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Pradhan Mantri Ujjwala Yojana (PMUY): Green Initiative to Achieve United Nations (UN) Sustainability Development Goals (SDGS) - A Study of Rural Households in Bihar

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Abstract

The seventeen Sustainable Development Goals (SDGs) were established by the United Nations (UN), and as a result, human beings were attempting to traverse the sustainable pathway. Meanwhile, Pradhan Mantri Ujjwala Yojana (PMUY) Scheme was launched as a green initiative having an objective to provide clean cooking fuel such as Liquefied Petroleum Gas (LPG) accessible to the deprived rural households which were habituated to traditional fuel having adverse effects on health of the society as well as affecting environment. The researchers propose this study as a guide to assess the PMUY scheme into the sustainable pathway by prioritizing sustainability to engage the actions for achieving the numerous SDGs specifically – Goal 1 (No Poverty), Goal 3 (Good Health and Well-being), Goal 5 (Gender Equality), Goal 7 (Affordable and Clean Energy), and Goal 13 (Climate Action). The Inquiry in this study begins with the qualitative Investigation of human experiences with regards to PMUY scheme with respect to afore-mentioned specified SDGs. Furthermore, quantitative investigation performed with the help of explorative approach to find out various factors and descriptive approach to evaluate and analyse the identified variables concerning the attainment of selected SDGs. With the help of survey schedule, data was collected by the researcher from the top three poor districts and 10 Villages from each district of Bihar. The formulated hypotheses were tested using a variety of statistical techniques, including correlation, regression, and ANOVA. The study's findings are valuable in achieving the UN SDGs in a more efficient manner. The study also assists stakeholders, including government and policymakers, in the development of effective policies and strategies to enhance the efficacy of the PMUY Scheme.

Keywords: PMUY, SDGs, Rural Household, Poverty, Gender Equality

I. INTRODUCTION

The human beings in this mortal world thrived through substantial progress in terms of industrialization, urbanization, green revolution and now marching in the direction of digitization. As they voyage through these progressions, the most vital aspects of sustainable and survival approaches are neglected and are not used in proper way, thus the universe exhibited its vengeance in profuse means. The humanity, in the present digitalized world, as they are verging on to "Type-I civilization", are in dire necessity to have well matured development that imbues sustainability into their behaviour and plan of

actions. As a result, the United Nations (UN) proposed "17 Sustainable Development Goals (SDGs)" (UN, 2015) which serves as guidelines for humanity to ensure that human behaviour and environment coevolve into a single self-sustaining system. It appears that the progress is not in line with the strategy of United Nations for the SDGs fixed targets by the year 2030, necessitating a lot more emphasis towards SDGs attainment. Despite the slow pace of development towards attaining sustainability, various challenges have forced humanity to endure a period of extraordinary change. The United Nations, in the year 2015, along with its 193 member states approved the 17 interconnected SDGs, to create more just, liveable, and peaceful world by 2030. India is dedicated to achieving the target set forth in the UN Agenda 2030. To attain the SDGs, Indian Government has launched several schemes to accomplish the objectives such as Pradhan Mantri Awas Yojana (PMAY), Ayushman Bharat, Swachh Bharat Abhiyan to name a few. One of the schemes known as "Pradhan Mantri Ujjwala Yojana (PMUY) or Ujjwala Yojana" was launched in 2016 as a flagship scheme having an objective to provide clean cooking fuel such as Liquefied petroleum Gas (LPG) accessible to the deprived rural households which were habituated to use fire wood, cow-dung, coal etc. as traditionally cooking fuels, having detrimental effects on the health of rural population as well as impacting the environment. In line with the UN Agenda 2030, PMUY necessitates the creation and development of a resilient society that functions in harmony with the environment is required for the future generation to come. To do so, it is crucial to prioritize the most vulnerable societal and industrial operations while also assuring global health and sustainable resource management (UNEP & IRP, 2020). The present Study seeks to put into context by offering guidance to the research and academic community, policymakers, investors, and government officials as to how to promote and sustainability and accomplish the multiple SDGs. The present study gives specific attention on Goal 1 (No Poverty), Goal 3 (Good Health and Well-being), Goal 5 (Gender Equality), Goal 7 (Affordable and Clean Energy), And Goal 13 (Climate Action).

