

TATA TRUSTS

JUNE 2026

# HORIZONS



## ENERGY SYNERGY

Solar power is fuelling welcome change for rural communities across India

### ALL IN FOR ART

India Foundation for the Arts is helping connect artists and art practices with a wider public

### LIVELIHOODS LIFT

Four success stories from Nagaland showcase a programme that has boosted incomes

### INTERVIEW

Rural development specialist Tushaar Shah on the water-energy nexus and how this has played out





# EDITORIAL

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Solar energy has for long held the promise of freeing our fragile world from the clutches, and the tyranny, of fossil fuels. That promise is steadily being realised, and India has kept pace with more advanced countries with its efforts to tap the power of the sun. Our cover story explains how the Tata Trusts are helping the solar cause, principally through programmes that enable marginalised rural communities to make the switch to solar energy and, with that, to sustainable and higher-income livelihoods.

The Trusts and their associate organisations have spread the word on and cemented the benefits of solar energy in nine Indian states and one union territory, offering a host of solar-based solutions and prototypes for use in the country's farming ecosystem. Irrigation tops the list in the swing to solar, and there's more: animal husbandry, pest-control aids, cold-storage facilities, household amenities and projects that have spawned energy entrepreneurs. Importantly, with abundant sunny weather to count on, India has the mother source on its side.

Our Centre Stage section concentrates on water, delving into research conducted by the Centre for Science and Environment — with support from the Tata Trusts — in two districts of Rajasthan and Uttar Pradesh. The research reveals the gaps that need to be plugged for rural India to get an adequate amount of potable water.

The second part of this section highlights the IWMI-Tata Water Policy Research Program (ITP), a collaboration between the Tata Trusts and the Colombo-based International Water Management Institute (IWMI) that has blended scientific expertise, global experience, field study and policy advocacy to drive improvements in rural livelihoods. We also have Tushaar Shah, the inspiration behind ITP, describing how this unfolded.

The feature stories segment of *Horizons* details the contribution of India Foundation for the Arts in linking artists and art practices to a wider public, covering a canvas that includes books, cinema, exhibitions, research and archives. A different kind of article scans an initiative that brings science and technology into sheep and goat breeding in the states of Rajasthan, Gujarat and Andhra Pradesh.

Wrapping it up are two of Tata Trusts' own. Keletsino Mejura from the Northeast Initiative Development Agency anchors a photo feature on four success stories from Nagaland that have emerged from an inventive livelihoods programme. And there's Kavin Malini, who is part of the analytics, insights and impact division at the Trusts, unpicking a crisis of sustainability.

*Christabelle Naranta*

*We hope you will help us make Horizons better with your valuable feedback. Please do write to us at [horizons@tatatrusters.org](mailto:horizons@tatatrusters.org).*

# CONTENTS

VOL 9 | ISSUE 2 | JUNE 2026

## COVER STORY



### 6 SUN AND SOLAR ON THEIR SIDE

Nearly 62,500 farming households have benefitted from the Tata Trusts' solar energy initiatives, leading to improved livelihoods and a more sustainable future

## CENTRE STAGE



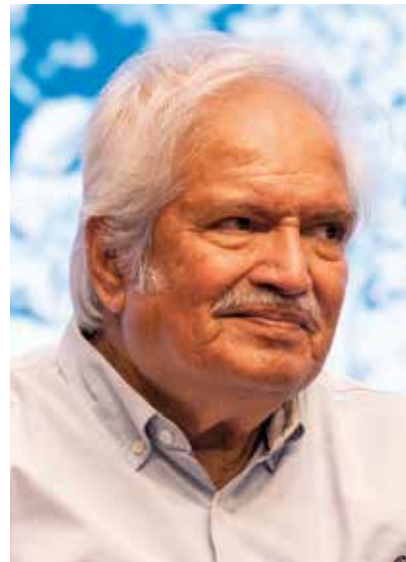
### 15 SOLUTIONS THAT COUNT

Research studies from Rajasthan and Uttar Pradesh reveal the gaps that need to be plugged for rural India to get its fill of potable water

### 20 A LODESTAR SHOWS THE WAY TO CHANGE

The IWMI-Tata Trusts collaboration — 25 years long and going strong — has employed research and field pilots to break new ground in the rural livelihoods sphere

## INTERVIEW



### 24 'OUR IDEAS WORK ON THE GROUND'

Economist, rural development maven and public policy specialist Tushaar Shah on India's water-energy equation, what bedevils it and what can smoothen its flow

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## FEATURE STORIES



**30**

### ALL IN FOR ART

Enabling an environment that can better connect artists and art practices with a wider public — India Foundation for the Arts is about that and plenty more

**37**

### HERD START

Infusing science and technology into sheep and goat breeding is helping rural communities in three states improve the quality of their livestock and their incomes

## SHOWCASE



**40**

### LIVELIHOODS LIFT

Four success stories from Nagaland, covering four livelihood streams, highlight the difference a programme focused on rural folks has been making

## PERSPECTIVE



**44**

### WHAT'S AT STAKE FOR WATER'S SAKE

Contrary to popular belief, India's water security crisis is not about scarcity — it is essentially a crisis of sustainability

#### Cover image

Farmers from Khetiyala village in the Udaipur district of Rajasthan now use solar-powered lift irrigation pumps to water their agricultural fields

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# Sun and solar on their side

**Nearly 62,500 farming households have benefited from the Tata Trusts' solar energy solutions, which have lit the way to improved livelihoods and a more sustainable future. By Labonita Ghosh**



Kiyaful Soren, from Tarbandha village in Jharkhand's Dumka district, stands near the solar panels that provide the energy required to transport water from a nearby source to her fields

A water user group meeting in Samited village in Rajasthan's Udaipur district



**T**ill a few years ago, solar energy-based devices were huge contraptions. Their photovoltaic panels alone required a lot of space and were often ineffective on cloudy or rainy days. Much of that has changed thanks to technology, especially nanotechnology. Solar panels can now be mounted on a single pole, they are easy to transport and more powerful than ever. Perhaps best of all, these panels work even in the absence of sunlight.

With the Indian government pushing to generate almost 300 gigawatts of solar energy by 2030 through the Jawaharlal Nehru National Solar Mission, solar is rapidly becoming the cleanest and most efficient source of alternative energy in the country. The Tata Trusts are staying in step with the Mission, the best example being an initiative to support marginalised tribal communities in securing sustainable livelihoods through the adoption of 'distributed renewable energy' (DRE), mainly solar.

The Trusts and their associate organisations like Coastal Salinity Prevention Cell (CSPC), Collectives for Integrated Livelihoods (CInI), Himmothan Society (HMS), North East India Development Agency (NEIDA), and Kalike, have operationalised the DRE programme in nine states and one union territory, offering a host of solar-based solutions and prototypes for use in the farming ecosystem.

### **Widespread usage**

These range from irrigation systems, animal husbandry and pest-control aids to cold-storage facilities, household amenities and projects that have spawned 'solar entrepreneurs'. The states where these solar solutions have been adopted are Jharkhand, Gujarat, Rajasthan, Maharashtra, Odisha, Uttarakhand, Karnataka, Madhya Pradesh, Nagaland and the union territory of Ladakh.

India has abundant sun power. Large parts of the country receive 5,000 trillion kWh (kilowatt-hour)

or more of solar radiation a year, with about 200 clear-sky days that deliver between 4.5 and 5.5 kWh/sqm of sunlight a day. Since 2014-15, when the first solar components were introduced in farming, Tata Trusts-backed DRE solutions have reached nearly 62,500 rural households.

"Our programme aims to introduce innovative renewable-energy solutions tailored to the needs of smallholder tribal farmers," says Ravinderjit Singh, head of rural upliftment at the Trusts. "By harnessing solar power, we seek to not only provide a reliable source of energy but also to create sustainable livelihood opportunities for local farmer communities."

These solar-based solutions for irrigation are effective, affordable and environmentally sustainable. They can help increase productivity and incomes, ensure food security and, importantly, reduce the dependence on water pumps that run on diesel or electricity.

"Diesel is getting costlier and



A solar photovoltaic power plant in Kargyam village in Ladakh's Leh district

## Solutions that shine

- **Micro lift irrigation** — Uses solar energy to 'lift' water from existing sources and channel it into agricultural fields. Often combined with solar-powered drip lines and mulching technology.
- **Poultry hatcheries and brooders** — Solar-powered lighting in hatcheries provides consistent light and heat, regulates the circadian rhythms of poultry, improves feed conversion rates and reduces stress levels among chicks. This leads to higher hatch rates and healthier poultry.
- **Insect traps** — These emit ultraviolet light to attract airborne insects that get stuck on a glued surface or drop-tray. Automated to turn on and off for optimal management. Reduces dependence on pesticides.
- **Hydroponics units** — Enable year-round cultivation of high-value fodder crops using minimal land and water. Enhances fodder security for smallholder farmers.
- **Flour and spice mills** — Grinding machines that, coupled with dryers, help produce flour or spice powders. Eliminated the drudgery of doing this by hand.
- **Biodigesters** — These systems transform organic waste (like dung) into clean biogas for cooking and heating, lowering household energy costs. The by-product, a nutrient-rich slurry, enhances soil fertility for crops and kitchen gardens.
- **Sprayers** — With small photovoltaic panels mounted on a device with wheels, the sprayers can be used to spray pesticides, fertilisers and water across farming fields.

electricity supply is either erratic or absent in remote areas," says Amitanshu Choudhary, programme manager, rural livelihoods, at the Trusts and chief executive of the Coastal Salinity Prevention Cell (CSPC), an associate organisation of the Tata Trusts. "However, many farmers in rural India still use diesel pumps due to a lack of knowledge and access to renewable sources of energy.

"We need to enable the shift to renewable sources of energy, and solar is one of the best options. With improvements in technology over the years, the cost of manufacturing and maintenance of solar panels has become substantially low. Also, there is a fair amount of government subsidies available to promote solar systems in an extensive way to benefit the rural poor."

Solar-based systems require relatively low maintenance and are scalable, particularly when adopted by a 'production cluster' (a group of farmers who share the facility as well as overall costs and the management of equipment).

Previously, cultivators in the programme areas used to rely on rain-fed farming for a single staple crop — paddy, wheat or maize — during the *kharif* (monsoon) season, then migrate to the nearest urban centre for work during the rest of the year. This led to abysmal levels of poverty and disruptions in families, with education, healthcare and the rest.

Making matters worse was the shortage of water, which forced these farmers to be mono-croppers.

Also, land holdings are typically small and fragmented in India's tribal belts (the average per capita operational size of land holdings in India is 1.33 hectares, well below the global average of 3.7 hectares).

For these and other reasons, small and marginal farmers prefer to go with the single staple crop and, if possible, use a small portion of their plot to grow vegetables for home consumption. Commercial-scale agriculture was out of the question.

### High-value shift

"Productivity enhancements of tribal farmlands can happen only with a change in current cropping patterns," says Sirshendu Paul, executive director, Collectives for Integrated Livelihood Initiatives (CInI), an associate entity of the Trusts. "While we urge marginal farmers to opt for multi-cropping and grow high-value vegetables alongside their staple, this can be possible only through solar irrigation systems that ensure water for cultivation all year round."

With more water for their land, farmers in the programme have two or even three cropping seasons. They grow tomatoes, cabbage, cauliflower, brinjal, okra, chillies and other vegetables, as well as, in some cases, fruits and spices.

"Income enhancements also come from converting those in the initiative from subsistence farmers to producers of cash crops in larger, commercially viable quantities," adds Amit Wajpe, team leader (Gujarat), CInI. Farming clusters have enabled this: with one solar-powered lift irrigation system used



King chillies — one of the world's hottest peppers and indigenous to Northeast India — being dried with the help of solar power at the Kade Cooperative Farmer-Producer Organisation's facility in Kade village in Nagaland's Phek district

to water contiguous plots, cultivators can grow similar crops to collectively earn more money.

Smallholder farmers can, additionally, employ solar solutions for their cattle and poultry businesses. Solar-powered hydroponic units have helped ensure fodder security for livestock, while consistent lighting and warmth in hatcheries and brooders have aided in the production of eggs and chicks.

