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AN ANALYTICAL STUDY OF SOCIO-ECONOMIC AND INFRASTRUCTURE DEVELOPMENT IN SOLU VILLAGE UNDER UNNAT BHARAT ABHIYAN

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ABSTRACT

This research paper offers an in-depth examination of the socio-economic conditions in Solu village from Pune district in Maharashtra aligning with the Unnat Bharat Abhiyan (UBA) initiative. It investigates critical demographic factors, access to basic amenities, agricultural practices, educational opportunities, and the implementation of government schemes within the village. By employing thorough data collection and analytical methods, the study uncovers significant disparities in resource accessibility and evaluates the effectiveness of existing government interventions. The findings reveal urgent areas that require attention, particularly in tackling poverty, improving health care, enhancing educational facilities, and upgrading infrastructure. These insights are particularly relevant to Sustainable Development Goals (SDGs), especially Goal 1 (No Poverty), Goal 3 (Good Health and Well-being), and Goal 4 (Quality Education). To promote sustainable development in Solu village, the paper offers actionable recommendations, including the introduction of targeted development programs and community engagement strategies. This study serves as a valuable resource for policymakers and development practitioners aiming to foster holistic growth and address socio-economic challenges effectively.

INTRODUCTION

1.1 Context and Background of the Research

The Unnat Bharat Abhiyan (UBA) is a flagship program initiated by the Government of India, aimed at promoting sustainable development in rural areas through collaborations between higher education institutions and local communities. This initiative encourages academic institutions to engage with villages, implementing various interventions to improve social and economic conditions. By fostering self-sufficiency and resilience among rural populations, UBA seeks to address critical issues such as education, healthcare, sanitation, and livelihood opportunities, aligning with India's broader vision of inclusive development. Solu village, which falls under the UBA program exemplifies the challenges and opportunities present in rural India. (*Unnat Bharat Abhiyan*, 2024) With a population of 2,264 residents across 514 households, Solu presents a microcosm of rural life. The gender ratio in the village is 874 females for every 1,000 males, reflecting common gender disparities in many rural settings. The average family size of four members aligns with national rural demographic trends, highlighting compact household structures. (*Data Analysis Report-Solu Village.Pdf*, n.d.) This study aims to evaluate the socio-economic status of Solu village by examining key areas such as household income, health infrastructure, educational attainment, agricultural practices, and the implementation of government schemes. A primary goal is to identify gaps in resource availability and propose priorities for future interventions under the UBA initiative. By doing so, the study aspires to contribute to the larger goal of uplifting rural communities through targeted development strategies.

1.2 Reason for Selecting Solu Village

Solu village Khed Taluka, Pune district, Maharashtra in India has been selected for a study focused on tackling socio-economic issues that align with the goals of UBA and the SDGs. The village

encounters challenges such as poverty, limited infrastructure, and unequal access to resources like banking, sanitation, and education. A major issue in the village is its heavy reliance on agriculture as the primary source of livelihood. Many residents engage in farming, yet they face hurdles such as inadequate irrigation facilities and limited access to modern agricultural techniques. This dependence, combined with income fluctuations caused by seasonal variations and market dynamics, creates economic instability for families. (*Data Analysis Report-Solu Village*, n.d.) Addressing these agricultural challenges is crucial for enhancing productivity and stabilizing income sources. Furthermore, the health infrastructure in Solu poses significant challenges. Many residents face barriers such as geographical distance to healthcare facilities, lack of awareness about available services, and financial constraints that hinder timely medical treatment. Enhancing health outcomes is vital for improving the quality of life in the village, requiring targeted interventions to strengthen health services and promote health education. These challenges directly connect with SDG targets, which emphasize enhancing education quality, reducing inequalities, and improving health, sanitation and water access. (*The Sustainable Development Goals Report*, 2023) This study seeks to provide critical insights for equitable development and sustainable rural advancement, making Solu a valuable case for fostering self-reliant, resource-accessible communities.

1.3 Research Problem

This research focuses on Solu village's socio-economic profile, examining challenges in infrastructure, healthcare, and educational access under the UBA. Significant disparities exist in access to banking, sanitation, and government schemes across different caste groups, raising concerns about equity in rural development. This study aims to evaluate the influence of these disparities on socio-economic progress and the effectiveness of government initiatives, identifying barriers to equitable access. Insights from this analysis will inform strategies for enhancing rural policy frameworks to foster inclusive, sustainable development.

1.4 Objectives of the Study

1. To understand the demographic structure of Solu village, located in Pune district, Maharashtra.
2. To identify socio-economic hurdles and highlight opportunities to improve the execution of rural development initiatives by the government.
3. To evaluate education, healthcare, and infrastructure facilities in the village and suggest strategies for improving their performance for overall rural progress.
4. To study the influence of various government schemes on the livelihoods of the rural population.

