

A REPORT ON  
**IMPACT ASSESSMENT OF  
CSR INITIATIVES OF  
THDC INDIA LTD.**



**CONDUCTED BY:**

DEPARTMENT OF MANAGEMENT STUDIES  
INDIAN INSTITUTE OF TECHNOLOGY, ROORKEE

A Report on

# IMPACT ASSESSMENT OF CSR INITIATIVES OF THDC INDIA LTD.

Submitted to:



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April, 2019

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# ACKNOWLEDGEMENTS

This study has been conducted by IIT Roorkee to evaluate the impact of the CSR initiatives undertaken by THDC India Ltd. We are thankful to the THDC India for choosing us to conduct this study. The impact assessment study was conducted in different places of Uttar Pradesh and Uttarakhand States.

We extend our sincere thanks to the officials of THDC India for their support and insights about the CSR activities throughout our study. Our special Thanks to Mr. Nathani, DGM, Mr. Singhal Mr. Bhat, Mr. Vipin Thapaliyal for their continuous support and help. Their help and cooperation are highly appreciated.

We extend special thanks to the respondents and the implementing agencies. The timely availability of the respondents has made the data collection quite easy and interactive. Without the support of the beneficiaries, this project would not have been completed. We also appreciate their valuable support and feedback.

**Dr. M. K. Rao**

**Dr. A. K. Sharma**

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# EXECUTIVE SUMMARY

## **Programme Description**

In view of electricity supply shortages, huge quantities of diesel and furnace oil are being used by all sectors – industrial, commercial, institutional or residential. Lack of rural lighting is leading to large-scale use of kerosene. This usage needs to be reduced, as it is leading to enormous costs in form of subsidies and increasing the country's import dependence.

At the same time, a very large proportion of the citizens continue to live with no access to electricity and other forms of commercial energy. More than 50% of the population has little or no commercial energy access for their living and livelihood. Others with access often have to cope with poor and erratic availability of electricity and other fuels. With constraints faced in resource availability and in delivery mechanisms, traditional means of energy supply are falling short. This is likely to be the case in the foreseeable future so that energy access will continue to remain a problem.

Renewable energy can make a substantial contribution in each of the above mentioned areas. It is in this context that the role of renewable energy needs to be seen. It is no longer “alternate energy”, but will increasingly become a key part of the solution to the nation's energy needs.

THDC under its CSR activities has taken up a significant initiative of installing solar and Mast lights in Unnao and Lucknow of Uttar Pradesh and Sitarganj area of Uttarakhand States. The specific objective of this project is to provide the renewable electricity to the villagers in these locations and help them in their daily life with the light and reduce their dependencies on other sources of power like electricity, kerosene etc. and thus contributes to the overall objective of contributing to poverty alleviation, employment generation, sustainable development etc.

## **Purpose of the evaluation**

The primary aim of this evaluation is to assess the progress and impact of the project in Unnao, Lucknow and Sitarganj. Specifically, the evaluation has sought to assess the implementation of project activities against final results with the aim of assessing the achievements, the processes affecting them, their sustainability key lessons learnt, the contribution to expected impact and the added value.

## **Methodology and Analytic Strategy**

The evaluation methodology comprised: document review and analysis, field visits to each of the three locations by the evaluation team, and analysis of the findings using a common framework reflected in the report. The field visits each included a review of a sample of beneficiaries, interviews with the respondents, and focus groups with beneficiaries and community stakeholders; this was complemented by a small survey of service users exploring their experiences, attitudes and the impact on their lives.

## **IMPACT OF SOLAR LIGHTING SYSTEM**

Apart from the above mentioned suggestions, the aim of the impact assessment of the SLS was to assess compatibility on different five key factors viz; relevance, efficiency, effectiveness, sustainability and impact. These five dimensions of impact assessment and their likelihood of meeting the desired objective are represented below.

### ***Relevance:***

Both rural and urban communities now have easy access to light and energy near their homes and other common places. All the family members including children and women can easily make use of the installed facility. SLS contributed to improving education, health and other conditions of beneficiaries. It provided comfortable environment to the children for study, 30% of households in the sample have improved their education.


### ***Effectiveness:***

SLS has considerably saved the cost and time of the beneficiaries. Cost of diesel, kerosene for burning chimneys and lantern and cost incurred on buying small battery cells for torches is also saved. Moreover, now they don't have to travel for purchasing battery cells, diesel and kerosene oil in this way they have also saved their time.

### ***Efficiency:***

SLS economically benefitted the large mass. At one end they have saved their time and money, the cost incurred on the traditional lighting system (chimneys and torch). On the other hand, they also feel secured as going out of their homes in the evening





or night is no longer an issue for them. There is no more threat of fire or other types of mishaps as earlier it had been in case of using chimneys or lantern. Now they have improved, safe and healthy source of energy in their localities.

***Sustainability:***

Having the most comfortable source of energy has developed a sense of ownership in the minds of beneficiaries towards this asset and thereby ensures the sustainability of the SLS. There is cost free electricity near the locality and no shortfall issue for them this unique feature also motivated them to care it wholeheartedly and keep it functional.

***Impact:***

There is sufficient solar light available at most of the times in a year in the area which is good enough for such type of initiative to create a lasting positive impact on the beneficiaries. School going children, women and elderly people are satisfied and seem more motivated due to the installation of this facility around them. SLS to some extent also contributed in domestic level income generation activities for women such as stitching and embroidery work.

# 1. INTRODUCTION

## 1.1 Corporate Social Responsibility


Corporate Social Responsibility (CSR) is a concept that says, it is the responsibility of the businesses operating within society to contribute towards social, economic and environmental development that creates positive impact on society at large. According to Department of Public Enterprises Corporate Social Responsibility and Sustainability is a company's commitment to its stakeholders to conduct business in an economically, socially and environmentally sustainable manner that is transparent and ethical. Stakeholders include employees, investors, shareholders, customers, business partners, clients, civil society groups, Government and non-government organisations, local communities, environment and society at large. CSR is also called as corporate conscience or corporate citizenship.

CLAUSE 135 of New Companies Act, 2013 includes following criteria for Corporate Social Responsibility:

- Net worth – Rs. 500 Crores or more OR
- Turnover – Rs. 1000 Crores or more OR
- Net Profit – Rs. 5 Crores or more.

If any company during any of the financial year fulfils, any of above conditions then it should:


1. Constitute a CSR committee of Board which shall consist of minimum three directors, out of which one shall be independent director.
2. The committee shall formulate and recommend CSR Policy which indicates company's activity as specified in Schedule VII and also amount recommend for the same.
3. At least 2% of the average net profit of the immediately preceding three financial years of the company shall be used for spending in accordance with the CSR Policy.
4. According to the approach "Comply or Explain", Board should explain the reason for not spending such amount if it fails to do so.

- 
5. The company shall give preference to its local area from where it operates, for CSR activities.

CSR policies encourage the companies to make a positive impact on the environment and stakeholders including employees, investors, shareholders, customers, local communities, environment and society at large. Even though the main motive of business is to earn profit, corporates should take initiative for welfare of the society and should perform its activities within the framework of environmental norms. The aim of the CSR is to increase long-term profits and shareholder trust through positive public relations and high ethical standards to reduce business and legal risk by taking responsibility for corporate actions.

## **1.2 DPE Guidelines**

The Department of Public Enterprises being the nodal department for all Central Public Sector Enterprises (CPSEs) formulates policy pertaining to the role of CPSEs in the economy. It lays down policy guidelines for performance improvement and evaluation, autonomy and financial delegation, personnel management and other related areas in respect of CPSEs. The DPE also acts as the interface between the various Parliamentary and Government organization and the CPSEs as a whole. In the last few years, the pioneering initiatives of the Department of Public Enterprises (DPE) in promoting awareness of the concept and philosophy of Corporate Social Responsibility (CSR) in the public sector enterprises in India through issue of guidelines on the subject, and regular interface with the management of CPSEs to ensure adherence to the guidelines in letter and spirit, has resulted in widespread understanding and acceptability of CSR in the country. The first guidelines on CSR issued by DPE in April 2010 made it mandatory for public sector enterprises to set aside a fixed percentage of their profits for CSR activities. Subsequently, DPE explored a new dimension of CSR as a form of responsible business to be adopted voluntarily by the companies. After extensive consultations with all key stakeholders, DPE issued revised guidelines on CSR and Sustainability, effective from 1st April 2013, which incorporated the global best practices but retained focus on the domestic socio-economic requirements of our country. As a result, DPE guidelines were very well received by the practitioners, the stakeholders and CSR experts, and got wide acclaim in international for also where DPE was invited to share its views with the international audience.



The thrust of DPE guidelines on CSR and Sustainability has been on inclusive growth, development of backward regions, upliftment of the marginalized under privileged and weaker sections of the society, empowerment of women, environment sustainability, promotion of green and energy efficiency technologies and sustainability development in all its diverse aspects. The CSR and Sustainability initiatives taken by CPSEs. In compliance of DPE guidelines on the subject have made tangible socio-economic and environmental impact for the betterment, though comprehensive studies have not yet been undertaken to accurately measure the impact.

The incorporation of specific provisions on CSR in the Companies Act 2013 was, in a way, a vindication and culmination of the efforts of DPE to mobilize the support of all key stakeholders to propagate the concept and philosophy of CRS and ensure its proper implementation in a developing economy like ours. The Companies Act 2013 makes it mandatory for all companies which fulfil the eligibility criteria based on profitability to spend at least 2% of their average net profits of three preceding years on CSR. India is perhaps the first country to make it mandatory by legislation for companies to discharge their Corporate Social Responsibility in a prescribed manner. Since CSR and Sustainability are dynamic subjects, DPE is constantly exploring new dimensions of these subjects and devising new implementation strategies to make CSR and Sustainability portent tool for achieving national development agenda along with “sustainable” development goals. (Source: [www.pib.nic.in](http://www.pib.nic.in); Press Information Bureau, GOI).

### ***Achieving Sustainability through CSR:***

Sustainability is a broad discipline and philosophy meant to preserve the near future. The United Nation’s report “World Commission on Environment and Development: Our Common Future” published in 1987 defines sustainability as “development that meets the needs of the present without compromising the ability of future generations to meet their own needs.” The focus of sustainable development is underlined by the triple-bottom approach to business: People, Planet and Profit.

In other words, development initiatives are a balanced act. The initiatives are to balance the profit and growth of a community keeping in view the future needs of the next generations, although it doesn’t end with that. These initiatives must show

progress in terms of contribution to the surrounding environment, stakeholders and stockholders. Sustainability is therefore, about generating sustainable livelihood, protect environment and combat poverty and/or disease.


Sustainable livelihood is the people’s ability to make a living in an ecologically, socially and economically sustainable manner. It can also involve providing employment training for people, so that they will improve their economic and social status. Or, awareness regarding damage caused to environment and its long-term impact on human communities and livelihood. The Govt. of India has introduced a variety of schemes and policies on a similar note. These schemes up skill people preserve environment and encourage sustainable corporate business practices for example, NITI Aayog (National Institution for Transforming India), enlists following sustainable goals to guide policy making:



**Figure 1 - Sustainable Development**

(Source: <http://niti.gov.in>)

Previously the United Nations Conference on Environment and Development (UNCED), held in Rio de Janeiro in June 1992 adopted Agenda 21 which is a “global



consensus and political commitment at the highest level on socio-economic development and environmental cooperation”.

In line with these objectives, India following a change in company Law in April 2014, decided that companies with annual revenues of more than 10 billion rupees are to compulsorily spend 2% of their Net Profit on Corporate Social responsibility activities like education, health etc.

As a result, THDC and other implementing agencies have done a list of activities under their socio-economic empowerment and development initiatives.

***Guidelines on CSR for CPSEs:***

The Ministry of Heavy Industries and Public Enterprises, Government of India, circulated the “**Guidelines on Corporate Social Responsibility for Central Public Sector Enterprises**” for all Central Public Sector Enterprises (CPSEs).

