

Samarpan

WORKING CEASELESSLY
FOR RURAL INDIA



ENERGY EFFICIENCY SERVICES LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)



Samarpan

EESL'S CEASELESS WORK
FOR RURAL INDIA



ENERGY EFFICIENCY SERVICES LIMITED
(A GOVERNMENT OF INDIA ENTERPRISE)



Energy Efficiency Services Limited

(A Joint Venture under the Ministry of Power, Government of India)

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आर. के. सिंह
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विद्युत एवं नवीन और नवीकरणीय ऊर्जा
राज्य मंत्री (स्वतंत्र प्रभार) एवं
कौशल विकास और उद्यमशीलता राज्य मंत्री
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Minister of State (Independent Charge)
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Minister of State in the Ministry of Skill Development
and Entrepreneurship
Government of India

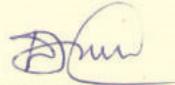


Message

We are well on our way to putting in place a power system which has universal access and provides quality 24x7 power supply on a sustainable basis; while at the same time reducing our carbon footprint. This metamorphosis, however, would not have been possible without the concerted efforts to bolster the nation's energy efficiency across sectors. With the rise in power demand, increasing the efficiencies of energy use has become imperative to achieve the nation's sustainability goals.

When EESL was established, back in 2009, our nation's energy efficiency market was still in its fledgling state, with a remarkable potential to spur national energy transition. EESL firmly took up the mantle of steering India's energy transition by ushering in significant efficiency improvements in an array of sectors – buildings, transportation, industry, or energy generation. Through the relentless efforts of the government, we have made significant progress towards our goal of enabling universal access to energy while ensuring a low-carbon future. Our initiatives, bespoke for the Indian ecosystem and denizens, have helped reduce India's carbon footprint, peak energy demand, and electricity bills. Interventions such as UJALA domestic bulb distribution scheme, The Solar Study Lamp Scheme, the Atal Jyoti Yojana, and Street Light National Programme have had enormous socio-economic impact. These initiatives are reducing the specific power consumption per unit of GDP and carbon footprint of the nation, improving the lives of the citizen through greater illumination and building a robust ecosystem for energy efficient technologies.

With our collective vision and EESL's pioneering initiatives, we will continue to forward the nation's climate change efforts and build a cleaner and greener tomorrow.


(R.K. Singh)



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VISION

Universal access to sustainable energy solutions to enable a low carbon future, with significant economic and social impact.

MISSION

To enable ecosystems for responsible energy adoption with innovations and market creation approaches.

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A photograph of a village street at night. The scene is dimly lit, with a prominent light source from a high mast lamp illuminating the ground. In the foreground, a young girl in a red and white sari is walking towards the camera. To her right, another person is sitting on a pile of bricks. In the background, a person in a red shirt is standing near a well. The street is unpaved and appears to be a dirt path. The overall atmosphere is quiet and somewhat somber due to the darkness.

A young girl walks home late evening, with the comfort of security provided by a high mast lamp supplied by EESL in Dwarikapur village, Ayodhya district, Uttar Pradesh





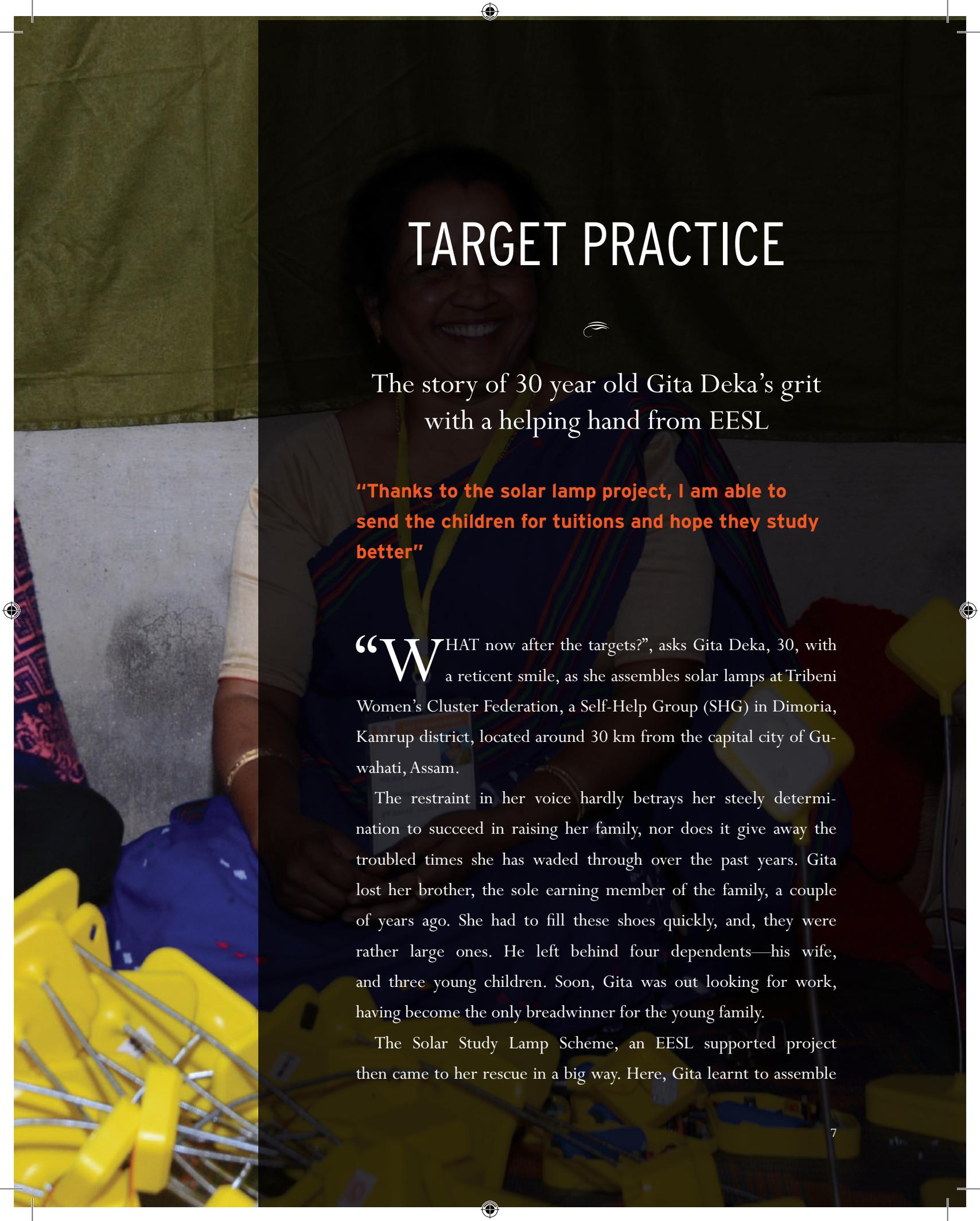


01

SOLAR STUDY LAMP SCHEME

Kindling the Spirit





TARGET PRACTICE

The story of 30 year old Gita Deka's grit with a helping hand from EESL

"Thanks to the solar lamp project, I am able to send the children for tuitions and hope they study better"

“WHAT now after the targets?”, asks Gita Deka, 30, with a reticent smile, as she assembles solar lamps at Tribeni Women's Cluster Federation, a Self-Help Group (SHG) in Dimoria, Kamrup district, located around 30 km from the capital city of Guwahati, Assam.

The restraint in her voice hardly betrays her steely determination to succeed in raising her family, nor does it give away the troubled times she has waded through over the past years. Gita lost her brother, the sole earning member of the family, a couple of years ago. She had to fill these shoes quickly, and, they were rather large ones. He left behind four dependents—his wife, and three young children. Soon, Gita was out looking for work, having become the only breadwinner for the young family.

The Solar Study Lamp Scheme, an EESL supported project then came to her rescue in a big way. Here, Gita learnt to assemble



Life is a celebration:
Children at the
Community English
School, Basorong, 30
km from Guwahati
town, enjoy a race in
the playground during
lunch hour.

solar lamps. The more she assembled, the more she earned.

But now, with the local area targets fulfilled, the scheme is ending. That set Gita to reflect on what it had done for her and why she hoped the scheme would live beyond the ‘targets’.

The scheme had singularly lifted her from the throes of vulnerability to one of confidence and hope. It has given her the confidence to skill up and earn a livelihood. “Now, I don’t want to stay home,” she says with an air of certainty.



EESL assisted Solar Study Lamp Scheme shines through

Projects under National Rural Livelihood Mission (Assam)	Bene- ficiaries	Project period (months)	Income earned (in INR)	Income/month (in INR)	Av. Per person gains/month (in INR)
Solar Study Lamp Scheme	470	8	1,80,92,746	22,61,593	4,812
Fisheries	1201	7	2,75,64,232	39,37,747	3,279
Incense Stick making	243	12	10,65,415	88,785	365
Back-yard poultry	227	1	5,79,192	5,79,192	2,552
Aajeevika Grameen Express Yojana	50	12	22,90,725	1,90,894	3,818
Water Hyacinth Craft	289	11	44,52,585	4,04,780	1,401
Sanitary Napkin	74	3	3,34,250	1,11,417	1,506
Handloom Value chain	1000	6	79,93,157	13,32,193	1,332

* Mushroom development scheme data not available

Secondly, the money is good.

“Thanks to the solar lamp project, I am able to send the children for tuitions and hope they study better,” she says. The earnings from the project has done a lot more. “I use the money to develop my other business, a mushroom farm”. Gita runs it with the help of her sister in law and hired labour.

Her keenness to know more about the future of the solar project is understandable. It is, by far, the most remunerative government project in the State (see table above). And so, she hopes it continues.

EESL is in touch with the Assam government to explore avenues to take forward the project.

Gita has little time for herself. She shies away when asked more about her life. Does she want to get married? “She doesn’t think for herself,” says an associate at the SHG, referring to the family circumstances that forced her to grow up overnight and be responsible for bringing bread to the table for her family.

We salute Gita’s resilience and are privileged to be part of her journey of empowerment.





THE PROVIDER

Nayammoni's enterprise is well rewarded

NAYAMMONI CHAMUA, 45, a housewife, always nursed an ambition to be independent. However, she could not build on her education, having studied up to secondary school, short of enrolling in college for under-graduate studies. Although her husband, Pintu Chamua, provided for her and her children, there were periods when the money was scarce. For, Pintu, a small-time contractor, doesn't get work all around the year. And so, Nayammoni was out looking for opportunities in enterprise.

When the EESL-assisted Solar Study Lamp Scheme was announced, she signed up to get skilled to assemble the lamps. Soon enough, she was on the job, earning INR 12 for every lamp assembled. Not only that, she started a repair shop for the lamps as well. To supplement her income, she decided to build on the platform that the repair shop provided. So, she began selling grocery and stationery items from the repair shop. The latter was a direct outcome of the repair business -

children who would bring their lamps for repair would often ask if she kept pencils and erasers.