2. LITERATURE REVIEW:

1. The systematic review by Ruja et al. (2024) highlighted poverty as a pressing global issue and a critical component of the Sustainable Development Goals (SDGs). Drawing on 22 studies from Scopus and WoS, the authors examined poverty alleviation programs, focusing on women's empowerment and the resulting social, economic, and environmental benefits in rural and urban settings. Despite the potential to uplift household incomes and improve community welfare, issues such as goal misalignment, inadequate funding, and gender inequities persist. The pandemic's impact has further delayed progress, stressing the need to reassess these programs, particularly in the 2020-2022 period. *(Ruja et al., 2024)*
2. In their 2024 study, *Mishra et al.* reviewed 620 research articles that explored the relationship between financial inclusion and its socioeconomic impacts on sustainable development, with a focus on India and developing countries. The study emphasizes the vital role of financial access for achieving sustainability and highlights government efforts, such as formal banking systems, in integrating financially disadvantaged groups into the formal financial sector. *(Mishra et al., 2024)*
3. According to *Menberu (2024)*, leveraging technology in financial education could significantly reduce financial literacy gaps in developing countries by ensuring flexibility, cost-effectiveness, and scalability. Nonetheless, additional research is required to overcome the challenges marginalized groups face, such as inadequate infrastructure and language differences. The study advocates for investments in digital infrastructure, collaboration with stakeholders, the development of targeted programs, and the creation of comprehensive monitoring and evaluation frameworks. *(Menberu, 2024)*
4. *M. Showkat and colleagues (2024)* analyzed the relationship between digital financial services and women's financial independence in North India. By utilizing Partial Least Squares Structural Equation Modelling (PLS-SEM) and PLS Predict on a sample of 426 women, the study found that digital services significantly improve financial decision-making. This research aligns with UN SDG-5, promoting gender equality and women's economic empowerment, and highlights the crucial role of ICT in enhancing women's socio-economic status. *(Showkat et al., 2024)*
5. In a 2023 study, *Saluja et al.* reviewed the literature on women's financial inclusion, focusing on obstacles and interventions. They applied the PRISMA method to select 67 studies from 1,740 records for detailed evaluation. The research identified key challenges like patriarchy, psychological barriers, low income, financial illiteracy, limited access to services, and ethnicity. Interventions such as government schemes, microfinance, asset transfers, formal savings, self-help groups, and digital financial tools were found to be effective solutions. *(Saluja et al., 2023)*
6. *Sarda (2023)* examined India's rural development trajectory, tracing it from the pre-independence era to modern times, with a focus on major initiatives like the First Five-Year Plan, the Green Revolution, and MGNREGA. The study highlights successes such as the Self-Help Group movement while also identifying persistent challenges, including agricultural crises, inadequate infrastructure, and limited access to education and healthcare. The paper stresses the importance of sustainable and inclusive rural development. *(Sarda, 2023)*
7. *Khan et al. (2022)* reviewed 10,091 studies on financial inclusion and literacy, based on data from more than 850,000 people worldwide over the past 45 years. The majority of the research originates from developed countries, particularly the US, with a strong focus on finance and economics. The study highlights the critical role of financial literacy in promoting financial inclusion and calls for further investigation to better distinguish these concepts for scholars, regulators, and policymakers. *(Khan et al., 2022)*
8. In their research, *Kalli et al. (2022)* assess India's Pradhan Mantri Ujjwala Yojana (PMUY), designed to alleviate energy poverty. While LPG connections have been subsidized and widely distributed, many recipients are not refilling their cylinders frequently, showing a continued reliance on traditional cooking fuels. The study explores how families are adopting LPG through PMUY and refilling their cylinders, while also analyzing the factors behind these behaviors. Data indicates that households, on average, refill only two cylinders annually, highlighting ongoing dependence on conventional energy sources. *(Kalli et al., 2022)*
9. *Kaur et al. (2021)* highlighted that India, which is home to more than a third of the world's undernourished children, ranked 94th out of 107 countries in the 2020 Global Hunger Index. Agriculture in India is vulnerable to production and market risks, impacting both farmers' income and national food security. This review examines crop insurance policies, particularly the Pradhan Mantri Fasal Bima Yojana (PMFBY). Despite the scheme's launch, participation remains low in terms of the number of farmers, insured areas, and claim settlements. Challenges include high premiums, slow claim processing, and limited awareness. Expanding digital outreach could enhance farmer participation in these schemes. *(Kaur et al., 2021)*
10. *Ghosh et al. (2021)* studied the challenges faced by farmers in developing countries, highlighting their limited access to crop insurance due to dependence on informal risk management and insufficient financial integration. In India, the research revealed that farmers see value in crop insurance, are willing to pay premiums above government subsidies, and emphasize the importance of timely payouts and adequate coverage. Improving crop insurance schemes could meet the pressing needs of these farmers. (R. K. Ghosh et al., 2021)
11. *M. E. Agwu (2020)* points out that poverty alleviation and addressing income inequality remain crucial, especially in

developing nations. Digital financial tools show potential, yet their effectiveness is hindered by barriers such as limited literacy, lack of knowledge, distrust, and inadequate infrastructure, particularly in rural regions. Although technology can lower costs and improve access to financial services, rural areas are often left out. Many rely on the informal sector because of personal connections. Agwu advocates for financial institutions to incorporate the informal sector to broaden access for unbanked populations, ultimately aiding in economic growth and global development goals. *(Agwu, 2020)*

12. *Bhatia and Singh (2019)* emphasized the critical role of financial inclusion in advancing global development and empowering women. Their research explored how access to financial services influences the social, political, and economic aspects of women's empowerment. Based on data collected from 737 women residing in Ludhiana's urban slums, who benefited from schemes such as the Pradhan Mantri Jan Dhan Yojana (PMJDY), the study found that PMJDY significantly contributed to women's empowerment. The findings highlight the essential role formal financial systems play in fostering inclusion. (S. Bhatia & Singh, 2019)
13. *C.F. Gould and J. Urpelainen (2018)* revealed that in rural areas of India, LPG is the primary clean cooking fuel; however, only 11% of households predominantly use it. To lessen the harmful social, economic, and health effects associated with solid fuel consumption, new policies are being implemented to enhance LPG usage. Solid fuels represent a significant health risk worldwide, particularly for women and children. To reduce air pollution to safe standards, there is a need for clean fuels such as ethanol, LPG, and electricity. The Indian government is making efforts to capitalize on the potential of the cooking fuel sector to support ten Sustainable Development Goals. *(Gould & Urpelainen, 2018)*
14. *Samag (2017)* stated that the aim of rural development is to boost the living standards and economic stability of over 69% of the rural population in India. Despite the advancements in urban economies, rural regions still struggle with agricultural, infrastructural, and social service deficits. This paper analyzes the challenges that rural communities encounter and offers recommendations for improving rural family life through opportunities for self-employment and community collaboration. *(Samag, 2017)*

3. RESEARCH METHODOLOGY

Research Design: The research adopted a descriptive design to analyze socio-economic factors such as literacy, income, healthcare access, and basic infrastructure.

Data: Primary data was gathered through household surveys using questionnaires designed by UBA, IIT Delhi, while secondary data was sourced from the UBA portal. Interviews covered demographics, education, and infrastructure use.