Literature Review:

Growing awareness regarding the sustainability and development around the globe particularly focused with relation to climate and health risks. As a result, numerous government initiatives and research have been conducted in developing nations to support the various SDGs. Sreeja et al. (2023) studied in the context of the BRICS nations—Brazil, Russia, India, China, and South Africa, which shed light on the connection between having access to clean cooking fuels and environmental damage. The purpose of the study is to determine whether using Liquefied Petroleum Gas (LPG) for cooking has a positive effect on halting environmental degradation in the BRICS countries. It investigates the potential environmental advantages of switching to cleaner alternatives from conventional cooking fuels such solid biomass (wood, dung, etc.).

Zhang et al. (2023) study identified the factors influencing the adoption of clean energy technology and the obstacles preventing energy transition. Rural households were surveyed and interviewed to acquire information from the respondents to analyse the socio-economic, cultural, and environmental factors influencing energy choices. According to the study, factors that affect whether or not clean energy solutions are adopted include income levels, access to energy infrastructure, cultural views and behaviours, and the availability of clean energy technologies.

Haque et al. (2022) researched on vulnerability and adaptability of communities in South Asia region that are particularly vulnerable to the effects of climate Change. The study focuses on comprehending the socioeconomic, cultural, and environmental elements that affect these communities' susceptibility and looks at the various actions these communities have made to create resilience. The research's shed light on the unique problems that populations in South Asia are currently dealing with, including an increase in the frequency of extreme weather events, a rise in sea levels, and changes in rainfall patterns.

Kumar et al. (2021) studied the various problems and concerns posed by energy transitions in developing nations. The study explores the critical need for the global South to switch to sustainable energy systems in order to address important problems including climate change, energy poverty, and environmental degradation. It emphasizes the necessity of striking a balance between urgent action and long-term sustainable development while recognizing the significance of justice and equity in these transitions.

Lu et al. (2020) study aims to pinpoint the traits of People and households that are most susceptible to energy poverty in rural Qinghai, China. The researchers shed light on the socioeconomic and demographic characteristics of low-energy individuals and households in China's least developed regions. According to the study, marginalized groups, such as those who have lower incomes, less education, and larger households, are disproportionately affected by energy poverty. Additionally, it emphasizes how important housing conditions and lack of access to contemporary energy sources are as causes of energy poverty in these areas.

Kimemia and Anne garn (2016) talked about challenges and lessons learnt with regard to domestic LPG interventions in South Africa. They performed one-on-one interviews in the Atteridgeville Town neighbourhood, a low-income area. Prior to the intervention, power was used for a variety of purposes, including heating and cooking, which resulted in a rise in demand during peak hours relative to supply, indicating that 70% of beneficiaries continue to use LPG and believe the intervention has improved their lives. Andadari et al. (2014) provides insight on the reduction of energy poverty in Indonesia through fuel 3 switching. They evaluated the effects of the government's intervention to replace kerosene with LPG using extensive household surveys in urban, semi-urban, and rural areas, and found that the program is a huge success, with dependencies on characteristics including household size, income, and education.

Similar research was done by Biscoff et al. (2012) in Ho Municipality, Ghana, on the growing shift from gasoline to LPG fuel for automobiles. They have obtained and reviewed the data through a survey using in-depth interviews, focus groups, and direct observations. Matthews (2014) come up with the opportunities and constraints for the Sub-Saharan African clean fuel market. The study looked into the relative effectiveness of the oil product supply networks in 12 sub-Saharan countries. To lessen the disparity between global reference prices and consumer pricing, chances for improvement in the direction of "best-practices" have been sought for. The National Family Health Survey-4 and National Family Health Survey-5 reports were used in the Shabnam et al. (2022) study to assess India's needed Progress rate for reaching the health-related targets under SDG 3 (i.e., good health and well-being) and the national health strategy of India 2017. They shed light on India's development in terms of different health indicators, including access to healthcare, maternal and child health, immunization rates, communicable and non-communicable diseases etc.