According to these guidelines:

*CSR activities are not limited to charity rather these should make an impact in the form of concrete and visible social changes by creating a sustainable resource base for people.*

To ensure the fulfilment of these objectives, impact assessment has been made compulsory.

**The Latest Revised DPE Guidelines (released on 21<sup>st</sup> October, 2014):**

1. The Government of India enacted the Companies Act 2013 in August 2013. Section 135 of the Companies Act 2013 deals with the subject of Corporate Social Responsibility (CSR). The Ministry of Corporate Affairs has formulated “CSR Rules” under the provisions of the Act.

2. All CPSEs shall have to comply with the provisions of the Act and the CSR Rules and advise the CPSEs not to overlook the larger objective of sustainable development in the conduct of business and in pursuit of CSR agenda.
3. While selecting CSR activities CPSEs should give priority to the issues which are of foremost concern in the national development agenda, like safe drinking water for all, provision of toilets especially for girls, health and sanitation, education, etc. The main focus of CSR and Sustainability policy of CPSEs should be on sustainable development and inclusive growth, and to address the basic needs of the deprived.
4. Sustainability initiatives would also include steps taken by CPSEs to promote welfare of employees, especially women, physically challenged, SC / ST /OBC categories.
5. CPSEs should give preference to the 'local area' in selecting the location of their CSR activities. It is desirable that the Board of Directors of CPSEs define the scope of the 'local area' of their commercial units /plants / projects, keeping in view the nature of their commercial operations, the extent of the impact of their operations on society and environment, and the suggestions / demands of the key stakeholders, especially those who are directly impacted by the company's commercial operations/ activities. The definition of 'local area' may form part of the CSR policy of the CPSE.
6. All companies are required to include an annual report on CSR in their Board's Report.
7. It is desirable that CPSEs get a baseline/ need assessment survey done prior to the selection of any CSR activity. It is also desirable that CPSEs should get an impact assessment study done by external agencies of the CSR activities / projects undertaken by them. Impact assessment is mandatory for mega projects, the threshold value of which can be determined by the Board of a CPSE and specified in its CSR and Sustainability policy. However, the expenditure incurred on baseline survey and impact assessment study should be within the overall limit of 5% of administrative overheads of CSR spend as provided for under the CSR Rules.

### **1.3 About THDC India Limited:**

THDC India Limited (Formerly Tehri Hydro Development Corporation Limited) was incorporated in July 1988. The THDCIL was jointly promoted by Government of India and Government of Uttar Pradesh with an equity ratio of 75:25. Currently the company has an authorised share capital of Rs. 4000 Cr. The Memorandum and Articles of Association of the Company have been modified to reflect the current business reality of projects. The object clause has been amended to incorporate development of Conventional/ Non-conventional/ Renewable sources of Energy and River Valley Projects. THDCIL is consistently profit making company since the commissioning of Tehri Dam & HPP in the year 2006-07. THDCIL has been conferred the Power Line Award in the category of 'Best Performing Generation Company (in Hydro Sector)' in May 2012. THDCIL has been conferred SCOPE Meritorious Award for Corporate Social Responsibility and Responsiveness in April'12. The Main objective of the company is to develop, operate and maintain the Tehri Hydro Power Complex and other Hydro Projects. Their core business operations involve the generation and sale of hydroelectricity, their operations have grown into a Multi-Project Organization, with Projects spread over various States as well as neighbouring country, Bhutan. THDCIL has obtained ISO 9001:2008 Certificate of Quality Management System, ISO 14001-2004 Certification (Environment Management System) and ISO 18001:2007 (Occupational Health and Safety Management System) Certification for Corporate Office, Rishikesh, Tehri HPP, Tehri PSP, Koteshwar HEP and Vishnugad Pipalkoti HEP.

Presently, THDCIL has a portfolio of 17 Projects totalling to an installed capacity of 6311 MW under operation and various stages of implementation/ development. Total installed capacity of THDCIL presently is 1450 MW. THDCIL has two Hydro Power generating stations namely Tehri HEP Stage-I (1000 MW) and Koteshwar HEP (400 MW) and one 50 MW Wind Power Generation Plant at Patan. The multipurpose Tehri Power Station was commissioned by THDCIL in 2006-07, which provides electricity to the Northern Region, Irrigation benefits to Uttar Pradesh & Uttarakhand, and Drinking Water to NCT of Delhi and U.P. The Koteshwar HEP, downstream of Tehri was commissioned in 2011-12. The 1,000 MW Tehri Pumped Storage Plant, which is under construction, would utilize the Tehri and Koteshwar reservoirs as the upper and lower reservoirs. Towards diversification of the company into Renewable Energy areas, THDCIL commissioned 50 MW Wind Power Project at Patan, Gujarat.





Tehri Dam has been conferred the Prestigious award of “International Milestone Project” of International Commission of Large Dam (ICOLD) in Oct.’09 at China, considering the uniqueness of its design and construction features. Koteshwar HEP has been conferred the PMI India Best Project Award of the year in long term duration (More than 3 years) category in 2011-12. Koteshwar HEP has won the prestigious “5th CIDC Vishwakarma Award-2013”. Koteshwar project adjudged winner in Category “Best Construction Project” among more than 70 submissions from all sectors under this category.

In addition to the 2,400 MW Tehri Hydro Complex, THDCIL is implementing the 444 MW Vishnugad Pipalkoti Hydro Electric Project (VPHEP) on the river Alaknanda in Uttarakhand. THDCIL is also implementing 24 MW Dhukwan Small Hydro Project on the Betwa River in Uttar Pradesh. In addition, there are various Hydro Projects of THDCIL under Survey & Investigation/DPR preparation. THDCIL has signed MoU with Solar Energy Corporation of India (SECI) for setting up Grid Connected Solar Power Projects up to 250 MW capacity. THDCIL has also signed a tripartite agreement with SECI and Kerala State Electricity Board for development of 50 MW Solar project in Distt. Kasaragod, Kerala. Under India-Bhutan Co-operation in hydro Sector development, THDCIL is involved in implementation of Bunakha HEP (180 MW) as a Joint Venture Project. The Company has also taken up work of updation of DPR of Sankosh HEP (2585 MW) in Bhutan as a consultancy assignment. The Company has been given a Credit Rating of AA+ by CARE on the Borrowings. The Company has made financial tie-ups with the World Bank, Nationalised Commercial Banks and other Foreign Financial Institutions for funding its ongoing Capital Projects.

**VISION:**

A world class energy entity with commitment to environment and social values.

**MISSION:**

- To plan, develop and operate energy resources efficiently.
- To adopt state of the art technologies.


- To achieve performance excellence by fostering work ethos of learning and innovation.
- To build sustainable value based relationship with stakeholders through mutual trust.
- To undertake rehabilitation and resettlement of project affected persons with human face.

#### **1.4 THDC India’s CSR Policy:**

THDCIL had developed a Policy on Corporate Social Responsibility (CSR) known as ‘Scheme for Corporate Social Responsibility - Community Development (CSR-CD)’ in the year 2008. In April 2010, ‘THDC CSRCD Scheme 2010’ was introduced according to the guidelines given by DPE in 2010. Later, based on DPE guidelines issued in September, 2011, a separate policy on Sustainable Development was framed in 2012. As required under Companies Act, 2013 and CSR Rules, all companies covered under the eligibility criteria shall formulate a Corporate Social Responsibility Policy with the approval of Board for activities to be undertaken as specified in Schedule VII of the Companies Act. Also, as per DPE Guidelines all CPSEs must adopt a CSR and Sustainability Policy specific to the Company, with the approval of the Board of Directors. Based on the combined guidelines (April, 2013) given by the DPE on Corporate Social Responsibility and Sustainability for CPSEs, THDCIL CSR & Sustainability Policy-2013 was issued with the approval of the Board.

Keeping in view the spirit of executing CSR & Sustainability programmes, the broad umbrella of THDCIL CSR initiatives are titled ‘THDC Sahridaya’ (Corporate with a Human heart). Focus areas where THDCIL shall undertake CSR programmes are titled by the objective they seek to achieve as under:

THDC Utthan	–	Rural Development
THDC Niramaya	–	Nutrition, Health and Sanitation and Drinking Water Projects
THDC Prakriti	–	Environment protection initiatives
THDC Jagriti	–	Education initiatives
THDC Daksh	–	Livelihood and Skill development initiatives



THDC Samarth – Empowerment initiatives  
THDC Saksham – Care of the aged and differently abled

**CSR & SUSTAINABILITY VISION:**

Socially responsible corporate, continuously enhancing value creation in society and community and promoting sustainable development.

**CSR & SUSTAINABILITY MISSION:**

- To build sustainable value based relationship with the key stakeholders through ongoing two-way communication.
- To undertake CSR programmes with a human face.
- To transparently share the CSR & Sustainability initiatives with the stakeholders.
- To ensure increased commitment at all levels in the organization to operate its business in an economically, socially and environmentally sustainable manner.
- To directly or indirectly take up CSR programmes that benefit the communities in and around its work centers and over a time result in enhancing the quality of life and economic wellbeing of the local populace.
- To promote inclusive growth and address the basic needs of the deprived, underprivileged, neglected and weaker sections of the society.
- To generate through CSR initiatives, goodwill and pride for THDCIL among stakeholders and help reinforce a positive and socially responsible image of THDCIL as corporate entity.

## 2. THE NEED FOR IMPACT ASSESSMENT

An impact assessment study is undertaken to determine the significant or lasting impacts on a community resulting from interventions such as this project targeting Solar light facilities undertaken by THDC India. While examining the impact of any initiative at any level taken by any agency, the SIA team tries to evaluate the positive and negative (if any) impacts on the various stakeholder and the society at large which is the utmost requirement of any CSR activity undertaken by any organisation. This requires an examination of a wide number of indicators at all levels and such a broad examination allows for an exploration of both intended and unintended impacts which may or may not be attributable to the project activities. While direct impacts are difficult to determine, change in the community status in general is considered. The areas in which impacts are assessed are in social and environmental.

## 3. RESEARCH BACKGROUND AND METHODOLOGY

### 3.1 Methodology Used

The present study is descriptive in nature. Descriptive research can be explained as a statement of affairs as they are at present with the researcher having no control over variable. Moreover, “descriptive studies may be characterised as simply the attempt to determine, describe or identify what is, while analytical research attempts to establish why it is that way or how it came to be”.

Descriptive research is “aimed at shedding light on current issues or problems through a process of data collection that enables them to describe the situation more completely than was possible without employing this method.”


In its essence, descriptive studies are used to describe various aspects of the phenomenon. In its popular format, descriptive research is used to describe characteristics and/or behaviour of sample population.

Three main purposes of descriptive studies can be explained as describing, explaining and validating research findings.

Since THDC’s CSR initiatives are varied in nature, it was therefore, considered that employing the descriptive research would be helpful in developing the understanding about the activities taken up under CSR.

### 3.2 Data Collection and Sampling

This study draws on interviews and questionnaires to determine significant change by asking specific questions relating to before and after situations. Indicators used to determine change are in the form of socio-economic or health changes such as time saved and reduced incidences of crime etc. While the majority of this impact assessment relies on qualitative data from the project participants and beneficiaries, quantitative data is also used to reinforce qualitative data findings. The methodology for this assessment entails recording community views on their perceived significant impacts resulting from this project.



Unstructured Questionnaire for the community which is aimed at participants and/or beneficiaries of the project also form part of this impact assessment. The community questionnaires attempt to establish what the community sees as the most significant change in their lives as a result of the solar lighting system facilities as well as future impacts. The questions were asked to Villagers and target approximately 20% of the population.

The project was categorized as belonging to infrastructure development and the impact assessment study was taken up by IIT Roorkee.

The geographical areas covered in this study fall under the areas the different blocks of the districts of Uttar Pradesh and Uttarakhand States namely, Unnao, Lucknow and Sitarganj where these projects were implemented by the company. Since the educational background of the target beneficiaries was not very high rather most of the beneficiaries are illiterate even today, it was therefore decided to use focused group interviews and unstructured questions in the local language i.e. Hindi to elicit more views of these beneficiaries. Focused group interviews of the beneficiaries were conducted by the SIA team along with the detailed discussion with the THDC India officials and with the staff of the implementing agencies who assisted the team in conducting the Impact Assessment at different locations.

