TATA TRUSTS

JUNE 2025

HORIZONS

GREEN GAINS

Small and marginal farmers are at the heart of multiple efforts by the Tata Trusts to help make agriculture a paying proposition

WATER WISDOM

More than 20,000 households in Rajasthan are learning the value of handling the elixir with care

A BIGGER BASKET

A wide-ranging livelihoods initiative in the Northeast has provided liftoff to commoners and communities

INTERVIEW

Social scientist Gita Sen examines the “wicked problem” of gender in India and what can be done about it

EDITORIAL

The term 'farm distress' is always close at hand in any discussion about Indian agriculture, which accounts for about 18% of the country's GDP and employs more than 40% of its workforce. There are positives here for sure: the farming sector has averaged 5% annual growth since 2017; foodgrain output has reached record highs; exports exceed $50 billion a year; and we are a global leader in the production of milk, pulses and spices. On the downside, Indian agriculture faces a range of challenges, from water scarcity and climate change to fragmented land holdings and falling incomes.

Small and marginal farmers are the worst hit by these weaknesses, and that's the constituency the Tata Trusts have been concentrating on with their endeavours to help enable the agriculture sector. Roughly 85% of our farmers are classified as small and marginal, which means they possess less than 2 hectares of land. They need technology, they need water resilience, they need links to markets, they need allies in the battle against climate change, they need modern farming know-how, and they need friends. Our cover story illustrates how the Trusts are working to fulfil these needs through a variety of programmes in different states.

This edition of *Horizons* also features stories on a comprehensive water security initiative in Rajasthan that has benefitted 20,000-plus households, a skilling push to provide jobs in the textiles hub of Tirupur in Tamil Nadu, and an effort to support villagers left homeless by the cloudburst that ravaged Himachal Pradesh in 2023. Our showcase section — where images do the storytelling — is about an extensive livelihood project in the northeastern states of Arunachal Pradesh, Mizoram and Nagaland, and the difference this has been making for those in its comforting embrace.

In the realm of perspectives, analyses and ideas, we have social development expert Gita Sen explaining the appalling reality of gender inequality in India — and what we can do to stem it. Then there's Dr Mammen Chandy, former head of the Tata Medical Center, Kolkata, blending the personal and professional in a close look at the 'emperor of all maladies'. Not least, there's Maja Daruwala and Valay Singh on the India Justice Report, 2025, a remarkable attempt to track and treat the country's justice delivery system.

Chistabelle Noronha

We hope you will help us make Horizons *better with your valuable feedback. Please do write to us at horizons@tatatrusts.org.*

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SHOWCASE

BY INVITATION

PERSPECTIVE

Cover image
Dhani Devi at her *rajma* farm in Nirtoli village in the Pithoragarh district of Uttarakhand

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A family in Mathavada village in Gujarat's Bhavnagar district that has benefitted from using solar-powered irrigation

Farmers in the frame

Irrigation, crop yields and falling incomes are vexing challenges for India's smaller-sized farms. Making farming sustainable is essential for a nation where two-thirds of the population is engaged in agriculture. The Tata Trusts have rolled out a barrage of initiatives — backed by an armoury of knowledge, technology and tools — to help India's farmers transform the way they work and earn.

In Gujarat, farmers have been drawn into *samvaad* (dialogue) and action on water management techniques. In Uttar Pradesh, farmers are finding new ways to grow vegetables profitably. The sun plays hero in Maharashtra, where goat farmers have shifted to growing better fodder for their herds. Pulses take centre stage as a valuable crop in tiny farms set on Uttarakhand's hilly slopes.

With support from the Trusts, these small farmers are learning to future-proof their livelihoods. By Gayatri Kamath and Philip Chacko

A plus for pulses

Small farmers are the focus of 'mission pulses', an example of collective agriculture that has lifted nearly 30,000 households in Uttarakhand

Munsyari, a small region in the Pithoragarh district of Uttarakhand, is known as the home of the Munsyari *rajma* (kidney bean). So popular is this variety of bean that it has a Geographical Indication (GI) tag — a sign used on products that have a specific geographical origin — much like Darjeeling tea or Guntur chillies. And these beans are transforming the lives of thousands of cultivators with small plots of land.

Munsyari *rajma* is the reason Dhani Devi, a 55-year-old farmer from Nirtoli village in Uttarakhand's Pithoragarh district, has been able to double her income over the last five years. Lending her a hand has been 'mission pulses', an initiative run by Himmotthan Pariyojana, an associate organisation of the Tata Trusts.

Harvesting rosemary in Uttricha village in the Pauri Garhwal district of Uttarakhand

Farm-to-market chain

Himmotthan works with underserved communities in Uttarakhand and 'mission pulses' is a standout example of how it does this. The mission has set up a farm-to-market chain that reaches nearly 30,000 households in 500 villages. These are mostly small farmers earning a meagre livelihood, with an average farm size of less than an acre.

The Himmotthan team has spent five years getting its equation right with 'mission pulses', educating and training farmers about better varieties of pulses and best practices in cultivation and harvesting, while also providing market linkages for their produce.

Pulses were chosen as the key crop because they grow well in hilly, rain-fed regions. Apart from Pithoragarh, the project area covers villages in the Uttarkashi, Bageshwar, Tehri Garhwal, Pauri Garhwal, Almora, Dehradun, Nainital and Chamoli districts. "The unique climate and terrain of these regions make them ideal for pulses farming," says Rajendra Koshyari, an area project manager with Himmotthan.

To identify the farmers most in need of support, Himmotthan conducted a survey in 2018. This

Chamomile charms

While pulses and vegetables are a big part of 'mission pulses', the programme has also worked to train agriculture entrepreneurs willing to go the extra mile. One such budding spark is 29-year-old Priyanka Negi, who lives in Uttricha village in Uttarakhand's Pauri Garhwal district.

Ms Negi used to look after her home and help out with the paddy and wheat crops her family cultivated. Losses were frequent due to the damage caused by animals, pests and crop diseases. The farm income was inadequate for her household of six and Ms Negi had to supplement the family earnings by doing manual labour.

Joining the mission in 2021 changed Ms Negi and her world. Armed with know-how and support, she branched out to set up a nursery, growing chamomile, rosemary, radish, garlic, onion, chili, potato and millet. And the best of this lot? "Chamomile is the most profitable crop," she says.

Ms Negi has been trained in plenty of agricultural aspects, including cultivation, harvesting, processing and the marketing of produce. "Himmotthan has enabled me to participate in training programmes and nursery management techniques," she adds. "I learned how to market my produce locally and connect with buyers interested in herbal and organic products."

Ms Negi now earns up to ₹100,000 annually by selling chamomile flowers and seeds, rosemary leaves and seedlings, and high-value seasonal vegetables. "The nursery has brought financial stability into my life," she says. ■

provided a baseline understanding of geographical and socioeconomic conditions. The exercise helped identify 12 clusters of villages with a high concentration of families living below the poverty line.

Himmotthan then engaged with local communities to understand existing practices and what the farmers needed. Local offices were set up, with field staff interacting directly with farmers. Pulses were already on the menu: locals typically grew *rajma,* black and white soya bean, rice bean and the like alongside wheat, rice and potato.

'Mission pulses' has focused on encouraging farmers to change age-old practices and move to newer methods. These include adopting high-yield and disease-resistant varieties, changing cropping patterns and improving pest management.

In the initial phase, some 6,000 farmers were encouraged to make *rajma* their star crop. Convincing the farmers to change was a challenge. The Himmotthan team consulted local community leaders and farmer groups to determine which interventions would be most helpful in a given location.

Thereafter, it employed a systematic and layered strategy that comprised substantial capacity building through the setting up of self-help groups (SHGs), cooperatives and community resource centres. There are now a dozen women farmer cooperatives in the programme and about 550 village-based farmers groups.

Multiple training

programmes, regular monitoring, follow-up sessions and feedback mechanisms have enabled the building of trust with the community, while ensuring that the inputs delivered are relevant to the needs of the farmers. Setting up a network of community institutions has bolstered the sustainability component of the initiative.

All of these measures have been a boon for the farmers. Average annual income from agriculture has more than doubled from the 2018 baseline (from ₹12,000 to ₹38,159). The income increase has been higher in households cultivating *rajma* crops, which have registered a 79% increase in yield and a six-fold rise in profitability.

Learning the lot

Ms Dhani is one of those farmers. She now grows *rajma,* amaranthus, potato and vegetables on her 2-acre spread and the shift happened after she joined the mission. "I have learned about modern agricultural techniques, about farmer producer groups, financial management and market access," she says.

Ms Dhani was trained in better production practices such as bio-composting to improve soil fertility, in sourcing superior onion seeds, and in using vertical nets for *rajma* cultivation to optimise space and yield. Himmotthan helped with the installation of a water tank for irrigation. Beekeeping is another skill that Ms Dhani has picked up.

Having joined the programme in 2018, Ms Dhani's annual earnings have doubled from ₹75,000 to ₹150,000. "We have been able to educate our children in better schools," she says. "Two of our children have graduated and our daughter is married. Also, we have opened a small store in our village."

A critical component of 'mission pulses' has to do with market linkages. In 2016, Himmotthan set up the Trishulii Producer Company as an apex body to market agricultural products cultivated by small and marginal farmers from across Uttarakhand. With more than 4,000 members, Trishulii is involved in value-addition processes that increase farmer incomes.

The organisation, which forms the last link in the farm-to-market chain set up by Himmotthan, coordinates closely with farmer groups, aggregates produce and ensures quality standards, turning small-scale agriculture into a profitable venture.

Trishulii has an annual turnover in excess of ₹20 million and has evolved into a recognised brand, with its products being sold to local retailers, institutional buyers and e-commerce sites (in August 2024, Trishulii launched its Munsyari *rajma* on Amazon).