Solar-run flour mills and spice grinders have made entrepreneurs of some farmers. In Gujarat's Halol district, for instance, farmers from 15 villages have come together to

grow turmeric over 25 acres. After washing and cleaning, the spice is dried and ground using solar-powered machines and turned into a high-value powder.

"The smallholder value chain has received a big boost, not just in terms of crop diversity but also entrepreneurship because of these solar solutions," says Mr Wajpe, "especially when a collective of farmers works together to produce the same commodity."

Babudiya Vanraj, a smallholder from Dalpura village in Gujarat's Banaskantha district, transformed his farming system when he made two changes. First, he adopted a

solar-powered irrigation system and, second, he became part of a production cluster.

Earlier, Mr Vanraj would grow fennel and wheat on his 1.6-acre plot using traditional cropping methods. But cultivation in summer was constrained due to unreliable and costly irrigation arrangements. He would have to buy water, which was expensive, the supply was irregular and needed intensive labour to be channelled into the fields.

Despite growing multiple crops, Mr Vanraj's annual income

remained low and vulnerable to water-related risks. "In open farming, we depend completely on the weather," he says. "Many a time, crops get damaged due to unseasonal rains or pests, resulting in uncertainty with incomes. I wanted a way of farming where my efforts could give assured results."

Mr Vanraj's fortunes changed when he joined a collective that shares a 10-horsepower solar lift irrigation system, complemented by distribution pipelines, drip irrigation and mulching for individual plots. With timely and

adequate water supply, he adopted a diversified, climate-resilient cropping pattern, growing vegetables such as tomato and brinjal alongside wheat and fennel.

Now Mr Vanraj can even add a summer cropping season, which has led to a considerable bump in his income. At the same time, the shift to solar-powered systems has contributed to improved water-use efficiency, reduced carbon emissions and better long-term resilience.

### Shared costs

To foster ownership, farmers are expected to chip in with about 30% of the overall costs. When shared by multiple cultivators, overheads and management expenses are considerably reduced as well.

Decentralisation of energy and technology enables essential services to reach remote communities while handing them operational control, choice and improved income opportunities.

"Our DRE projects underscore the importance of community engagement, capacity building and knowledge sharing as fundamental pillars of sustainable development," says Mr Singh. "We work closely with tribal villages to ensure their active participation at every stage of the programme, from planning and implementation to monitoring and evaluation.

"Together, we strive to create a future where renewable energy can bring positive change, uplift the lives of the marginalised communities and help pave the way to a more sustainable world." ■



Kiwi fruit gets the solar-drying treatment (in preparation for packaging) at the Kade Cooperative FPO facility in Kade village in Nagaland's Phek district

Water entrepreneur Kamdev Pandit, a resident of Birajpur village in Jharkhand's Deoghar district, checking the flow from his solar-powered water pump



# Power progress

**Solar solutions are enabling tribal and marginalised farmers in Jharkhand to think differently in their quest to secure livelihood gains**

**C**handu Nag has come to believe in the safety of numbers, and that was not how it used to be for the 50-year-old tribal farmer from Bhursu village in Jharkhand's Khunti district.

Five years ago, at a time when she was struggling to make ends meet for her six-member family while squeezing out a living from her meagre agricultural plot, Ms Nag was reluctant to join a

farmers' collective and share her limited resources. She saw the other farmers as competitors who might undercut her.

"That was despite most of my 3-acre land holding going to waste," says Ms Nag. "I would grow rain-fed paddy during the monsoon season, and that was it for the whole year." Anything more was impossible in the face of severe water scarcity. This blight routinely stymies smallholder farmers in

Jharkhand's tribal regions, which also have to cope with the large-scale migration of menfolk seeking daily-wage labour in the nearest urban hubs.

While farmer-producer companies can help with market linkages and technology, and self-help groups can facilitate access to credit, farmers like Ms Nag who live in the remote areas often can't access these benefits. Increasing yield from whatever agricultural



Farmers from Tarbandha village in Dumka district and the solar panels that enable water supply to their fields

## More to the energy story

Integrating solar solutions into the ‘distributed renewable energy’ programme means combining devices for optimal energy use. Juliyani Tiru, a 44-year-old farmer from Bichna village in Jharkhand’s Khunti district, uses a solar-powered MLI to water her 1-acre plot, and she has attached an insect trap to it. The automated trap emits an ultraviolet light that ensnares the insects.

“In the beginning, I was not sure if the trap would work; it sounded too good to be true,” says Ms Tiru. “But it is so effective that I use less pesticide in my fields, and my vegetables are growing in a cleaner environment.”

When she does need pesticides, Ms Tiru uses a solar-powered sprayer that can be carried around or mounted on a bicycle. Ms Tiru’s savings on pest control, combined with bountiful harvests, have lifted her household’s income from ₹80,000 annually to ₹400,000.

Deepak Singh, a farmer from Bhonda village in Khunti, installed a solar MLI in 2021 and later attached a solar-powered drip irrigation line to it to water his 3-acre plot.

“I was initially sceptical about solar because I wasn’t sure it was worth the investment.” Mr Singh, who shares a production patch with 15 other cultivators. “I used to grow vegetables on about a quarter of my field; now I use it in its entirety.”

Worried about theft, Mr Singh spent many months sleeping out in his field to guard his equipment when it had just been installed. “That used to happen when there were fewer solar panels,” says Garima Kumari, team leader (Jharkhand), CInI, an associate organisation of the Tata Trusts. “Now everyone wants solar solutions and they are getting them at reasonable rates thanks to government subsidies and our support.” ■

land they own is the only option available to them.

Ms Nag's attempt to do that meant using a water-lifting diesel pump to flood her fields (there was no steady electricity supply in her village). This was both expensive and painstaking. Ms Nag had to travel a fair distance to buy the fuel, and she had to cart the heavy pump back and forth from her farm.

Then in 2021, Ms Nag learned of a solar-powered micro-lift irrigation (MLI) system being used in her village. This was a part of a programme powered by 'distributed renewable energy' (DRE) solutions and supported by the Tata Trusts through their associate organisation, Collectives for Integrated Livelihood Initiatives (CInI).

The programme enabled

farmers to access water all year round for cultivation, which meant they could grow high-value vegetables alongside their staple crops. Ms Nag joined a 'production patch', a cluster of about 10 farmers who, with CInI's help, have installed MLI systems to irrigate their fields. There was no looking back for Ms Nag from here on.

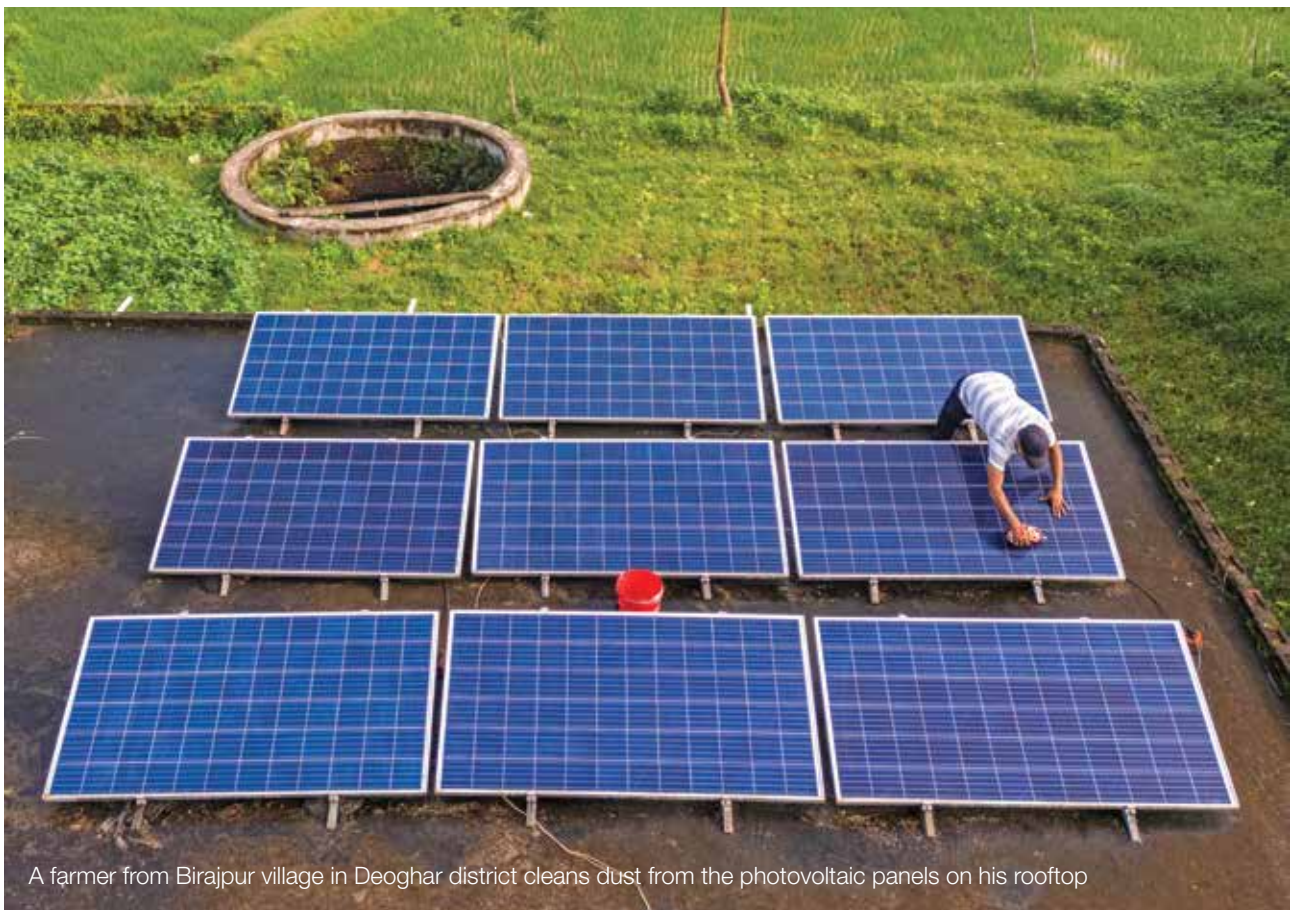
### **Synchronised setting**

The farmer cluster bears 30% of the cost of the MLI systems and other expenses. They grow similar vegetables all through the year, synchronising their cultivation cycles to reach a larger amount of produce to the nearest market. With crop diversification, Ms Nag's annual income has jumped from ₹80,000-₹90,000

a few years ago to ₹800,000 to ₹900,000, a ten-fold increase.

That is a typical lift for many of the smallholder farmers in Jharkhand who have taken to solar energy and modern agricultural practices. Within the Trusts' countrywide DRE initiative, which reaches nine states and one union territory, Jharkhand's farmers have adopted a number of solar solutions.

The DRE push in Jharkhand has resulted in the installation of more than 1,000 MLI systems and portable pumps; solar insect trappers and power sprayers; cold-storage units, vaccination chambers; solar dryers, pruners and moisture sensors; and other equipment that have collectively made farming just a little bit easier for Ms Nag and her compatriots.



A farmer from Birajpur village in Deoghar district cleans dust from the photovoltaic panels on his rooftop

About 25,000 households have benefited from adopting these clean, environment-friendly technologies. Also, unlike bulky and unwieldy diesel pumps which needed considerable physical strength to operate, solar MLI systems are easy to run, which suits women farmers.

There are solar solutions at every stage of the agriculture and animal husbandry value chain. “Income enhancement is the primary goal of the DRE programme and, to that end, we cover both the pre- and post-production stages of agriculture,” says Sirshendu Paul, executive director, CInI.

### Multi-cropping push

The small and fragmented land holdings of these farmers make multi-cropping the best option. And solar solutions enable that. “Better incomes can be achieved only by helping farmers transition from traditional subsistence levels of production to commercial quantities of produce,” adds Mr Paul.

“Earlier our work focussed on bolstering the primary monsoon crop which used to be the mainstay of the household,” says Sudipta Das, an assistant manager with CInI. “For farmers to also grow vegetables we had to provide the requisite irrigation support, which we can now do with solar pumps.”