Patnayak and Jha (2020) study done the critical analysis of caste, class, and gender dynamics' effects on Liquefied Petroleum Gas (LPG) adoption as a sustainable cooking fuel in India. The purpose of the study is to comprehend the socio-cultural and economic variables that influence the patterns of LPG adoption in India among various caste, class, and gender groups. It evaluates the degree to which these elements play a role in unequal access to clean cooking fuel as well as any potential effects on social inequality and energy justice.

Yadav (2020) study on PMUY initiative, which gives rural households access to clean cooking fuel, notably Liquefied Petroleum Gas (LPG), aims to determine how it has influenced women's empowerment in the chosen regions of Rajasthan. The study looks at a number of aspects of women's empowerment, such as financial Empowerment, decision-making authority, education, and general well-being. In order to optimize the advantages of PMUY, the study also underlines the significance of awareness campaigns and capacity-building initiatives.

Nikhat(2019)has emphasized on the importance of integrated marketing communication approach in reaching the goals of an organization.

Arshad et al(2022) has done a rsearch on the importance of mask in prevention of the diseases which is related to the health goals of SDG,s

Danish et al(2022) has felt that online marketing is in boom and focussed on the purchasing pattern of the consumer.

Nikhat et al(2023)has done a case study on the herbal medicine efficiency in curing the diseases specially during Covid Times.

Kavya et al. (2019) with an emphasis on Indian instances, investigates a framework for incorporating gender equity considerations into climate change mitigation plans. The research suggests a two-step strategy that combines gender analysis and gender responsive policy design to ensure that gender views are taken into account when developing solutions to mitigate climate change. It highlights how crucial it is to understand the differential impacts of climate change and mitigation policies affect men and women, as well as how crucial it is to address gender inequities in these processes. The adoption and continuing use of Liquefied Petroleum Gas (LPG) under the PMUY plan in tribal tribes of Pune district, India, is examined by Patil (2021). The goal of the study is to pinpoint the obstacles and enablers that tribal communities must overcome in order to obtain, adopt, and continue using LPG as a clean cooking fuel. It looks into the Socioeconomic, cultural, and physical elements that affect how LPG cylinders are adopted and used in these areas. Aggarwal et al. (2018) concentrates on the creation and application of a tool to help with the PMUY scheme decision-making process. The goal of the study is to develop a decision support system that uses data analytics and technology to make it easier to find and choose eligible beneficiaries for the PMUY program. The method uses a number of metrics and criteria to identify and prioritize the households that have the greatest need for access to clean cooking fuel.

Research Gap

Even though the Pradhan Mantri Ujjwala Yojana (PMUY) and its effects on many elements of energy access and women's empowerment have been extensively researched, there are still research gaps that must be filled in light of certain Sustainable Development Goals (SDGs) with respect to Goals 1 (No Poverty), 3 (Good Health and Well-Being), 5 (Gender Equality), 7 (Affordable and Clean Energy), and 13 (Climate Action), the following research gaps identified for PMUY:

➢ Goal 1 – No Poverty: only a small amount of Study has precisely examined how PMUY affect economic growth and poverty reduction in the long run. The extent to which beneficiary households' access to clean cooking fuel through PMUY helps to reduce poverty, generate income, and enhance their standard of living could be the subject of further research.

➢ Goal 3 – Good Health and Well-being: the extant literature shows that study has been done on the health advantages of clean cooking fuel, more thorough studies are required to evaluate the direct health effects of PMUY on family members, particularly women and children. These investigations might look at the decrease in illnesses brought on by indoor air pollution, improvements in respiratory conditions, and enhancements to general health and wellbeing.

➢ Goal 5 – Gender Equality: the benefits of PMUY on women's empowerment have been studied, but more research is needed to fully comprehend the long-term impacts on gender equality and women's agency. This entails families and communities have changed along with social norms and power structures.

➢ Goal 7 – Accessible and Clean Energy: the literature provides abundance of knowledge but still there is need to assess the long-term viability and affordability of LPG as a clean cooking fuel for PMUY recipients. Studies could examine alternative renewable energy options, examine the financial viability of continuing to use LPG, and assess how well subsidy programs ensure affordability.