The going, and the growing, has been good for 'mission pulses', and the future holds the promise of further gains for small farmers at the heart of the effort. ■

A woman farmer from Barbatana village in Amreli district

Rural blend powers agricultural advance

More than 24,000 villagers in Gujarat have made hay while banking on superior farming techniques, with water at the heart of the effort

'Socially I feel more connected with my fellow villagers," says Popat Govind Solanki of the community cohesion fuelling the well-being of a farming-focused livelihoods programme that has sustained him splendidly for the past two years.

"I came into the programme after attending a village meeting where we were told about improved agricultural practices and water conservation," adds Mr Solanki, a 54-year-old farmer from Belada village in Gujarat's Bhavnagar district. "The regular interactions and field visits [in the initiative] have broadened my understanding of sustainable farming, resource management and, importantly, the benefits of community-based development work."

Groundnut, soyabean and mustard are part of the family produce basket for Mr Solanki, one of more than 24,000 farmers who have gained from a project that has grown roots in about 200 villages spread across the regions of Talaja, Rajula and Jafrabad in the districts of Amreli and Bhavnagar.

The 'sustainable agriculture management and water resources development programme', seeded and implemented by the Coastal Salinity Prevention Cell (CSPC) and the Tata Trusts, comes under the canopy of *Samvaad (*dialogue). *Samvaad* serves as the framework in Gujarat for the Trusts and their partners, among them CSPC, to engage with communities, foster collaboration and drive social change through interventions in spheres such as livelihoods, education, and water and sanitation.

The big picture is substantial but it is on the ground and in the field that this extensive effort finds vivid expression. Mansukh Madhabhai Makvana is an example of what the programme has delivered. Mr Makvana has a

family of 10 to care for, including his wife and two children, and traditional agriculture would not have enabled him to manage that adequately. Joining the programme proved a blessing for this 56-year-old farmer from Unchadi village in Bhavnagar.

Mr Makvana cultivates *bajra* (pearl millet), cotton, sesame, vegetables and fodder in his 1-acre spread. His expertise in the business has been buttressed by knowledge garnered through the initiative's training modules, by technology inputs and advanced farming methods. Wholehearted support from the programme team has also helped.

Tremendous boost

"I have benefitted tremendously since joining the programme two years back," says Mr Makvana. "I now have a laser irrigation system, vegetable kits and pheromone traps (to handle pests). I have learned about improved farming techniques, animal husbandry, pest and disease management, soil health and the criticality of water-efficient systems."

Mr Makvana remembers a time when advances of the kind were rare in his village. "Before the programme began our village had limited knowledge of sustainable farming practices and water usage. That has changed. Desilting and repairing our check dam has led to improved water storage and water availability. In fact, the success of the water resources work in Unchadi has inspired nearby villages to take up similar projects."

Planting progress

The 'sustainable agriculture management and water resources development programme' at a glance:

- **The protagonists** — More than 24,000 farmers from about 200 villages in the subdistricts of Talaja, Rajula and Jafrabad in Gujarat's Amreli and Bhavnagar districts
- **The canvas** — Optimal water usage and water conservation; improved farming practices; soil health; and animal husbandry
- **The gains** — Farmers in the initiative can expect a 20-25% increase in annual incomes

Water or, rather, its scarcity was what prompted Ramji Premji Tadha to enroll in the programme. A 44-year-old native of Thaliya village in Bhavnagar, Mr Tadha has a relatively large land holding — 10 acres — on which he grows groundnuts, sesame, onions and *bajra*. Getting to better understand the lay of his land and how to maximise its output has kept Mr Tadha in fine farming fettle.

"We were introduced to various water-recharge activities in our village and we were taught about the importance of water conservation," he says. "Thanks to all the work done, we now have water available across all three cropping seasons. And I've got recognition and respect in my community for being involved in water-related work."

Water is also the principal concern for Paresh Dhanji Panot in a state where the elixir is forever in short supply, for reasons that range from rampant overuse and climate change to salinity ingress. A 35-year-old farmer from Ragon village in Bhavnagar with 7 acres of land,
Mr Panot is in a better place than most of his compatriots in the state and he is quick to acknowledge the role the programme has played in making that happen.

Says Mr Panot: "I have learned so many valuable lessons: the vitality of micro-irrigation systems, how to manage soil health, when and how much to irrigate, and how water quality affects crop yield. This programme has brought positivity to our community.

"People from nearby villages now approach us with curiosity and admiration. Their interest makes me realise that this initiative is not just about helping individual farmers like me, but also about spreading awareness and motivating others. This programme has opened my eyes in multiple ways."

Launched in 2017, the current

phase of the initiative has a host of partners backing it, among them HDFC Bank, DMart and Ernst & Young. Water is the most important piece in the programme, which also includes sustainable agriculture, soil health and animal husbandry.

Meetings, training sessions and field visits are a common feature of the programme. The wider matrix has in its fold water conservation, micro-irrigation and the rejuvenation of water structures; farming inputs, high-yielding crop varieties and horticulture plantations; vermicomposting, and soil-health monitoring and improvement; and a slew of livestock enhancement activities aimed at upping incomes from dairy farming.

A farmer from Kotdi village in Amreli district measures the soil moisture of his field

'Water is of the essence'

"We have concentrated on livelihoods and agriculture — and water is of the essence to both," says Meghal Soni, a senior programme manager with CSPC, established jointly by the Tata Trusts, the Aga Khan Rural Support Programme and Ambuja Cement Foundation in 2008. "In this context, demand-side management is more important than supply-side management. Because no matter how many water structures you build and how much water you conserve, these will not do any good unless you work on the demand side."

That means farmers and what they do with the limited amount of water they can access. "Farmers are using too much water and wastefully so," adds Mr Soni. "The thing is, you have to manage demand to reduce the overexploitation of water. We have water-usage groups and they comprise 12-15 members. Managing water usage, water conservation and water structures in their respective villages is the responsibility of these groups."

On the supply-side front, 744 water structures have been constructed under the programme over the past five years and this caters to the irrigation requirements of some 5,000 farmers. About 65MCFT (million cubic feet) of water storage capacity has also been created. On the demand side, nearly 7,000 farmers have committed themselves to sustainable water use.

The programme gets local *panchayats* (village councils) and village elders involved before kicking off any intervention. Says Mr Soni: "Typically, 5-10% of villagers understand things quickly but, yes, it takes time to build a rapport with them. Once that happens progress is quick."

Farmers who go all in with the programme can expect a 20-25% increase in annual incomes, and the money earned will keep increasing as they get further embedded in it. What about the sustainability factor? "We need an average of five-six years of continuous work in a village to make it self-sufficient," says Mr Soni. "That's when we can think of exiting."

Mr Makvana may be on the cusp of such self-sufficiency. "I hope to continue improving my farm productivity through new techniques," he says. "I want our village to become self-supporting in water and agriculture."

"This programme has shown us what is possible," says Mr Panot. "Migration has decreased and people are now more interested in staying and working within the village. There is this shared feeling that development is possible when we work together. I believe my village

Crop and reap

In excess of 100,000 farming families in Uttar Pradesh will reap the benefits of improved agricultural practices through Sujalam Sufalam

Buying a car is a dream for India's marginal farmers. That's why when Savitri Devi's family managed to save enough to buy a second-hand version there was elation in the household. Better times would follow. Ms Savitri converted her hut into a proper brick-and-cement house and, soon after, put together enough money for her daughter's wedding.

These milestones were reached after Ms Savitri and her family became part of the Sujalam Sufalam programme in 2019. Seeded and supported by the Tata Trusts, Sujalam Sufalam translates into 'clear water, good fruit'. It has certainly borne fruit for Ms Savitri, raising her family's annual agricultural income from about ₹50,000 to more than ₹120,000.

Propelled by the objective of doubling farm-based incomes, Sujalam Sufalam covers 100,000-plus farming families in 457 villages in the eastern Uttar Pradesh districts of Balrampur, Bahraich and Shravasti. The villages in the programme are blessed with the fertile soil of the Gangetic-basin flood plains. The promise of agricultural development is high, yet the region is prone to endemic poverty.

Rakesh Singh, programme manager for Tata Trusts' rural upliftment portfolio, offers one explanation: "Many of the farmers here have small landholdings. This becomes a bottleneck for mechanisation and prevents them from fully realising the income potential of traditional crops like wheat and paddy."

Sujalam Sufalam addresses this issue, as also the exploitation that farmers face due to a lack of knowledge about market demand and crop prices. Adds Mr Singh: "They are often cheated by traders on the weight of their produce and they struggle to get fair margins from traders. The existing value chains are highly disaggregated and informal."

Sujalam Sufalam, which commenced in 2019 is designed to be an intensive intervention that works as an enabler for the households under its canopy:

Vegetables flourish in the agricultural farm of Geeta Maurya (left) in Naya Nagar village in Balrampur district

'Zero-tillage wheat' has proven to be a sustainable crop for Shivram Maurya at his farm in Naya Nagar in Balrampur district

60,000-plus in Balrampur, 20,000-plus in Shravasti and 20,000-plus in Bahraich. About 80% of this target group have landholdings of less than 2.5 acres and annual incomes under ₹30,000.

The numbers in the programme are a help when it comes to developing a value-chain approach to marketing produce, and it attracts multiple stakeholders.

Higher-value crops

The Trusts team got going by convincing farmers to add high-value crops to their mix: pulses in the *kharif* season (June to October); maize and mustard in the *rabi* season (November to March); and sugarcane, groundnuts and beans in the *zaid* season (March to June). Also in the farming basket are potatoes, onions and vegetables.

"The crop combination has been prepared keeping in mind soil conditions and allelopathy, the process by which plants and microorganisms influence one another," explains Mr Singh.

Mechanisation was introduced and this was a game changer for the farmers involved. The farmers were educated on best practices by community resource persons and the Trusts teamed up with NGOs with feet on the ground to drive training in soil health improvement, fertiliser and pesticide use, cropping intensity, water conservation and micro irrigation.

Selling their produce at a fair price is always a challenge for India's small farmers. The Trusts team has met this challenge by trying to ensure that small farmers get the minimum support price (MSP) promised by the government. Furthermore, market access has been enhanced through the setting up of farmer producer companies (FPCs). The team also trained 290 local youth as agriculture entrepreneurs. These youngsters now provide doorstep services to farmers and FPCs.

