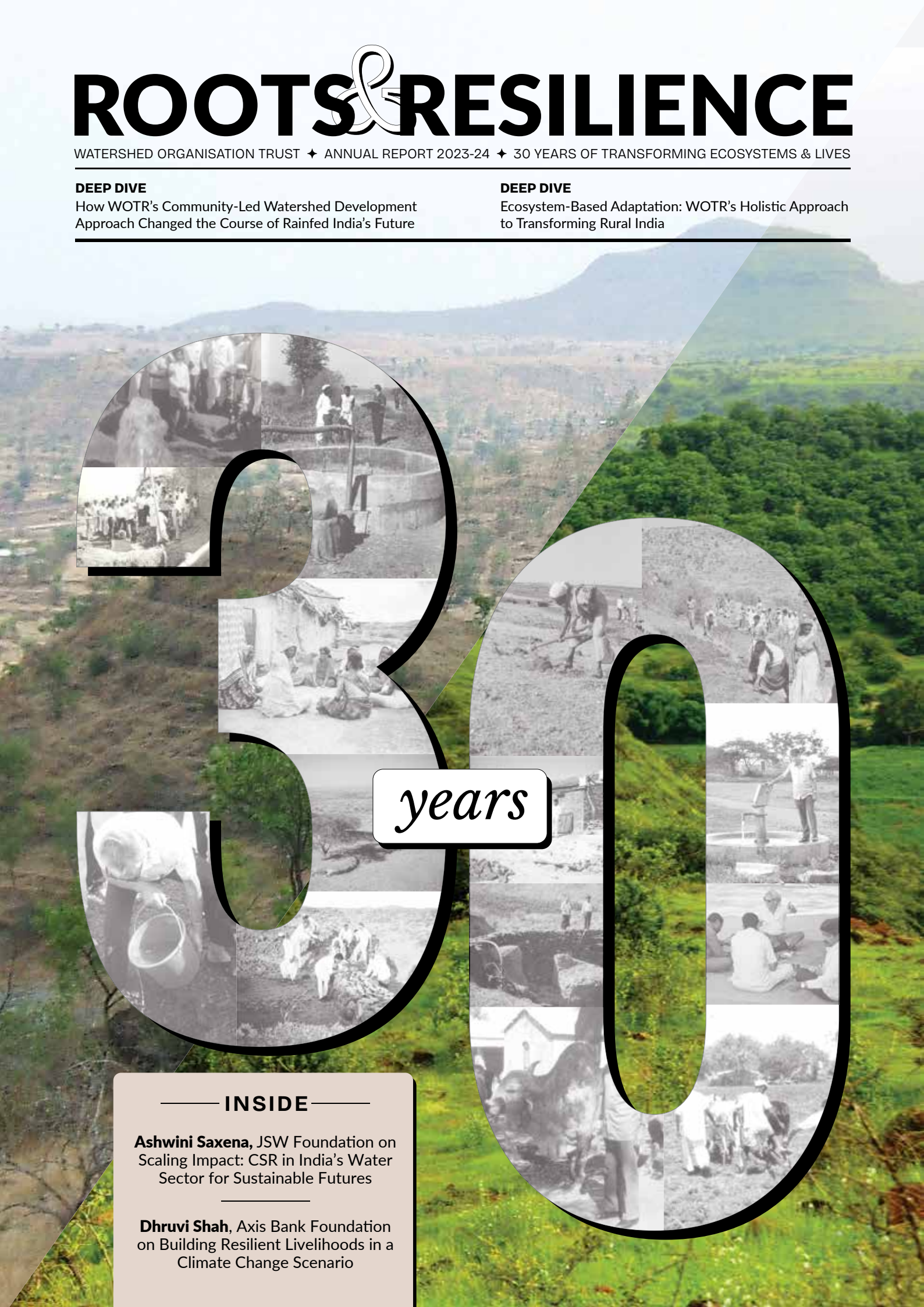
ROOTS & RESILIENCE

WATERSHED ORGANISATION TRUST ✦ ANNUAL REPORT 2023-24 ✦ 30 YEARS OF TRANSFORMING ECOSYSTEMS & LIVES

DEEP DIVE
How WOTR's Community-Led Watershed Development Approach Changed the Course of Rainfed India's Future

DEEP DIVE
Ecosystem-Based Adaptation: WOTR's Holistic Approach to Transforming Rural India



INSIDE

Ashwini Saxena, JSW Foundation on Scaling Impact: CSR in India's Water Sector for Sustainable Futures

Dhruvi Shah, Axis Bank Foundation on Building Resilient Livelihoods in a Climate Change Scenario

ROOTS & RESILIENCE

30 YEARS OF TRANSFORMING ECOSYSTEMS AND LIVES

WOTR
Rejuvenating Communities & Ecosystems

TABLE OF contents

FROM THE MANAGEMENT'S DESK 4

VISION, MISSION AND APPROACH 6

THE THEMES THAT ENABLE A SYSTEMIC INTERVENTION 8

BOARD OF TRUSTEES 12

WOTR AT A GLANCE 13

OUR PRESENCE 14

WOTR IN 2023-24 15

30 YEARS OF WOTR 16

IMPLEMENTATION HIGHLIGHTS FROM THE STATES 18

DEEP DIVE 26
How WOTR's Community-Led Watershed Development Approach Changed the Course of Rainfed India's Future
by Crispino Lobo

DEEP DIVE 32
Ecosystem-Based Adaptation: WOTR's Holistic Approach to Transforming Rural India
by Marcella D'Souza

APPLIED RESEARCH: W-CReS 36

INNOVATING FOR SCALAR IMPACT 42

DONOR SPEAK 44
Scaling Impact: CSR in India's Water Sector for Sustainable Futures
by Ashwini Saxena, JSW Foundation

EXPERT SPEAK 50
Water Governance: Transforming Mindsets for Collective Responsibility
by Eshwer Kale & Ankita Yadav

COMMUNITY HEROES 54
From Fatalism to a Redeemed Future: One Man's Sustainable Development Mission – Beni Prasad Jhariya

EXPERT SPEAK 58
Guardians of the Land: Harnessing Traditional Knowledge for Biodiversity Conservation
by Ashwini M Wadhu, Omkar M Hande, Y.D. Imran Khan

CASE STUDY 64
Can Rocks Grow Grains?
A Saga from Rajasthan

EXPERT SPEAK 66
Empowering Farmers with Forecasts:
How can regular weather updates
aid Farmers' Decision-making
by Sahana Hegde

COMMUNITY HEROES 74
The Fertile Ground: Restoring the
Land, Reviving a Community

EXPERT SPEAK 76
Advancing Climate Resilient
Development for Semiarid
Farming Systems in India
by Arjuna Srinidhi

COMMUNITY VOICES 80
Building a Sustainable Future

DONOR SPEAK 82
Building Resilient Livelihoods
in a Climate Change Scenario
by Dhruvi Shah, Axis Bank Foundation

CASE STUDY 88
Hope Distilled-How Villages in
Telangana and Jharkhand transitioned
from Liquor to Sustainable Livelihoods

IN THE MEDIA 90

COMMUNITY HEROES 94
They used to throw Stones
at Me! – Bireng Soy

DEEP DIVE 97
Empowering Farmer Producer Companies:
A WOTR Approach to Transforming
India's Agricultural Landscape
by Abhijit Shinde

FROM THE GROUND 102
A Day in the Life of a Jal Sewika

EXPERT SPEAK 104
Maintaining Ecosystem Services
and Biodiversity for Long-term
Sustainability of Ecosystems
by Tushar Suryawanshi, Satyam Rana,
Saurabh Purohit

COMMUNITY HEROES 109
She was subject to merciless beatings
night after night! – Urvashi Gaekwad

EXPERT SPEAK 112
Building Organisational Culture
for a Future-ready NGO
by Sridhar Ganesh

COMMUNITY HEROES 117
This family mostly Survived on Rice or
Jowar with Chilli – Singaram Budhundu

PUBLICATIONS & PRODUCTIONS 120

ECOBARI 122

KNOWLEDGE PARTNERS 124

FUNDING PARTNERS 125

OVERVIEW OF PROJECT
EXPENDITURE 2023-24 127

FROM THE Management's Desk

Dear Partner,

As we embark on the release of our annual report for the financial year 2023-24, we do so with a profound sense of reflection and a steadfast commitment to the future. This momentous year marks a pivotal milestone in the journey of the Watershed Organisation Trust (WOTR) – 30 years of dedicated efforts to transform ecosystems and mobilise communities.

Over the past three decades, WOTR has stood at the forefront of implementing integrated watershed development and climate change adaptation programmes in rural India. It is a journey fueled by the spirit of partnership, drawing on the knowledge and expertise of local communities, science-based insights, government institutions, and dedicated supporters from India and around the globe.

The journey has crossed many milestones along the way and here are a few we fondly recount:

- → **MOBILISING COMMUNITIES:** We ignited change through our role as co-designers and as the technical, capacity building and coordinating agency for the ground breaking Indo-German Watershed Development Programme (IGWDP), kickstarting community-led watershed development, at scale, across the country.
- → **CHAMPIONING INCLUSION:** Our pioneering Wasundhara Approach has empowered every member of society, ensuring their voices are heard and their needs are met.
- → **EMPOWERING WOMEN:** We've always recognized that women are the heart of progress, making their empowerment a core pillar of our work.
- → **CONFRONTING THE WATER CRISIS:** Through innovative initiatives like Water Stewardship, Water Budgeting, Aquifer Management and the Water Governance Standard (WGS), we have attempted to tackle India's water challenges head-on. Our WGS promotes positive behavioural change and incentivizes water investments thus bolstering water security for rural communities.
- → **RESEARCH TO GUIDE SUSTAINABLE ACTIONS ON THE GROUND:** Our dedicated research wing, W-CReS, ensures the challenges faced by rural communities are not only understood but also addressed in research and policy-making.
- → **BUILDING CLIMATE RESILIENCE:** We've championed the EbA (Ecosystem-based Adaptation) approach, protecting ecosystems, preserving biodiversity, and fortifying communities against the impacts of climate change.
- → **EMPOWERING FARMERS WITH TECHNOLOGY:** We are at the forefront of delivering dynamic weather-based, location-crop-livestock specific advisories through our successful FarmPrecise app, now used by 70,000 farmers.
- → **LEADING DROUGHT MITIGATION:** We were appointed by the Governments of Maharashtra and Madhya Pradesh as the Technical Support Agency for Drought Mitigation Planning under the National Disaster Management Fund (NDMF).
- → **SCALING CLIMATE SOLUTIONS:** We co-founded ECOBARI, a collaborative dedicated to expanding the reach of EbA solutions across India.. Our commitment to climate resilience extends to key roles on government committees, including the National Committee on Climate Resilient Agriculture and the Technical Committee for Water Management under the Green Credit Program. Further strengthening this commitment, we signed a Memorandum of Understanding (MOU) with the Government of Maharashtra. This MOU focuses on developing methodologies to mitigate

climate risks, enhance the adaptive capacities of rural communities in water and agriculture management, and formulate a policy promoting eco-centric, climate-resilient development in rural areas.

In this journey, we have been fortunate to receive recognition such as the Kyoto World Water Grand Prize at the 5th World Water Forum, and the "Land for Life Award" by the United Convention to Combat Desertification in 2017.

This journey, however, is far from over. The urgency of our mission is underscored by the escalating global climate crisis. From the devastating Himalayan floods to the prolonged droughts across vast regions of dryland India, we see how climate change is disrupting lives and livelihoods in the country. This challenge demands a concerted global response, one that prioritises building resilience within the most vulnerable communities.

The pages of this annual report tell a compelling story. In the past year alone, we have restored 14,800 hectares of degraded land and built resilience among 2.4 million people across India's most vulnerable regions. In Maharashtra, five MOUs have been signed with various departments of the Government of Maharashtra to build community resilience across vast rural regions of the state. These figures are not mere statistics; they represent countless lives transformed through access to clean water, improved agricultural practices, better nutrition and health, and the hope of a sustainable future.

Yet, as we celebrate these achievements, we also recognize the formidable challenges that remain.

Climate change, environmental degradation and biodiversity loss continue to reshape our planet, and its impact falls disproportionately upon those already facing poverty and marginalisation. The road before us will undoubtedly demand continued innovation, unwavering determination, and the expansion of our collaborative network. In this spirit of collaboration, this special edition of our Annual Report features the voices of our partners - scientists, sustainability partners and our community representatives.

As we look ahead, WOTR is poised to enter a new chapter. We will continue to refine our interventions, prioritising ecosystem-based adaptation, climate-resilient agriculture, community-led natural resource management, and gender-inclusive development. Our focus on capacity-building, knowledge dissemination, and evidence-based advocacy will amplify our impact and inspire action at all levels.

We extend our heartfelt gratitude to the countless individuals, communities, and organisations who have walked alongside us throughout this journey. It is your unwavering support that fuels our work and makes the dream of a just and sustainable world a tangible reality.

On behalf of the Board of Trustees, we invite you to explore this annual report and witness the transformative power of collective action. Together, let us continue cultivating a future where both people and the planet can thrive.

Yours Sincerely,

Prakash Keskar
Executive Director

Marcella D'Souza
Founder Director, W-CReS

Crispino Lobo
Managing Trustee and Co-founder

a vision for rural india

Resilient rural communities that enjoy a fulfilling quality of life within vibrant and sustainable ecosystems

a mission to make rural poverty a distant memory

WOTR tackles the key causes of rural poverty by rejuvenating ecosystems and building the community's resilience to climate change. We enhance the availability of water, increase the productivity of land and agriculture, diversify livelihoods, empower women, and strengthen the health and well-being of vulnerable rural communities

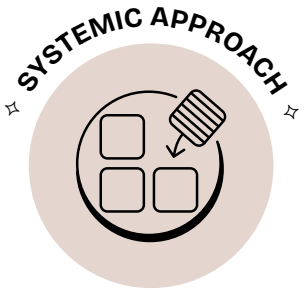
our impact areas

WOTR engages at the intersection of practice, knowledge and policy across scales and in collaboration with various stakeholders across sectors. This is enabled through

- **Implementation**
  through a systemic lens. Thematic areas include 'Land & Water Management', 'Climate Resilient Agriculture', 'Livelihoods', 'Women Empowerment' and 'Health, Sanitation & Nutrition'

- **Applied Research and Policy Advocacy through W-CReS**
  which leads to effective implementation and sustainable outcomes on the ground

- **Training and Capacity Building**
  through training programmes for diverse groups, including government officials, community organisations, corporations, and students. These programmes cover fields like ecosystem based adaptation, geospatial tools, water budgeting, and climate-resilient agriculture.



a systemic approach

We firmly believe that combating rural poverty requires a systemic approach that requires rejuvenating both rural communities and their surrounding natural ecosystems. Employing an EbA approach, we mobilise rural communities to restore and efficiently manage their land, water, and forests, while promoting participatory governance and sustainable livelihoods thus enhancing their adaptive capacities. This leads to revitalised ecosystems that strengthen their resilience to climate change, generates more livelihood opportunities, and boosts their overall quality of life, health, and nutrition.

Read in detail about our Systemic Approach

aligning with the international agenda

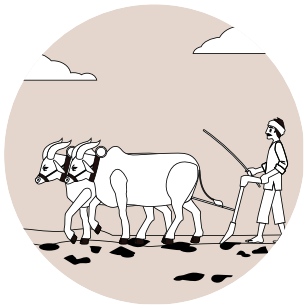
Our work strongly aligns with key international priorities, including Land Degradation Neutrality, the Paris Agreement on Climate Change, the Convention for Biodiversity, the Sendai Framework for Disaster Risk Reduction, and the UN 2030 Agenda for Sustainable Development.

By placing a high priority on environmental protection, natural resource conservation, adaptive capacity enhancement, and community resilience building, we actively contribute to 12 out of the 17 Sustainable Development Goals (SDGs) established by the United Nations.

The themes that enable a systemic intervention

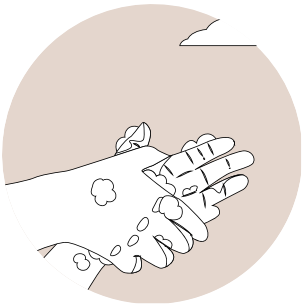
LAND AND WATER MANAGEMENT: At WOTR, our primary commitment lies in revitalising ecosystems that have faced degradation. We understand that restored natural ecosystems offer the only sustainable path out of poverty. A comprehensive integrated watershed development is employed where we join hands with rural communities to conserve and restore natural resources, including soil and water. The approach is holistic and spans the entire landscape - from the ridge to the valley. We mobilise our communities to harvest each drop of rainfall and preserve every bit of soil, laying a firm foundation for them to thrive and prosper. In parallel, we work closely with these communities, fostering effective governance of these vital resources. This dual approach, we believe, not only yields lasting benefits but also ensures the sustainability of our efforts.

LIVELIHOODS: Our Livelihoods programme focuses on the comprehensive development of both farm and non-farm based enterprises in rural communities. We provide support to improve productivity and sustainability in agriculture, while also aiding the growth of non-farm activities to diversify income sources. By equipping communities with the skills, knowledge, and resources necessary to establish and expand local businesses, we enhance income stability and financial independence. Our approach includes promoting sustainable farming methods, enhancing market linkages, and encouraging entrepreneurship in areas such as crafts, livestock, and services. Our goal is to help rural communities build resilient and diversified livelihoods that can weather economic and climatic uncertainties.



AGRICULTURE: Our focus on Climate Resilient Agriculture is aimed at empowering rural communities to effectively manage and enhance their agricultural practices amidst changing climate conditions. We strive to blend traditional knowledge with scientific advancements to develop sustainable farming practices that can withstand climatic uncertainties. Our goal is to improve crop productivity and livelihood resilience while reducing environmental footprints. Through comprehensive training and knowledge-sharing, we help communities transform their agriculture into a sustainable, adaptive, and economically viable system, ensuring food security and livelihoods in the face of climate change.

WOMEN EMPOWERMENT: Our Women Empowerment programme places special emphasis on establishing and supporting Self-Help Groups (SHGs), recognising the transformational power they hold in rural societies. Through these groups, we aim to equip women with the necessary skills, resources, and confidence to become active economic and social contributors in their communities. We provide training and support to foster leadership, entrepreneurship, and financial literacy. This not only enhances their income-generating capacities but also boosts their social status and decision-making power within their households and communities. By nurturing these SHGs, we are not just empowering individual women, but catalysing change that uplifts entire communities, advancing gender equality and contributing to overall rural development.



HEALTH, SANITATION, AND NUTRITION: Our Health, Sanitation, and Nutrition initiative is committed to improving the overall wellbeing of rural communities. We promote kitchen gardens and multilayer farms as sources of nutritious food and self-sufficiency. Through initiatives focused on accessing clean drinking water, we address a crucial aspect of disease prevention and good health. We organise health camps for anaemia detection and treatment and monitor child growth to ensure proper development. Our comprehensive approach to health extends to menstrual hygiene as well; we distribute Saafkins, an eco-friendly menstrual product, promoting a safe and hygienic menstrual cycle for women. By integrating these diverse components – nutrition from locally-grown food, improved sanitation from clean water, and direct health interventions – we foster healthier, more resilient communities.

BOARD OF trustees

Asoke Basak

Chairman, former Additional Chief Secretary, **MAHARASHTRA** *former Chairman,* **MAHARASHTRA STATE ELECTRICITY BOARD**

Crispino Lobo

Managing Trustee and Co-founder, former Program Coordinator **INDO-GERMAN WATERSHED DEVELOPMENT PROGRAMME**

Dr. Marcella D'Souza

Founder Director, **W-CReS** *former Executive Director,* **WOTR** *Takemi Fellow,* **HARVARD SCHOOL OF PUBLIC HEALTH**

Malini Thadani

Director, **ACCESS DEVELOPMENT SERVICES;** *Independent Director,* **AU SMALL FINANCE BANK;** *Independent Director,* **MIRAE ASSET INVESTMENT MANAGERS (INDIA);** *Senior Adviser,* **FTI CONSULTING;** *former Registrar,* **NATIONAL INSTITUTE OF FASHION TECHNOLOGY;** *Former Head, Corporate Sustainability,* **HSBC ASIA PACIFIC**

N. Srinivasan

Development finance and livelihoods expert; Member, **ENFORCEMENT COMMITTEE, SELF REGULATORY ORGANISATION OF MFIS - SaDHAN;** *Independent Director,* **SAMUNNATI FINANCIAL INTERMEDIATION & SERVICES PRIVATE LIMITED;** *Independent Director,* **EQUITAS SMALL FINANCE BANK;** *Advisor, Board of Trustees,* **HAND IN HAND INDIA**

WOTR AT A glance

REACH

STATES	DISTRICTS	VILLAGES
10	75	7255

PEOPLE IMPACTED
7.92 MILLION

FPOs ESTABLISHED*
72

LAND TREATED
3.83 MILLION HECTARES

PEOPLE TRAINED**
757,502+

NGOs/GOVT. AGENCIES COLLABORATED WITH
231

IMPACT OF HEALTH & NUTRITION INITIATIVES
>2.2 LAKH PEOPLE

FAMILIES IMPACTED THROUGH WSI* INTERVENTIONS
>72,864

NO. OF WOMEN SUPPORTED THROUGH SHGs
252,829

WOMEN SHGs* SUPPORTED
21,500

RESEARCH PUBLICATIONS
>200

FILMS CREATED
470

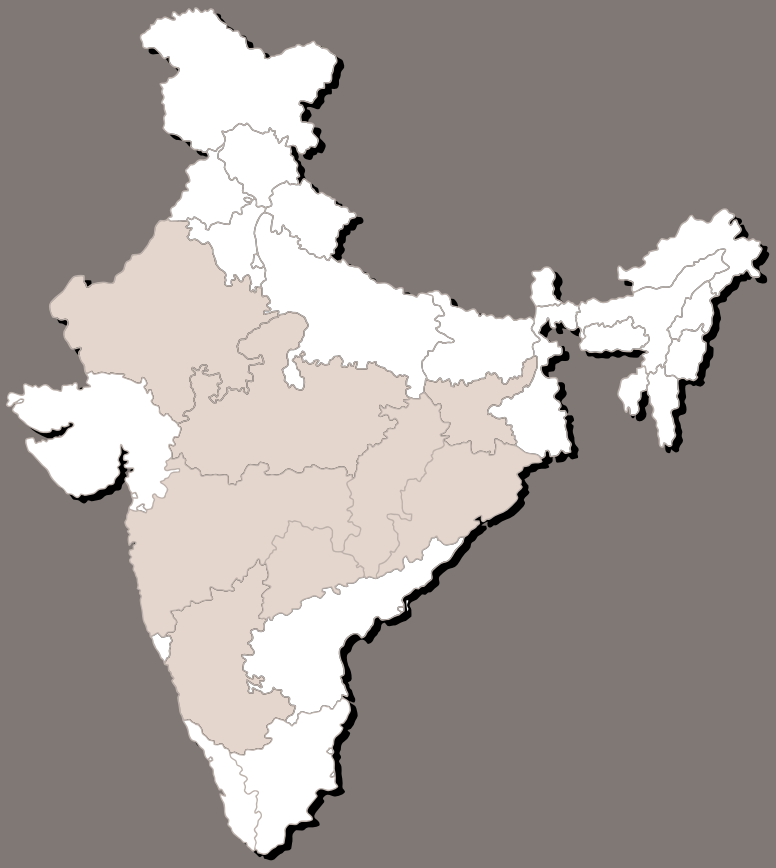
BLOG POSTS CREATED
277

OTHER PUBLICATIONS
>740

FPO: FARMER PRODUCER ORGANISATION **SHG:** SELF HELP GROUP **WSI:** WATER STEWARDSHIP INITIATIVE

****WOTR & PARTNERS**

OUR presence



RAJASTHAN

Districts: *Udaipur, Rajasamand, Salumbar, Sawai Madhopur, Gangapur City, Karauli, Baran*

KARNATAKA

District: *Bidar*

TELANGANA

Districts: *Sangareddy, Rangareddy, Narayanpet, Siddipet, Khammam*

MADHYA PRADESH

Districts: *Damoh, Dhar, Chhindwara, Seoni, Mandla, Pandhurna, Dindori, Anuppur*

CHHATTISGARH

Districts: *Korea, Surajpur*

ODISHA

Districts: *Rayagada, Gajapati, Ganjam*

MAHARASHTRA

Districts: *Dhule, Nashik, Palghar, Thane, Raigad, Pune, Satara, Sangli, Solapur, Beed, Jalna, Dharashiv, Ahmednagar, Chhatrapati Sambhajinagar, Buldana, Amravati, Yavatmal, Wardha, Nagpur, Gadchiroli*

JHARKHAND

Districts: *Palamu, Gola Ramgarh, Gumla, Khunti, Goilkera, West Singhbhum*

WOTR IN 2023-24

VILLAGES
2,136

PEOPLE IMPACTED
>2.42 MILLION

HOUSEHOLDS IMPACTED
756,889

WATER STORAGE CAPACITY CREATED
3.922 BILLION LITRES

NO. OF FPOs SUPPORTED
37

SHGs SUPPORTED
7,175

LAND TREATED FOR SOIL AND WATER CONSERVATION
>14,793 Ha

AREA UNDER CRA* PRACTICES
>12,771 Ha

WATER SAVED
>1.68 BILLION LITRES

PUBLICATIONS
108

PEOPLE TRAINED
98,281

FILMS PRODUCED
23

CRA: CLIMATE RESILIENT AGRICULTURE
FPO: FARMER PRODUCER ORGANISATION **SHG:** SELF HELP GROUP **WSI:** WATER STEWARDSHIP INITIATIVE

30 years of WOTR

1992

Launch of the path breaking Indo-German Watershed Development Programme (IGWDP)

- Conceptualisation of WOTR

1993

WOTR founded and established as the technical, capacity building and coordinating agency of the IGWDP

1995

Need for women representation in Watershed Development acutely felt

- WOTR forays into Women Empowerment

1996

WOTR starts implementing Watershed Development Projects on its own to develop a standard and a benchmark

2002

Wasundhara Approach conceptualized to include gender and all sections of society

- WOTR moves into health and nutrition

2007

Significant weather variability observed affecting agriculture and livelihoods

- Automated weather stations installed in villages
- Action Research on Rural Issues and Climate Change initiated
- The concept and practice of Water Budgeting initiated to address frequent water shortages in villages

2009

Large-scale Climate Change Adaptation and Vulnerability Reduction Program launched

- Crop Weather Advisories rolled out to help farmers deal with climate change
- Automated weather stations network expanded

2015

An impending water crisis in India

- WOTR designs the Water Stewardship Initiative to address how water is used (demand side) which includes the Water Budgeting methodology

2016

Challenges faced by rural communities not adequately represented and understood in research and policy-making

- W-CReS (WOTR Centre for Resilience Studies) established as a dedicated applied research wing

2019

Need felt to secure ecosystems, conserve biodiversity and build resilience to climate change

- EbA approach adopted
- FarmPrecise mobile app launched to help farmers with dynamic, locale and crop specific weather-based advisories
- Community-based Aquifer Management developed and implemented as a new addition to the Water Stewardship Initiative

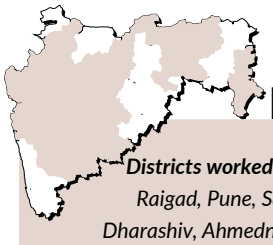
2021

The Collaborative, ECOBARI, launched with 8 other co-founding partners to upscale EbA in the country

2023

- **Launch of the Water Governance Standard (WGS), a certification framework that rates villages with a "water score"- promotes Water Stewardship by creating incentives that nudge behavioral change and attract water investments**
- **Various departments / agencies of Government of Maharashtra -Environment and Climate Change, Agriculture, Water Supply and Sanitation, Water Resources, Groundwater Survey and Development Agency and POCRA- formally partner WOTR to build resilience to climate change by promoting climate resilient agriculture, enhancing water security and developing an Ecosystem-based Adaptation (EbA) Policy for rural Maharashtra**
- **The governments of Maharashtra and Madhya Pradesh appoint WOTR as Technical Support Agency for Drought Mitigation Planning under the National Disaster Management Fund (NDMF)**
- **WOTR appointed to the national Committee for preparing a framework on village level climate change adaptation plans under the National Mission for Sustainable Agriculture (NMSA) by Govt. of India**
- **Govt. of India appoints WOTR to the Technical Committee for Water Management under the Green Credit Program**
- **WOTR participates in several G20 conclaves**
- **WOTR alongside ICARDA, and ICLARM participate at COP28 on the theme,'Beyond Resilience: Thriving Dryland Communities through Integrated Land, Water, and Food Systems'**

STATE implementation highlights



Maharashtra

Districts worked in: *Dhule, Nashik, Palghar, Thane, Raigad, Pune, Satara, Sangli, Solapur, Beed, Jalna, Dharashiv, Ahmednagar, Chhatrapati Sambhajinagar, Buldana, Amravati, Yavatmal, Wardha, Nagpur, Gadchiroli*

LIVES IMPACTED
1.2+ million

NO. OF VILLAGES
800

LAND TREATED FOR SOIL AND WATER CONSERVATION
6,870+ hectares

WATER SAVED
948+ million litres

WATER STORAGE CAPACITY CREATED
2.3 billion litres

SHGs SUPPORTED
4,826

NO. OF FPOs SUPPORTED
18

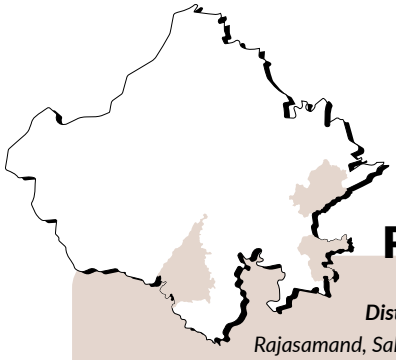
AREA UNDER SUSTAINABLE FARMING
9,511 hectares

Maharashtra's agriculture faces a severe crisis, with only 54% of its land under cultivation and one-third of the state within a rain-shadow area of low, erratic rainfall. Climate change, high input costs, market volatility, and shrinking landholdings have rendered the sector increasingly unprofitable, threatening the livelihoods of over half the state's population.