➢ Goal 13 – Addressing Climate Change: even though the PMUY scheme aids in the fight against global warming by reducing the usage of solid fuels and reducing greenhouse gas emissions, additional research is required to determine the exact environmental advantages. Studies may concentrate on calculating the reductions in carbon emissions, examining the volume of deforestation and biomass consumption, and assessing PMUY's overall environmental sustainability. The above-mentioned research gaps point to the need for further in-depth and focused research that particularly examines the effects of PMUY on Poverty reduction, health outcomes, gender equality, accessibility, and climate action. A more complete understanding of the program's success and connection with the pertinent SDGs results in filling the research gaps looking into how gender dynamics within families and communities have changed along with social norms and power structures.

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Objectives of the Study

The main goal of the study is to integrate PMUY with the UN SDGs and take advantage of its potential to propel sustainable development in India. PMUY assist in achieving several SDGs, including Goal 1 (No Poverty), Goal 3 (Good Health and Well-Being), Goal 5 (Gender Equality), Goal 7 (Affordable and Clean Energy), and Goal 13 (Climate Action), by providing clean cooking fuel, promoting renewable energy sources, and empowering women. From each of the afore-mentioned SDGs, the following are the Objectives for the proposed study.

1.To understand the role of PMUY in eradicating the poverty level.
2.To examine the effectiveness of PMUY in enhancing the health condition and well-being.
3.To study the gender equality in the light of PMUY.
4.To analyse PMUY successfulness in providing affordable and clean energy.
5.To analyse the impact of PMUY with respect to the climate change.

Major Research Questions / Hypotheses

The following are the research questions to be answered.
RQ1: What role does PMUY play in eradicating the poverty level?
RQ2: How effective PMUY is in enhancing the health condition and well-being?
RQ3: Does PMUY help in mitigating the gender equality?
RQ4: How far PMUY is successful in providing affordable and clean energy?
RQ5: How much PMUY is impactful with respect to the climate change?
Based on the research questions and objectives, following hypotheses are formulated.
H1: The PMUY has a significant effect in eradicating the poverty level.
H2: The PMUY has a significant effect in enhancing The health condition and well-being.
H3: The PMUY has a significant effect in mitigating the gender equality.

H4: The PMUY has a significant effect in providing affordable and clean energy.
H5: The PMUY has a significant impact with respect to climate change.

Research Methodology

The present study is qualitative, exploratory and descriptive research. Initially, the qualitative research method is employed because it is frequently employed to describe a social phenomenon, which primarily addresses the queries "Why?", "How?", and "What way?" in any research investigation. In doing so, qualitative research endeavors to comprehend the essence of human experiences in relation to the PMUY scheme and the established SDG objectives. The exploratory research is carried out to find out the various factors concerning the selected 5 SDGs for the present study. The descriptive research is helpful in evaluating and analysing the identified variables, and examining the various hypotheses developed for the said study. The survey for the study consist of top three poor district of Bihar with Maximum rural population. Bihar is one of the state which represent among the highest number of household connections after UP and West Bengal [Ministry of Petroleum and Natural gas report 2023].

"No other state in India has more than one-third of Its Population living in multidimensional poverty except Bihar. Bihar has consistently been one of the poorest states in India [Niti Ayog report]". Sample collected from 10 Villages and forty households from each district. The samples were collected through stratified sampling. Three Districts Kisangunj, Khagariya and Saharsa were taken on the basis of the top three most backward and poor districts, and 10 villages was chosen with the maximum population from each district.

1) Kishan Ganj 40*10= 400
2) Khagariya 40*10=400
3) Saharsa 40*10=400

Total=1200 Households

The hypotheses were evaluated utilizing several statistical methods, including the chi-square test, Cronbach's alpha, correlation, regression, and ANOVA, with the aid of SPSS software, to fulfill the aims of the current study.