These moves have fetched dividends. FMCG behemoth ITC,

Farming fine

The 'sustainable agriculture management and water resources development programme' in a nutshell:

- Covers 100,000+ households in 457 villages in the districts of Balrampur, Bahraich and Shravasti
- Introduces small and marginal farmers to high-value crops and a clutch of improved agricultural practices and processes
- The aim is to double annual household income from farming
- 80,000+ households have benefited from the initiative
- Farmer producer companies in the programme had a turnover of ₹20 million in 2023-24

the multi-business conglomerate, has come on board to buy cereals from the farmers at higher-than-MSP rates. Meanwhile, the FPCs have managed to increase their turnover to ₹20 million (2023-24).

The more visible change is at the individual farm level, with Sujalam Sufalam influencing what and how farmers grow. An example is Geeta Mourya, whose family of 13 survives on the income from a 2.4-acre farm in Naya Nagar village in Balrampur.

Farming culture changes

In 2019, before she became a part of Sujalam Sufalam, Ms Mourya's farm had paddy, wheat, sugarcane and a few vegetables. "The quality of the produce was not good and insects and weeds were a constant menace," says Ms Mourya, whose farming fortunes took a turn for the better after her Sujalam Sufalam training.

Ms Mourya now grows four crops in the same field, saving on fertiliser and water, and vegetables are of a quality that net her a higher income. As a result, her annual farm income has jumped from ₹96,000 to more than ₹200,000. The money has been put to good use. Ms Mourya has invested in a solar pump for irrigation and she has renovated her family home.

Sujalam Sufalam has had a ripple effect that goes beyond farming. "We see our farmers building concrete houses and buying vehicles, and they also say that they have more respect in the community," says Mr Singh. ■

Veggie way forward

Mamta Maurya (above) wanted a proper house to live in, not the thatched hut she came to when she got married in 2011 and arrived at her husband's village, Muravan Purwa, in Bahraich district. A portion of the hut was cemented, and that's where all 11 members of the family would sleep.

Ms Maurya and her husband own a 0.3-acre farm plot. "It was not enough to support our family. I wanted a better life for my three children," she says.

The pathway to the better life Ms Maurya craved opened up in 2020 after she attended a meeting organised by the Tata Trusts and its NGO partner Trust Community Livelihood (TCL). "The meeting included many village elders and the talk was about growing vegetables to increase our income," says Ms Maurya. "I listened carefully and understood the possible benefits, and I convinced my husband that vegetable farming was the way forward."

With the help of the TCL-Tata Trusts team, the Mauryas installed a net house and started growing radish, spinach, cauliflower and cabbage. "The net house helped us grow good-quality vegetables and we kept adding to our produce list."

The couple soon realised that selling directly to customers would be more profitable, and they opened a vegetable shop. Soon after, the Mauryas ventured into dairy farming, which brought in a steady income, manure for the farm and fuel for their biogas stove.

All of this has brightened the world of the Mauryas. "Our kids go to a good school, we eat better, wear nicer clothes and we have even bought a motorcycle," says Ms Maurya. "We have Rs50,000 left to repay on the loan we took for the motorcycle, and we hope to clear that soon." ■

Amruta Valvi at her goat farm in Jamana village in the Nandurbar district of Maharashtra

Funky fodder

Livestock farmers in Maharashtra and Gujarat are capitalising on an uncommon method to improve their herds and increase their incomes

The summer sun in interior Maharashtra brings with it a searing heat that scorches the land. For 30-year-old goat farmer Amruta Chetan Valvi, the hot season presented two challenges: keeping her herd of goats fed and healthy when open grazing was not an option, and securing fodder to make this possible.

With water becoming scarce in the summer months, Ms Valvi and other livestock farmers in her village — Jamana in Maharashtra's Nandurbar district — were starved of the scarcest of resources.

Ms Valvi had about 20 goats and they were a vital source of income. Earnings from the sale of milk and meat helped sustain her family of five through the year, especially during the months when there was no income from crops.

The problem was that every summer the adult goats would lose weight and the quality of the milk would dip, and with it Ms Valvi's earnings. Then, in May 2024, Ms Valvi became one of the first goat herders in the region to change the way she reared her livestock. Instead of bemoaning the sun, she harnessed its energy by utilising solar-powered hydroponics to produce fresh and nutritious fodder for her animals.

Hydroponics is a technique of growing plants in a water-based nutrient solution rather than soil. The solar hydroponics idea was brought to Ms Valvi's village by Collectives for Integrated Livelihood Initiatives (CInI), an associate organisation of the Tata Trusts that works with rural and tribal communities.

The hydroponics technology is part of the Trusts' larger 'Lakhpati Kisan' initiative, a multi-pronged effort to increase the incomes of

rural and tribal farmers from agriculture and animal husbandry. To support small and marginal farming households dependent on income from livestock — and to understand how a wider programme could unfold — CInI has rolled out the hydroponics solution in 50 villages in Gujarat, Maharashtra and Rajasthan.

The solar hydroponic technique provides a solution for the year-round availability of quality fodder. Says Sachin Choudhari, a livestock expert with CInI: "The need of the hour is to make livestock rearing more sustainable. Farmers need such pathways to build climate resilience and self-sufficiency."

Hydroponic fodder supports Reshiben Prabhubhai in running her small dairy farm in Matarvada village in the Sabarkantha district of Gujarat

Fodder culture

The hydroponics unit is easily adopted. Solar energy is used to draw water from wells. Fodder grains such as maize are grown in minimal water in large racks of plastic trays. The hydroponics system transforms 1kg of maize or wheat seeds into 7-8 kg of green fodder within 10 days.

To feed a herd of 20, a goat farmer needs a rack of 48 trays. With the right planning on how to sow and rotate the trays, a farmer can get a regular supply of nutritious fodder. This is a far better feeding option than its alternatives, crop residue or grazing on open land. [CInI also has a model of 24 trays for farmers with smaller herds.]

The solar hydroponic method offers several advantages. The labour and time involved in growing fodder crops or grazing a herd are reduced considerably. The amount of water needed is low and farmers can also save on having to buy fodder from the market.

There are other benefits as well. Maize is high in protein and easily available. Eating homegrown produce reduces the risk of goats consuming plants that could be toxic, a common cause of death in rural areas. Instead, the herds get a regular source of high-quality feed that improves their health and keeps lactation high.

The resulting improvement in the weight and health of goats and their kids has a direct impact on income gains — up to 25% — down the line. This increase in income is also because of the demand for quality goats and kids within the project area.

There is a wrinkle here, though. The costs attached to solar hydroponics can be a deterrent for marginal farmers. A 48-tray rack costs around ₹43,000 and this yields about 60kg of fodder daily. The solar component costs around ₹38,000, but farmers can opt for manual watering instead.

"For marginal farmers and poorer households, financial support often comes through loans from local self-help groups, family members or their farmer producer company," says Mr Choudhari.

The cost factor aside, Ganesh Neelam, CInI's former executive director, is upbeat about the positives of the project. "Solar hydroponics is a solution that is both climate- and farmer-friendly," he says, "This intervention has outcomes beyond farmers and herds. It makes green and nutritious fodder available around the year, it saves on water usage, builds climate resilience and it also helps reduce the pressure on forest resources."

The farmer-friendly facet is what appeals most to Ms Valvi, "Earlier, we were dependent on conventional fodder and summers meant scarcity as well as water stress," she explains. "It's different now. The weight of our goats has

Gamar Niraben Vinodbhai has set up a 48-tray solar hydroponics unit at her home in Sandhosi village in Gujarat's Banaskantha district

gone up, their lactation levels are on the rise and their overall health has improved. I have a herd of 22 goats at present and I'm planning to double their number."

While the intervention has been chiefly used for goats so far, Mr Choudhari says that the solar hydroponics equipment will work just as well in upping animal health and milk production.

Rolling out anything new is always a challenge in rural reaches. With the solar hydroponics solution, farmers have complained about cloudy skies (during the monsoon season) affecting the output of their solar panels. Additionally, the racks need protection from heavy rains and the trays need to be checked regularly to ensure that fungus and worms are kept away.

CInI works on engaging and training farmers to deal with these issues. It conducts hands-on training in operations and maintenance along with a local technology partner. Farmers who have already adopted the solution — Ms Valvi, for instance — are brought in to share their experiences.

From the community perspective, the adoption and management of, and investment required for, any new technology is dependent on returns. If income increases are a certainty, then the new technology will be more than welcome.

The success of the hydroponics intervention has prompted the Tata Trusts to expand the solution to other regions where farmers need a helping hand to boost incomes. And the roadmap for the future includes villages in Karnataka, Uttar Pradesh and Rajasthan.■

A water security planning workshop in Balda village in Sirohi district

Water wisdom fuels a world of change

Water is the most valuable of resources and its optimal use is vital in every way — that's the learning absorbed in overflowing measure by 20,000-plus households in 350 'water-secure' Rajasthan villages

Think 'budget' and what comes to mind are finance ministers, grand pronouncements and endless analyses. Not so for Shaitan Singh Songira, whose understanding of what the word means is of recent vintage, and a bit different from the norm.

A 44-year-old farmer from Kambhal village in Rajasthan's Sirohi district, Mr Songira sees budget and budgeting in terms of water: how much of it he can access and use, what conditions will ensure its continuing availability, and why being prudent about it now and in the future is best for him, his family and his community.

"We had never heard of a budget, let alone a budget in the context of water," says Mr Songira. "Then we did a water budgeting exercise and that's when we realised the situation we were in: we did not have enough water and we were being wasteful with what we had. We were using more than 80% of our water for farming, our water

Participants raise a cheer after a *pani mitra* (water friend) workshop in Abu Road in Sirohi district

systems were inadequate and inefficient, and the quality of the water was not good enough."