The average size of operational holdings has drastically decreased from 4.28 hectares in 1970-71 to 1.34 hectares in 2015-16, with marginalised communities such as Scheduled Castes and Tribes experiencing even sharper declines. Smallholder agriculture dominates the landscape, with 79.5% of holdings being small or marginal, yet these farmers face significant financial and operational pressures.

The agricultural crisis is starkly underscored by the 2,527 farmer suicides in Vidarbha and Marathwada in 2023, highlighting the distress caused by cycles of crop loss and debt. Untimely rains in 2023 caused significant losses in cereals, pulses, oilseeds, and sugarcane, while drought conditions affected 22.66 lakh hectares of crops.

The Desertification and Land Degradation Atlas reports that 14.3 million hectares of land in Maharashtra are degraded, intensifying the crisis. To address these challenges, Maharashtra needs a multi-pronged strategy focusing on reviving the natural ecosystems, climate-resilient agriculture, support for smallholders, land rehabilitation, and expanding organic farming. These steps are crucial to revitalising the state's agricultural sector and ensuring sustainable livelihoods for its rural population. ✦



Rajasthan

Districts worked in: *Udaipur, Rajasamand, Salumbar, Sawai Madhopur, Gangapur City, Karauli, Baran*

LIVES IMPACTED
395,896

NO. OF VILLAGES
370

LAND TREATED FOR SOIL AND WATER CONSERVATION
795+ hectares

WATER SAVED
118 million litres

WATER STORAGE CAPACITY CREATED
49 million litres

NO. OF FPOs SUPPORTED
12

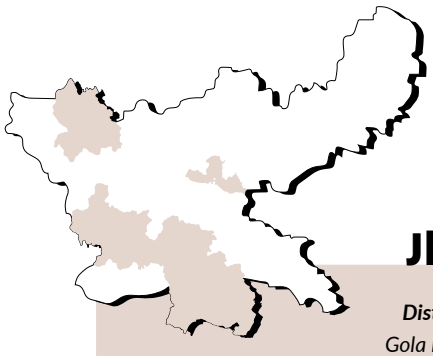
AREA UNDER SUSTAINABLE FARMING
218 hectares

Rajasthan, the largest state in India, faces severe challenges in agriculture due to its extreme climate, erratic rainfall, and depleting water resources. The state experiences four distinct seasons, with a short monsoon period characterised by late onset, early withdrawal, and scanty, irregular rainfall. Agriculture is primarily rain-fed, making the sector highly vulnerable to these climatic uncertainties and the rapidly declining groundwater levels.

Over 62.06% of Rajasthan's total geographical area, approximately 21.23 million hectares, is undergoing desertification and land degradation, significantly impacting agricultural productivity. The scarcity of water is exacerbated by interrupted rainfall patterns and high livestock populations, making access to potable water increasingly difficult. With over 79% of the groundwater blocks classified as overexploited or critical, the state's water crisis is a formidable barrier to sustainable agricultural development.

Despite these challenges, agriculture and allied activities remain the backbone of Rajasthan's economy, contributing 26.72% to the state's GSVA in 2023-24. However, over 61% of land holdings belong to small and marginal farmers who are disproportionately affected by water scarcity and land degradation.

To secure Rajasthan's agricultural future, there is a pressing need for sustainable water management, improved irrigation infrastructure, and support for small and marginal farmers. Emphasising drought-resistant crop varieties, promoting efficient water use practices, and investing in groundwater recharge initiatives are critical steps toward mitigating the impact of climate change and ensuring the resilience of Rajasthan's agricultural sector. ✦



Jharkhand

Districts worked in: *Palamu, Gola Ramgarh, Gumla, Khunti, Goilkera, West Singhbhum*

LIVES IMPACTED
313,911

NO. OF VILLAGES
525

LAND TREATED FOR SOIL AND WATER CONSERVATION
252+ hectares

WATER SAVED
16+ million litres

WATER STORAGE CAPACITY CREATED
22+ million litres

SHGs SUPPORTED
1,508

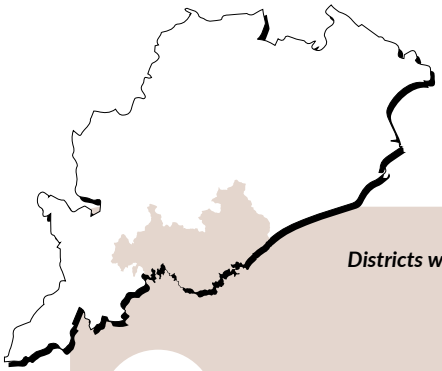
NO. OF FPOs SUPPORTED
1

Jharkhand's rural development faces significant challenges, particularly in the face of climate change and poverty. With 75.95% of its population residing in rural areas, including a large proportion of Scheduled Castes and Scheduled Tribes, Jharkhand struggles with high poverty levels—46% of the rural population lives below the poverty line. Agriculture employs over 75% of the workforce but contributes only 20% to the Gross State Domestic Product (GSDP), reflecting low productivity and limited irrigation infrastructure.

The state's agriculture is predominantly rain-fed, with only 13.5% of the net sown area having access to irrigation, and just 12% of its irrigation potential utilised. Erratic rainfall, prolonged droughts, and flooding—often exacerbated by climate change and El Niño effects—further strain agricultural productivity, particularly for marginalised and tribal communities who lack resources to adapt. Jharkhand's undulated topography and absence of perennial rivers limit irrigation schemes primarily to minor ones, leaving farmers dependent on groundwater for agriculture and domestic use.

With around 50% of farmers owning less than 0.4 hectares and 70% of landholdings classified as marginal, agricultural productivity is severely constrained. The skewed land ownership distribution, reliance on traditional farming practices, and the vulnerability of small-scale farmers to climate variability exacerbate food insecurity and economic distress.

To address these challenges, Jharkhand needs a comprehensive rural development strategy that incorporates climate resilience, enhances irrigation infrastructure, and supports small and marginal farmers. Implementing adaptive measures, improving water management, and expanding access to modern agricultural technologies are essential steps to boost productivity and ensure sustainable livelihoods for Jharkhand's rural communities. ✦



Odisha

Districts worked in: *Rayagada, Gajapati, Ganjam*

LIVES IMPACTED
174,174

NO. OF VILLAGES
175

LAND TREATED FOR SOIL AND WATER CONSERVATION
171+ hectares

WATER SAVED
2+ million litres

WATER STORAGE CAPACITY CREATED
8+ million litres

SHGs SUPPORTED
174

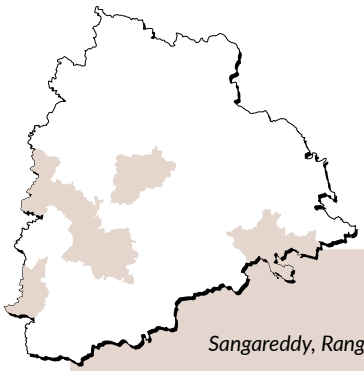
NO. OF FPOs SUPPORTED
4

Odisha, with 87% of its 37 million people living in rural areas, faces significant developmental challenges, despite its agricultural backbone. The state's performance in achieving the United Nations-mandated Sustainable Development Goals has been underwhelming, with Odisha ranked among the lowest five states by NITI Aayog in 2021. Agriculture and allied sectors employ 48.1% of the workforce, yet the sector is under severe stress due to land degradation, poor irrigation infrastructure, and climate vulnerabilities.

Approximately 34.42% of Odisha's land—around 5.35 million hectares—is undergoing desertification and land degradation, severely affecting agricultural productivity. The state's predominantly hilly terrain makes rural areas highly susceptible to water flow damage from upper catchment areas, exacerbating soil erosion and damaging farmlands. A lack of proper irrigation infrastructure forces farmers to rely heavily on erratic rainfall, heightening the risks to crop yields and livelihoods.

Odisha's economic indicators further highlight the struggle: the per capita income stands at INR 1.6 lakh, 12% lower than the national average of INR 1.8 lakh. The state also grapples with high levels of multidimensional poverty, affecting 14.96% of its population, and concerning maternal and child health statistics, including a maternal mortality ratio of 119, above the national average of 97.

The agricultural sector is in distress, facing a lack of both capital and human resources, and the impacts of climate change are poised to worsen these conditions. Odisha urgently needs targeted interventions to improve irrigation infrastructure, promote sustainable land management, and build climate resilience in agriculture. Additionally, investment in health, education, and income-generating opportunities is critical to improving the overall quality of life and lifting the state towards achieving its development goals. ✦



Telangana

Districts worked in:
Sangareddy, Rangareddy, Narayanpet, Siddipet, Khammam

LIVES IMPACTED
109,412

NO. OF VILLAGES
83

LAND TREATED FOR SOIL AND WATER CONSERVATION
3,521+ hectares

WATER SAVED
35+ million litres

WATER STORAGE CAPACITY CREATED
934+ million litres

SHGs SUPPORTED
364

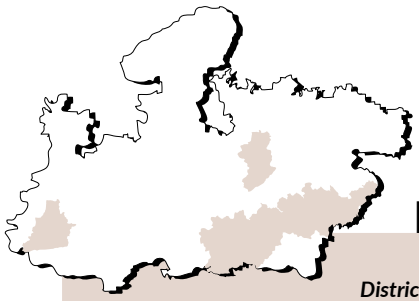
NO. OF FPOs SUPPORTED
1

AREA UNDER SUSTAINABLE FARMING
1,365+ hectares

Telangana faces critical challenges in agriculture due to land degradation, climate variability, and water scarcity. Approximately 31.68% of the state's land, about 3.6 million hectares, is undergoing degradation, primarily due to soil erosion, deforestation, and unsustainable farming practices. These issues directly impact agricultural productivity, threatening food security for half of the state's population that relies on agriculture for their livelihoods. Rural Telangana is increasingly vulnerable to climate change, experiencing frequent droughts and erratic rainfall. Delayed monsoons, significant rainfall variability, and prolonged dry spells, particularly in 2023, have led to crop failures and economic distress among farmers. Groundwater depletion and inadequate irrigation further exacerbate the challenges, particularly for small landholders who face high risks and low yields. The average size of landholdings has decreased from 1 hectare in 2015-16 to 0.89 hectares in 2021-22, reflecting ongoing fragmentation that hampers productivity and complicates land management.

Telangana's small and marginal farmers often rely on traditional methods, lack access to modern technologies, and face poor soil conditions. The absence of post-harvest facilities and market linkages further strains farmers' ability to sustain their livelihoods. Over-extraction of groundwater and poor irrigation infrastructure is also contributing to a decline in agricultural output. This water scarcity not only affects crop production but also impacts drinking water availability, causing health issues in rural communities.

To address these challenges, Telangana needs a comprehensive strategy focused on sustainable land management, improved irrigation, support for small farmers, and climate adaptation measures. Enhancing access to modern agricultural technologies, strengthening market linkages, and improving health services in rural areas are critical to securing sustainable development and improving the livelihoods of Telangana's farming communities. ✦



Madhya Pradesh

Districts worked in: *Damoh, Dhar, Chhindwara, Seoni, Mandla, Pandhurna, Dindori, Anuppur*

LIVES IMPACTED
87,697

NO. OF VILLAGES
133

LAND TREATED FOR SOIL AND WATER CONSERVATION
1,200+ hectares

WATER SAVED
355+ million litres

WATER STORAGE CAPACITY CREATED
222+ million litres

SHGs SUPPORTED
301

NO. OF FPOs SUPPORTED
1

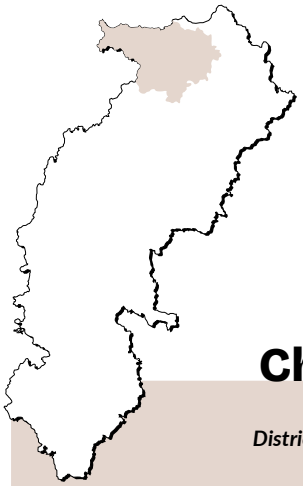
AREA UNDER SUSTAINABLE FARMING
1,618 hectares

Madhya Pradesh, a state where nearly three-quarters of the population depends on agriculture and related sectors, has made remarkable strides in transforming its agricultural landscape. It has emerged as a leading producer of essential commodities like food grains, pulses, and oilseeds, significantly contributing to India's agricultural output. With over 9.8 million farmers, the majority being small and marginal, agriculture forms the backbone of the state's economy and sustains the livelihoods of millions in rural areas.

However, despite this progress, environmental degradation poses a serious threat to the state's agricultural sustainability. A significant portion of the state's land, about 3.85 million hectares or 12.52%, is undergoing degradation, primarily due to unsustainable practices such as over-harvesting, deforestation, and cultivation on marginal lands. These practices have led to soil erosion, water pollution, and declining soil fertility, jeopardising the livelihoods of countless rural communities.

The vulnerability of Madhya Pradesh's rural population is further compounded by their dependence on natural resources and low income levels. To safeguard the state's agricultural future and ensure the well-being of its people, urgent action is required.

Key interventions include promoting sustainable farming practices that conserve soil and water resources, providing support and training to small and marginal farmers, and implementing effective soil and water management techniques. By strengthening these areas, Madhya Pradesh can secure the future of its agricultural sector and protect the livelihoods of millions who depend on it. ✦



Chhattisgarh

Districts worked in: *Korea, Surajpur*

LIVES IMPACTED
35,776

NO. OF VILLAGES
44

LAND TREATED FOR SOIL AND WATER CONSERVATION
924+ hectares

WATER SAVED
10+ million litres

WATER STORAGE CAPACITY CREATED
103+ million litres

SHGs SUPPORTED
2

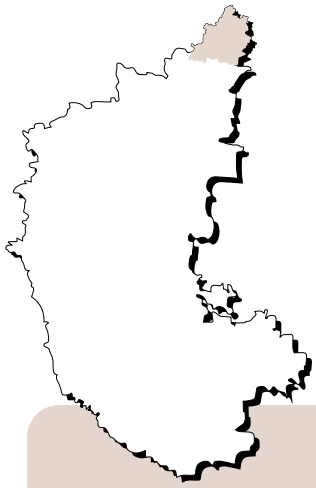
AREA UNDER SUSTAINABLE FARMING
49 hectares

Chhattisgarh's economy heavily relies on agriculture, which serves as the primary livelihood for 80% of the state's population and contributes about one-third to the state's GDP. However, the sector is predominantly rainfed, with rice as the main crop, making it highly vulnerable to climatic variations. Over 75% of farm households are small and marginal farmers with an average landholding of 1.4 hectares, facing low productivity due to traditional farming methods and inadequate access to modern agricultural technologies.

Land degradation is a growing concern, with 17.06% of Chhattisgarh's total geographical area—about 2.30 million hectares—undergoing desertification and degradation. This exacerbates the challenges of low agricultural productivity and increases the vulnerability of the state's farming communities. The lack of adequate non-farm employment opportunities leads to seasonal unemployment and underemployment, further compounding rural poverty.

Health challenges, particularly among rural women and children, are significant. Despite some improvements in maternal mortality rates, access to quality healthcare services remains limited, especially in remote areas. High rates of anaemia and malnutrition persist, affecting a substantial portion of women and children and hindering overall development.

To address these issues, Chhattisgarh needs to promote sustainable agricultural practices, enhance access to irrigation, and provide support for small and marginal farmers. Diversifying rural employment opportunities, investing in healthcare infrastructure, and improving nutrition services are essential steps toward building a resilient agricultural sector and improving the quality of life for Chhattisgarh's rural population. ✦



Karnataka

District worked in: *Bidar*

LIVES IMPACTED
18,165

NO. OF VILLAGES
6

LAND TREATED FOR SOIL AND WATER CONSERVATION
1,057 hectares

WATER SAVED
193+ million litres

WATER STORAGE CAPACITY CREATED
301+ million litres

Karnataka, the 8th largest state in India, faces severe agricultural challenges due to its heavy reliance on rainfed agriculture. With only 26% of its total sown area under irrigation, the state's agriculture depends largely on monsoon rainfall, which varies significantly in distribution. Approximately 36.29% of Karnataka's land, around 6.96 million hectares, is undergoing desertification and land degradation, significantly affecting agricultural productivity.

Frequent droughts have plagued Karnataka in recent years, with 223 out of 236 taluks declared drought-affected in 2023-24, resulting in substantial crop damage across 46.11 lakh hectares. Additionally, severe weather events like hailstorms have further damaged thousands of hectares, contributing to the decline in the agricultural sector's growth rate, expected to be -1.8% in 2023-24, down from 2.8% in the previous year. Fisheries have also suffered a decline of -4.6%, highlighting the broader impact of inadequate rainfall and extreme weather.

Small and marginal farmers, who account for 80% of total holdings and operate 44% of the cultivated area, are particularly vulnerable. They face recurrent droughts, untimely rainfall, and increased water scarcity, all of which severely impact crop yields. The shift from traditional organic to chemical farming in response to pests and diseases due to changing climatic conditions has further degraded soil fertility, compounding the sector's struggles.

To address these challenges, Karnataka needs to enhance its irrigation infrastructure, promote sustainable farming practices, and support small and marginal farmers through better access to resources and climate-resilient technologies. Investing in water management, pest control solutions, and soil conservation will be critical to mitigating the impacts of climate change and ensuring sustainable agricultural growth in the state. ✦

DEEP dive

How WOTR's Community-Led Watershed Development Approach Changed the Course of Rainfed India's Future

For generations, Indian farmers have lived at the mercy of the monsoon. Their eyes scan the heavens, their hopes and livelihoods hanging on those rain-laden clouds. The country's dependence on rain-fed agriculture makes it particularly vulnerable to the whims of nature.

From the 1970s to 2000, India suffered a series of severe droughts, including devastating episodes in 1972, 1979, and 1987. These droughts triggered severe water scarcity, crop failures, and economic hardship, highlighting the urgent need for sustainable water management solutions across the country.

Maharashtra, in particular, has historically struggled with frequent droughts. These droughts have had a profound impact on the state, leading to food shortages, economic distress, depletion of vital water resources, and increased social tensions. The ripple effects of these droughts were most acutely felt in rural areas, where agriculture forms the backbone of the economy and life itself. Families faced food insecurity, farmers spiralled into debt, and conflicts over scarce water resources became common.

But in India's rural heartland, a revolution is brewing – a transformation that empowers farmers to wrest control from the fickle skies.

This is the story of community-led watershed development, a movement that's turning barren lands lush and giving communities the tools to secure their own water future. Organisations like the Watershed Organisation Trust (WOTR) stand at the vanguard of this change. WOTR understands that the solutions lie within the communities themselves – in local voices, in traditional knowledge in dialogue with science and technology, and a collective will to build resilience.

Crispino Lobo, Co-founder, WOTR, paints a vivid picture of the challenges faced by India's rain-fed agriculture. "Imagine," he says, "80% of our rainfall comes in a single burst, the Southwest Monsoon. This means farmers have a limited window, the Kharif season, for assured cultivation." The harsh reality is that winter (Rabi) crops rely heavily on stored rainwater, primarily accessed through wells and tanks, significantly restricting the total area under cultivation throughout the year.

The geological makeup of the land further amplifies these woes. "A substantial portion of our rain-fed areas fall under hard rock formations," explains Lobo. "Groundwater recharge in these regions is far less efficient compared to areas with alluvial soil, like the Indo-Gangetic plains." Rainfed farmers thus grapple not just with unpredictable rainfall but also with limited and quickly depleting groundwater reserves. This precarious situation translates to inconsistent yields, jeopardising food security and hindering the economic prospects of rural populations. India has historically attempted to address water scarcity through large-scale irrigation projects, relying on dams and canals. While these projects have undoubtedly played a role, Lobo emphasises their limitations. "We've neared the peak of our irrigation potential with canals and dams," he says. "Expanding further is simply not feasible." Furthermore, large dams often come with significant environmental and social costs, disrupting natural river flows and displacing communities.

A NEW DAWN: THE INDO-GERMAN WATERSHED DEVELOPMENT PROGRAMME (IGWDP) AND WOTR'S FORMATION

The early 1990s marked a turning point. The Indo-German Watershed Development Programme (IGWDP), launched by WOTR's late Co-founder, Hermann Bacher, introduced a revolutionary new approach to water management.

PHOTOS: *WOTR, co-founded by Hermann Bacher and Cripino Lobo, in partnership with NABARD, fundamentally altered the approach to watershed development in India.*

Lobo describes the paradigm shift that began with the IGWDP. “Prior to IGWDP,” he explains, “watershed development projects were largely government-driven and technical in nature. While well-intentioned, they often lacked true community engagement, resulting in limited long-term impact.”

The IGWDP’s success was its collaborative nature. It was one of the largest of its kind, with the Government of India, Government of Germany, Government of Maharashtra, state institutions, and NGOs coming together, making it one of the most impactful programmes in the space. Its impact would ultimately shape policy, leading to the creation of a national Watershed Development Fund under NABARD (National Bank for Agriculture and Rural Development) to expand watershed development across India. Recognising the limitations of top-down, government-centric initiatives, the IGWDP focused on extensive capacity building and empowerment at the community level.

This was where WOTR emerged. Founded in 1993, WOTR was established to manage the capacity-building component of the IGWDP. “The need was to set up an institution to introduce the concept of capacity building and qualifying principles before you moved into full implementation,” Lobo explains. WOTR became responsible for identifying suitable communities, training community members and partner organisations, and ensuring progress before projects were scaled up.

WOTR, in partnership with NABARD, fundamentally altered the approach to watershed development in India. Through this groundbreaking collaboration, WOTR helped channel funding and resources for community-led initiatives.

FROM BENEFICIARIES TO DECISION-MAKERS: THE SANGAMNER MODEL

The IGWDP's transformative potential unfolded not just in policy changes, but also in the farmyards and village squares of rural India. The programme's impact is perhaps best exemplified by the "Sangamner Pattern," established in a city of the same name in Maharashtra. Father Bacher was a key advocate for collective action, driving this unique initiative.

Here, a visionary local MLA (Member of the Legislative Assembly) integrated the watershed programme into the block-level development plan. This seemingly simple act had profound consequences.

This integration of efforts led to several unique outcomes. Villages chosen for watershed development were included in the broader development plan of the block. Funding from other schemes was mobilised to supplement watershed development efforts. This approach brought in at least 30% of the funding for watershed development projects from local government schemes.

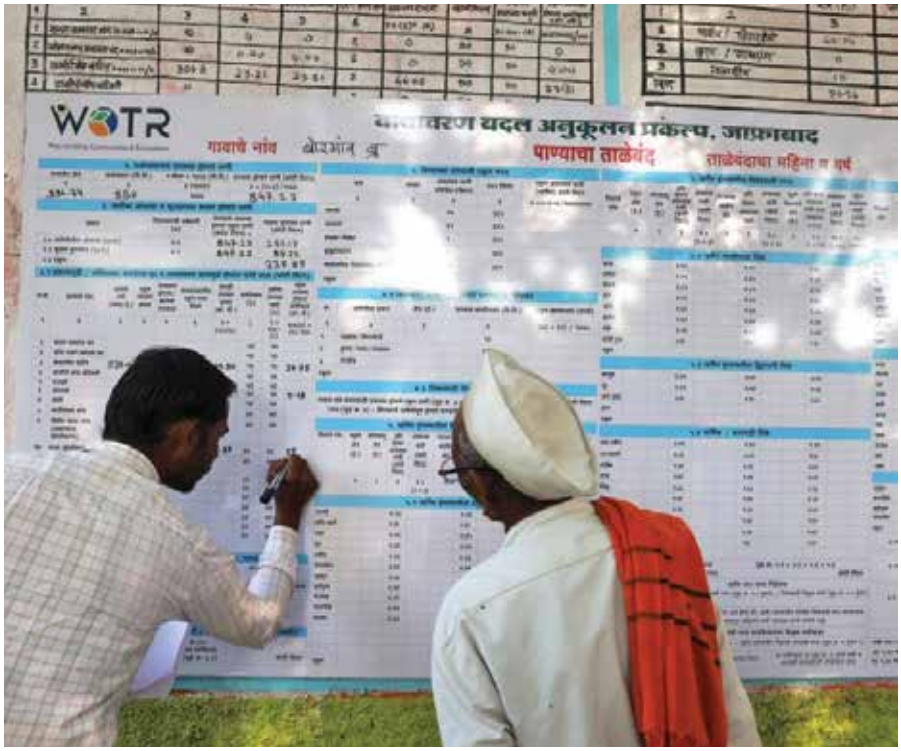


PHOTO: *Watershed development must be coupled with demand management – regulating water usage, promoting water-efficient crops, and ensuring sustainability. Water budgeting is one such practice*

But what's truly remarkable about the Sangamner model is the way it transformed relationships between communities and the local government. "Villagers who previously felt powerless and disconnected from government officials," says Lobo, "were suddenly empowered to participate in planning meetings and hold local authorities accountable." Villagers learned to negotiate for their needs, access government schemes, and manage their water resources effectively.