The activities taken up by the THDC India with the help of implementing agencies are scattered across various places and therefore sample size was different in each project. It has been ensured that the minimum sample is as prescribed in each of the activities.

This sample consists of those beneficiaries who got some or no benefits out of the activities taken up by both the funding and the implementing agency as well. The sample selection is largely influenced due to the nature of the project i.e. the areas to be covered and the size of the population. In some cases, unstructured questions were asked to the beneficiaries till the saturation point has not reached. Whereas, in some cases the sample was certain and definite.

## 4. PLANNING AND EVALUATION

First stage consists of the relevant **literature review** of the available secondary data from different sources and the similarly the mapping of the beneficiaries was also done regarding each activity.

Secondly stage involves the preparation for collecting the **data** from the so mapped beneficiaries from the geographical locations for each activity.

In the second stage it was planned to **visit the project site to** meet and interact with the stakeholders to elicit their views on the initiatives taken up by the THDC.

Similarly the **primary data was also collected** from the respondednts for the activities so identified.

The third phase of the assessment activity includes the process of evaluating the responses so collected in terms of the relevant analysis of the data, finding and necessary recommendations thereto.

## 5. OBJECTIVES OF THE PROJECT

As the study aims at conducting the assessment of impact of CSR initiatives of THDC, the major focus of this assessment was to take a holistic view of the targeted beneficiaries of the different geographical areas of Unnao, Lucknow and Sitarganj districts/ areas where the THDC has implemented its CSR projects and to see how these initiatives of THDC have helped the local people in improving their socio-economic standards. The broad objectives of the study are outlined as below:

1. To conduct a descriptive study on social impact of the solar and mast lights activities undertaken by THDC.
2. To assess the impact of the CSR activities in the blocks/villages & whether these impacts are positive or negative.
3. To conform that the projects are following the objectives and mission of the Projects.
4. To identify the areas for change in policy or method of CSR activities by which more and more people are benefitted.
5. To look for opportunities and possibilities for strengthening the existing programmes.




## 6. NEW AND RENEWABLE ENERGY: A PRECURSOR

India's substantial and sustained economic growth is placing enormous demand on its energy resources. The demand and supply imbalance in energy sources is pervasive requiring serious efforts by GoI to augment energy supplies. India imports about 80% of its oil. There is a threat of these increasing further, creating serious problems for India's future energy security. There is also a significant risk of lesser thermal capacity being installed on account of lack of indigenous coal in the coming years because of both production and logistic constraints, and increased dependence on imported coal. Significant accretion of gas reserves and production in recent years is likely to mitigate power needs only to a limited extent. Difficulties of large hydro are increasing and nuclear power is also beset with problems. The country thus faces possible severe energy supply constraints. Economic growth, increasing prosperity and urbanization, rise in per capita consumption, and spread of energy access are the factors likely to substantially increase the total demand for electricity. Thus there is an emerging energy supply-demand imbalance. Already, in the electricity sector, official peak deficits are of the order of 12.7%, which could increase over the long term.

In view of electricity supply shortages, huge quantities of diesel and furnace oil are being used by all sectors – industrial, commercial, institutional or residential. Lack of rural lighting is leading to large-scale use of kerosene. This usage needs to be reduced, as it is leading to enormous costs in form of subsidies and increasing the country's import dependence.

At the same time, a very large proportion of the citizens continue to live with no access to electricity and other forms of commercial energy. More than 50% of the population has little or no commercial energy access for their living and livelihood. Others with access often have to cope with poor and erratic availability of electricity and other fuels. With constraints faced in resource availability and in delivery mechanisms, traditional means of energy supply are falling short. This is likely to be the case in the foreseeable future so that energy access will continue to remain a problem.

Renewable energy can make a substantial contribution in each of the above mentioned areas. It is in this context that the role of renewable energy needs to be seen. It is no longer "alternate energy", but will increasingly become a key part of the solution to the nation's energy needs.



Renewable energy has been an important component of India's energy planning process since quite some time. The importance of renewable energy sources in the transition to a sustainable energy base was recognized in the early 1970s. At the Government level, political commitment to renewable energy manifested itself in the establishment of the first Department of Non-Conventional Energy Sources in 1982, which was then upgraded to a full-fledged Ministry of Non-Conventional Energy Sources (MNES) in 1992 subsequently renamed as Ministry of New and Renewable Energy (MNRE). This is the only such Ministry in the world. MNRE is the nodal Ministry of the Government of India at the Federal level for all matters relating to new and renewable energy. The Ministry has been facilitating the implementation of broad spectrum programmes including harnessing renewable power, renewable energy to rural areas for lighting, cooking and motive power, use of renewable energy in urban, industrial and commercial applications and development of alternate fuels and applications. In addition, it supports research, design and development of new and renewable energy technologies, products and services.

**SPECIFIC, MEASURABLE, ACHIEVABLE, REALISTIC, TIME-BOUND (SMART) TARGETS FOR 2011-17:**


Grid Interactive Renewable Power: This comprises power generation from mainly the following resources:

1. Solar Power
2. Wind Power
3. Biomass Power /Bagasse Cogeneration
4. Small Hydro Power

**ASPIRATION OF THE MINISTRY:**

The long term aspiration of the Ministry follows from its Vision and Mission statement given is as under:

1. Develop, demonstrate and commercialize technologies for harnessing new and renewable energy sources in close concert with corporate, scientific and technical institutions. In particular, the aspiration would be to reach grid parity



for both solar PV and solar thermal and achieve technological breakthroughs in second generation biofuels and hydrogen energy/fuel cells.

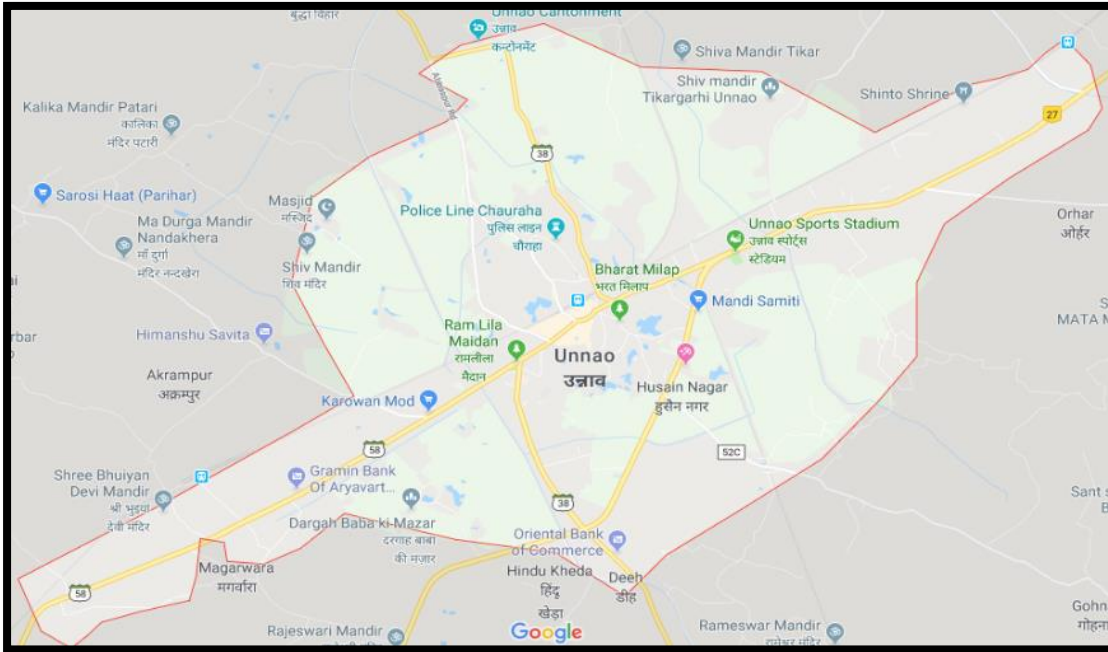
2. Replace use of different fossil fuels wherever possible in even greater quantities, and increase access to electricity/ lighting in all remote and rural areas where it is needed, through Renewable Energy Systems.
3. Increase the contribution of Renewable power in the total installed power generation capacity of the country from 16 per cent to about 18 per cent by 2022, with 7.3 per cent contribution to electricity mix. This would require an achievement of about 13% over the already ambitious targets proposed.<sup>1</sup>

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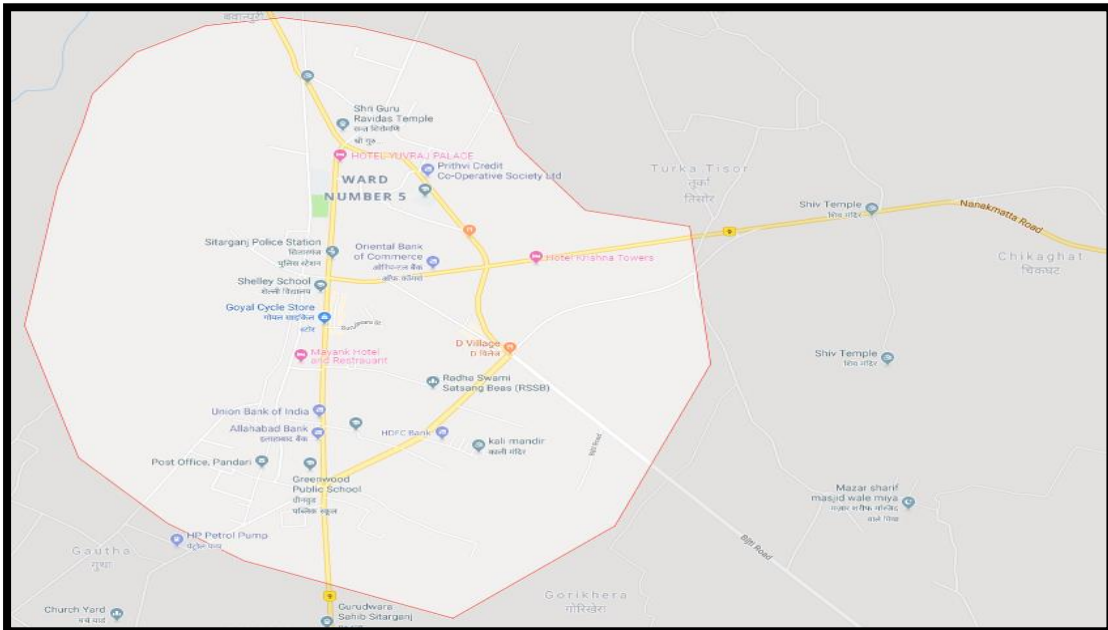
<sup>1</sup> [mnre.gov.in/sites/default/files/uploads/strategic\\_plan\\_mnre\\_2011\\_17.pdf](http://mnre.gov.in/sites/default/files/uploads/strategic_plan_mnre_2011_17.pdf)

# 7. AREAS COVERED

**Geographical areas covered by the study: Unnao, Sitarganj and Lucknow.**



**Figure 2 - Unnao**



**Figure 3 - Sitarganj**



**Figure 4 - Lucknow**

## **SITARGANJ:**

### **7.1 Tharu Tisor, Udham Singh Nagar, Uttarakhand**

Tharu Tisor is a medium size village located in Sitarganj Tehsil of Udham Singh Nagar district, Uttarakhand with total 292 families residing. The Tharu Tisor village has population of 1666 of which 873 are males while 793 are females as per Population Census 2011.

In Tharu Tisor village population of children with age 0-6 is 186 which makes up 11.16 % of total population of village. Average Sex Ratio of Tharu Tisor village is 908 which is lower than Uttarakhand state average of 963. Child Sex Ratio for the Tharu Tisor as per census is 879, lower than Uttarakhand average of 890.

Tharu Tisor village has lower literacy rate compared to Uttarakhand. In 2011, literacy rate of Tharu Tisor village was 77.91 % compared to 78.82 % of Uttarakhand. In Tharu Tisor Male literacy stands at 87.47 % while female literacy rate was 67.42 %.

