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An Exploratory Study on Sustainable Resource Management Practices Adopted by Rural Households in Ayodhya (U.P.)

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ABSTRACT

Sustainable resource management (SRM) is critical for ensuring the long-term welfare of rural households, which often depend on natural resources for their livelihoods. This study explores the SRM practices adopted by rural households and identifies challenges in the adoption of sustainable practices by analysing key areas like energy, water, waste management, agriculture land use, and livestock management. The present study was conducted in the villages Shivnath Pur and Sidhauna, from the Milkipur block, and Pithla and Bawan from the Amaniganj. block of the Ayodhya district. Thirty households from each village were randomly selected for the study. Thus, the total sample comprises 120 households. Primary data was collected from the head of the household using a structured Interview schedule. Analysis of results reveals that 52.50 percent of households under study belonged to the lower socio-economic status. Major sustainable resource management practices adopted for energy conservation were using LPG stoves (100 Percent), and storage tanks (41.66 percent) were the most preferred practice for water conservation. Composting (50.00 percent) was a majorly adopted practice for waste management, soil testing (41.66 percent) for agricultural land use, and AI Breeding (51.66 percent) for livestock management. Insufficient access to financial support for sustainable practices (e.g., loans, subsidies) with a score of 2.70 and the high cost of adopting sustainable practices with a score of 2.61 were ranked I and II, respectively, as major challenges in the adoption of sustainable resource management practices

Keywords: Sustainable resource management (SRM), Milkipur block, respectively

INTRODUCTION

Sustainable resource management is a cornerstone for fostering environmental conservation and socio-economic stability, particularly in rural households where livelihoods are deeply intertwined with natural resources. These communities often rely on agriculture, forestry, fisheries, and water resources to meet their subsistence and economic needs. However, unsustainable practices, such as overexploitation, deforestation, and inefficient water use, pose significant challenges to their sustainability and resilience. Implementing sustainable resource management practices in rural households ensures the prudent use of natural resources while enhancing their long-term availability. Strategies such as agroforestry, organic farming, water harvesting, and renewable energy adoption offer viable solutions to mitigate environmental degradation and improve livelihoods. These approaches not only promote ecological balance but also empower communities by reducing vulnerability to climate change and economic shocks. Sustainable resource management in rural households is essential for preserving ecosystems, supporting rural development, and achieving global sustainability goals. By promoting environmentally responsible practices, rural communities can secure their future while contributing to broader environmental conservation efforts. Assessment of sustainable resource management practices adopted by rural households is crucial in addressing pressing global challenges such as resource depletion, environmental degradation, and climate change.

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Rural families are often at the forefront of natural resource use, relying heavily on land, water, forests, and energy for their livelihoods. However, unsustainable exploitation of these resources can lead to long-term socio-economic vulnerabilities and ecological imbalances.

This study is justified by the growing need to ensure sustainable development while improving rural livelihoods. Identifying the sustainable resource management strategies currently in use provides insight into their impact on environmental conservation, household resilience, and community well-being. Additionally, such an assessment can highlight gaps in knowledge, resources, and support systems that hinder broader adoption of sustainable practices. By focusing on rural households, this research underscores the importance of empowering communities that are both the custodians and beneficiaries of natural resources. This approach ensures the protection of ecosystems and the improvement of livelihoods, fostering a balanced and sustainable future for rural populations. The findings of this study can guide the development of targeted interventions to enhance the efficiency and scalability of sustainable resource management practices. Furthermore, the study contributes to global efforts to achieve sustainability goals, such as the United Nations Sustainable Development Goals (SDGs), particularly those related to responsible consumption, climate action, and life on land. The study focuses on the socio-economic status of rural households in a specified region, examining resource management practices related to energy, water, waste management, agricultural land use, and livestock management, and challenges faced in the adoption of sustainable resource management practices.

