tube well	-	9	30	16	1	-	8
Well	-	-	-	-	5	3	2
Saran	-	-	-	-	-	10	3
Common well	-	-	-	-	11	-	2
N/A	11	16	8	3	-	3	5

In Baitu block, it was 89% HHs, whereas in Aburoad block (Sirohi), it was 38%. While the agricultural sectors of the Baitu, Sankara, and Baap blocks were highly reliant on precipitation for their operations, the Aburoad and Bali blocks were somewhat less so. Tube wells and dug wells were the two most prevalent types of irrigation wells in the areas. In order to water their crops, over 12% of HHs dug their own wells, whereas 8% utilized tube wells. Two percent of the respondents irrigated their agricultural fields using a shared well, bringing the total number of households using wells to twenty-five percent. Then, the Saran (irrigation canals) were largely used in the Bali block. On this front, about 5% of HHs chose not to reply.

Source of cooking energy

In the area, it is normal practice to use both dung cake and fuelwood for cooking and heating purposes. Both were used by around 58% of HHs, with a much higher proportion in Bali block (84% vs. 21% in Baap) (Table 5). Less desertic regions, such as Sanchor, Bali, and Aburoad, used dung cake and fuelwood more often than more desertic regions, such as the Baap, Sankara, and Baitu blocks. Twenty percent of HHs (from seventeen percent in Baap to forty-five percent in Baitu block) went toward fuelwood use after then. The usage of liquid petroleum gas (LPG) was found to be very low, whereas a small percentage of households used fuelwood, kerosene, and dung cake in conjunction with LPG for cooking. There was also very little use of kerosene for cooking purposes. Approximately 7% of people surveyed reported using a mix of dung cake, fuel wood, and kerosene in their cooking, with that number rising to 11% in the Bali block from 5% in Aburoad.

Table 5: Varieties of energy-generating appliances used for cooking in the blocks surveyed throughout western Rajasthan districts

Source of energy	Block (% HHs)						
	Baitu	Sankara	Baap	Sanchor	Aburoad	Bali	Total
Fuel wood (FW)	45	25	17	22	29	-	20
Dung cake (DC)/FW	41	41	21	55	66	84	58
DC / FW/crop residue	-	-	-	1	-	-	0
DC /FW/kerosene	6	11	7	-	5	11	7
FW/kerosene	5	16	1	-	-	-	3
LPG/kerosene/FW	-	-	1	0	-	-	0
LPG/FW	-	1	20	1	-	-	2
LPG/ DC/FW	3	0	30	17	-	5	8
FW/ DC/kerosene/LPG	-	6	3	4	-	-	2

Type of cooking device

Nearly three quarters of the families in the area relied on chulhas, which might be constructed from mud or bricks, as their primary means of food preparation. Table 6 shows that the percentage of HHs varied among blocks, with 38% in Baap and 94% in Aburoad. Then, 11% of households used a combination of Chulha and LPG stoves for cooking, with the percentage varying from 0% in Aburoad to 50% in Baap block. When having visitors around, it is customary to make tea over a kerosene burner. About 10% of HHs were caused by a mix of Chulha and kerosene burners. There was hardly little use of kerosene or LPG burners for cooking in the area.

Table 6: Cooking device used by villagers in different blocks of western Rajasthan

Cooking device	Block (% HHs)						
	Baitu	Sankara	Baap	Sanchor	Aburoad	Bali	Total
Chulha	85	68	38	82	94	84	78
Kerosene stove	1	-	-	-	-	-	0
LPG stove	-	-	-	-	-	-	-
Chulha/kerosene stove	11	25	8	-	6	11	10
Chulha/kerosene/LPG	-	6	4	-	-	-	1
Chulha/LPG	3	1	50	18	-	5	11

CONCLUSION

Climate change poses a new threat to agricultural families in Rajasthan's arid and semi-arid areas, with increasing sea levels, unpredictable rainfall, and scorching hot weather. The majority of families are aware of climate change and its effects, including higher average temperatures, less frequent and intense rainfall, and fewer total rainfall events. Major contributors to climate change include deforestation, shifting living standards, population growth, urbanization, and industry. Factors influencing farmers' perceptions include gender, social responsibility, literacy and education level of the household head, number of years of agricultural experience, size of the family, proximity to institutions, and visits from extension officers. Adaptation tactics used by agricultural families include diversifying crops, using fertilizer, building ponds on farms, growing a variety of crops at once, planting trees, and selling animals. Factors determining adaptation strategies include the head of the household's educational status, their farming experience, external help, training, the size of the land, the revenue from agriculture, the distance to agricultural institutions, social capital, crop insurance, and storage. Based on an adaptive capacity vulnerability score, the majority of families are classified as moderately sensitive to the effects of climate change.

To address climate change, there is a need to enhance policies targeting rural families by providing access to climate change knowledge, agricultural training, and accurate weather forecasting systems. Individualized instruction on how to cope with climate change should be made available to households, and smart agricultural methods should be disseminated. Financial assistance in the form of accessible and affordable finance is also important. In western Rajasthan, people have adapted to climate challenges through rainwater gathering, tree retention on farmlands, and soil and water conservation for agricultural crop cultivation. Government programs aimed at enhancing adaptability and reducing the impact of climate change are also in place. A vegetation research and soil sample were conducted in five key land uses: grassland, roadside, woods, Oran/sacred groves, and agricultural. Selected 30 villages throughout all six blocks had 10% of their households polled to record socioeconomic status and people's views on adaptation and mitigation strategies for climate change.

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