There is a water committee in Mr Songira's village now and he is its president. That gives him a better perspective than most on the ebb and flow of the precious liquid. "Where there is water, there is life," he says. "There are shortcomings in our village but we are on our way to removing them. The more we come together and work as a community, the greater will be our chances of development."

The change in their approach to water began happening for Mr Songira and his fellow villagers with the implementation of a 'water security programme' in Kambhal by Centre for microFinance (CmF), an associate organisation of the Tata Trusts. Launched in April 2022, the initiative has thus far reached more than 20,000 households in 350 villages in Rajasthan's Sirohi and Pali districts. Designed to be inclusive and sustainable, the CmF initiative is comprehensive and nuanced in method. Community participation is the key and every intervention starts with meetings involving, among others, village elders and influencers. That's the groundwork leading up to a series of workshops — a 'water crisis' game is part of the creative proceedings — that villagers are invited and cajoled to attend.

In the right order

With any given implementation village, the programme unfolds in phases from here on: water security planning; the setting up of a water security committee (WSC); technical and financial support to the WSC; seeding water-augmentation and water-saving systems; capacity building of *panchayats* (village councils) and local institutions; leveraging government schemes; and ensuring drinking water quality.

The water security plan places strong emphasis on both supply-side interventions (to augment groundwater levels through recharge and harvesting) and demand-side interventions (to enhance water-use efficiency, specifically in agriculture).

All of this adds up to a collective kind of well-being that has eased the daily grind of the farmers in the venture. One of them is Navaram Meghwal, whose weather-beaten face breaks into the slightest of smiles as he remembers a time when growing crops on his 5-acre spread was a struggle. "It used to be hard work and we wasted a lot of water," says the 51-year-old from Mamavali village in Sirohi.

Mr Meghwal has come a long way since. He cultivates a variety of crops, his annual income has climbed to nearly ₹400,000 and he believes there is scope for further improvement. "I have a micro-irrigation setup, I use bio-fertilisers, I have learned about superior farming practices — and I use a lot less water in my field," he says.

Like many villagers in the areas where the intervention has taken root, Mr Meghwal was reluctant initially to join it. "There's a natural suspicion of outsiders here and that's how we saw CmF at first

when it came to introduce the initiative," he adds. "You are always thinking, 'What are these people selling, what do they want?' But our doubts soon gave way to trust, simply because CmF demonstrated the efficacy of their procedures and also their sincerity. Their people are very helpful."

Swaruparam Mali did not need much convincing to become part of the initiative. A 49-year-old government schoolteacher from Varal village in Sirohi, he grows groundnuts and castor on a 15-acre land parcel that he has leased with a partner. "I connected immediately with what CmF was advocating because environment is among the subjects I teach and I keep talking to my schoolchildren about water," he says. "I had never before seen villagers making a water budget. That was something."

Meticulous method

From preparations to operations, the CmF team has been meticulous with its implementation of the water security programme. The detailing tells the story: workshop planning, data collection, field visits for villagers, monitoring fluoride levels in the water, water security processes, supply- and demand-side measures, provisioning of funds and, not least, aligning with the state government and its schemes.

Expending an overload of energy on tasks big and small has reaped dividends but, as with any extensive and intensive social development endeavour, there's always more to be done.

"The first big challenge is getting farmers to shift from their

Switch in time

Highlights of the water security programme being implemented by CmF in Rajasthan

The coverage — 20,000+ households in 350 villages in Sirohi and Pali districts

The ingredients — Water security planning; technical and financial support; capacity building of village councils and local bodies; community participation; connecting with government schemes; ensuring drinking water quality; behaviour change

The outcome — Improved water availability; reduced water usage; superior farming practices; better soil health; crop diversification; gains through horticulture; extensive growing of cash crops

Income effect — Higher annual earnings across the board for farmers in the initiative

A renovated check dam in Bharla village in Pali district

traditional practices; we cannot do this overnight," says Parikshit Singh Tomar, lead, behaviour change communication, CmF. "For example, with wheat it suffices to water the crop five-six times in its growth cycle. But farmers water their wheat endlessly and unnecessarily. We have created a model to counter this, one that can be easily replicated."

The good news is that farmers, once shown the rights and wrongs, are willing to adapt. "The mindset change is vital and it goes beyond water," adds Mr Tomar. "There's fertiliser use, soil health, farming practices, crop diversification, community participation and plenty more. It begins with water and then everything happens together. Within the given framework, we have a mix-and-match approach."

"The results are starting to show," says Ganpat Singh Kumpawat, CmF's team lead for the programme. "We have a pool of model farmers and model villages and the time is ripe to make this pool bigger by adding more farmers and more youth to it. And we want to craft multiple options for our farmers. That's the goal."

CmF has a bunch of partners backing its water cause in Rajasthan, among them the Canada-based One Drop Foundation and the Crompton CSR Foundation. Also pitching in with support are arms of the state and central governments, particularly with training villagers in water security.

Government for partner

The Rajasthan government has gone out of its way to collaborate with and enable CmF in tackling what is a clear and present crisis. "Groundwater levels are falling drastically in the state; where once you could find water at 25-30 feet, today you have to go down 150 feet or more," says Bhagwat Singh Deora, an assistant agricultural officer with the state government.

"Making matters worse is erratic rainfall; sometimes very little of it and sometimes too much of it, and in short spells," adds Mr Deora. "Of course, we need all the help we can get and organisations like the Tata Trusts provide that. What's certain is that we cannot keep going the way we have been. Water conservation is crucial in the context."

Mr Deora bemoans the mentality of farmers who are stuck in their ways, blaming it partly on low education levels in Sirohi and its neighbouring districts. "Many farmers are just not aware of how deep the problem runs, but the government understands. We have different schemes in place and we are promoting micro- and mini-irrigation projects, crops that require less water, and horticulture."

[One government initiative that stands out in Rajasthan is 'drone *didi*'. Elder sister is what *didi* translates into and these are women trained to pilot drones that can be employed to do land surveys and spray pesticides in village fields, a chore that farmers are only too glad to outsource.]

The pessimism that envelops agriculture and its future in India may have some justification, but not as far as Hemraj

Participants at a water security planning workshop in Kuran village in Pali district

Meena is concerned. A deputy director with the state government's horticulture department, Mr Meena believes the outlook for farming is brighter than at any time in the recent past.

"In Rajasthan at least, we have witnessed a return to farming from when the Covid pandemic struck, especially with regard to migrants who were forced to return home," he says. "The government is delivering a lot of support for free and there are many farmers – the educated among them, for sure – who run their show like a proper business. I don't think it's true that no farmer wants his children in agriculture."

Mr Meena understands the importance of organisations like the Tata Trusts, their nimbleness and their ability to quicken the pace of social and community development. "The government cannot cover every sector and then there are all these rules and formalities, red tape and bureaucracy," he adds. "That's eliminated when an efficient and genuine outside agency comes into the picture."

Help from the outside has worked out fine for Leelaram Meghwal, a 52-year-old widower who also hails from Varal in Sirohi. He owns 18 acres of land and his farm income has jumped from ₹250,000 annually to ₹750,000 since joining the water security initiative. "I did what the CmF people told me to and there has been no looking back," he says. ■

Philip Chacko

‘Gender is a wicked problem in India’

Professor emeritus at the Indian Institute of Management (Bangalore) and former director of the Ramalingaswami Centre on Equity and Social Determinants of Health at the Public Health Foundation of India, Gita Sen’s research and work involves longstanding challenges with a high degree of difficulty: gender inequality, public health and population policies.

Ms Sen has a doctorate in economics from Stanford University, has been a visiting professor at Harvard University and was the first chairperson of the World Bank’s ‘external gender consultative group’. She has worked with the United Nations in several capacities, including as lead consultant for the UN Population Fund’s ‘India population assessment’. She is also a founder member of Development Alternatives with Women for a New Era, a global network of women scholars, researchers and activists.

In this conversation with Labonita Ghosh, Ms Sen talks about how early social imprinting of unequal gender norms is deeply embedded in Indian society, which is one reason why we fail to create opportunities for women and to protect them from gender violence that is perpetrated to “keep them in line”.

What is the critical role played by gender scholars in India today, and what is the ‘truth’ that they bring to light vis-à-vis the social development sector?

The role is the same as that of any scholar, which is to bring to light that which is not known, in this instance the nature of gender power and gender relations in society. The second point is to get people — women in particular, but also those with other minority gender identities — to take action against the negative consequences and harms caused by gender power.

The idea is to bring this to the notice of college and postgraduate students, researchers and others, to get them engaged in more analyses and

activism on the subject, and to advocate with policymakers for change. Gender power and gender institutions are imprinted and embedded in society. So how do you change that? Gender and women's studies have tried to do that since their inception in the country in the 1970s.

Gender is a prime social relationship, so it's impossible to think of social development without thinking about gender. Health, education or human development, none of these can be tackled without giving front-and-centre attention to the way in which gender relations and power occur in society. If you talk about social development without referencing gender, things are likely to go wrong. Your understanding is likely to be limited and often misdirected.

We have by now a lot of academic and research knowledge — as well as practical and programmatic policy evidence from work on the ground — to inform us that if we don't look at things through the lens of gender, we

will miss out on critical aspects. We are likely to end up taking misdirected or wrong pathways to reach our goal.

Do you believe it's important to embed the issue of gender in social development programmes right from the design stage? And is that happening?

Absolutely. And no, not enough of it is happening. Let's take the provision of clean water in rural India. [Access to this] is not an engineering problem alone. It's more than knowing where to put the handpump or where to locate the water tank so that it serves every household. It's also about knowing the communal and caste issues in the village. You cannot put the water point at a place where only the upper castes of the village can access it.

But there's also a gender issue here. Since it's mainly the woman who collects water for the family, you have to make it available at a time when she can go and fetch it. If she has to set aside household tasks to do this, she will likely depute her daughter to fetch water instead of sending her to school. That's why understanding how gender works is crucial, along with caste and economic inequality (the rich-poor divide that puts access to resources only in certain hands).

What needs to change in programme design thinking to be able to incorporate gender issues from the start?

