

**Ujjwala Yojana, Health and Environment: A
Sociological Study of Women of Peri-Urban Areas of
Selected Cities of Uttar Pradesh**

**Abstract
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Abstract

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Introduction

Cooking sans clean fuels is predominantly injurious to the health of women and children, who are frequently exposed to toxic smoke from traditional cooking stoves. According to IEA (2022), India's share of population with access to clean cooking in 2019 was 64.2 per cent. LPG, as compared to traditional biomass fuels, it has many benefits, like it eliminates household air pollution, reduces the drudgery of firewood collection and checks deforestation, forest resource depletion and families' reliance on traditional fuels. Moreover, families save time when using clean cooking stoves and can dedicate more of their day to educational or economic activities. And for this purpose, the 'Pradhan Mantri Ujjwala Yojana' (PMUY) was launched in May 2016 to prevent the negative health implications of traditional cooking fuel. Though, a number of studies have examined the hindering and supporting factors in the path of sustained usage of LPG in rural and poor households India (Kumar et al. 2016), but there is paucity of empirical data in context to peri-urban areas of Uttar Pradesh. Also, previous studies mainly considered rural-urban variations (jointly or separately) in fuel usage patterns. The present study addresses this gap and analyzes the perspectives of beneficiaries of Ujjwala of peri-urban areas of two cities of Uttar Pradesh using the peri-urban approach. It describes the demographic, economic and socio-cultural factors behind the use of alternative fuel (biomass) despite having an LPG connection in the household. It attempts to find out as why people still use biomass in peri-urban areas despite knowing its ill effects. It also investigates as to how 'Ujjwala' Yojana is contributing to eliminate the health hazards involved with traditional cooking methods and how LPG is saving the cooking time and cost of cooking, apart from improving the environmental quality and sustainability. In nutshell, it broadly revolves around the nexus between socio-economic and cultural factors, the persistence of biomass apart from LPG and beneficiaries of Ujjwala Yojana. The present

study will be beneficial for policymakers to bring about improvement in the yojana for sustained usage of LPG, which will give leisure time to women and their socio-economic development.

The present study contains seven chapters. The first chapter begins with a brief introduction of the cooking fuel (biomass and clean cooking fuel), the relevant literature review, its importance, objectives and the statement of the problem. In the second chapter, the approaches, pattern and determinants of fuel use are discussed. It also sheds light on the two models, namely, the energy ladder and fuel stacking approach, along with studies based on the said models are given (at the international and national levels). Besides, it also gives a brief over view of PMUY, the financial assistance given by the government, the total number of connections issued, the refill rate and about the subsidy given under the scheme. The third chapter deliberates the socio-economic profile of the two selected districts, and fuel usage pattern in the sampled households after the launch of Ujjwala Yojana. The chapter four and five deals with the impact of Ujjwala yojana on health, environment and women empowerment. The sixth chapter compares the demographic profile and fuel usage pattern of Ujjwala and non-Ujjwala fuel users. The seventh and the last chapter summarize the main findings of the study and recommendations /suggestions are given to rectify the inherent weaknesses of the yojana.

The specific objectives of the present study are:

- To analyze the role of social, economic and cultural factors in the adoption of LPG (Ujjwala).
- To study the impact of ‘Ujjwala’ yojana on socio-economic status of beneficiaries.
- To analyze the impact of ‘Ujjwala’ yojana on health.
- To explore the impact of ‘Ujjwala’ yojana on the environment.
- To examine the impact of ‘Ujjwala’ yojana’ on socio-economic empowerment of women.

The hypothesis of the present study are:

1. The social, economic and cultural factors play an essential role in the adoption of LPG (Ujjwala).
2. 'Ujjwala' yojana has led to the improvement of socio-economic status of beneficiaries.
3. 'Ujjwala' yojana has contributed to the improvement in the health of women and household members.
4. 'Ujjwala' yojana is contributing to a clean environment.
5. 'Ujjwala' yojana has a positive impact on socio-economic empowerment of women.