As per constitution of India and Panchyati Raaj Act, Tharu Tisor village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Tharu Tisor village.

### **Tharu Tisor Data**

Particulars	Total	Male	Female
Total No. of Houses	292	-	-
Population	1,666	873	793
Child (0-6)	186	99	87
Schedule Caste	870	466	404
Schedule Tribe	600	294	306
Literacy	77.91 %	87.47 %	67.42 %
Total Workers	539	427	112
Main Worker	276	-	-
Marginal Worker	263	175	88

#### ***Caste Factor***

In Tharu Tisor village, most of the villagers are from Schedule Caste (SC) & Schedule Tribe (ST). Schedule Caste (SC) constitutes 52.22 % while Schedule Tribe (ST) were 36.01 % of total population in Tharu Tisor village.

#### ***Work Profile***

In Tharu Tisor village out of total population, 539 were engaged in work activities. 51.21 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 48.79 % were involved in Marginal activity providing livelihood for less than 6 months. Of 539 workers engaged in Main Work, 187 were cultivators (owner or co-owner) while 39 were Agricultural labourer.

## **7.2 Nakulia, Udham Singh Nagar, Uttarakhand**

Nakulia is a large village located in Sitarganj Tehsil of Udham Singh Nagar district, Uttarakhand with total 603 families residing. The Nakulia village has population of 3819 of which 1936 are males while 1883 are females as per Population Census 2011.

In Nakulia village population of children with age 0-6 is 557 which makes up 14.58 % of total population of village. Average Sex Ratio of Nakulia village is 973 which is higher than Uttarakhand state average of 963. Child Sex Ratio for the Nakulia as per census is 869, lower than Uttarakhand average of 890.

Nakulia village has lower literacy rate compared to Uttarakhand. In 2011, literacy rate of Nakulia village was 60.82 % compared to 78.82 % of Uttarakhand. In Nakulia Male literacy stands at 69.47 % while female literacy rate was 52.09 %. As per constitution of India and Panchyati Raaj Act, Nakulia village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Nakulia village.



### **Nakulia Data**

Particulars	Total	Male	Female
Total No. of Houses	603	-	-
Population	3,819	1,936	1,883
Child (0-6)	557	298	259
Schedule Caste	89	43	46
Schedule Tribe	1,802	900	902
Literacy	60.82 %	69.47 %	52.09 %
Total Workers	1,075	978	97
Main Worker	1,056	-	-
Marginal Worker	19	7	12

#### ***Caste Factor***

In Nakulia village, most of the village population is from Schedule Tribe (ST). Schedule Tribe (ST) constitutes 47.19 % while Schedule Caste (SC) were 2.33 % of total population in Nakulia village.

#### ***Work Profile***

In Nakulia village out of total population, 1075 were engaged in work activities. 98.23 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 1.77 % were involved in Marginal activity providing livelihood for less than 6 months. Of 1075 workers engaged in Main Work, 615 were cultivators (owner or co-owner) while 379 were Agricultural labourer.

### **7.3 Sisona, Udham Singh Nagar, Uttarakhand**

Sisona is a large village located in Sitarganj Tehsil of Udham Singh Nagar district, Uttarakhand with total 704 families residing. The Sisona village has population of 4157 of which 2102 are males while 2055 are females as per Population Census 2011.

In Sisona village population of children with age 0-6 is 500 which makes up 12.03 % of total population of village. Average Sex Ratio of Sisona village is 978 which is higher than Uttarakhand state average of 963. Child Sex Ratio for the Sisona as per census is 961, higher than Uttarakhand average of 890.

Sisona village has lower literacy rate compared to Uttarakhand. In 2011, literacy rate of Sisona village was 74.76 % compared to 78.82 % of Uttarakhand. In Sisona Male literacy stands at 84.79 % while female literacy rate was 64.53 %. As per constitution of India and Panchyati Raaj Act, Sisona village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Sisona village.

### Sisona Data

Particulars	Total	Male	Female
Total No. of Houses	704	-	-
Population	4,157	2,102	2,055
Child (0-6)	500	255	245
Schedule Caste	556	294	262
Schedule Tribe	2,349	1,166	1,183
Literacy	74.76 %	84.79 %	64.53 %
Total Workers	1,232	1,022	210
Main Worker	1,024	-	-
Marginal Worker	208	125	83

#### ***Caste Factor***

In Sisona village, most of the village population is from Schedule Tribe (ST). Schedule Tribe (ST) constitutes 56.51 % while Schedule Caste (SC) were 13.38 % of total population in Sisona village.

#### ***Work Profile***

In Sisona village out of total population, 1232 were engaged in work activities. 83.12 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 16.88 % were involved in Marginal activity providing livelihood for less than 6 months. Of 1232 workers engaged in Main Work, 513 were cultivators (owner or co-owner) while 248 were Agricultural labourer.

#### **7.4 Chikaghat, Udham Singh Nagar, Uttarakhand**

Chikaghat is a medium size village located in Sitarganj Tehsil of Udham Singh Nagar district, Uttarakhand with total 126 families residing. The Chikaghat village has population of 634 of which 332 are males while 302 are females as per Population Census 2011.

In Chikaghat village population of children with age 0-6 is 115 which makes up 18.14 % of total population of village. Average Sex Ratio of Chikaghat village is 910 which is lower than Uttarakhand state average of 963. Child Sex Ratio for the Chikaghat as per census is 825, lower than Uttarakhand average of 890.

Chikaghat village has lower literacy rate compared to Uttarakhand. In 2011, literacy rate of Chikaghat village was 68.79 % compared to 78.82 % of Uttarakhand. In Chikaghat Male literacy stands at 81.41 % while female literacy rate was 55.20 %.

As per constitution of India and Panchyati Raaj Act, Chikaghat village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Chikaghat village.

### Chikaghat Data

Particulars	Total	Male	Female
Total No. of Houses	126	-	-
Population	634	332	302
Child (0-6)	115	63	52
Schedule Caste	80	38	42
Schedule Tribe	17	10	7
Literacy	68.79 %	81.41 %	55.20 %
Total Workers	204	192	12
Main Worker	203	-	-
Marginal Worker	1	1	0

#### **Caste Factor**

Schedule Caste (SC) constitutes 12.62 % while Schedule Tribe (ST) were 2.68 % of total population in Chikaghat village.

#### **Work Profile**

In Chikaghat village out of total population, 204 were engaged in work activities. 99.51 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 0.49 % were involved in Marginal activity providing livelihood for less than 6 months. Of 204 workers engaged in Main Work, 44 were cultivators (owner or co-owner) while 107 were Agricultural labourer.

## **7.5 Rudpur, Udham Singh Nagar, Uttarakhand**

Rudpur is a large village located in Sitarganj Tehsil of Udham Singh Nagar district, Uttarakhand with total 800 families residing. The Rudpur village has population of 4317 of which 2233 are males while 2084 are females as per Population Census 2011.

In Rudpur village population of children with age 0-6 is 509 which makes up 11.79 % of total population of village. Average Sex Ratio of Rudpur village is 933 which is lower than Uttarakhand state average of 963. Child Sex Ratio for the Rudpur as per census is 1036, higher than Uttarakhand average of 890.

Rudpur village has lower literacy rate compared to Uttarakhand. In 2011, literacy rate of Rudpur village was 70.48 % compared to 78.82 % of Uttarakhand. In Rudpur Male literacy stands at 80.28 % while female literacy rate was 59.84 %.

As per constitution of India and Panchyati Raaj Act, Rudpur village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Rudpur village.

### **Rudpur Data**

Particulars	Total	Male	Female
Total No. of Houses	800	-	-
Population	4,317	2,233	2,084
Child (0-6)	509	250	259
Schedule Caste	22	11	11
Schedule Tribe	0	0	0
Literacy	70.48 %	80.28 %	59.84 %
Total Workers	1,531	1,212	319
Main Worker	1,100	-	-
Marginal Worker	431	233	198

#### ***Caste Factor***

Schedule Caste (SC) constitutes 0.51 % of total population in Rudpur village. The village Rudpur currently doesn't have any Schedule Tribe (ST) population.

#### ***Work Profile***

In Rudpur village out of total population, 1531 were engaged in work activities. 71.85 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 28.15 % were involved in Marginal activity providing livelihood for less than 6 months. Of 1531 workers engaged in Main Work, 514 were cultivators (owner or co-owner) while 220 were Agricultural labourer.

## **UNNAO:**

### **7.6 Sarosi, Unnao, Uttar Pradesh**

Sarosi is a large village located in Unnao Tehsil of Unnao district, Uttar Pradesh with total 863 families residing. The Sarosi village has population of 4920 of which 2636 are males while 2284 are females as per Population Census 2011. In Sarosi village population of children with age 0-6 is 634 which makes up 12.89 % of total population of village. Average Sex Ratio of Sarosi village is 866 which is lower than Uttar Pradesh state average of 912. Child Sex Ratio for the Sarosi as per census is 939, higher than Uttar Pradesh average of 902.

Sarosi village has higher literacy rate compared to Uttar Pradesh. In 2011, literacy rate of Sarosi village was 67.78 % compared to 67.68 % of Uttar Pradesh. In Sarosi Male literacy stands at 75.66 % while female literacy rate was 58.57 %. As per constitution of India and Panchyati Raaj Act, Sarosi village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Sarosi village.



### Sarosi Data

Particulars	Total	Male	Female
Total No. of Houses	863	-	-
Population	4,920	2,636	2,284
Child (0-6)	634	327	307
Schedule Caste	958	514	444
Schedule Tribe	0	0	0
Literacy	67.78 %	75.66 %	58.57 %
Total Workers	1,672	1,389	283
Main Worker	1,182	-	-
Marginal Worker	490	326	164

#### **Caste Factor**

Schedule Caste (SC) constitutes 19.47 % of total population in Sarosi village. The village Sarosi currently doesn't have any Schedule Tribe (ST) population.

#### **Work Profile**

In Sarosi village out of total population, 1672 were engaged in work activities. 70.69 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 29.31 % were involved in Marginal activity providing livelihood for less than 6 months. Of 1672 workers engaged in Main Work, 310 were cultivators (owner or co-owner) while 155 were Agricultural labourer.

## **7.7 Pindorwa, Unnao, Uttar Pradesh**

Pindorwa is a medium size village located in Unnao Tehsil of Unnao district, Uttar Pradesh with total 382 families residing. The Pindorwa village has population of 1842 of which 944 are males while 898 are females as per Population Census 2011.

In Pindorwa village population of children with age 0-6 is 281 which makes up 15.26 % of total population of village. Average Sex Ratio of Pindorwa village is 951 which is higher than Uttar Pradesh state average of 912. Child Sex Ratio for the Pindorwa as per census is 965, higher than Uttar Pradesh average of 902.

Pindorwa village has lower literacy rate compared to Uttar Pradesh. In 2011, literacy rate of Pindorwa village was 59.51 % compared to 67.68 % of Uttar Pradesh. In Pindorwa Male literacy stands at 69.29 % while female literacy rate was 49.21 %.

As per constitution of India and Panchyati Raaj Act, Pindorwa village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Pindorwa village.

### **Pindorwa Data**

Particulars	Total	Male	Female
Total No. of Houses	382	-	-
Population	1,842	944	898
Child (0-6)	281	143	138
Schedule Caste	627	321	306
Schedule Tribe	0	0	0
Literacy	59.51 %	69.29 %	49.21 %
Total Workers	633	531	102
Main Worker	535	-	-
Marginal Worker	98	51	47

#### ***Caste Factor***

Pindorwa village of Unnao has substantial population of Schedule Caste. Schedule Caste (SC) constitutes 34.04 % of total population in Pindorwa village. The village Pindorwa currently doesn't have any Schedule Tribe (ST) population.

#### ***Work Profile***

In Pindorwa village out of total population, 633 were engaged in work activities. 84.52 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 15.48 % were involved in Marginal activity providing livelihood for less than 6 months. Of 633 workers engaged in Main Work, 157 were cultivators (owner or co-owner) while 110 were Agricultural labourer.