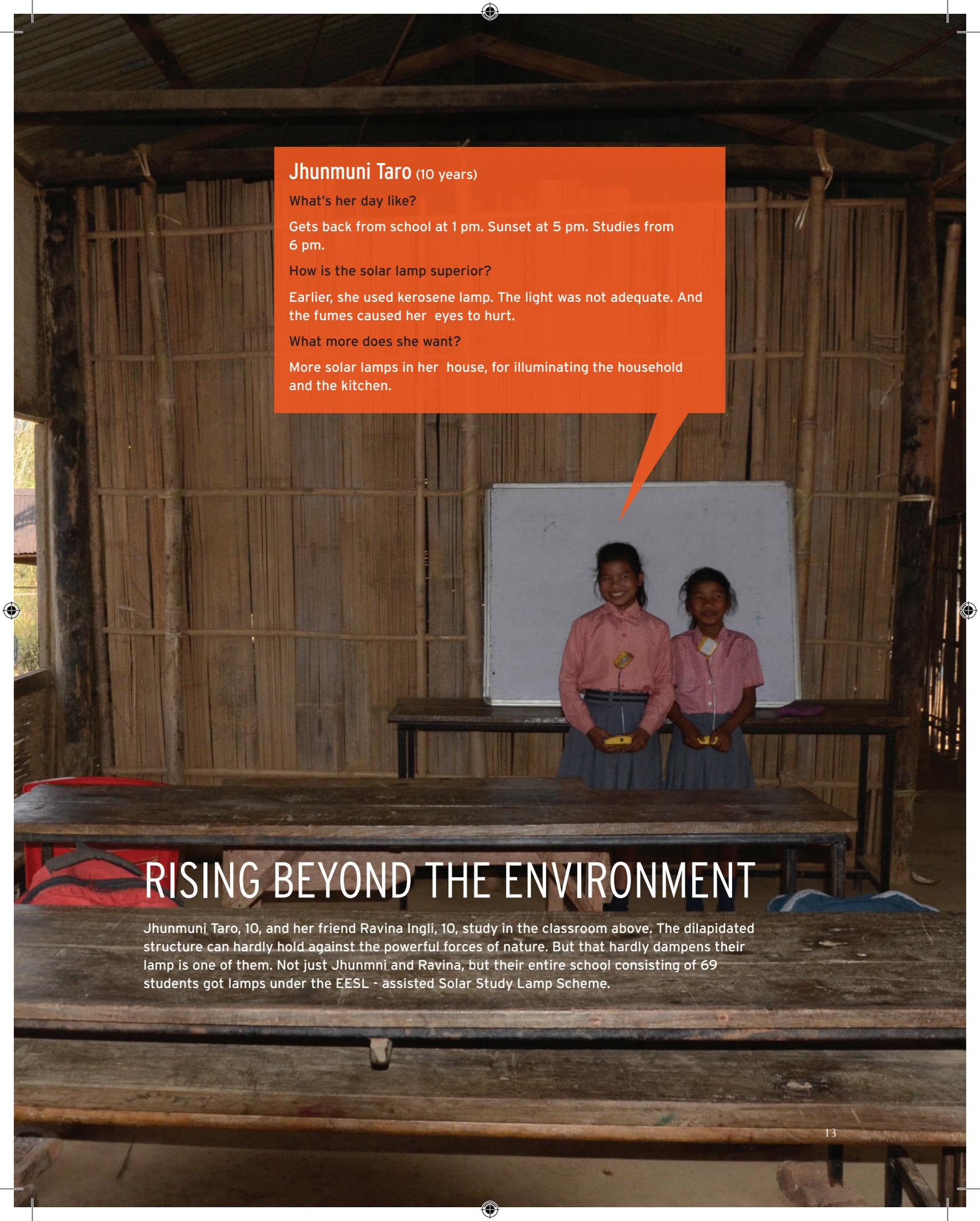
All this vaulted her income to the point that on some occasions she earned more than her husband. “I have earned on an average INR 7,000 per month,” says Nayammoni with a gentle smile. This has helped her look after the children’s education costs, taking over this burden from her husband. However, greater happiness lies beyond this existential need. “I feel a deep sense of pride and immense happiness when, at the end of the month, I walk up to my husband and tell him, ‘I have the salary. Take it now’, says a beaming Nayammoni.

The process has, evidently, enriched her beyond monetary considerations. “My self-confidence has improved. So much so that my neighbours look upto me for advice on various issues,” reckons Nayammoni. In fact, they too want to step out of their homes and take the path that I have treaded, she adds.

Is the job tough? “Not at all,” darts back the reply. Repairing lamps is not difficult since the main complaint relates to a part that suffers natural wear and tear, the switch. EESL’s stringent and efficient procurement of lamp components has ensured that Nayammoni does not have to struggle with the repairs. Nor are her consumers unhappy with the product.

EESL takes pride in enjoining Nayammoni’s journey to empower herself and contribute as an equal partner in her personal life.





Jhunmuni Taro (10 years)

What's her day like?

Gets back from school at 1 pm. Sunset at 5 pm. Studies from 6 pm.

How is the solar lamp superior?

Earlier, she used kerosene lamp. The light was not adequate. And the fumes caused her eyes to hurt.

What more does she want?

More solar lamps in her house, for illuminating the household and the kitchen.

RISING BEYOND THE ENVIRONMENT

Jhunmuni Taro, 10, and her friend Ravina Ingli, 10, study in the classroom above. The dilapidated structure can hardly hold against the powerful forces of nature. But that hardly dampens their lamp is one of them. Not just Jhunmuni and Ravina, but their entire school consisting of 69 students got lamps under the EESL - assisted Solar Study Lamp Scheme.

A MOTHER'S PERSPECTIVE

Lamps under the EESL assisted Solar Study Lamp Scheme have reached children in deep rural areas. Below, some of the mothers answer key questions: Why did they buy it? What does it take to buy it? How does it impact their lives? And finally, do they want more of it and in what manner? The answers are revealing.



Martha, 35, with Stephen, her 3 year old son

Her aspiration: Wants her child to have a government job and become a 'big' person.

Her occupation: Daily work as a agriculture labourer - earns INR 200 per day; has a fish pond; sells fish in the market; also sells vegetables in market.

What the lamp does for her: During 1-2 weeks of monsoon season, there is no electricity. The lamp doubles up to light up the room; cooks food under it; uses it as a torch when family members step out of the house at night.

What the lamp does for Stephen: He likes the buttons, likes playing with it. He is in Kindergarten, where they teach alphabets and numbers. Better illumination from the light helps him enjoy the experience of learning.



Darpana (28 years)

What does she spend on?

Food, transportation, tiffin, stationary, books and school uniforms

How does she supplement home income ?

Tends to a kitchen garden

How long does it take to save money to buy a lamp?

It takes one month to save INR 100, the cost of a solar lamp.

AN EMPOWERED LADY

Afsana Parveen, 34

Balua village, Arrah district, Bihar

Financial Gains: INR 6-7,000 per month from operations; total earnings: INR 12,000 per month.

What does she do with the money?: Afsana has two daughters and a son - Suhana Parveen, 16, Shania Sultan, 13 and Mohammed Kaif, 14. They would ask for to be enrolled in private schools since they have computer classes, better tuition and assignments. This was not possible earlier. Now, she has enrolled her youngest daughter, Shania, in a private school.

"Earlier on, if the children asked for small things, i would refuse," says Afsana. "If your father doesn't save, how can i get you married off?", she would buttress her reply to them. "Now, I am able to meet their small demands," she says

Social impact: "Didi, how can I get this job?", people in the village come and ask me," she says with a sense of pride.



"When I walk in the village and people come up and say 'Pranaam Didi', I feel I am someone (important)"



Shania Sultan, 13, Studying at her home, Balua village, Arrah district, 70 km off the capital city of Patna, Bihar.

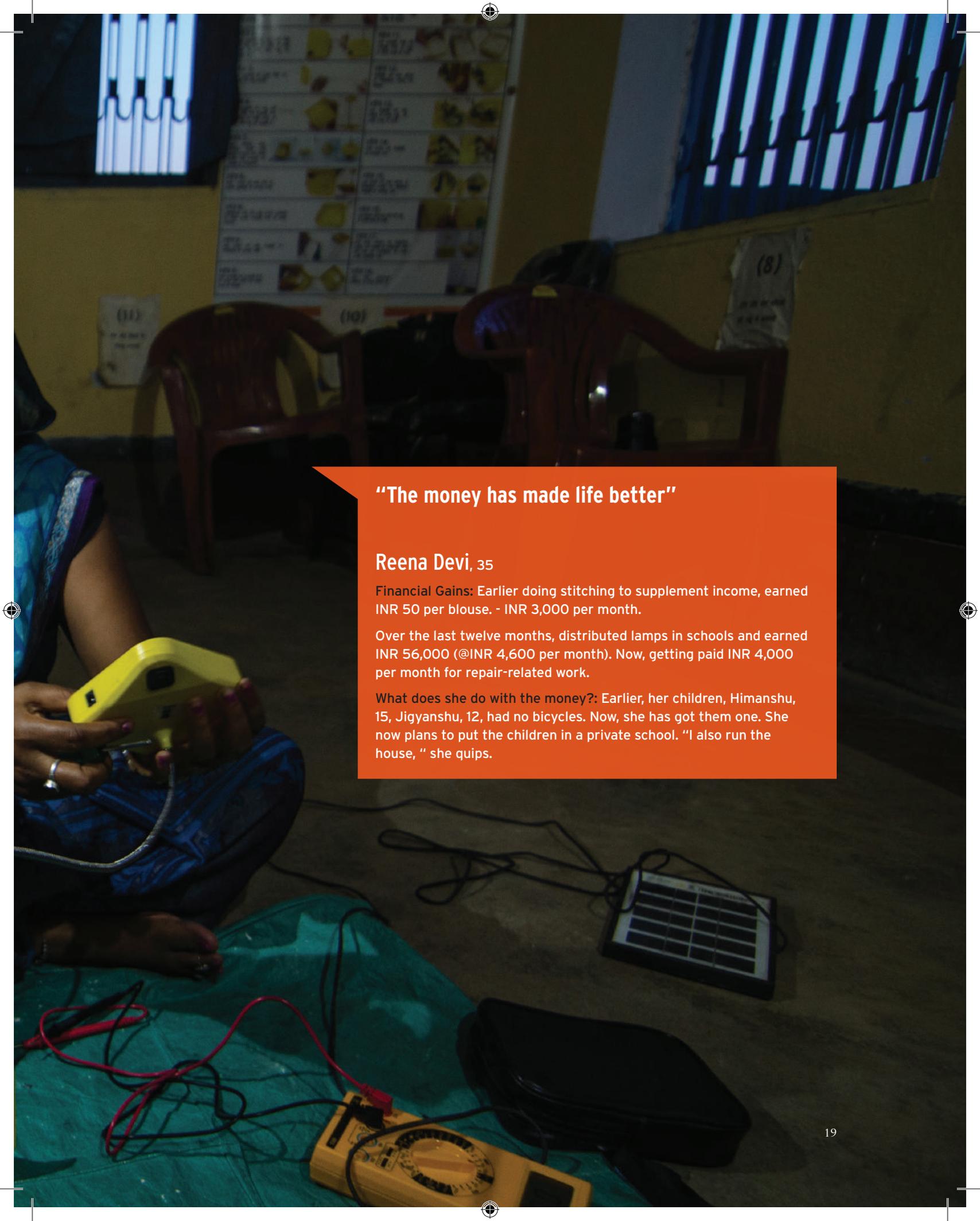
Why does she like the lamp? "It's so simple to operate and it lasts for as long as 12 hours,"

What does she want to do when she grows up? "I want to join Indian Air Force and fly planes. It is an exciting life"

(3)

लोड बायर को लोड
एल ई डी से सोल्डरिंग
करना





“The money has made life better”

Reena Devi, 35

Financial Gains: Earlier doing stitching to supplement income, earned INR 50 per blouse. - INR 3,000 per month.