Sampling Plan: A stratified random sampling method was applied to ensure adequate representation across different caste and income groups.

Sample Size: 514 households and 2264 individuals from Solu were included in the study.

Variables Used: Household data, including family demographics, poverty status, housing type, toilet and drainage access, and participation in government schemes, were collected. Information on water, energy, agricultural inputs, and livestock numbers was also gathered.

Data Analysis: Descriptive statistics were used to summarize educational and income data, with comparative analysis revealing disparities by caste and gender. Bar and pie charts were used to present findings.

Statistical Tools Used: MS Excel was employed for statistical analysis and data visualization.

4.2 Health and Sanitation:

Solu faces significant challenges in healthcare and sanitation infrastructure, despite some progress in line with government efforts and Sustainable Development Goals (SDGs). With only one primary health center for its 2,264 residents, Solu's healthcare system struggles to address diverse health needs, particularly as nearby major healthcare facilities are lacking. To align with SDG 3, which aims to ensure healthy lives and promote well-being for all ages, increased investment in healthcare facilities and staff is essential. Sanitation, however, shows improvement with 96.36% of households having access to toilets, a positive step toward SDG 6 on clean water and sanitation, although 3.64% of households, mainly from the general caste, still practice open defecation.

4. RESULTS ANALYSIS

4.1 Demographic Profile

4.1.1 Gender-Wise Population Across Age Groups

In Solu, the population includes 1,206 males and 1,056 females. Among children aged 0-5, there are 57 males and 70 females. The 6-18 age group includes 291 males and 193 females, reflecting a notable male dominance as age increases. In the primary working-age category of 19-45 years, there are 562 males and 570 females, almost balanced. For those aged 46 and above, the village records 296 males and 223 females. This age-structured gender distribution indicates a predominantly male demographic, particularly in economically active and elderly groups, impacting local labor and social dynamics.

4.1.2 Poverty Line Across Prevailing Caste Sections

Out of Solu's 516 households, 185 are categorized below the poverty line (BPL), while 331 are above it (APL). The economic profile varies significantly across caste lines. For Scheduled Castes (SC), 26 households are BPL and 35 are APL. Scheduled Tribes (ST) have 4 BPL households and 7 APL. Other Backward Classes (OBC) report 29 BPL and 26 APL households. The General (GEN) category has the largest number of APL households (263), with 126 BPL. These figures underscore significant economic inequalities among caste groups, suggesting a need for targeted economic support for BPL households, especially within SC and OBC categories.

4.1.3 Aadhaar Coverage Across Prevailing Caste Sections

Aadhaar registration in Solu is impressively high, covering 2,172 of the total 2,264 residents, ensuring broad access to essential services and welfare programs. Among SCs, 259 out of 274 individuals hold Aadhaar, while STs show similar inclusion with 52 out of 54. For OBCs, 219 of 232 residents have Aadhaar, and the GEN category shows the highest coverage, with 1,642 out of 1,704 individuals registered. This near-universal documentation supports socioeconomic inclusion, especially for marginalized groups.

4.1.4 Bank Coverage Across Prevailing Caste Sections

Financial access in Solu is substantial but varies by caste. Out of 1,960 individuals, 1,522 have a bank account, with the highest inclusion seen in the GEN category, where 1,155 out of 1,490 individuals possess accounts. SCs have 191 with bank accounts out of 239, while 29 out of 40 STs and 147 out of 191 OBCs also hold accounts. This financial inclusion allows a majority of residents access to savings, credit, and other financial services, but there is still room to improve accessibility, particularly among ST and OBC households.

4.1.5 Government Schemes Coverage

Solu's involvement in government schemes shows selective uptake. Notable welfare programs like PM Ujjwala Yojana and PM Awas Yojana benefit 16 and 12 households, respectively. Other schemes have lower participation: Fasal Bima Yojana serves 2 households, and Krishi Sinchai Yojana reaches 4. Only 18 individuals benefit from PM Jan Dhan Yojana, while smaller numbers participate in initiatives like Sukanya Samriddhi Yojana (2) and Mudra Yojana (2). Limited enrollment suggests potential barriers, such as lack of awareness or eligibility challenges, signaling the need for improved outreach.

4.1.6 Migration Scenario

The migration rate in Solu is low, with only 58 out of 2,264 residents migrating to urban areas. Migration patterns show that the GEN category has the highest number of migrants at 47, while SCs have 5 migrants, STs have 3, and OBCs also have 3. This limited migration reflects sufficient local livelihood opportunities or a strong community attachment, suggesting that local employment programs could further reduce out-migration and enhance rural stability.

Fig.1: Household Waste Collection System

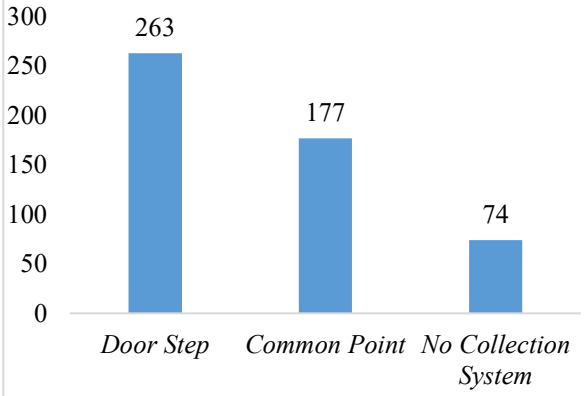


Fig2:Compost Pit

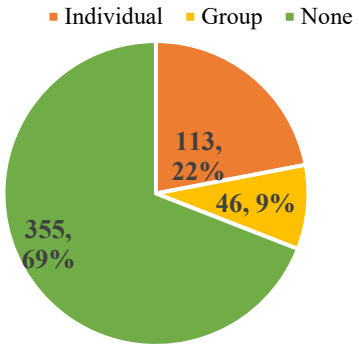


Fig3:Drainage Linked to Households

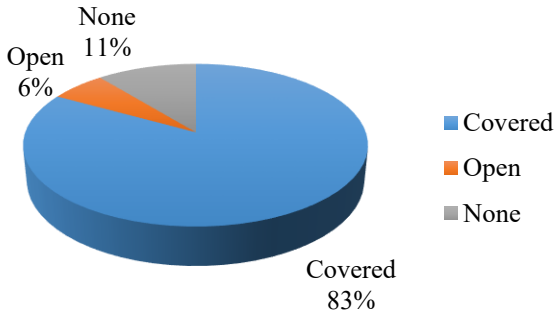


Fig.4: Households with and without toilets across different prevailing caste section in village