Methodology

The present study is empirical and is done from a sociological perspective using the mixed-method approach. The study focuses on the two districts of central region of Uttar Pradesh i.e., Lucknow & Hardoi. Lucknow, the capital city has highest number of LPG users while Hardoi has lowest LPG users. From these two districts, two peri-urban blocks were selected from each district. From each peri-urban block, 100 households were selected for fieldwork. From Lucknow district, Bakshi Ka Talab and Mohanlalganj were selected whereas from Hardoi district, Pihani and Sandila were selected for the present study. Both exploratory and descriptive research design has been adopted in the study. The concurrent mixed method is used with a pragmatic worldview where instead of focusing on methods, the research problem is emphasized and by using all the approaches, the problem is examined and possible solutions are given.

Findings

The third chapter gives a brief backdrop (geographical location and demography) of the districts and blocks under study. It also gives details of the socio-economic background (demographic structure, family structure, occupation, income, education, sanitation, etc.) of the beneficiaries of Ujjwala Yojana based on field survey. Out of the total respondents (beneficiaries) who were interviewed, approximately 85 per cent were females and were in the age group of 31-50 years of age. Also, majority of the respondents (57 per cent)

belonged to OBC caste while 31.7 per cent hail from SC category. Almost, all the respondents (99.0 per cent) were married.

Out of the total sampled households in both the districts, majority of the respondents (65 per cent) were found residing in 'pucca' houses while only 2 per cent were residing in 'kutcha' houses. However, out of the total sampled households from Lucknow district, only 0.7 per cent was 'kutcha' as compared to Hardoi's 3.3 per cent. Out of the total sampled households in both the districts, around 35 per cent were having one room accommodation. It was found that 51 per cent of the total sampled households had no kitchen. It means in households sans kitchen either food is cooked outdoors (courtyard) or in living area. Around 64 per cent of the total sampled households have sanitation facility with running water while around 36 per cent still don't have sanitation facility with running water. It was found that almost all the sampled households have well connectivity with the outside world as 99.3 per cent of the total sampled households have mobiles and 93 per cent of the households have television. As far as land is concerned, only 10.7 per cent have land in Lucknow compared to Hardoi's 34.7 per cent. However, items of comfort like refrigerator and cooler were missing in majority of the households in both the districts under study.

The educational situation is truly depressing. In terms of literacy rate, the number of females having higher education is very low than that of males'. The educational status of the respondents (beneficiaries) from both the blocks of the two districts was found low as only few respondents 5 per cent were graduates while majority of the beneficiaries (around 41 per cent) were having middle level (class 8th) education. Notably, 11 per cent of the members of total sampled households were found illiterate. Also, around 23 per cent of the persons in the total sampled households have middle level of education and 22 per cent of the persons were found illiterate. It is noticed that there are only 4 per cent graduates in the total sampled households. Overall, 77 per cent males and 23 per cent females were graduates in the total sampled population. Besides, the educational level of the main bread winner in the total sampled households is generally low. Since the occupation and income is generally connected with the level of education. Hence, with low level of education, the income is affected and with low level of income, one can't

expect their economic well-being and use of clean fuel. The gender wise educational profile of the members of sampled house holds two districts under study depicts disparity in terms of educational level among males and females.

The gender wise distribution of activity status of the total members of sampled beneficiary households of Hardoi and Lucknow districts shows that in both the districts, around 91 per cent of the female members of the sampled beneficiary households were found involved in household chores while only 4.1 per cent were found working as compared to male members. As the form of society is patriarchal, the women folk are usually confined to household activities. The employment status of females is unsatisfactory in both districts under study as only 2.2 per cent of the female members of the sampled beneficiary households were found self-employed in Hardoi district as compared to 19.2 per cent in Lucknow district. The study found that among the women beneficiaries that were surveyed, few are engaged in tailoring/ stitching and embroidery related work while other women beneficiaries assist in their husband's fast-food work. With some additional income, they are able to support their children's education and could buy other non-durable goods as well. Some are supporting their husband to repay their loan as well that has been taken for personal use for marriage and educational purpose. However, some women also experienced restriction from their family members as some beneficiaries family members had a restricted mindset, and considered that they were disobeying the social norms of breaking the patriarchal system. It was found that half of the total respondents (52.3 per cent) in both the districts under study were involved in labour work. Under labour work, construction labourers, mechanic, carpenters, washer men and sweepers are included. Only 12 per cent of the total respondents were doing private job. Besides, majority of the males (above 95 per cent) in both the districts were found engaged in non-agricultural labour works while majority of females (50 per cent) in both the districts were found engaged in agricultural labour work.