Over the last twelve months, distributed lamps in schools and earned INR 56,000 (@INR 4,600 per month). Now, getting paid INR 4,000 per month for repair-related work.

What does she do with the money?: Earlier, her children, Himanshu, 15, Jigyanshu, 12, had no bicycles. Now, she has got them one. She now plans to put the children in a private school. “I also run the house,” she quips.

What is Solar Study Lamp Scheme?

- The Solar Study Lamp Scheme seeks to change the way children experience light when the sun sets. A large part of this populace currently depends on kerosene to go by their evenings and early mornings. The noxious kerosene fumes are harmful for health. Besides, they offer poor illumination
- The Union government's Ministry of New and renewable Energy (MNRE) set out a scheme wherein 7 million solar study lamps would be distributed across five states of Assam, Bihar, Odisha, Jharkhand and Uttar Pradesh. These lamps were targeted for areas where less than 50 per cent households had access to grid-based electricity
- The scheme has been jointly implemented by Energy Efficiency Services Ltd, Indian Institute of Technology – Mumbai and the State Rural Livelihood Missions of the respective states

Outcome

Students Benefitted

4 Million 83 Lakh

Local People Skilled to Service Lamps

Over 7 Thousand

Villages Covered

Over 15 Thousand

Overall Lamps to be Distributed

7 Million



How does EESL contribute?

EESL is responsible for procurement of the various lamp components and its delivery to the distribution centres. This means procuring the photovoltaic module (Solar Panel) that converts light to electricity, the LED luminaire and the battery which powers it for around 4-5 hours daily.

Why EESL?

EESL has an established track record for competitive, transparent and efficient procurement of mass consumption energy efficient product. They were singularly responsible for lowering the price of LED bulbs from INR 310 to INR 38 in 5 years in their lowest procurement cycle. The consumer market has witnessed a drop in prices from INR 450 to INR 90 in the same time frame, thereby ushering in the LED revolution in the country.

In the case of LED solar lamps, EESL has proven it once again. The procurement costs are well below the original estimates. (Table 1)

Importantly, this has not come at the cost of quality. EESL observes stringent quality controls. This ensures that women entrepreneurs like Nayammoni (page 10) don't have to fret while repairing or servicing the lamps. As much as that, consumers like Shania Sultan (page 17) are happy, evoking sentiments towards greater application of such lamps in their daily lives.

This is possible since EESL has a three-stage process for ensuring that quality checks are maintained. (Table 2)

Going forward:

The success of the Solar Study Lamp Scheme propelled the Assam government to conduct a study in early 2019 on the future potential it holds. The findings of the market survey are revealing:

1. There is good demand for the Solar lamps to the point where people are interested in buying them (under the original scheme, Assam government charges a nominal INR 100 per lamp towards administrative and logistics costs)
2. Women entrepreneurs, post enterprise level training, are willing to open shops for repair and sale.

Against this backdrop, EESL, given its strong, commercial and technical pedigree, is on course to distributing 2.5 million solar study lamps in the north eastern States of Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura. It has also initiated dialogue with Uttar Pradesh government to take forward the solar lamp scheme.

Table 1: Holding the Priceline

	Order Placement	Estimated Cost perlamp (INR)	Discovered cost (INR)	Savings (approx.)
Phase-1	June 5, 2017	600.00	449.00	25%
Phase-2	April 27, 2018	449.00	396.90	11.6%
Phase-3	December 28, 2018	397.00	393.75	1%

Table 2: Strong Filters

	Agency	Work
Phase-1	IIT-Bombay	Prototype test from each vendor before mass production
Phase-2	Manufacturer's end	Pre-dispatch inspection before each and every dispatch of consignment
Phase-3	ADC	Testing of each lamp during the assembly of lamps by the assemblers



स्वभावदेवतासि
कृतमसा कृतमसा

STY CARPET

मायवनी देवी मठ
महिला मठ
ग्राम. क. भार
(प्र.)

मायवनी देवी मठ

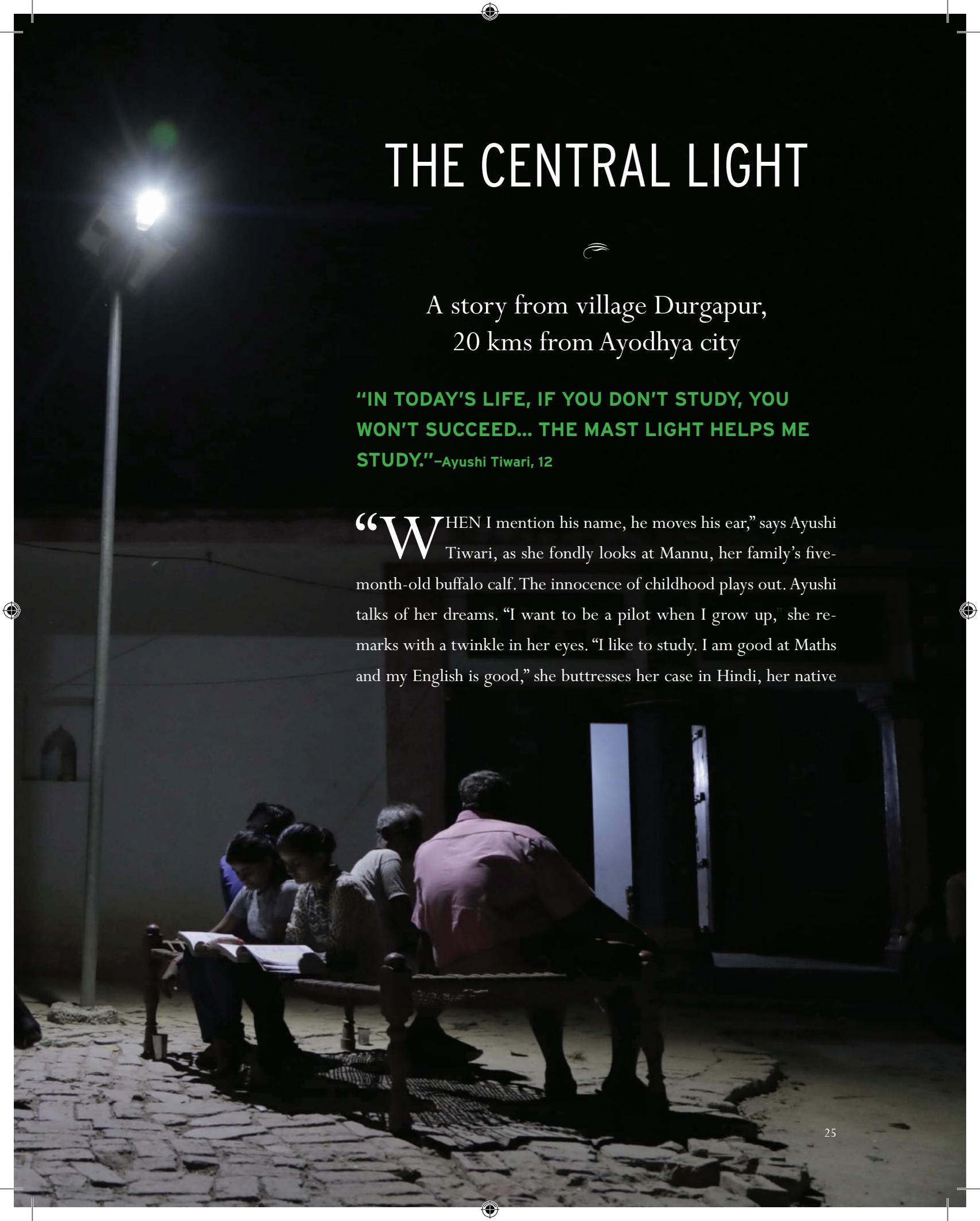
ATAL JYOTI YOJANA

Sun on the Streets

02







THE CENTRAL LIGHT

A story from village Durgapur,
20 kms from Ayodhya city

"IN TODAY'S LIFE, IF YOU DON'T STUDY, YOU WON'T SUCCEED... THE MAST LIGHT HELPS ME STUDY."—Ayushi Tiwari, 12

“WHEN I mention his name, he moves his ear,” says Ayushi Tiwari, as she fondly looks at Mannu, her family’s five-month-old buffalo calf. The innocence of childhood plays out. Ayushi talks of her dreams. “I want to be a pilot when I grow up,” she remarks with a twinkle in her eyes. “I like to study. I am good at Maths and my English is good,” she buttresses her case in Hindi, her native



Dusk settles on Durgapur village; (right) Ayushi and her sister study under the EESL Solar LED Street Light.

language. And, as if to allay any doubts on her linguistic skills, she shakes her head and says, “Yeah!”, with joi de verve.

The innocence then starts to fray at the edges. For, life is not all about passion.

“In today’s life, if you don’t study, you won’t succeed,” she replies, when asked why she liked to educate herself. “And, the mast light helps me study in the evening. I step out of my home and sit on the portico and study happily. The light is bright, and it helps all the more when



there is no electricity,” she hastens to add, referring to the solar powered street light implemented by EESL under the Government of India’s Atal Jyoti Yojana (AJAY) scheme.

The high mast lamp does more than just make studies more enjoyable for Ayushi. As much as it disperses light, it gathers people. “Ever since the lamp was set up, I come here more often to see my uncle,” says Ram Prakash Tiwari, 40, who spends several evenings on the charpoy placed below the mast, located on the narrow lane where his uncle Ram Tiwari, 58, resides. The evening social gathering is not just about the family meeting place. Neighbours too drop in. “Light from the street light falls on my house as well and it feels nice,” says Ram Lagan Yadav, 60, as he relaxes on the charpoy.

The high mast lamp has indeed improved the quality of life of people around in the villages. Women feel safer (refer page 28). Further, hawkers and vendors try to pick up spots under the high-mast solar street light in the hope they can sell more and earn more money, and, they are right (refer page 30) .



Savithri, 35
"it feels very good."

Babita, 24
"We spend time together, children play in the well lit area thanks to the light"

WHEN LIGHT SPARKS HARMONY

At village Dwarikapur, 25 km from Ayodhya city, an EESL-implemented high mast light is located in the midst of six houses. It serves several objectives. below, the residents throw light on them.