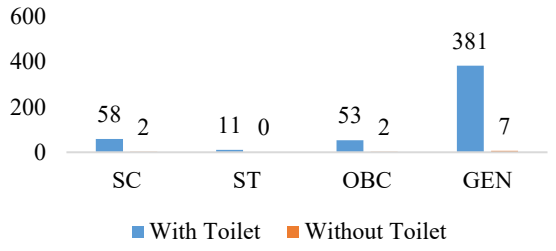
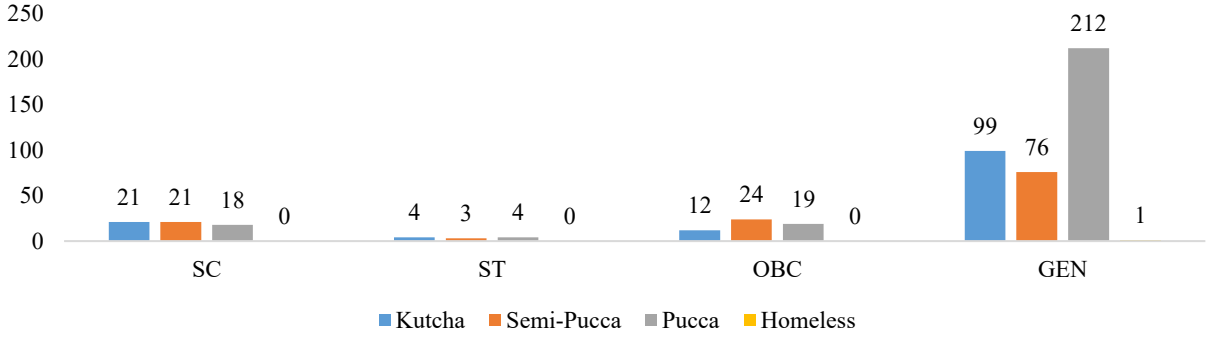


Fig.5: Type of Houses among the households



It is depicted from the present study that, government efforts toward "*Swachh Bharat*" (Clean India) have helped improve sanitation access, but more targeted outreach may be needed to eliminate open defecation entirely. Sustainable waste management remains an issue; only 14.4% of households have door-to-door waste collection, and 83.1% lack access to compost pits, underscoring the need for improved waste management systems to support SDG 11 for sustainable cities and communities. Moreover, while 427 households have covered drainage, 56 households lack any drainage infrastructure, signaling an urgent need for inclusive and environmentally sustainable waste and sanitation solutions. (*Data Analysis Report-Solu Village*, n.d.; *Unnat Bharat Abhiyan*, 2024)

4.2 Basic Amenities

4.2.1 Education:

The village of Solu, under the UBA initiative, reveals significant insights into education levels, school-going children, and adult literacy across caste groups. Solu maintains a male literacy rate of 88.08% and a female literacy rate of 81.91%, averaging 85.20% overall, indicating a relatively high literacy environment. Primary education facilities are accessible, with two government primary schools available. Education distribution among males and females shows a varying level of attainment, with most residents educated up to Class 10. However, a gender disparity is notable, as more males complete secondary education (Class 10) compared to females, who lag slightly behind in higher educational attainment. For school enrollment, the male-to-female ratio is approximately 239:149, highlighting a slight gender gap in school attendance. Adult literacy also varies among caste groups, with the General caste showing the highest adult literacy levels, while Scheduled Castes and Tribes present lower figures, especially within Below Poverty Line (BPL) groups. (*Unnat Bharat Abhiyan*, 2024) These findings emphasize the need for targeted interventions to bridge gender and caste-based disparities in education access and literacy, ensuring equitable educational resources and opportunities across the community.