## **7.8 Chilaula, Unnao, Uttar Pradesh**

Chilaula is a large village located in Unnao Tehsil of Unnao district, Uttar Pradesh with total 534 families residing. The Chilaula village has population of 2899 of which 1547 are males while 1352 are females as per Population Census 2011.

In Chilaula village population of children with age 0-6 is 383 which makes up 13.21 % of total population of village. Average Sex Ratio of Chilaula village is 874 which is lower than Uttar Pradesh state average of 912. Child Sex Ratio for the Chilaula as per census is 859, lower than Uttar Pradesh average of 902.

Chilaula village has higher literacy rate compared to Uttar Pradesh. In 2011, literacy rate of Chilaula village was 71.34 % compared to 67.68 % of Uttar Pradesh. In Chilaula Male literacy stands at 77.93 % while female literacy rate was 63.83 %.

As per constitution of India and Panchyati Raaj Act, Chilaula village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Chilaula village.

### Chilaula Data

Particulars	Total	Male	Female
Total No. of Houses	534	-	-
Population	2,899	1,547	1,352
Child (0-6)	383	206	177
Schedule Caste	865	473	392
Schedule Tribe	0	0	0
Literacy	71.34 %	77.93 %	63.83 %
Total Workers	940	763	177
Main Worker	557	-	-
Marginal Worker	383	266	117

#### ***Caste Factor***

Chilaula village of Unnao has substantial population of Schedule Caste. Schedule Caste (SC) constitutes 29.84 % of total population in Chilaula village. The village Chilaula currently doesn't have any Schedule Tribe (ST) population.

#### ***Work Profile***

In Chilaula village out of total population, 940 were engaged in work activities. 59.26 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 40.74 % were involved in Marginal activity providing livelihood for less than 6 months. Of 940 workers engaged in Main Work, 148 were cultivators (owner or co-owner) while 30 were Agricultural labourer.

## **7.9 Hajipur, Unnao, Uttar Pradesh**

Hajipur is a large village located in Unnao Tehsil of Unnao district, Uttar Pradesh with total 390 families residing. The Hajipur village has population of 2162 of which 1134 are males while 1028 are females as per Population Census 2011.

In Hajipur village population of children with age 0-6 is 338 which makes up 15.63 % of total population of village. Average Sex Ratio of Hajipur village is 907 which is lower than Uttar Pradesh state average of 912. Child Sex Ratio for the Hajipur as per census is 943, higher than Uttar Pradesh average of 902.

Hajipur village has lower literacy rate compared to Uttar Pradesh. In 2011, literacy rate of Hajipur village was 55.10 % compared to 67.68 % of Uttar Pradesh. In Hajipur Male literacy stands at 64.90 % while female literacy rate was 44.21 %.

As per constitution of India and Panchyati Raaj Act, Hajipur village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Hajipur village.

### Hajipur Data

Particulars	Total	Male	Female
Total No. of Houses	390	-	-
Population	2,162	1,134	1,028
Child (0-6)	338	174	164
Schedule Caste	448	240	208
Schedule Tribe	0	0	0
Literacy	55.10 %	64.90 %	44.21 %
Total Workers	757	604	153
Main Worker	623	-	-
Marginal Worker	134	96	38

#### **Caste Factor**

Schedule Caste (SC) constitutes 20.72 % of total population in Hajipur village. The village Hajipur currently doesn't have any Schedule Tribe (ST) population.

#### **Work Profile**

In Hajipur village out of total population, 757 were engaged in work activities. 82.30 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 17.70 % were involved in Marginal activity providing livelihood for less than 6 months. Of 757 workers engaged in Main Work, 320 were cultivators (owner or co-owner) while 207 were Agricultural labourer.

### **7.10 Gadan Khera, Unnao, Uttar Pradesh**

Gadan Khera is a large village located in Unnao Tehsil of Unnao district, Uttar Pradesh with total 405 families residing. The Gadan Khera village has population of 2070 of which 1060 are males while 1010 are females as per Population Census 2011.

In Gadan Khera village population of children with age 0-6 is 318 which makes up 15.36 % of total population of village. Average Sex Ratio of Gadan Khera village is 953 which is higher than Uttar Pradesh state average of 912. Child Sex Ratio for the Gadan Khera as per census is 1038, higher than Uttar Pradesh average of 902.

Gadan Khera village has lower literacy rate compared to Uttar Pradesh. In 2011, literacy rate of Gadan Khera village was 64.95 % compared to 67.68 % of Uttar Pradesh. In Gadan Khera Male literacy stands at 77.10 % while female literacy rate was 52.00 %.

As per constitution of India and Panchyati Raaj Act, Gadan Khera village is administrated by Sarpanch (Head of Village) who is elected representative of village. Our website, don't have information about schools and hospital in Gadan Khera village.



### Gadan Khera Data

Particulars	Total	Male	Female
Total No. of Houses	405	-	-
Population	2,070	1,060	1,010
Child (0-6)	318	156	162
Schedule Caste	414	212	202
Schedule Tribe	0	0	0
Literacy	64.95 %	77.10 %	52.00 %
Total Workers	747	555	192
Main Worker	430	-	-
Marginal Worker	317	197	120

#### **Caste Factor**

Schedule Caste (SC) constitutes 20.00 % of total population in Gadan Khera village. The village Gadan Khera currently doesn't have any Schedule Tribe (ST) population.

#### **Work Profile**

In Gadan Khera village out of total population, 747 were engaged in work activities. 57.56 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 42.44 % were involved in Marginal activity providing livelihood for less than 6 months. Of 747 workers engaged in Main Work, 108 were cultivators (owner or co-owner) while 113 were Agricultural labourer.

### **7.11 Deeh, Unnao, Uttar Pradesh**

Deeh is a large village located in Unnao Tehsil of Unnao district, Uttar Pradesh with total 1618 families residing. The Deeh village has population of 8194 of which 4350 are males while 3844 are females as per Population Census 2011.

In Deeh village population of children with age 0-6 is 1115 which makes up 13.61 % of total population of village. Average Sex Ratio of Deeh village is 884 which is lower than Uttar Pradesh state average of 912. Child Sex Ratio for the Deeh as per census is 893, lower than Uttar Pradesh average of 902.

Deeh village has higher literacy rate compared to Uttar Pradesh. In 2011, literacy rate of Deeh village was 67.71 % compared to 67.68 % of Uttar Pradesh. In Deeh Male literacy stands at 77.00 % while female literacy rate was 57.17 %.

As per constitution of India and Panchyati Raaj Act, Deeh village is administrated by Sarpanch (Head of Village) who is elected representative of village.

### Deeh Data

Particulars	Total	Male	Female
Total No. of Houses	1,618	-	-
Population	8,194	4,350	3,844
Child (0-6)	1,115	589	526
Schedule Caste	2,898	1,529	1,369
Schedule Tribe	0	0	0
Literacy	67.71 %	77.00 %	57.17 %
Total Workers	2,822	2,365	457
Main Worker	2,327	-	-
Marginal Worker	495	380	115

#### **Caste Factor**

In Deeh village, most of the villagers are from Schedule Caste (SC). Schedule Caste (SC) constitutes 35.37 % of total population in Deeh village. The village Deeh currently doesn't have any Schedule Tribe (ST) population.

#### **Work Profile**

In Deeh village out of total population, 2822 were engaged in work activities. 82.46 % of workers describe their work as Main Work (Employment or Earning more than 6 Months) while 17.54 % were involved in Marginal activity providing livelihood for less than 6 months. Of 2822 workers engaged in Main Work, 837 were cultivators (owner or co-owner) while 590 were Agricultural labourer.

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Sources for all the above information: <https://villageinfo.in/uttar-pradesh/html>  
[https://en.wikipedia.org/wiki/Uttar Pradesh](https://en.wikipedia.org/wiki/Uttar_Pradesh)

## **LUCKNOW CANTONMENT AREA**

Lucknow Cantonment is a constituency of the Uttar Pradesh Legislative Assembly covering the city of Cantonment part of Lucknow in the Lucknow district of Uttar Pradesh, India. The name of Lucknow city can be traced back to the epic 'Ramayana'.

The city stands at an elevation of approximately 123 metres (404 ft) above sea level. Lucknow district covers an area of 2,528 square kilometres (976 sq mi).<sup>[14][15]</sup> Bounded on the east by Barabanki, on the west by Unnao, on the south by Raebareli and in the north by Sitapur, Lucknow sits on the northwestern shore of the Gomti River.

The population of Lucknow Urban Agglomeration (LUA) rose above one million in 1981, while the 2001 census estimated it had risen to 2.24 million. This included about 60,000 people in the Lucknow Cantonment and 2.18 million in Lucknow city and represented an increase of 34.53% over the 1991 figure.

According to the provisional report of 2011 Census of India, Lucknow city had a population of 2,815,601, of which 1,470,133 were men and 1,345,468 women. This was an increase of 25.36% compared to the 2001 figures.

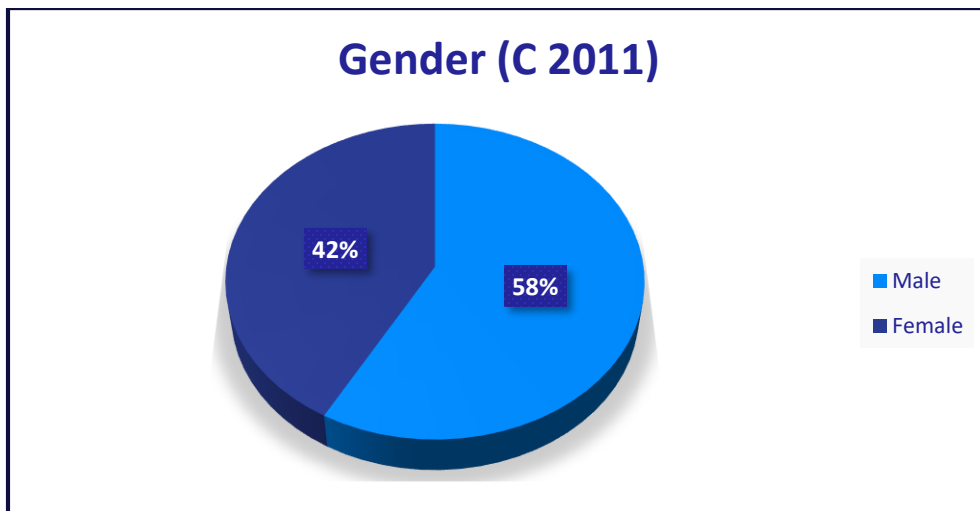
Between 1991 and 2001, the population registered growth of 32.03%, significantly lower than the 37.14% which was registered between 1981 and 1991.

The sex ratio in Lucknow city stood at 915 females per 1000 males in 2011, compared to the 2001 census figure of 888. The average national sex ratio in India is 940 according to the Census 2011 Directorate. The city has a total literacy level in 2011 of 84.72% compared to 67.68% for Uttar Pradesh as a whole. In 2001 these same figures stood at 75.98% and 56.27%. In Lucknow city, the total literate population totalled 2,147,564 people of which 1,161,250 were male and 986,314 were female. Despite the fact that the overall work participation rate in the district (32.24%) is higher than the state average (23.7%), the rate among females in Lucknow is very low at only 5.6% and shows a decline from the 1991 figure of 5.9%.