Let's take any programme relating to social development in water, sanitation, education or health. What are the parameters that should get built in right from the beginning? If the programme is location-specific, we would start by doing a survey of the households in the area and sort them by economic criteria (income, land ownership, consumption patterns, etc). That would give us a sense of who is deprived or marginalised in the area and how we should design a programme to serve them.

We need to think about caste and gender in the same way. We need to know the caste composition of the community to understand the nature of social relationships, and we need to know about gender norms, belief systems and behaviours. While we have methodologies to gauge economic parameters and categorise beneficiaries accordingly, we don't have standard parameters for caste classification, although we're improving on that.

With gender, scholars have been trying to convince people that we need a similar set of standard tools. We need to see, first, if women have control over land and resources. Are they unpaid family workers? Do they have access to bank accounts in their own name that they can use? What are their education levels? For far too long women's work, either in the household or outside, has been negated and sometimes not considered work at all.

We have general surveys that tell us what the nature of women's work is, but we need to know more. For instance, are they the ones fetching water, collecting fuel and taking care of the livestock? They are certainly cooking and minding the children and the elderly, but what resources do

"Health, education or human development, none of these can be tackled without giving front-and-centre attention to the way in which gender relations and power occur in society."

they have at their disposal? Do they have access to education and healthcare? What is the age of marriage and fertility rate in the area? Is violence — physical, psychological, emotional — used to keep girls and women subordinated and in their place?

How many social development programmes not explicitly targeted at women are designed keeping these parameters in mind? Very few. So then we've left out half the population from the design of a programme, and yet we talk about bringing about big changes. Improvements may happen, but they will be happenstance for women; they won't be by design or participation.

Even today, women and Dalits sit at the back or on the edges in *gram sabha* (village assembly) meetings; they often don't get a chance to participate in proceedings. Therefore, we need to get back to the drawing board and look at the gender, caste or religious dimensions of projects, instead of always only starting with economic parameters.

"At age two or three, there are few differences in the way boys and girls are treated," says Ms Sen. "But come age four, five or six, the little girl may be handed a small broom and told to sweep the courtyard while her brother continues to play."

You have often referred to gender as a 'wicked problem'. What does that mean?

Wicked problems are those that are hard to tackle and difficult to change. Gender is imprinted in us from a very early age; it's built into everything we do. At age two or three, there are no normative differences in the way boys and girls are treated. The girl, as with the boy, will not be told to sit in a particular way or forbidden from running around and playing. But come age four, five or six, the little girl may be handed a small broom and told to sweep the courtyard. This while her brother continues to play with his friends.

Gender norms for the way a girl or boy should be, or the things they can do, are imprinted that early. By the time they are nine or ten, kids are no longer children; they are boys or girls. By the time they hit puberty they have been fully assimilated into the gender system. The same happens with caste, which is also imprinted early. That's why caste is also a wicked problem.

If we leave it to society on its own to change these wicked problems, it will never happen. We need active intervention to change social relations. But the common dilemma is: should gender be a track by itself or should it be mainstreamed into everything? I feel it needs to be mainstreamed into our work on ageing, for example, our work on technology, and certainly our work in education.

Is the problem of unpaid women's labour at the heart of gender issues?

It's a very important issue because society still does not accept that the care of human beings should be a social project. And by care I mean childbearing and the feeding, care and raising of human beings; of taking care of their health and their old age. These are not considered as social responsibilities but private ones. But if it is a private responsibility, who's doing it? If it's being done in the home, it's being done largely by women and it's unpaid.

Can we find redress for this?

It requires re-imprinting, a recognition of the problem and a willingness to change it. But this hasn't yet happened anywhere in the world, not even in the Scandinavian countries that are supposed to be good on gender equality.

There was a study conducted in Sweden that measured the stress levels of managers over the course of the day to gauge at which times they were the most or least stressed. It did this by measuring their cortisol levels [cortisol is known as a stress hormone] and the subjects, both men and women, were from the same managerial strata. The study found that with male managers the stress levels would start rising as they got to work and then peak around noon. After lunchtime, it would plateau and then start coming down by the end of the workday. There was just one single peak.

With women managers, however, the study found two peaks in a day: the first corresponded with that of the men and the second was at the end of the workday, when their stress levels would shoot up again. This was because for women a second workday started when they left their office. They would have to shop, get dinner going at home, manage the kids' homework and such. So 'womens' work' is something that needs to be addressed collectively and consistently, not just as a matter of health and human rights, but also as an issue of social health and social rights.

Unfortunately, the way this wicked problem is currently dealt with in society is through gender violence (or the fear of it): to ensure that women stay in line. An extreme form of this plays out when women run away or elope with someone from a different caste or religion. The brutality with which they are often made to pay for this is an example. And who is that brutality meted out by? Their fathers, brothers and other male (and sometimes female) members of the family. Just like caste, gender is also policed in society with the threat of, or actual, violence.

Should we, then, have more programmes that ensure sensitisation and protection of women from sexual violence?

Most gender violence is perpetrated by people known to the woman, and much of it takes place at home. The girl may be sexually abused by her father, brother or other male relatives. We get horrified by incidents like the Nirbhaya rape and murder or the RG Kar Hospital case, but there has been sexual violence around caste forever in India. The first factor we have to recognise is the locus of violence, or where the bulk of it is taking place.

There are some programmes, like the World Health Organization working with CEHAT in Mumbai, to ensure that the healthcare system does a better job of recognising and handling gender violence when it occurs. Most people, when they see a domestic violence victim with a black eye and bruises all over her body, back off, saying it's a family matter. But that's what needs to change. Such violence, though, is just the tip of the iceberg. There is a much bigger mass, called gender inequality, that lies beneath that surface. ■

"...we need to get back to the drawing board and look at the gender, caste or religious dimensions of projects, instead of always only starting with economic parameters."

T3 alumnus R Sivaransani now works as a textile lab technician in Tirupur

The will to skill

The Textile Technology Training Center in Tirupur is equipping young graduates with the know-how to secure jobs, while meeting the demands of a thriving industry

Soft-spoken and a bit shy she may be, but Duraisamy Suganthi does not lack confidence when describing her career path and how it is panning out. "I had the theoretical knowledge, I had practical experience and I now have this job. There's no doubt that I will make a success of it," says the 23-year-old Ms Suganthi, a native of Tirupur (Tamil Nadu) who has settled into gainful employment.

Ms Suganthi is one of 460 graduates – the majority of them women – who have completed a skilling course that equips them to find placement in Tirupur's thriving textile and knitwear industry. Their alma mater is the Textile Technology Training (T3) Center, established in July 2022 in Tirupur by Reviving Green Revolution (RGR) Cell, an associate organisation of the Tata Trusts.

"I was nervous and a little blank when

Trainees from the T3 Center during an industry visit

I started at the Center, but I got a hang of things quickly thanks to the trainers and the way the course is structured," says Ms Suganthi, who completed the training in May 2024 and found a position at a garment company less than six months later. "The teaching was superb and that enabled me to settle into my job quickly."

Ms Suganthi's story is similar to that of most who have come through T3's skills training, which is provided free of cost. They hail from less-than-privileged backgrounds, they are based in and around Tirupur, and they have ambitions that transcend their modest circumstances.

Mohammed Farman, 22, is looking to set up a manufacturing unit for women's garments that can augment his father's tailoring business. Mohaseena, a 24-year-old who goes by a single name, wants to get into management in the "textiles field". Murugesan Dhivya, 23, is hoping she can learn all she can about fabrics, fibres and garments. And Deepashri Ramaswamy, 20 — with an unemployed father and school-going siblings — dreams of a secure job that will lift her family out of poverty.

T3 has fuelled the future of these youth in an environment where employment is scarce, social discrimination is rife and financial constraints leave families unable to support their children educationally beyond graduation. On the other side lies Tirupur and its textile sector, forever in search of skilled personnel and facing a crunch due to the shortage of it.

The T3 course has been designed to bridge the gap that divides educated but unemployed young people from Tirupur and the villages neighbouring it, on the one hand, and a textile industry, on the other, with a plethora of openings for skilled

labour to fill roles that demand technical know-how of a high order.

With a three-month duration, the T3 course has three skilling modules: textile lab technician, merchandising and the latterly introduced fabric quality inspection. Also on the training menu are soft skills such as communication, problem-solving and the building of self-confidence. This combination of professional and personal development has proven to be a winner.

The course itself has five components: classroom sessions, industry visits, guest lectures, practical training and internships. Placements are almost a given, with more than 75% of those completing the course getting jobs. Giving preference to women candidates was a conscious decision, though this may sometimes take convincing family members.

Bringing them on board

The T3 approach starts with the mobilisation of young graduates — the stream does not matter — from local colleges and nearby villages. The initiative has staffers dedicated to the task and they meet college principals, heads of *panchayats* (village councils) and even parents to spread the word about the course and its benefits.

The course curriculum has been crafted to meet industry requirements and the trainees are independently certified after written and practical examinations. Exposure visits to textile factories and testing labs are a constant and the guest lectures, delivered by industry experts, orient the students to the latest technologies, emerging trends and the opportunities they can seize.

The prospects of the trainees are bright, with salary offers ranging from ₹10,000 to ₹25,000 a month. The T3 team arranges interviews for those who have completed the skilling course and they are supported

An exam in progress at the T3 Center in Tirupur

Lending a hand

The statistics are stark: 73% of workers in India aged 15-59 years have not had any formal or informal vocational or technical training; more than 12 million youth in the 15-29 age range are added to India's labour force each year; and ensuring that women account for half the new workforce created by 2030 is critical for the country to attain an 8% GDP growth rate.

The Tata Trusts have been deeply invested in lending a hand to enhance India's skilling ecosystem. Leading this effort is Tata STRIVE, which operates under the aegis of the Trusts. Tata STRIVE focuses on skilling youth from economically stressed backgrounds. It has touched the lives of more than 1.3 million people, youth in the main, through 156 centres in 24 states.