Fig.6: Number of male and female individuals across different education levels

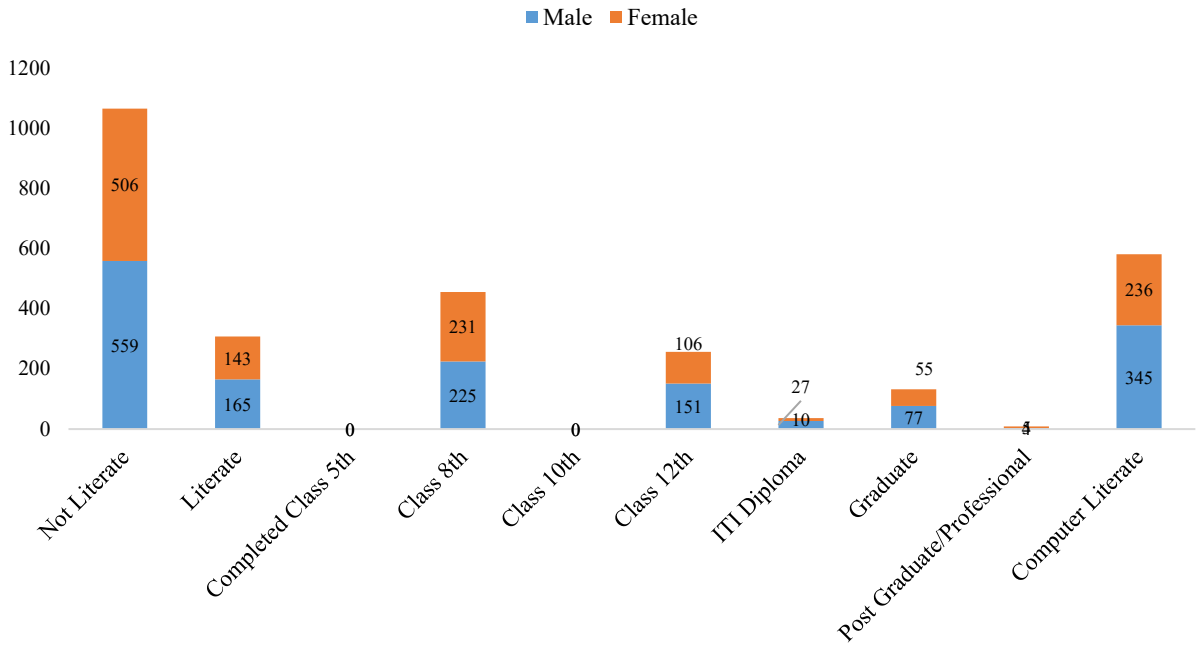


Table 1: School Going Children and adult literacy across caste groups

Caste	*Category*	*School Going Children*			*Adults*			*Total Not Going*			*Total Not Applicable*		
		Male	*Female*	*Total*	*Male*	*Female*	*Total*	*Male*	*Female*	*Total*	*Male*	*Female*	*Total*
SC	BPL	10	6	16	4	4	8	30	28	58	5	5	10
	APL	22	14	36	2	3	5	66	52	118	2	4	6
ST	BPL	5	1	6	0	0	0	6	6	12	1	2	3
	APL	5	4	9	1	2	3	12	8	20	0	0	0
OBC	BPL	8	11	19	2	1	3	44	39	83	6	2	8
	APL	17	15	32	7	5	12	30	33	63	5	2	7
GEN	BPL	45	38	83	14	27	41	200	197	397	16	19	35
	APL	118	83	201	44	41	85	410	353	763	34	21	55
TOTAL	BPL	68	56	124	20	32	52	280	270	550	28	28	56
	APL	162	116	278	54	51	105	518	446	964	41	27	68

4.2 Health, Water and Sanitation

Solu village, with a population of 2264, has only one primary health center, leaving gaps in healthcare accessibility and significant health challenges. Establishing mobile health units or nearby secondary facilities could enhance health outcomes. Water sources include piped connections, community taps, hand pumps, and open wells. The pie chart in fig.7 shows that nearly half (49%) of Solu village relies on miscellaneous water sources, while piped water serves 23% of households. Community taps and hand pumps provide water for 12% and 9%, respectively, with open wells covering 7%. Expanding piped water access could reduce reliance on potentially unsafe sources, improving overall water quality and public health. Expanding piped access and maintaining communal taps and wells can reduce waterborne illnesses and improve health quality.

Fig.7: Drinkage Water Facility

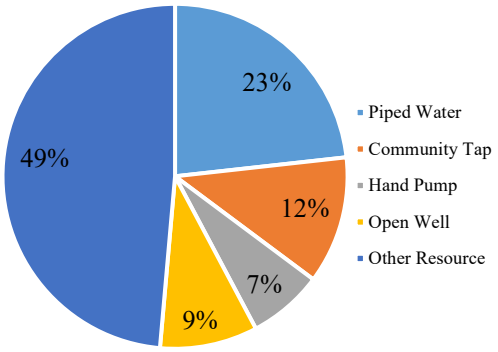
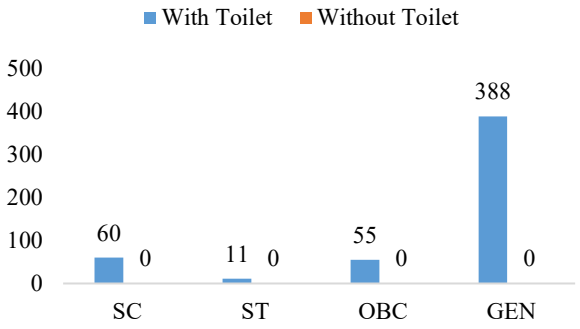


Fig.8: Households with and without toilets across different prevailing caste section in village



The village's drainage is partly effective, with 427 households using covered drainage, while 31 have open systems and 56 lack drainage altogether. Enhanced waste management and covered drainage expansion can significantly improve sanitation and reduce contamination risks. Composting facilities are present but limited; 355 households lack them. Increased access to composting facilities, combined with educational programs, could foster eco-friendly waste practices. Toilet access varies across caste groups, with good coverage among Scheduled Castes and Other Backward Classes. Expanding sanitation for uncovered households will further improve community health. Most households practice private toilet use, with 92% opting for private toilets. Community engagement in toilet maintenance and use would further enhance village sanitation and hygiene. (*Data Analysis Report-Solu Village*, n.d.; *Unnat Bharat Abhiyan*, 2024)

4.3 Type of Houses, Village Transport, Infrastructure and Basic Amenities

Solu has 490 households, with around 62% living in semi-permanent structures, while the rest reside in fully concrete homes. This high number of semi-permanent houses suggests a need for improved housing infrastructure, which aligns with Unnat Bharat Abhiyan's mission to enhance rural living standards. The village has approximately 5 kilometers of road, but transportation options are limited, and most villagers rely on private or shared transport for traveling to nearby towns. Expanding road networks and introducing public transport could improve access to essential services, aligning with national goals for rural development. Solu has two primary schools and a primary health center to meet basic educational and healthcare needs. However, there is a lack of secondary healthcare and higher education facilities. In terms of water, only 23% of households have piped access, while 12% use community taps, and 49% depend on other sources, which may not always be safe. Expanding piped water coverage and healthcare resources could enhance quality of life, supporting SDGs 3 (Health) and 6 (Clean Water). (*Data Analysis Report-Solu Village*, n.d.; *The Sustainable Development Goals Report*, 2023)

4.4 Sustainable Land Use and Agricultural Practices

4.4.1 Land and Agriculture Resources

Of the village's cultivable land, 60% is irrigated, while 40% remains unirrigated, limiting agricultural productivity. Increasing irrigation infrastructure can boost crop yields and contribute to food security, providing sustainable income for local families.