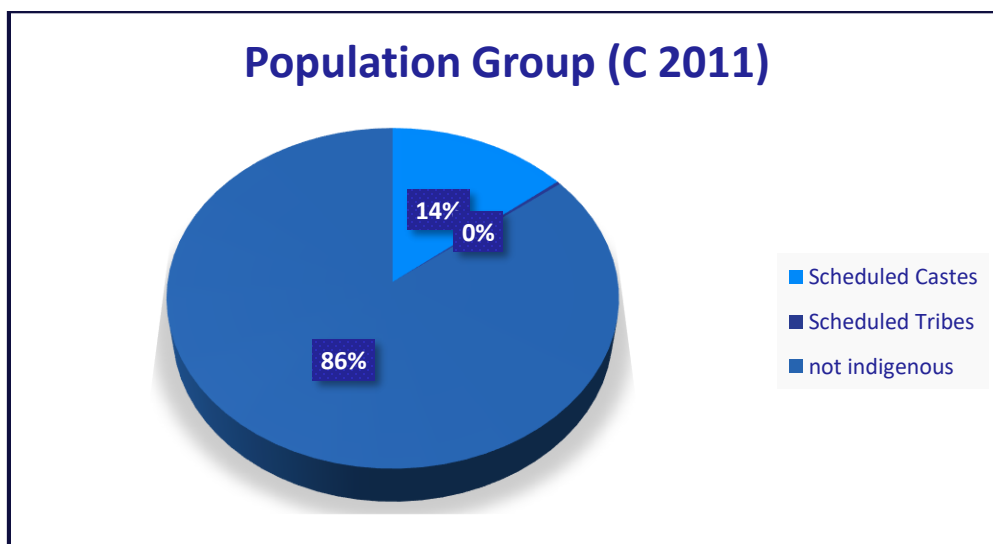
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Source: <https://en.wikipedia.org/wiki/Lucknow>

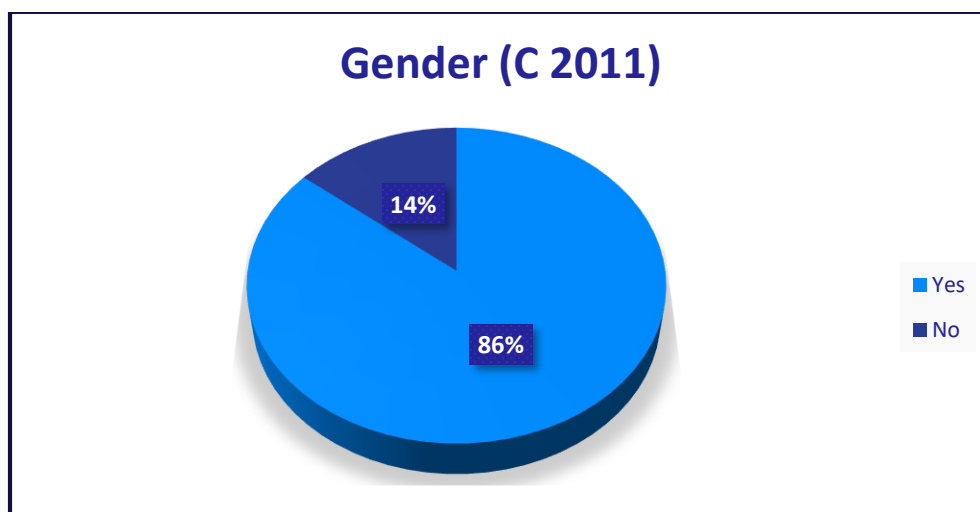
Gender (C 2011)	
Males	36,586
Females	26,417



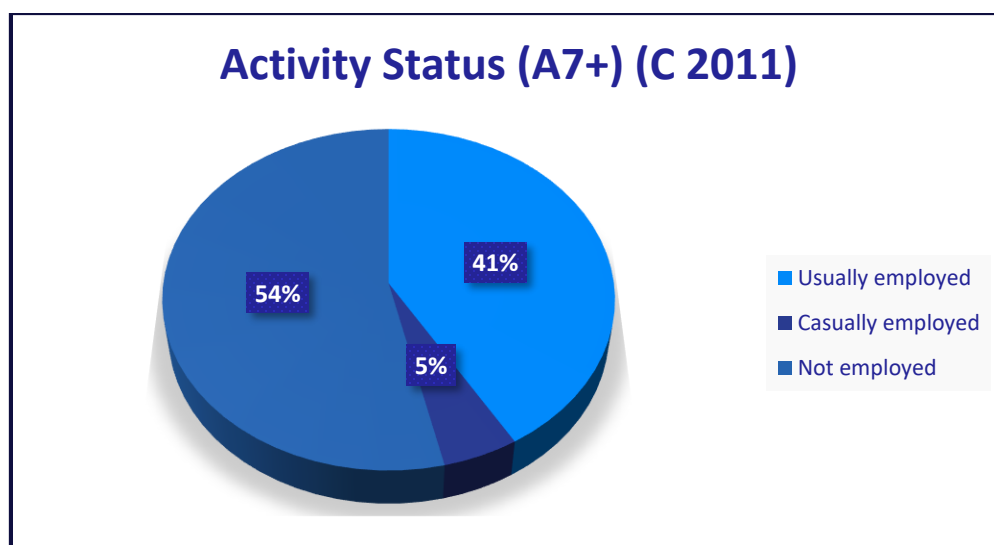
Population Group (C 2011)	
Scheduled Castes	8,915
Scheduled Tribes	179
Not indigenous	53,909



Literacy (A7+) (C 2011)	
Yes	48,786
No	8,022



Activity Status (A7+) (C 2011)	
Usually employed	23,528
Casually employed	2,821
Not employed	30,459



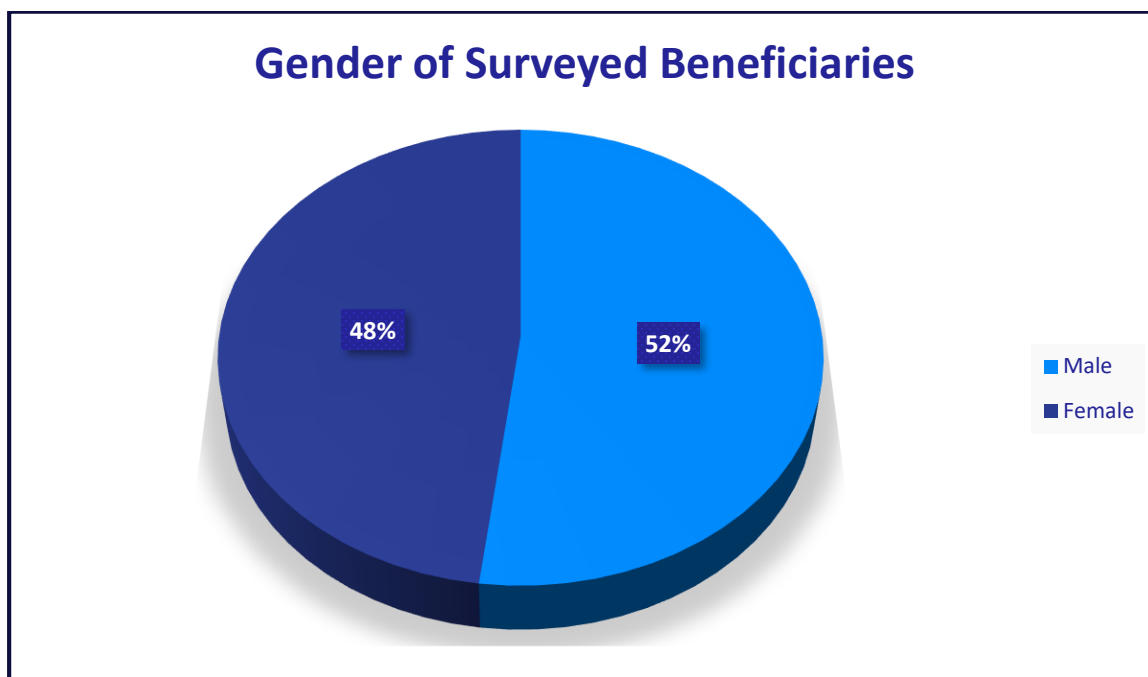
Source: <http://www.citypopulation.de/php/india-uttarpradesh.php?cityid=0942706000>

## 8. EVALUATION AND IMPACT ASSESSMENT

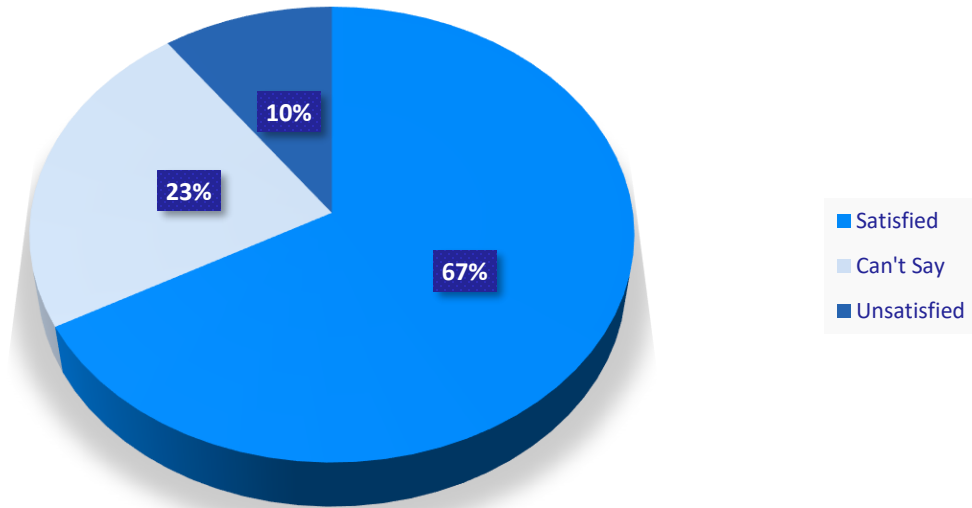
The evaluation and impact assessment was devised in two stages and types. First is the quantitative assessment or more of a feedback data collection. It was done through survey among the target group and beneficiaries. Second is the qualitative assessment. It was carried out through semi-structured interviews with the major stakeholders and also the available secondary data. This set of data helped in carrying out the specific detailed case studies for a profound qualitative assessment.

### 8.1 Quantitative Assessment

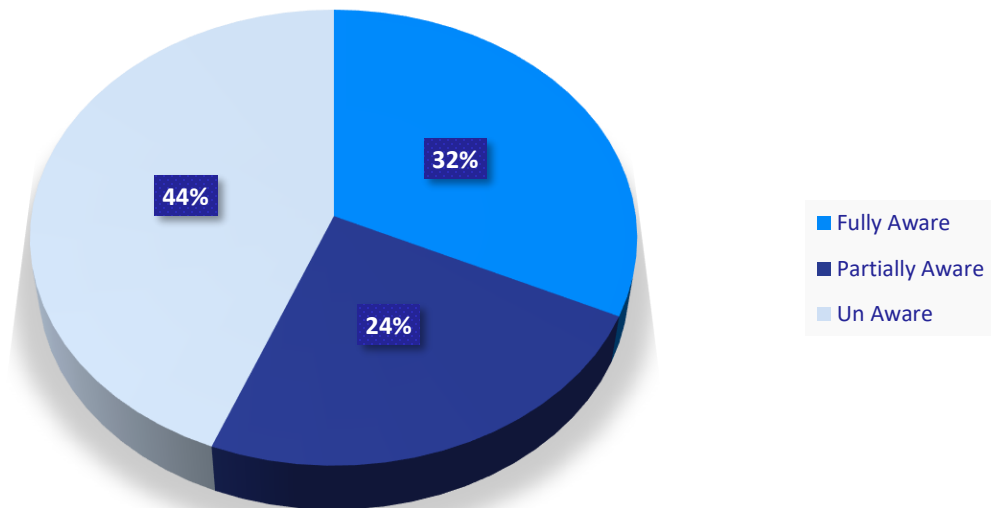
For quantitative assessment, an unstructured survey questionnaire was constructed. Various questions relating to the evaluation and impact assessment were asked to the respondents (*For survey questionnaire, see annexure*). The whole data collected was both qualitative and quantitative. The sample size for this data collection was 20%. Respondents who were benefitted because of the installation of the solar lighting system are taken into consideration for inspection and evaluation. And also, there was other quantitative data regarding the demography which was also taken.