The average income of the sampled households stands out at Rs. 8160 while per person monthly household income Rs.1754 in both the districts under study combined together. Besides, per day household income stands at Rs.272. It reflects that it is poverty that

prompts them to use biomass along with LPG. Besides, around half of the total sampled households (51.3 per cent) under study have taken some kind of loan. Also, majority of the respondents (56.8 per cent) have taken loan for medical reasons. It was found that average monthly expenditure in Hardoi district came out to be Rs.6147 while it is Rs.6598 in Lucknow district. However, per head monthly expenditure in Hardoi Rs.1229 while Lucknow's is Rs.1320. If expenses on fuel are checked, it is found that the pattern is somewhat uniform (12.1 per cent). However, on education, the expenses in Hardoi are less (5.9 per cent) as compared to Lucknow (7.3 per cent). The overall average monthly expenditure per household is Rs.1274 of the total sampled households in both the districts under study.

Regarding PMUY, it was found that 59 per cent respondents of the total sampled households in both the districts told that they got to know about PMUY through government. It was found that in 44 per cent of the households in both the districts stated an LPG cylinder lasts between 45-60 days. However, much variation is seen between its uses within blocks of the two districts under study and on average 6 to 8 cylinders is used by beneficiary households of Hardoi and Lucknow districts. Moreover, the beneficiaries simultaneously use other 'solid' fuels to make the LPG cylinder lasts longer like in both the districts 37.52 per cent use 'cow dung' as the second alternative fuel. However, households in Bakshi Ka Talab block of Lucknow district use agri /crop residue as the second alternative fuel.

In Lucknow district, more than 90 per cent of the sampled households don't use wood, both for cooking and boiling purposes. However, in Hardoi district, 18 per cent of the sampled households in Hardoi district still cook food on wood on daily basis despite having LPG while 22.7 use it for boiling water. Similarly, 18.7 and 30 per cent of the sampled households in Hardoi district, still cook food on agri/crop residue and cow dung respectively on daily basis despite having LPG. Looking on LPG usage, it was found that around 90 per cent of the households use LPG for cooking on daily basis in both the districts. In Hardoi district, around 11 per cent still don't use LPG for cooking on daily basis while in Lucknow only 7.3 per cent don't use it daily. It is interesting to note that in

Hardoi, 48.7 per cent never boil water on LPG while in Lucknow 92 per cent use it for boiling purpose also apart from cooking.

Regarding cooking day meal, it is found that in Hardoi district, only 57.6 and 59.1 per cent sampled households use LPG for preparing day and night meal respectively while more than 90 per cent households cook day and night meal on LPG. Significantly, around 27 per cent of the total sampled households don't refill LPG cylinders on regular basis. The main reason cited by them is high price of the cylinder. It was found that in Hardoi, only 53.3 per cent of the sampled households refill cylinder on regular basis as compared to Lucknow's 92 per cent. Also, only 5 per cent of the sampled households in both the districts get home delivery of LPG cylinders. In majority of the sampled households (71.3 per cent) in Lucknow district, the stated distance of LPG distribution Centre from their home is between 6-10kms while in Hardoi, around 24 per cent of the sampled households told that the distance of LPG distribution Centre from their home is between 6-10 kms. Almost half of the sampled households in both the districts under study denied the easy availability of LPG cylinders. Interestingly, in Lucknow around 63 per cent of the households reported that LPG cylinders are not available easily while in Hardoi 39 per cent of the sampled households reported of not getting LPG cylinders easily. Lack of sufficient LPG distribution centers is the main reason cited by majority of households in both the districts under study. However, other reasons given by them are long waiting time to get LPG refill (6 per cent) and money constraints (3.7 per cent). Around 28 per cent of the sampled households replied affirmatively that seasons affect their fuel choice. It was found that a thumping majority of respondents gave positive response that their pattern of cooking changed after availing LPG through Ujjwala. It was unanimously reported by all of the respondents of both the districts that cooking on LPG saved their valuable time and now they have ample time to rest and pursue other activities.

Regarding health issues, more than 95 per cent of the respondents in both the districts stated there is reduction in health problems after switching to LPG while 88 per cent reported that they got adequate time for leisure activities. Around quarter of respondents of both the districts told that there is increase in time for proper care of children. Majority of the respondents (65.3 per cent) in both the districts stated that they save up to 2 hours

after they started cooking on LPG. Further, one third of the respondents stated dislikeliness of food cooked on LPG and the main reason given by the respondents of their dislikeliness is taste issue. It was found that only 8.3 per cent of the respondents affirmatively replied that income of the family got increased after switching to Ujjwala. In Hardoi district, around 11 per cent and 6 per cent beneficiaries from Lucknow replied positively that they noticed increase in income after they got LPG connection through Ujjwala.