METHODOLOGY

The present study was conducted in the Ayodhya district of Uttar Pradesh, a region predominantly characterized by a rural population reliant on agriculture, forestry, and other natural resources for their livelihoods. An exploratory research design was employed to examine the rural household's sustainable resource management practices. The multistage random sampling technique was used to select the study area. Two villages Shivnath Pur and Sidhauna, from the Milkipur block, and two villages Pithla and Bawan from the Amaniganj block of Ayodhya, were randomly selected as a locale of study. Thirty households from each village were selected randomly, resulting in a total sample size of 120 households. Data on socio-economic status of respondents was collected by administering socio-economic status scale of **Pareek, U. and Trivedi, G. 2024**, Primary data on sustainable resource management practices adopted by households and challenges in adoption of sustainable resource management practices i.e. energy, water, waste, agricultural land use and livestock management were collected using self-structured interview schedule Secondary data will be obtained from government reports and academic publications to provide context and validate survey findings.

RESULT AND DISCUSSION

Socio-Economic Status of Households: Socio-economic status (SES) is a measure of the social standing of an individual or a family in society, and it has important implications on all aspects of life. It influences accessibility, affordability, acceptability, and utilization of available resources. The Udai Pareek socio-economic status scale is a widely used tool to assess the socio-economic status (SES) of rural populations in India, considering nine factors like caste, occupation, education, landholding, housing, farm power, material possessions, family type, and social participation.

Table 1: Socio-Economic Status of Households **N=120**

S.No.	Socio-Economic Class	Total Score	Frequency	Percentage
1	Upper Class	Above 43	00	00.00
2	Upper Middle Class	33-42	15	12.50
3	Middle Class	24-32	20	16.66
4	Lower Middle Class	13-23	22	18.33
5	Lower Class	Below 13	63	52.50

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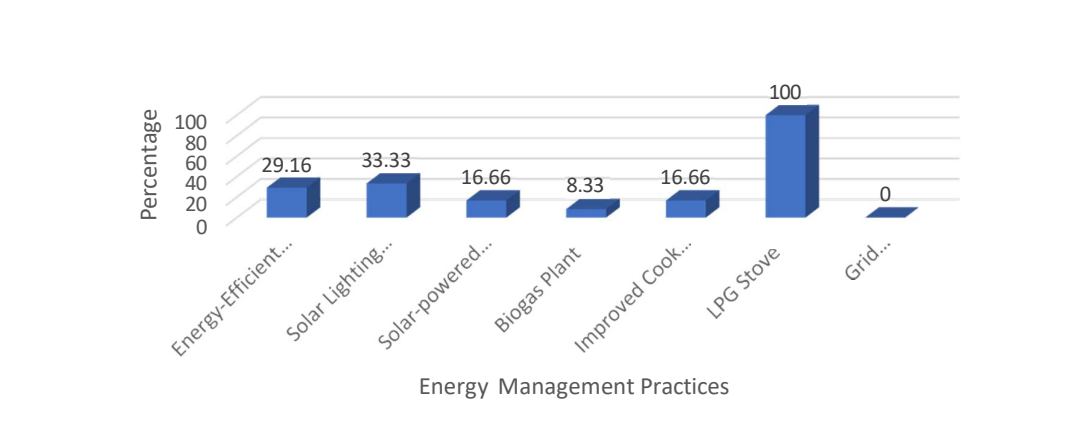
Analysis of data in Table 1 envisages that the majority, 52.50 percent households belong to the lower class, followed by 29.20 percent lower middle class, 16.66 percent to the middle class, and 12.50 percent to the upper middle class. None of the households falls in the upper-class category. This might be due to the limited access to resources, education, and opportunities, leading to poverty, unemployment, and poor health outcomes.

Energy Resource Management Practices: India is the third-largest contributor to anthropogenic carbon emissions **M. Crippa et al. 2020**. Out of the net energy consumption in India, more than 80 percent of the total demand is still being met by coal, oil, and solid biomass **IEA 2021.** If the conveyance is excluded, approximately 30 percent of the total energy consumption in India is in households **B. S. Reddy and P. Balachandra, 2006, S. D. Pohekar et.al., 2005**. In households, cooking is the highest energy-consuming service, accounting for a share of 66 percent in urban and 78 percent in rural areas of the net energy consumed. With increasing urbanisation, the transition to clean and energy-efficient fuels for cooking and lighting services is observed **K. Yawale et.al. 2021.** Households are an important sector carrying out human development activities, accounting for more than 30 percent of the total global energy consumption. Sustainable energy resource management practices involve optimizing energy use to reduce consumption, minimize environmental impact, and lower operational costs.