Ramlali, 45

"As a woman, I feel a lot safer with the new lamp. Also, earlier on, we neighbours would sit down together for a short while and go back home. Now, we spend time together in the open thanks to the good quality light."



PROPPING BUSINESS

Return to the Village (and Prosper)

Sonu, 24, returned back to the village Karma Koneri from Ayodhya town in February 2019. And, he doesn't regret it one bit. His business of selling fried momos is earning him good money. For part, he attributes it to the choice of location of his cart—it is situated right below an EESL-implemented high mast.

"The light attracts people and I do good business,"

—says Sonu, who makes as much as INR 500 per day.

What is Atal Jyoti Yojana (AJAY) scheme?

- The AJAY scheme seeks to provide solar powered street lights in States
- In its first phase (September 2016-March 2018), the scheme focussed on States where less than 50 per cent homes had access to grid-based electricity—Assam, Bihar, Jharkhand, Odisha and Uttar Pradesh. The lights supplied were of 7 Watts
- In its second phase (2018-2020), the scheme covers a larger area. In addition to the states listed in the first phase, it also covers Sikkim, Jammu and Kashmir, Himachal, Uttarakhand and the islands of Andaman and Nicobar. Besides all districts in these States, the scheme also covers 48 ‘aspirational districts’ in other States. These are districts where the government is putting greater resources and energy than the others in view of their relatively poor socio-economic condition. The lights supplied in the second phase are of 12 Watts
- In both the phases, the solar lights choice of financing remains the same. While ministry of New and Renewable Energy provides 75 per cent of the cost, the remaining 25 per cent can be footed either by Members of Parliament through their MPLAD (Members of Parliament Local Area Development Scheme) fund or it can be funded through Panchayat funds, Municipalities or other Urban Local Bodies fund
- Under the scheme, upto 2000 lights can be installed in each constituency

Outcome

Total Solar Streetlights installed so far under AJAY

1.46 Lakh

Number of constituencies covered under the first phase:

96

Street lights installed so far in the first phase:

1.38 Lakh

How does EESL contribute?

EESL is the government appointed nodal agency for implementation of the AJAY scheme. This means it procures and ensures successful installation and maintenance of the solar street lights.

Key Implementation aspects:

- Letters to the 169 Members of Parliament seeking their participation in the scheme to install upto 2000 solar street lights
- Once the Members of Parliament (MP) agree to pay for 25 per cent of the cost of the lights from their MP Local Area Development (MPLAD) funds, EESL moves the local District Magistrate to receive the cheque payment
- The Member of Parliament, then, gives a list of locations where the lights need to be installed
- EESL through its local area expertise and supervision ensures successful commissioning of the solar lights and report back to the District Magistrate with appropriate documentation
- EESL secures the lights with a five-year maintenance contract

Challenges:

- The execution of the lights project is fraught with risks
- In some areas, the local social disturbance come in the way of the implementation. EESL handles them deftly, observing the local sensitivities
- Since the battery is built into the solar street light casing, the compactness of the lights set off suspicion that the product is sub-standard. EESL engages actively with the local residents to allay their fears

Outcomes:

- Safety: Women feel safer in areas where the street lights have been installed
- Improved education: Children are able to prolong their study hours, especially when power cuts occur. The quality of study time is vastly improved, since they don't suffer the noxious fumes of kerosene lamps nor its low poor light
- Social prosperity: Greater bonding between families in the neighbourhood as they spend more time sitting out in the common areas, below the high mast light
- Better Business: Consumers are drawn to light. Especially when it concerns food
- Employment generation: The sale of lights is backed by a 5-year service contract. This ensures that locals are skilled to provide the basic services

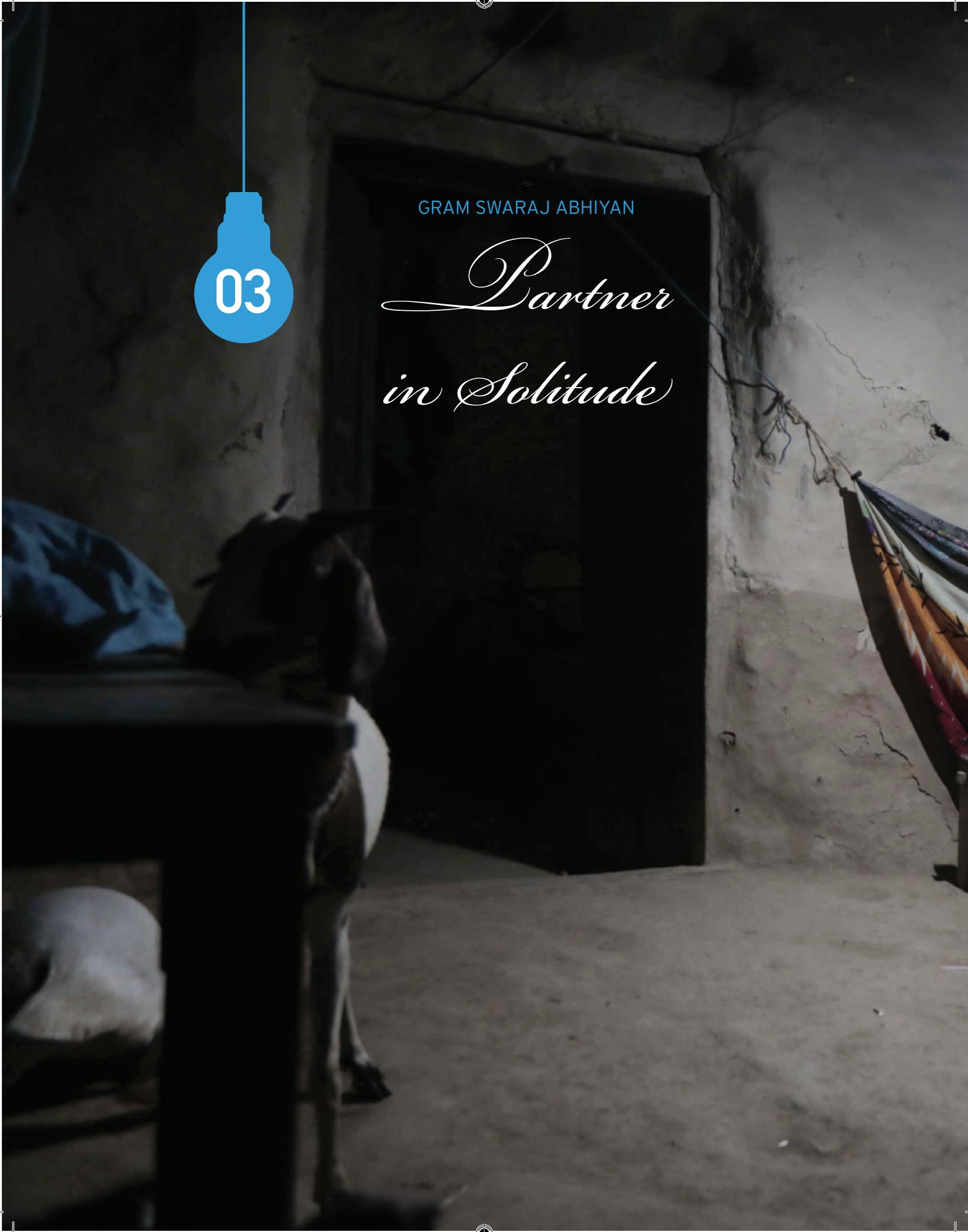
Work in progress-AJAY

Project Development Activity	U.P.	Bihar	Orissa	Jharkhand	Assam	Total
No of constituencies	80	40	21	14	14	169
No of MPs responded in the programme	67	26	10	9	9	121
MPs who have provided detailed information	58	19	6	9	7	99
Sanction letters provided by the DMs	54	20	6	9	7	96

GRAM SWARAJ ABHIYAN

03

*Partner
in Solitude*





AN EVENING BALM

Story of Ramkali, a resident of Gadiya village,
35 km off Barbanki city, Uttar Pradesh

**“I HAVE TO STAY ON THE COT ALL DAY LONG
AND THE OLD BULB WOULD PRODUCE A LOT OF
HEAT. THE NEW LED BULB (SUPPLIED BY EESL)
IS NOT ONLY COOLER BUT ALSO BRIGHTER”**

—Ramkali, 85

“No, don’t do it, you will hurt yourself,” says Ramkali, sternly, lying in her charpoy. The reprimand is for her grandson, Sunny, 10, who rushes to connect wires and switch on the light in the portico of her hut, where she is resting.

For Sunny, the child, it is the thrill and excitement of switching on a ‘toy’. And, constant reminders from his mother and grandmother are routinely met with a hanging head and a sullen face, only to be back to his naughty ways the next evening when the sun sets.

The sternness in her voice is laced with a strange mix of pride and frustration - pride over a caring family that lives in harmony. The



Ramkali swallowing her daily evening medicines under a EESL bulb procured under the Gram Swaraj Abhiyan while resting on a charpoy at her home



Sunny, Ramkali's grandson, connects the wires to light up the EESL bulb in the portico where his grand mother spends the evening hours

frustration reveals what lies below the general bonhomie and banter.

Ramkali's health has been on the wane over the last year and half. She is unable to move and spends most of her time on the charpoy. It is the curse of old age, she says. Her ill-health amplifies her poverty. The mud hut is barren; it has none of the modern amenities that her neighbours have. "How can I afford a television when, every day, I spend INR 50 on medicines," she laments.

The dejection over poor physical health, however, does not envelope her completely.

For one, money for medicines is not entirely a struggle. The con-



struction boom in neighbouring cities in Barabanki district ensures a livelihood superior to farm labour.

“My son Jitender takes his tractor out to the city everyday and earns enough to pay for the medicines,” she notes.

Importantly, her emotional health is reasonably cared for.

“I have four sons and they take good care of me. My grandchildren come over and spend time once they are back from school and my daughter-in-law brings food for me,” she says with a gentle smile.

But that is not all. She has one more reason to be happy about.

“I have to stay in the cot all day long and the old bulb would produce a lot of heat. The new LED bulb (supplied by EESL) is not only cooler but also brighter,” says Ramkali with a sense of relief, only to be interrupted by a bunch of pills and a glass of water that her daughter-in-law hands her. After gulping down the medicines, she completes what she set out to say. “The light is clear,” she says and goes back to a supine position, a reminder that her body is aging.

At EESL, we consider it a privilege to be of some assistance to Ramkali in the evening of her life.