Thus, the findings of the study verify the first hypothesis that the social, economic and cultural factors play an essential role in the adoption of LPG (Ujjwala). Also, as the income of 8.3 per cent beneficiaries got increased after switching to Ujjwala (Hardoi district, around 11 per cent and 6 per cent in Lucknow district), it proves the second hypothesis that Ujjwala yojana has led to the improvement of socio-economic status of beneficiaries.

The fourth chapter examines the impact of Ujjwala on health and environment. The findings of the present study reverberate that women had a number of health issues, and most of them were caused due to cooking in smoke-filled environment. Nevertheless, these health issues have considerably reduced when they switched to LPG. The results show that women face more health issues than males and are the main victims of indoor air pollution, as they spend more time at home due to which they face more smoke. Most of the respondents (98 per cent) stated that they faced eye related problems like irritation in eyes, redness etc. when they regularly cooked on biomass before availing LPG connections through Ujjwala Yojana. The second health problem most stated by the respondents is headache (89.7per cent). Besides, coughing (85.3 per cent) and nose irritation (64.7 per cent) were also reported by many respondents. Thus, in both the districts, problems related to eyes, headache and coughing were mostly reported when the beneficiaries cooked food using biomass. However, around 79 per cent of the respondents stated their eye irritation went away after using LPG. Also, 71 per cent of the respondents told that their regular coughing problem vanished after using clean fuel, i.e., LPG. The other problems that many beneficiaries reported were cured are nose irritation (57.7 per cent), headache (64.7per cent) and burns (49per cent).In both the districts under study, considerable number of diseases got cured when the beneficiaries shifted to LPG. Both,

in Hardoi district (39 per cent) and Lucknow district (32 per cent), majority of the beneficiaries spent Rs. 1000/- on medical issues last year preceding the survey. Overall also, majority (38 per cent) of the beneficiaries in both the districts spent the same amount (Rs. 1000/-) on medical issues caused due to cooking on biomass.

In both the districts under study, majority of the beneficiaries sought treatment from both private and government health centres. However, in Lucknow district, 30.4 per cent beneficiaries went to government health centres to seek treatment while this percentage stands at only 7.4 in Hardoi district. In both the districts under study, before availing Ujjwala scheme, the beneficiaries used to spend Rs.1094 per person on diseases caused due to cooking on biomass. However, after getting LPG connection through Ujjwala, the expenses on medical issues declined to Rs.643/- per person. In Hardoi district, pre and post Ujjwala expenses were Rs. 956/- and Rs.578/- while in Lucknow district this stands at Rs.1544/- and Rs.856/- respectively.

Around 86 per cent of the respondents of both the districts positively agree on Ujjwala's role in solving household air pollution and its role in protecting the environment. However, in Hardoi district, only 12 per cent 'strongly' agree as compared to Lucknow's 44 per cent. However, 20 per cent of the respondents were neutral on Ujjwala's role in combating indoor air pollution. Regarding the perception of the respondents on declining of the cutting of trees in their area after the launch of Ujjwala Yojana, it was found that that there was the level of agreement on the aforesaid issue. Block wise also, majority of the respondents unanimously agreed on the positive impact of the scheme.

Further, there was unanimity in replies of the positive role of Ujjwala in lessening fire incidences and improvement in air quality in the surrounding areas after the launch of Ujjwala Yojana. Also, around 93.7 per cent of the respondents of both the districts positively agree on the issue mentioned above. Among these respondents in the districts under study, 35 per cent 'strongly agreed' on the role of people in improving and maintaining the environment. Around 60 per cent out of the total respondents cited economic reasons while 33.1 per cent stated that in order to protect health ailments caused due to cooking on biomass led them to shift from traditional fuels (wood, cow dung, crop residue) to clean cooking fuel (LPG). A fraction of the respondents also thought about