Adds Garima Kumari, team leader (Jharkhand), CInI.: “We have tweaked our programmes to shift from food sustainability to income enhancement through the cultivation of high-value vegetables.



A farmer from Pharasimal village in Deoghar district beside a solar-powered meter that measures the moisture content in her field

Our solar technology has been integrated into what we call a production hub.”

Several levels up from the production patch that Ms Nag belongs to, the hub comprises several large clusters of farmers – 40-50 in each cluster, with upwards of 12 acres between them – and may cater to as many as 250-300 cultivators collectively owning some 60-70 acres.

Along with encouraging commercial-level output, the hub tries to reduce the cost of inputs for farmers through bulk procurement of seeds, fertilisers, etc. Solar-powered systems provide a timely and reliable supply of water, fuelling a shift to more profitable crops and better prices through collective selling. All this is overseen and managed by different

farmer producer companies where farmers are shareholders.

Mukta Nag, a board member of the Murhu Nari Shakti Kisan Producer Company Limited, sees a huge benefit for farmers thanks to solar. “Ever since they adopted solar strategies, our members have been able to utilise their entire holding and produce more for the market,” she says. “Now they are taking the seeds we provide and cultivating two or more seasons of fruit and vegetables where earlier it was barely one.”

The farmers in the initiative are also experimenting with new methods more confidently, like using grafts for tomatoes to secure higher yields, cultivating plants that survive longer, and growing their own saplings in nethouses watered by solar-powered drip lines. (A notch below greenhouses, net houses have an optimal microclimate that protects high-value crops from harsh weather, pests and excessive heat.)

There’s more in the solar mix. Solar mills, driers and grinders help farmers produce flour or red chillies without the drudgery of having to do this by hand, and solar cold-storage units allow them to preserve unsold stock for another day rather than sell them at low rates.

“Our farmers were already employing a package of practices that delivered a lot,” says Ms Nag. “Now solar is transforming their lives and bank balances, and also helping them conserve precious resources. That’s a win any way you look at it.” ■

# Solutions that count

Research studies from two districts in Rajasthan and Uttar Pradesh reveal the challenges that need to be addressed for rural India to get its fill of potable water

**P**rabhu Ram, who hails from a tribal community in Goriya village in Rajasthan's Pali district, understands only too well what water scarcity means. His house is

on a hillock and the women and children in his family once had to make the arduous back-and-forth walk every day to fetch water from an open well.

Lack of piped water has been a

plight shared not just by the 600-odd households of Goriya but by countless millions across India. Since independence, various programmes at the central and state government levels have attempted



Villagers fetch water for domestic use from the ground-level reservoir in Gogra village in the Pali district of Rajasthan



# Reimagining the flow

The Centre for Science and Environment's 'source sustainability and greywater management studies' in Pali and Banda reveal problems and offer sustainable solutions



## WATER SOURCES

### Groundwater



Borewells

Hand pumps

Open wells

### Surface water



Dams

Rivers

## CURRENT CHALLENGE

### Groundwater overextraction



### Non-functional pipe connections



## ON-GROUND REALITY

### Groundwater depletion



### Irregular supply



### Inefficient greywater management



## PROPOSED SOLUTIONS

### Dual water supply systems

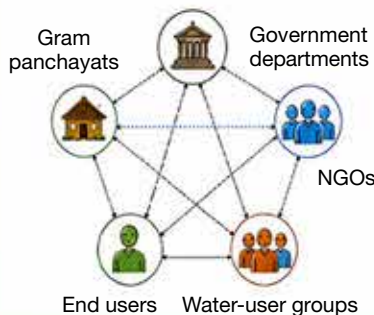
Increase functionality of household tap connections



Treat greywater (soakpits)



### Collaboration in the ecosystem



### Water resource planning

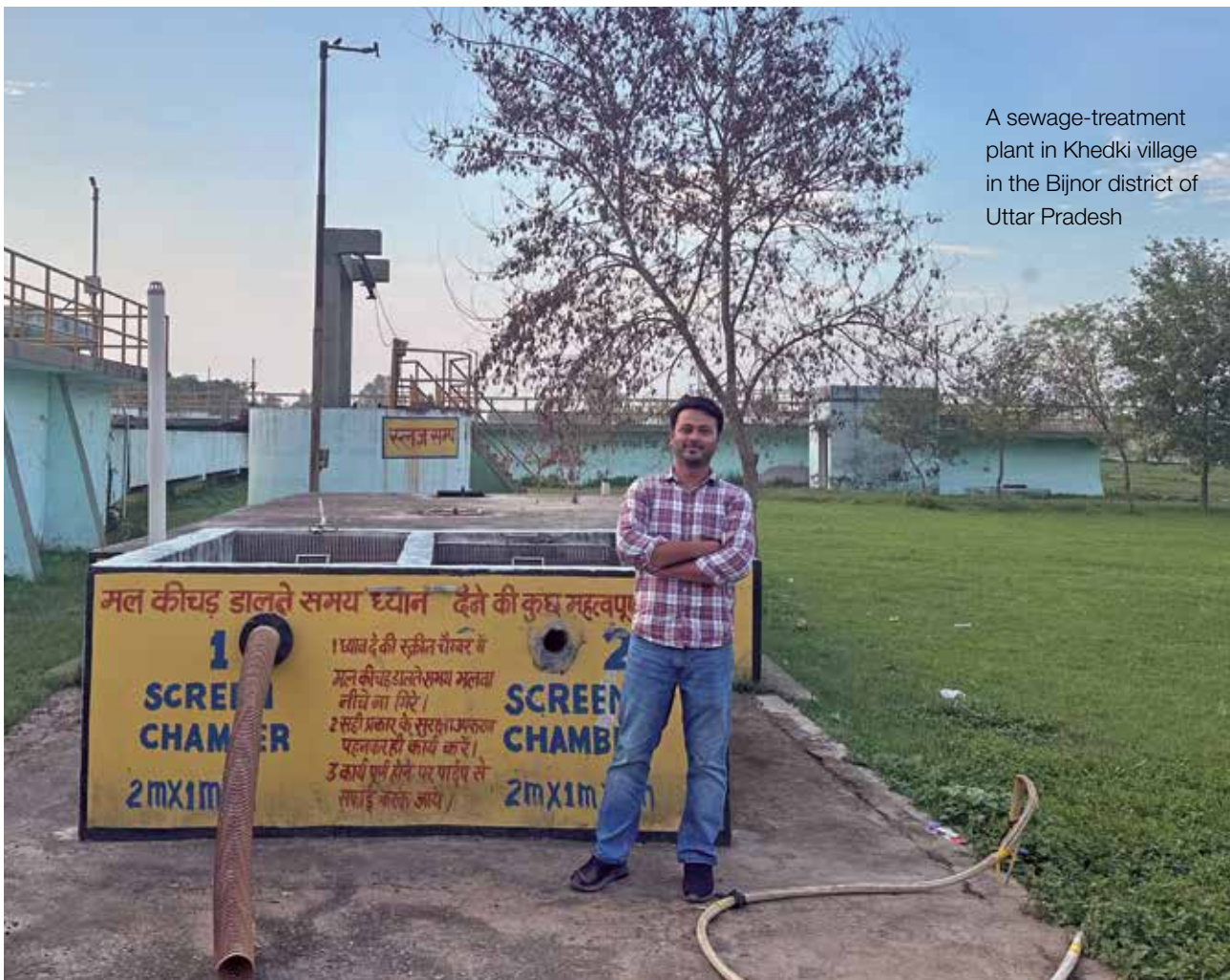
- Mapping of sources
- Water audits
- Well-designed systems

### Infrastructure management



### Community engagement





A sewage-treatment plant in Khedki village in the Bijnor district of Uttar Pradesh

to plug this problem. The most ambitious of these initiatives is the Jal Jeevan Mission (JJM), launched in 2019 as a nationwide water initiative to provide every rural home with a functional household tap connection (FHTC) for drinking water.

While JJM has hugely expanded water access, extending tap connections to an estimated 81% of rural households, there are areas that need strengthening to ensure water supply to village communities, including two critical aspects of water management: sustainability of water sources and greywater management.

The Tata Trusts have supported three diagnostic studies — conducted by the Delhi-based Centre for Science and

Environment (CSE) — to analyse these aspects. The studies' findings will help sharpen the Trusts' understanding and be of use in designing future interventions.

### Two districts researched

CSE selected two ecologically distinct rural regions for its evidence-based research: Rajasthan's desert district of Pali and Banda district in Uttar Pradesh's Indo-Gangetic Plain. The nonprofit's studies stated that while taps are in place in these two districts, water supply is not reliable. More positively, the studies shed light on how actions in the field could bring about change.

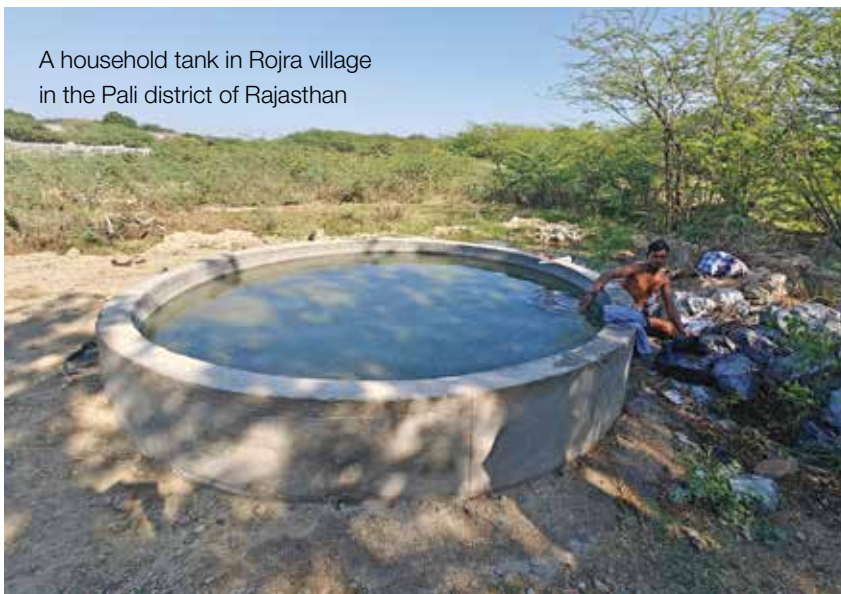
The reasons for inadequate water supply vary from the capacity gap facing communities in the

maintenance of pipe systems to the drying up of sources. In Pali, traditional groundwater sources have become saline due to overextraction, compelling villagers to turn to surface water sources like the Jawai Dam.

The CSE studies also show how uneven governance, limited community participation, the absence of proper water resources mapping, and inadequate funding are contributing to challenges in sustaining drinking water sources.

The Trusts have attempted to complement government efforts through water-focused initiatives implemented by their associate organisations, among them the Centre for microFinance (CmF) and Collectives for Integrated Livelihood Initiatives (CInI).

A household tank in Rojra village in the Pali district of Rajasthan



## No fringe benefits

While rural India struggles to manage its greywater, the issue is even more complex in peri-urban areas. These are, typically, the outer fringes of cities.

Towns have expanded outward and absorbed nearby villages. Bijnor in Uttar Pradesh is an example. In December 2020, the town nearly doubled in size when its municipal boundary was extended to absorb 14 surrounding villages. Areas that had been served by *gram panchayats* (village councils) now came under the city's municipality. The pipes, drains and sanitation systems didn't change overnight, but responsibilities expanded.

Five years on, the Centre for Science and Environment's study of Bijnor's new peri-urban wards reveals what happens when settlements get caught between rural and urban service systems.

While the core city meets national service benchmarks, the new peri-urban wards get intermittent supply of water, leaving many households dependent on hand pumps. And almost every household still relies on septic tanks.

Bijnor's sewage treatment plant runs below capacity because the new wards are not connected to it. Open drains carry a mix of stormwater, greywater and even septic tank overflows.

The study highlights how peri-urban settlements across India tend to experience some of the most acute problems in water supply, sanitation, wastewater management and stormwater drainage. ■

In Goriya, for example, CmF encouraged Mr Ram and a cluster of neighbouring households to come together to form a water-user group. The group managed the construction of a nearby water tank, which now provides them with access to potable water.