Prudence in Fragile Times

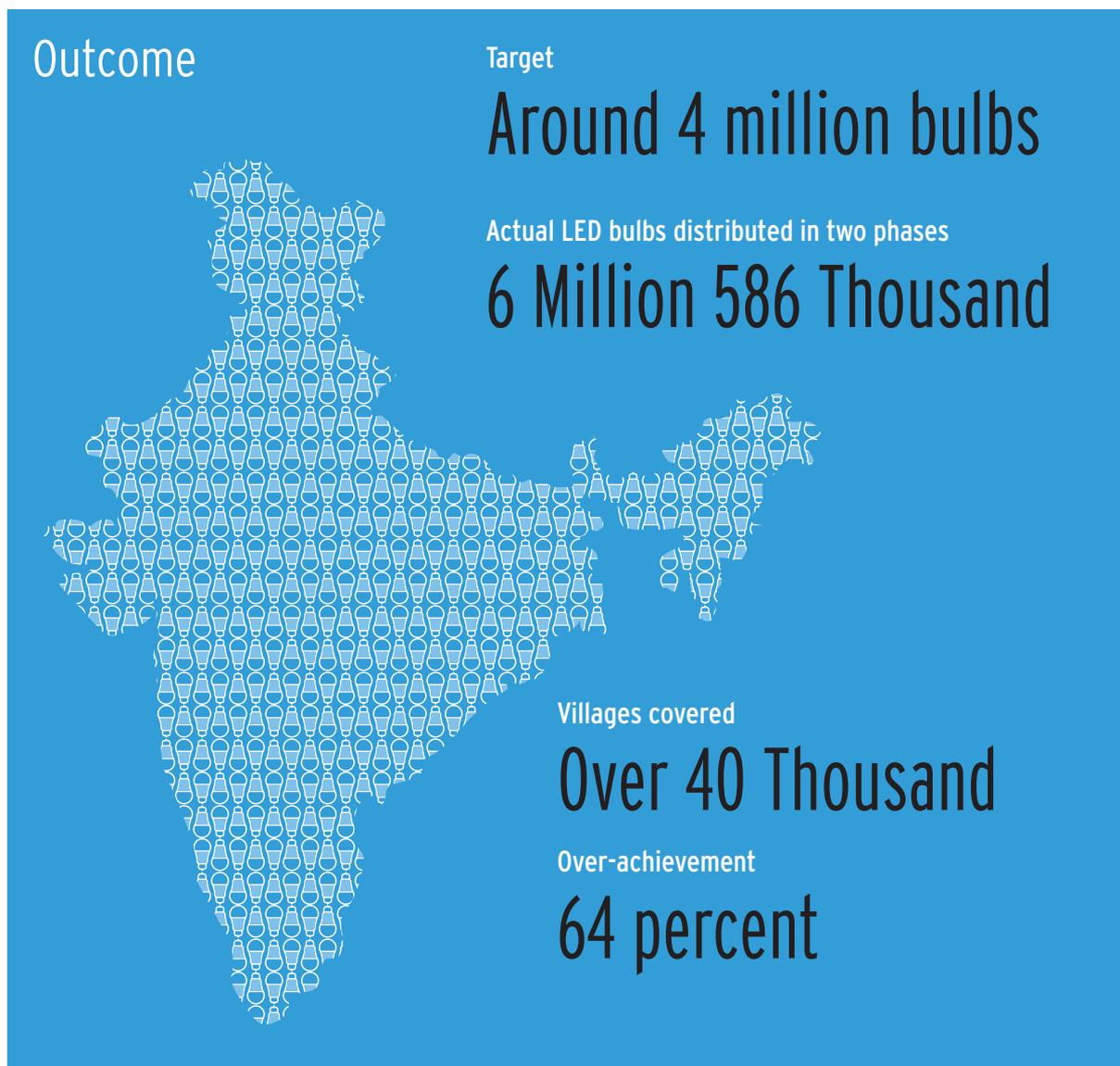
Jagat Pal, 32, is a landless labourer. He lives with his wife, Sangeeta, 30, three children and his mother in Musapur village, around 32 km from Bahraich city, Uttar Pradesh. He toils in the local farms, earning a meagre INR 150 a day. To supplement his income, he raises cattle. "I will sell the goats once they grow up," he says. Jagat bought two LED bulbs from EESL under the Gram Swaraj Abhiyan, costing INR 50 each. It wasn't easy saving up to buy the bulbs but he finds it entirely worth the investment.

"The incandescent bulbs would get spoilt frequently and came with no warranty. The EESL bulbs are working well and in case they fail, I can get a replacement."



What is the Gram Swaraj Abhiyan scheme?

- Gram Swaraj Abhiyan was a campaign organised by the Government of India to promote social harmony and spread its pro-poor initiatives across the country
- Gram Swaraj Abhiyan was held in two phases. The first phase was between 14th April and 5th May 2018 and the second between 1st June and 15th August 2018
- As part of this campaign, EESL was entrusted with the task of reaching out to over 40,000 villages across the country to sell LED bulbs under its UJALA scheme



EESL's Gram Swaraj Abhiyan scorecard

State / UT	PHASE-1		PHASE-2	
	villages covered	Bulbs distributed	villages covered	Bulbs distributed
Andhra Pradesh	305	38470	1782	86643
Arunachal Pradesh	166	70301	15	3250
Assam	3038	102688	2728	99288
Bihar	635	44255	8568	735861
Chhattisgarh	346	132580	1865	213434
Gujarat	96	26764	758	164456
Haryana	232	38439	299	106823
Himachal Pradesh	93	39518	70	2534
Jammu And Kashmir	124	53018	499	34271
Jharkhand	251	33768	6512	639632
Karnataka	0	0	1440	358869
Kerala	2	2428	0	0
Madhya Pradesh	404	82798	3048	259960
Maharashtra	192	16995	1707	66944
Manipur	535	16931	11	151535
Meghalaya	1173	55726	33	15004
Mizoram	372	19506	21	4249
Nagaland	474	103867	16	39320
Odisha	365	96692	2807	260443
Puducherry	10	30730	0	0
Punjab	1257	103521	410	21860
Rajasthan	599	259240	1603	260574
Sikkim	101	17809	56	16735
Tamil Nadu	1477	596015	583	242336
Telangana	73	33485	656	64639
Tripura	531	82410	102	40525
Uttar Pradesh	3385	178447	5130	191344
Uttarakhand	116	19121	695	94286
West Bengal	0	0	7408	115355
Total	16,352	2,295,522	48,822	4,290,170

How does EESL contribute?

In a short period of less than two months, EESL reached out to a staggering 10 per cent of India's villages (census 2011) and sold over 6.5 million bulbs to its residents.

To achieve this task EESL did the following:

- Engaged with locals in nearby towns and engaged their service. This ensured that campaign was well received in the villages and not viewed adversely. Successful local area access ensured faster sales
- To further catalyse sales, various modes of transport were used. From bikes to vans, the flexible delivery systems ensured that intractable areas were covered
- Tied up with the local state Utility office in nearby towns to ensure replacement of faulty bulbs, thereby earning the confidence of the villagers
- To ensure greater absorption, EESL sold bulbs at INR 50 a piece, as against INR 70 in urban areas

Challenges:

- Developing credible local area networks to access villages
- In less prosperous villages, it is not easy to find villagers who can, upfront, spare INR 50, the cost of LED bulb
- Convincing villagers to buy EESL's LED bulb, even though an incandescent bulb cost only a fifth of it

Going forward:

- UJALA, EESL's flagship programme, has sold 350 million bulbs sold directly and through State Utilities in a short period of 5 years, heralding the dawn of a new era in lighting in the country. Further, the programme, on the back of large volumes, brought down the price of LED bulbs from INR 310 to INR 38 for procurement. Most of these bulbs have found their way into the urban town-based residents
- The GSA programme is an important extension of the UJALA programme. Under this umbrella, EESL has accessed a sizeable portion of rural India in quick time on the back of experience gathered from the UJALA programme
- EESL is now exploring means to repeat the UJALA narrative in the rural areas. Towards this end, it has sought funding from the World Bank's Transformative Carbon Asset Facility (TCAF) in view of the huge carbon emission savings potential arising from lower power needs to light up rural India
- The measures are aimed at further lowering the price of LED bulbs, thereby hastening the penetration of LED bulbs in rural India

EESL AGRICULTURAL PUMPS PROGRAMME

04

A Scaffold to Reduce Farm Risk

A FARMER'S CHALLENGE

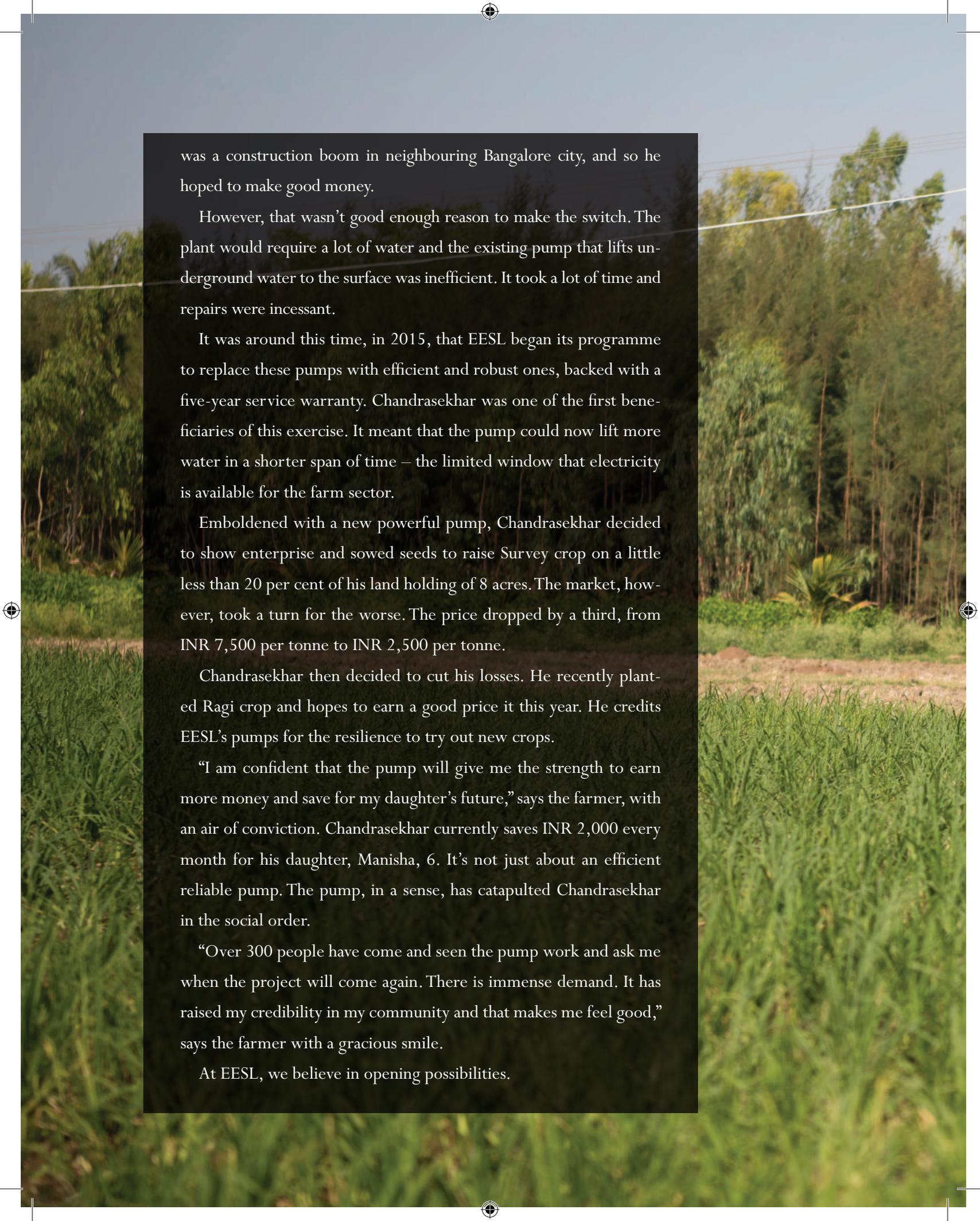
Changing crop patterns is a challenging task.
A farmer in Hubli district, Karnataka, dealt with
it, aided by EESL



“THE PUMP WILL GIVE ME THE STRENGTH...”