### Satisfaction Level



### Awareness Level of Beneficiaries







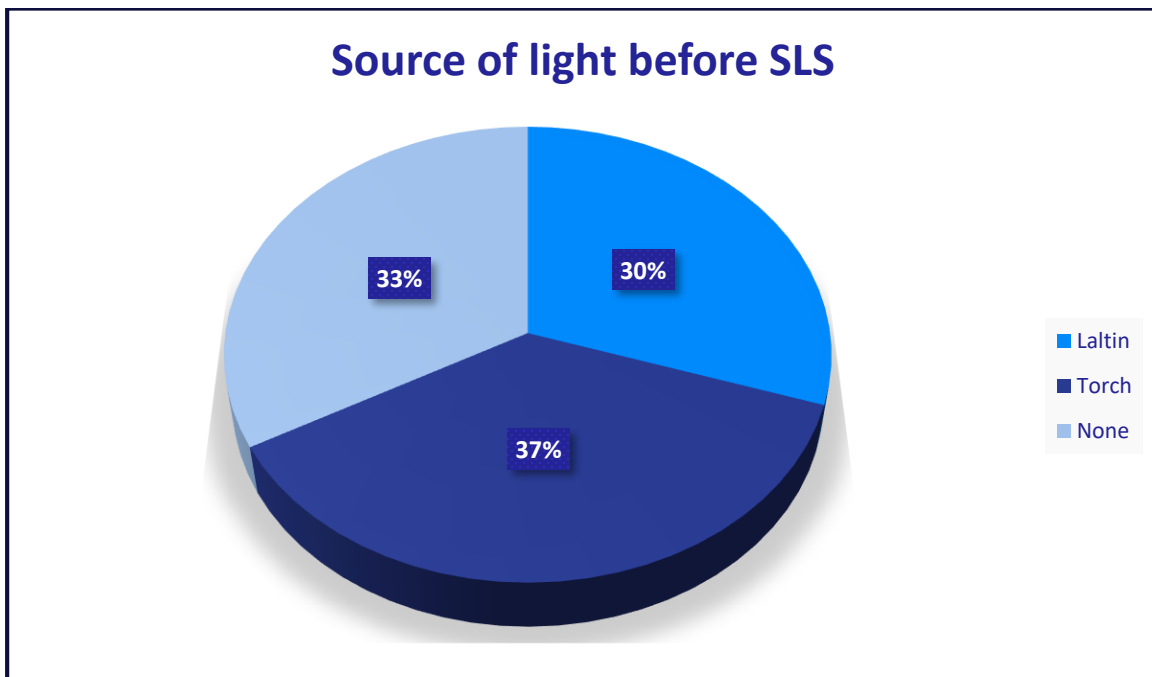
## **8.2 Qualitative Assessment**

For Qualitative assessment, the focused group discussion and interviews were used to elicit the information from the respondents. Qualitative assessment is the one in which the data is collected till the saturation point to determine significant change by asking specific questions relating to before and after situations. The methodology for this assessment entails recording villagers' views on their perceived significant impacts resulting from the SLS project.

## 9. FINDINGS

### Source of light before Solar and Mast Lighting System

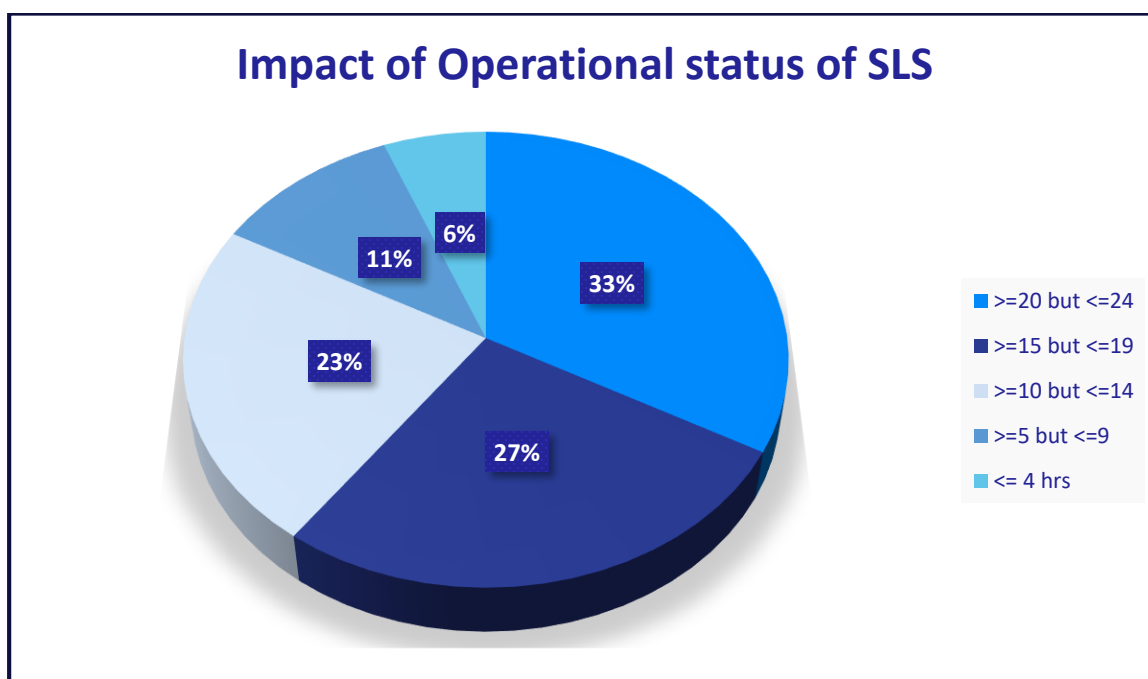
It was reported by the people that previously they were using other sources for lighting purposes namely, torch and lanterns as the main source of light before the installation of SLS. Approximately 30% households use lanterns and another 37% use torch for lighting purposes. Usage of Lantern was reported only in one household who used kerosene oil. Usage of torch with small battery cells was found in 20-25 households. The propensity of using old source of light is showed in below chart. This initiative of THDC enabled community to get rid from using dangerous and unhealthy source of energy. Now they have environment friendly and healthy source of energy at home.



### Impact of Operational status of SLS

To obtain more information about availability of lighting since installation of the system the beneficiaries were asked to select one of the following time ranges. Five different time ranges were taken into consideration for further evaluation of SLS progress and functional status. The 33% of villagers fall under the time band ( $\geq 20$

but  $\leq 24$ ) which indicates that the electricity is generated at optimum level i.e. for the 20-24 hours, 27% of the beneficiaries fall under the time band ( $\geq 15$  but  $\leq 19$ ) which implies the generation of electricity for the 15-19 hours. While 23%, 11% and 6% of the beneficiaries indicated the remaining time ranges respectively. Below chart shows the functional status of SLS.

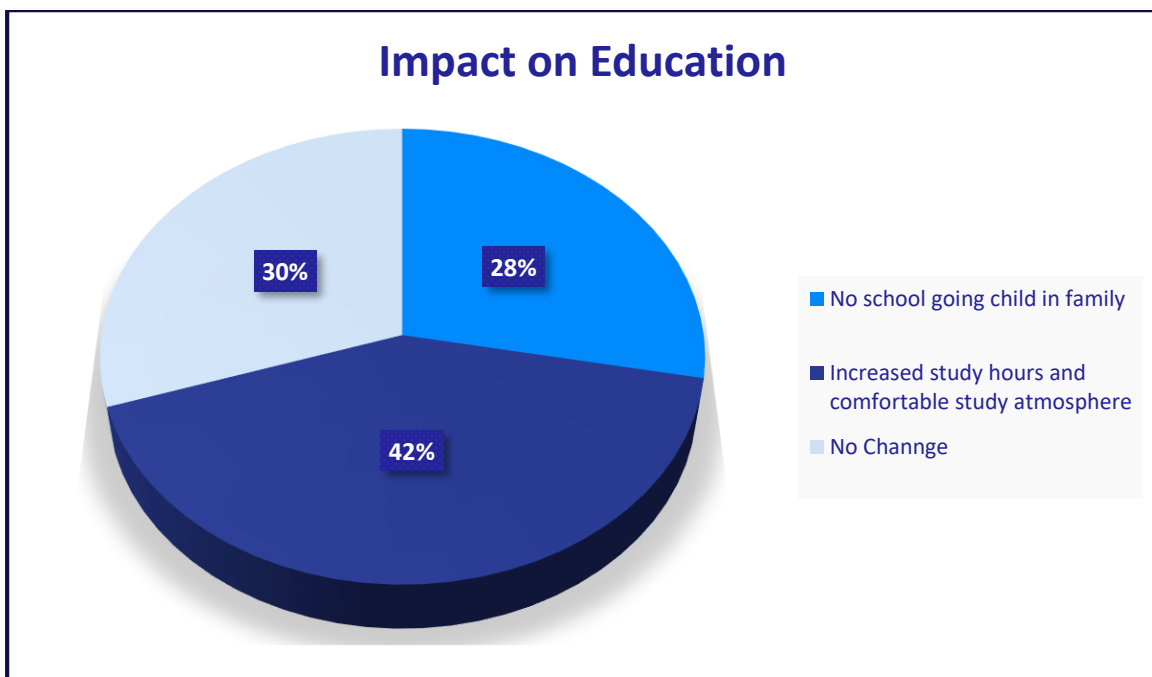


The installation process of SLS has few flaws like; the lights lack proper logos or stickers of the resource provider i.e. THDC. In some cases, lights have been installed in places where alternative means of light were already available and electric connection was available in the homes of beneficiaries and the beneficiaries were unaware as to why and who was providing these solar lights. Despite these few minor flaws the initiative has been successful and the beneficiaries are quite happy and satisfied with the facility created. On an average 10- 15% of the respondents (in each village) were aware about the system to acquire alternate source of energy.

The present geographical location is an ideal area for solar energy interventions due to its conducive climatic conditions. However, some beneficiaries reported that the efficiency and performance may suffer during winter, fog and rainy days.

## Impact on Education

SLS is found to have created another positive impact on the education of the villagers. Prior to SLS, the school going children were finding it difficult to study and complete their homework in the evening hours. Below chart shows that there were 28% population in the sample did not have any school going child in their family. Whereas, 42% of the school going children have found increased in their study hours. There are 30% households who have reported that “same study hours or no change” even after the installation of SLS, it may be due either to the failure to identify the exact location or the requirement of the lighting system to reach to the beneficiaries.



## Impact on Health and Environment

SLS potentially has a significant health and environmental benefits in the chosen areas. This is due to the fact that solar lights emit no carbon footprint and thus is safe for the environment. Moreover, solar lights create a more positive environmental impacts than other fuels. A solar light can replace kerosene lamps and can further reduce the dependency on it and other fuels, which usually release carbon monoxide, nitric oxides and sulphur dioxide all of which adversely affect the air quality.

### **Other Observations:**

Most of the beneficiaries who are using the SLS were satisfied with the facility created by THDC. However, there are few shortcomings like lack of technical expertise and battery replacement. The waiting period of a day or two was required to fix the problem.

Somewhere about 5-10% of the sampled solar and mast lights were found producing less illumination at optimal capacity due to the factors, like covered by trees, some are damaged either by rain, dirt, temperature fluctuations or wind. It was also noticed that surfaces of the panels of some of the lights were not regularly cleaned. The beneficiaries (20%) also expressed their concern with regard to the charging of the battery.

- (i) Most of solar lights were placed at places where already other road lights were implanted and were serving the purpose of individual households rather than serving common masses.
- (ii) Both solar and mast Lights were of much benefits in some areas as it ensured proper lighting in the absence of power supply
- (iii) Density of solar lights was high in Surya Nagar near Para Police Station whereas in areas of much necessity the density was low.
- (iv) Concerns regarding the battery backup of the equipment were raised by the beneficiaries
- (v) Complains of Battery theft, Pole displacement etc. were raised.
- (vi) High Mast Lights were city centric and few lights were situated in the villages also whereas Eon lights focused on distant locations of the villages in Unnao.
- (vii) Issues with respect to battery backup was common across the sample, major reason being the beneficiaries' lack of awareness in case of inappropriate functioning of Solar Lights.