protecting the environment and shifted to LPG. Block wise, the picture is almost the same in both the districts under study. Interestingly, almost all the respondents stated that they noticed positive changes in the area after the launch of Ujjwala Yojana and all of them are aware of the harmful emissions from traditional fuels. However, regarding the presence of mosquitoes playing a role in their fuel choice, around 42 per cent replied in affirmation (notably from Hardoi, 74 per cent answered that mosquitoes do play a role in their decision on fuel selection). It was found that 28 per cent of the total respondents sometimes cook outside for the reason mentioned above. Notably, those replying in affirmation were 47 per cent in Hardoi as compared to Lucknow's mere 8.7 per cent. Regarding the type of fuel used while cooking outside, around 63 per cent of the respondents in Hardoi district stated cow dung while its use was 53 per cent in Lucknow. It is to be noted that PAHAL (*Pratyaksh Hanstantrit Labh*) or Direct Benefits Transfer for LPG (DBTL) scheme was started for LPG Consumers across India on 1st June, 2013. Under this scheme, the customers compulsorily require an Aadhaar number for availing LPG subsidy. As per this scheme, an LPG customer will get an LPG cylinder at full market price and the subsidy will be transferred to his /her bank account. Surprisingly, out of the total respondents, only 3 per cent are aware about PAHAL scheme. Although, all the respondents stated that they are getting subsidy in '*Jan Dhan*' bank account (93.7 per cent). Besides, almost all the respondents were aware of the *Pradhan Mantri Jan Dhan Yojana*. Besides, 75.3 per cent out of the total respondents were also aware about *Pradhan Mantri Jan Arogya Yojana* and a fraction of respondents (4.3 per cent) stated that they are aware about *Sukanya Samridhi Yojana*. Notably, amidst social, economic and environmental transition, most of the respondents in the peri-urban areas of Lucknow & Hardoi are aware of the policies and programmes.

Thus, the findings of the present study reverberate that women had a number of health issues, and most of them were caused due to cooking in smoke-filled environment. Nevertheless, these health issues have considerably reduced when they switched to LPG through Ujjwala Yojana. Hence, the findings verify the third hypothesis that Ujjwala' Yojana has contributed to the improvement in the health of women and household members. Also, majority of the respondents positively reported that Ujjwala has helped in solving household air pollution, lessening of fire incidences and improvement in air

quality in the surrounding areas. Hence, the findings prove the fourth hypothesis that 'Ujjwala' Yojana is contributing to a clean environment.

The fifth chapter discusses the determinants of women empowerment (financial independence, decision making power, and increased confidence), the role of PMUY in empowering women, and discusses the perspectives/viewpoint of women (beneficiaries) who are getting benefitted through PMUY. It examines as to how Ujjwala Yojana has brought changes in the lives of women folk and has promoted the self-development of women. In the present study, it was found that the level of education of women is very low. In both the districts, around 51 per cent of the female members of the sampled beneficiary households were found illiterate, 35.6 per cent were found having below primary level of education and only 23 per cent were having graduate degree as compared to male members. In Hardoi district, 53.3 per cent of the female members of the sampled beneficiary households were having middle level of education (class eight) and only 28.2 per cent were having graduate degree as compared to male members. Notably, in Lucknow district, around 60 per cent female members of the sampled beneficiary households were found illiterate and only 13.6 per cent were having graduate degree as compared to male members. Thus, the level of education of females is not satisfactory in both districts under study. In both the districts, around 91 per cent of the female members of the sampled beneficiary households were found involved in household chores while only 4.1 per cent were found working as compared to male members. The employment status of females is unsatisfactory in both districts under study as none of the female members of the sampled beneficiary households in both the districts were engaged in regular employment as compared to male members. Interestingly only 2.2 per cent of the female members of the sampled beneficiary households were found self-employed in Hardoi district as compared to 19.2 per cent in Lucknow district. The study found that among the women beneficiaries that were surveyed, few are engaged in tailoring and stitching or embroidery related work while other women beneficiaries assist in their husband's fast-food work. With some additional income, they are able to support their children's education and could buy other non-durable goods as well. Some are supporting their husband to repay their loan as well that they have taken for personal use for marriage and educational purpose. However, some

women also experienced restriction from their family members as some beneficiaries family members had a restricted mindset, and considered that they were disobeying the social norms of breaking the patriarchal system.