“I have had 50 tonnes of it in my warehouse for a while. I am simply waiting for the prices to rise,” laments Chandrasekhar N, 42 years, a farmer in Mandya district, Karnataka.

This was a sowing decision that didn't go off too well. Three-and-half years ago, Chandrasekhar decided to take a chance and depart from sowing the traditional crops like Maize and Paddy. He decided to plant Survey crops that yield bamboo-like poles that are used as scaffolds in the construction industry. He had good reason to make the shift – there



was a construction boom in neighbouring Bangalore city, and so he hoped to make good money.

However, that wasn't good enough reason to make the switch. The plant would require a lot of water and the existing pump that lifts underground water to the surface was inefficient. It took a lot of time and repairs were incessant.

It was around this time, in 2015, that EESL began its programme to replace these pumps with efficient and robust ones, backed with a five-year service warranty. Chandrasekhar was one of the first beneficiaries of this exercise. It meant that the pump could now lift more water in a shorter span of time – the limited window that electricity is available for the farm sector.

Emboldened with a new powerful pump, Chandrasekhar decided to show enterprise and sowed seeds to raise Survey crop on a little less than 20 per cent of his land holding of 8 acres. The market, however, took a turn for the worse. The price dropped by a third, from INR 7,500 per tonne to INR 2,500 per tonne.

Chandrasekhar then decided to cut his losses. He recently planted Ragi crop and hopes to earn a good price it this year. He credits EESL's pumps for the resilience to try out new crops.

"I am confident that the pump will give me the strength to earn more money and save for my daughter's future," says the farmer, with an air of conviction. Chandrasekhar currently saves INR 2,000 every month for his daughter, Manisha, 6. It's not just about an efficient reliable pump. The pump, in a sense, has catapulted Chandrasekhar in the social order.

"Over 300 people have come and seen the pump work and ask me when the project will come again. There is immense demand. It has raised my credibility in my community and that makes me feel good," says the farmer with a gracious smile.

At EESL, we believe in opening possibilities.



The Past, Present and the Future

The tall survey crop behind farmer Chandrasekhar and his family represents the past. Its a crop decision that didn't go right, owing to market conditions. The farmer then changed track. The lush green field of Ragi crop in front of the farmer represents this outcome. The future lies in this.

WHEN PAIN EASES

EESL's pumps and control offers farmer Venkateswara Rao's family twin benefits

Farmer Venkateswara Rao's right knee has given up. Hence, walking is painful. EESL's pump and remote access (far right) ensures that he doesn't have to travel to the farm daily to turn it on or turn off. He can do it at ease from the comfort of his home.

This also releases time for the farmer and his son to access non-farm opportunities.



"MY INCOME HAS GONE UP BY 60 PER CENT"

“Now, I am able to take rest at home. I don't have to travel to the fields every day,” says Obulnaini Venkateswara Rao, 66, a farmer in Krishna district, Andhra Pradesh, while massaging his left knee, with the occasional strain showing on his face.

For Rao, the pain in his left knee is far beyond the usual arthritic variety that aging inflicts. It has worn down completely. The doctors have advised him to go under the knife and get the knee replaced. He knows it only too well. His other knee underwent a replacement surgery only a few months before.

And hence, he greatly values the timely reprieve from daily visits to the farm, as he now operates his pump from the comfort of his



home. “This is possible because of EESL’s pump and remote access. Now, I give five rings on my mobile to a designated number and the motor switches on; three rings to switch it off,” he hastens to add, with a gentle smile on his face.

EESL’s pumps have not only ushers in improved comfort of living but also improved the financial health of the farmer.

“Earlier, we were spending as much as INR 7,000 every year on repairing our old pump. Unfortunately, we cannot afford a new quality pump since it costs as much as INR 40-50,000. Now, with EESL’s pump, we not only save on repair costs this year but over the next five years, the warranty period,” notes Venkateswara Rao’s son, Nagender Rao, 30.

Comfort of irrigation operation has, in turn, released time for the farmer’s son to pursue other opportunities to earn money.

“Earlier, we would spend the entire day at the farm to turn on and turn off the pump. Now, the control is in my palm, on the mobile phone. Hence, I bought buffaloes to start a dairy business. I earn close to INR 5,000 per month by selling milk to the local diary,” says Nagender Rao.

So, what does it add up to? Nagender says that the one-acre farm on which he grows three crops a year besides vegetables earns him, after meeting various costs, one lakh rupees every year. “After installing EESL’s pumps, income has gone up 60%” says Nagender.

EESL is privileged to enable the farmer to pursue non-farm income, as demonstrated in Nagender’s case.

So, how difficult was it to get an EESL pump?

Not at all, says Nagender. All I had to do was to sign a ‘willingness’ form, and the pump was installed. There were no intermediaries, he adds.

For the farmer’s family, the painless benefit from EESL pumps will go a long way in helping them tide over the financial burden of elder Rao impending knee surgery. For, the last time around, they had cough up INR 20,000 for the implant.

What is the Agricultural Pumps Program?

Agriculture sector consumes close to a fifth of the electricity consumed in the country. However, this consumption is hugely inefficient. Across the country, the pumps used to lift water to the ground are not only inefficient but require expensive repairs. This means that the Indian farmer is left with less money at the end of the day.

EESL's Agriculture Demand Side Management programme seeks to redress this problem and help save the farmer's money. Under this programme, the farmer's pumps are replaced with no discomfort whatsoever. The savings in efficiency pay for the new pump.

With the efficient pumps in place, the electricity supply Utility makes continuous savings on the avoided power purchase otherwise required to serve the farmers.

Outcome

So far, EESL has successfully forayed across three states, with work-in-progress in two states. Below are the results.

Financial:

State	Nos. of Pumps replaced		Gains to Farmers / annum		
	PHASE 1	PHASE 2	REPAIR*	TRAVEL ^	TOTAL
Uttar Pradesh	1168	900,000**	4.1 mn.	2.9 mn.	7 mn.
Andhra Pradesh	69,300	70,000**	242.6 mn.	173.2 mn.	415.8 mn.
Karnataka	1600	-	72,000	-	-

* assuming repair expenses at INR 3,500 per annum

^ Travel to the farm is now avoided since the pumps have remote access mechanism - assuming 50 days per annum at INR 50 per day fuel cost (travel upto four times a day to monitor the pump)

** in talks with the Utility

Non-financial -Improved ease of living:

1. Farmers is relieved of the burden of constant worry about the health of the pump, its unreliability. This is crucial in times of irrigation, when the pump cannot be taken out of service for repairs.
2. Farmer can now turn on and turn off the pumps sitting in the comfort of his home, rather than rushing to the farm site, which can be a few kilometres away.

How does EESL do it?

Challenges:

- Overcoming farmer's scepticism about the painless benefits of EESL's Programme
- Reaching out to a large populace of farmers to join the programme
- For large scale replacement of pumps, it is imperative to demonstrate to State-owned power distribution Utilities the efficiency gains of the pump on credible, sustained basis
- Retain farmer confidence after the pumps are installed

EESL's strategy:

Strong outreach:

A comprehensive awareness Programme was designed and implemented. It reached out to various stakeholders - from farmers to local politicians, local area government officials in various departments like Irrigation, Agriculture, etc. The Programme brought out the salient features of EESL's agriculture pump replacement Programme.

Effective local area presence:

Convincing farmers to embrace a novel measure is not easy. They are so weathered by the challenges of farming that it is difficult for them to conceive of any healthy intervention that is painless. So, when EESL went to farmers for the first time, in 2015, they were met with deep scepticism. This was for two reasons, exemplified by the below narrative.

"We got to hear that the motor and pumps were being distributed free of cost. We thought this was a fake. Secondly, this offer came from far away Delhi," observed Chandrasekhar (page 45), a farmer in Hubli district, Karnataka, when EESL approached him. The farmer rejected the offer initially. It was only after several rounds of promotions and visits to the farmers' residence that the resistance eased, and the farmer agreed to install EESL pumps. In fact, over time, he proved to be one of EESL's major evangelists, passionately selling the scheme to other farmers near his village.

Farmer-focussed service/execution

EESL has ensured that farmers do not face any process related speed breakers while adopting the scheme. Farmers require to only sign a consent form. Below is a typical testimony to the wide dispersal of information on the scheme and its easy implementation.

"One day, I learnt from the local administration about EESL's scheme. I learnt there are no intermediaries and all that I need to do is to sign a willingness form," observed Obulnaini Nagendra, a farmer in Krishna district, Andhra Pradesh (page 48) when asked about his experience while installing EESL's agriculture pump and its remote access.

To secure the farmer's confidence and to build a long-term relationship with him, EESL has ensured that the pumps and its remote access come with a five-year warranty. EESL also oversees the satisfactory after sales service to ensure smooth redressal of any pump-related issues.

Successfully engaging with State-owned power Utilities:

Any credible 'no-pain' farmer interaction is unlikely without meaningfully engaging with his sole electricity supplier, the State-owned electricity distribution Utility. The farmer can gain only when this happens. This, however, is not easy since the Utilities are in a financially fragile condition.

EESL makes this happen through innovative practises.

- **Setting credible benchmarks:** EESL executes pilot projects to demonstrate to the Utility the gains to be achieved by implementing it on a large-scale. This involves joint reading of data by EESL and Utility to help establish the gains achieved on use of EESL pumps. This demonstrated gain helps the Utility to buy EESL procured pumps in a manner that its financial health does not deteriorate. If anything, it only improves.
- **Established track record:** This was successfully demonstrated in its flagship programme UJALA, involving replacement of incandescent bulbs with LED ones across the country which led to a drastic reduction in cost of LED bulb by as much as two-thirds in a short span of three years. The same approach has been taken in the case of agriculture pumps.