Another initiative by the Tata Trusts that is making a difference is the Indian Institute of Skills (IIS), established in collaboration with the Government of India's Ministry of Skill Development and Entrepreneurship. IIS offers highly specialised and future-facing courses in industrial automation robotics, computer numerical control, robotic welding, 3D printing, electric vehicles and hospitality.

The Textile Technology Training Center in Tirupur is of a piece with the skilling push of the Trusts. Its performance since being set up in 2022, and the promise it holds of reaping further gains, shows what can be achieved in what is no less than a national cause. ■

N Jansirani, who was part of the first batch of trainees at T3, has found employment as a textile lab technician

even after they secure employment.

The T3 programme has a host of partners. It is funded by the United Kingdom-based Intertek, a 130-year-old enterprise that provides what is known as 'total quality assurance' to a variety of industries and services around the world, including textiles and garments (Intertek has a presence in Tirupur as well). Also on board are the Tirupur Exporters Association and an array of textile laboratories and garment companies.

Continuous examinations and certifications are conducted in collaboration with Methods Apparel Consultancy, an authorised body of the National Skill Development Corporation, which operates under the Indian government's Ministry of Skill Development and Entrepreneurship.

Housing the Center in Tirupur, India's knitwear capital, makes sense. The city's economy is based on the textile industry, there are some 10,000 garment-manufacturing units here, it employs more than over 600,000 people, has annual exports in excess of $5.1 billion, and some of the world's largest companies — including Nike and Adidas — as clients.

T3 has had its share of challenges to overcome — low enrolment in its initial days, for instance — but these have been mostly teething troubles. Now in its third phase, the programme is on a sound footing and its potential for further growth is positive (there are plans to take the idea to more locations in India).

"The need and the purpose for such a centre will never fade," says Arul Durai, a programme manager with RGR Cell, the implementors of the initiative. "As the textile industry grows, so too will the demand for skilled professionals. We believe this centre has the potential to become an institution — and who better than the Tata Trusts to drive that vision?" ■

By Philip Chacko

Havens for the helpless

Families left homeless by the cloudburst that devastated Himachal Pradesh in 2023 now have a roof over their heads — thanks to innovative and reusable disaster shelters

Khube Ram and his wife, from Saraugi village in Mandi district, amid the debris of what was once their home

On August 14, 2023, Himachal Pradesh was battered by a cloudburst unprecedented in scale. The floods and landslides triggered by the calamitous event claimed 72 lives across the state and left thousands bereft of their homes and livelihoods. Among the affected were Room Prakash and his family, residents of Saraugi village in Mandi district, who lost their home and belongings to the devastation.

With his modest land holding in disarray, Mr Prakash's livelihood was in ruins and his future uncertain. The immediate challenge for the family, though, was finding a roof over their heads. For two months, they took shelter in a cattle shed belonging to a relative in a nearby village. Then they moved into a makeshift dwelling. Mr Prakash needed help, and urgently so.

That would materialise in November 2023, when Mr Prakash and his family became part of a programme that was developed to provide temporary shelters to people hit by disasters. The programme was conceived and executed through a collaboration between the Tata Trusts and People's Science Institute (PSI), a nonprofit based in Dehradun in Uttarakhand.

Before winter set in, the Prakash family moved into a disaster shelter that they could use as a temporary home. It not only gave comfort and dignity to the family but also enabled them to get their lives back on track. "This shelter has been our home since then and we are grateful to the Tata Trusts and PSI for helping us," says Mr Prakash.

The requirement for such shelters arises from how India handles disaster rehabilitation. While the government steps in to offer funding, the time taken for a family to rebuild their home can extend to years. Meanwhile, the rise in extreme weather events means that the demand for such shelters is increasing all the time.

Jeet Ram (right) and his family, from Bandal village in Kullu district, at their temporary shelter

The Trusts' solution addresses several aspects of the problem. Somewhat like a portable cabin, the temporary shelter can be fabricated locally and dismantled, stored and reassembled quickly whenever needed. The design is based on a template that can be replicated, and comes with a process manual carrying instructions for assembly.

"The modular shelters demonstrate immense potential for scaling, particularly in the context of a disaster," explains Shikha Srivastava, head of urban poverty alleviation at the Tata Trusts. "By integrating them with housing schemes and urban resilience projects, they can bridge the gap between emergency relief and long-term recovery, offering a replicable model for other regions."

Collaborative effort

To make it work, PSI collaborated with the Trusts, local NGOs, architects, *gram panchayats* (village councils) and district disaster management agencies. By the end of the project, 60 shelters — each having a habitable room, an attached bathroom and a verandah — were successfully installed in the Kullu and Mandi areas of Himachal Pradesh.

The project was launched in the wake of more than 500 families being rendered homeless by the August 2023 tragedy. "Our experience showed that homeless families take at least one or two years to build a new permanent home and move into it," said Debashish Sen, the director of PSI.

PSI is well placed to know. Established in 1988 by a group of professionals from the Indian Institute of Technology and their well-wishers, the NGO operates in a variety of fields besides disaster rehabilitation, among them livelihoods, natural resource management and river conservation.

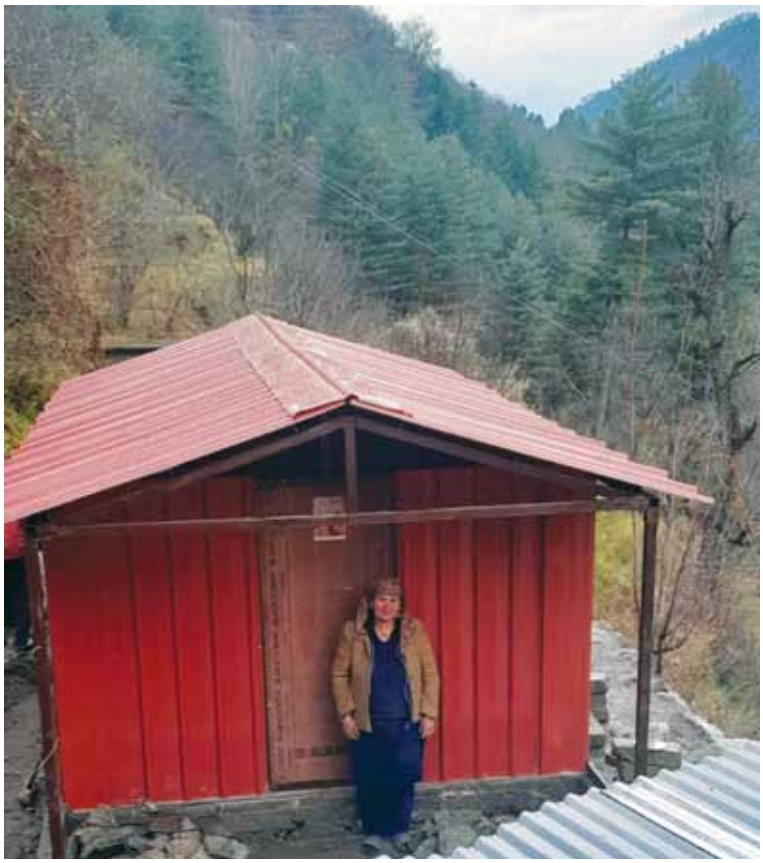
The Himachal disaster shelter intervention started to take shape in September 2023. Between September and November 2023, the PSI and Tata Trusts teams finalised the project's operational guidelines. PSI collaborated with Ashok B Lall Architects to design prototyped shelters that could withstand the challenging terrain and weather conditions of the Himalayan region.

A team led by principal architect Ashok Lall and project architect Shruti Goel guided the construction process. The team recommended a shelter with a floor area of 180 sq ft, inclusive of a toilet. While the initial plan was to use wooden logs and corrugated iron sheets to construct the shelters, reusable and insulated units on a steel framework were eventually employed. This change resulted in an eco-friendly and reusable option.

The project also covered the development of training materials and guidelines for constructing the units. Despite winter rains and harsh weather conditions, training was provided to local artisans, mechanics, welders and beneficiaries on construction, assembly and upkeep of the shelters.

The draft design of the shelters was prepared and criteria for selecting the beneficiaries were finalised in consultation with the local gram panchayats. District disaster management authorities were also brought on board for consultation.

"This is the first time that we have conceived and deployed a sustainable, reusable solution for disaster relief and rehabilitation," says Ms Srivastava. "We hope this will prove to be a ready solution that can be quickly set up and put to use in times of need."



Tara Devi, from Koshonali village in Kullu district, at the constructed shelter provided to her

Weather the adversary

For PSI, the project had its fair share of challenges, with the weather being a constant adversary. The remoteness of the affected areas made transportation of material from the fabrication site difficult. Electricity supply was often disrupted and generators had to be employed to assemble the fabricated materials.

Through the project, the design team improved the shelter design based on user feedback, adapting to specific needs and site conditions. "Our design focused on creating reusable, insulated shelters that could be easily assembled and dismantled," says Mr Lall.

Assessing the durability and reusability of these shelters beyond the relief phase would provide valuable insights for improving future disaster responses and scaling similar initiatives. "The handbooks and posters developed through the project will help in knowledge dissemination among concerned stakeholders and contribute to the scaling up of the initiative," explains Subhash Rawat, field assistant with PSI.

A key learning from the project has been the importance of balancing speed and quality in disaster response, especially in remote areas. "We saw that local governance structures, such as gram panchayats, are crucial in beneficiary identification and site selection," says Bigrai Narzari, programme officer at the Tata Trusts. "Also, dealing with weather disruptions and supply-chain challenges taught us the value of incorporating buffer time and contingency planning in project timelines."

Project architect Shruti Goel sums up the project experience well: "Witnessing the positive impact on the lives of the beneficiaries, who can now rebuild and restart with dignity, has been truly rewarding." ■

By Kishore Rathod

A BIGGER BASKET

The northeastern states of Arunachal Pradesh, Nagaland and Mizoram are characterised by hilly terrain, lack of infrastructure and fragmented land holdings. With limited income sources, people here tend to pursue age-old agricultural practices, mainly subsistence cultivation and backyard operations, to make ends meet. This leaves rural households cash-poor and vulnerable.