HOW THE OBJECTIVES OF WATERSHED DEVELOPMENT EVOLVED

The objectives of watershed development have evolved significantly over the years. As Lobo explains, "Normally when there's nothing, you start with something that is urgently felt, and once you succeed there, a lot of opportunities open up."

In the initial stages, the focus was understandably on securing water for basic needs – drinking water and irrigation for the Kharif season. However, once success was achieved, communities discovered new possibilities and ambitions. As water availability improved, farmers could expand their cropping patterns into the Rabi season, cultivate higher-value crops, and explore allied activities like animal husbandry.

This led to a natural demand for better agricultural techniques, crop diversification, and water-efficient irrigation systems like drip irrigation. The evolution of watershed development mirrored the rising aspirations and economic diversification within rural communities.

Unfortunately, the very success of watershed development introduced new challenges. Lobo warns of the dangers of overexploitation: "[The] measure of [watershed development] success [was that] it created so much ambition and over-expectations that people actually began mining water. There's only so much water you can harvest and use in a rainfed farming system…"

He emphasises that watershed development must be coupled with demand management – regulating water usage, promoting water-efficient crops, and ensuring sustainability.

WOTR responded to this challenge by incorporating interventions such as:

- → **WATER STEWARDSHIP:**
  (a) Water Budgeting: Teaching communities to balance water availability with water use.
  (b) Groundwater Aquifer Management: Helping communities map groundwater sources, estimate water availability and manage extraction and use.
  (c) The Water Governance Standard: Gives a "water score" to communities which rates, ranks and accredits them in regard to overall water management.
- → **CLIMATE-RESILIENT AGRICULTURE:** Promoting crops and systems adaptable to climate change.
- → **TECHNOLOGY INTEGRATION:** Using water efficient technologies, satellite data and weather-based crop advisories to optimise water use.

TRANSFORMATIVE IMPACT OF SUCCESSFUL WATERSHED DEVELOPMENT

WOTR has witnessed first-hand the impact of well-implemented watershed programmes over the last three decades. Lobo cites their initial vision: "We act as catalysts, fostering inclusive and creative dialogues for socially desirable outcomes… Stir the giant within people in the hope that they can change their future and realise their dreams."

Successful watershed programmes have done just that. Increased water availability has led to enhanced crop yields and agricultural income, stabilising farmers' income and ensuring food security. It has also led to reduced migration. As economic opportunities open up within the communities, people are less likely to migrate to urban areas in search of work.

Stir the giant within people in the hope that they can change their future and realise their dreams

Most importantly, Lobo says, WOTR's watershed development initiatives directly empower communities to invest in education. Increased incomes and resources resulting from improved water management allow families to prioritise keeping their children in school for the long term. This opens up new possibilities for future generations to break the cycle of poverty and pursue careers outside of traditional agriculture.

The true transformation achieved through this is about empowering communities to build a resilient future in the face of climate change and economic uncertainty.

"The full potential of what was achieved and what is being achieved through watershed development has not been really recognised," says Lobo.

"I guess in time it will," he concludes. ✦

Crispino Lobo is the Co-founder and Managing Trustee of WOTR.

DEEP dive

Ecosystem-Based Adaptation: WOTR's Holistic Approach to Transforming Rural India

"Healthy ecosystems are the foundation of thriving communities," says Marcella D'Souza, Director of the WOTR Centre for Resilience Studies (W-CReS). In the face of climate change, the importance of Ecosystem-based Adaptation (EbA) cannot be overstated, especially in a country like India where over 50% of the population relies on agriculture for their livelihood.

EbA, as Marcella explains, begins with a comprehensive understanding of diverse landscapes and ecosystems.

"It's about understanding the landscape in its entirety," she explains. "From the hills and forests to the drylands and wetlands, each component plays a vital role." This comprehensive perspective allows us to tailor interventions to specific ecosystems, ensuring that restoration efforts are ecologically sound and beneficial to the local communities."

It's about understanding the landscape in its entirety. From the hills and forests to the drylands and wetlands, each component plays a vital role.

In the Indian context, EbA holds particular relevance for the vast arid and semi-arid regions that make up the majority of the country's landmass. These areas are particularly vulnerable to climate change impacts, such as droughts, floods, and soil erosion. By working with nature, rather than against it, EbA offers a sustainable pathway to enhance both ecological and human resilience.

The Convention on Biological Diversity (CBD) defines EbA as the use of biodiversity and ecosystem services to help people adapt to climate change. It encompasses sustainable management, conservation, and restoration of ecosystems, with a focus on the multiple benefits for local communities. In essence, EbA harnesses the power of nature to safeguard human societies from the adverse effects of climate change.

WOTR'S JOURNEY: FROM WATERSHED DEVELOPMENT TO EbA

India's vast arid and semi-arid regions, comprising about 70% of the country, face significant challenges like water scarcity, soil erosion, and land degradation. These challenges impact millions of farmers who rely on these lands for their livelihoods. With 54% of the Indian population engaged in farming and 40% of the country's food coming from semi-arid areas, the importance of sustainable land and water management is paramount.

WOTR's journey towards EbA began with its extensive experience in watershed development. "We recognised that degraded landscapes were a major contributor to declining agricultural productivity and rural poverty. By implementing nature-based solutions such as contour trenches, tree planting, and water harvesting structures, we were able to restore degraded lands and improve water availability for farmers," says Marcella.

Over time, our approach evolved to encompass a broader understanding of ecosystems and their services. This led to the integration of biodiversity conservation, sustainable agriculture, and community-based resource management into our work. WOTR's EbA approach now recognises that the well-being of both people and nature is inextricably linked.

TOP: *WOTR's EbA approach recognises that the well-being of both people and nature is inextricably linked.*
BOTTOM: *WOTR holds several multi-stakeholder workshops to highlight EbA.*

"We learned a lot along the way," Marcella reflects. "In the early days, we focused heavily on tree planting, but we didn't always choose the right species for the local ecosystem. We planted trees that the cattle wouldn't graze, which wasn't always the best choice for the local ecosystem. We also overlooked the importance of grasslands." These lessons led to a shift in WOTR's approach, prioritising local biodiversity and incorporating a wider range of natural solutions into their projects.

A pivotal moment came during 2019-2021 when WOTR assessed its practices against the CBD guidelines. "We discovered that many of our activities were already EbA-compliant but identified areas for improvement, which had previously been overlooked," says Marcella.

The shift from purely anthropocentric goals—focused on water access and agricultural productivity—to a broader perspective that includes ecosystem services marks a significant evolution in WOTR's approach. This transition acknowledges the intrinsic value of ecosystems beyond their direct economic benefits, embracing a more holistic view of environmental stewardship.

IMPACT AND ACHIEVEMENTS

The results of WOTR's EbA approach are both impressive and inspiring. Over the past three decades, it has reached millions of people across 10 states, regenerating vast swathes of degraded land and improving water security. These efforts have led to increased agricultural productivity, diversified livelihoods, and a significant reduction in distress migration.

Central to this success is the unwavering commitment to community engagement. Marcella emphasises that sustainable ecosystem management is only possible with the active participation of local people. "We believe in empowering communities to take ownership of their natural resources," she says. "This not only ensures the long-term

viability of our interventions but also builds a sense of stewardship and pride among local residents."

WOTR achieves this through a multi-faceted approach that includes education, training, and capacity building. By equipping communities with the knowledge and skills they need to manage their landscapes, we foster a sense of shared responsibility for environmental well-being.

LOOKING AHEAD: A COMMITMENT TO CONTINUED INNOVATION

As climate change continues to pose new challenges, WOTR remains dedicated to pushing the boundaries of EbA. It is actively employing new techniques and technologies, such as remote sensing and GIS mapping, to further refine its approach. The organisation is also expanding its partnerships with government agencies, research institutions, and other NGOs to amplify impact.

In March 2024, WOTR, in collaboration with the India Climate Collaborative (ICC) and the Government of Maharashtra, hosted a significant workshop on World Water Day. This event focused on sustainable water management practices and highlighted the importance of community involvement in preserving natural water resources. The workshop brought together experts, policymakers, and community leaders to discuss and promote integrated water resource management strategies.

Through the lens of EbA, WOTR aims to offer a roadmap for regions facing similar challenges, demonstrating that the synergy between humans and nature is the key to sustainable development.

"Our work is far from over. We have a long way to go, but we are confident that EbA holds the key to a more resilient and sustainable future for rural India," concludes Marcella. ✦

Marcella D'Souza is the Founder Director of the WOTR Centre for Resilience Studies (W-CReS).

Applied Research: The WOTR Centre for Resilience Studies (W-CReS)

While applied research in WOTR started around 2007, the WOTR Centre for Resilience Studies (W-CReS) was established in 2016, with the aim of guiding practice and policy through on-ground science-based interdisciplinary study to achieve sustainable outcomes.

W-CReS works across the following Thematic areas:
(i) Land and forests; (ii) Water Resources; (iii) Biodiversity; (iv) Agriculture; (v) Health, Nutrition, WASH, (vi) Social, Gender and Human Behaviour; (vii) Economics; and (viii) Local Governance.

W-CReS' multi-disciplinary teams have expertise in the following areas:
(a) Hydrology, Geology, Geo-physics, and Water Governance; (b) Geo-informatics and Remote Sensing; (c) Climate Science; (d) Ecology, Forest & Biodiversity; (e) Agriculture Engineering: Agronomy, Soil Science, Irrigation, Entomology; (f) Sociology, Anthropology, Gender; (g) Economics; and (h)Nutrition

W-CReS draws on the expertise of various research institutions to enhance its work, such as the ICAR, NBSS&LUP, IMD, CRIDA* and others

ICAR: Indian Council for Agricultural Research
NBSS&LUP: ICAR-National Bureau of Soil Survey & Land Use Planning
IMD: India Meteorological Department
CRIDA: ICAR-Central Research Institute for Dryland Agriculture

Key Research & Consulting Projects in 2023-24

- **NATURE-BASED SOLUTIONS FOR SUSTAINABLE RURAL LANDSCAPES AND CLIMATE RESILIENCE:** The project, backed by HSBC Software Development (India) is being implemented in Maharashtra and Telangana. It focuses on the practical applications of the ecosystem-based adaptation (EbA) approach, such as in restoring rivers, managing water, farming in a changing climate, and promoting green jobs. The project supports national goals like increasing farmers' income and restoring 26 million hectares of land by 2030 and international agendas like the SDGs, the CBD, the Paris Agreement, and LDN targets.

- **INTEGRATED WATER RESOURCES DEVELOPMENT AND PROMOTION OF EbA:** This project supported by Honeywell Hometown Solutions India Foundation is working to empower rural communities in Maharashtra to use their natural ecosystems for sustainable living. It raises awareness and encourages communities to adopt Ecosystem-based Adaptation (EbA) measures, working with farmer collectives, including FPOs, to implement EbA for better livelihoods. The project also studies the effects of rising temperatures on land and water resources and supports the ECOBARI initiative to spread EbA across India.

- **BUILDING RESILIENCE IN AGRICULTURE AND ALLIED SECTORS:** Supported by India Climate Collaborative (ICC), this project provides strategic support to government departments to foster resilient rural communities within healthy ecosystems in Maharashtra. It focuses on promoting nature-friendly farming practices and utilizing the "NaturePro" framework to assess climate risks. Farmers also gain access to WOTR's "FarmPrecise" app for customized weather-based farming advice and market information. The project further integrates Ecosystem-based Adaptation (EbA) principles into policies like the State Action Plan on Climate Change (SAPCC) and Majhi Vasundhara. Finally, it collaborates with water departments to improve water management, governance, and stewardship through training and resources.

- **BUILDING WATER SECURITY FOR AGRICULTURAL LIVELIHOODS:** Funded by Standard Chartered Bank, this project is being implemented in Dharashiv district, Maharashtra. It focuses on building community capacities to manage water resources efficiently, aiming to increase farmers' income, ensure safe drinking water, and improve water storage capacities.

- **SUSTAINABLE LIVELIHOOD PROJECT:** Funded by Axis Bank Foundation, this project promotes nature-positive solutions and integrated farming systems in Ahmednagar district's Partner taluka in Maharashtra. This project promotes environmentally friendly farming practices like using organic pest control and composting to reduce reliance on synthetic chemicals. It focuses on improving soil health and encourages integrated farming systems with diverse crops to create stable income and use resources efficiently. The goal is to build sustainable agricultural models that benefit both the environment and the livelihoods of rural communities.

- **NORWAY INDIA WATER-SOIL-MICROBIOME NEXUS (NIWASM):** This collaboration with the University of South-Eastern Norway and Savitribai Phule Pune University facilitates knowledge sharing on the Water-Soil-Microbiome nexus and EbA for sustainable ecosystems through student and staff exchanges.

- **IMPACT ASSESSMENT OF REJUVENATED WATER BODIES:** Funded by A.T.E. Chandra Foundation, this study focuses on the impact of desilting water bodies in Maharashtra's rainfed regions. It demonstrates high returns on investment (109%) and significant environmental benefits, emphasizing the importance of preliminary research in optimizing desilting processes.

- **IMPACT ASSESSMENT OF REJUVENATED WATER BODIES:** Parmarth Samaj Sevi Sansthan (PSSS) and Watershed Organisation Trust (WOTR)

partnered with Hindustan Unilever Limited (HUL) to implement a water stewardship plan at its site in Orai, Uttar Pradesh. This project focused on managing both water supply and demand, involving local stakeholders and following the AWS Standard 2.0. It included mapping the area, assessing risks and opportunities, prioritizing villages for intervention, and creating a comprehensive plan to promote responsible water use in the region.

Participation in International and National Events

W-CReS made notable contributions to several high-profile international events in 2023-24 including:

- **CONFERENCE OF PARTIES (COP 28) IN DUBAI:** W-CReS co-hosted and participated in a side event on cultivating resilience in communities, fish, and drylands. Additionally, W-CReS representatives contributed to a panel discussion on enabling food producers to thrive in a climate-impacted world

- **ADAPTATION FUTURES 2023 IN MONTREAL, CANADA:** W-CReS presented findings from ongoing research conducted in collaboration with Wageningen University

- **INTERNATIONAL CONFERENCE ON ADVANCES IN ENVIRONMENTAL SUSTAINABILITY, ENERGY AND EARTH SCIENCE (AESEE- 2024):** W-CReS representatives presented on ecosystem-based approaches for sustainable socio-ecological development and phytoplankton diversity assessment

- **INTERNATIONAL CONFERENCE ON TRADITIONAL MEDICINE & PHYTOPHARMACEUTICALS:** W-CReS presented a poster on the role of Traditional Ecological Knowledge in tribal health systems of the Northern Western Ghats

- **OPEN DATA KIT SUMMIT 2023 IN LONDON, UK:** W-CReS participated in this workshop focused on data collection tools

W-CReS also actively engaged in numerous national events including:

- **INDIAN AGRICULTURE @75 SEMINAR:** W-CReS presented on the comprehensive assessment of tank desiltation and its impact on farmers' economic status in the Marathwada region

- **SCIENCE-POLICY DIALOGUE ON ECOSYSTEM-BASED APPROACH IN THE INDIAN HIMALAYA:** W-CReS presented on the transition from watershed to ecosystem-based approaches

- **NATIONAL CONSULTATION ON LONG-TERM DROUGHT MITIGATION PLANNING:** W-CReS contributed to this important discussion held in New Delhi

- **TECHNOSCAPE23 CONFERENCE:** W-CReS participated in a panel discussion and presented on sustainable water management techniques, including group micro-irrigation approaches and the changing role of farm ponds

- **WORKSHOP ON MAINSTREAMING NATURE-BASED SOLUTIONS AND LAND HEALTH MONITORING IN AGRICULTURE:** W-CReS presented on integrating nature/ ecosystem-based solutions for sustainable land management

W-CReS' Research Publications – See Page 120

MULTISTAKEHOLDER WORKSHOP ON SECURING WATER IN A TIME OF CLIMATE CHANGE THROUGH NATURAL ECOSYSTEMS MANAGEMENT

Supported by the India Climate Collaborative, W-CReS, in collaboration with the Department of Environment and Climate Change, Government of Maharashtra, organized a multi-stakeholder workshop titled “Securing Water in a Time of Climate Change through Natural Ecosystems Management” on March 21, 2024, in Mumbai.

The event brought together 75 diverse actors from across Maharashtra’s water sector, including high-level government officials, investors, researchers, and practitioners. The workshop aimed to foster understanding of the interconnectedness of water systems, identify problems and systemic causes in different water ecosystems, and recommend key actions for stakeholders.

Participants explored issues in riverine, rainfed/groundwater-dependent, and canal irrigation systems, emphasizing the importance of healthy ecosystems for long-term water security. The workshop realised the need of employing the Ecosystem-based Adaptation (EbA) approach as a path forward, focusing on ecosystem restoration and enhancement to address climate risks while ensuring sustainable water management across Maharashtra.

Innovating for Scalar Impact

WOTR focuses on scaling up innovations that empower rural communities, improve their lives, create sustainable income opportunities and secure nature. Some not able areas and examples are:

Driving Community-led Watershed Development (WSD): WOTR has influenced and significantly contributed to shaping the concept, discourse and implementation of WSD in the country. Together with its partners, WOTR has implemented and facilitated watershed and land development projects covering 3.83 million hectares impacting 7.92 million people.

- The inclusion of a systematic Capacity Building Phase as a separate, prior and qualifying requirement for entry into full implementation of a watershed project

- The 'Net Planning Method'/ Participatory Net Planning Method (PNP) which actively engages the farmer couple in the development of their lands; site-specific treatments on a 'Ridge-to-Valley' basis; community 'ownership' of the entire lifecycle of the project including its financial management, mandatory 'beneficiary contribution' and post project maintenance; and civil society-governance-corporate partnerships for convergent actions

- Contributed to the establishment of the Watershed Development Fund at NABARD in 1999 by the Govt. of India, to replicate in other parts of the country the experience of the Indo-German Watershed Development Program (IGWDP), in which WOTR played a key role. As of September 2024, this fund has supported 3,747 projects in which 27.09 lakh hectares have been treated with grant assistance of Rs. 2,873 crores[2]

- Trained thousands of para engineers, para technicians, watershed volunteers' and development practitioners who became 'replicators' across the country, spreading mass awareness and providing technical support to many a successful watershed project

Building Climate Resilience and Adaptive Capacities of Rural Communities: Since 2007, WOTR has been undertaking science-based, transdisciplinary research on how climate change is impacting lives and livelihoods in rural areas, implementing measures that enhance overall resilience and engaging with government agencies. Not able contributions to up-scaling are:

- Contributed to the establishment of the National Adaptation Fund for Climate Change (NAFCC) at MoEF&CC in 2015. As of date Rs.848 crores have been sanctioned for projects across 27 states[3]

- Developing, implementing and disseminating the concept and practice of eco-centric development and ecosystem-based watershed management

---

1 Wherever degraded forest lands were present, usually in the upper regions of a watershed, permission to treat them was given by the Govt. Of Maharashtra to village groups implementing the Indo-German Watershed Development Program (IGWDP) - a singular achievement as generally, only the Forest Dept. can work on such lands.

2 https://www.nabard.org/contentsearch.aspx?AID=95&Key=watershed+development+fund; accessed on 4.11.2024

3 https://www.nabard.org/content.aspx?id=585 accessed on 11.11.2024

- Supporting the Govt. of Maharashtra to develop a policy to integrate Ecosystem-based Adaptation (EbA) across development policies and projects.
- Developed an android App (FarmPrecise) that provides farmers with farm customized, dynamic weather and satellite-based crop-and-livestock specific advisories

- Developed a tool (NaturePro) for the Govt. of Maharashtra to assess agricultural climate risk and nature footprint at the village level

- Developed and implementing a strategy for Eco-centric, Climate Resilient Agriculture

Promoting Water Security through Incentivizing Behavioural Change: From its very beginning, WOTR has mobilized rural communities to secure and efficiently manage water for life and livelihoods. Two notable innovations are:

- The **Water Stewardship Initiative** which seeks to inculcate responsible attitudes and equitable behaviours in regard to water access and use. This consists of 2 sub-components:
  → *Water Budgeting* which enables communities to assess overall net water availability given current use and undertake measures to address the deficit, if any
  → *Ground Water Aquifer Management* which enables communities to identify aquifers, assess ground water availability (and quality) and manage the same sustainably

- The **Water Governance Standard** is a certification framework that rates villages with a "water score" based on how they manage their water resources. This can help grow a market for water investments where those seeking water infrastructure are incentivized to improve their "water score" and those looking for investment opportunities are able to identify promising ones. Aspects of this framework have been incorporated into some related government programs.

DONOR SPEAK

Scaling Impact: CSR in India's Water Sector for Sustainable Futures

Ashwini Saxena, CEO JSW Foundation

WATER CRISIS IS A GLOBAL ISSUE

W. H. Auden, the famous British American poet once said, "Thousands have lived without love, not one without water." Yet the replenishment, protection, and management of this 'conditionally' renewable natural resource need attention for water security for all. Currently, 4 billion people live in water-scarce areas and one in four cities faces water insecurity. By 2030, global freshwater demand is likely to outstrip supply by 40%, and an estimated 1.6 billion people will lack safely managed drinking water. Roughly 50% of wastewater is discharged untreated, potentially contaminating water bodies.[1] Large investments for water-related infrastructure and institutions, including river basin agencies, utilities, and municipalities are needed, estimated to be a staggering $6.7 trillion by 2030 — and $22.6 trillion by 2050. Yet the global water sector currently attracts less than 2% of public spending, with a similar level of private investment in low- and middle-income countries. In a connected world, water is a global resource that needs to be tackled accordingly.

INDIAN WATER (CRISIS) SCENARIO

Water security is crucial for economic activities, and in a business-as-usual scenario, water scarcity may result in a 6% loss to India's GDP by 2050.[2] According to Niti Aayog, 21 major Indian cities are in immediate danger of running out of groundwater. 3/4th Indian districts, home to 638 million people, are hotspots for water-related disasters. The key concerns are:

→ **Unequal natural distribution of water resources:** Water availability in the country is uneven due to climatic, hydro-geological, and

1 Refer 'Charting our water future' by 2030 Water Resources Group & WEF data
2 https://shorturl.at/2Y5q7

> Indian cultural context:
> Rig Veda 10-9-1 says
> **"आपोद्विष्ठा मयो भुवस्तानुर्जे दधातन। महेरणाय चक्षसे।"**, meaning **"Water is mother of welfare. May our mother show the way of prosperity and impart her strength to us."**

topographical diversity. Climate change is altering weather patterns and rainfall distribution, leading to rainfed agriculture excessively relying on groundwater. Vulnerability studies are pointing towards shifting trends in monsoon water availability in existing dams and reservoirs, causing previously water-secure areas to experience water stress. [3,4]

→ **Over-extraction of groundwater & lack of effective regulation:** India extracts roughly 25% of the total groundwater extracted in the world, crossing 63% of the extractable groundwater and in some states, touching 100%. Coupled with the excessive use of nitrogenous fertilisers, rising nitrate contamination of groundwater is an alarming issue in some regions. Out of 806 districts in the country, 409 districts report fluoride contamination and 209 districts report arsenic contamination.

→ **Polluted Surface Water bodies:** As per UNICEF, 70% of surface water is unfit for consumption in India, with major cities of India producing approx. 38354 MLD sewage against a treatment capacity of only 11786 MLD.[5] Annually about 37.7 million Indians are affected by waterborne diseases, 1.5 million children die of diarrhoea and 73 million working days are lost leading to an economic burden of $600 million a year.[6]

→ **Water governance challenges:** Water is a State Subject with the Union Government empowered mainly for inter-state rivers & river valleys, leading to delayed and impeded policy implementation despite the Supreme Court ruling that water is a public trust. The Inter-State Water Disputes (Amendment) Bill, 2017 aims to have a Single Permanent Tribunal and a Dispute Resolution Committee with a multidisciplinary team to resolve the long-standing issues. The distribution and regulation of water at the municipal and panchayat levels have serious gaps in terms of coordination, sectoral knowledge of the intertwined issues, and thus lack of regulation and the desired direction.

ACTIONS FOR A SUSTAINABLE FUTURE

Despite the issues, a lot can still be done with the active involvement of relevant stakeholders, the private sector being integral to this. For industries, investing in a sustainable water supply is not just a business imperative but also an opportunity to provide technical expertise, coordination, and catalytic funding to ensure reliable water resources.

The country needs a **comprehensive decentralised water resource management plan** focusing on:

1. **Water strategies for each scientifically delineated watershed region, integrating surface as well as subsurface water resources:**
   Augmentation of water resources requires a scientific approach to surface water storage and discharge water, keeping in mind the potential of recharge of the groundwater and its extraction. Using GIS imagery, and sub-surface surveys of groundwater reservoirs has been taken up by governments across the country and the private sector expertise can play a significant role here. e.g., the CII Triveni Water Institute's WATSCAN surveys. Carrying

3 https://shorturl.at/Pm0RT 4 https://shorturl.at/Qoi5R
5 Kaur et al, 'Wastewater production, treatment & use in India', UN Water 6 Refer India Water Portal

out similar studies in the country with the active involvement of communities to have a shared long-term plan can be very useful.

2. **Solutions to not just augment water resources but advise optimised exploitation**
   Stakeholders must collaborate to create integrated water management plans that can withstand environmental changes and ensure long-term water security. Invariably more water availability may lead to more deployment of water into water-intensive crops or wasteful behaviour towards water. This can translate into a vicious cycle and jeopardise the impact of the initial efforts of water resource augmentation.

Thus, village/ block/ panchayat level water resource planning will be required and inputs from agriculture experts for the most suitable crops and crop rotation, better irrigation techniques, identification and management of water quality issues, all will have to be planned and capacities need to be built. This again is an area where CSR institutions can play a very big role, given that the businesses are sometimes present in some of the remotest parts of the country and also have a continuity of engagement with the communities.