# 10. PHOTOGRAPHS























# 11. RECOMMENDATIONS

## **Relevance:**

Both rural and urban communities now have easy access to light and energy near their homes. All the family members including children and women can easily make use of the installed facility. SLS contributed to improving education and health of beneficiaries. It provided comfortable environment to the children for studying, 31% of households in the sample have improved their education. People have more relaxed and soothing sleep after having SLS.

## **Effectiveness:**

SLS has considerably saved the cost and time of the beneficiaries. Cost of diesel, kerosene for burning chimneys and lantern and cost incurred on buying small battery cells for torches is also saved. Moreover, now they don't have to travel for purchasing battery cells, diesel and kerosene oil in this way they have also saved their time and money.

## **Efficiency:**

SLS economically benefitted the masses. At one end they have saved their time and money in terms of the cost incurred on the traditional lighting system (chimneys and torch). On the other hand they also feel secured as going out of their homes in the evening or night is no longer an issue for them now.

There is no more threat of fire or other types of mishaps as earlier it had been in case of using chimneys or lantern. Now they have improved, safe and healthy source of energy and light in their localities.

## **Sustainability:**

Having the most comfortable source of energy has developed a sense of ownership in the minds of beneficiaries towards this asset and thereby ensures the sustainability of the SLS.

There is cost free electricity near the locality facilitating a complete access to all rural activities all the time and no shortfall issue for them this unique feature also motivated them to safeguard the facility wholeheartedly and keep it functional.

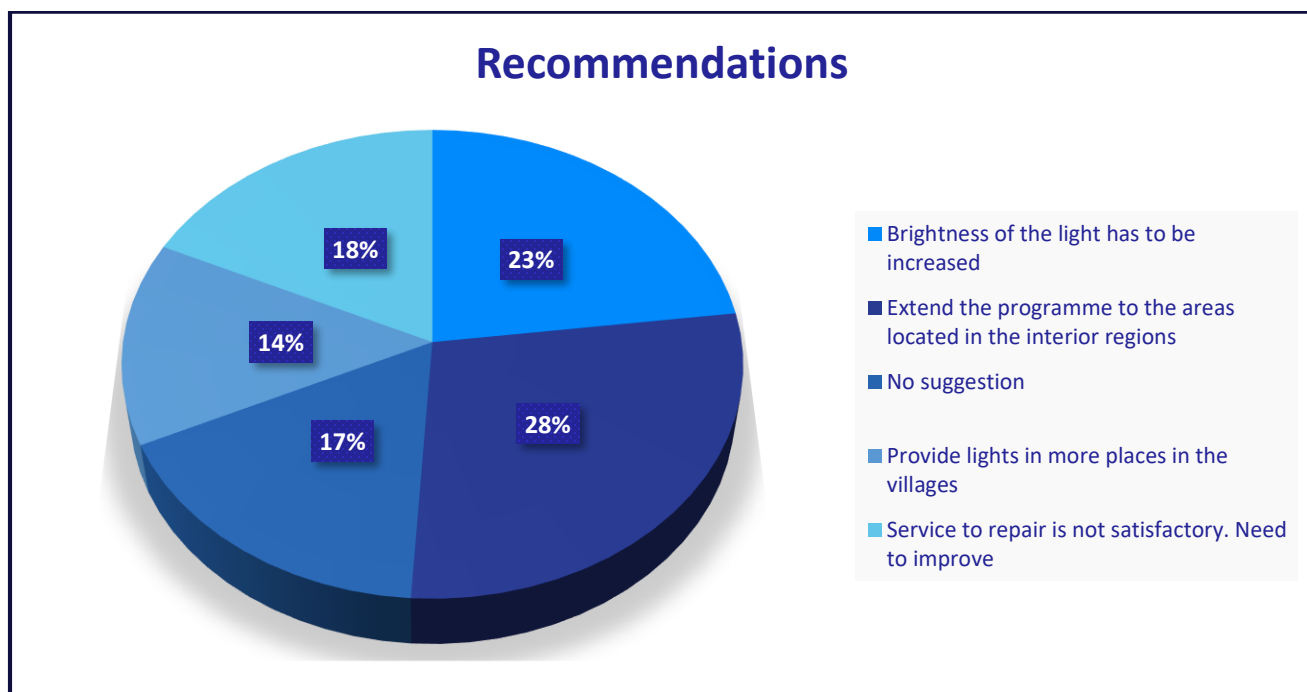


### Impact:

There is sufficient solar light available at most of the times in a year in the area which is good enough for such type of initiative to create a lasting positive impact on the beneficiaries. School going children, women and elderly people are satisfied and seem more motivated due to the installation of this facility around them. SLS to some extent also contributed in domestic level income generation activities for women such as stitching and embroidery work. Lights should be installed where more people can take advantage and should not be installed in personal premises. Implementing agency should take care and mark solar lights provided with distinct identifiers, so as to easily locate and track these lights provided.

### Further Suggestions for Improvements:

Based on the focussed group discussions with the beneficiaries the following views expressed by them are given for making the necessary changes.



## 12. DISCUSSION AND CONCLUSION

The solar lighting systems are reliable and simple source of renewable energy which has a potential to meet the basic energy requirement of a household in the rural areas. This impact assessment clearly shows that solar lighting system in the remote village can influence the life of people very significantly as installing SLS has definite and clear benefits like increase in the duration of studying reduced consumption of kerosene and in particular, this scheme is found benefiting women and children. Most of the women find it easy to do their household activities whereas children get the light facility to study at night. Many of the beneficiaries of solar lighting system are happy with the functionality of the system. The impact of the solar lighting system is also significant in the case of performance of school going children. Many beneficiaries have expressed satisfaction on the significant improvement in their children's education. The SLS was able to create another positive impact especially on women users who are able engage themselves in certain other productive works thus they are able to generate extra income for their families. Thus, adoption of SLS has led to an improvement of rural livelihood to a certain extent.

Nevertheless, in order to address the complaints of the installed SLS, more emphasis is required in terms of developing a clearly stated mechanism through which the complaints of the stakeholders can be resolved. This can be ensured by providing local technical experts and regular meetings between the implementing agency and the users. Though the SLS is a simple equipment, but there is a necessity to provide for the regular maintenance of the SLS so as to keep it operational. Similarly, the implementing agency needs to organize an awareness programme so as to provide sufficient opportunity to the villagers to learn the basic operations of these SLS. The installation of SLS has resulted into the saving of certain expenditure on kerosene, candle, battery etc. which is a commendable benefit. Though, the expenditure on the above said products has been reduced still the current practice of installing the SLS is not able to meet the complete lighting demand of all the villagers, which requires another baseline study to make this initiative more encompassing and comprehensive.

It is therefore, finally concluded that providing local technical experts, engaging the villagers in effective dialogues with THDC and implementing agencies, conducting social awareness and training programmes towards livelihood improvement opportunities will certainly improve the sustainability of this initiative.

## 13. LIMITATIONS AND SCOPE OF THE STUDY

The cause and effect relationship has not been a part of this study as a result of which some impacts may not be directly attributable to the project.

There can be potentially other interventions which are not associated with this initiative that could have influenced certain changes in the community. Therefore it needs to be recognised that the proposed changes through such initiatives could be possible by other interventions.

The impact assessments of the community driven initiatives are more effective when the communities are encouraged to explore changes within the community and take greater control of these changes. This can be possible only when abundant time and other resources are available. Therefore, it is recommended that a follow-up community-driven impact assessment should take place regularly.

In this impact assessment study, semi structured questionnaires and interview methods were used to investigate. However, these methods do have their own limitations in the sense that the questions may not have been understood by the villagers taking part in the questionnaire.

There are few other limitations too, as some people might have faced with the intra-personal conflict as to what they were saying is wrong and they would be spelling out the negatives.

Any impact assessment study that is undertaken after such a short time has a possibility of highlighting significant impacts. Therefore, it is suggested that a regular follow-up assessment need to be undertaken to gauge the lasting changes or any long-term negative impacts.

## 14. SIX STORIES OF RENEWABLE ENERGY

In 2015 the world saw great momentum for climate action, culminating in a historic agreement in December to cut carbon emissions and contain global warming. It was also a year of continued transformation for the energy sector. For the first time in history, a global sustainable development goal was adopted solely for energy, aiming at access to affordable, reliable, sustainable and modern energy for all.

To turn this objective into reality while mitigating climate change impacts, more countries are upping their game and going further with solar, wind, geothermal and other sources of renewable energy. These stories from around the world present a flavour of how they are leading the charge toward a climate-friendly future.

### **14.1 Morocco is rising to be a “Solar Superpower.”**

On the edge of the Sahara desert, the Middle East’s top energy-importing country is building one of the world’s largest concentrated solar power plants. When fully operational, the Noor-Ouarzazate power complex will produce enough energy for more than one million Moroccans and reduce the country’s dependence on fossil fuels by 2.5 million tons of oil.

### **14.2 In Bangladesh, The Number Of Solar-Powered Homes is Surging, Making It The World’s Fastest Expansion Of Solar Energy.**

About 3.5 million homes—or 18 million Bangladeshis— now have electricity thanks to solar home systems. This means that besides reducing carbon emissions, these systems will help children at home, make it safer for women to walk at night, assist families to receive remittances more easily, and help more people find jobs.

### **14.3 China is turning 800 primary and middle schools in Beijing into “sunshine schools.”**

Once the project is completed, the rooftops of these schools will be covered with 100 megawatts of solar panels to power classrooms for teachers and students, making way for bluer skies and healthier air for local residents and more awareness about the environment in young hearts and minds. This will also help bolster China’s efforts to scale up renewable energy and reach its ambitious climate targets set at COP21.

#### **14.4 Mexico's efforts to promote more efficient household lighting have gone nationwide.**

The country has achieved an energy efficiency milestone by distributing almost 23 million energy-saving light bulbs for free. More than 5.5 million Mexican families now use energy-saving lamps. This helps these families save up to 18 percent on their electricity bill, and prevents an estimated 1.4 million tons of CO<sub>2</sub> emissions each year.

#### **14.5 Tanzania holds immense potential in solar and wind power.**

According to an energy mapping study taking place in 12 countries, Tanzania has solar resources equivalent to Spain and its potential for wind power exceeds that of the U.S. state of California. What does that mean for those who lack electricity access in Tanzania? One potential success story is the hundreds of rural water points that will soon be powered by solar energy, making it more affordable for farming communities to operate and maintain rural water systems.

#### **14.6 Turkey has achieved a substantial growth of renewable energy in recent years.**

Since 2001, the country has commissioned 16,000 MW private sector hydro, wind, geothermal and other renewable sources. Today, more private investment continues to pour into Turkey to propel its power sector modernization. Supported by the Clean Technology Fund, private sector renewable energy and energy efficiency projects financed by EBRD, IFC and the World Bank are helping avoid an estimated 5 million tons of CO<sub>2</sub> emissions each year.

Similar results are being achieved in India, Kenya, Mongolia and many other countries around the world. Now that the climate deal has been struck, it's time for countries to scale up action to make their economic development more sustainable and fully *climate operational*.<sup>3</sup>

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Adapted from: <http://Blogs.Worldbank.Org/Energy/Six-Stories-Show-Renewable-Energy-Underpins-Climate-Friendly-Future>, by Andy Shuai Liu. 2016

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## 16. ANNEXURE

### 16.1 Questions for Solar Lights Beneficiaries:

1. Name of the Village:
2. Name of the revenue Village:
3. Name of the Respondent:
4. Number of family Members, No of Adults and Children in the family.
5. Occupation:
6. Do you have electricity in your village?
7. Do you have electricity connection in your house?
8. What did you use for lighting your home before installing the solar lights?
9. When was this solar light installed in your locality?
10. Do the solar light works properly?
11. For how many hours solar light remains functional in a day (24 hours)
12. What are main source of lighting in your house?  
*Electricity/ kerosene/ personal solar panels/ other*
13. Does this solar light reduce your personal consumption of kerosene?
14. Have you and your family members benefited from this solar light?
15. Has solar light helped to improve the education of your children?
16. How many houses have directly benefited from this solar light?
17. Did this facility help in any income generation activity for women?
18. How do you rate your satisfaction after using the solar lights?
19. Any disadvantages of solar light?