Graph 1: Sustainable Energy Resource Management Practices Adopted by Rural Households

Data in graph 1 reveals that out of the total 120 household's cent percent use LPG stoves, 33.33 percent use solar lighting systems, 29.16 percent use energy-efficient appliances, 16.66 percent use solar-powered pumps and improved cook stoves. None of the households were engaged in the grid electrification initiative. The study by **Jan I. et.al. 2012** also indicates that almost all respondents opted for gas as the best alternative source available to them, due to its efficient cooking, availability of gas, and gas being pro-environment. The problem of access to modern energy sources is more severe in rural areas, either due to insufficient or unreliable access to these sources **Elias and Victor 2005.**

Water Resource Management Practices: The most pressing problem before the world and humanity is not the fear of the outbreak of war, epidemic, or the collapse of civil administration, but the daunting problem of water scarcity **Jury and Vaux 2006.**

In India, as a result of population rise and economic development, the water demand is increasing both in urban and rural areas. The per capita average annual fresh water availability has reduced from 5,177 m3 in 1951 to 1,820 m3 in 2001, and it is estimated to further come down to 1,341 m3 in 2025 and 1,140 m3 in 2050 **Kumar et al. 2005.** Decreasing availability may increase tensions and disputes over the sharing of water resources **Shaban and Sharma 2007**. Sustainable water resource management involves implementing practices that ensure efficient and responsible use of water to meet current needs without compromising future availability.

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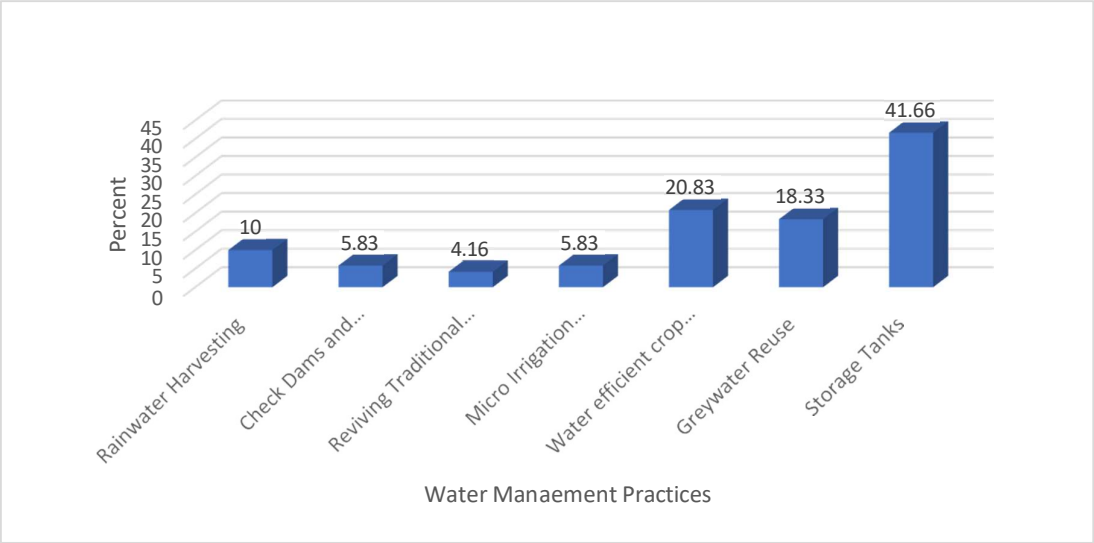
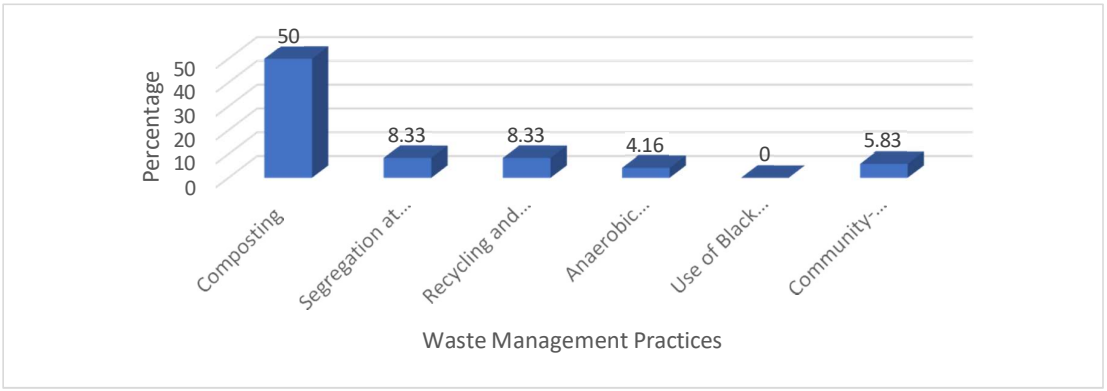