→ **STRENGTHENING & OPTIMISING WATER INFRASTRUCTURE**
The union government has taken some bold steps in terms of creating the Ministry of Jal Shakti by merging the Ministry of Drinking Water & Sanitation with the Ministry of Water Resources, River Development, and Ganga Rejuvenation. Founded in 2019, this ministry is now responsible for the development of India's water resources, and providing quality drinking water and sanitation facilities to all citizens. The ministry has taken some pathbreaking steps towards cleaning rivers, such as the Namami Gange; 'Catch the Rain', aiming at creating 47 lakh rainwater harvesting structures in the country and a major shift in the government's

JSW Foundation undertook a detailed hydrogeological survey through WATSCAN for mapping the survey surface & subsurface water potential of Palghar district, Maharashtra in 2018. The Foundation used this scientific information to identify specific locations for watershed activities for achieving maximum recharge of water. Sharing of the report with the district administration led to the government using it for its future planning and decision making. Other CSR institutions also used this study to guide their work. All this is likely to lead to a better coordinated public-private partnership for the region's long-term water resource management. The same approach was then extended by JSWF to all its locations in the country, helping even some businesses to benefit from the same.

NbS Approach: Reviving Urban waterbodies for Long-Term Sustainability

A lake in Bangalore that was completely filled with silt, debris and waste was desilted and the silt used to strengthen its banks. Its slopes were stabilized by planting grasses and creepers, over 10,000 trees were planted along the lake. Its channels were cleared of debris and encroachments. Very little concrete was used during the whole process of rejuvenation of the lake. A separate channel was created for sewage being discharged from surrounding housing complexes. A series of floating wetlands with reed beds were installed in the channel for treating the sewage. This nature-based solution has not only changed the ecology of the lake, but has restored biodiversity of the area as well.

approach from big dams to more distributed water storage. All these initiatives need support not just in terms of funds but also in terms of expertise and coordination and corporates can play a big role here. The work that is warranted at the municipal level for water and sanitation-related infrastructure will perhaps need a separate elaborate document but it suffices to state that these are areas where PPP projects, coupled with CSR funds to conduct quick but detailed studies on the demand-supply and infrastructure gaps can go a long way to address these concerns for urban areas. A lot of effort may also be required for training and capacity building of local communities towards the creation, upkeep, and management of water-related infrastructure in the country; construction of check dams, watershed structures, digging of wells, upkeep of hand pumps etc. CSR institutions along with civil society institutions can play in this and thus also create water-based livelihoods for long-term sustenance.

→ **ADDRESSING THE ADJACENCIES SUCH AS SANITATION & SOLID-LIQUID WASTE MANAGEMENT**
Using an ecosystem services lens and nature-based solutions (NbS) can significantly multiply the social, ecological, and economic return on investment in water projects. For instance, restoring wetlands and forests can improve water infiltration, reduce runoff, and enhance groundwater recharge, providing a more sustainable water source at much lower costs. By preserving natural habitats and biodiversity, these solutions provide co-benefits such as improved air quality, enhanced recreational spaces, and increased resilience to climate change impacts.

→ **POLICY SUPPORT**
With the advent of the Ministry of Jal Shakti, a lot of long pending issues related to water are likely to get resolved or at least better understood. In India, numerous private and government agencies operate

LEFT: *A lot of effort may also be required for training and capacity building of local communities towards the creation, upkeep, and management of water-related infrastructure in the country.*

in the water sector, sometimes leading to contradictions and inefficiencies. CSR institutions can help in creating convergence platforms for effective policy dialogue, propagating the schemes and policies of the government, and sharing expertise to supplement government efforts at the municipal and panchayat levels. CSR programs can help in creating such enablement opportunities. E.g., The India Sanitation Coalition housed at FICCI is a great example of how government and corporate functionaries can work together to make the policies work better at the field level. The paradigm that the private sector can be a fast mover and help in carrying out programs and assessing programs better is most required.

CONCLUSION

It can be safe to conclude that the multiplicity of talent, resources, and approaches can be combined through CSR initiatives to address water-related issues in the country through effective collaboration with the government and other stakeholders. ✦

References

1. Mahato, A., Upadhyay, S., & Sharma, D. (2022). Global water scarcity due to climate change and its conservation strategies with special reference to India: a review. Plant Archives (09725210), 22(1).
2. Nechifor, V., & Winning, M. (2018). Global economic and food security impacts of demand-driven water scarcity—Alternative water management options for a thirsty world. Water, 10(10), 1442.
3. Zhang, D., Sial, M. S., Ahmad, N., Filipe, A. J., Thu, P. A., Zia-Ud-Din, M., & Caleiro, A. B. (2020). Water scarcity and sustainability in an emerging economy: a management perspective for future. Sustainability, 13(1), 144.
4. Silva, J. A. (2024). Corporate Social Responsibility (CSR) and Sustainability in Water Supply: A Systematic Review. Sustainability, 16(8), 3183.
5. https://www.imfa.in/resource-centre/2013/Nov28.htm
6. https://prsindia.org/budgets/parliament/demand-for-grants-2023-24-analysis-jal-shakti

Ashwini Saxena is the CEO of JSW Foundation. He comes with more than 30 years' experience across India and Africa with reputed development organisations such as UNIDO, IFC (World Bank) and corporates. He has led MSME development/ CSR/Sustainability programs and championed IFC's Sustainability Tools in South Asia.

EXPERT SPEAK

expert SPEAK

Water Governance: Transforming Mindsets for Collective Responsibility

Dr. Eshwer Kale and Ankita Yadav

WATER GOVERNANCE: TRANSFORMING MINDSETS FOR COLLECTIVE RESPONSIBILITY

"Water, water everywhere, not a drop to drink." This poignant line by Samuel Taylor Coleridge aptly captures the paradox faced in groundwater-dependent regions of India. While monsoons bring devastating floods to many regions, many villages paradoxically rely on water tankers during the dry summers. With erratic rainfall and a changing climate, India's dependence on groundwater for both sustenance and agriculture is intensifying, causing alarming drops in groundwater levels across the nation.

However, the crux of India's groundwater crisis lies not just in scarcity, but in weak institutional governance and inadequate demand-side management. The pervasive belief among many farmers that groundwater is their "private property," rather than a shared resource, is a significant obstacle. This misconception, often rooted in a lack of understanding about aquifer systems and groundwater dynamics, underscores the urgent need for both improved water governance and robust community-based natural resource management (CBNRM).

While grassroots efforts by village communities to manage groundwater sustainably are commendable, these initiatives face challenges in long-term sustainability without concrete incentives.

To address these challenges, the Watershed Organisation Trust (WOTR), with its lasting legacy in comprehensive and participatory watershed development and climate change adaptation, has designed, piloted, and promoted the following important approaches and frameworks through implementation, training for practitioners and donors, and active dialogue with state departments to integrate them into state policies.

1. **THE WATER STEWARDSHIP APPROACH**
   This innovative approach is transforming the way we manage water by integrating science, governance, and policy at both the grassroots and community levels. A key aspect of this strategy is the 'co-production of knowledge and learning,' which fosters behavioural and institutional change for more effective water management.

   At its core, the water stewardship approach aims to shift mindsets among water users, moving away from the notion of water as individual property towards a recognition of its public nature. To achieve this, WOTR

has developed cadres of 'water stewards' in project villages – individuals who understand their responsibility for effective water management within their communities.

Through stakeholder engagement, various groups (village teams, government officials, researchers) collaborate to understand water-related issues, develop water management plans, and apply water budgeting processes. This systematic understanding not only builds inclusive institutions but also motivates villagers to take sustainable action towards good water governance.

WOTR has implemented this initiative in 356 villages across India, providing training materials and educating numerous government officials and practitioners. These ground-level governance measures are crucial for adapting to climate change and its resulting extreme events. In recognition of its contribution to water security, the water stewardship initiative received a special mention in the Best Climate Practice award by The International Centre for Climate Governance (ICCG) in 2017.

The Water Stewardship Manual is available to download at *https://wotr.org/wsi-manual/*

2. THE WATER GOVERNANCE STANDARD AND CERTIFICATION SYSTEM

A key challenge in India's water sector, particularly in groundwater management, is the lack of incentives for village communities and a structured decision support system for investors. There currently exists no standardized way to measure a village's water governance capabilities. To address this, WOTR has developed the Water Governance Standard (WGS) toolkit.

The WGS toolkit catalyses competitive dynamics within rural communities, revealing promising water investment opportunities that benefit both communities and investors. It uses a modular approach, assigning a total water score of 100 across four modules: governance, water supply, demand management, and equity and sustainability.

The WGS evaluates how effectively communities manage their water resources, assigns them a "water score" and rates them across four levels: Bronze (entry-level), Silver, Gold, and Platinum (highest rank).
By applying the WGS, financial and technical resources can be directed towards rural communities, enabling them to become "water-positive" in a sustainable, equitable, and environmentally friendly way. This system also empowers investors to identify promising investment opportunities and channel resources effectively.

The WGS aligns with the Composite Water Management Index developed by NITI Aayog, and has the potential to transform how water is managed and used in India. It can play a significant role in addressing India's water challenges and mitigating the risks climate change poses to its water future. To learn more, WOTR's book on the Water Stewardship Initiative (WSI) is available for download at *https://wotr.org/wgs/*

1. AQUIFER LITERACY AND MANAGEMENT

A major obstacle in effective water resource management is the prevailing misconception that groundwater beneath one's land is private property. This misunderstanding, coupled with the fact that aquifers are hidden and poorly understood, makes sustainable management difficult.

To address this, WOTR developed the Community-Driven Visual Integrator (CDVI), a tool that creates 3D maps of local aquifers and their surface characteristics. This innovative tool has been successfully implemented in numerous villages and clusters across Maharashtra, Telangana, and Madhya Pradesh. Notably, it was used to mobilize communities in Jalna and Ahmednagar districts, where multiple villages share common aquifers.

The visual impact of these 3D aquifer models has proven to be a powerful educational tool. They help local communities and farmers visualize groundwater systems, fostering a deeper understanding and appreciation of groundwater as a shared, communal resource. This shift in perspective has been instrumental in promoting water stewardship, driving behavioural change among water users, and facilitating the implementation of groundwater laws and policies.

For those interested in learning more, WOTR's manual on CDVI is available here: *https://rb.gy/4tn49d*

2. GROUP MICRO-IRRIGATION

The Group Micro-Irrigation (GMI) model is a community-based approach to water management that challenges the traditional notion of water as a private good. By encouraging neighbouring farmers to share groundwater from a single source, GMI aims to reduce the overexploitation of this precious resource.

However, the benefits of GMI extend beyond water conservation. It also promotes water-use efficiency, good agricultural practices, and crop planning tailored to soil type and water availability. This holistic approach empowers farmers to make informed decisions about their water usage, leading to more sustainable agricultural practices.

GMI is a prime example of self-regulation at the grassroots level. By working together and modifying their water-sharing behaviour, farmers can avoid overexploitation and ensure the long-term sustainability of their groundwater resources. This model has been successfully implemented in parts of Maharashtra and Telangana, and is now being scaled up to reach more villages.

For a deeper dive into the GMI model, additional information can be found at *https://rb.gy/4tn49d*

CONTRIBUTION TO THE DEVELOPMENTAL AGENDA

WOTR's initiatives, as outlined above, are instrumental in educating, motivating, and mobilizing rural communities to transform their water-use behaviour and practices. By fostering collective action for the sustainable and judicious use of this precious resource, WOTR is making significant contributions on multiple fronts.

Globally: WOTR's work aligns with and advances several Sustainable Development Goals (SDGs), including:

- → **SDG 6:** Clean Water and Sanitation: By promoting responsible water management and conservation.
- → **SDG 12:** Responsible Consumption and Production: By reducing the overall use of natural resources and advocating for sustainable practices.
- → **SDG 13:** Climate Action: By contributing to a low-carbon development pathway through reduced resource consumption and improved water management.
- → **SDG 16:** Peace, Justice and Strong Institutions: By fostering community-based governance and equitable access to water resources.

Nationally: WOTR's experiences and lessons learned offer valuable insights for operationalizing groundwater management policies and programs in India. These include:

- → The Maharashtra Groundwater Act of 2009
- → The National Project on Aquifer Management (NAQUIM)
- → The Atal Bhujal Yojana (Atal Jal)

By demonstrating the effectiveness of community-based approaches and innovative tools like the CDVI and WGS, WOTR is helping to shape a more sustainable and equitable water future for India. ✦

PHOTO: *A major obstacle in effective water resource management is the prevailing misconception that groundwater beneath one's land is private property.*

Dr. Eshwer B. Kale, senior researcher at W-CReS, investigates water-related issues in Maharashtra, India. He holds an MPhil in Rural Development and a PhD in Policy Failure in the Indian Groundwater Sector. In 2010, he was awarded the prestigious National Child Rights Research Fellowship. His work primarily focuses on developing and promoting a water stewardship approach in drought-prone Indian states.

Ankita Yadav, a researcher at W-CReS, is a hydrogeologist and groundwater expert with extensive knowledge in aquifer mapping. She is also a CDVI specialist, working closely with rural communities to develop these evaluation tools.

COMMUNITY
heroes

FROM FATALISM TO A REDEEMED FUTURE: ONE MAN'S SUSTAINABLE DEVELOPMENT MISSION

Born in 1956 into a low-income family in the small village of Jangaliya, Madhya Pradesh, Beni Prasad Jhariya faced significant economic challenges from an early age. His education was cut short in tenth grade due to financial difficulties, leading him to work as an Assistant Revenue Inspector in a government department from 1977 to 1987. His early job exposed him to the complexities and deficiencies within his village, particularly in agriculture and women's health.

Motivated by these challenges, Beni was determined to address the inefficient agricultural practices, poor water management, and neglected health issues that plagued his community. His goal was to guide his village towards modern, sustainable practices and to ensure that government initiatives were fully utilised.

The turning point came in 2006 with a watershed project implemented by WOTR that introduced new agricultural methods and water conservation techniques. This initiative inspired Beni to take a proactive role in community development. He joined WOTR in 2015 as a Wasundhara Sevak and worked in eight locations, where he engaged deeply with the community, learning the intricacies of water conservation during a time of shortage.

However, this path was not without roadblocks. Villagers initially resisted weekly awareness meetings, perceiving them as a waste of time. “They were steeped in a certain fatalism,” Beni recalls, “believing their hardships were God-given.”

Undeterred, he shifted tactics, using door-to-door interactions to outline the tangible benefits of WOTR’s work, which gradually wore down resistance. After months of persistence, villagers began attending these meetings, their voices joining the conversation.

Beni’s hands-on fieldwork across various locations helped him advocate for the adoption of sustainable practices. Each project added a layer to

BOTTOM: *As a water steward, Beni has influenced 290 households in sustainable water management and farming practices.*

BOTTOM: *Beni's leadership has led to a 75% adoption rate of advanced agricultural techniques among local farmers.*

his knowledge, including water budgeting, livestock management, and the principles of sustainable agriculture. More importantly, WOTR's programmes demonstrated the power of community involvement — through the formation of Village Development Committees (VDC) and the collaborative planning of watershed development projects. "This practical grounding was invaluable," Beni emphasises.

Nearly a decade later, Beni's efforts have significantly transformed his community. As a water steward, he has influenced 290 households, with 200 actively engaged in farming. His leadership has led to a 75% adoption rate of advanced agricultural techniques such as SRI and water budgeting among local farmers. The VDCs, initiated through his efforts, now see active participation and collaborative planning, proving the power of community involvement in sustainable development. Beni's work has not only revolutionised his village but has also inspired adjacent communities, creating a widespread impact on regional agricultural practices. ✦

expert SPEAK

Guardians of the Land: Harnessing Traditional Knowledge for Biodiversity Conservation

Ms. Ashwini M Wadhu, Mr. Omkar M Hande, Dr. Y.D. Imran Khan

India, a nation renowned for its astonishing biodiversity, boasts a variety of species and ecosystems that rank it among the world's most biologically rich countries. Remarkably, four of the planet's thirty-six biodiversity hotspots—the Himalayas, the Western Ghats, the Indo-Burma region, and Sundaland—are located within its borders. India is also home to a multitude of Indigenous Peoples and Local Communities (IPLCs), each with unique ethical, cultural, and traditional practices. For centuries, these communities have harnessed their Traditional Ecological Knowledge (TEK) to sustain their livelihoods and preserve their cultural identities.

LEFT: *Tribal art (Warli Painitings) created by the Warli tribe in Maharashtra (Source: Wikimedia Commons)*

WHY IS TRADITIONAL ECOLOGICAL KNOWLEDGE IMPORTANT?

Traditional Ecological Knowledge (TEK) of Indigenous Peoples and Local Communities (IPLCs) is crucial for achieving numerous Sustainable Development Goals (SDGs) at both national and international levels (see figure). TEK is instrumental in resource management, agriculture, and medicinal practices. It not only preserves cultural heritage but also supports marginalised communities in addressing socio-economic challenges. Moreover, TEK offers valuable insights into climate change, fostering conservation strategies that safeguard biodiversity.

TEK can be broadly divided into the following categories:

1. **SACRED FORESTS/GROVES AND ANIMALS**

   Sacred groves are biodiversity-rich and ecologically valuable forests intertwined with the cultural and religious beliefs, taboos, and myths of IPLCs (Sharma and Kumar, 2021). These groves are pivotal for biodiversity conservation and maintaining ecosystem integrity, particularly outside protected areas.

   For instance, in Raigad district, locals revere the leaves of the Holigarna grahamii (Blistering

BOTTOM: *TEK and its linkages with Sustainable Development Goals (SDGs) (Source: (Das et al. 2023))*
OPPOSITE PAGE: *Sateri Devi sacred grove from Sindhudurg district (Source: Google Images)*

Varnish) tree, using them in sacred grove worship. The vulnerable Vateria indica (White Dammar) species, found in the Sateri Devi sacred grove of Choukul village in Sindhudurg district, is protected and propagated by locals who use its resin in rituals (Patwardhan et al., 2021).

2. INDIGENOUS FARMING AND IRRIGATION PRACTICES

Indigenous farming and irrigation practices, honed over centuries by IPLCs are crucial for preserving ecosystems, biodiversity, and maintaining overall ecosystem health (Melash et al., 2023).

For example, the Apatani tribe in Arunachal Pradesh has developed a sophisticated native farming system that integrates rice and fish cultivation symbiotically. The decaying rice leaves nourish microorganisms, which in turn become food for the fish. These fish help to loosen the soil, facilitating nutrient absorption by the rice plants. This symbiotic relationship enhances both fish and rice production, providing substantial benefits to the farmers (Tangjang and Nair, 2015).

3. ETHNOMEDICINES AND FOREST PRODUCTS

Ethnomedicines and forest products play a vital role in the sustainable use of natural resources, contributing significantly to biodiversity conservation (Sinthumule, 2023). These traditional practices help identify Rare, Endangered, and Threatened (RET) plants, aiding decision-makers in crafting effective management plans for their survival in the wild.

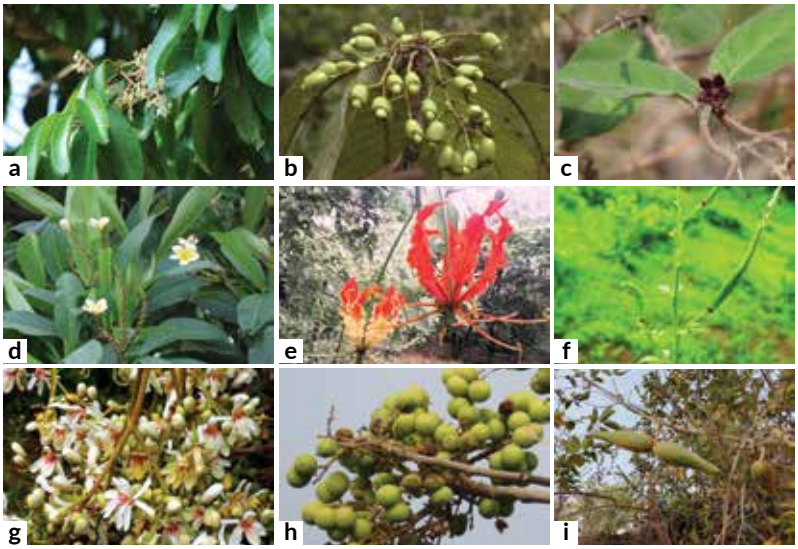
In the Ahmednagar district of the Northern Western Ghats of Maharashtra, local

communities such as the Mahadev Koli, Thakar, Bhills, and Ramoshi still rely on ethnomedicinal knowledge to treat snake bites from the region's various venomous snakes, including the Indian Cobra (Naja naja), Common Krait (Bungarus caeruleus), Saw-scaled Viper (Echis carinatus), Russell's Viper (Daboia russelii), and Bamboo Pit Viper (Trimeresurus gramineus). Traditional healers use different plant parts, such as Plumeria alba (White Champa), Hemidesmus indicus (Indian Sarsaparilla), Gloriosa superba (Glory Lily), and Sapindus mukorossi (Reetha) for snakebite treatments (Khyade, 2011). Additionally, the latex of Wattakaka volubilis (Cotton Milk Plant) and Plumeria alba is applied externally to cure skin diseases (Waman and Khyade, 2018).

In the Jawhar block of Palghar district, Maharashtra, tribal communities utilize various plants for ethnomedicinal purposes. For instance, leaves of Cleome viscosa (Asian Spider Flower/Tickweed) and Moringa concanensis (Konkan Moringa/Ran Shevaga) are boiled, and the resulting water is used for baths to alleviate fever and body aches (Lele et al., 2017).

ABOVE: *The traditional agriculture practice (Integrated rice with fish farming) of the Apatani tribes of Ziro Valley, Arunachal Pradesh (Source:Tangjang and Nair, 2015)*

RIGHT: *Various ethnomedicinal plants used in traditional knowledge a) Vateria indica (White Damar), b) Holigarna grahamii (Blistering Varnish), c) Hemidesmus indicus (Indian Sarsaparilla), d) Pulmeria alba (White Champa), e) Gloriosa superba (Glory Lily), f) Cleome viscosa (Asian spider flower), g) Moringa Concanensis (Konkan Moringa), h) Sapindus mukorossi (Reetha), and i) Wattakaka volubilis (Cotton milk plant).*



BOTTOM: *Forest conserved by saffron sprinkle in Rajasthan (Image Source: Dr. Devendra Singh Chouhan)*

4. INDIGENOUS CUSTOMS AND BELIEF SYSTEMS

Indigenous Peoples and Local Communities (IPLCs) follow diverse customs and belief systems, with biodiversity protection often deeply ingrained in these traditions (Janaki et al., 2021). These belief systems can significantly enhance the ecosystem services of a particular area.

For example, the Kesar Chhanta Pratha is a traditional custom practised in the Udaipur district of Rajasthan. This unique conservation method involves IPLCs sprinkling saffron water in the name of Kesariyaji (Kala Baba) and taking an oath not to cut the forest (Ormsby and Bhagwat, 2010) (Fig 6).

ROLE OF ECOSYSTEM-BASED ADAPTATION IN PRESERVING TRADITIONAL ECOLOGICAL KNOWLEDGE

Ecosystem-based adaptation (EbA) is an approach that integrates the sustainable use of biodiversity and ecosystem services into adaptation strategies (CBD, 2009). Traditional Ecological Knowledge (TEK) encompasses the age-old wisdom and practices of indigenous and local communities, including land management, biodiversity conservation, and resource sustainability. By blending EbA with TEK, we can enhance ecosystem health and increase community resilience to climate change.

WOTR'S INTERVENTIONS

WOTR has implemented several initiatives to integrate TEK and EbA, fostering community resilience and biodiversity conservation:

- → **Preparation of People's Biodiversity Registers (PBRs) and Children's Biodiversity Registers (CBRs):** These registers document local biodiversity and involve communities in conservation efforts.
  Promotion and Conservation of Traditional Crop Varieties: Establishing seed banks in villages helps preserve traditional crops.
- → **Wild Vegetables Festival (Raan Bhaji):** This festival celebrates the connection between people and nature, promoting the use of wild vegetables.
- → **Documentation of Ethnomedicinal Knowledge:** Recording traditional medicinal practices ensures the preservation of valuable indigenous knowledge.
- → **Development of Sustainable Ecotourism Models:** Implementing ecotourism initiatives in villages fosters sustainable development and conservation.

The Traditional Ecological Knowledge (TEK) held by Indigenous Peoples and Local Communities (IPLCs) offers invaluable insights for biodiversity conservation and cultural heritage preservation. By recognizing and respecting this wisdom, we can develop more effective, inclusive, and equitable conservation policies. Integrating TEK into national and international frameworks has the potential to enhance conservation efforts and promote sustainable development. Through awareness, collaborative research, and supportive policies, we can harness the full potential of TEK to protect biodiversity, preserve cultural heritage, and contribute to achieving global Sustainable Development Goals (SDGs). ✦

References

1. Das, A., Gujre, N., Devi, R. J., & Mitra, S. (2023). A Review on Traditional Ecological Knowledge and Its Role in Natural Resources Management: North East India, a Cultural Paradise. Environmental Management, 72(1), 113–134. https://doi.org/10.1007/s00267-021-01554-y
2. Janaki, M., Pandit, R., & Sharma, R. K. (2021). The role of traditional belief systems in conserving biological diversity in the Eastern Himalaya Eco-region of India. Human Dimensions of Wildlife, 26(1), 13–30. https://doi.org/10.1080/10871209.2020.1781982
3. Khyade, M. (2011). Plants used as an antidote against snakebite in Akole Taluka of Ahmednagar District (MS), India. Journal of Natural Remedies, 11, 182–192.
4. Lele, Y., Thorve, B., Tomar, S., & Parasnis, A. (2017). Traditional uses of the wild plants by the tribal communities of Jawhar, Palghar, Maharashtra, India. International Journal of Botany and Research, 7(6), 19–22.
5. Melash, A. A., Bogale, A. A., Migbaru, A. T., Chakilu, G. G., Percze, A., Ábrahám, É. B., & Mengistu, D. K. (2023). Indigenous agricultural knowledge: A neglected human based resource for sustainable crop protection and production. Heliyon, 9(1), e12978. https://doi.org/https://doi.org/10.1016/j.heliyon.2023.e12978
6. Ormsby, A., & Bhagwat, S. (2010). Sacred Forests of India: A Strong Tradition Of Community-Based Natural Resource Management. Environmental Conservation, 37(3), 320–326. https://doi.org/10.1017/S0376892910000561
7. Patwardhan, A., Ghate, P., Mhaskar, M., & Bansude, A. (2021). Cultural dimensions of sacred forests in the Western Ghats Biodiversity Hot Spot, Southern India and its implications for biodiversity protection. International Journal of Anthropology and Ethnology, 5(1), 12. https://doi.org/10.1186/s41257-021-00053-6
8. Sharma, S., & Kumar, R. (2021). Sacred groves of India: repositories of a rich heritage and tools for biodiversity conservation. Journal of Forestry Research, 32(3), 899–916. https://doi.org/10.1007/s11676-020-01183-x
9. Sinthumule, N. I. (2023). Traditional ecological knowledge and its role in biodiversity conservation: a systematic review . Frontiers in Environmental Science . https://www.frontiersin.org/articles/10.3389/fenvs.2023.1164900
10. Tangjang, S., & Nair, P. (2015). Rice + Fish Farming in Homesteads: Sustainable Natural-Resource Management for Subsistence in Arunachal Pradesh, India. Journal of Environmental Science and Engineering A, 4, 545–557. https://doi.org/10.17265/2162-5298/2015.10.007
11. Waman, M. B., & Khyade, M. S. (2018). Ethnobotanical Uses of Some Plants of Families Apocynaceae and Asclepiadaceae from the Northwestern Region of Ahmednagar District, Maharashtra BT - Plant and Human Health, Volume 1: Ethnobotany and Physiology. In M. Ozturk & K. R. Hakeem (Eds.), (pp. 569–582). Cham: Springer International Publishing. https://doi.org/10.1007/978-3-319-93997-1_14

Ashwini Wadhu, a researcher at W-CReS, specialises in Forestry and Tree Improvement. She also has experience in working with the community at the ground level.