The majority of females in both the district were having agricultural work as their main occupation in both districts under study. Around 67 per cent of the female members of the sampled beneficiary households were found engaged in agricultural work in Hardoi district as compared to 33.3 per cent in Lucknow district. Remarkably, almost all the respondents stated that they noticed positive change in their lives after getting gas connection under Ujjwala Yojana as it has lessened the time and drudgery of arranging biomass and has given them ample time to pursue leisure activities like watching television and spending time with children. Also, 92 per cent out of the total respondents told that their work load has decreased. It may be noted that leisure activities linked with LPG usage are also influenced by several other factors like higher household incomes, living in urban locality, or having higher average levels of education.

Regarding LPG refilling, it was found that in most cases, LPG refill order and collection are done by men, however households where women made sole or joint decisions about purchasing durable goods are significantly more likely to adopt LPG than households as compared to those households where women did not participate in the decision to purchase durable goods. Similarly, among LPG adapters, households where women made sole or joint decisions about ordering LPG refills were significantly more likely to refill more frequently than households where the refill decision was made solely by men. In 79 per cent of total households in both districts under study, the husband makes the decision pertaining to fuel. However, 14 per cent of the respondents stated that the decision is solely taken by the wives only. Concerning women's say in fuel selection, it was found that 87 per cent of the women are consulted with respect to type of fuel used in the household and only around 12 per cent of women respondents reported of being never consulted at all by saying that these decisions are solely taken by the breadwinners of the family. Moreover, since the PMUY scheme provides only female beneficiaries the subsidies for an LPG connection, it is reasonable to infer that it has placed more decision-

making power in the hands of women but still the patriarchal structure seems more active in household fuel selection.

As far as choice of food to be cooked in the household is concerned, around 81 per cent of the total women respondents replied that whatever husband takes away home is cooked. The women stated that since they (husband) are the breadwinners, the food is normally cooked as per their liking. However, 12 per cent of the women said they solely decide what to cook. In Hardoi around 73 per cent as compared to Lucknow's 88.7 per cent women decide the type of food to be cooked in the family in the total sampled households of Hardoi and Lucknow districts. 88.3 per cent of the women replied that they are consulted on the type of food to be cooked and bought in the house. In Hardoi around 87 per cent as compared to Lucknow's 90 per cent women were consulted regarding the type of food to be cooked and bought in the family.

Lastly, it can be said that no doubt the drudgery involved in cooking has lessened and women are utilizing their time, thus saved from cooking on LPG, on income generating activities. However, their level of education and source of generation of income is not satisfactory. Unless both the issues are tackled, one can't expect the radical change in their situation. Hence, the findings partially prove the fifth hypothesis that Ujjwala Yojana has contributed to socio-economic empowerment of women. As their decision is valued, they are consulted regarding fuel usage; type of food to be cooked and bought depicts their social empowerment. However, economically, the picture is not satisfactory. Nonetheless, they are indirectly contributing to family's income by assisting in their husband's work.

The sixth chapter contains the comparative analysis of Ujjwala beneficiaries with non-Ujjwala users with reference to socio-economic profile, pattern of fuel use, the type of health problems faced due to cooking on solid /traditional fuel and the reasons of their shift towards clean fuel i.e., LPG. When the sampled households of Ujjwala and non-Ujjwala users of LPG is compared on the basis of socio-economic profile, pattern of fuel use, the type of health problems faced due to cooking on solid /traditional fuel and the reasons of their shift towards clean fuel i.e., LPG., it was found that among Ujjwala users, the majority of respondents from the both districts combined together have middle

level of education (40.7 per cent) whereas among non-Ujjwala users category, the majority of respondents from the both districts combined together have secondary level of education (34.0 per cent). In Hardoi district, among non-Ujjwala 30.0 per cent were found graduates while this figure stands at 24.0 per cent in the same category. The comparison of Ujjwala and non-Ujjwala users of LPG of Hardoi and Lucknow district on the basis of main source of income shows that in half of the households in non-Ujjwala users category, the main source of income is from shop/ business while in Ujjwala category, income comes from non-agricultural labour works (Labourer/Mechanic/ Carpenter/Washer /Sweeper) in both the districts. Looking district wise, it is noticed that in 58 per cent of the households in Hardoi district under non-Ujjwala category, the main source of income is from business activity while only 2.0 per cent are earning from farming. Similarly, in Lucknow district, under non-Ujjwala category, the main source of income is also from business activity (46.0 per cent). It is interesting to note that none of the respondent in Mohanlalganj block of Lucknow district under both the categories (Ujjwala and non-Ujjwala) was found earning from farming. The expenditure of households of non-Ujjwala category is higher than Ujjwala category in both the districts under study. In both the districts, the average expenditure of households under Ujjwala category is Rs.6372 while of non-Ujjwala users is Rs.9415. It is important to note that the expenditure of Ujjwala beneficiaries on education as compared to non-Ujjwala users of LPG is much lower. In Hardoi, under Ujjwala and non-Ujjwala users' category, it is 5.9 and 18.8 per cent while in Lucknow, it stands at 8.4 and 15.3 per cent respectively.