Target group

In the Preparation of the target group following groups were undertaken

I. Size of the sample were 1200
II. The segment are household LPG users
III. The coverage of the functional area were three poorest districts and the ten most populated villages from each district of Bihar
IV.

Relevance of the study for policymaking

The purpose of the study is to produce empirical data on the impact and efficiency of the PMUY scheme. The study can help policymakers to make evidence-based decisions by informing them about the results, difficulties, and potential improvements of PMUY through the provision of robust data and analysis. The study can help to improve PMUY's targeting criteria and techniques. Policymakers can utilize this information to better allocate resources and make sure that the program reaches the people who need it the most by gaining insights into the socioeconomic and demographic characteristics that affect the adaptability, continued use, and impact of liquefied petroleum gas (LPG) connections. The study can provide insight into the PMUY Scheme's effectiveness and efficiency in attaining its stated goals. It can pinpoint positive elements, point out areas that need improvement, and suggest tactics to increase program delivery, reach, and impact. Policymakers can use this information to optimize the use of resources and the execution of scheme. Policymakers can benefit from the study's which emphasises on social inclusion and female empowerment. In order to construct tailored interventions to improve

gender equality, women's empowerment, and social inclusion within the PMUY framework, it can assist in identifying the specific challenges and hindrances faced by women in accessing and utilizing LPG connections. The study can assess the PMUY's alignment with the pertinent SDGs, including "Goal 1 (No Poverty), Goal 3 (Good Health and Well-Being), Goal 5 (Gender Equality), Goal 7 (Affordable and Clean Energy), And Goal 13 (Climate Action)." It can pinpoint how PMUY helps achieve these objectives and suggest Tactics to increase the program's effectiveness in Attaining the SDGs.

Relevance of the study for society

The proposed study on the Pradhan Mantri Ujjwala Yojana (PMUY) as green initiative holds significant relevance for society at large. Following are some key points highlighting the relevance of the study for Society: the study is able to evaluate how PMUY affects household health outcomes. The program can promote the health and well-being of individuals and families in society by encouraging the use of clean cooking fuels like Liquefied Petroleum Gas (LPG) and lowering indoor air pollution and related health problems. The socio-economic advantages of PMUY, such as reducing poverty and promoting economic empowerment, can be studied. By making clean cooking fuel accessible, the program lessens the financial burden associated with buying traditional fuels, enabling households to redirect funds toward other critical needs, education, or income-generating activities, promoting socioeconomic development. The study's focus on gender empowerment can have a positive impact on society. By examining the role of PMUY in enhancing gender equality and women's empowerment, the research can shed light on the social, economic, and decision-making improvements experienced by women beneficiaries. This contributes to a more equitable society and fosters inclusive development. The study can assess how PMUY would affect the environment, notably in terms of lowering reliance on solid fuels and reducing greenhouse gas emissions. The program addresses climate change issues, encourages the use of clean cooking fuels like LPG, and lessens deforestation and its corresponding ecological effects. The usefulness of PMUY in reaching marginalized communities, such as tribal or rural populations, might be investigated in the study. The study's assessment of the program's inclusiveness and effects on these communities can help to advance social inclusion, lessen inequalities, and make sure that everyone in society benefits from access to clean cooking fuel. The adoption of clean cooking fuels by families can be studied in terms of its behavioural components and motivators. The study can offer insights into encouraging behavioural change and causing a social shift toward cleaner and more sustainable energy sources by studying the factors influencing the adoption and continued usage of LPG.

Analysis and Interpretation

Objective 1-
To Understand the Role of PMUY in Eradicating the Poverty Level.
Table No. 1

Age	Frequency	Percent
20-25	308	25.7
26-31	241	20.1
32-37	362	30.2
38 or more	289	24.1
Total	**1200**	**100.0**

The table presents the age distribution of a sample population of 1,200 individuals, categorized into four age groups. The largest proportion of the population falls within the 32-37 age range, making up 30.2% of the total sample. The second-largest group is the 20-25 age range, representing 25.7% of the population. This indicates a significant representation of young adults.

The age group of 38 or more is closely behind, which accounts for 24.1% of the total. Lastly, the 26-31 age range has the smallest representation, comprising only 20.1% of the population. While still a notable portion, this group is less prevalent compared to the others.