Graph 2: Sustainable Water Resource Management Practices Adopted by Rural Households

Analysis of data in graph 2 reveals that the majority, 41.66 percent households have installed storage tanks to store water, followed by 5.83 percent check dams and percolation tanks, 4.16 percent revived traditional water bodies, 20.8.3 percent grow water-efficient crops, and 18.33 percent reuse greywater. Only 10.00 percent of households adopt rainwater harvesting, and 5.83 percent use the micro irrigation technique

Waste Management Practices: Solid waste management is a critical global concern, and India grapples with this issue as well. With its massive population exceeding 1.3 billion, India generates a staggering 62 million tonnes of solid waste annually, making it as the world's third-largest waste generator **Sharma et al., 2021.** Poor disposal practices and insufficient waste treatment contribute to pollution of air, water, and soil, causing harm to ecosystems and human health **Mohan and Joseph, 2021.** Accumulation of waste in landfills and dumping sites emits greenhouse gases and contaminates groundwater, worsening environmental degradation. Additionally, improper waste disposal contributes to the spread of diseases, including vector-borne and respiratory illnesses **Mainul, 2019.**

Sustainable waste management focuses on minimizing environmental impact through practices like Refuse, Reduce, Reuse, Repurpose, and Recycle.



Graph 3: Sustainable Waste Management Practices Adopted by Rural Households

Analysis of data in graph 3 reveals that for the management of waste, the majority 50.00 percent of households, adopt the composting technique, and only 8.33 percent segregate waste at source and recycle or reuse the waste. Community-based waste collection was adopted by only 5,83 percent of households, and 4.16 percent use anaerobic

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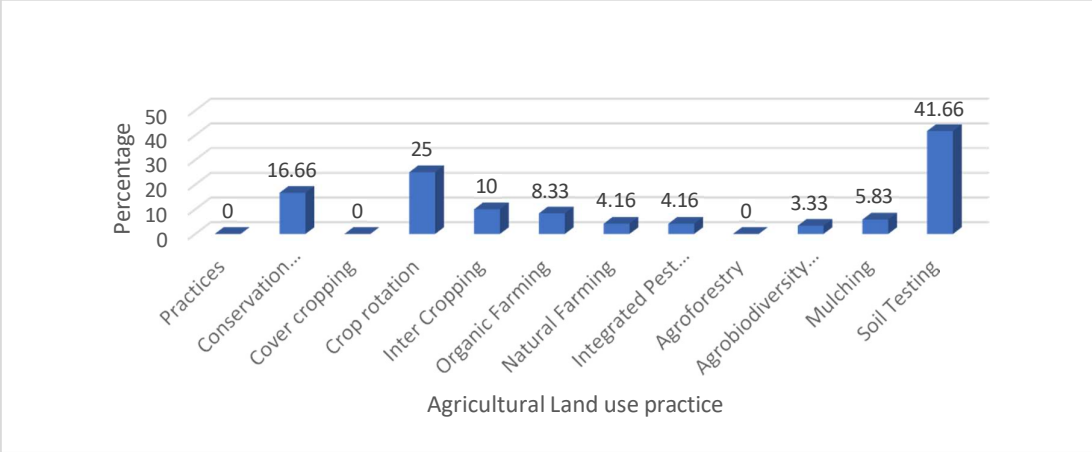
digestion. **Vergera and Tchobanoglous 2012** reported that as population and purchasing power of people increases worldwide, more goods are produced to meet increasing demand, thereby leading to the production of more waste. **Marchettini et.al.2007** pointed out that these continuous flows of waste resulting from human activities overburdened the environment. **Ghiani et al 2014** added that a proper organisation of solid waste management has become an essential task needed to safeguard the environment