### Its's better in Banda

The situation is marginally better in Banda in Uttar Pradesh. Households here rely on groundwater as well as surface water from the Yamuna and Ken rivers. However, coverage of tap connectivity remains low, and water supply consistency continues to be a challenge.

CSE's research flags how the digging of deeper borewells has led to overextraction of groundwater and an increased risk of geogenic contamination, wherein minerals such as fluorides leach from underground rocks into the groundwater.

The CSE studies conclude that source sustainability of drinking water can be achieved through the combined use of surface and groundwater. Advanced tools, complemented by traditional community knowledge, can be used to map existing and potential drinking water sources; identify potential recharge zones with effective design and implementation; and increase recharge systems to improve groundwater quality.

All of this is possible through decentralised water governance, primarily collaborative efforts of relevant government agencies and village communities, like in Goriya,

where the water user group under Mr Ram's leadership operates and maintains its water supply system (with technical support from the local government agency and CmF).

As consumption of water increases in rural communities under JJM, so does the generation of greywater. CSE found different problems in the two districts: in arid Pali, low greywater volumes seep into porous soil; in Banda, large volumes overwhelm village drains.

Lack of data on how much water is being supplied, consumed and discharged as greywater makes planning difficult. Missing or non-functional soak pits, clogged drains, septic tank overflows and the poor maintenance of water and sanitation infrastructure add to the challenge.

### **Greywater management**

The solutions for greywater management mirror those needed for source sustainability: stronger governance, better data and community engagement. The studies recommend household-level reuse where possible (soak pits, kitchen gardens, etc), community-level nature-based systems where volumes are large, and dual plumbing in water-scarce regions to recycle treated greywater.

There is no one-size-fits-all solution: the answer depends on local soil, groundwater conditions and greywater volumes. This is where community engagement can lead to effective change, as one village in Rajasthan demonstrated.

The households of Khetarli village in Rajasthan's Pali district



A pond restored by the village council in Milathu in the Banda district of Uttar Pradesh and, below, members of the Solar Pump Irrigators' Cooperative in Dhundi in the Kheda district of Gujarat, a state that Rajasthan and Uttar Pradesh can learn from on how to manage the water and energy equation equitably



reuse greywater to irrigate their kitchen gardens. Bhura Ram, one of the residents, explains that the locals take care to use wood ash instead of detergents to wash utensils.

From the arid areas of Rajasthan to the Indo-Gangetic plains of Uttar Pradesh, the CSE studies have revealed challenges as well as identified areas for urgent

action, such as setting up a system for infrastructure management, the strengthening and decentralising of governance processes, and the need for collaborative action. These actions point the way forward for successful water management in rural India. ■

*Sasha Mahajan*



A farmer-member of a solar cooperative in Dhundi village in Gujarat's Kheda District

# A lodestar shows the way to change

**The IWMI-Tata Trusts collaboration — 25 years and going strong — has employed research findings and field pilots to craft groundbreaking solutions in the rural livelihoods sphere**

**T**here has been a distinct change in the profile of India's small and marginal farmers over the last couple of decades. Farmers across the country have adopted modern agricultural practices and discovered new streams of income while tapping the potential of solar energy and making the most of irrigation technologies.

Some of the transformative measures behind these advances can

be traced to the efforts of an initiative that has fused scientific expertise, global experience, field experimentation and policy engagement to drive improvements in rural livelihoods — the IWMI-Tata Water Policy Research Program (ITP).

Started in 2001, ITP is a collaborative endeavour involving the Colombo-based International Water Management Institute (IWMI) and the Tata Trusts. ITP

has concentrated on five interlinked elements in its research domain — water, agriculture, energy, environment and livelihoods — to provide solutions that boost farmer incomes. Importantly, it has helped shape rural development initiatives of governments and donor organisations through policy research and analyses.

The 'small farmer, prosperous farmer' (SFPPF) initiative, launched

by ITP in 2012, is an instance of how research findings have been translated into tangible results on the ground. The challenge was to not only ensure access to water, but to use the resource to fuel smallholder prosperity.

SFPF-compatible interventions in the tribal belt of Dahod district in Gujarat, covering about 45,600 marginal farmers with landholdings of between 1.5 and 3 acres, included a compact of interventions around water security, irrigation efficiency, yield improvement, crop diversification and market specialisation. The annual income of about 60% of the farmers thus empowered rose to about ₹125,000, and 20% of them pulled in ₹250,000 and more.

### Lessons for all

SFPF offered programme design and policy formulation lessons for civil society and government initiatives aimed at enhancing the well-being of small and marginal farmers, especially in the tribal context. Down the line, SFPF laid the groundwork for the Tata Trusts' wide-ranging Lakhpati Kisan campaign, which covers hundreds of thousands of households in several Indian states.

Informing water and livelihood programmes and policies is what ITP does best. "Our research has inspired and shaped critical government projects and investments in several states," says Shilp Verma, ITP's programme leader and IWMI's deputy country representative for India.

ITP is driven by a team comprising young researchers, in

## Energy-irrigation nexus

Gujarat once faced a situation where its water and energy challenges were deeply enmeshed. Farmers relied on subsidised farm power connections to draw water for irrigation, driving up energy consumption and anarchy in rural feeders, as domestic, agricultural and commercial connections shared common feeders. That led to supply rationing, power thefts, and unhappy farm and non-farm consumers.

Worsening the condition was a combination of depleted aquifers, a near-bankrupt electricity board, and powerful farm lobbies resistant to metering and consumption-linked power tariffs. A solution — any solution that worked — was the need of the time, and the IWMI-Tata Water Policy Research Program (ITP) delivered just that.

ITP recommended that electricity utilities tailor farm power supply to better fit farmers' requirements. Implementing this "intelligent rationing" of farm power, ITP argued, would leave both farmers and electricity utilities better off.

The government responded to the suggestion and, through a rewiring of rural feeders, invested \$260 million to separate agricultural and non-agricultural feeder lines across the state.

Combined with institutional reforms in the electricity bureaucracy, Gujarat's Jyotigram Yojana led to an impressive agrarian boom, reducing farm power subsidy, making the state's electricity utility viable and improving groundwater governance. The net result — a happier citizenry in the countryside. ■

the main, that collaborates with a network of some 250 partners from across India, among them a host of grassroots organisations. "Over the last 25 years, IWMI and the Tata Trusts have invested around \$8 million [approximately ₹76.5 crore] in ITP. In return, even by the most conservative estimate, ITP's research has inspired and influenced development investments worth more than 1,000 times this investment," adds Mr Verma.

Some of ITP's early work highlighted the ubiquitous interlinkages between water and

energy in India's rural landscape. "ITP was among the first to posit that the fate of India's water and energy economies is intricately linked, that energy policies not only impact groundwater use but also offer a potent instrument for governance," explains Mr Verma. This need for a 'co-management' approach won ITP the United Nations' best water management practices award in 2014.

A large part of ITP's success can be attributed to its flexibility and its ability to explore new research themes, its pioneering work in solar

## The ITP spread

### Catalysing smallholder prosperity



Building on the 2012-24 'Small farmer, Prosperous farmer' initiative, ITP aims to extend its research to new cohorts; develop and execute a 'Catalyzing Smallholder Prosperity' training programme; and translate research into field action by testing SFPF insights through field labs.

### Solar energy for rural livelihoods

Water and energy security are intricately linked and ITP has for long highlighted opportunities for co-management of the two. ITP will expand the work to include new applications; facilitate inclusion of the 'nexus approach'; and help shape policies.



### Water for life and ecosystems



As India's water programmes evolve, rural and urban water and sanitation systems are certain to see significant public and private investments. ITP will strengthen and deepen work in this domain, including on critical aspects of water quality and health.

### Future of Indian agriculture

How will India's agriculture and its linked livelihoods look in Viksit Bharat 2047? This theme will include the modernisation of infrastructure; data-driven and AI-powered tools and systems; and India's blue economy.



irrigation being a standout example. In 2016, ITP initiated a field pilot in Dhundi, a village in Gujarat's Kheda district (*see Dhundi sparks a revolution on facing page*) that became the inspiration for the state's SKY (Suryashakti Kisan Yojana) initiative and a key component in the Indian government's PM-KUSUM campaign.

The pilot and ITP's pioneering work around solarisation in agriculture also spurred IWMI's global work on this theme, especially across Asia and Africa.

### Solar entrepreneurs

Another ITP pilot that drew attention unfolded in Chakhaji, a village in Bihar's Samastipur district. In 2016, in a place where diesel pumps dominated the irrigation economy, ITP partnered the Aga Khan Rural Support Programme to create a cadre of solar irrigation entrepreneurs and catalysed buyer-friendly solar irrigation service markets.

Using a network of buried pipes, each solar entrepreneur delivers irrigation-as-a-service to scores of farmers, reducing fossil fuel costs and improving cropping intensity. Insights from the experiment shaped the now-famous Solar Didi model, which has women from self-help groups take up solar pumps as micro enterprises.

ITP stays relevant because it has evolved alongside the ecosystem it operates in, crafting solutions that address the many challenges in India's complex water and agriculture domain. The research underpinning all of this has benefitted a slew of Tata Trusts programmes in different parts of

## Dhundi sparks a revolution

**F**armers in Dhundi in Gujarat's Kheda district once relied on diesel generators to pump irrigation water. Then an intervention by the IWMI-Tata Water Policy Research Program (ITP) lit up the lives of these farmers.

In 2016, an ITP team approached Dhundi's farmers and convinced them that solar pumps would deliver enough water for their farm needs. The icing on the cake was that any power that their panels generated but was not used for pumping groundwater could be sold to the state's electricity utility at an attractive tariff. Within months of commissioning, participating farmers were loving their solar pumps.

More farmers joined and ITP helped organise them into the world's first Solar Pump Irrigators' Cooperative Enterprise, which pooled and sold its surplus solar energy to the local power distributor under a 25-year agreement. The distributor meters, monitors and pays money to the cooperative, which distributes the revenue based on how much each member has contributed.

"Farmers and their families have not only got rid of the noise, fumes and cost of diesel, but are

also earning thousands of rupees selling solar energy," says Rahul Rathod, an ITP consultant.

The Dhundi venture has shown how solar power can deliver 'climate-proof' income. Farmers make as much as ₹7,000 per month by selling surplus solar power and Praveenbhai Parmar, a Dhundi farmer who owns about one acre of land, is an example. "Once I started selling electricity, I was able to buy a cow within a year," says Mr Parmar, whose incremental income means he can afford to send his two children to a private school.

Dhundi's farmers have also put the land under the solar panels to good use. "We thought the panels will take up a lot of land, but we found that crops could be cultivated under these panels," says Udabhai Chavda, who has nine solar panels on his 3-acre spread.

The Dhundi pilot has provided a water-energy blueprint that the Gujarat government's Suryashakti Kisan Yojana and the central government's PM KUSUM scheme have adopted. Whatever angle it is viewed from, the shift to solar energy has been a winner for Dhundi. ■

India, including in the Himalayan region and in the Northeast.

In the Northwest plains — India's breadbasket that spans regions of Punjab, Haryana, Uttar Pradesh, Rajasthan and Gujarat — years of unsustainable agricultural practices have eroded and degraded land and water resources. ITP has explored ways to combat this crisis through efficient irrigation, crop diversification and climate-smart, groundwater-benign expansion of solar applications.

ITP's work in the central Indian tribal belt helped incubate the Trusts' associate organisation,

Collectives for Integrated Livelihood Initiatives, which works with underserved village communities to improve agricultural practices, expand irrigation coverage, develop animal husbandry and provide better market linkages.

In the floodplains of the eastern Gangetic and Brahmaputra basins — covering parts of Uttar Pradesh, Bihar, West Bengal, Odisha and Assam — the challenges are different. Despite high rainfall, abundant aquifers and fertile soil, the region's agricultural productivity is low due to small

and fragmented land holdings and the damage caused by errant monsoons. Here, ITP has devised practices and systems that tackle the productivity problem head-on.