Specialising in Ecology, Omkar Hande, a researcher at W-CReS, possesses extensive knowledge in biodiversity conservation and restoration.

With over 14 years of experience in ecology, Dr. Y D Imran Khan leads the ecology team at W-CReS, specialising in conservation biology and socio-ecology. His work emphasises an "integrated interdisciplinary approach" to address various cross-cutting themes, all contributing to the socio-ecological sustainability of landscapes.

CASE STUDY

CASE study

Can Rocks Grow Grains?

A Saga from Rajasthan

> ***Pahad mein kya ugega?*** (what will we grow on this rocky, mountainous terrain?)

Ramsingh Gurjar, a 69-year-old farmer from Chaube ki Guwari in the 'Dang' region of Rajasthan, spent most of his life witnessing barren land. The rocky terrain and lack of water forced many, including Ramsingh, to migrate for work.

However, in 2021, WOTR and YES Foundation introduced the 'Wasundhara Gram Vikas Karyakram' project. This initiative focused on soil conservation and water management, constructing rainwater harvesting structures and farm bunds. The abundance of water allowed Ramsingh to cultivate his land for the first time, growing wheat, mustard, sesame, and bajra.

PREVIOUS SPREAD: *The 'Wasundhara Gram Vikas Karyakram project focused on soil conservation and water management.*
TOP: *With no water, and no means of livelihood in the village, many like Ramsingh would work in the nearby mining quarries or migrate to the big cities.*

A similar transformation occurred in the verdant landscapes of Udaipur, where small farmers like Kukaram Chamna found hope through a newly built check-dam. "Pehle kachu nai tha.. Baarish mein sab beh jaata (Earlier, we had no [water] left. It would flow away during the rains)," he says. This access to water allowed him and his family to cultivate wheat for the first time.

Community-led watershed management activities, including constructing trenches and de-silting water bodies, further enhanced the region's water storage capacity. Additionally, convergence with MGNREGA created livelihood opportunities.

From the rocky terrains of Karauli to the rolling hills of Udaipur, communities are building resilience through access to water. "*Sab paani ki maya hai..* (It's all because of [access to] water)," adds Ambalal Gameti. These interventions have empowered communities, allowing them to become self-reliant and hopeful for a better future. ✦

Read the full story here:

expert SPEAK

Empowering Farmers with Forecasts: How Can Regular Weather Updates Aid Farmers' Decision-making?

Sahana Hegde

Laxman, an onion farmer in Kukkadgaon, Osmanabad, was preparing his land for transplanting when his FarmPrecise app alerted him to heavy rainfall expected in the next three days. Understanding that such downpours could damage his newly transplanted crop, he wisely decided to postpone. The very next day, his region was inundated, and thanks to the timely weather warning and his prudent decision, he avoided significant losses in both inputs and labour.

This example underscores the critical role of regular weather monitoring in farming. When speaking to farmers who actively follow forecasts, countless similar stories emerge, each demonstrating the power of early warnings and timely action. The overwhelming consensus is that sustainable agriculture is simply unattainable without staying abreast of weather patterns.

1. IMPORTANCE/NEED OF WEATHER UPDATES IN AGRICULTURE

Weather has played a major role in Indian agriculture, and significant crop production losses are often weather-induced. As a country dependent on the monsoon, the arrival, distribution, and quantity of

monsoonal rains determine the future of the agricultural economy. In recent years, even the onset of the summer season has influenced the production of major rabi cereals. Due to these weather vagaries, farmers have relied on weather information to make better decisions in farming activities since the beginning of agriculture. While we cannot modify the weather, understanding its nature and anticipating future conditions have greatly benefited the farming community.

Advances in physics and mathematics have revolutionised weather forecasting through statistical and numerical methods. By analysing vast amounts of meteorological data and applying complex mathematical equations, these modern techniques provide a top-down approach, predicting regional weather patterns based on broader atmospheric trends. The larger the area of focus, the more accurate the forecast becomes.

2. MAJOR WEATHER EVENTS FARMERS SEEK INFORMATION ABOUT

For the vast majority of Indian farmers, a myriad of weather events can influence crop production, with the monsoon wielding the most significant impact.

S. No.	Critical weather events that need prior information	Key Farming practices benefitting from weather information
1	**Monsoon**	**Crucial for crop production:** The lifeblood of Indian agriculture, dictating crop yields and overall agricultural success. **Onset, development, distribution, and withdrawal:** These phases are key indicators for farmers, influencing decisions from sowing to harvesting.
2	**Western Disturbances**	**Predominantly impact Northern India:** A primary source of moisture for rabi crops, moderating extreme temperature fluctuations in the region.
3	**Winter temperatures**	**Frost and chilling risk:** Forecasts of low temperatures can allow farmers to take preventive measures against frost and chilling damage to crops.
4	**Summer temperatures**	Early warnings of extreme heat events, like those experienced in early February in recent years, enable farmers to protect their rabi and summer crops from potential losses.
5	**Cyclones**	**Devastating effects:** These storms bring intense rainfall and powerful winds, leading to structural damage, animal deaths, waterlogging, saltwater intrusion, crop lodging, and significant damage to plantations.
6	**Hailstorms**	**Pre-monsoon threat:** These storms, primarily occurring before the monsoon season, can wreak havoc on crops, damaging tree branches and causing vegetable crop lodging.

3. ADOPTION OF WEATHER INFORMATION FOR AGRICULTURE PLANNING

In the face of increasing weather variability, a growing number of farmers are turning to weather information for guidance. Those cultivating high-investment crops like apples, grapes, coffee, tea, areca nuts, and black pepper find such forecasts particularly indispensable in their daily operations. A study by the Watershed Organisation Trust (WOTR) in Telangana revealed that 90% of farmers experienced a 25% reduction in costs related to field inputs, labour, and overall cultivation by adhering to weather-based agricultural advisories[1]. Similarly, a 2020 report from the National Council of Applied Economic Research (NCAER) showed a substantial increase in average annual income for farming households who modified their practices based on weather data. However, despite these clear economic benefits, a 2018 report indicated that only 42 million farming households in India – roughly half the total – were directly utilising weather information from the meteorological department[2].

4. CHALLENGES IN FARMER ADOPTION OF WEATHER INFORMATION

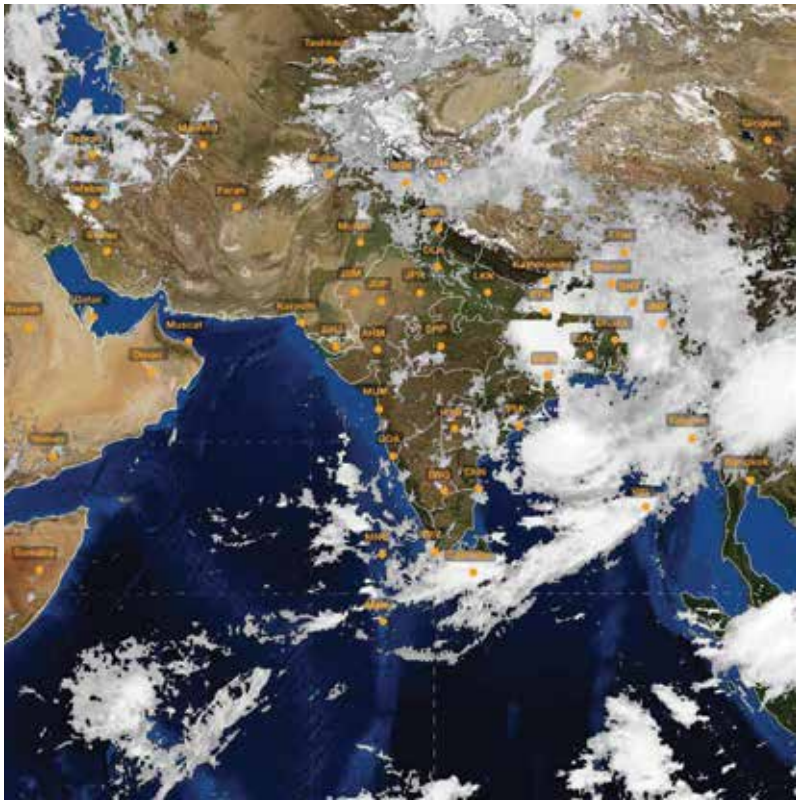
→ **Limited Forecast Precision:** Current forecasts in India lack the location-specific detail necessary for farm-level decision-making. While efforts are underway to provide village-level forecasts, their accuracy remains a concern. Block and district-level forecasts, though valuable for administrative planning, lack the granularity needed for on-the-ground farming choices[3].

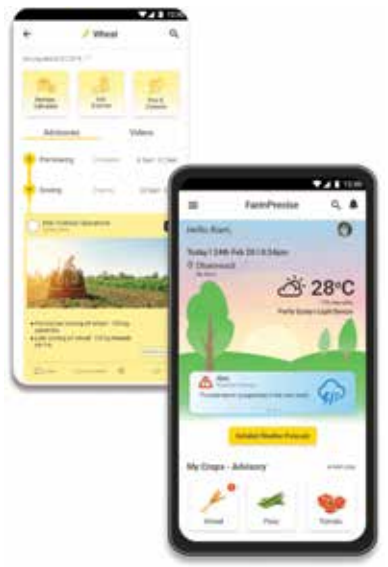
PREVIOUS SPREAD: *Sustainable agriculture is simply unattainable without staying abreast of weather patterns. A farmer reading a weather advisory on WOTR's FarmPrecise app.*
TOP: *A WOTR personnel sensitising farmers to the need for following weather advisories.*

Field specific forecasts, timing of events, event duration, distribution of events, impact-based forecast, and timely dissemination are key factors for effective weather communication with farmers.

THIS PAGE: *WOTR provides dynamic weather-based crop management advisories tailored to crop and farm specific conditions through the use of data from its Automated Weather Stations in villages (AWS), IMD and OpenWeather.*

OPPOSITE PAGE: *Lower profit margins and high stakes make Indian farmers hesitant to adopt new technologies.*





- → **Accessibility and Confusion:** Despite regular updates through social media, news apps, and websites, weather information often fails to reach farmers effectively. This can be due to limited technology access and the overwhelming number of sources, both government and private, leading to confusion and uncertainty about which forecasts to trust.
- → **Difficulty in Interpretation:** Weather forecasts, due to inherent uncertainties, are often presented in technical terms and probabilities. This can be difficult for local farmers to interpret, leading to misunderstandings about whether a particular weather event is likely to occur[4].
- → **Trust and Risk Aversion:** Indian farmers, reliant on agricultural income for their livelihoods, are understandably risk-averse. Lower profit margins and high stakes make them hesitant to adopt new technologies or deviate from traditional practices. Weather information is more likely to be utilised when it aligns with existing knowledge and comes from trusted local sources[5].

1. KEY FACTORS FOR EFFECTIVE WEATHER COMMUNICATION WITH FARMERS

- → **Field-Specific Forecasts:** Farmers require forecasts tailored to their precise location, not broad regional predictions. While location-specific forecasts are increasingly available, their accuracy and timeliness require further refinement.
- → **Timing of Events:** Knowing when a weather event will occur – morning, afternoon, night – is crucial for farmers. Nighttime events often have less impact on farming activities compared to daytime ones, which can disrupt spraying, fertilizing, and harvesting.
- → **Event Duration:** Farmers need to know the start and end dates of weather events, not just daily updates. Cumulative forecasts, even for just a

few days, can be more valuable than less accurate daily predictions

- → **Distribution of Events:** Given varying forecast accuracy across different weather systems, it's often more helpful to describe the extent of events rather than precise values. Terms like "scattered" or "well-distributed" rainfall provide better actionable information than mere probabilities.
- → **Impact-Based Forecasts:** Forecasts should be framed in terms farmers understand. Describing rainfall's impact on soil moisture or wind's effect on tree branches is more meaningful than numerical values alone.
- → **Timely Dissemination:** When farmers receive forecasts is critical. Early morning or evening updates allow them to plan their day, allocate labor, and manage resources effectively.

2. FUTURE RESEARCH & TECHNOLOGIES TO EMPOWER FARMERS WITH WEATHER INFORMATION

Significant strides are being made in both public and private sectors to enhance forecast accuracy. Leveraging AI and ML-based models, the goal is to provide precise, location-specific predictions in the coming years. However, to truly maximize the benefits of weather forecasting for agriculture, we must also expand its applications and ensure real-time delivery to end users.

Here are some key areas of research and technology to focus on:

- → **Impact Quantification Database:** Developing a comprehensive database that quantifies the impact of various weather events on agricultural activities. This data will be invaluable for AI-based tools, allowing for impact-based alerts that inform farmers about the specific effects of weather conditions on their crops, enabling them to take proactive measures.
- → **Voice-Based Interactive Assistance:** Utilizing voice-based technologies to offer interactive assistance in interpreting forecasts, providing personalized advice, and answering farmers' questions in real time. This can enhance user-friendliness and build trust in the forecasting system.
- → **Integrating Satellite & IoT Data:** Applications that combine weather forecasts with satellite observations and IoT sensors can significantly improve accuracy at the field level. This integration of real-time data from multiple sources will provide farmers with more precise and actionable information.

BOTTOM: *Farmers require forecasts tailored to their precise location, not broad regional predictions.*

→ **Weather Advisories with Market Insights:** Weather advisories should go beyond basic forecasts by incorporating pest and disease warnings, along with market implications based on production and supply chain disruptions. This comprehensive approach empowers farmers to make informed decisions that protect their crops and optimize their market strategies. ✦

Weather advisories should go beyond basic forecasts by incorporating pest and disease warnings, along with market implications.

References

1. Bhagat, A., Gholkar, M., Shinde, Y., Nikam, N., Kandula, J., Kumbhar, N., & Gaikwad, P. (2022). Effectiveness of mobile application based agromet advisory servict: Case Study in Telangana, India. Indian Journal of Dryland Agricultural Research and Development, 37(1), 30-34.
2. NCAER, (2020) Estimating the economic benefits of Investment in Monsoon Mission and High Performance Computing facilities, New Delhi
3. Kumar, K. A., Umadevi, G. D., & Reddy, B. S. (2022). Verification of medium range rainfall forecast in scares rainfall zone of Andhra Pradesh.
4. https://www.climatecentre.org/downloads/files/FULL%20REPORT%20final.pdf
5. Paton, D. (2008). Risk communication and natural hazard mitigation: how trust influences its effectiveness. International Journal of Global Environmental Issues, 8(1-2), 2-16.

With nearly a decade of experience, Sahana Hegde, researcher at W-CReS, specialises in agromet advisories, climatology, agrometeorology, and climate projections to enhance the lives of the farming community in India.

COMMUNITY
heroes

THE FERTILE GROUND: RESTORING THE LAND, REVIVING A COMMUNITY

In Udaipur's Morwal village in Rajasthan, traditional farming methods relying on chemical fertilisers had depleted soil nutrients, prompting a need for sustainable practices. Kusava Goswami (40), her mother-in-law Dhapubai (80), and Ambalal Gameti - a Wasundhara Sewak (WOTR's change agent from the community) recognized the urgency to transition their community towards organic agriculture.

Determined to demonstrate the benefits of organic farming, Kusava and Dhapubai decided to showcase the potential of natural fertilisers through a crop demonstration. Their aim was to convince the local farming community of the economic and environmental advantages of organic methods. Meanwhile, as a change agent, Ambalal sought to empower his village by embracing and promoting these practices.

Kusava and Dhapubai conducted an experiment on their 2 bigha land, growing maize with organic formulations like Amritpani and Dashparni on one part, and with chemical fertilisers on the other. The results were striking, with the organic plot yielding larger, sweeter maize at a significantly higher volume.

Dhapubai celebrated an unprecedented crop yield, the best in 20 years. With an increase from 1 quintal the previous year to 1.5 quintals this year, she and her partner are now eagerly looking forward to the next season.

When whispers of Kusava and Dhapubai's organic success reached Ambalal, he knew he had found the demonstrable solution he sought. Ambalal purchased the formulations from Kusava and Dhapubai and saw astounding results in his Turai crop. His 2-acre farm yielded 100 kilograms of Turai, earning him Rs 70,000, despite the relentless rains of July 2023 in Rajasthan. "Hearing the news of Ambalal's success, many were coming from outside to see his fields," recalls Kusava.

The success stories of Kusava, Dhapubai, and Ambalal have sparked a quiet revolution in Morwal. Their achievements have not only increased yields and income but have also inspired many from neighbouring villages to visit and learn from their organic practices. The community is now recognizing the sustainable benefits of organic farming, paving the way for a healthier future for the land and its people. The trio's efforts have set a precedent, proving that with knowledge, determination, and community cooperation, lasting agricultural transformation is possible. ✦

OPPOSITE PAGE:
Kusava Goswami (R) with her mother-in-law, Dhapubai.
ABOVE:
Ambalal Gameti works as a Wasundhara Sewak for WOTR and has been a big proponent of organic farming in the region.

The success stories of Kusava, Dhapubai, and Ambalal have sparked a quiet revolution in Morwal.

EXPERT SPEAK

expert
SPEAK

Advancing Climate Resilient Development for Semiarid Farming Systems in India

Dr. Arjuna Srinidhi

Semi-arid regions in India, defined by agriculture-based livelihoods, are increasingly vulnerable to extreme weather events. The uncertainties posed by future climate and socio-economic changes further complicate efforts to build resilience within these farming systems. This challenging context inspired my research over the past four years at W-CReS, where I collaborated extensively with colleagues from WOTR, W-CReS, and senior researchers at Wageningen University. This collaborative journey has explored the complex interplay between climate, development, and the livelihoods of semi-arid farming communities, culminating in my doctoral thesis on advancing climate-resilient development for semi-arid farming systems in India.

Challenges in advancing climate-resilient development for semi-arid farming systems in India include: adopting a holistic view of climate resilience, examining how a series of interventions impact the resilience of a farming system, understanding future climate risks, and negotiating synergies and trade-offs between interventions towards the broader aspirations of stakeholders.

Our research aimed not only to diagnose these challenges but also to propose solutions for advancing climate-resilient development in these regions. To achieve this, we focused on four key objectives:

1. **DEVELOPING A FRAMEWORK FOR ASSESSING RESILIENCE:** It became clear that a robust framework was crucial for accurately assessing the climate resilience of these farming systems. We developed the Climate Resilience in Semi-arid India (CRISI) framework, tailored to the unique challenges of Indian agriculture and the dryland farming systems of central India. Our research combined insights from existing literature, the expertise of the research team, and a case study application to ensure the framework's effectiveness. The CRISI framework goes beyond existing

BOTTOM: *The Climate Resilience in Semi-arid India (CRISI) framework is tailored to the unique challenges of Indian agriculture and the dryland farming systems of central India.*

models by incorporating a holistic understanding of resilience, emphasising participatory approaches, and providing customised tools for assessing farming system resilience.

2. **EVALUATING THE IMPACT OF INTERVENTIONS:** Existing agricultural development interventions were another piece of the puzzle. We investigated their contribution to climate resilience by retrospectively applying the CRISI framework to two case studies. The findings revealed that interventions focused solely on productivity improvements had limited impact. However, integrating these interventions with measures addressing water management, soil health, livelihood diversification, and food security led to significant improvements in resilience indicators. This underscores the importance of a comprehensive approach that addresses multiple vulnerabilities.

3. **IDENTIFYING CRITICAL CLIMATE-STRESS MOMENTS:** Understanding future climate risks was another crucial step. Through collaboration with stakeholders and analysis of climate data, we identified and characterised critical climate-stress moments for four typical farming systems in semi-arid Maharashtra. These moments included increasing late-monsoon rainfall, rising winter temperatures, extreme heat events, heavy rainfall events, and increased dry-season rainfall. This information provides valuable insights for targeted climate resilience-building actions

BOTTOM: *Focus was laid on co-creating climate-resilient development pathways (CRDPs) with farmer producer organisations (FPOs).*
OPPOSITE PAGE: *The complexity of the challenges faced by semi-arid farming systems in India necessitates a holistic understanding of climate resilience.*

4. **CO-CREATING DEVELOPMENT PATHWAYS**

   Finally, we focused on co-creating climate-resilient development pathways (CRDPs) with farmer producer organisations (FPOs). This involved workshops with each FPO to document their existing plans, challenges, and areas for improvement in climate resilience. The process was collaborative, with experts providing additional recommendations. The resulting CRDPs challenged existing visions and incorporated targeted climate-resilience measures. This approach is particularly valuable in situations with contested goals and ambiguous visions, fostering a dynamic and inclusive process.

The primary focus of our work has been on semi-arid regions across India, with specific case studies conducted in Maharashtra due to its predominantly semi-arid nature and vulnerability to climate extremes. We synthesised our findings and formulated four key policy recommendations. These recommendations advocate for the adoption of the CRISI framework in government programs, the revision of national watershed development guidelines to incorporate an ecosystem-based approach, the integration of critical climate-stress moments and CRDPs into national and state climate action plans, and the revision of the existing FPO promotion policy to include a differentiated model based on FPO types and development stages.

The complexity of the challenges faced by semi-arid farming systems in India necessitates a holistic understanding of climate resilience, one that integrates both climate and development concerns. Our research underscores the importance of such an approach. Furthermore, the dynamic nature of climate risks, evolving aspirations, and contested visions requires a responsive and adaptive strategy. The Climate-Resilient Development Pathways (CRDP) approach, with its emphasis on collaboration and flexibility, offers a promising avenue for advancing climate-resilient development in these critical regions. As I move forward from this research, I hope these findings can contribute to a more secure and sustainable future for these communities. ✦

References

1. **CRISI framework:** Assessing the Climate Resilience of Semi-Arid Farming Systems in India: Framework and Application
2. **Evaluating the Impact of Interventions:** Retrospective climate resilience assessment of semi-arid farming systems in India

Dr. Arjuna Srinidhi, Lead of Ecosystem-based Adaptation at W-CReS, brings over 15 years of experience as a researcher and thought leader in climate change and sustainable development policies. He has worked across diverse sectors both in India and internationally. Dr. Srinidhi is passionate about leading interdisciplinary research teams that connect research, practice, and policy advocacy.

COMMUNITY VOICES

COMMUNITY voices

Building a sustainable future

For 30 years, WOTR has walked alongside rural communities, empowering them to overcome challenges and embrace opportunities through watershed-based, ecosystem restoration solutions. This commitment has transformed lives and landscapes. Hear directly from those who have witnessed and shaped this incredible journey of resilience and growth.

Pandharinath Kalu Dhongre

Jal Sewak (MH)

Villagers were forced to abandon their homes due to the unrelenting drought. However, after watershed initiatives, they found work right here, in their own homes! And they are prospering even today! Children who were previously denied an education due to water scarcity were finally able to return to classrooms and pursue their academic aspirations. These very children are now doctors, teachers, and clerks, contributing meaningfully to society in ways we once thought unimaginable.

Sunanda Rajendra Nagare

Darewadi (MH)

During the WSD project, I was taken for a training program to Mendhwan. The impact of that training program has been deeply rooted in my heart. When I heard how one can lift a community out of poverty, I was motivated. Back home, I completely involved myself in community work especially concerning the women. This gave me an identity as a leader of women. I started realising that the women in the village who used to underestimate me, started respecting me. All these developments led me to change my attitude towards the villagers.

Imam Pathan
Ex-Sarpanch, Mendhwan (MH)

We didn't even have drinking water! But since the project was implemented in the 90s up until today, there has been tremendous growth and progress here.. As per my understanding, Mendhwan is one of the richest villages among the neighbouring villages. And because of this change, everyone has prospered.

Khanderao Gawadiram Avhad
Darewadi (MH)

Fr. Bacher's efforts empowered us. We acquired the knowledge and skills necessary to manage our resources effectively, becoming stewards of our own future. Even today, we continue to reap the benefits of this invaluable work done!

Baban Sukharam Ugale
Bhojdari (MH)

In the earlier days, our children would slide down these mountains unimpeded, from the top to the bottom. There were no CCTs, no trenches or any structures in the way. After the watershed projects were initiated in 1995, the area has turned into a lush, green forest. What was once a rocky, barren landscape has now blossomed into a thriving green paradise!

Kisan Icche
Bhokardan (MH)

The area under cotton has been drastically reduced and is replaced with soya bean and chickpea. The water budgeting process initiated in the village has played a great role in achieving this. Farmers have come to know the amount of water required to grow each crop. This information has helped farmers to shift to low water requiring crops, keeping in mind the water available in the village.

Jaishree Santosh Pawar
Gandharwadi (MH)

When do women get training (in farming)? We were doing everything on our own. It has been years since I went to school, but the exposure visit and the Farmer Field Schools have opened new opportunities, breathing life into my farms! Slowly but surely, many changes like these will occur in my village!

Ramsingh Gurjar
Karauli (RJ)

Now there is grain, there is water! My grandchildren are able to attend school and I can pursue agricultural endeavours. The interventions have led us to this day and I hope that with time, there will come a day when no one from the village will have to migrate in search of work.

Nanda Kale
Mhaswandi (MH)

Prior to the Save the Girl Child intervention in 2008, we had no health facilities in our village Mhaswandi. WOTR's Health Officers trained us to be Health Promoters with basic medical care skills. The realisation of the importance of cleanliness and hygiene led the community to construct family toilets, ensuring better health for today, and the future generations.

Maheshwaram Manga
Loyapally (TS)

After constructing a farm pond, new prospects of livelihoods opened for us. We invested in fish farming and now we earn four times more than what we were earning from just agriculture. Now, we can see our dream of a comfortable home become a reality, where our family can stay together, and where we can finally play with our grandchildren.

DONOR SPEAK

donor
SPEAK

Building Resilient Livelihoods in a Climate Change Scenario

Dhruvi Shah, Executive Trustee and CEO of Axis Bank Foundation (ABF)

India, despite occupying 2.4 percent of the world's landmass and 4 percent of water reserves, houses 18 percent of the human population, 8 percent of the world's biodiversity and 18 percent of its livestock[1]. It also produces around 10 percent and 25 percent of the world's food and milk, respectively. While these figures highlight India's immense importance as a powerhouse of global food and ecological security, they also reveal the tremendous pressure its land and natural resources face. Furthermore, an estimated 700 million people, or roughly half of India's population, depend on forests and agriculture for their livelihoods. Of these, nearly 200 million people, including indigenous communities, women, and marginal farmers experience this dependence most acutely. They rely heavily on forests for fuelwood, fodder, food security, and non-timber forest produce for their survival.