Agriculture land use practices: Agricultural land use refers to the area under arable land, which includes land under net area sown, fallow lands, culturable wastelands, area under miscellaneous tree crops and groves, and so on. Agricultural land use patterns are continuously changing as a result of shifting economic, climatic, and technological factors as well as social and cultural practices **Garrett et al., 2018; Reenberg, 2001**. Rapid population growth has resulted in more dynamism in agricultural land use **Lambin et al., 2000**. The conversion of agricultural land for non-agricultural purposes, such as urbanisation and industrialisation, puts immense pressure on agricultural land as it leads to lower per capita net sown area **Muthumperumal & Ramachadran, 2021.** Sustainable agriculture land use practices aim to meet current food needs while preserving resources for future generations.



Graph 4: Sustainable Agriculture Land Use Practices Adopted by Rural Households

Analysis of data in graph 4 reveals that the majority, 41.66 percent households adopted soil testing, followed by 25.00 percent crop rotation, 16.66 percent conservation tillage, and 10.00 percent intercropping. Sustainable resource management practices like organic farming were adopted by 8.33 percent, mulching by 5.83 percent, and natural farming and IPM by 4.16 percent of households. Agrobiodiversity was adopted by only 3.33 percent of households. The likelihood of adoption of soil test technology increases with a decrease in distance from the farm to the soil test laboratory. Similarly, the high incidence of low adoption of organic farming and natural farming practices was also reported in studies conducted by **Bhople et al. (2001) and Thayagarajan and Ramanathan (2001).**

Livestock Management Practices: Feeding, management, along housing play a very important role in exploiting the real potential of livestock. Optimum feeding and housing are the prerequisite factors for milk production, but feed scarcity is the biggest challenge for increasing milk production in India **Jain et al. 1996, Saha et al. 1997.** The farmers must understand the fact that animal production can be increased by adopting improved animal feeding and breeding practices **Gupta et.al.,2020.** Effective livestock management encompasses a range of practices for optimizing animal health, productivity, and environmental sustainability.

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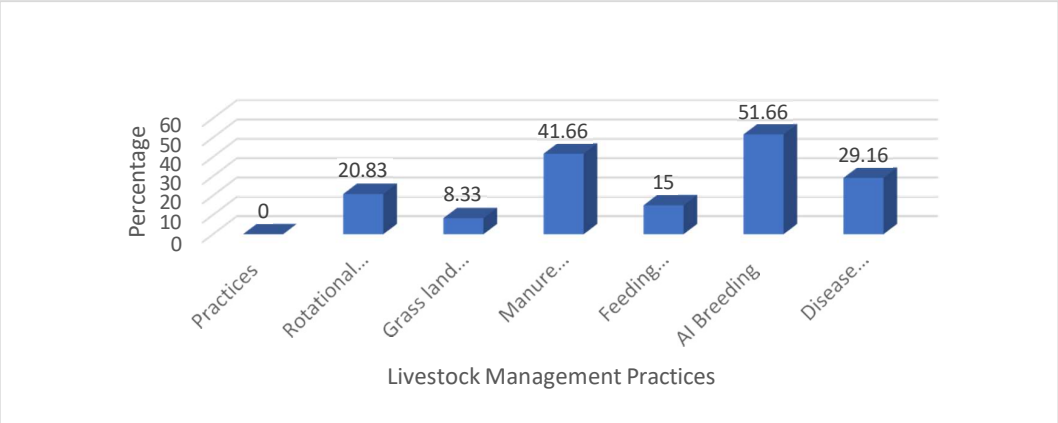

Graph 5: Sustainable Livestock Management Practices Adopted by Rural Households

Analysis of data in graph 5 reveals that 51.66 percent households adopt AI breeding practices, followed by 41.66 percent manure management practices, 29.16 percent disease prevention and health management, 20.83 percent rotational grazing, 15.00 percent feed mineral mixture, and only 8.33 percent grassland restoration. The present results are in agreement with **Garg et al. 2005**, who reported that only 13.33 percent of farmers provided a supplementary mineral mixture to their animals in rural areas. Feeding a mineral mixture by a tiny proportion of farmers might be due to the lack of awareness about the benefits of mineral mixture on the health, productivity, and reproductive performance of dairy animals **Veenesh Rajput et.al. 2021** reported that none of the farmers adopted grazing practices for their dairy animals due to the unavailability of grazing area and about half of the farmers used A. I. for breeding their animals