Rooted in research and problem-solving, ITP's accomplishments have been cemented at the confluence of science, policy and field action. With 25 years of experience, expertise-building and commitment to bank on, the Programme has proven its worth. And there's more to come. ■

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*Kishore Rathod*

# ‘Our ideas work on the ground’

The water-energy-food-livelihood nexus is Tushaar Shah’s abiding concern, the multiple-element fulcrum of his wide-ranging body of study and research. An economist, rural development maven and public policy specialist, Dr Shah is an emeritus scientist with the International Water Management Institute, Colombo, and professor emeritus at the Institute of Rural Management Anand in Gujarat.

Dr Shah’s principal research interests are water governance and farmer organisations, two spheres in which his work has triggered on-ground change and shaped policymaking. He is also the architect of the International Water Management Institute-Tata Water Policy Research Program, a collaborative endeavour aimed at “converting science into policy action”.

The Anand-based Dr Shah speaks here to Philip Chacko about India’s water-energy equation, what bedevils it and what can smoothen its flow. Excerpts from the interview:

**It has been said that we in India don’t think of water as a collective problem. What’s the way to draw the larger community into the conversation and the water crisis that confronts us all?**

I think there’s a need for more extensive and ambitious education and training programmes for ordinary people to engage them in water governance issues. Where state governments are more active in water governance, I surmise that people have a greater interest in these issues. We have seen that in states such as Gujarat, where community organisation for local water harvesting has worked wonders in Saurashtra and north Gujarat.

There are things in the water sector that only governments can do, like with large irrigation and water supply schemes. The problem in our country is that state governments and their agencies have not really been effective in involving people in managing water systems. Governments and people often work at cross purposes, and that creates disruptions in water supply systems and poor water services.

There are political issues as well. For example, most political leaders resist cost recoveries from people; they want to give everything free. Municipal water and irrigation water are provided free without any measurements. In



China, by contrast, they insist on full cost recovery for the water services provided. That's how water operations become self-sufficient once you build the necessary infrastructure.

**You have paid particular attention to farmer organisations in your research work over the years. How are these organisations responding to the multiple challenges in the country's agriculture ecosystem?**

The response of farmer organisations depends a lot on how their agriculture is organised. Because of the agrarian system we have, farmer organisations are able to play a prominent role. But we expect that over the next 50 years more and more people will move out of agriculture. Landholding sizes will then increase and we will probably have a new system with great local participation.

The government has promoted farmer-water-industry associations, but the response from the farmers' side to this has been poor. Most water-user organisations in India are defunct and the performance in much of the rest of the developing world is not much better.



Dr Shah during a field visit to a village in Bihar

The situation is different in countries such as the United States and Australia, where land holdings are large and where irrigation systems serve up to 50 farmers apiece. In these places it is possible to bring all the farmers into a classroom and negotiate with them. That would be impossible in India, where a group of farmers can add up to a million.

**The water-energy-food-livelihood nexus is another of your research interests. What exactly is this about?**

In India there is this perverse relationship between irrigation and energy activity that has created some positive impact but a much larger negative impact. In the 1950s and 1960s, there was hardly any overuse of groundwater in our country. Then came easy and cost-effective technologies to access groundwater — diesel pumps and tubewells — and we could replace bullock bailers and increase the rate at which groundwater is pumped out.

Groundwater irrigation became common, but the cost of the energy used for the pumping would grow into a big issue. States and their newly formed electricity corporations started by trying to stimulate the use of energy by farmers and other consumers, with politicians devising innovative ways to encourage farmers to use more energy in agriculture. One of these ways was popularising electric pumps, and they did that by providing subsidies to farmers on electricity as well as equipment.

In the 1970s, Tamil Nadu began offering farmers free power, with meters removed so they could use as much electricity as they wanted. This

led to a boom in demand for power connections; farmers got one, two and even three connections. All they had to do was dig boreholes and they had free energy to pump.

The burgeoning groundwater economy that followed was patently unsustainable. Farmers came together as a political group to avail and insist on subsidies. Every time a government tried to impose some kind of electricity tariff, farmers would become a political threat.

The first time something different happened was when Narendra Modi became Gujarat's chief minister. He did not touch the existing connections. Farmers who already had subsidised power connections, he did not touch them, but those taking new connections had to pay a tariff, albeit a highly subsidised one.

India has now become the groundwater overuse champion of the world; every year we extract more groundwater for agriculture. Electricity companies are in the red, unable to recover the cost of the power. There are many electricity boards — Rajasthan is an example — to whom no bank is willing to lend because they are accumulating large losses from agricultural power subsidies. Basically, our electricity supply network has been bankrupted.

If we were to accept a 10% reduction in food production, then we could actually restore an environmentally sustainable and financially viable water-energy-food system. That will happen only if we find politically acceptable ways of changing our equation on power consumption and tariffs.

In 2000, we argued with the Gujarat government that if we are providing farmers with highly subsidised power, then we need to ration the supply. That was an acceptable way of not only reducing power subsidies but also groundwater overdraft.

The government implemented such rationing through a scheme that put hundreds of thousands of farmers on special agricultural feeders. The move put a cap on groundwater extraction in Gujarat while massively reducing subsidies to farmers.

#### **How would you describe the enduring collaboration between IWMI and the Tata Trusts? What has it delivered?**

The International Water Management Institute-Tata Water Policy Research Program [ITP] has crafted water and energy solutions based on evidence and logic. We have seeded pilot projects to demonstrate that the ideas we are proposing actually work on the ground. An example is the Sardar Sarovar Project [the multi-purpose river valley development scheme on the Narmada River that provides irrigation and hydroelectric power generation to Gujarat, Madhya Pradesh, Maharashtra and Rajasthan].

We argued that instead of laying open canals, Gujarat should change to a buried pipeline network. The Gujarat government finally agreed with us and the idea of pipelining last-mile distribution took off. That's what has

***“In India there is this perverse relationship between irrigation and energy activity that has created some positive impact but a much larger negative impact.”***

***“China is decades ahead of us in matters related to water and energy. All the problems we are facing now, they have faced since 1995, and they have emerged out of that.”***

led to Punjab redesigning its irrigation system to use buried pipelines for water delivery services to farmers.

Similarly, we showed that solar energy in Indian agriculture could turn around the entire energy-water-food-nexus. We demonstrated this in Dhundi, a small village in Gujarat’s Kheda district. We gave nine farmers access to solar power, organised them into a microgrid, and got the electricity board to enter into a 25-year agreement with the farmers.

Farmers could use any amount of energy they wanted, but got incentivised to conserve energy and water by paying for solar energy export to the grid. In the same village, you have electric pump owners using heavily subsidised power – never a good idea – and solar farmers generating their own energy and selling excess power to the board.

As a research programme, the most we can do is create evidence to support our ideas, but we need a champion to push these ideas. What we have found is that every once in a while there comes a powerful politician who puts long-term benefits over short-term political advantages. Mr Modi was one such politician.

Sujit Gulati, then the additional chief secretary in charge of energy, picked up the ball and ran with it. He said, “One village is not enough; let’s do the project in 400 to 500 villages and see what happens.” He put a lot of his energy behind the idea and made it work.

I am really hopeful that the partnership with the Tata Trusts progresses further. Ours is a modestly funded initiative but it has secured a whole lot of support.

**On the issue of water, climate change has emerged as a principal villain. Are we, as a country, doing enough in dealing with what is a clear and immediate threat?**

We are doing a great deal but not in the water sector, though there’s plenty that can be done there. In a situation where rainfall is going to be more and more unpredictable, the crucial adaptation factor is water storage that minimises evaporation. Groundwater governance is emerging as a powerful and robust response to climate change.

ITP’s case for solar pumps is a response to the threat of climate change. This is a way of reducing carbon emissions as well, while putting in place a financially sustainable model where groundwater can be conserved and solar energy promoted.

In the 1990s and 2000s in Gujarat and Punjab, to give two examples, a lot of resources were invested in water-harvesting structures. Now we have other states doing the same with institutional support. Telangana stands out in this context.

The problem is that we have, nationally speaking, a water bureaucracy that does not perform well enough. It is not easy to hold this bureaucracy accountable, one reason being that many state governments have not paid much attention to it.



**With reference to the rapid and messy urbanisation that India is experiencing, water will surely be an ever-more critical factor. Given the reality, what would your advice be to city dwellers and city planners?**

ITP has traditionally focused on agriculture – that was our mandate – but over the past eight-nine years we have been exploring urban issues. Urban infrastructure is a huge challenge and one important issue here is water metering. I think it requires a certain amount of political courage to actually enforce this, but there's no other way of managing water demand.

**In terms of policymaking, how best can India deal with its water woes? What can we learn from other countries in this context?**

We have tried to draw lessons from around the world on what we should do, but then our situation is much different from anywhere else. Many solutions that work well in other countries do not fit our setting.

The exception to this rule is China, a country that offers very useful solutions. China is decades ahead of us in matters related to water and energy. All the problems we are facing now, they have faced since 1995, and they have emerged out of that. That said, the political system in China is different. It's hard for us to easily replicate what China has accomplished. ■

A farmer in Kherwara village in Rajasthan's Udaipur district gets her fill of water; Dr Shah says that many water solutions that work well in other countries do not fit the Indian setting

Pankaj Saikia, a project coordinator with IFA, conducts a workshop on picture-book making and storytelling for children in Majuli in Assam



# All in for art

**Enabling an environment that can better connect artists and art practices to a wider public — India Foundation for the Arts is about that and plenty more**

**T**he canvas — books, cinema, performances, exhibitions, research, archives and more — is as sizeable as the objective: widening access to and stimulating broader participation in the many worlds of art and culture for a diverse audience. It's an endeavour India Foundation for the Arts (IFA) has engaged with in full measure for more than three decades.

Artists and art practices are central to the IFA approach, which aims to help fashion an environment that enables both to find a footing and to flourish. "We are committed to supporting [art and artists] across contexts, languages and regions, to

strengthen the ecosystem for art and the conversations around it," says Menaka Rodriguez, the Bengaluru-based nonprofit's executive director.

Founded in 1993 as a public charitable trust, IFA has spread its wings to respond better to the changing realities of India's art and culture milieu. It has more than 950 projects across various programmes under its belt, encompassing practice, research and education in the arts, and embedded in the public domain through seminars, screenings, exhibitions and festivals.

"Our programmes have evolved and expanded in new directions; they are rooted in — and responsive to — the aspirations of

the field,” adds Ms Rodriguez. “We are attuned to the ever-changing sociopolitical and economic changes that impact the arts community, and our possibilities as a philanthropy. We want to keep building networks, connections and solidarities in the art and culture space.”

Securing the financial wherewithal to bring all of this together is a complicated task, especially so in some circumstances. “One of the Foundation’s key impulses is to fill the funding gap in the arts,” adds Ms Rodriguez. “That’s what drives us to seek work in spaces, disciplines and research that would not typically receive backing and visibility.”

The Tata Trusts were an early patron of IFA’s initiatives and they continue to be. Beginning in 2024, the Trusts have been supporting two of the organisation’s five principal programmes: arts practice productions (APP) and archives and museums (AMP).

### Mix and match

Recast in 2021, APP implements projects that cover performative, aural, visual, digital, literary and interdisciplinary work. Under this rubric are explorations of nascent ideas, productions of an artistic work, creation of spaces for exchange and dialogue (seminars, residencies and workshops), and the fostering of art and culture platforms.

Project coordinators contracted by IFA are at the heart of these efforts, which are crafted to encourage work in Indian languages other than English, artist practitioners from non-metro centres, and collaborations within and across practices. Included in the programme’s fold are performing artists, visual artists, curators and writers.

“Our primary challenge is managing the large number of proposals we receive – there were 421 in 2025 – from across



creative disciplines,” says Mridupankhi Rajkumari, IFA’s programme officer for APP. “Ensuring that each proposal is evaluated fairly and ethically requires time and attention. Rejecting proposals is often the most difficult part of the process.”

IFA supports its project coordinators through the 18-month time period of the programme. “These are projects with solid artistic outcomes, be they in theatre, dance, music, films, exhibitions or books and manuscripts,” adds Ms Rajkumari. “We at IFA have to keep up with current discourses and interventions in the art and culture arena to address different artistic forms and disciplines.”