4.4.2 Forest & Horticultural Profile

Forest coverage in Solu is minimal, with only 5 hectares available, and horticulture practices are limited as well. Introducing fruit-bearing trees and expanding horticultural activities could diversify income and support environmental sustainability, aligning with SDG 15 (Life on Land).

4.4.3 Source-Wise Irrigation Coverage

In Solu, irrigation for 40% of farmland comes from wells, 35% from canals, and the remaining 25% from other sources. Increasing the availability of canals and wells could enhance water access for agriculture, especially in dry seasons, advancing Unnat Bharat Abhiyan's agricultural objectives.

4.4.4 Irrigation Methods Used

Traditional irrigation methods are predominant, with 70% of households using pumps and few adopting modern techniques. Water-efficient methods like drip irrigation are rare, indicating a need for improved irrigation practices to enhance productivity and water conservation, supporting SDG 2 (Zero Hunger).

4.4.5 Use of Chemicals and Fertilizers

Around 75% of households use chemical fertilizers, while only 25% engage in organic practices. The high use of chemicals poses risks to soil health. Promoting balanced or organic farming practices can help maintain soil fertility, supporting SDG 12 (Responsible Consumption and Production) through sustainable agriculture.

Fig.9: Irrigation methods used among the households

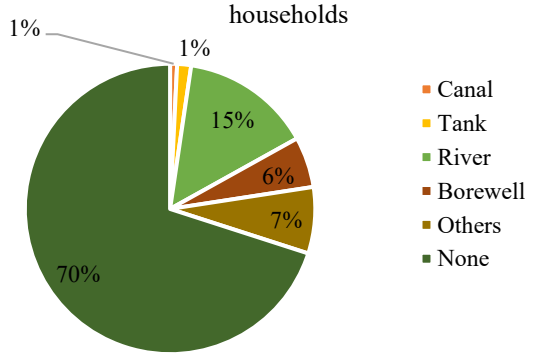
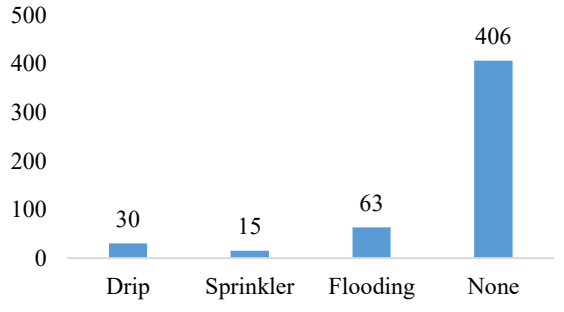


Fig.10: Irrigation methods used among the households



4.4 Digital Literacy: In Solu village, digital literacy has notably risen, with 345 men and 236 women now proficient in computer skills. However, participation in government schemes such as PM Ujjwala Yojana, PM Awas Yojana, Fasal Bima Yojana, and Swachh Bharat Mission remains limited. Financial schemes have also seen low enrollment, with only 18 individuals benefiting from PM Jan Dhan Yojana and just 2 girls enrolled in the Sukanya Samriddhi Yojana.

4.5 Electricity: Electricity reaches 98.6% of households, though efforts are needed to reduce outages and ensure a steady supply,

especially for community facilities. While the water supply mainly relies on piped water, seasonal shortages continue to affect availability.

4.6 Migration Scenario: Migration for better economic prospects has led 58 villagers to move to urban areas. Farming is the primary livelihood, with 407 men and 288 women actively working in agriculture.

4.7 Livestock: Livestock ownership is primarily held by the general caste (GEN), totaling 213 animals. Improved animal shelters are needed to enhance livestock health and productivity. LPG serves as the primary cooking fuel for 386 GEN households, while traditional stoves are still widely used, especially among 92.73% of SC and 97.55% of GEN households.

These findings offer a comprehensive view of the demographic, socio-economic, agricultural, educational, and infrastructural conditions in Solu village, highlighting areas for targeted development interventions.

DISCUSSION

The socio-economic profile of Solu village under the Unnat Bharat Abhiyan (UBA) provides critical insights into the village's demographics, resource distribution, livelihood opportunities, and development needs. This analysis aligns closely with India's national Sustainable Development Goals (SDGs) agenda, specifically in eradicating poverty (SDG 1), improving education (SDG 4), promoting gender equality (SDG 5), and ensuring access to clean water and sanitation (SDG 6). (*The United Nations: 2030 SDG's*, n.d.) The UBA initiative itself targets holistic rural development through inclusive and sustainable means, aiming to bring transformational changes to villages by addressing these goals in practical, ground-level implementations. (*A Holistic Approach to Rural Development in India*, 2023; Samag, 2017; WOTR, 2023) Government programs like the Pradhan Mantri Awas Yojana, PM Ujjwala Yojana, and Swachh Bharat Mission are instrumental in bridging the gaps in essential services, improving housing and sanitation, and facilitating access to basic amenities. The data from Solu village underscores the importance of these programs while also revealing areas where additional intervention could significantly uplift the socio-economic status of residents.(*Data Analysis Report-Solu Village*, n.d.; Srikanth, 2009) One of the fundamental areas explored in Solu is demographic distribution, which indicates a moderate gender imbalance, with a ratio of 874 females per 1,000 males. Gender disparities within rural communities often reflect historical socio-cultural norms, impacting education and economic participation. *(Bose, 2012; Sharma & Agarwal, 2020)* The village's educational facilities show a literacy rate of 85.20%, yet with a notable gender gap that reflects wider systemic issues seen across rural India. This connects with SDG 4 and SDG 5, focusing on quality education and gender equality, respectively. Increased investments in educational access for girls and boys alike, along with the provision of vocational training and higher educational facilities, could provide a solid foundation for economic stability, particularly if aligned with the UBA objective of empowering rural youth. *(Data Analysis Report-Solu Village, n.d.; Unnat Bharat Abhiyan, 2024; M. Ghosh, 2017; Yu et al., 2024)* Solu's government scheme coverage shows moderate engagement with welfare programs, such as the PM Ujjwala Yojana for clean cooking fuel, which has shown promising results but still requires improved outreach for greater inclusion, especially among lower-income households. *(M. S. Bhatia, 1999; Samag, 2017; Schemes/Programmes | Ministry of Rural Development | Government of India, n.d.)*