These factors, juxtaposed with the ones below, reveal the tipping point India's most vulnerable find themselves in:

→ **RISING INEQUITIES:** As of 2015, just 4.4 percent farmers in India owned 30 percent of the country's operational farmland. On the other hand, 86 percent of farmers owned just 47 percent. (Agriculture Census of India, 2021)[2]. This inequity is further exacerbated by how subsidies are structured. To put things into perspective, India's fertiliser (Urea and DAP) subsidy bill, which is nearing INR 32 trillion or USD 30 billion[3], provides benefits worth ~ USD 10 billion to its top 5 percent farmers.

→ **RAPID URBANISATION:** As India develops, rapid urbanisation continues to be one of its most dominant trends. In its submission to the UNFCCC for Nationally Determined Contribution in 2015, the Government of India declared that 'more than half of India of 2030 is yet to be built'. We are already seeing this shift exponentially increase the demand for infrastructure and urban amenities like housing, energy, transport, food, water, and waste disposal. Over 40 percent of India's population will be urban by 2030 as against 33% at present[5].

→ **CLIMATE CHANGE:** Bordered by the fragile young Himalayas and a long coastline, India's vast and diverse geography is particularly vulnerable to climate change. More than 80 percent of India's people live in districts that are at risk of climate-induced disasters. Rising temperatures, changing rainfall patterns, declining groundwater levels, retreating glaciers, intense cyclones and sea-level rise can precipitate major crises for livelihoods, food security and the economy. (World Bank, 2023)[6].

1 https://icfre.gov.in/publication/publication51.pdf 2 Agriculture Census (agcensus.gov.in)
3 At Rs 2.55 lakh crore, India's fertilizer subsidy bill overshoots even revised estimate (newindianexpress.com)
4 INDIA INDC TO UNFCCC.pdf 5 India: Helping People Build Resilience to Climate Change (worldbank.org)

→ **LAND DEGRADATION:** A third of India's land is under degradation (ISRO, 2019)[7]. The major drivers are vegetation degradation, agriculture intensification and land-use changes driven by rising demands of infrastructure, energy, and water. While India has committed to achieve Land Degradation Neutrality by 2030 and restore ~26 million hectares of land, pathways to achieve these remain unclear and struggle to compete with the immediate priorities of economic development.

→ **WATER INSECURITY:** Lastly, and most importantly, India finds itself facing a looming water crisis. One key driver is the increase in irrigation capacity, leading to more intensive agricultural practices. NITI Aayog data from 2022-23 shows a significant increase in irrigation access across India. Of the 141 million hectares of gross sown area, nearly 73 million hectares (or 52%) now have access, up from 41% in 2016. However, while India produces ~10 percent of the world's food and fibre, estimates put its groundwater use at roughly one-quarter of the global usage, with total usage surpassing that of China and the United States combined[8]. Subsidies on power, coupled with the existing bundling of rights over groundwater with rights over land, further intensifies the issue.

The above illustrates the context or the **'system'** our communities find themselves in and navigate to make a livelihood. While those with some extent of asset accumulation and access to productive resources fare better, this 'system' is a vicious cycle for the most vulnerable. Inadvertently, poverty runs deepest among these households. Distress migration is often their last resort.

EVERY DROP OF WATER NARRATES A STORY IN RURAL INDIA!!

By design, we find an overlap of India's most vulnerable communities and its water stressed regions. Water is not just a source of life, but a resource that structures vulnerability, shapes livelihoods and defines the local ecology. Hence, all our sustainable livelihoods projects focus on improving water availability and access. This

Axis Bank Foundation (ABF) strives to make this 'system' work for India's most vulnerable. Over the last decade, ABF has worked alongside rural communities and civil society organisations at the grassroots, to co-design and develop processes to enable systemic and lasting transformation. Through our support, we aim to foster improved farm and off-farm livelihoods which are backed by robust community institutions, and provide better quality and access to natural resources, especially water.

6 https://icfre.gov.in/publication/publication51.pdf 7 https://siwi.org/latest/water-crisis-india-everything-need-know/

starts with mapping of water supply and demand, followed by understanding local challenges around management of water. This is followed by a process that focuses on co-designing and advancing a collective action plan to facilitate development and revival/restoration of water bodies. Common lands, including forests, which are foundational to ensuring improved and sustained water availability, need to be restored and conserved. Empowered community institutions can understand and implement water budgeting, ensuring equitable access with a focus on the most marginalised.

Through years of collective efforts, driven by our NGO partners and guided by local government schemes and staff, our projects are inching towards enabling water security for our community. In successful collaborations like our work with WOTR in Maharashtra & Jharkhand, year-round water access for irrigation and domestic needs is now a reality. Such examples have demonstrated that improved water availability and its equitable access has the power to drive collective prosperity in rural India. Our projects have reported increased cropping intensity and elevated soil moisture and groundwater levels. Functional common property resources have led to improved access to water, fodder, and fuel, thereby reducing drudgery, particularly for women. There has also been a significant shift in the ability of communities to expand their basket of livelihoods and diversify into allied activities such as livestock rearing, fisheries, horticulture and floriculture. This has not only reduced their dependence on a single source of income but translated into so much more.

These ripple effects include increased purchasing and savings capacity at the household level, investments in higher education, health-seeking behaviour, and a platform to prioritise the well-being of the entire household and the local economy.

However, much more work is needed. Some focus areas for the future that ABF has started initiating include:

→ **ENSURING INCLUSIVITY:** As we deepen our understanding of the 'system' our communities reside in; we realise that our

villages are not a sacrosanct unit. Even in the most homogenous societies, we see a spectrum of economic groups. Large and medium farmers, who are often small in number, command the lion's share of resources. This group wields substantial influence in decision making. On the other end of the spectrum are the ultra-poor, who suffer from a more acute form of exclusion. This section is often invisible to even the village community and excluded from the social safety net that still exists in our rural settings. Our ability to create a systemic change will depend heavily on developing curated strategies to engage with these groups meaningfully.

→ **LAYERING HEALTH AND CONSERVATION:** The COVID-19 pandemic reiterated how a medical disaster can destroy years and sometimes generational wealth of families. A health emergency among the rural poor has an even deeper impact. We are noticing years of hard work of our participant households and partners undone due to a sudden illness or hospitalisation of a family member. Similarly, there exists an inextricable, yet dwindling, link between people and nature.

PHOTOS: *Water as a resource structures vulnerability, shapes livelihoods and defines the local ecology.*

In addition to this, most developmental strategies being promoted across rural India focus on improving supply and extraction of natural resources. These often neglect the importance of promoting their judicious use and management. Focus on protection and restoration of common lands, including forests, water bodies, riparian areas, and other forms of open habitats, is missing. Bundling of health and conservation priorities, hence, must be an imperative and developmental NGOs must be open to collaborate and synchronise their efforts with health and conservation civil societies.

→ **BUILDING 'BLOCKS':** Public funding for the social sector in India stood at INR 21.3 trillion, or ~ USD 250 billion[8], during FY 23. Philanthropic and CSR contributions totaled INR 1.2 trillion, or ~4%, in addition to this. Needless to say, Government schemes and programmes are driving development in our rural landscape and are routed through administrative blocks, with panchayats or village councils being their building blocks. The requirement to develop annual Gram Panchayat Development Plans (GPDPs) is a crucial exercise that facilitates the consolidation of village and gram panchayat development priorities at the block level. NGOs can significantly contribute to strengthening Gram Panchayat Development Plans (GPDPs) at the village/ panchayat level.Their efforts can focus on two key areas: a) by strengthening the quality of GPDPs, fostering inclusivity in the planning process, and integrating health and conservation priorities. b) by helping different block-level departments work together. This collaboration promotes a holistic development plan.

As ABF strives to improve the livelihoods of two million households by 2026-27, one of the intensifying and worrying hurdles our communities face is the disproportionate impact of climate change. Climate adaptation is, hence, an urgency!

Most developmental strategies being promoted across rural India focus on improving supply and extraction of natural resources. These often neglect the importance of promoting their judicious use and management.

Achieving this, however, necessitates drastic transformations across existing behaviours, strategies, infrastructure, and policies. Climate adaptation must be a systemic response aimed at creating and preserving options that enable communities to respond with agility. This necessitates a collective and concerted approach. Stakeholders must break down silos, think in terms of scale, and create robust support systems for one another. Something that we are aspiring to do and also encouraging our partners to imbibe through our Sustainable Livelihoods Program. ✦

Dhruvi Shah is the Executive Trustee and CEO of Axis Bank Foundation (ABF).
ABF supports livelihood promotion for rural communities across India. It collaborates with not-for-profit organisations to foster community-centric programmes, designed to intentionally sustain economic growth for rural households.

8 https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1894916

CASE
study

Hope Distilled:
How Villages in Telangana and Jharkhand transitioned from Liquor to Sustainable Livelihoods

> ***Jis gaon mein jis cheez ki kami thi, wo dilaya***
> (Wherever whatever kind of assistance was needed, it was provided,)

Kuwari Bhengra, a 49-year-old resident of Koyengsar, Jharkhand, faced a life of poverty and reliance on the forest for sustenance. Erratic weather, lack of irrigation, and alcoholism plagued the community. Women were also forced to partake in the alcohol economy, with many, including Bhengra, making and selling Hadiya (a local rice beer).

However, in 2019, Bhengra was introduced to Axis Bank Foundation's 'Sustainable Livelihood Programme', implemented by WOTR in the region.The programme, implemented in 66 villages in Jharkhand and 21 villages in Telangana, focused on income generation through agriculture, livestock, and water resource development. Bhengra found success through lac cultivation, now earning over Rs 3 lakh annually. "*Jis gaon mein jis cheez ki kami thi, wo dilaya*," (Wherever whatever kind of assistance was needed, it was provided,) she says.

A similar transformation occurred in Telangana's

Narayanpet Mandal. Water scarcity and reliance on chemical fertilisers had devastated agriculture. The programme introduced climate-resilient practices through Farmer Field Schools (FFS).

Initially hesitant, farmers like Kishan witnessed the benefits of the System of Rice Intensification (SRI) and organic methods. Crop cutting experiments showed SRI plots yielded double the produce. Now, 80% of farmers in the programme's villages use SRI.

These transformations have empowered communities, reducing migration and increasing incomes. Both Koyengsar and the villages in Narayanpet Mandal showcase the power of sustainable livelihoods in uplifting communities. ✦

TOP: *Kuwari Bhengra found success through lac cultivation and now earns over Rs 3 lakh annually.*
BOTTOM: *80% of farmers in the programme's villages use SRI.*

Read the full story here:

IN THE MEDIA

IN THE media

SOME GLIMPSES ACROSS 30 YEARS

IndiaSpend

...ndia's Home-Grown Innovations Help Farmers Adapt To Climate Change

...e diverse challenges faced by the agriculture sector in India require more localised actions and adaptation, say experts

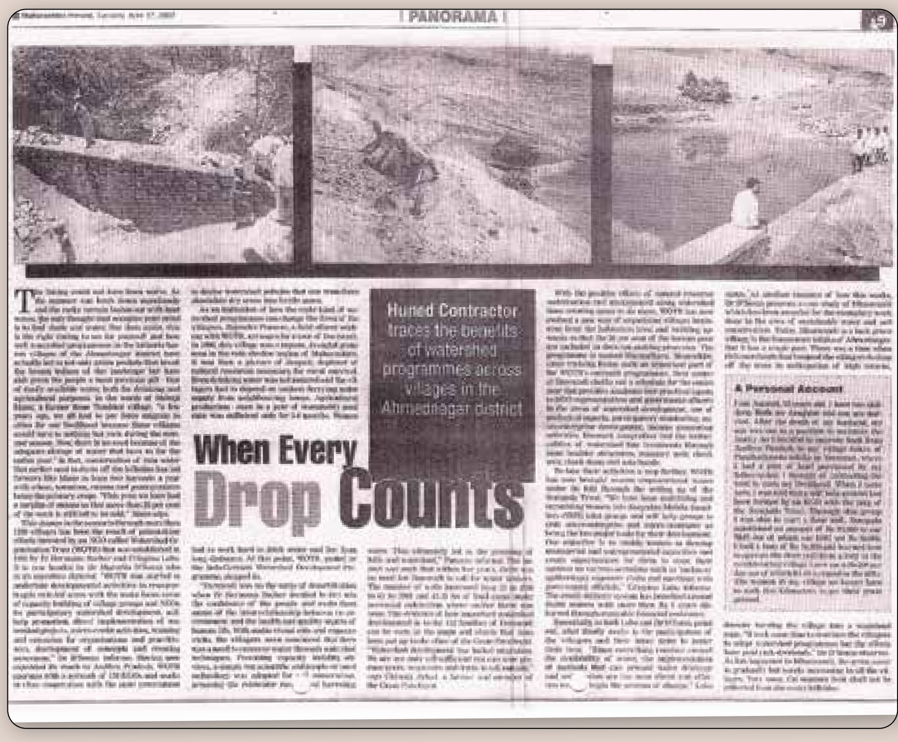
By Kavitha Yarlagadda | 3 Apr, 2023

K. Kanakaiah

ECOLOGY

GOAN OBSERVER

We have eyes but we do not see...



PANORAMA

Huned Contractor traces the benefits of watershed programmes across villages in the Ahmednagar district

When Every Drop Counts

A Personal Account

नागदरवाडीत वाहतात जलसमृद्धीचे पाट!


लोकसत्ता

नगरच्या मार्सेला डिसोझा यांना क्योटो जागतिक जल पारितोषिक

Grand Prize
Kyoto World Water Grand Prize


Sakal Times

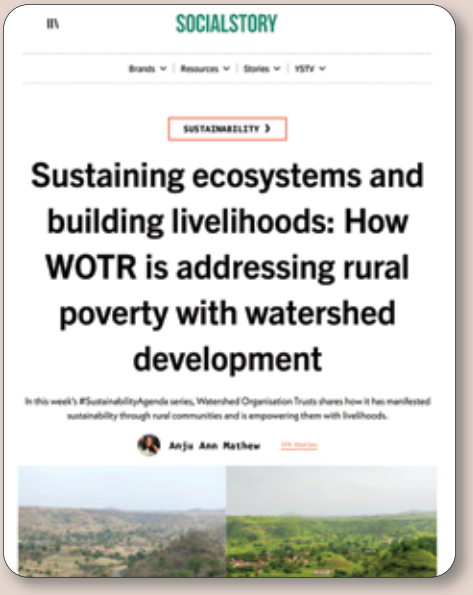
plus

Adapting agriculture to climate change


Edit Page

The partial scarcity picture

Claims of success of state's pet scheme Jalayukta Shivar Abhiyan are an eyewash

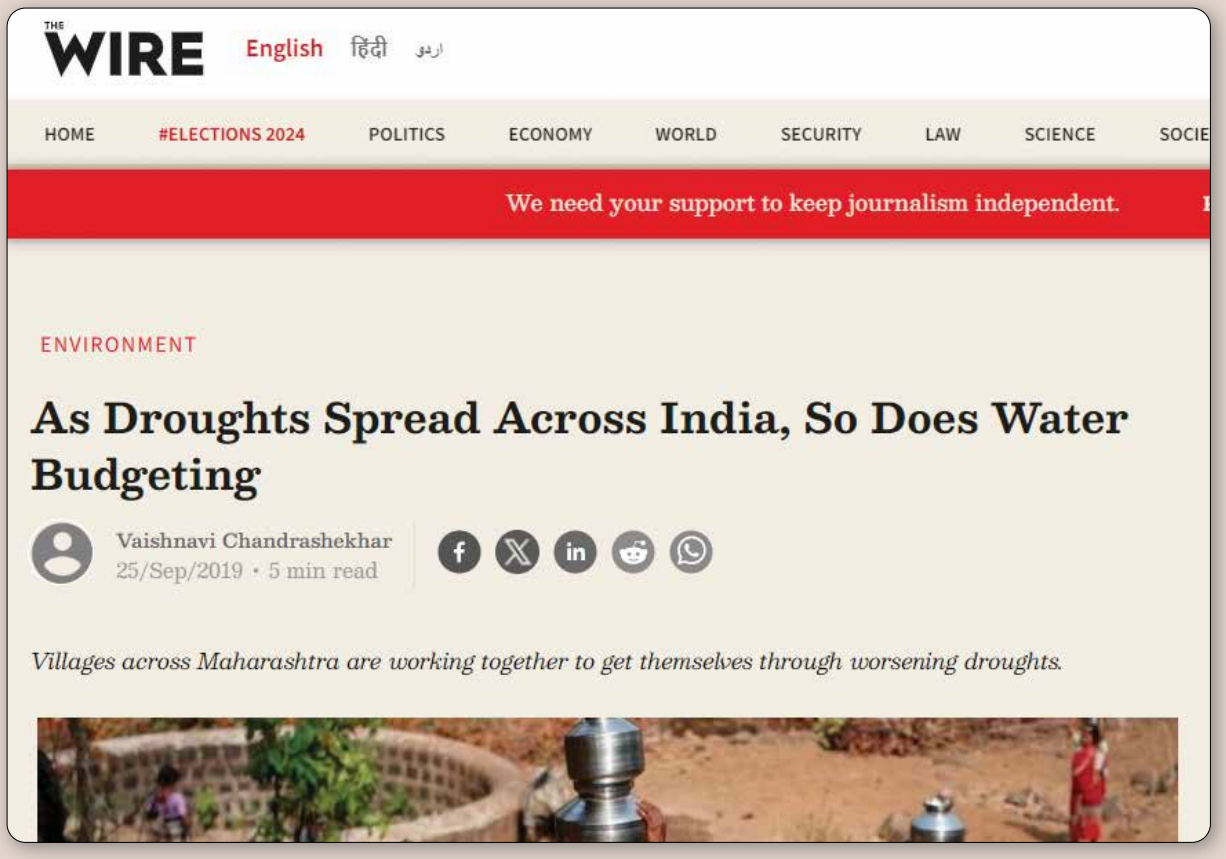

SOCIALSTORY

SUSTAINABILITY

Sustaining ecosystems and building livelihoods: How WOTR is addressing rural poverty with watershed development

In this week's #SustainabilityAgenda series, Watershed Organisation Trusts shares how it has manifested sustainability through rural communities and is empowering them with livelihoods.

Anju Ann Mathew


THE WIRE

English हिंदी اردو

HOME #ELECTIONS 2024 POLITICS ECONOMY WORLD SECURITY LAW SCIENCE SOCIE

We need your support to keep journalism independent.

ENVIRONMENT

As Droughts Spread Across India, So Does Water Budgeting

Vaishnavi Chandrashekhar
25/Sep/2019 • 5 min read

Villages across Maharashtra are working together to get themselves through worsening droughts.

MONGABAY
NEWS & INSPIRATION FROM NATURE'S FRONTLINE IN INDIA

FORESTS ANIMALS OCEANS PEOPLE RIVERS SOLUTIONS OPPORTUNITIES MONGABAY GLOBAL ABOUT

To search, type and hit enter

Mongabay Series: Conserving Agro-biodiversity, Nature-based Solutions

Ecosystem-based adaptation takes nature-based, people-centric approach to agriculture

by Arathi Menon on 9 August 2023

TH India World Opinion Elections e-Paper

FREE TRIAL SUBSCRIBE LOGIN

Ministry board urges politicians to include water crisis in election manifesto

The day long discussion was conducted to mark 'Water for Peace' the theme of World Water Day this year, that urges to focus on the critical role water plays in the stability of the state and its people.

March 22, 2024 08:18 am | Updated 10:25 am IST

PURNIMA SAH

READ LATER PRINT

Prajwal Revanna case: Those possessing explicit videos also

Villagers get lesson on sharing groundwater

NGO implemented project after it located an aquifer shared by 14 hamlets

One of the sessions in water literacy

State to rope in corporates, PSUs for afforestation schemes

VIVEK DESHPANDE
NAGPUR, AUGUST 27

IN AN attempt to manage the heavy cost of afforestation, the state government will involve corporate houses and public sector undertakings (PSU) in greening of 25,000 hectares as "something like" a corporate social responsibility (CSR) activity. A government resolution to this effect will soon be issued.

The idea is to have a tripartite agreement between the forest department, the company and an NGO that will help the company develop the plantation.

Head of Forest Force (HoFF) Alok Joshi told The Indian Express, "This is going to be a no-returns proposal for the companies, meaning the companies have to do it as something like CSR and would expect no returns against it."

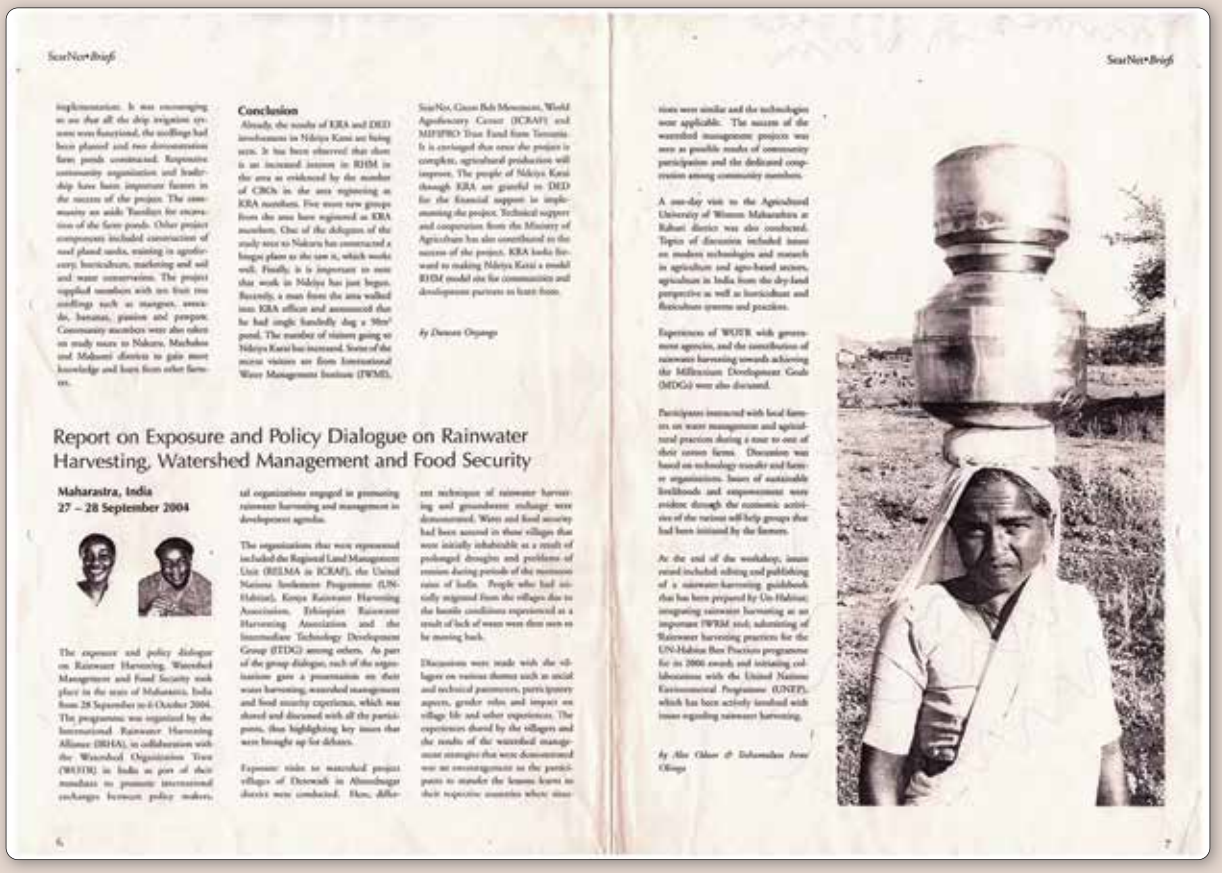
There will be two-level committees — a state-level panel led by chief secretary for private corporate houses and local-level panels headed by the chief conservator of forest for PSUs—which will grant the permissions for such projects. "There will have to be a minimum of 500 hectares of greening proposal," Joshi said.

"The companies will, however, get carbon credits for the work," he said.

Joshi said there are NGOs like Water Organisation Trust (WOTR) in Ahmednagar, which have done good work on the greening front. They can be good catalysts for such CSR projects, he said.

Joshi also said, "there are some other greening proposals before the department like the one submitted by the Shirdi Foundation. The foundation has said it would grow firewood on 4,000 hectares of degraded land and use the firewood bio-mass to produce 25 MW electricity. They have also offered to fulfill the firewood requirement of the local villagers with it."

"The proposal is also being considered positively by the government," Joshi said.



SeaNet•Briefs

implementation. It was encouraging to see that all the drip irrigation systems were functional, the seedlings had been planted and two demonstration farm ponds constructed. Responsive community organization and leadership have been important factors in the success of the project. The community set aside Tuesdays for excavation of the farm ponds. Other project components included construction of road plated tanks, training in agroforestry, horticulture, marketing and soil and water conservation. The project supplied members with tea fruit tree seedlings such as mangoes, avocados, bananas, guavas and pawpaw. Community members were also taken on study tours to Nakuru, Machakos and Makueni districts to gain more knowledge and learn from other farmers.

Conclusion

Already, the results of KRA and DED involvements in Ndeiya Kansi are being seen. It has been observed that there is an increased interest in RHM in the area as evidenced by the number of CBOs in the area registering as KRA members. Five more new groups from the area have registered as KRA members. One of the delegates of the study tour to Nakuru has constructed a biogas plant in the site it, which works well. Finally, it is important to note that work in Ndeiya has just begun. Recently, a man from the area walked into KRA offices and announced that he had single handedly dug a 50m³ pond. The number of visitors going to Ndeiya Kansi has increased. Some of the recent visitors are from International Water Management Institute (IWMI), SeaNet, Green Belt Movement, World Agroforestry Center (ICRAF) and MIPIPRO Trust Fund from Tanzania. It is envisaged that once the project is complete, agricultural production will improve. The people of Ndeiya Kansi though KRA are grateful to DED for the financial support in implementing the project. Technical support and cooperation from the Ministry of Agriculture has also contributed to the success of the project. KRA looks forward to making Ndeiya Kansi a model RHM model site for communities and development partners to learn from.

by Dennis Onyango

Report on Exposure and Policy Dialogue on Rainwater Harvesting, Watershed Management and Food Security

Maharastra, India
27 – 28 September 2004

The exposure and policy dialogue on Rainwater Harvesting, Watershed Management and Food Security took place in the state of Maharastra, India from 28 September to 6 October 2004. The programme was organized by the International Rainwater Harvesting Alliance (IRHA), in collaboration with the Watershed Organization Trust (WOTR) in India as part of their mandate to promote international exchanges between policy makers, national organizations engaged in promoting rainwater harvesting and management in development agendas.

The organizations that were represented included the Regional Land Management Unit (RELMA in ICRAF), the United Nations Settlements Programme (UN-Habitat), Kenya Rainwater Harvesting Association, Ethiopian Rainwater Harvesting Association and the Intermediate Technology Development Group (ITDG) among others. As part of the group dialogue, each of the organizations gave a presentation on their water harvesting, watershed management and food security experiences, which was shared and discussed with all the participants, thus highlighting key issues that were brought up for debates.