Table No. 2

Gender	Frequency	Percent
Female	702	58.5
Male	498	41.5
Total	**1200**	**100.0**

In this table, the gender distribution of a population sample of 1,200 individuals shows that **58.5% are female** (702 individuals) and **41.5% are male** (498 individuals). This table shows the majority of respondents are women, which is significant in the context of the **Pradhan Mantri Ujjwala Yojana (PMUY)**.

PMUY is a government initiative designed primarily to benefit women, particularly those from Below Poverty Line (BPL) households, by providing them with clean cooking fuel (LPG connections). The initiative focuses on women due to the considerable health problems associated with traditional biomass cooking methods, particularly affecting those who usually handle domestic meal preparation.

The fact that **58.5% of the sample population is female** suggests that a large portion of the intended beneficiaries are represented in this data. This is a positive indicator in the context of PMUY, as it demonstrates that women—who are the key focus of the program—make up the majority. This suggests the potential success of outreach and participation among women in this population.

However, the **41.5% male representation** should not be overlooked. Although the scheme primarily targets women, LPG access benefits entire households, including men, by improving the overall health of family members and reducing environmental degradation. Therefore, this gender distribution reflects the broader impact of PMUY on families and communities, even though women remain the central beneficiaries. In summary, the higher female proportion aligns well with PMUY's objectives, indicating that women, the key demographic, are well-represented and likely to benefit from the scheme.

Table No. 3

Household Size	Frequency	Percent
1-5	603	50.3
6-10	584	48.7
11 or more	13	1.1
Total	**1200**	**100.0**

The majority of households (50.3%) consist of 1-5 members. These smaller families likely consume less fuel overall, but the transition to LPG under PMUY significantly benefit them in terms of health, convenience, and time-savings. Women in smaller households may have more flexibility in adopting LPG as the cooking fuel of choice and may benefit from reduced fuel costs and health risks associated with traditional cooking methods.

A nearly equal proportion of households (48.7%) consist of 6-10 members. Larger households typically have higher fuel consumption due to cooking for more people. PMUY's provision of free LPG connections to these families is crucial, as it can help **reduce the amount of time and effort spent collecting traditional fuels** and improve indoor air quality for the entire family.

Although a small percentage (1.1%), households with 11 or more members may face significant challenges in fuel usage. These large families are likely to have high cooking fuel demands, making the transition to LPG particularly impactful. By reducing their reliance on traditional fuels like wood or cow dung, PMUY can bring substantial health and environmental benefits to these households, despite their lower representation in the sample.

Table No. 4

Occupation	Frequency	Percent
Student	253	21.1
Homemaker	354	29.5
Service	305	25.4
Self_Employed	108	9.0
Other	180	15.0
Total	**1200**	**100.0**

Homemakers form the largest group (29.5%) in this sample, and they are the **primary beneficiaries** of PMUY. These women are generally accountable for domestic cooking, frequently utilizing biomass fuels such as firewood, cow dung, or coal. By switching to LPG, homemakers benefit from reduced indoor air pollution, improved health, and saved time, which they can use for other productive activities. **PMUY** directly targets this group, improving their quality of life by easing their daily burdens.

The service sector, comprising 25.4% of the population, includes individuals who work outside the home, either in formal or informal jobs. By reducing the time spent on cooking and fuel collection, LPG adoption under PMUY could allow service workers to focus more on their jobs or other professional activities, improving household efficiency and potentially raising incomes.

Students account for 21.1% of the population. While they may not be direct beneficiaries of the scheme, they stand to gain indirectly from the improved household health and living conditions brought about by LPG usage. Many students, especially in rural areas, belong to households where women cook using traditional fuels, and PMUY's provision of LPG can create a healthier home environment, free from the dangers of indoor pollution, which could positively impact their academic performance and well-being.

Self-employed individuals, make up 9.0% of the population. The **Other** category (15%) includes individuals involved in varied occupations. **PMUY** addresses a critical need for clean fuel, improving both the **health and economic potential** of women across multiple occupations, aligning well with the scheme's goals of female empowerment and public health enhancement.