The comparison of Ujjwala and non-Ujjwala households of Hardoi and Lucknow districts on the basis of usage of LPG shows that on average, 55.0 per cent of the households under non-Ujjwala category reported that an LPG cylinder lasts up to 30-45 days while 44.0 per cent of Ujjwala beneficiaries stated that an LPG cylinder lasts up to 45-60 days. Further, around 18 per cent Ujjwala beneficiaries' use of one LPG cylinder for more than 2 months as to 3 per cent by non-Ujjwala users.

In Hardoi district under study, the usage of biomass (wood, cow dung and crop residue) is more by Ujjwala beneficiaries as compared to non-Ujjwala LPG owners. However in Lucknow, none of the household under non-Ujjwala users category use biomass. The

comparison of Ujjwala and non-Ujjwala households of Hardoi and Lucknow district on the basis of wood usage shows that in Hardoi district, the usage of wood is more by Ujjwala beneficiaries as compared to non-Ujjwala LPG owners. The comparison of Ujjwala and non-Ujjwala households of Hardoi and Lucknow district on the basis of crop residue depicts that in both the districts under study, the usage of crop residue is not much. Around 87 per cent of Ujjwala beneficiaries and 99 per cent of non-Ujjwala users in both the districts never use crop residue for cooking. Further, the comparison of Ujjwala and non-Ujjwala households of Hardoi and Lucknow district on cow dung use shows that in Lucknow district, the usage of Cow dung is absent among non-Ujjwala users while 94 per cent Ujjwala beneficiaries never use cow dung. However, in Hardoi district, 58 per cent of Ujjwala beneficiaries and 84 per cent non-Ujjwala users don't use cow dung for cooking.

The comparison of Ujjwala and non-Ujjwala households of Hardoi and Lucknow district on LPG use depicts that in Lucknow district around 93 per cent of Ujjwala beneficiaries use LPG daily for cooking while in Hardoi district it is around 89 per cent in the same category. Notably, all the households under non-Ujjwala category use LPG for cooking.

Further, the comparison of Ujjwala and non-Ujjwala households of Hardoi and Lucknow district on the basis of fuel use pattern in per day cooking shows that in Hardoi district, around 66 per cent of Ujjwala beneficiaries and 94 per cent of non-Ujjwala users use LPG for cooking day meal. In Lucknow district, LPG usage is around 93 per cent by Ujjwala beneficiaries and 98 per cent by non-Ujjwala beneficiaries. As far as night meal is concerned, 98 per cent non-Ujjwala users and 94 per cent Ujjwala beneficiaries use LPG for cooking.

Notably in both the districts under study, the Ujjwala beneficiaries reported that LPG cylinders are not delivered at their doorsteps. The reverse is reported by non-Ujjwala users where in 85 per cent of the households, the LPG is delivered at their doorsteps. Moreover 27.7 per cent of Ujjwala beneficiaries and only 10.1 per cent of non-Ujjwala users in both the districts reported that seasonal variation affects their pattern of cooking. It is interesting to note that in Lucknow district, none of the non-Ujjwala user reported

that seasonal variation affects cooking. The main reason cited by Ujjwala beneficiaries is that in rainy season, biomass get wet and that's why consumption of LPG increases.

The comparison of Ujjwala and non-Ujjwala households of Hardoi and Lucknow district on the basis of type of health problems that respondents faced due to cooking on solid / traditional fuel before using LPG depicts that eye irritation, headache and coughing are the main problems that are reported by both Ujjwala and non-Ujjwala users in both the districts under study. Regarding the type of health problems that got cured after switching to clean fuel, 89 per cent of non-Ujjwala users and 78.7 per cent of Ujjwala beneficiaries in both the districts reported that eye irritation got cured when they switched to LPG. Similarly, 82 per cent of non-Ujjwala users and 71 per cent Ujjwala beneficiaries in both the districts stated that coughing problems got cured after started cooking on LPG. Regarding change noticed after using LPG by both Ujjwala and non-Ujjwala users in both the districts under study shows that saving of time, reduction in health problems and increase in leisure activities are the important changes that were mostly reported.