The AMP component in the Foundation’s initiatives is about collaborations with archives and museums to establish platforms for dialogue and discourse, and to generate critical and creative approaches to engage the wider public. That means bringing institutions and individuals together to become co-producers of knowledge and expertise.

Support from the Trusts, which previously backed AMP’s fellowships initiative (from 2014 to 2019), has benefitted projects involving partnerships with a variety of institutions, among them the archives of the Marg Foundation,

A gallery at the Chandernagore Government College Museum (West Bengal), one of the institutions IFA has collaborated with



One of the galleries at the Conflictorium Museum, Ahmedabad, another institution that IFA has been involved with

Mumbai; the archives of the National Centre for Biological Sciences, Bengaluru; the Rani Abbakka Tulu Nadu Museum, Bantwal (Karnataka); and the Conflictorium Museum in Ahmedabad.

“Our intent is to nurture public-facing projects that speak to a larger audience,” says Ritwika Misra, AMP’s programme officer. “For example, archives in India can be opened up to people in new forms, telling stories that would otherwise remain hidden.” The collaborative nature of the venture is its essence. “IFA, our project coordinators and the institutions function as a triad, and our outcomes here have resulted in films, books, workshops, exhibitions, museum walks, etc.”

Art and culture may be in a state of perpetual revolution, forever buffeted by the swells of changing times, the proliferation of celebrity practitioners and the surrender of creativity at the altar of money. Within this maelstrom, IFA has managed to carve out a corner where discovery and the visual reward for those moved by art and culture are paramount. Having the Tata Trusts on its side has been

an advantage for IFA in this quest.

“The Foundation plays a crucial role in the arts sector in India,” says Paroma Sadhana, programme manager, arts and culture, with the Tata Trusts. “It encourages innovative work and documents these to create a living archive of the palimpsest that is Indian art practice.”

“There are very few organisations that support art and culture in meaningful ways in India; the Tata Trusts are among the few that do,” says Ms Rodriguez. “They value creativity, innovation and a deeper engagement with communities. They are sensitive to the complexities of the arts and culture landscape. Such support provides institutions and artists with the resources and opportunities needed to spawn new and creative approaches that connect with the public.” ■

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*Philip Chacko*

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**From facing page, interviews with four art practitioners who have benefited from support extended by India Foundation for the Arts.**

# The tangible and the imagined

**Ogin Nayam**, a native of Arunachal Pradesh, is an Itanagar-based visual artist and children's book illustrator who works primarily with watercolours. A multiple award winner, his project is an illustrated art book — 'In the Land I was Born' — that takes readers through a voyage shaped by memory, folklore and landscape. The written word acts as an accompaniment to the illustrations in the book, which is informed by oral histories and archival work.

**Arunachal Pradesh, its stories and traditions are at the heart of your illustrated book. Why this subject and why this medium?**

Arunachal Pradesh has always felt to me like a living archive of stories, a place where landscape, memory, folklore and everyday life are inseparable. Many of these stories continue to survive through ritual, songs and oral traditions rather than through written records.

I was drawn to the idea of creating an illustrated book because it allows me to hold together the tangible and the imagined at once. A drawing can carry atmosphere, silence and emotion in ways that documentation alone sometimes cannot. There is also a certain freedom in visualising these stories and interpreting what is remembered, imagined or only partially told — while still holding onto their emotional truth.

**The brief for your project says the book will be “a voyage shaped by memory, folklore and landscape”. Why, from your inside perspective, is a rendering of this voyage vital?** In Arunachal Pradesh, memory is deeply connected to the land.

Rivers, forests and mountains are not just backdrops but active parts of the stories. Myths here often emerge from lived relationships with the natural world. Now, as oral traditions slowly fade, there is a risk of losing not only the stories, but also the ways of seeing the world they carry. Through this book I hope to preserve these landscapes of memory as living and evolving experiences rather than static records.

**Your book is about turning these stories from Arunachal into artworks on paper. What are the challenges involved here, especially in the gathering and choosing of the stories?**

The challenge lies in interpretation. Oral stories are fluid and communal, with no single, fixed version; translating them into images requires careful listening and sensitivity. Another challenge is selection; not every story fits the art book format, so finding stories that can be translated into visually compelling artworks becomes difficult.

**How do you see this project furthering your progress as an artist in terms of craftsmanship and recognition?**



An illustration from Mr Nayam's book

This project is pushing me to work more patiently and deeply as a storyteller and as a visual artist. It requires research, listening, field observation and experimentation with visual language, all of which are expanding my practice. ■

# Portrait of a community

**Elroy Pinto's** project is a documentary film that blends dance, archival research and fictionalised scenes to present a multidimensional portrait of the history, identity and culture of Mumbai's Koli fishing community. With protagonist and collaborator Aishwarya Raut, a contemporary dancer, Mr Pinto — a filmmaker who has also trained in music — is using the language of cinema to reinterpret the 19th-century folk ballad 'Governor and Koli: A Fisherman's Legend'.

**How much of the history and the struggles of the Koli community have been recorded or documented? How will your film help in the context?**

The Kolis have to be seen not as a monolithic entity but as a series of discrete particulars that can be defined by their relationship to their geographical, historical and material conditions. There were several forms of agitation undertaken by them in the decades after independence and, before that, during the colonial era.

My film is about Aishwarya's exploration of her identity. With the ballad at the heart of the film, song and dance were but natural aspects to build the work into.

**Blending social documentation and fiction, as you are attempting to do, is a**



A still from Mr Pinto's documentary, which blends a variety of enticing elements

**delicate task. What do you have to guard against in an undertaking of this kind?**

I think the primary contradiction in any film is that it feels, at times, to be trapped in a modernist binary of universal-particular, men-women, classical-folk and whatnot. A film must take place between these two opposites. Similarly, working with docu-fiction involves freedom in where one can take the viewer, but there is responsibility attached to it: the possibility to imagine a moment that is truly explosive and revolutionary.

**How much space is left in the India of today for artists, more so filmmakers, to engage with subjects of their choice, be they controversial, contentious or merely nuanced?**

It has shrunk and funding structures have undergone tremendous change. If education and healthcare are gutted, you can be sure the arts are too. What

remains are scraps and we have to compete for that with other disciplines. Artists have been self-censoring themselves out of fear. What we need is a revitalisation, and spaces that continue to provide progressive artists with opportunities.

**Your film has been shown at a centre in Mumbai and presented online. That seems limiting.**

My film was shown at a community-led cultural centre called Nirmik, which sits between two of Mumbai's largest slums. It was a two-day affair and we had people from all age groups in attendance. The aim was to take the film to the community with whom we worked, and we want to broaden its appeal through a gradual build-up of screenings. We are particularly interested in not keeping this within the Koli community; it must travel to everyone who is marginalised. ■

# Design with a difference

**Madhushree Kamak**, together with Brian Dsouza — both are designers — is working on a project ('Beneath the Green Canopy') that involves creating an exhibition and an interactive web experience with artefacts from the collection of the Rani Abbakka Tulu Nadu Museum in Bantwal, Karnataka. Research, guided tours and public programmes for local educators are components of the project.

**What was your reaction to being selected under the IFA's archives and museums programme? What has the experience been like?**

This is a rare opportunity to do the kind of slow, careful work that rarely gets funded. Over the past year, it has been deeply fulfilling to watch a concept go from a framework on paper to an exhibition that people are walking through and recognising their own lives in.

**What were the considerations for you and Mr Dsouza while executing this project?**

The first question we kept coming back to was: who are we actually making this for? The local community was always at the centre. We wanted to capture and give back their stories, provoke curiosity about local histories, and make the museum feel like an exciting, living space rather than a repository of old things.

For the Museum itself, we were thinking about longevity: how do you revitalise a collection, bring in new audiences, and ensure these stories survive beyond any single curator's memory?

**Tell us about your interactions with the Museum and IFA.**

It's genuinely collaborative. We go in with open minds and expect to be changed by the process. Working



Mr Dsouza and Ms Kamak at the Rani Abbakka Tulu Nadu Museum

with the Museum team has been like accessing a deep well of local customs, oral traditions and the philosophical underpinnings of everyday objects. This is knowledge that no amount of desk research can replicate.

**What do you have to keep in mind when 'the public', in all its forms, is the audience, as it is with this project?**

There's no single, right way to engage with cultural heritage; people come with different backgrounds, knowledge and expectations. The exhibition works as a sensory experience: you can read, listen, watch, do and participate. We have developed content in Tulu, Kannada and English, consciously varying the complexity of language to work across age groups.

Working with an anthropology museum for the first time has shifted how we think about design entirely. A small museum in a low-resource setting forces you to think about sustainability and modularity from day one. We also had to translate living, conversational knowledge into formats that could stand on their own without a human guide. That's a different kind of design challenge.

This is a project that reminds you why the work we do matters. Smaller museums often hold the most specific, the most irreplaceable stories, the ones that don't make it into national narratives. We hope 'Beneath the Green Canopy' becomes part of a larger argument for investing in such spaces, and for giving practitioners the time and trust to do this kind of work properly. ■

# Tapestry of people and histories

A visual artist and illustrator based in Goa, **Pakhi** — she uses a mononym — is working on textiles and the stories wrapped in them for her project. These stories, retrieved from the archives of the Marg Foundation, Mumbai, will be the source material for an interactive website in an assignment that features 10 animated narratives, short-form videos and social media clips.



Textiles are storytellers, historians, sociologists and artworks, says Ms Pakhi

## In terms of your evolution as an artist, what have been the benefits of working on the ‘Textile Stories’ project?

This project feels personal in many ways. I grew up in a family where textiles were treated like heirlooms, so I think I absorbed a fascination for this world quite subliminally from a young age. Over time, that fascination became more conscious in my own artistic practice.

I’ve always been interested in the emotional and narrative life of textiles, not just as objects of beauty but as carriers of memory, migration, labour, trade, revival, and identity. What this project has allowed me to do is delve much deeper into those intimate relationships between people and textiles. Each story I’ve worked on has opened into larger histories.

## What is it about the project that you find interesting, and how complex is the undertaking?

What I find most interesting about the project is that textiles are never

just decorative objects. They are storytellers, historians, sociologists and artworks, all at once. A textile captures time and place in an incredibly intimate way. Being able to move through these different stories has felt like slowly unveiling a much larger tapestry of people, histories, and relationships.

## Among the stated objectives of this project is “to devise a visually rich platform” where the stories of India’s textiles can be made “accessible to a global audience...” How do you plan to accomplish that?

For me, the intention behind creating a visually rich and accessible platform is really about sparking curiosity and emotional connection. There is a certain everyday intimacy with textiles that I feel is slowly fading. Increasingly, Indian textiles are being absorbed into a very flattened luxury or global commercial market. What I hope this project can do is make the subject feel alive again.

## What’s your view of the environment for emerging artists such as yourself in today’s India? What are the positives and the negatives?

I think it’s both an exciting and an exhausting time to be an emerging artist in India. There are far more possibilities now in terms of collaboration, interdisciplinary practice and the different formats through which art can exist and circulate. At the same time, there is definitely pressure to participate in a culture with a very short attention span and an almost constant demand for visibility and newness.

I think meaningful artistic work often requires slowness. Some of the most important works across history have emerged through long periods of observation, uncertainty, research and gestation. So, one of the challenges today is trying to remain truthful to your own rhythm while also navigating systems that reward speed and constant visibility. That balancing can be difficult. ■



Kali Bai of Malera village in Rajasthan's Sirohi district is part of the community-based breeding programme

# Herd start

**Infusing science and technology into sheep and goat breeding is helping rural communities in three states improve the quality of their livestock and their incomes**

**T**he stray buck walking through Thandi Beri village in Rajasthan's Sirohi district has no owner but, with an ear tag as identifier number, it is among the livestock categorised and counted by the local community. The ear tag is how the village tracks the goat's value, not in terms of a possible selling price but for its breeding potential. This one is not a good choice and the ear tag tells the story.

Goat or sheep-rearing is an important source of income for marginal farmers across India with small landholdings, especially those living in arid areas. The genetic quality of the buck or doe is

important here. Goats that can gain weight, produce more milk, are disease-resistant and climate-adapted can boost a family's income by 50% or more. What tends to compromise matters is how the breeding happens.