Exposure visits to watershed project villages of Dotewadi in Ahmednagar district were conducted. Here, different techniques of rainwater harvesting and groundwater recharge were demonstrated. Water and food security had been secured in these villages that were initially inhabitable as a result of prolonged droughts and problems of erosion during periods of the monsoon rains of India. People who had initially migrated from the villages due to the hostile conditions experienced as a result of lack of water were then seen to be moving back.

Discussions were made with the villagers on various themes such as social and technical parameters, participatory aspects, gender roles and impact on village life and other experiences. The experiences shared by the villagers and the results of the watershed management strategies that were demonstrated was an encouragement to the participants to transfer the lessons learnt to their respective countries where situations were similar and the technologies were applicable. The success of the watershed management projects was seen as possible results of community participation and the dedicated cooperation among community members.

A one-day visit to the Agricultural University of Western Maharashtra at Rahuri district was also conducted. Topics of discussion included issues on modern technologies and research in agriculture and agro-based sectors, agriculture in India from the dry-land perspective as well as horticulture and floriculture systems and practices.

Experiences of WOTR with government agencies, and the contribution of rainwater harvesting towards achieving the Millennium Development Goals (MDGs) were also discussed.

Participants interacted with local farmers on water management and agricultural practices during a tour to one of their cotton farms. Discussion was based on technology transfer and farmer organizations. Issues of sustainable livelihoods and empowerment were evident through the economic activities of the various self-help groups that had been initiated by the farmers.

At the end of the workshop, issues raised included editing and publishing of a rainwater-harvesting guidebook that has been prepared by Un-Habitat, integrating rainwater harvesting as an important IWRM tool; submitting of Rainwater harvesting practices for the UN-Habitat Best Practices programme for its 2006 awards and initiating collaborations with the United Nations Environmental Programme (UNEP), which has been actively involved with issues regarding rainwater harvesting.

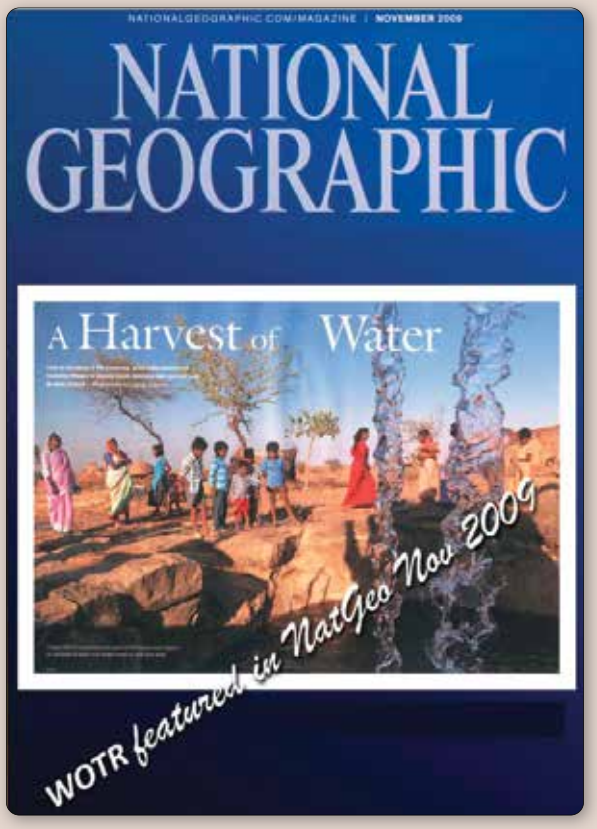
by Alice Odour & Subramaniam Iyenr Olenga

6

TIMES CITY

Letting the grass grow

There is nothing official about it. Yet, the ban on grazing imposed in certain villages in Ahmednagar district has led to remarkable results



NATIONALGEOGRAPHIC.COM/MAGAZINE | NOVEMBER 2009

NATIONAL GEOGRAPHIC

A Harvest of Water

WOTR featured in NatGeo Nov 2009

COMMUNITY
heroes

THEY USED TO THROW STONES AT ME!

Bireng Soy fell in love while still in school and got married immediately thereafter. She became a mother at 16. “Love marriages are frowned upon amongst the Mundas, so after marriage, my husband and I were ostracised by the village and our families,” Soy, who lives in Karanjtoli village, in Khunti, Jharkhand says.

Young and innocent, Bireng was forced to quit school and focus on the household instead. “We rented a small house, and started building a family there,” she recalls, talking about that time. Eventually, she became a mother to three children, and life became increasingly harder as the years went by. Since they were ostracised, the couple had little land to farm on. “I would do manual labour in other people’s fields, and he would drive. But the money was not enough,” she says.

Things became worse when her husband became an alcoholic, straining family finances even further and leaving Soy as the sole breadwinner. “To make ends meet, I started selling hadiya (a local rice beer available in these parts) in the village. *Dimaag hi nai tha, ghar ko kaise chalayein, to jo samjah aaya wo kia* (I didn’t have the maturity to understand how to run the household, so I did whatever I could),” she says.

Soy eventually joined a self-help group and came in contact with WOTR through the group. Eventually, she started working as a community worker

THIS PAGE:
Bireng has been instrumental in mobilising communities towards sustainable agricultural practices.

"Things change slowly," Soy says, "One has to just keep going"

with the organisation, helping mobilise communities towards sustainable agricultural practices. Since 2019, she has been working as a Krishi Wasundhara Sevika, under which she guides farming communities to take up organic farming.

"I wasn't sure if I had it in me to go into the community, to motivate, to do this kind of work. *Meri koi pehchaan hi nai thi* (I had no identity). Who would listen to me? But the training that I received from the organisation gave me the confidence to go out there. Today, I have a name in the village," she says.

Talking about the challenges she says, "I have seen days when they (villagers) would throw stones at me when I would say something in the Gram Sabha. That is no longer the case. Everyone knows and trusts me, and I have been able to get some good work done in my village," she says.

Through her engagement with self-help groups, she has also been able to connect other women in the village with diverse livelihood options for them to be able to support themselves economically.

She is also the only woman board member of the only Farmer Producer Organisation (FPO) in the area - the Birsa Farmers Producer Company which presently has more than 900 members. “When I filed my nomination to be a director, I didn’t understand what that word meant. I only understood the problems in my community, and the fact that if farmers get together, we could collectively face the problems better. The idea that farmers can have a company of their own was key to my decision to join the Board of Directors (BOD),” she says.

Her focus, presently, is to understand the nitty-gritties of what running an FPO entails.

Before WOTR’s intervention, Bireng’s annual income was a mere Rs 50,000. Her training and work as a Wasundhara Sevak opened avenues for growth. As a Director and staff of the FPO, she earns Rs 72,000 annually. Additionally, her role as a cluster treasurer for the National Rural Livelihood Mission (NRLM) Project provides her with Rs 36,000 annually and her work with the Village Organisation of SHGs adds Rs 6,000 to her income. Combined with her earnings of Rs 45,000 from agriculture and livestock, Bireng’s total annual income has significantly increased to Rs 1,56,000.

She is also determined for her three children to finish school. “I had to discontinue my education, but I don’t want the same fate for my children,” she says. Her eldest just got admitted to a Nurses’ Training School, and Soy says she doesn’t remember the last time she was so thrilled. ✦

BOTTOM: *Through her engagement with self-help groups, Bireng has also been able to connect other women in the village with diverse livelihood options.*

“Today, I have a name in the village”

DEEP dive

Empowering Farmer Producer Companies: A WOTR Approach to Transforming India's Agricultural Landscape

Abhijit Shinde

In the face of climate change, unpredictable markets, and a fragmented supply chain, Farmer Producer Companies (FPCs) are emerging as resilient pillars of India's agricultural sector. These farmer-owned and operated enterprises hold the potential to revolutionise how crops are grown, processed, and marketed. However, FPCs are not without their hurdles. Limited access to finance, lack of technical expertise, and difficulties in reaching profitable markets can stifle their growth.

In light of these challenges, WOTR with its focus on sustainable development and social justice, has made empowering FPCs a cornerstone of its mission, recognizing their potential to uplift rural communities and promote environmental stewardship.

UNRAVELLING THE FPC ECOSYSTEM: A WEB OF CHALLENGES

While Farmer Producer Companies (FPCs) offer a promising model for agricultural transformation, they operate within a complex ecosystem riddled with interconnected challenges that can hinder their growth and sustainability. Understanding these challenges is crucial for developing effective solutions that empower FPCs to reach their full potential.

1. **FINANCIAL CONSTRAINTS**
   Limited access to finance is a major roadblock for FPCs. Traditional lenders often hesitate to provide credit due to the perceived risks associated with agriculture, such as unpredictable weather patterns and market fluctuations. This lack of access to capital restricts FPCs' ability to invest in essential inputs, modern technologies, processing facilities, and marketing initiatives.

2. **CAPACITY AND SKILL GAPS**
   Many FPCs lack the technical and managerial expertise needed for efficient operations. This includes skills in crop production, post-harvest management, financial management, marketing, and leadership. Without adequate

capacity building, FPCs may struggle to make informed decisions, negotiate favourable deals, and adapt to changing market conditions.

3. **MARKET ACCESS AND LINKAGES**
Establishing reliable market linkages is a significant challenge for FPCs. They often lack the knowledge and resources to identify potential buyers, negotiate fair prices, and maintain consistent demand for their produce. Inadequate infrastructure, such as storage facilities, processing units, and transportation networks, further exacerbates these issues, leading to post-harvest losses and reduced profitability.

4. **REGULATORY AND POLICY ENVIRONMENT**
Navigating complex regulatory frameworks and compliance requirements can be overwhelming for FPCs, especially those with limited resources. Moreover, the policy environment may not always be conducive to FPC growth, with inadequate support mechanisms,

BOTTOM: *Farmer Producer Companies (FPCs) are emerging as resilient pillars of India's agricultural sector.*

inconsistent regulations, and limited awareness among policymakers about the unique needs of FPCs.

5. **FRAGMENTED SUPPLY CHAINS**
   The agricultural supply chain in India is often fragmented, with multiple intermediaries between farmers and consumers. This fragmentation leads to inefficiencies, higher transaction costs, and reduced returns for farmers. FPCs can play a crucial role in consolidating supply chains, but they require support in developing efficient logistics, aggregation mechanisms, and quality control systems.

6. **TECHNOLOGICAL ADOPTION**
   Many FPCs are slow to adopt new technologies due to lack of awareness, financial constraints, and resistance to change. This can hinder their competitiveness and limit their ability to improve productivity, reduce costs, and enhance product quality. Embracing digital tools and precision agriculture techniques is essential for FPCs to thrive in the modern agricultural landscape.

7. **SOCIAL AND GOVERNANCE ISSUES**
   Building trust and cooperation among FPC members is vital for their success. However, social dynamics, power imbalances, and conflicts of interest can sometimes create internal challenges. Ensuring transparent and inclusive governance structures, promoting gender equity, and resolving disputes amicably are essential for FPC cohesion and long-term sustainability.

By addressing these interconnected challenges through a multi-faceted approach that includes capacity building, financial inclusion, market development, policy advocacy, infrastructure development, and technological adoption, WOTR and other stakeholders can create an enabling environment for FPCs to flourish. Empowering FPCs is not only crucial for improving the livelihoods of farmers but also for ensuring food security, promoting sustainable agriculture, and driving rural development in India.

A HOLISTIC APPROACH: BUILDING CAPACITY, FORGING LINKAGES

For WOTR, FPCs are a means of actively engaging farmers in the development process. They provide an organised system to transfer modern technology combined with climate and ecological approaches, absorb them efficiently into rural development programs, and monitor their socio-economic progress. They also play a critical role in creating sustainable employment for youth and women, and progress towards reducing poverty for millions of people.

In our ongoing efforts to empower FPCs, we focus on comprehensive capacity building. This involves guiding FPCs in strategic procurement planning and developing a deep understanding of dynamic market forces. Through tailored market training sessions, we educate FPCs on effective post-harvest management techniques and facilitate seamless execution of local trades. Our initiatives extend to creating robust buyer-seller platforms, where we introduce institutional buyers to enhance market access and sustainability. Additionally, we strengthen FPC leadership and decision-making capabilities through targeted BoD (Board of Directors) training programs, ensuring they navigate market linkages with confidence and stability.

These efforts culminate in stable market linkages that offer predictable pricing and timely payments, bolstered by systems that assure fair compensation to all FPC members. We also prioritise skill enhancement across business operations, procurement strategies, pricing mechanisms, and quality management. By mentoring members and fostering a supportive environment, we aim to build confidence and resilience in their business endeavours. Furthermore, we actively support infrastructure development, including the establishment of storage and processing facilities, while facilitating financial linkages to empower FPCs with essential credit and financial services for sustained growth. Our holistic approach also includes advising on effective cost management strategies, introducing risk mitigation tools such as promoting secure contract farming practices, thereby enabling FPCs to thrive within a competitive agricultural landscape.

In the fiscal year 2023-24, our supported FPCs in Maharashtra saw their turnover soar by 141%, rising from ₹6.71 crores to ₹16.17 crores. Meanwhile, supported FPCs in Odisha experienced a surge of 382%, with turnover skyrocketing from ₹48 lacs to ₹2.31 crores. Overall, FPCs reported a remarkable 261% growth, showcasing the strategic impact of focused initiatives in these states. This collective progress reflects an average 160% growth across all supported FPCs, underscoring the effectiveness of targeted interventions in driving significant business expansion.

A VISION FOR THE FUTURE: STRATEGIC INITIATIVES IN 2024-25

In the fiscal year 2024-25, the WOTR is intensifying its efforts through various CSR (Corporate Social Responsibility) projects in Maharashtra. These projects will focus on women's participation, infrastructure, climate-resilient agriculture, and business initiatives.

WOTR is addressing climate and market challenges faced by farmers by creating sustainable business linkages and resilient crop production systems through the FPCs. FPCs empower farmers by providing an organised structure for technology transfer, integrating climate-smart practices, and fostering socio-economic progress. WOTR enhances farmers' bargaining power, enabling competitive pricing for inputs and outputs and facilitating access to technical, technological, and financial support. These efforts aim to improve productivity, income, and resilience, while promoting women's participation and sustainable farming practices.

TOP: *Through its work with FPCs WOTR aims to improve productivity, income, and resilience, while promoting women's participation and sustainable farming practices.*

WOTR's initiatives include efficient water management, climate-resilient agricultural practices, post-harvest processing, and capacity building.

The proposed interventions focus on innovative farm planning, primary and secondary post-harvest processing, and integrating farmers into value chains to reduce losses and increase income. WOTR plans to utilise digital technologies for better decision-making and market linkages, ensuring quality and food safety. The Farm Precise App is one such tool providing weather-based, location-specific advisories. Capacity building initiatives will enhance stakeholders' knowledge and skills, making the program sustainable. An advisory committee comprising agri-value chain professionals will support WOTR in strategizing and achieving program objectives, ensuring the development of resilient, climate-smart farming systems and robust market linkages for FPCs.

WOTR is placing significant emphasis on EbA (Ecosystem-Based Adaptation) compliance to align all FPC operations with environmental, social, and governance standards. WOTR is also prioritising gender inclusivity in FPC governance to foster diversity and equity across their initiatives. Capacity building initiatives will empower FPCs to actively engage and thrive within these projects.

To strengthen market linkages, WOTR aims to onboard new institutional buyers, thereby diversifying sales channels for FPO (Farmer Producer Organization) products. Improved data management systems will facilitate informed decision-making, while exploring Agritech Platforms for Partnerships seeks to foster innovative collaborations to enhance agricultural productivity.

By focusing on these key areas, WOTR aims to create a more sustainable, equitable, and prosperous future for India's agricultural sector. ✦

Abhijit Shinde works with WOTR and is a seasoned Agri-Business Development Professional with over 16 years of experience bridging agriculture and markets, enhancing market linkages and creating sustainable value chains.

FROM THE
ground

A Day in the Life of a Jal Sewika

Chaaya's life took a dramatic turn in 1997 when she left behind the bustling energy of Pune, exchanging it for the peaceful rhythms of Mendhwan village in Ahmednagar. Embracing this slower-paced life wasn't without its challenges, but her supportive family helped ease the transition. Yet, a new challenge lay in wait, one that would shape Chaaya's story – the stark reality of water scarcity.

At first, she endured a gruelling daily trek. A half-kilometre walk to the village well, heavy pots of water precariously balanced, became her lifeline. Water wasn't just for drinking and cooking – it was the cornerstone of her entire existence in this rural setting. But as the seasons changed, so did the reliability of rainfall. The water scarcity worsened, and Chaaya knew a desperate search for solutions was crucial.

It was amidst this struggle that a flicker of hope emerged. WOTR stepped in, bringing the promise of change. As their watershed project began to take shape in Mendhwan, Chaaya was not content to be a bystander. Alongside other determined women, she embraced a transformative role as a Jal Sewika – a water steward – ready to pave the way for a water-secure future in her village.

Chaaya begins her day promptly at 5 am. A brief yoga session awakens her senses, a small island

of personal ritual before the bustle of village life begins. Household chores follow – the familiar clink of utensils, the scent of spices rising as she prepares a simple meal for herself and her husband.

However, every alternate day presents a vastly different challenge – it's water supply day.

By 7 am, their household needs are met with carefully filled pots ensuring a steady supply. This decision – an alternate-day water system – wasn't arrived at lightly. Chaaya, in her role as a Jal Sewika (Community worker for water), understands the harsh realities better than most. Once plentiful rains now come in short, unpredictable bursts, leaving wells parched. As the village grappled with water scarcity, it was she who proposed a balanced solution during a tense Water Management Committee meeting.

She rallied support from the village's self-help groups and the Gram Panchayat, her voice gaining strength with every word. "If we don't act in unity now," she had argued, "our future will be decided by thirst."

By 8 am, Chaaya is a whirlwind of motion at the Mahila Vikas Sangathan. As a dedicated member of this women's development organisation, her tasks range from distributing rations to helping women with queries about government schemes. When ration days pass, she's in the fields – weeding crops, tending to irrigation, shouldering her share of the workload. Her farm, shared with her husband, is currently abuzz with the peanut harvest. In a month's time, just after the onions were gathered, the women's self-help group organised a potluck to celebrate the harvest. Dishes made with fresh onions filled the room, a testament to both their hard work and the warmth of their community.

Evenings bring a slower pace. By 6 pm, she's preparing tea for her husband, a quiet ritual of shared silence. Though Chaaya doesn't join him in the cup of tea, she enjoys this slice of domestic normalcy. Dinner follows, and then more chores – preparing vegetables for the next day, ensuring her small household is in order. By 10 pm, after catching the news and her favourite show, '*Amchi Maati, Amchi Mansa*' on Doordarshan, Chaaya finally retires for the night.

Her day might seem ordinary, filled with the tasks of any village woman. Yet, within those familiar rhythms lies the extraordinary heart of a Jal Sewika. With every shared pot of water, with every community meeting, with every onion harvested, Chaaya Bodke weaves a future for Mendhwan where water, the source of life, is secured. ✦

PHOTOS: *As a Jal Sewika – a water steward, Chaaya has been at the forefront of good water management practices in her village.*

expert SPEAK

Maintaining Ecosystem Services and Biodiversity for Long-term Sustainability of Ecosystems

Tushar Suryawanshi, Satyam Rana, Dr. Saurabh Purohit

Ecosystems, ranging from verdant grasslands and serene wetlands to luxuriant rainforests and vibrant coral reefs, form the intricate webs of life that sustain our planet. These natural networks are more than mere assemblages of organisms, vegetation, and bacteria; they function as dynamic systems where every component is integral to maintaining equilibrium and operation. This notion is encapsulated in the concept of ecosystem integrity, which emphasises the importance of preserving the health, stability, and resilience of these systems.

Ecosystem integrity is a holistic approach to conservation that considers the wholeness of entire landscapes and ecosystems rather than focusing solely on individual species or resources. It advocates for the interconnectedness of various biotic and abiotic components within ecosystems, encompassing structure (e.g., species presence and diversity), composition (e.g., connectivity, fragmentation), and function (e.g., productivity, disturbance regimes, and functional connectivity). This approach centres on how closely an ecosystem resembles its original state or, more precisely, its natural range of variation (Nicholson et al., 2021; Noss, 1990).

BIODIVERSITY + ECOSYSTEM SERVICES = ECOSYSTEM INTEGRITY

Biodiversity refers to the variety of plants, animals, and microorganisms that inhabit a specific area. Like pieces of a vast puzzle, each element plays a crucial role in maintaining ecosystem integrity. Biodiversity is fundamental to ecosystem functioning, providing resources through natural systems and forming the foundation of the benefits humans derive from their environment. For example, different species of plants and animals support each other and help maintain stability: birds control pests, bees pollinate flowers, and trees provide oxygen and habitats. However, anthropogenic activities such as land use change, overexploitation, pollution, and the spread of invasive species can severely impact biodiversity, leading to species loss at an alarming rate.

Ecosystem services are the numerous benefits that nature provides to humans, often without them even realising it. These services are categorised into four major types: Provisioning services (products obtained from ecosystems), Regulating services (benefits derived from the regulation of ecosystem processes), Supporting

TOP LEFT: *Natural resources provided by biodiversity, the benefits and beneficiaries, and drivers of change (Source: epa.gov.in)*
BOTTOM LEFT: *Different types of ecosystem services (Source: WWF)*

services (which support other ecosystem services), and Cultural services (non-material benefits obtained from ecosystems). However, relentless exploitation of these services often comes at the expense of biodiversity, leading to degraded ecosystems and reduced resilience in the face of environmental change. Balancing biodiversity conservation with the sustainable use of ecosystem services is essential for maintaining ecosystem integrity. In the intricate cycle of nature, biodiversity and ecosystem services intertwine, shaping the resilience and vitality of our planet. As humanity navigates an era marked by unprecedented environmental challenges, the imperative to preserve ecosystem integrity is greater than ever. This can be achieved through the RPM approach: Restoration of degraded ecosystems, Protection of the environment from the adverse impacts of climate change, and Maintenance of existing ecosystem integrity through sustainable ecosystem-based management principles.

ECOSYSTEM INTEGRITY: A PATHWAY TO SUSTAINABILITY

Ecosystem integrity is paramount for long-term sustainability, ensuring the resilience of ecosystems through biodiversity and ecosystem services. This

resilience allows ecosystems to withstand and recover from disturbances such as climate change, natural disasters, and human activities. Ecosystem integrity serves as the foundation upon which other aspects of ecological well-being and sustainability are built. When ecosystems are healthy and intact, they provide essential services such as clean air and water, habitats for wildlife, and the regulation of natural processes, contributing to overall ecological health and sustainability. Furthermore, maintaining ecosystem integrity preserves biological diversity and ecosystem services, which are crucial components of healthy ecosystems. By prioritising and preserving ecosystem integrity, we can safeguard and promote the health and sustainability of ecological systems as a whole.

MAINTAINING ECOSYSTEM INTEGRITY IN DRYLANDS: CHALLENGES AND OPPORTUNITIES

Drylands, characterised by low rainfall, face severe and multifaceted challenges that undermine the integrity of their fragile ecosystems. These challenges arise from a complex interplay of environmental, socio-economic, and institutional factors, exacerbating the vulnerability of these landscapes and the communities that depend on them.

CHALLENGES

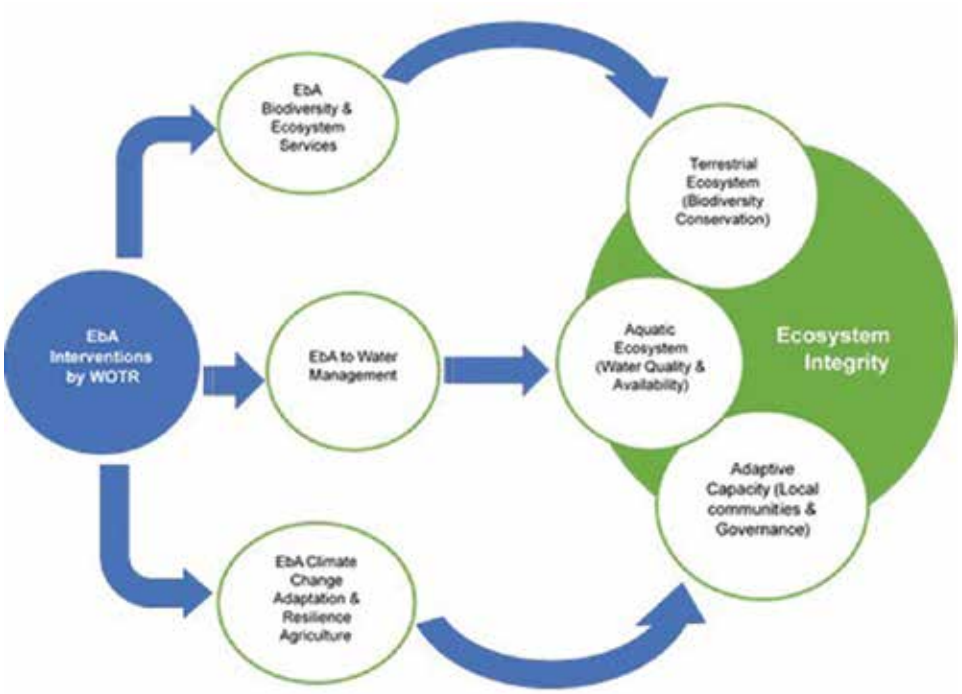
- → Driven by growing human populations and increasing demand for resources, drylands often face overexploitation of their natural resources, including overgrazing, unsustainable fuelwood extraction, and inappropriate land-use practices.
- → The conversion of dryland ecosystems for agricultural expansion, urban development, and infrastructure projects has resulted in habitat fragmentation and loss of biodiversity.
- → Climate change, population growth, and unsustainable water management have increased water stress, groundwater depletion, and deterioration of water quality posing severe challenges to the sustainability of dryland ecosystems and the livelihoods of communities that rely on them.
- → Poverty, lack of alternative livelihood opportunities, and insufficient institutional and policy frameworks can perpetuate unsustainable practices in dryland regions.

OPPORTUNITIES

- → Implementation of adaptive and integrated ecosystem management strategies that balance resource utilisation and conservation, fostering diversified and climate-resilient livelihoods, and integrating traditional ecological knowledge with scientific insights.
- → Prioritisation of biodiversity conservation and habitat restoration through the expansion of the protected area network, restoring the wildlife corridors and actively involving local communities in conservation efforts.
- → Strengthening of the institutional and policy frameworks to support sustainable resource management and ensure equitable access to resources.
- → Creation of innovative financing and incentive mechanisms (payment of ecosystem services, green bonds etc.) is essential to drive dryland conservation and sustainable development forward.
- → Utilisation of the national and international climate change funding opportunities to bolster conservation efforts in dryland ecosystems.