Sanitation and waste management emerge as significant aspects of Solu's development profile, connecting directly to SDG 6, which focuses on clean water and sanitation for all. The presence of doorstep waste collection for over half the households in Solu indicates a foundational level of waste management. However, the village faces challenges with drainage systems, as 83.1% of households lack adequate drainage, posing health and environmental risks. *(Data Analysis Report-Solu Village.Pdf, n.d.; A. Ghosh et al., 2024; Samuel et al., 2009)* Open defecation has nearly been eliminated, showcasing the success of the Swachh Bharat Mission in promoting sanitation practices. Yet, the lack of formal composting and sustainable waste processing highlights an opportunity for UBA programs to integrate eco-friendly waste management strategies, like community composting or biogas production from animal waste. *(Chary et al., 2022; Rao et al., 2020)* Expanding waste and water management infrastructure aligns with the UBA's environmental sustainability goals and SDG 6, directly impacting health and sanitation quality. *(Chaskin, 2001; Deshpande et al., 2021; wa, 2018)* Economic activities in Solu primarily center around agriculture, animal husbandry, and small-scale labor. Agricultural practices reflect a combination of traditional methods alongside gradual adoption of modern techniques such as drip and sprinkler irrigation. However, reliance on chemical fertilizers and insecticides, with limited access to organic alternatives, suggests a need to promote sustainable farming aligned with SDG 2, which advocates for sustainable food production systems. *(Chary et al., 2022; Choithani et al., 2021; Majumdar, 2020)* Expanding the use of sustainable agricultural practices, such as organic composting, agroforestry, and diversified cropping patterns, can mitigate environmental degradation and bolster economic resilience. *(Panda, 2021; Rao et al., 2020; Samag, 2017)* Livestock assets, particularly dairy production, form an integral part of rural livelihood in Solu, reflecting the importance of livestock management in achieving food security and economic stability *(Choudhary & Singh, 2021)*. UBA could promote improved livestock shelter and veterinary support, enhancing productivity and creating new income streams, thus addressing poverty alleviation under SDG 1. (*Unnat Bharat Abhiyan*, 2024)

Solu's infrastructure and energy usage reflect a moderate development status, with nearly universal electricity coverage but limited renewable energy utilization. Though LPG is widely adopted for cooking, reliance on kerosene by a minority reveals potential for further energy diversification, directly supporting SDG 7, which promotes access to affordable and clean energy. The UBA initiative, in partnership with government renewable energy schemes, could expand solar power projects in Solu, reducing energy costs and environmental impact. *(Cabiyo et al., 2021; Gould & Urpelainen, 2018; Kalli et al., 2022)* Moreover, improvements in transportation and connectivity infrastructure, such as completion of the main road and internal road expansion, would facilitate access to markets, healthcare, and educational institutions, supporting SDG 9, which advocates resilient infrastructure and inclusive industrialization. Improved connectivity can enable Solu's residents to engage in diverse employment opportunities, thus enhancing income levels and socio-economic mobility. *(Antle, 1984; Binswanger et al., 1993; M. Ghosh, 2017; Lokesha & Mahesha, 2016; Samag, 2017)*

Income data for Solu reveals significant disparities among caste groups, with general caste households earning substantially more than scheduled castes (SC), scheduled tribes (ST), and other backward classes (OBC). Addressing such disparities is central to UBA's inclusivity focus and resonates with SDG 10, which targets the reduction of inequalities within and among countries. *(S. Bhatia & Dawar, 2023; Mishra et al., 2024; R. R. Sharma, 2020)* Access to income-generating opportunities, vocational training, and small business support programs could uplift economically weaker groups, thereby fostering equity and resilience. Supporting alternative income sources like poultry farming, handicrafts, and small-scale trade could also diversify the village economy, aligning with SDG 8 for decent work and economic growth. *(Ruja et al., 2024; Saluja et al., 2023; Samag, 2017)* The establishment of micro-finance institutions, skill development centers, and self-help groups (SHGs) could serve as critical mechanisms to empower marginalized groups economically.

In conclusion, Solu village's UBA assessment reveals a complex socio-economic and environmental landscape with promising developmental achievements and notable challenges. The village aligns with SDG targets in multiple areas, from improving education and sanitation to fostering sustainable agriculture and clean energy usage. Yet, gaps in healthcare, financial equity, and sustainable infrastructure point to areas where the UBA, alongside state and national programs, could implement targeted interventions. (*Data Analysis Report-Solu Village*, n.d.) Such initiatives would enable Solu to progress towards a resilient and self-sustaining rural economy, fulfilling UBA's vision of a self-reliant India. Through collaborative efforts that integrate UBA

objectives, SDG targets, and government programs, Solu and similar villages can achieve transformative development that is both inclusive and sustainable.(*The United Nations: 2030 SDG's*, n.d.; *Unnat Bharat Abhiyan*, 2024)

5. SUMMARY

The socio-economic assessment of Solu village under the Unnat Bharat Abhiyan (UBA) showcases a blend of advancements and ongoing challenges, reflecting its alignment with several Sustainable Development Goals (SDGs). Positive strides are evident in areas such as educational outreach, gender inclusion, clean water access, and sustainable energy availability. However, the village still faces notable challenges, particularly in gender disparity, limited healthcare facilities, uneven access to education, and low participation in government welfare programs. Addressing these issues through targeted policies could significantly strengthen the village's social and economic fabric.