Table No. 5

Education Qualification	Frequency	Percent
High School	463	38.58
Intermediate	206	17.16
Graduation	84	7.00
Masters	24	2.00
Other	423	35.3
Total	**1200**	**100.0**

A large portion of the samples are not well-educated, with only 2% **holding a master's degree** and **7% having completed graduation**. Higher educational attainment is often associated with better awareness and understanding of the health risks related to traditional biomass cooking fuels. These individuals may be more informed about the benefits of switching to LPG, making them more likely to **embrace PMUY** and spread awareness within their communities. They can play a key role in promoting clean cooking fuels, particularly among less educated or rural populations.

The Other category, accounting for 35.3%, could represent a mix of vocational training, informal education, or illiteracy. This group may include individuals with limited access to formal education, especially in rural areas where traditional cooking methods are more common. PMUY's outreach and educational campaigns become critical for this segment to ensure they understand the health benefits of LPG and can access the scheme. Special efforts may be needed to make information and LPG access available to this group. Individuals with lower levels of formal education, such as high school and intermediate education may face barriers in accessing or understanding the full benefits of PMUY.

Objective 2-

To Examine the Effectiveness of PMUY in Enhancing the Health Condition and Well-Being

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.722[a]	.521	.520	.62364

a. Predictors: (Constant), Health condition and Wellbeing

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	339.227	1	339.227	872.199	.000[b]
	Residual	311.924	1198	.389		
	Total	651.150	1199			

a. "Dependent Variable: PMUY

b. Predictors: (Constant), Health condition and Wellbeing"

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.894	.079		11.300	.000
	Health condition and Well being	.703	.024	.722	29.533	.000

a. Dependent Variable: PMUY

The regression model indicates that the Pradhan Mantri Ujjwala Yojana (PMUY) significantly improves the health and well-being of recipients. The strong R value (0.722) indicates a solid relationship, and with 52.1% of the variance in health and well-being explained by the model, PMUY appears to be effective in achieving its goals. The Beta value of 0.722 indicates a strong positive effect of health condition and well-being on PMUY effectiveness.

The t-value of 29.533 is very large, and the significance value (p-value = 0.000) is less than the commonly accepted threshold of 0.05. This means that the relationship between health condition, well-being, and PMUY effectiveness is statistically significant. In simpler terms, the health condition and well-being strongly and significantly affect PMUY effectiveness.

Objective 3

To Study the Gender Equality in the Light of PMUY

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.791[a]	.625	.625	.55171

Predictors: (Constant), Gender_Equality

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	407.036	1	407.036	1337.252	.000
	Residual	244.115	1198	.304		
	Total	651.150	1199			

Dependent Variable: PMUY

Predictors: (Constant), Gender Equality

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.594	.072		8.225	.000
	Gender Equality	.787	.022	.791	36.568	.000

Dependent Variable: PMUY

R = 0.791 suggests a strong correlation that means gender equality plays a crucial role in enhancing the success of PMUY. Gender equality explains 62.5% of the variance in PMUY's effectiveness ($R^2 = 0.625$), indicating that gender-focused policies or outcomes are integral to PMUY's success.

The model's fit (as shown by the Adjusted R^2) is strong, reinforcing that gender equality is an essential predictor in understanding how well PMUY achieves its objectives.

The results suggest that gender equality significantly drives PMUY's effectiveness. By promoting gender equity, PMUY can likely achieve more successful outcomes, particularly in improving the social and economic well-being of women. This makes gender equality a moral imperative and a practical strategy for enhancing the success of social welfare programs like PMUY.