To address the problem, the North East Initiative Development Agency (NEIDA) — an associate entity of the Tata Trusts — began implementing a livelihoods programme in these three states in 2012. The objective: to enhance household earnings from multiple sources.

NEIDA focuses on the value-chain development of crops grown in the region while also encouraging non-farm activities such as piggery and beekeeping. Many of the 26,489 households in the programme area — 102 villages in Arunachal Pradesh, 139 in Mizoram and 128 in Nagaland — have seen their annual incomes go up considerably. Here are some of the success stories from the initiative:

(clockwise from facing page top left) **Bizietunuo Lea**, from Tsupfume village in the Phek district of Nagaland, with her cabbage harvest; **Lhizonyiu Naro**, from Chizami village in Phek district, in her broccoli field; **Rhilo Chiero**, an entrepreneur from Mesulumi village in Phek district, with king chillies from his farm; **Zosangzuala**, from Ruantlang Farlui Zau village in Mizoram's Champhai district, has made a success of growing green peas.

Arou Shupao (above), a farmer from Zhavame village in Phek district, cutivates organic cabbage; **participants** at a training programme in piggery management held in Nima village in the Lower Subansiri district of Arunachal Pradesh.

Darlawma and Tlangmawii (above), of Keitum village in the Serchhip district of Mizoram, have been rearing pigs since 2018; **a woman farmer** from Sangdak village in Nagaland's Tuensang district, de-husking maize, widely grown in the region to feed pigs.

Among (above), a farmer from C Saddle village in the Tuensang district of Nagaland, in her garden peas farm; **Parmawia** (below), from Piler village in Mizoram's Serchhip district, now has a thriving business in pig-rearing.

S Vanlalauva and his wife (above), from Khuangleng village in Mizoram's Champhai district, have profited by cultivating high-value vegetables; **members of** the Arunachal Pradesh-based Panior Pare Producer Company, which has 640 farmer-shareholders who grow oranges, vegetables and cardamom.

Ningsantingi, from a village in the Champhai district of Mizoram, is a pig farmer who earns more than ₹150,000 a year from her business.


The Tata Medical Center in Kolkata

A birth to remember

Dr Mammen Chandy, former director of the Tata Medical Center, Kolkata, recounts his journey as a cancer specialist and an up-close encounter with the disease

Back in 1979, very few physicians in India were treating acute myeloid leukaemia (AML). I was then a junior lecturer at the Christian Medical College (CMC) in Vellore under Dr Benjamin Pulimood, the only physician there willing to treat these AML patients. One patient with AML, named Anthony, was surviving after basic chemotherapy and immunotherapy with a monthly BCG vaccination. This treatment was tried by Georges Math , the French physician, in 1969 and subsequently published in *The Lancet* in 1974 (BCG is now used only for bladder cancer since we have much better drugs to treat leukaemia).

I got to know Anthony well and managed him at the time of a relapse, when it was a nightmare to find a vein since we were not using central lines at that time. In 1984, we were not ready for bone marrow transplants, but Anthony convinced us to go ahead (with his brother as the donor). This was our first transplant – and it was not successful.

Going forward, after finishing my master's in medicine at CMC in 1978 and working under Dr Pulimood, I realised that I needed more training in blood diseases. There was no super specialty course in haematology in India then. I was able to secure a registrar position at Westmead Hospital in Sydney, Australia, and completed my studies. I returned to Vellore in 1982 and started the department of haematology (DoH) with one intern and a small procedure room. Today CMC's DoH has the largest 'hematopoietic stem cell transplant' programme in the country.

We started the first doctorate of medicine course in haematology in India. Patients with three haematological malignancies – leukaemia, lymphoma and myeloma – can now get state-of-the-art treatment at Vellore, as also treatment for numerous benign blood disorders. Other cancers are treated by the medical oncologist.

CMC requires faculty to retire when they have completed 60, which for me was in August 2009. I was contemplating what I

Dr Mammen Chandy is a former director of the Tata Medical Center, Kolkata, and an alumnus of Christian Medical College, Vellore

would do when Dr Ketayun Dinshaw, former director of the Tata Memorial Hospital (TMH), Mumbai, after her retirement, was commissioned by Mr Ratan Tata to be the project director and develop a world-class cancer centre in Kolkata. This was at a time when the Tata group was setting up the Nano project in West Bengal.

The TMH story

TMH Mumbai, was established in 1941 in memory of Lady Meherbai Tata, who died of chronic myeloid leukaemia, and in 1952 the Indian Cancer Research Institute was set up for cancer research. Both of these were handed over to the Indian government in 1957 and administrative control of the two passed in 1962 to the Department of Atomic Energy. By virtue of TMH being founded by the Tata Trusts, two trustees from the Trusts are always on the hospital's governing council.

During his visits to TMH, Mr Ratan Tata noticed that there were many patients from eastern India being treated there. TMC in Kolkata was conceived as a cancer hospital to meet the needs of such patients, and those from the northeastern states, who would not have to travel far away from home for treatment.

Dr Dinshaw, a CMC alumnus, kept calling me in the early months of 2009, requesting me to join the project. I kept refusing since I could not imagine working in Kolkata for the Tatas when I had spent most of my working life in a mission hospital in South India. However, in late 2009 she convinced me to meet Mr RK Krishna Kumar at Bombay House, the Tata headquarters in Mumbai.

It was a memorable meeting in an office with an entire wall filled with Ganeshas of varying styles and sizes. We discussed religion, philosophy and more before I finally told him that I would join but only as a haematologist, not as director. "Then we do not want you," he replied. I was amazed when he qualified the reply by saying that he did not want the tail to wag the dog, that unless I was the director I would not be able to bring "something of the ethos of Vellore" to this Tata project.

For a corporate honcho to feel that this was important was remarkable. I was then asked to make a presentation of my vision of what TMC should be. I did this one rainy evening at the site office in Kolkata when Mr Ratan Tata and Mr Krishna Kumar were on a visit.

I moved to Kolkata in April 2010 and for the next 12 months I wore a construction helmet at work, being at the site for most of the day before returning to the hotel in the evening completely soaked (that is when you realise air-conditioning is not a luxury). It was a fantastic time, interacting with architects and engineers and seeing something wonderful coming up.

It was also great to go to Mr Krishna Kumar with my requests — another ₹100 million over budget for laboratory equipment, a lily pond with a waterfall as part of the landscape and such — and being told to go ahead without any committee approval. The project was something new to me in terms of what the Tata group would do for aesthetics and functionality.

Building an institution

The external cladding of the building was made from a Rajasthan soft stone called Yellow Teak, dry clad on stainless steel pins in an intricate design approved by Mr Tata at a cost of more than ₹100 million (the surface protection cost in excess of ₹20 million). A team of doctors was recruited months before the hospital opened and they spent a whole lot of time at Tata Consultancy Services developing a clinical and hospital information software program.

Many of the recruited faculty helped in other ways to set up the different clinical

Dr Chandy with Ratan Tata (left) and RK Krishna Kumar (right) during a site visit by senior Tata group officials to the then under-construction TMC in August 2010

departments and develop the clinical pathways for the hospital to function. It was a fantastic experience working with landscape architects from Delhi and a 75-year-old horticulture expert.

We bought 10-foot-tall trees grown in large tubs and they grew fast once they were put in the ground. We soon had a beautiful campus. Artists were requested to donate their renderings for the hospital and these were spread all over the buildings (all of this art was collectively valued at $350,000 by a gallery in Mumbai).

On May 16, 2011, TMC was inaugurated by Mr Ratan Tata. It was a stunning piece of architecture with a blend of glass, steel and stone, making the hospital look more like a research building in Scandinavia than a cancer facility.

However, a stunning building and good infrastructure do not by themselves make a great hospital. Rather, it is the people staffing the institution at different levels who make that happen, people who believe in the hospital's purpose and mission and are willing to contribute to that mission in terms of competence, compassion and care for patients with cancer, the 'emperor of all maladies'.

TMC has been able to recruit such individuals to implement its mission of patient care, education and research. Precision in diagnosis is the first step in cancer care and TMC has all that is necessary for this, with an excellent histopathology lab, flowcytometry, cytogenetics and next-generation sequencing to document and track mutation-causing malignancies, and imaging techniques to gauge the extent of the disease.

Compassion is the key

Treatment with surgery, radiation or chemotherapy, or combinations of the three, is discussed and decided upon by tumour boards with access to international protocols and capable of evaluating treatment outcomes. But all of this must be undergirded by compassion. One could get a Christmas card from grateful parents whose child has been treated and cured at TMC, but the real credit comes

The day-care treatment facility at TMC Kolkata

when parents who have lost a child with cancer choose to continue to remember the treating team years later.

In February 2020, just before the Covid pandemic hit, I was diagnosed with colon cancer. A laparoscopic left hemicolectomy was done, and I had a difficult time in intensive care for many days. This was followed by six months of chemotherapy and I returned to work by the end of 2020.

What I tell my patients is that life is uncertain even when we are well. The secret is to take one day at a time, like children with cancer who only want to know when they can go back to school.

Cancer treatment has advanced in leaps and bounds over the last decade, with new therapies being added to the armamentarium almost every year. Most of these new drugs are expensive and beyond the reach of the poor, but government schemes are making it possible for many patients to have good cancer treatment.

For those with aggressive cancers that have spread and for which new therapies have become available, the physician is faced with a difficult choice when he advises patients and their families on how to proceed. The cancer care team must remember that patients and their families need support even when all curative medical options have been exhausted. We have to minimise pain and discomfort and help patients die with dignity when there is no other option left.

My personal journey as a physician who treats patients with leukaemia, lymphoma and myeloma has been rewarding and the progress that has been made in these three malignancies over the last decade is tremendous (there is the possibility of cure in over 90% of children with acute lymphatic leukaemia).