Breeding is more often than not random, with goat owners sometimes choosing bucks based solely on appearance or allowing their animals to breed with strays. This is the reality that a promising livelihoods programme of the Tata Trusts has sought to change, through awareness-building and, just as important, by getting the community to employ data and technology with their animal-breeding practices.



Women at a meeting in Demti village in Gujarat's Sabarkantha district to promote the programme

The Trusts' community-based breeding programme (CBBP) was launched in Rajasthan and Gujarat in 2024, with Andhra Pradesh being added to the fold a year later. The programme has been introduced in a cluster of villages that were part of earlier Trusts' programmes in animal management. In the south Aravalli region that overlaps with south Rajasthan and north Gujarat – this is home to the Garasiya Bhil tribe – CBBP has been introduced in about 25 villages.

The initiative is implemented by associate organisations of the Trusts, the Centre for microFinance (CmF) and Collectives for Integrated Livelihood Initiatives (CInI) in Rajasthan and Gujarat respectively, and the Vijayvahini Charitable Foundation in Andhra Pradesh. The knowledge partner is the Nimbkar Agricultural Research Institute, a sheep- and goat-breeding centre in Phaltan in Maharashtra.

CBBP is essentially about making the community aware of why pedigree and quality of livestock count. Like many of the Trusts' programmes, the initiative is designed around sustainability, securing a commitment from the community, and encouraging women's empowerment. It is

driven in the main by '*pashu sakebis*', women from the community who are taught basic animal husbandry skills.

The technology in the breeding programme, which is used to capture data on the goats, is from AbacusBio, a New Zealand-based agribusiness company. AbacusBio runs an app called Dtreo, which is currently used by CBBP to host data on about 4,500 goats and sheep.

### Data decoders

The *pashu sakebis* – there are 18 of them – have learned how to tag the goats and use tablets to upload the tag number and data of every animal in their care. The data includes a host of metrics: age, birthweight, girth, litter size, size of sire, milk production by its mother, etc.

High-scoring bucks are selected as breeders and low scorers are castrated and reared for sale for meat. Similarly, female animals with a history of healthy litters and good milk output are retained for breeding purposes. Selection of better performers for breeding improves the local gene pool with every successive generation. What's noteworthy about the programme is that marginalised communities are learning to achieve this by using data and technology.

Having healthier animals can make a life-impacting difference to families living on the edge. Shantaben Babubhai Gamar should know. A goat rearer for seven years, Ms Gamar is also a resident of Boradiyala village, with a herd of 55 goats, including male bucks, female goats and lambs. Before joining CBBP, Ms Gamar earned around ₹40,000 annually from goat rearing. That figure has climbed plenty since. “We sold seven goats and earned ₹110,000,” she says, “and that was a big income jump for us.”

“Women farmers learning to monitor and evaluate local goats is empowering for them,” says Sushmita Parai, the Tata Trusts programme officer with CBBP. “Equipped with skills and technology, these women are role models in the community.”

Having access to a local pool of good breeders means that the goat rearers don’t have to buy expensive breeding bucks from elsewhere. “Also, there is the likelihood of unknown breeding bucks falling sick, dying of disease or being unable to adapt to local climate and fodder,” explains Dr Parai. “Using bucks from a known database reduces this risk.”

To prevent inbreeding, CBBP has set up a process whereby breeding bucks are rotated among the villages. While breeding is the key, the initiative looks at holistic animal health as well. It encourages timely vaccination, regular deworming, and proper nutritional care. The larger intent is to improve the overall productivity and resilience of the herds.

CmF and CInI are, meanwhile, working with the communities to set up farmer-producer companies to further enhance their income. Money aside, the initiative’s social impact is significant. It empowers rural women with knowledge and technology and puts them at the centre of community livelihood creation. ■

By Gayatri Kamath



Basu Bai (left) is a *pashu sakhi* and a successful breeder as well

## Learning to flourish

**B**asu Bai, a tribal from Thandi Beri village in Rajasthan’s Sirohi district, started turning her life around in 2018 when she got two goats and decided to earn a little more by becoming a *pashu sakhi*. Six years later, she joined the community-based breeding programme (CBBP) run by the Centre for microFinance (CmF), an associate entity of the Tata Trusts. By that point, Ms Basu had learned about ear tagging, regular weighing, body measurement and how to select better breeding animals.

Her toughest challenge was entering data on the Dtreo app, using a tablet to manage the monitoring of the animal. “I refused at first. I have studied up to class 8 only and wasn’t sure I could do it,” she says. Those concerns were soon overcome as Ms Basu began gaining some useful expertise with training and support from the Nimbkar Agricultural Research Institute, the knowledge partner in the initiative, and the CmF team.

Ms Basu now manages the digital records of goats belonging to 215 households. She has challenged social taboos by understanding all about goats and breeding, even how to carry out castrations. Despite living in a traditionally patriarchal society, she has taken on the job, and this speaks of her resolve to have an identity of her own. Her family income has risen, from ₹10,000-₹12,000 a year from selling a couple of goats, to about ₹50,000-₹60,000 from goat sales and *pashu sakhi* services.

Ms Basu owns 12 goats and has established herself as a skilled and experienced goat rearer. Beyond her personal achievements, she has emerged as a beacon for change in her community. ■



# LIVELIHOODS LIFT

**T**he Northeast is known for its rich natural resources, a relatively literate population and climatic conditions conducive to agriculture. Despite these strengths, the region continues to lag, not least due to inadequate livelihood opportunities.

The Northeast Initiative Development Agency (NEIDA), an associate entity of the Tata Trusts, has been working to overcome this challenge while implementing its 'integrated livelihoods programme' (ILP), which is operational across Nagaland, Arunachal Pradesh and Mizoram.

NEIDA works closely with underserved rural communities to improve the incomes of village

folks and to diversify their livelihood sources. In its basket are multiple livelihood models, market-oriented agriculture, backyard piggeries, tourism ventures and more.

ILP emphasises the building and reinforcing of community institutions and the participation of women. The programme has reached 29,488 households across the three states, with 72% of these households now earning more than ₹100,000 a year.

Featured here are four success stories from Nagaland — covering four livelihood streams — that illuminate the difference ILP has been making. Written and coordinated by ***Keletsino Mejura***



(clockwise from facing page top) **A group of** potato farmers from Penkim village in Kiphire district. **Agri service** providers at a training session in Pungro village in Kiphire. **Women farmers** receive hands-on training in Tsupfume village in Phek district on planting young cabbage seedlings in soil beds.



## SOTUNO MEYASE — ECOTOURISM

## VENTURE WITH A VIEW

**S**otuno Meyase, a 50-year-old mother of three, runs the Sotuno Homestay in Dzuleke village in Nagaland's Kohima district. She and her husband, Letso, have been running the business since 2014, and it has never been on firmer footing. From getting the enterprise off the ground to making it a success, the Meyases have been backed all the way by the Northeast Initiative Development Agency (NEIDA).

NEIDA introduced its community-based ecotourism initiative in Dzuleke after identifying the village as a potential tourist hotspot. This was in 2014 and the Meyases, at that point, were primarily engaged in subsistence farming. In search of an alternative and sustainable source of income, they were prime candidates to cash in on NEIDA's ecotourism idea.

The homestay with which the Meyases got into business boasts two bedrooms, a spacious outdoor area and a welcoming environment for visitors seeking a peaceful retreat. Putting all these elements together has been a winning proposition for the family.

"I did not have any knowledge of how to run a homestay and was also hesitant," says Ms Meyase. "Then I began attending NEIDA's training sessions and that, not to mention the encouragement and support I



received, was instrumental in me developing my homestay — and in building my confidence."

She recalls attending training sessions in Kohima along with other homestay owners. They learned the ropes of the hospitality business, including housekeeping, hygiene and

preparing vegetarian and non-vegetarian food.

More than a decade later, the skills and knowledge she gained continue to sustain Ms Meyase's homestay. The income generated from it has helped her manage household expenses and support her children's education.



Sotuno Meyase (left) and images of the homestay that she and her husband, Letso, have made a success of

Today, all three of her children are working in Kohima, an outcome she attributes in part to the stability provided by income generated from the homestay.

It has not been an easy ride for Ms Meyase. “Communicating with tourists is difficult for me,” she says. “Fortunately, my husband can speak some English and Hindi, which helps. On days when we struggle to express ourselves, we communicate through gestures.”



The broader transformation in her village is a point that Ms Meyase emphasises. “Earlier, people here depended only on agriculture. But after the ecotourism initiative, many have diversified into running homestays and working as tour guides, in catering and with tourist information centres. These opportunities have enabled people to earn and contribute to the development of the village.” ■

## HUKHRULU KHAMO – AGRICULTURE

# FARMING FLOURISH

“I was motivated to join ILP [the ‘integrated livelihoods programme’] after attending a community meeting held in my village in 2025,” says Hukhrulu Khamo, a 45-year-old farmer from Lozaphuhu in Nagaland’s Phek district. “That’s when I first learned about the potential of diversifying into vegetable crops.”

Ms Khamo, a mother of three children, and her husband Vechizo rely primarily on agriculture to support their family, while also pursuing piggery as an additional source of income. The couple

owns five acres of land, where they cultivate a variety of seasonal crops, including cabbage, peas, beans, broccoli, potatoes, chillies and spices.

The Khamo household’s income in 2024 from farming was around ₹30,000. The meagre return was easily explained: limited access to quality seeds and inputs, unpredictable weather conditions, fluctuating market prices and financial constraints. The family was in dire need of a livelihood lift.

That’s what ILP and the Northeast Initiative Development

Agency (NEIDA), an associate entity of the Tata Trusts, have delivered for Ms Khamo.

A year of being in the programme has enabled the Khamos to pull in approximately ₹55,000 through farming. The additional income has made a meaningful difference, allowing Ms Khamo to pay for her children’s school fees regularly and bringing a measure of financial stability to her life. The family is now looking to expand into orchard farming.

Subsistence farming is a thing of the past for Ms Khamo, as it is for many in Lozaphuhu. ■



## PELENEINUO KHING — PIGGERY ENTREPRENEUR

## VILLAGE WAY TO GO

**P**eleneinuo Khing, 34, and her husband Gwahilo, 36, are piggery entrepreneurs from Gwachonlo village in Nagaland's Tseminyu district. The couple, who have a young son, previously lived in Kohima, where Mr Khing worked as a sales executive in a private company. With that not amounting to much, the family decided in 2024 to return home to their village. The hope was that they could find a better livelihood source, and that's how it has turned out.

Born and raised in Gwachonlo, Ms Khing has always felt a strong connection to her roots. "I have forever had an interest in livestock rearing, particularly piggery, since I grew up in a family that was involved in it," she says. Building on this interest, the couple decided to take up piggery as a full-time business.

That was in 2024, when the Khings began their entrepreneurship journey by purchasing seven piglets, six breeding sows and one boar. It was far from smooth sailing in the initial stages, though. With little exposure to modern piggery practices — sanitation measures, size of the breeding units, proper drainage systems, etc — meeting expectations proved problematic.

Joining the 'integrated livelihoods programme' being implemented by the Northeast



Ms Khing, seen here with her husband, has translated her interest into a business

Initiative Development Agency (NEIDA) was the turning point for Ms Khing. She received capacity-building support through training in piggery management practices, gaining a scientific understanding of rearing methods as well as sanitation and biosecurity measures.

Recognising Ms Khing's dedication and willingness to learn, NEIDA supported her with a mini-breeding unit in 2025. Since then, the Khings have steadily expanded their enterprise and they now own seven sows, one boar and 15 fatteners. The piggery business they had set so

much store by has become a reliable source of income.

As a member of the Nzon Nyegi Farmer Producer Organisation, Ms Khing benefits from access to pig feed at subsidised rates, timely delivery within the village and reduced input costs.

Looking ahead, Ms Khing hopes to further scale up her business by increasing the number of breeding sows, supplying piglets within her village and beyond, expanding her fattening units to better manage feed costs, and adopting artificial insemination techniques. ■

## HOTOI AND VONGTSUSHE — HORTICULTURE

## PLANTING TO PROSPER

**H**otoi, 60, and his wife Vongtsushe, 55, who hail from Pungro village in Nagaland's Kiphire district, have spent four decades working side by side on their two-acre farm while raising seven children. For

most of these years, farming was their only livelihood, providing less than enough despite plenty of hard work.