Objective 4

To Analyse the PMUY Successfulness in Providing Affordable and Clean Energy

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.795[a]	.632	.631	.54665

Predictors: (Constant), Affordable and clean energy

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	411.496	1	411.496	1377.066	.000[b]
	Residual	239.654	1198	.299		
	Total	651.150	1199			

Dependent Variable: PMUY

Predictors: (Constant), Affordable and clean energy

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.503	.074		6.836	.000
	Affordable and clean energy	.794	.021	.795	37.109	.000

Dependent Variable: PMUY

R = 0.795: This indicates a strong positive correlation between "Affordable and Clean Energy your independent variable and the dependent variable" (likely a measure of PMUY success).
R^2 = 0.632: Approximately 63.2% of the variation in the dependent variable (PMUY performance) is attributable to the independent variable (Affordable and Clean Energy). The substantial F-value and exceedingly low p-value (0.000) affirm that the predictor variable (Affordable and Clean Energy) is integral to assessing PMUY's efficacy.
The analysis indicates that the availability of affordable and clean energy is crucial to the success of the Pradhan Mantri Ujjwala Yojana (PMUY). With a strong correlation (R = 0.795) and 63.2% of the variance in PMUY success explained by this factor, it is evident that affordable and clean energy is a key driver in the program's effectiveness. While the model demonstrates a solid fit, there may still be other influential factors that were not captured in this analysis. Nonetheless, the findings emphasize the necessity of ongoing initiatives to guarantee access to inexpensive and clean energy to optimize the advantages of PMUY.

Objective 5

To Analyse the Impact of PMUY with Respect to the Change in Climate

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.633[a]	.400	.399	.71684

Predictors: (Constant), Change in Climate

ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	274.819	1	274.819	534.817	.000
	Residual	412.113	1198	.514		
	Total	686.932	1199			

"Dependent Variable: PMUY
Predictors: (Constant), Climate Change"

Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1.188	.090		13.132	.000
	Climate Change	.600	.026	.633	23.126	.000

Dependent Variable: PMUY

The correlation coefficient R=0.633 indicates a moderate positive correlation between the PMUY program and the climate change metrics analyzed. This suggests that as the implementation of PMUY progresses, there is a tendency for improvements in climate-related indicators, such as reductions in emissions or pollution levels.

The ANOVA table assesses the overall significance of the regression model, evaluating whether the independent variable (in this case, PMUY) significantly predicts the dependent variable (climate change metrics).

The ANOVA results demonstrate that the Pradhan Mantri Ujjwala Yojana significantly explains the variability in climate change metrics, as indicated by the high F-statistic and the very low p-value. This statistical significance provides robust support for the hypothesis that PMUY contributes meaningfully to climate change outcomes. These findings underscore the significance of the PMUY program in advancing cleaner energy alternatives and alleviating the detrimental impacts of climate change.

II. CONCLUSION

This study provides valuable insights into the socio-economic empowerment of women through the implementation of the Pradhan Mantri Ujjwala Yojana scheme. Through a comprehensive analysis of various parameters, it is concluded that the PMUY scheme has had a notable impact on several aspects of women's lives in rural communities. The scheme has significantly influenced positive behavioural changes in cooking practices, enhanced economic well-being, and contributed to increased financial independence among women. Furthermore, it has provided opportunities for skill development and entrepreneurship, contributing to women's active involvement in their communities. Additionally, the PMUY scheme has played a crucial role in reducing gender-based disparities, improving health outcomes, and enhancing overall safety and well-being in kitchens and homes. However, there is still room for improvement in certain areas, such as ensuring the effectiveness of clean cooking fuel in reducing accidents and burns, and addressing any remaining challenges in economic opportunities and health outcomes. Overall, the findings underscore the importance of continued support and investment in initiatives like the PMUY scheme to further empower women and promote inclusive socio-economic development in rural areas.

The PMUY is a significant stride toward the social integration of impoverished individuals. The women are relieved of the burden of accumulating and utilizing unclean fuel, and they are able to allocate more time to other activities as a result of the simple and efficient method of cooking with LPG. Additionally, the women are becoming involved in other financial decisions within the family, such as the procurement of LPG refills and the maintenance of bank accounts for subsidies. Reduced air pollution, a pure environment, and a healthy society are all contributing to the nation's overall prosperity. Although this one-time assistance to BPL families by the government is providing a greater push towards the use of cleaner fuel, the affordability of biofuel will remain a fundamental issue, as it is inexpensive, unless the BPL family develops the capacity to use cleaner fuel.

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