Table 2: Challenges in the Adoption of Sustainable Resource Management Practices N=120

S.No.	Statement	Agree 3	Neutral 2	Disagree 1	Score	Rank
1	The high cost of adopting sustainable practices	87 (72.5)	20 (16.66)	13 (10.83)	2.61	II
2	Insufficient access to financial support for sustainable practices (e.g., loans, subsidies)	90 (75.00)	25 (20.83)	5 (4.16)	2.70	I
3	Lack of access to modern or alternative technologies	65 (54.16)	35 (29.16)	20 (16.66)	2.37	VII
4	Limited availability of sustainable resources (e.g., organic fertilizers, renewable energy)	79 (65.83)	20 (16.66)	21 (17.50)	2.48	V
5	Traditional practices are preferred over sustainable technologies in the household.	68 (56.66)	30 (25.00)	22 (18.33)	2.38	VI
6	Cultural or religious beliefs hinder the adoption of sustainable practices.	30 (25.00)	16 (13.33)	74 (61.66)	1.63	IX
7	Lack of government or institutional support for sustainable practices.	64 (53.33)	20 (16.66)	36 (30.00)	2.21	VIII
8	Lack of training and awareness programs on sustainable	88 (73.33)	14 (11.66)	18 (15.00)	2.58	III

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	resource management.					
9	The time and labor required to implement sustainable practices are too demanding.	90 (75.00)	15 (12.50)	5 (4.16)	2.54	IV

Analysis of data in Table 2 reveals that the majority, 72.50 percent of respondents were agreed that the high cost of sustainable practices is a challenge in its adoption, 75.00 percent agreed that insufficient access to financial support e.g., loans, subsidies was major challenge, 54.16 percent agreed that lack of access to modern or alternative technologies as major challenge ,65.83 percent agreed for limited availability of sustainable resources (e.g., organic fertilizers, renewable energy), 56.66 percent agreed for preference of traditional over sustainable technologies, 25.00 percent agreed that cultural or religious beliefs hinder the adoption of sustainable practices, 53.33 percent agreed for lack of government or institutional support for adoption of sustainable practices, 73.33 percent agreed for lack of training and awareness programs on sustainable resource management practices and 75.00 percent agreed for high demand of the time and labour required to implement sustainable practices are major challenge in adoption of sustainable resource management practices.

Table further reveals that insufficient access to financial support for sustainable practices (e.g., loans, subsidies) scored (2.70) highest followed by the high cost of adopting sustainable practices (2.61), Lack of training and awareness programs on sustainable resource management (2.58), the time and labour required to implement sustainable practices are too demanding (2.54), limited availability of sustainable resources e.g., organic fertilizers, renewable energy (2.48),Traditional practices are preferred over sustainable technologies in the household (2.38), lack of access to modern or alternative technologies (2.37),Lack of government or institutional support for sustainable practices (2.21), cultural or religious beliefs hinder the adoption of sustainable practices (1.63) as a challenge in adoption of sustainable resource management practices.

CONCLUSION:

The study on sustainable resource management practices among rural households in Ayodhya, Uttar Pradesh, reveals a growing adoption of eco-friendly strategies. Key practices include agroforestry, where farmers integrate tree cultivation with traditional crops, enhancing biodiversity and providing additional income sources. Water conservation methods, such as rainwater harvesting and the implementation of the Smart Water Village concept, have been instrumental in addressing water scarcity and ensuring reliable access to clean water. Waste management initiatives, particularly decentralized composting, have improved soil fertility and reduced environmental pollution. These efforts align with the Uttar Pradesh government's Vision 2030, aiming for balanced and sustainable development. Collectively, these practices not only enhance the livelihoods of rural households but also contribute to environmental conservation and resilience against climate change. The study highlights the importance of sustainable resource management in rural households for improving livelihoods and protecting natural resources. While several households adopt SRM practices, significant gaps remain in awareness, infrastructure, and support. Addressing these challenges through integrated approaches can promote the widespread adoption of sustainable practices and ensure the long-term resilience of rural communities

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