Going forward:

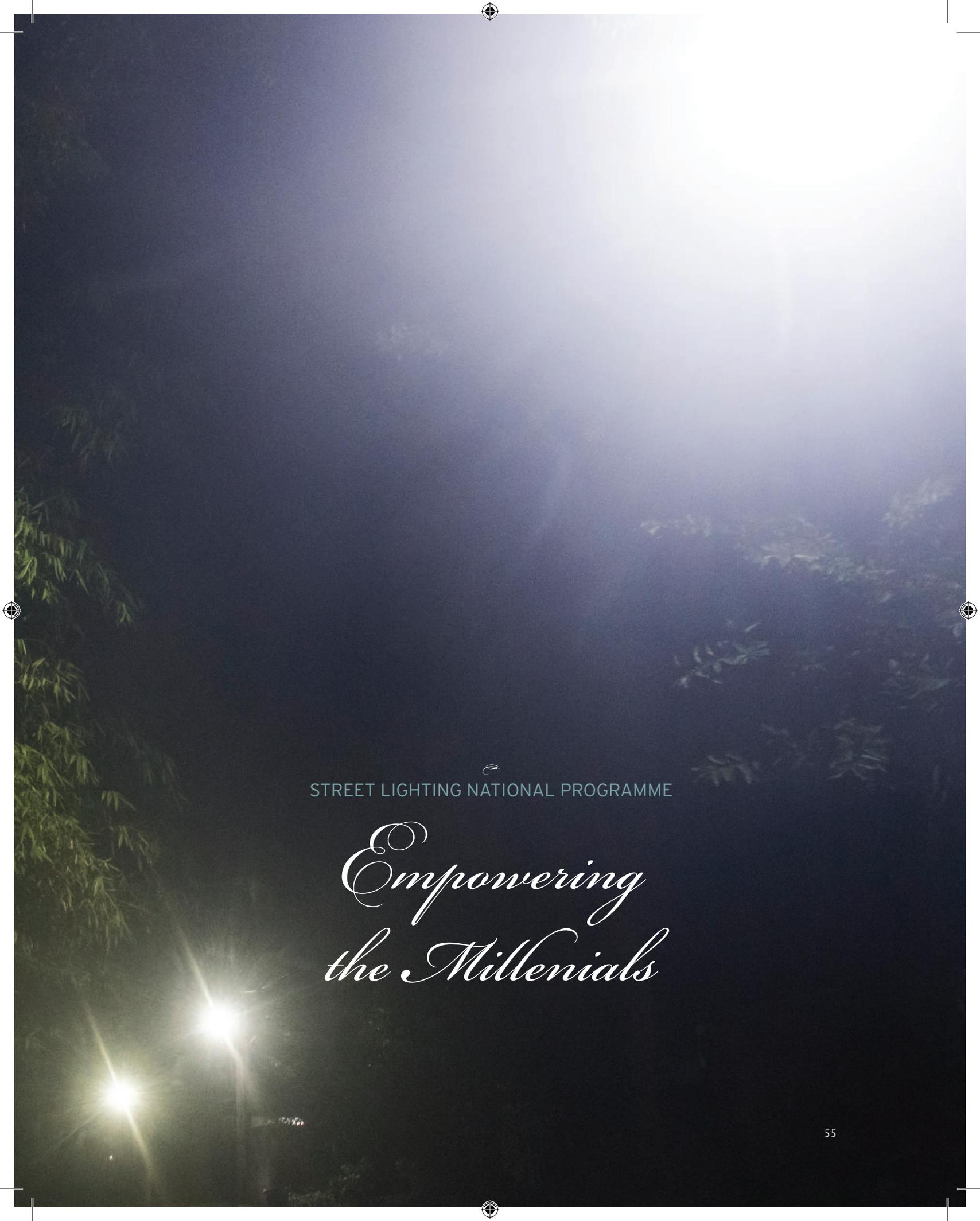
- With recent simplification of GST norms, EESL will be able to shoulder some of the financing burden that Utilities encounter in buying the pumps. This will enable the Utilities to pass on more benefit to the farmers.
- Given the potential listed below, EESL is in conversation with several states to implement the Ag DSM programme.

Benefit to the farmers*

Haryana			
Punjab		760.95 Crore	
Rajasthan		787.65 Crore	
U.P.		597.61 Crore	
Uttarakhand		16.83 Crore	
Chattisgarh		225.87 Crore	
Gujarat		794.23 Crore	
M.P.		854.52 Crore	
Maharashtra		2583.83 Crore	
A.P.		966.79 Crore	
Telangana		1070.51 Crore	
Karnataka		1439.66 Crore	
Tamil Nadu		1241.97 Crore	
Bihar		171.30 Crore	
West Bengal		170.86 Crore	
Tripura		3.45 Crore	
Puducherry		5.54 Crore	
J & K		5.83 Crore	
Kerala		306.39 Crore	
			Total Pan India saving: INR 12,371.38 Crore

* Assuming INR 3,500 per annum savings towards repairs and INR 2,500 per annum savings towards transport costs to the pump site. Only States that have agricultural consumption larger than 1% of total electricity consumption are considered.



A night photograph of a street scene. The sky is dark blue and black, with some light clouds. In the foreground, there are several bright streetlights that create a lens flare effect. The trees are dark, with some leaves visible in the lower left and right corners. The overall mood is serene and modern.

STREET LIGHTING NATIONAL PROGRAMME

*Empowering
the Millennials*

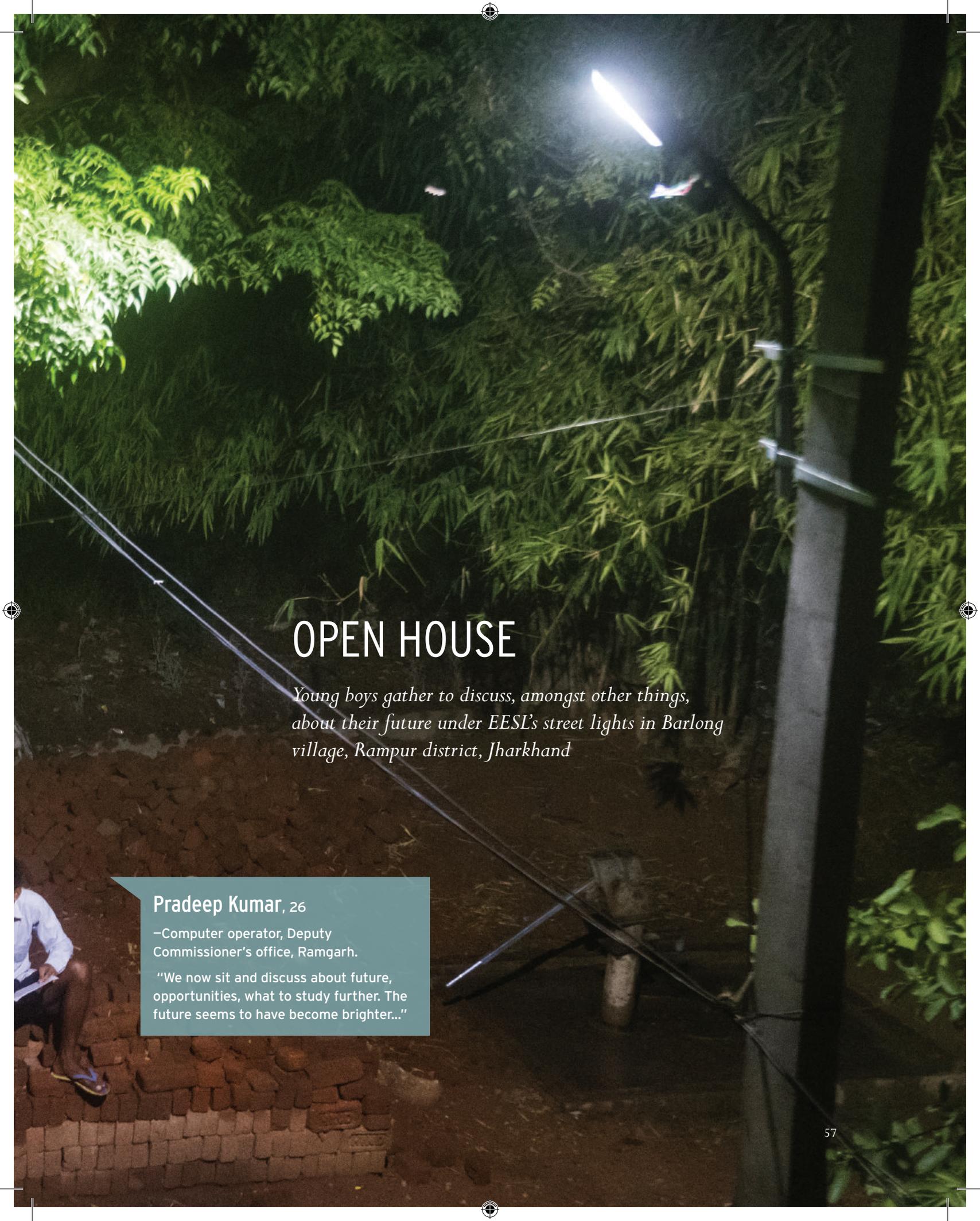


Kuldeep Kumar, 23

"I am still studying."

Roshan Kumar, 25

"I have completed 'Mining Sardari' course and await a job opportunity in the State coal department "



OPEN HOUSE

Young boys gather to discuss, amongst other things, about their future under EESL's street lights in Barlong village, Rampur district, Jharkhand

Pradeep Kumar, 26

—Computer operator, Deputy
Commissioner's office, Ramgarh.

"We now sit and discuss about future, opportunities, what to study further. The future seems to have become brighter..."

A VILLAGE COMES ALIVE

A first for the village, the street lights have touched the lives its residents in many ways.

1

Raviram, 11

"Play a bit more, but I do study!!"

2

Murli Ravidas, 40

"The light makes a big difference..."

3

Srimatiya Devi, 70

"I used to fall a lot while walking in the evening and hurt myself. Now, with the street lit up, I am able to step out in the evening without fear of hurting myself"

4

Soni Devi, 27

Feels like a town, no longer a village; earlier, in the evening, I was scared of venturing out.

5

Banwari Munda, 40, Village Mukhiya

"People in the village have gotten closer to each other thanks to the street lights. They come out of their homes more often and share their problems"



1

2

3

4

5

What is the Street Lighting National Programme?

THE PROGRAMME:

Under the Street Lighting National Programme, over the last four years 2015-2019, EESL has replaced a staggering 9.5 million sodium vapor street lights with LED ones in over 500 cities across the country.

THE SKILLS

In the process of achieving this tall order task in such a short period of time, EESL has acquired competencies in several key areas, hitherto unavailable in the domestic market. These include fast-paced procurements, substantial reduction in unit product price vis-à-vis market, project management skills to ensure consistent satisfactory installation and operation.

THE FORAYS

With an established track record in urban India, two years ago, in early 2017, the company turned its attention to rural India. Since then, it has met with success in the states of Andhra Pradesh and Jharkhand, where it has lit up several villages with LED street lights. The diversity in work is revealing. In Andhra, it was a case of retrofitting the street lights with LED ones. In Jharkhand, EESL set up street lights for the first time.