WOTR'S INTERVENTIONS

For the last three decades, the Watershed Organisation Trust (WOTR) has promoted integrated watershed management, climate change adaptation, and Ecosystem-based Adaptation (EbA) approaches to maintain ecosystem integrity in the arid and semi-arid regions of Maharashtra. EbA is a nature-based and human-centred approach to tackling the



TOP LEFT:
Conceptual diagram of interlinkages of EbA projects with Ecosystem Integrity
NEXT PAGE:
Ecosystem integrity is paramount for long term sustainability, ensuring the resilience of ecosystems through biodiversity and ecosystem services.

impacts of climate change. It preserves the natural resource base for agricultural production, helps people adapt to climate change, and enhances food security.

- → **EbA Approach to Biodiversity and Ecosystem Services:** By implementing Ecosystem-based Adaptation (EbA) practices to enhance biodiversity and ecosystem services, WOTR has undertaken several initiatives. These include afforestation using indigenous species, agroforestry practices, the preparation of People's Biodiversity Registers, promotion of sustainable livelihood activities (such as bamboo-based enterprises and apiculture), and the development of biodiversity parks. These efforts directly contribute to the integrity of terrestrial ecosystems.
- → **EbA approach to Water Management:** Sustainable water management practices, such as rainwater harvesting, wetland restoration, and watershed management is crucial for maintaining the ecosystem integrity of a particular location.
- → **EbA Approach to Agriculture:** By implementing climate-resilient agricultural practices such as crop diversification, soil conservation, multi-layer farming, and the promotion of traditional crops, WOTR directly contributes to ecosystem integrity.

Overall, the interconnectedness of the EbA projects with ecosystem integrity lies in their collective impact on maintaining and enhancing the health and functionality of ecosystems for present and future generations (Figure 6).

CONCLUSION

Ecosystem integrity is crucial for a sustainable future. The restoration of biodiversity and ecosystem services, with the active involvement of local communities, can maintain ecosystem integrity and help combat the adverse impacts of climate change. WOTR's unwavering commitment to preserving ecosystem integrity through the holistic EbA approach can safeguard ecological health, ecosystem services, environmental quality, and biological diversity. This ensures the sustenance of life on Earth without compromising the quality of life for communities dependent on natural resources, securing a prosperous and sustainable future. ✦

Tushar Suryanwanshi, researcher with the Ecology team at W-CRes is an environmentalist with over 5 years of experience in Environmental Economics and Natural Resource Management.

Satyam Rana, researcher with the Ecology team at W-CReS, specialises in Aquatic Ecology, and Limnology. He has also conducted extensive studies on plankton.

Dr. Saurabh Purohit's areas of interest and expertise include Forestry, Nature-based Solutions, Ecosystem-based Adaptation, and Ecology. He focuses on how remote sensing and Geographical Information Systems, combined with ground expertise, can enhance natural resource management for the sustenance of the living world.

References

1. Nicholson, E., Watermeyer, K. E., Rowland, J. A., Sato, C. F., Stevenson, S. L., Andrade, A., et al. (2021). Scientific foundations for an ecosystem goal, milestones and indicators for the post-2020 global biodiversity framework. Nature Ecology & Evolution, 5(10), 1338–1349. https://doi.org/10.1038/s41559-021-01538-5
2. Noss, R. F. (1990). Indicators for Monitoring Biodiversity: A Hierarchical Approach. Conservation Biology, 4(4), 355–364. https://doi.org/https://doi.org/10.1111/j.1523-1739.1990.tb00309.

COMMUNITY
heroes

SHE WAS SUBJECT TO MERCILESS BEATINGS NIGHT AFTER NIGHT!

Ujwala Gaekwad, 29, was 17 when she was married off to a violent alcoholic. The beatings began a few months later. "*Tu gobar uthane aur bartan dhone ke layak hai* (You can only clean dirty utensils, and pick cow dung)," her husband would shout, as he subjected her to merciless beatings night after night.

At times, when a certain mood gripped him, he would lock her up inside their decrepit hut in the village, withholding food and water for days. "It was like he was punishing me, but I didn't know what I had done to deserve such treatment," Ujwala says.

This continued for years until one day, the beatings escalated to such a violent extent that news reached her father, warning him that she might die if not rescued.

With nothing but the clothes on her back, Ujwala eventually returned to her father's house in Chande Khurd, a village 15 km from Karjat, Maharashtra (in 2015). There, she and her 5-year-old son took shelter in a makeshift goat shed near her father's house. For three years, she didn't step outside.

"I had no connection with the village. I didn't talk to anyone, or go anywhere. I had no money, no education. *Aankh utha ke baat nai kar pati thi* (I couldn't look people in the eye)," she says, recalling that time.

Money is very important. Every woman should have money that is rightfully hers.

In 2020, on the insistence of her brother's wife, Ujwala joined a Self-Help Group (SHG) initiated by WOTR.

When she joined the group though, her immediate concern was securing the next square meal. She didn't realise these were her first tentative steps towards financial empowerment.

Within a few months, she obtained her own identification, acquired a bank account and became aware of various government schemes. Long estranged from the community, she began reconnecting with it once again. In 2021, with the SHG's backing, she secured a loan of ₹40,000 from the bank and used the money to move from the goat shed to her own one-room tin house.

Determined to eliminate reliance on male family members, she secured an additional loan in 2022 and bought a scooty. Around this time, she began attending tailoring workshops as part of the skill development training organised by the programme and started stitching blouses and sarees for her neighbours.

In 2023, leveraging ₹15,000 of her personal savings and acquiring another ₹15,000 as seed capital through the same programme, she finally decided to start a sari shop from her house."There are no sari shops in Chande Khurd, and women have to travel 15 kilometres to Karjat to shop," she says.
It's still early days for the venture, but if the steady stream of women in her house is any indicator, the shop's prospects look promising. Already, her income has risen from ₹3,000 per month to ₹7,000. With this money, she has not only been able to invest in herself and her home but also has enrolled her son in an English medium school in Karjat.

"*Paisa bohat zaroori hai. Har aurat ke paas khud ka hona chahiye, aur apne haq ka hona chahiye* (Money is very important. Every woman should have money that is rightfully hers)," she says, in a quiet, resolute voice. ✦

PREVIOUS SPREAD: *In 2021, with her SHG's backing, Ujwala moved from a goat shed to her own one-room tin house.*
BOTTOM: *Ujwala on her scooty, purchased to eliminate her dependence on male family members for travel.*

expert SPEAK

Building Organisational Culture for a Future-ready NGO

In Conversation with Sridhar Ganesh

This stark observation from a seasoned HR practitioner cuts to the heart of why organisational culture is not just a buzzword, but the very lifeblood of a successful non-profit. In a sector where passion and purpose fuel a mission greater than any individual, a misaligned culture can derail even the most noble endeavours.

To delve deeper into the intricacies of organisational culture, we turn to Sridhar Ganesh, a veteran HR professional. He served as HR Director at Cadbury India Limited and then at Cadbury Schweppes UK for about 16 years and held the position of Director - HR at the Murugappa Group for over six years. Currently, he is a Mentor and Executive Coach specialising in leadership development.

Sridhar reveals how shared values, beliefs, and behaviours shape everything from employee engagement to social impact. It's a wake-up call for organisations to look beyond mission statements and delve into the living, breathing culture that either propels their engagement at work or holds them back.

The work of your organisation might be something very important to the society, something that should bring you happiness but if the people working there are not happy, it means that the beliefs and values, the organisation subscribes to, is not shared by everyone

DEFINING ORGANISATIONAL CULTURE

Sridhar describes culture in a very simple way - It is the way people do things in an organisation. It encompasses how individuals relate to each other, how performance is managed, and what behaviours are encouraged or discouraged. It is the unwritten code of conduct, the collective mindset, and the shared values and beliefs that permeate every aspect of an organisation's operations.

In essence, culture is a reflection of an organisation's identity, its unique personality, and the values it holds dear. It is the sum of its traditions, rituals, symbols, and stories, all of which contribute to a shared sense of purpose and meaning. This can also be reflected in the physical environment of the organisation. For example, an NGO that values openness and collaboration might have an open office layout with shared workspaces. Or people in such an organisation might prefer to keep their doors open, literally living out the value of openness!".

"If I visit an office that's almost silent, without laughter or a sense of joy, where the lighting is poor, it will appear that the physical environment doesn't convey or promote an engaging and vibrant atmosphere," says Sridhar.

BOTTOM: *Culture is also reflected in the physical environment of an organisation.*

THE IMPORTANCE OF CULTURE IN NON-PROFITS

While culture is vital in any organisation, its significance is amplified in the non-profit sector. Unlike for-profit entities, where the primary goal is profit maximisation, nonprofits are driven by a mission to create a positive impact on society. This fundamental difference necessitates a unique cultural environment that fosters passion, commitment, and a shared sense of purpose among employees.

"In the case of a for-profit, the goal is very clear, it is profit. In the case of nonprofits, the goal is to create an impact in the space in which they are working," says Sridhar.

This impact-oriented focus requires a culture that values collaboration, innovation, and adaptability. It demands a workforce that is intrinsically motivated by the desire to make a difference, rather than by monetary rewards alone.

KEEPING THE PURPOSE ALIVE

One of the most significant challenges faced by non-profits is ensuring that employees who join the organisation share the same sense of purpose as the founder's. Sridhar believes that this alignment can be achieved through careful recruitment and selection:

"Even as I recruit, even as I hire people, I have to see value alignment. Do we think the same? Do we feel the same? Do we value the same?," says Sridhar.

By prioritising cultural fit and seeking individuals who resonate with the organisation's mission and values, nonprofits can build a team that is genuinely passionate about the cause they serve. This alignment can be further reinforced through the physical environment, creating spaces that encourage interaction, creativity, and a sense of community.

Still, in the long run, sustaining a strong sense of purpose among employees can be a daunting task. Sridhar suggests culture can play a crucial role in keeping the flame alive:

"The way you celebrate, the way you recognise people, the way you deal with people, the way you assign accountabilities. All these can help in creating this awareness of the purpose," says Sridhar.

Regularly sharing success stories, recognising individual contributions, and fostering a supportive work environment can all contribute to a culture that reinforces the organisation's mission and values. The physical environment can also play a role here, with spaces for celebration, recognition, and team-building activities.

While HR managers can play a supportive role in shaping and maintaining organisational culture, Sridhar emphasises that it is a collective responsibility of the entire leadership team.

"Culture is not HR's responsibility. It is a collective responsibility of leadership," says Sridhar.

Leaders must actively participate in defining and reinforcing the desired culture through their actions, decisions, and communication. They must model the behaviours they expect from their employees and create an environment where everyone feels valued and empowered to contribute to the organisation's mission.

CHALLENGES IN SUSTAINING A GOOD CULTURE

The biggest challenge in sustaining a positive organisational culture lies in orchestrating collective behaviour and ensuring that the shared values and beliefs are consistently reflected in the actions of all employees.

A key element in creating and maintaining a strong culture, according to Sridhar, is "institutionalising" certain behaviours and processes. This goes beyond mere policy; it's about embedding values into the very fabric of how things are done. For instance, instead of generic team-building exercises, an NGO focused on environmental conservation might organise regular volunteer outings to clean up local parks. This not only reinforces their mission but also builds camaraderie and a shared sense of purpose among employees. And this practice gets institutionalised - it stays with the Organisation.

Similarly, instead of standard quarterly reviews, an organisation dedicated to education might create a system where employees regularly share stories of impact from their work, highlighting the difference they're making in students' lives. This fosters a culture of reflection, appreciation, and continuous learning, all aligned with the core mission of the organisation.

REGULARLY CHECKING THE PULSE

Sridhar suggests conducting regular culture surveys and comparing the results with the intended culture. Additionally,

BOTTOM: *Leaders must actively participate in defining and reinforcing the desired culture through their actions, decisions, and communication.*

establishing a culture committee or assigning specific individuals to monitor and assess the cultural environment can help identify areas for improvement and implement necessary changes. This assessment should also include an evaluation of the physical environment and its impact on the culture.

Organisational culture is a powerful force that can either propel an NGO towards success or hinder its progress. By understanding the nuances of culture, recognising its significance, and actively cultivating a positive cultural environment, nonprofits can create a thriving organisation where employees are passionate, engaged, and committed to making a meaningful impact on society.

As the saying goes, “Culture can eat Strategy for breakfast”, particularly in the not for profit organisation! So Culture is indeed the greatest asset! ✦

Organisational culture is a powerful force that can either propel an NGO towards success or hinder its progress.

TOP: *Sustaining a positive organisational culture lies in orchestrating collective behaviour and ensuring that the shared values and beliefs are consistently reflected in the actions of all employees.*

Sridhar Ganesh is a veteran HR professional with extensive experience in leadership roles. He served as HR Director at Cadbury India Limited and Cadbury Schweppes UK for about 16 years, followed by over six years as Director of HR at the Murugappa Group. Currently, he specialises in leadership development as a mentor and executive coach.

COMMUNITY HEROES

COMMUNITY heroes

THIS FAMILY MOSTLY SURVIVED ON RICE OR JOWAR WITH CHILLI

Singaram Budhundu, 58, is a marginal farmer who lives with his family of 8 in Chinnajetram village in Narayanpet, Telangana. He owns 2 acres of land, where he grows rice and red gram.

When we stepped into the courtyard of his home for a glass of water, the beauty of the surrounding greenery surprised us. Within a small place, Budhundu and his family members manage a small kitchen garden and grow vegetables like red chillies, brinjal, tomatoes, okra and cauliflower using water from the household tap.

The kitchen garden provides his family with a steady stream of fruits and vegetables, adds to their nutrition and also provides a little extra for sale to add to the family income.

This wasn't always the case. Until five years ago, Budhundu was entirely dependent on produce from his farm to meet the nutritional needs of his family. Their diet lacked diversity and consisted mostly of crops they could grow on their farmland. Buying produce from the market was a costly affair, and hence out of question. "We mostly ate rice, or jowar, with chilli, and very rarely a seasonal vegetable, when we could afford it," he says.

Around the time of the first lockdown, imposed during Covid-19, he saw a couple of women in his village working on their kitchen gardens. "That's when it occurred to me. I could also grow one," he says.

In May 2020, he received a kitchen garden kit from WOTR, and began cultivating his own vegetables in earnest. He also planted a few trees like banana, moringa, lemon, and custard apple.

Within a few months itself, the garden started giving. "We started using things that we were growing in the garden in recipes at home," he says.
The intervention has also been

OPPOSITE PAGE: *Organic Papayas from Singaram Budhundu's kitchen garden*
TOP: *Budhundu's kitchen garden has a few trees including moringa, lemon, bananas and custard apple*

TOP: *Budhundu's kitchen garden provides his family with a steady stream of fruits and vegetables, adding to their nutrition*

successful in reducing the family's reliance on the market. According to Budhundu, apart from some spices and oil, the family does not need to buy any produce from outside. "There is also always plenty to go around. We grow our own rice and jowar, so we always had a lot of grain. That feeling of scarcity that we sometimes felt when it came to eating fruits and vegetables is gone. The garden was very helpful for us during the lockdown as well. We ate and also gave our neighbours vegetables to eat," he says.

What's more, Budhundu's kitchen garden is entirely organic. "At the farmer field school, we learnt how to make natural pesticides like amritpani. Since it can be made with easily available ingredients, I thought of giving it a try and preparing it at home," he says.

For fresh milk produce, and to be able to make organic formulations and manure, Budhundu invested in buying a cow last year. Inspired by Budhundu's kitchen garden, his neighbour Balappa has also decided to go organic.

"Kitchen gardening inspired me to go organic. It has made me self-sufficient, and now I encourage others to also do the same," says Budhundu. ✦

Kitchen gardening inspired me to go organic. It has made me self-sufficient, and now I encourage others to also do the same

Publications & Productions

No.	Title	Author(s)	QR codes
1	**Assessing the Climate Resilience of Semi-Arid Farming Systems in India: Framework and Application** Journal article, 2023	Arjuna Srinidhi, Saskia E. Werners, Fulco Ludwig, Marcella D'Souza and Miranda P.M. Meuwissen	
2	**Understanding the Mental Models that Promote Water Sharing for Agriculture Through Group Micro-Irrigation Models in Maharashtra, India** Book Chapter, 2023	Upasana Koli, Arun Bhagat, and Marcella D'Souza	
3	**Retrospective climate resilience assessment of semi-arid farming systems in India** Journal article, May 2023	Arjuna Srinidhi, Saskia E. Werners, Dada Dadas, Marcella D'Souza, Fulco Ludwig & Miranda P. M. Meuwissen	
4	**Indian Pastoralism amidst Changing Climate and Land Use:Evidence from Dhangar Community of Semi-arid Region of Maharashtra** Book Chapter, September 2023	Dada R. Dadas	
5	**Effectiveness of Mobile Application based Agromet Advisory Service: Case Study in Telangana, India** Journal article, June 2023	Arun Bhagat, Madhav Gholkar, Yogesh Shinde, Nitin Kumbhar and Prithviraj Gaikwad	
6	**Farm Ponds in Semi-arid Hard Rock Terrain of India. Are They Increasing Dependency on Groundwater?** Book Chapter, March 2024	Ankita Yadav, Taufique Warsi, Eshwer Kale, Sarita Chemburkar, Marcella D'Souza & Dipankar Saha	

In addition 90 posts were published through the year on WOTR's blog, 'A Better Tomorrow'.
Read blog

23 films were also published, highlighting WOTR's work across projects and locations.
View YouTube Channel

ECOBARI
COLLABORATIVE FOR RESILIENCE

Ecosystem-based Adaptation for Resilient Incomes (ECOBARI) A year of many firsts

ECOBARI, a collaborative platform uniting diverse stakeholders – including government, businesses, NGOs, and academia – champions Ecosystem-based Adaptation (EbA) across India and the Global South. The platform fosters knowledge exchange and collaboration to empower communities to build resilience in the face of climate change.

The year 2023-24 marked a period of significant growth and impact for ECOBARI. Here's a look back at the year's highlights:

LAUNCH OF WEBINAR SERIES: A new webinar series "The Southbound Resilience Webinars" was launched. Touching upon essential topics such as Biodiversity, Water management, Sustainable Agriculture and Communicating Stories of Change, the webinars brought in eminent experts and a wide range of participants from NGOs, research institutes, government officials, media houses, corporates and students – reaching over 500 participants in all.

BRINGING VOICES OF RURAL CHANGEMAKERS TO THE FORE: A special podcast episode, produced in collaboration with the echo network, featured Balu Bhangare's story. Balu, a rural changemaker, opened up about the inspiration behind his work and the importance of biodiversity and ecosystem conservation. This episode aired on Spotify in March 2024.

PROVIDING SUPPORT TO SAGE FELLOWS: ECOBARI extended its support to the echo network through the SAGE Senior Ambassadors program, engaging with 24 Master's students from India and Nordic countries. Through a 12-week course focusing on sustainability issues, the programme offered handson action research opportunities in India. ECOBARI also joined the Advisory Council for the SAGE Fellows program in March 2024.

EXPANDING MEMBERSHIP: ECOBARI's membership saw an impressive growth, expanding from 10 organisations at the end of 2022-23 to 23 at the end of 2023-24. This influx of new members signifies the growing recognition of EbA as a critical strategy for climate adaptation.

BUILDING CAPACITIES: Two in-person training and capacity building events were organised, in collaboration with researchers and implementation staff from WOTR. 25 practitioners from the rural development sector participated in the events, which focused on the topics of Climate Resilient Agriculture and Ecosystem-based Adaptation.

PUBLICATIONS OF THE SECRETARIAT: The ECOBARI secretariat submitted a scientific article on an EbA assessment of two projects to the 'Global Water Security Issues (GWSI) Series', co-published by UNESCO and the International Water Resources Association (IWRA). The accepted article is expected to be published as part of the 'Global Water Security Issues (GWSI) Series' – Issue 6 in 2024.

ECOBARI's commitment to upscaling EbA across India and the Global South remains unwavering. As it looks towards the future, the collaborative anticipates exciting partnerships, knowledge-sharing initiatives, and inspiring stories. Ultimately, ECOBARI envisions a future where ecosystems flourish and communities prosper, together. ✦

knowledge
PARTNERS

INDIAN COUNCIL OF AGRICULTURAL RESEARCH (ICAR)

BHARATI VIDYAPEETH INSTITUTE OF ENVIRONMENT EDUCATION AND RESEARCH (BVIEER)

INDIAN METEOROLOGICAL DEPARTMENT (IMD)

WAGENINGEN UNIVERSITY & RESEARCH (WUR)

MAHATMA PHULE KRISHI VIDYAPEETH (MPKV)

VASANTRAO NAIK MARATHWADA KRISHI VIDYAPEETH PARBHANI (VNMKVP)

CENTRAL RESEARCH INSTITUTE FOR DRYLAND AGRICULTURE (CRIDA)

TMG - THINK TANK FOR SUSTAINABILITY (TMG)

THE ECHO NETWORK (TEN)

SAVITRIBAI PHULE PUNE UNIVERSITY (SPPU)

DR. PANJABRAO DESHMUKH KRISHI VIDYAPEETH, AKOLA

NORWAY UNIVERSITY

WORLD AGROFORESTRY CENTRE

funding
PARTNERS

ACCENTURE SOLUTIONS

ANDHERI HILFE BONN

APRAAVA ENERGY

ARTECO COOLANTS

A.T.E. CHANDRA FOUNDATION

ATLAS COPCO

AXIS BANK FOUNDATION

AZIM PREMJI PHILANTHROPIC INITIATIVES (APPI)

BAYER FOUNDATION INDIA

BOSCH GLOBAL SOFTWARE TECHNOLOGIES

BREAD FOR THE WORLD

EATON INDIA FOUNDATION

EDUCATION FOR EMPLOYABILITY FOUNDATION(E2F)

EY FOUNDATION

GLAXOSMITHKLINE

GODREJ AGROVET

GOVERNMENT OF JHARKHAND

GRUNDFOS PUMPS

HDB FINANCIAL SERVICES

HDFC BANK

HONEYWELL HOMETOWN SOLUTIONS INDIA FOUNDATION

HSBC SOFTWARE DEVELOPMENT

INDUSIND BANK

JOHN DEERE

JSW FOUNDATION

KOTAK MAHINDRA BANK

LARSEN & TOUBRO

MAHINDRA & MAHINDRA

MYLAN LABORATORIES (A VIATRIS COMPANY)

NATIONAL BANK FOR AGRICULTURE AND RURAL DEVELOPMENT(NABARD)

NATIONAL COALITION FOR NATURAL FARMING

NOMURA GROUP

PERNOD RICARD INDIA FOUNDATION

R.G.MANUDHANE FOUNDATION

ROTARY CLUB OF POONA

ROTARY CLUB OF PUNE METRO CHARITABLE TRUST (RCPMCT)

SONATA SOFTWARE

STANDARD CHARTERED BANK

SUN PHARMACEUTICAL LABORATORIES

TATA PROJECTS

WELLS FARGO INTERNATIONAL SOLUTIONS

WELT HUNGER HILFE

YES FOUNDATION

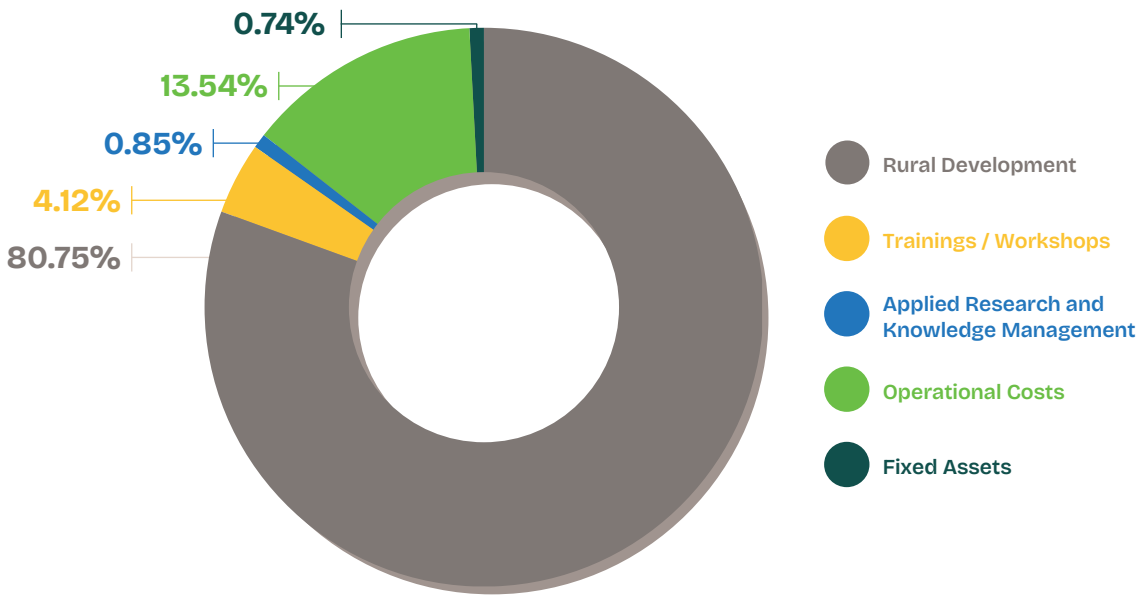
WALMART FOUNDATION

OVERVIEW OF

project expenditure

2023-24

S. No.	Expenditure	Expenditure in %	Amount (₹)
1	Rural Development	80.75%	95,60,22,057
2	Trainings / Workshops	4.12%	4,88,36,670
3	Applied Research and Knowledge Management	0.85%	1,00,42,769
4	Operational Costs	13.54%	16,02,59,633
5	Fixed Assets	0.74%	87,70,094
	TOTAL		**1,18,39,31,223**



Funds additionally secured through community contribution and convergence through various public schemes **₹ 1,93,62,00,000**

WOTR is a nationally and globally recognised leader and think tank in rural development. Committed to eradicating the root causes of rural poverty, WOTR champions ecosystem rejuvenation and the strengthening of community resilience to climate change. By enhancing water availability, improving land and agricultural productivity, diversifying livelihoods, empowering women, and bolstering the health and well-being of vulnerable rural communities, WOTR has made significant strides in transforming rural landscapes. The organisation's unique approach brings together a diverse range of stakeholders, including practitioners, academics, researchers, trainers, and policy makers, fostering collaborative efforts to build the resilience of rural communities. In the course of over 3 decades, WOTR has worked in 7,255 villages across 10 states in India, positively impacting the lives of 7.92 million people. For more information, please visit

www.wotr.org

W-CReS
Building Resilient Futures

Initiated in 2007 and set up as an autonomous unit in 2016, W-CReS (the WOTR Centre for Resilience Studies) undertakes multi-stakeholder, applied research on ground-level problems using a trans-disciplinary approach. The objective of W-CReS is to understand causal relationships and drivers of behavioural change, identify and test effective strategies for change and contribute to capacity building and policy enhancement. W-CReS has formal MOUs with leading national and international research and scientific institutions including ICAR, IMD, and CRIDA among others. Both WOTR and W-CReS work in close collaboration with civil society entities, companies, and the federal and state governments to achieve their objectives.

Watch the
WOTR@30 Film

WOTR

Rejuvenating Communities & Ecosystems

www.wotr.org