Like many others in their village, Mr Hotoi and his wife grew traditional crops, mainly for

their own consumption, with little knowledge of scientific agricultural practices or access to markets. "It was mostly subsistence farming," says Mr Hotoi. "Whatever little surplus we had did not generate much



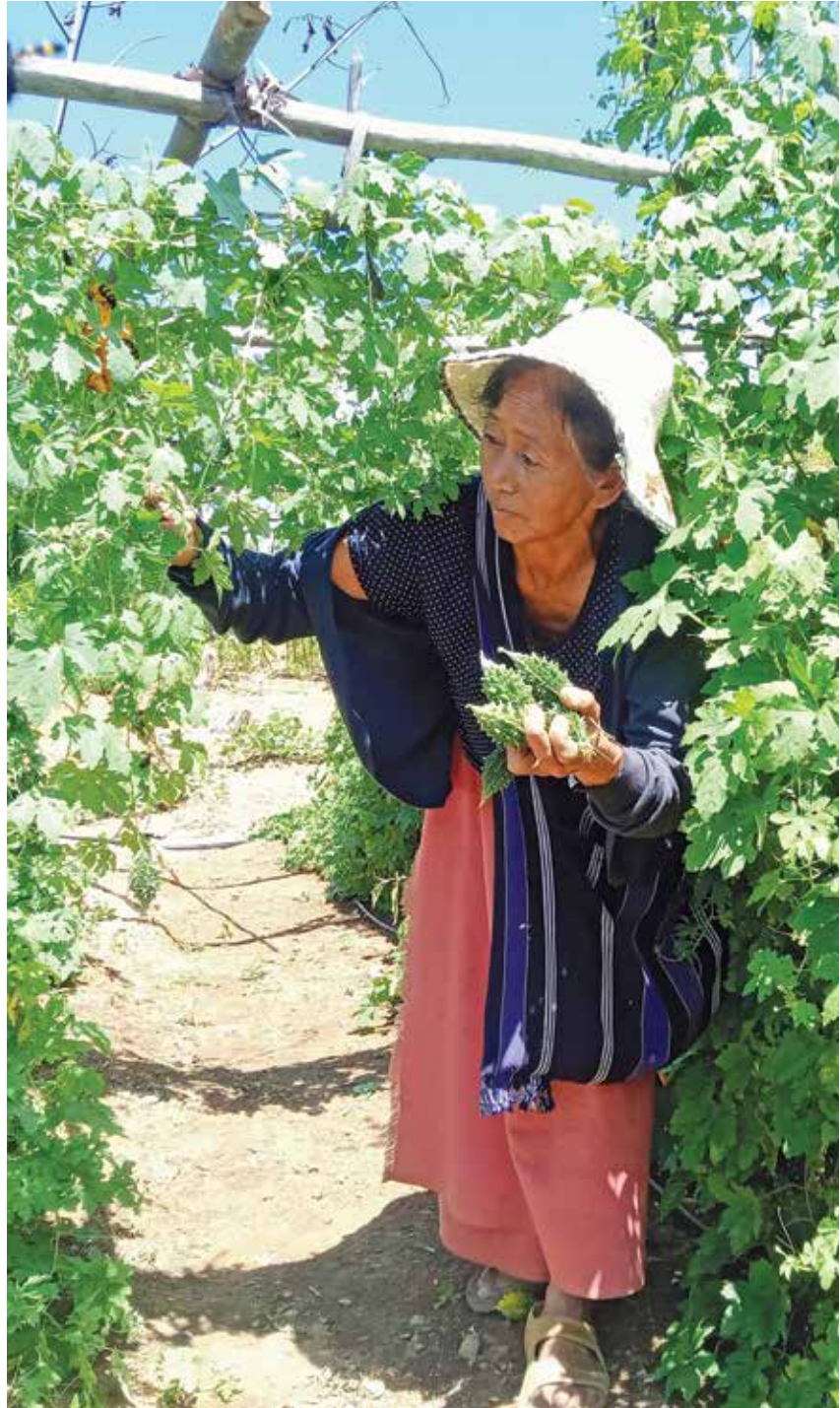
income, which made it difficult to manage household expenses and our children's education."

Then, in 2023, Mr Hotoi became part of the 'integrated livelihoods programme' introduced by the Northeast Initiative Development Agency (NEIDA) in their village. There was no hesitation on his part. "We wanted to learn modern farming techniques and become part of a group where we could grow and support one another."

Before the programme was introduced, farming in Pungro was mostly traditional and subsistence-based. Farmers primarily cultivated landrace crops, low in yield and grown for household consumption rather than sale. There was little awareness of, and exposure to, modern farming techniques. Agriculture was not viewed as a profitable activity.

Three years down the line, the scenario has been transformed, as have the lives of Mr Hotoi and his family. The shift to diversified farming and a market-oriented approach has enabled Mr Hotoi and Ms Vongtsushe to grow a range of vegetables and fruits. An enhanced income aside, they can have their fill of nutritious, home-grown food

"Our three years in the programme have resulted in a major improvement in our livelihood and in our overall financial stability," says Mr Hotoi, who now earns around ₹200,000 a year from farming. This steady income has helped him with his



Hotoi and Vongtsushe at their home (left) and Vongtsushe in her bitter gourd field

children's education and his family's other needs. The constant worrying about money has disappeared.

Mr Hotoi and Ms Vongtsushe have received awards for their efforts, but beyond the honours and the improved income, they

credit the programme with changing how they see themselves and their work. "I now see farming as a business rather than a means of survival," says Mr Hotoi. "I am more confident, more aware and more connected to the outside world." ■

# What's at stake for water's sake

Contrary to popular belief, India's water security crisis is not about scarcity — it is essentially a crisis of sustainability

India's water security crisis is not so much about a lack of the precious resource as it is about making the most of funds already allocated to ensuring its availability. A public financing study covering Markapuram in Andhra Pradesh, East Singhbhum in Jharkhand and Dahod in Gujarat has sought to unpack this phenomenon.

The study, conducted by a team of independent research consultants led by Raman VR and Amulya Miriyala, presents an important finding: the financing architecture needed to maximise the value of public investments in rural water infrastructure and make these investments work sustainably, is well within reach.

This article draws on field observations and public-finance analyses to examine how communities and *gram panchayats* (village councils) can leverage existing resources to address their water challenges.

India's water sector is funded through multiple schemes: the Jal Jeevan Mission (JJM), Finance Commission grants, employment-guarantee programmes, irrigation projects and various initiatives by state governments. This fiscal structure presents lucrative opportunities to pool resources and enable convergence.

However, the funding streams in the structure tend to operate in silos. As a result, the sector falls into a capital expenditure trap, even as critical lifecycle costs — maintenance, groundwater recharge

and institution strengthening — remain largely underfunded. The study shows that this can be corrected within the existing allocations framework.

JJM has achieved considerable coverage in terms of providing 'functional household tap connectivity' to rural communities. East Singhbhum records 420 solar cluster schemes, in Markapuram 75-85% of the populace has household tap connections, and Dahod has 513 operational JJM schemes. This is a substantial base from which communities can work.

## Reliability in functionality

The challenge here is functional reliability. East Singhbhum's solar power systems operate at 50% reliability. The financial and institutional mechanisms required to maintain these structures are not particularly complex. The study identifies exactly where to start, and the good news is that improving functionality does not require more capital expenditure.

The study indicates a capital expenditure trap, where visible infrastructure dominates while lifecycle costs remain grossly underfunded. Provisioning for operations and maintenance (O&M) is just 35-45% of requirements in Markapuram, 35% in East Singhbhum and 20% in Dahod. This is not in direct alignment with guidelines, which mandate annual O&M spending of 10% of scheme cost.

There are real consequences to this.



**Kavin Malini**, who has a background in economics and sociology, is with the analytics, insights and impact division of the Tata Trusts



Nonfunctional or partially functional systems, motor failures, unrepaired distribution leakages, and solar systems that do not deliver a reliable supply are all outcomes of insufficient O&M funding. In Markapuram, the *gram panchayat* diverts 15-25% of its maintenance budget from preventive work to address reactive demands to ensure effective service delivery.

Plugging this gap does not require new allocations. The Finance Commission component, if ring-fenced for O&M rather than capital works, could reduce the annual deficit in the district's O&M requirement.

Institutional architecture for community water governance comprises village water and sanitation committees (VWSCs), *jai sabhiyas* (community water volunteers) and self-help groups (SHGs). While these institutions exist in a formal sense, their operational authority requires further strengthening, particularly with training, remuneration and financial autonomy.

There is immense untapped potential in existing organisational capacity that can be directly connected to water governance. Bavka village in Dahod has 14 women's SHGs with effective financial management capacity through dairy cooperatives. But none of these SHGs currently hold formal positions in VWSC functioning or tariff collection. Linking them would immediately strengthen both institutions.

Similarly, the *jai sabhiyas* of East Singhbhum are community-rooted, water-focused entities who, with the right tools and remuneration, can anchor local water governance in ways no external agency can.

Composite gender and social inclusion scores indicate how much room there is to improve (Markapuram scored 1.37 out of 5 and Dahod 1.4). Making women the majority in VWSCs — as JJM guidelines already require — would bring the most knowledgeable water users into governance. Tariff collection, currently almost absent,

A water user group in Upla Kolwada village in the Pali district of Rajasthan

becomes far more feasible when managed by trusted community institutions.

The drudgery borne by women in the matter of water is amplified by the system's failures. Across all three districts, women remain primarily responsible for fetching water. In Dhadkibani village in East Singhbhum, women report spending 45-60 minutes each day collecting water during outages. This is time that would otherwise go towards agricultural activities, care work and income-generating activities.

The burden increases significantly for tribal women, who experience multiple intersecting forms of vulnerability. Markapuram's tribal households, with smaller landholdings and limited savings, face greater exposure to borewell failures and seasonal migration.

### System and source

Dahod, a predominantly tribal district, has Gujarat's 'tribal sub-plan', allocating ₹49-₹74 crore per year for the district. This creates an opportunity for *gram panchayats* to improve the functionality of their systems and ensure source sustainability.

The social cost of failing rural water infrastructure falls disproportionately on women and marginalised communities. Redirecting resources towards where they are most needed is, therefore, both a financing reform and an equity-centred imperative.

One of the key findings of the study is that sustainable water security can be achieved within current fiscal allocations. The path forward calls for three interventions that *gram panchayats* are well placed to champion.

The first involves ring-fencing O&M funds through dedicated accounts at the village level. The second involves operationalising VWSCs as functional bodies with bank accounts, regular transfers,

a formal integration with SHGs for tariff collections, and ensuring a majority of women members. The third involves establishing convergence mechanisms to integrate different funding streams.

MGNREGA, the central government's job-guarantee programme, already directs 47% of its works budget to natural resource management in Markapuram. This is a ready entry point for aquifer recharge investments. The source sustainability window of 5-10% of the scheme cost for recharge can be activated through *gram panchayat*-level advocacy. These are administrative decisions; they do not require new capital.

Civil society organisations (CSOs) are uniquely positioned to support communities and *gram panchayats* in realising these opportunities. That includes facilitating the shift towards lifecycle-oriented financing, supporting community-led aquifer budgeting, and building the capacity of *gram panchayats* to absorb and deploy available funds.

The study's analytical framework combines lifecycle costing, eGramSwaraj public expenditure data, and gender-equity social inclusion analysis. It is designed as a replicable tool that CSOs can use with district and block-level administrations.

The 'integrated financing gap matrix', developed in all three districts covered by the study, provides *gram panchayats* with a structured way to identify which funds are available, which are underutilised and where O&M investments will have the best impact.

Strengthening institutional commitment among authorities to align fiscal resources with sustainability and equity goals is essential. Importantly, investments have to be accompanied by adequate maintenance, empowered institutions and effective governance frameworks. Sustainable progress depends not only on creating infrastructure or systems, but also on strengthening long-term capacity and accountability. ■