A key area requiring focus is gender equality, which is crucial for achieving SDG 5 (Gender Equality). Increasing economic opportunities and educational access for women could create a more balanced workforce and foster inclusive growth. Skill-building initiatives, small-scale industries, and agricultural training could also help retain local talent, reducing the rate of migration for better economic prospects. This would also align with SDG 8 (Decent Work and Economic Growth), which emphasizes local employment and sustainable livelihoods. In healthcare, UBA could contribute by deploying mobile health units and telemedicine services to improve access, especially for remote populations, thus advancing SDG 3 (Good Health and Well-being). Educational opportunities could be expanded through specialized programs aimed at reducing dropout rates and increasing literacy among women. Sustainable agricultural practices, including organic farming, crop rotation, and water-efficient irrigation techniques, could support SDG 2 (Zero Hunger) by improving food security and reducing reliance on chemical fertilizers. Solu's energy landscape, though largely covered by traditional LPG and kerosene sources, could benefit from a transition to renewable options like solar power and bioenergy, aligning with SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action). Such renewable energy initiatives could reduce environmental impact and ensure energy resilience within the community. Sanitation and waste management are also key areas for improvement, as inadequate drainage and waste disposal methods contribute to health risks. Encouraging eco-friendly waste management practices, like composting, could enhance environmental health and community sanitation, furthering the objectives of SDG 6 (Clean Water and Sanitation) and SDG 11 (Sustainable Cities and Communities).

By addressing these socio-economic gaps, UBA's holistic approach can help Solu village progress toward self-sufficiency and sustainable development. Tailored interventions, encompassing education, healthcare, renewable energy, and sustainable agriculture, can empower Solu and similar villages across India, fostering rural resilience and aligning with broader national development goals.

CONCLUSION

The socio-economic study of Solu village, conducted under Unnat Bharat Abhiyan (UBA), illustrates progress in areas tied to the Sustainable Development Goals (SDGs), including education, gender equality, sanitation, and sustainable energy. Despite this advancement, gender disparities, limited healthcare and education access, and low adoption rates of government schemes highlight a need for targeted policy efforts to bolster the village's socio-economic resilience. Addressing these challenges would enable women to play a greater role in economic growth, fostering a more inclusive community. UBA could further support skill-building programs, local industries, and agricultural training to mitigate migration and create employment opportunities. Additionally, improving healthcare through mobile units and telemedicine would enhance health outcomes and align with SDG 3. Sustainable agricultural practices—such as organic farming, crop rotation, and advanced irrigation—could strengthen local farming. UBA could also promote renewable energy options, including solar power and bioenergy, advancing SDG 7 and SDG 13. By implementing eco-friendly waste management, sanitation and environmental health could be further improved. This cohesive approach supports Solu and similar communities on a path to sustainable development, emphasizing India's dedication to balanced rural and national growth.

7. RECOMMENDATIONS

The present study suggests following recommendations offering a holistic approach to help Solu village from Khed taluka of Pune district in Maharashtra achieve sustainable and inclusive growth.

1. ***Raise Awareness of Government Programs***: Increase outreach and simplify access to welfare schemes, particularly for marginalized groups (SDG 1).
2. ***Expand Women's Education and Employment Opportunities***: Develop educational and vocational training for women to boost economic participation and gender equality (SDG 5).
3. ***Introduce Mobile Health and Telemedicine***: Improve healthcare access with mobile clinics and telemedicine for preventive care (SDG 3).
4. ***Promote Sustainable Farming***: Encourage organic farming, crop diversity, and efficient irrigation to support resilient agriculture (SDG 2, SDG 13).
5. ***Support Renewable Energy Use***: Promote solar power and bioenergy solutions to reduce reliance on non-renewables (SDG 7).
6. ***Upgrade Sanitation and Waste Management***: Install proper drainage and community composting for better sanitation and environmental health (SDG 6).
7. ***Create Skill Development Centers***: Establish centers for vocational training to curb migration and boost local employment (SDG 8).
8. ***Improve Infrastructure and Connectivity***: Enhance roads and transport to facilitate access to markets and services (SDG 9).
9. ***Boost Financial Literacy and Inclusion***: Offer financial literacy programs to ensure economic inclusion for all residents (SDG 10).
10. ***Encourage Community Involvement in Sustainable Practices***: Promote community-led initiatives in waste management and resource conservation for sustainable development (SDG 11).

8. FUTURE SCOPE

The present study encourages the researchers to undertake studies in the following direction addressing critical needs for sustainable rural development in Solu village.

1. ***Impact of Digital Literacy on Rural Employment***: Investigate how enhancing digital skills among rural youth can reduce migration by creating local job opportunities, which aligns with SDG 8 (Decent Work and Economic Growth) and supports UBA's goal of empowering self-reliant villages.
2. ***Barriers to Women's Economic Participation***: Conduct a comprehensive study on the socio-cultural and economic barriers that limit women's access to education and employment in rural areas. Understanding these barriers is essential for promoting SDG 5 (Gender Equality) and fostering inclusive community development.
3. ***Assessment of Renewable Energy Adoption***: Evaluate the feasibility and impact of renewable energy sources, like solar and bioenergy, for rural households. This research can inform sustainable energy policies that support SDG 7 (Affordable and Clean Energy) and UBA's focus on sustainable rural development.
4. ***Improving Healthcare Access through Mobile Services***: Study the effectiveness of mobile health clinics and telemedicine in meeting rural healthcare needs. This research aligns with SDG 3 (Good Health and Well-being) and could inform initiatives to extend healthcare access to underserved communities.
5. ***Effective Waste Management and Sanitation Practices***: Explore sustainable waste management models for villages, including composting and recycling practices. This would support SDG 6 (Clean Water and Sanitation) and improve environmental health in rural areas under UBA.
6. ***Financial Literacy and Access to Government Schemes***: Investigate the impact of financial literacy on access to

government welfare programs. Researching ways to improve financial inclusion supports SDG 1 (No Poverty) and enhances rural communities' resilience by ensuring equitable benefits from available schemes.

9. LIMITATION

The results obtained in this research paper are applicable to Solu village of Khed Taluka in Pune district of Maharashtra, India and may not necessarily be applicable to other villages in India.

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