New drugs for chronic myeloid leukaemia have converted a cancer to a disease where one can carry on with normal life on the back of a pill a day. For me, it was great to be part of the team, backed by the Tata Trusts, that established a high-quality cancer facility and recruited an outstanding team of healthcare individuals. ■

The Supreme Court in New Delhi

Healing the law

With its evidence-based approach and incisive analyses, the India Justice Report 2025 is a landmark endeavour that pleads the case for a more equitable justice system in the country

As India moves towards a hundred years of being a democratic, rule-of-law nation, making the justice system 'better' envisions one that is more accessible, equitable, efficient, and responsive to the needs of the people it serves — a system that truly lives up to the ideals of the constitution and works tirelessly to ensure that justice is not only done but is seen to be done.

For too long India's justice system has been weighed down by inefficiencies, backlogs, and resource constraints. These problems, though widely recognised, have neglected a deep dive into examining the supporting framework that underpins the justice delivery system. Launched in 2019, the latest India Justice Report (IJR) 2025 seeks to change this by offering a comprehensive and structured assessment of the anatomy of the nation's justice delivery mechanisms.

The key questions IJR interrogates are: do the many institutions — police, prisons, judiciary and legal aid — that are charged with delivering justice have the adequate structural foundations they need to fulfil their mandates? How do states compare with one another? Are systems being strengthened or allowed to stagnate? In short, is the system fit for purpose and, if lacking, how can it be made so?

A detailed analysis of the justice delivery landscape has revealed national

Maja Daruwala is chief editor of the India Justice Report 2025

Valay Singh is project lead of the India Justice Report 2025

patterns and trends. The southern states consistently rank among the top performers, excelling in areas such as human resources, judicial infrastructure and legal aid services. In the middle tier, states like Chhattisgarh, Madhya Pradesh and Odisha have shown a gradual improvement. Maharashtra, though, sees a significant decline from its previously held top position, and Gujarat and Punjab exhibit inconsistent performances.

In the bottom tier, states such as Bihar, Rajasthan, Jharkhand, Uttarakhand, Uttar Pradesh, and West Bengal have largely maintained their positions, with minor shifts. Uttar Pradesh, rising one rung from the bottom, has switched places with West Bengal. Overall, these changes underscore the shifting dynamics of state performance, shaped by evolving governance, economic policies and other influencing factors.

Infrastructure bottleneck

The infrastructure gap adds another bottleneck. Many states face a critical shortage of courtrooms. Police stations, particularly in rural areas, are either too few or serve unmanageably large populations while often lacking basic amenities.

The rankings of small states reveal a mix of trends. Sikkim consistently retains its top position. Himachal Pradesh, Arunachal Pradesh, and Tripura occupy the middle rung but Meghalaya, Mizoram, and Goa show a dip in their most recent rankings, to fifth, sixth and seventh places, respectively.

The good news is that, in general, there has been a steady growth in investment in strengthening the structural capacity of the justice delivery system across all key institutions assessed by IJR. Budget allocations have risen, with judiciary per capita expenditure improving, and gender diversity within the lower judiciary and police has shown an upward trend, as it has among legal aid secretaries and paralegal volunteers.

India, a diverse agglomeration of marginalised communities, presents a complex challenge to inclusion. From caste groups to women, Dalits, minorities, transgender individuals and people with disabilities, demands for representation within the justice system are ever-present.

The aspiration behind affirmative action is to address historical and systemic inequalities faced by marginalised groups. The standard is to bridge the gulf in representation of consistently underrepresented groups in all spheres — placing the onus on governments and public authorities to lead the way.

One group continues to remain largely invisible within the justice system: people with disabilities. The nearly decade-old Rights of Persons with Disabilities Act of 2016 mandates a 4% reservation. While India's legal framework acknowledges the rights of disabled individuals, systemic inaction has led to their continued exclusion. Within the police, judiciary, and prison administration, they are negligible and often ignored in recruitment policies and implementation. This leaves them underrepresented as professionals and underserved as users of justice.

True diversity in the justice system requires moving beyond token representation. While strides have been made for women and with caste-based inclusion, leadership gaps persist, with disability representation remaining an afterthought.

Forensic science plays a crucial role in the delivery of justice. Despite their importance, forensic labs across the country face significant capacity constraints. Many suffer from chronic underfunding, have outdated infrastructure, and an acute shortage of skilled personnel.

Overall ranking *

* Composite ranking across police, prisons, judiciary and legal aid

Color guide

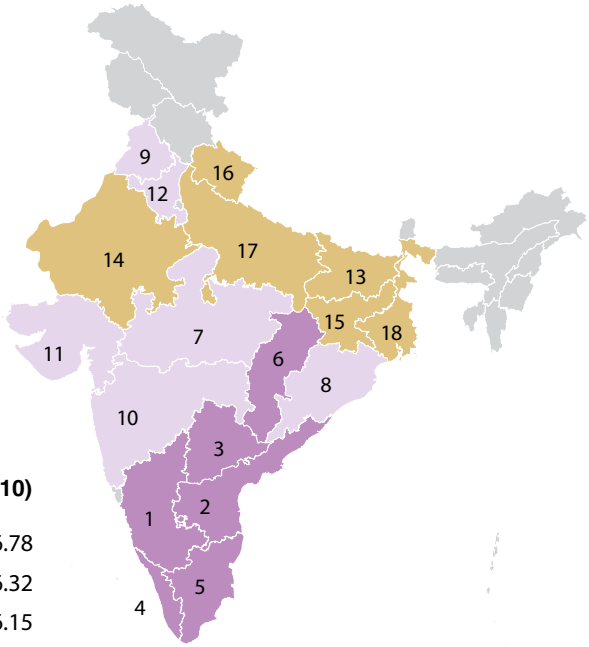
Best | Middle | Worst

Indicators (in IJR 4) 102

Clusters

I. 18 large and mid-sized states (population above 10 million)

II. 7 small-sized states (population up to 10 million)



Map 1: Large and mid-sized states

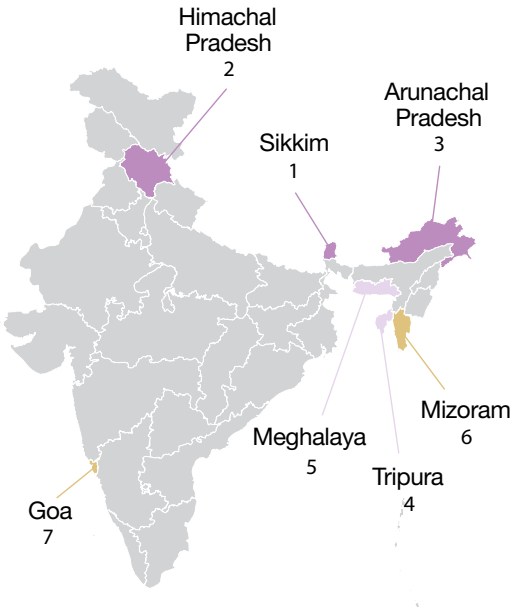
Rank (out of 18)

IJR 1 2019	IJR 2 2020	IJR 3 2022	NEW IJR 4 2025	State	Score (out of 10)
6	14	1	1	Karnataka	6.78
13	12	5	2	Andhra Pradesh	6.32
11	3	3	3	Telangana	6.15
2	5	6	4	Kerala	6.09
3	2	2	5	Tamil Nadu	5.62
10	7	9	6	Chhattisgarh	5.54
9	16	8	7	Madhya Pradesh	5.42
7	11	11	8	Odisha	5.41
4	4	10	9	Punjab	5.33
1	1	12	10	Maharashtra	5.12
8	6	4	11	Gujarat	5.07
5	9	13	12	Haryana	5.02
17	13	16	13	Bihar	4.88
14	10	15	14	Rajasthan	4.83
16	8	7	15	Jharkhand	4.78
15	15	14	16	Uttarakhand	4.41
18	18	18	17	Uttar Pradesh	3.92
12	17	17	18	West Bengal	3.63

Map 2: Small states

Rank (out of 7)

IJR 1 2019	IJR 2 2020	IJR 3 2022	NEW IJR 4 2025	State	Score (out of 10)
2	2	1	1	Sikkim	5.20
3	4	6	2	Himachal Pradesh	4.36
6	5	2	3	Arunachal Pradesh	4.21
7	1	3	4	Tripura	4.11
5	7	4	5	Meghalaya	4.02
4	6	5	6	Mizoram	3.81
1	3	7	7	Goa	3.51



The increasing demand for forensic analyses, coupled with limited resources, has led to case backlogs that delay investigations and trials. Budgetary allocations remain insufficient and slow recruitment processes exacerbate the shortage of trained experts. Additionally, the lack of adequate regional forensic facilities means that crucial evidence often has to be sent to overburdened state-level laboratories, further prolonging forensic examinations and delaying investigations and trials.

The central government has introduced the DNA Technology (Use and Application) Regulation Bill to establish standardised forensic procedures and enhance the reliability of forensic evidence. Ensuring the long-term effectiveness of these measures will require sustained investment, inter-agency collaboration, and a commitment to keeping forensic science independent, well-resourced and aligned with the broader goal of justice delivery.

Data can be a help

India's commitment to achieving the United Nations' Sustainable Development Goals by 2030 includes ambitious targets for gender equality, reduced inequalities, peace, justice, and strong institutions. While some progress is likely in certain areas — especially improved access to justice that is driven by digitisation and increased legal awareness — full achievement across all goals will remain a challenge. Data can help with this.

Disaggregated, consistent, timely and accurate data — accessible and compiled year-on-year in one place in relation to justice delivery — provides the basis for policymakers to frame plans and identify priorities within a complex set of interdependent operations.

IJR 2025 is the outcome of close collaboration between the independent IJR Collective and several external advisers, guides and supporters. We hope this report will inspire readers to consider a fundamental question: how can a system designed to deliver specific quality standards hope to achieve them when essential, officially recognised building blocks remain absent?

This gap — between aspiration and implementation — remains an oversight and a profound failure, one so critical that we cannot in good conscience continue to ignore it. ■