Even as EESL is expanding its work in these States, it is actively in talks with other states, municipal bodies, urban local bodies and Gram Panchayats to pursue its rural street lamps programme. These include the States of Uttar Pradesh, Maharashtra and Gujarat.

How does EESL do it?

EESL's forte	Challenge	Outcome
Upfront financing of Street Lights, repayment from savings from use of LED bulbs	Given limited finances, States and municipal bodies can now undertake the exercise without any burden	Significant social impact in rural areas, especially ease of living
Flexible financing. Sensitive to local area needs	Some municipal bodies are financially weaker than others, especially in rural areas, hence require longer repayment periods	EESL ensures pan-India inclusivity in its street light programme outreach
Low gestation competitive procurement process	State Utilities typically take long periods of time to complete procurement, often running into litigation and other controversies that further delay the process	Quick implementation of LED street lights in the State
Effective procurement process involving large volumes; prices obtained are often as low as half the prevailing market price	Since Utilities procure in smaller quantities, their ability to extract a competitive price is limited	States can now set up more LED street lights with the same money
Integrated end-to-end solution: procurement- installation-management through oversight and strong contractual terms with vendors.	Given the States Utilities' multitude of responsibilities, their ability to allocate manpower and resources to manage the propagation of LED street lights is limited.	Consumer satisfaction is maximised, with EESL's ability to offer 95 per cent up-time for its LED street lights.

06

*Lending an
Invisible hand*





Balaso Shitoli working on his farm, collecting *Bajra* cobs



"I HAVE HEARD ABOUT SOME WORK..."

“OVER the last 4-8 months, I did hear about some electricity work being undertaken a few kilometres up from here. But little else...,” says Balaso Shitole, 60, a farmer who owns 8 acres in Padvi village, Pune district, Maharashtra.



He is right. About five kilometres up hill, EESL has set up a solar power plant in spare land abutting the local power distribution Utility's feeder sub-station. What he doesn't know is that some of the electricity that he uses to operate his irrigation pumps is actually coming from here. Of course, he won't know, for the electrons don't carry geo-tags.

Ensuring this smooth uneventful life is EESL's mark of respect to Shitole's efforts in the farm. For, beneath the calm waters lies several large waves of reform measures that the State distribution Utility is undertaking in the power sector. And, the transition is not a zero-sum game.

THE PROBLEM:

Shitole's electricity bill is subsidised to a large extent. Not only does the electricity regulatory allow a cross subsidy vis-a-vis domestic and industrial consumers, but the State Government further softens the bill.

But that's not all.

The Government ends up collecting a mere 14 per cent of bills from farmers. Ofcourse, they are not to blame given the challenges they face, more often than not, punching way beyond their weight, in a manner of speaking. For one, on the market side, they earn government-controlled prices that aren't remunerative, Government keeps a lid on the prices to avert consumer inflation. For another, they face farming related vagaries like poor rainfall. And finally, their socio-economic condition limits their flourish.

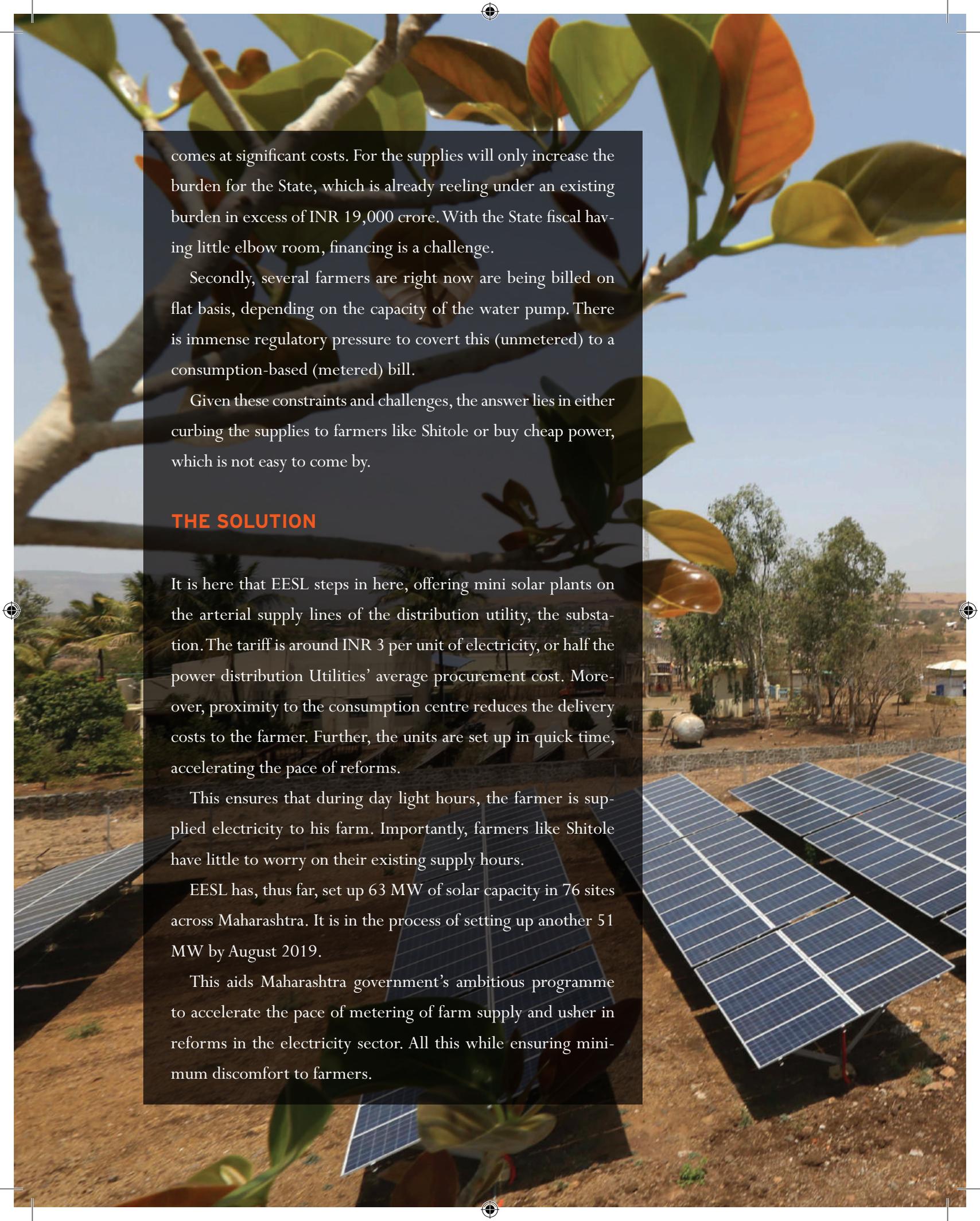
But that's only the part story.

Unlike Shitole, there are several farmers who are not on the metering net. Some of these farmers use diesel sets, which financially hurts the farmer. Any attempt to improve their condition

Sarojini Shitole, 50, working on her five acre family farm in Pune district, Maharashtra







comes at significant costs. For the supplies will only increase the burden for the State, which is already reeling under an existing burden in excess of INR 19,000 crore. With the State fiscal having little elbow room, financing is a challenge.

Secondly, several farmers are right now are being billed on flat basis, depending on the capacity of the water pump. There is immense regulatory pressure to covert this (unmetered) to a consumption-based (metered) bill.

Given these constraints and challenges, the answer lies in either curbing the supplies to farmers like Shitole or buy cheap power, which is not easy to come by.

THE SOLUTION

It is here that EESL steps in here, offering mini solar plants on the arterial supply lines of the distribution utility, the substation. The tariff is around INR 3 per unit of electricity, or half the power distribution Utilities' average procurement cost. Moreover, proximity to the consumption centre reduces the delivery costs to the farmer. Further, the units are set up in quick time, accelerating the pace of reforms.

This ensures that during day light hours, the farmer is supplied electricity to his farm. Importantly, farmers like Shitole have little to worry on their existing supply hours.

EESL has, thus far, set up 63 MW of solar capacity in 76 sites across Maharashtra. It is in the process of setting up another 51 MW by August 2019.

This aids Maharashtra government's ambitious programme to accelerate the pace of metering of farm supply and usher in reforms in the electricity sector. All this while ensuring minimum discomfort to farmers.



EESL's solar farm setup in the spare land belonging to the State Utility's feeder substation at Padvi, Pune district, Maharashtra

What is the Programme?

The agriculture sector accounts for around 18 per cent of the total electricity consumed in the country. However, the farm income accounts for a mere 5 per cent of the country's Gross Domestic Produce (GDP). EESL seeks to improve the lives of farmers with its multi-pronged Solar Agricultural demand Side Management Programme. The Programme has two stages:

Stage 1: Set up solar mini plants on spare or vacant Government land closer to agriculture farms, like the Utilities' feeder substations.

How does it help?

This is aimed at ensuring supply to farmers during day time, an improvement over the general prevailing practise of State Utilities to supply power to the farm only at night. This vastly improves the quality of life for the farmer.

States undertaking farm sector reforms can access inexpensive electricity so that farmers are not inconvenienced with financial/ supply hardships (refer page 66)

Stage 2: Supply small scale solar power plants to farmers with the objective of turning the farmer into an electricity producer

How does it help?

Farmers will be no longer dependent on the Utilities for power supply. To that extent, the tariff will be constant since Utilities procure across various fuel sources.

This will create non-farm income. The farmer can sell excess electricity produced from the solar panels on his farm to the Utility.

Outcome:

EESL has commissioned an aggregate 63 MW capacity across 76 sites belonging to the state government. Further, 51 MW capacity is under implementation. This is expected to be completed by August 2019.

It is currently in talks with Andhra Pradesh, Orissa, Meghalaya and Jharkhand to set up solar mini plants.

How does EESL do it?

Phase-1: Under implementation

- EESL signs a contract with a State entity, typically the industrial development corporation, to set up a mini solar plant (typically having a capacity of 0.5 - 2 MW) and sell power to it.
- The plant is set up in the fenced premises of the State's property, for example, the Utility's sub-station or vacant land near the farms.
- EESL takes responsibility for the O&M (Operations and Maintenance) of the plant or 25 years.

Phase-2: The future

- EESL supplies the farmer with a solar plant to be put up in his farm premises
- The capacity is well above what the farmer needs to operate the pump. The excess capacity can be sold to the grid, thereby making the farmer a producer/seller of not just farm products but also electricity.
- The farmer can make a tidy profit after setting off payment for the solar panels and losses in transit of electricity



The bullock cart has served the farmer since yore to plough his fields. EESL now adds one more to his arsenal. The mini solar farm. And this one ploughs profits.



On a rainy day, the effect of the LED street lamps installed by EESL in Marlapalam village, Krishna district, Andhra Pradesh, is much acknowledged. According to the Nageshwara Rao, who runs a small shop that sells hot drinks on the highway road, safety on the roads has improved. "quality of life has gone up," he reckons.





ENERGY EFFICIENCY SERVICES LIMITED

(A Joint Venture under the Ministry of Power, Government of India)

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