Further, regarding the role of Ujjwala Yojana in solving the problem of 'indoor air pollution & promoting environmental sustainability, around 57 per cent of Ujjwala and 64 per cent of non-Ujjwala users in both the districts agreed that the scheme has helped in checking 'indoor air pollution and promoting environmental sustainability. Regarding views on drop in cutting of trees after start of Ujjwala Scheme, majority of respondents of Ujjwala beneficiaries and non-Ujjwala users in both the districts stated that cutting of trees has lessened after the launch of Ujjwala Yojana. In both the districts, under both the categories (Ujjwala and non-Ujjwala users), 35 per cent respondents strongly agreed that it is the responsibility of every citizen to protect the environment. Many respondents stated that cooking on LPG has lessened the smoke in the surrounding areas. Economic reasons like high price of the LPG refill and low level of household income is the top cited reason by Ujjwala and non-Ujjwala respondents in both the districts under study. The next important reason given by majority of the respondents in both the districts under study is to protect health. Many respondents spoke about various health issues that they faced before transitioning towards clean fuel. Besides, 87 per cent of non-Ujjwala users

stated that they switched towards clean fuel in order to protect the surrounding environment from smoke and harmful gases that are emitted from burning of biomass.

Lastly, the two types of approaches to explain households' energy-use-behavior namely, the energy ladder & energy/fuel stacking¹, discussed in the second chapter, the energy ladder model is applicable in Lucknow whereas in Hardoi district both energy ladder and energy stacking is more pertinent. The findings depict that for day meal 57.6 per cent beneficiaries in Hardoi district use LPG while this figure stands at 93.7 per cent in Lucknow district. Similarly, for night meal only 59.1 per cent in Hardoi use LPG while in Lucknow 92.8 per cent use LPG. Similarly, in Hardoi 42 per cent still use cow dung and 32 per cent wood for cooking. While in Lucknow more than 90 per cent never use cow dung and wood for cooking food.

Policy Implications

As the impact of climate change is looming over the horizon, it is imperative that appropriate measures be taken by the government for the dissemination of clean energy. The launch of Ujjwala is a step towards that direction. However, for sustained use of clean fuel, there is a need for an honest and comprehensive research initiative that promotes sustained LPG usage. The study suggests that: 1. Access to fuel at a reasonable price to poor households is the need of the hour. Since, the cost of the cylinder directly affects the usage pattern, so first of all, it needs to be priced appropriately. 2. The awareness regarding harmful implications of cooking from biomass/solid fuel and benefits of clean fuel on health and environmental sustainability should be amplified. 3. The switch to cleaner fuel can be made easy by enhancing the purchasing power of the household. Also, there is need to enhance women's income-earning opportunities. 4. The improvement in the level of education can play a role in transition from traditional fuels to clean fuels. Therefore, investing in education can encourage household to shift towards clean fuel and enable a larger share in the household cooking energy mix. 5. Increasing

¹ While the energy ladder suggests that households completely switch the fuels they use with increasing income, the energy stacking rejects that, and suggests an alternative behavior of using multiple fuels at the same time.

gainful employment opportunities, especially for women can be the best way to reduce the use of biomass.⁶ In the long term, no single fuel alone can meet the cooking energy requirements and eradicate household air pollution, hence India needs a roadmap for clean cooking and support to alternatives that includes the development of non-fossil cooking solutions like biogas and electricity.⁷ It is argued that change in cooking practices can be inspired by the relative rewards and incentives, which can be in the form of praise and appreciation from others. ⁸ Developing infrastructure and strengthening fuel distribution network will aid in the adoption of clean cooking fuels. ⁹ Although, women are the end-users of energy but they are generally not adequately consulted by policymakers in discussions related to the design of technologies on alternative energy appliances meant for them. Hence, women should also be involved in decisions pertaining to clean energy sources. Also, subsidizing the beneficiaries in LPG subsidy is a welcome move but the subsidies need to be increased in proportion to the increase in the LPG prices. Lastly, the policy of not providing a free stove or first refill undermines the scheme's energy access goals and decreases affordability for the poorest. So, providing free stoves can ease the burden on poor households.