

TOWARDS a SUSTAINABLE NATURAL RESOURCE BASE for LIVING and LIVELIHOODS

Land for Life Day,
UNCCD COP 13, Ordos, China
12th September 2017

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Watershed Organisation Trust



India

The Challenges India faces

“There is no solution to **drought without Participatory Watershed Development”**
Fr. Hermann Bacher, co-founder WOTR

Leading causes of desertification in India:

a. Man-made causes:

Overuse of land: large population, and agriculture dependent,
Deforestation,
Cultivation of low potential lands, failure of conservation practices,
improper crop rotation, increase use of agro-chemicals and
Poor water management practices

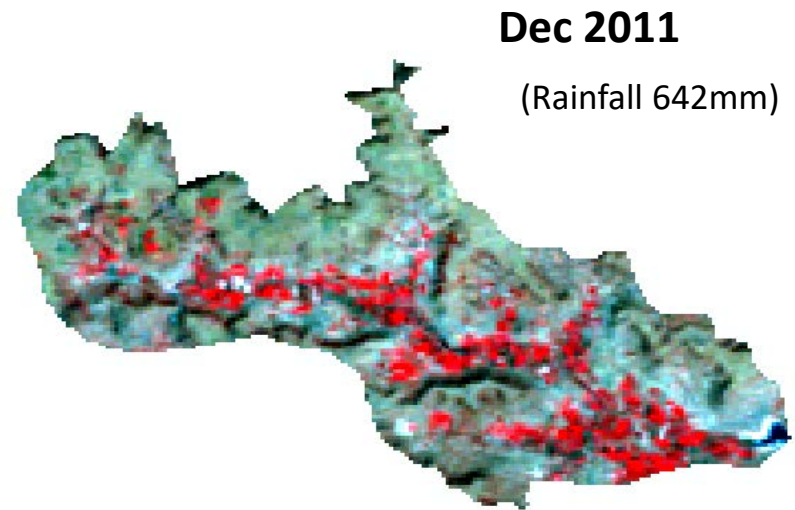
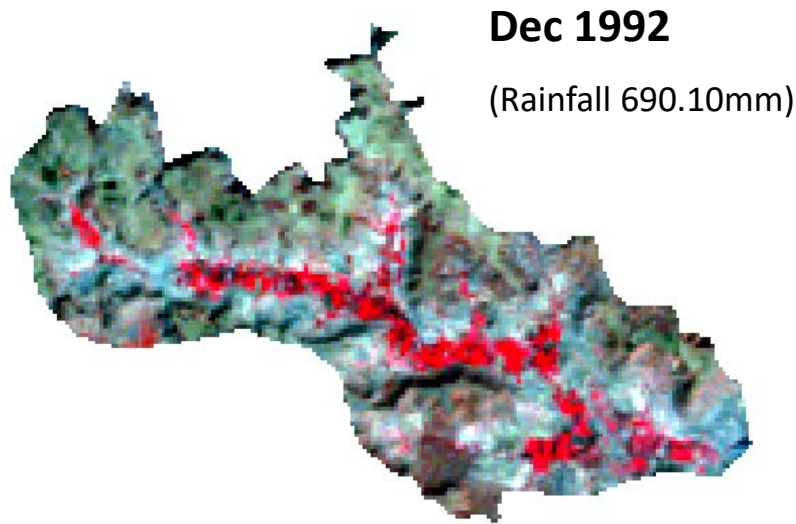
b. Climatic variability – erratic and decrease in precipitation

Kumbharwadi: Impact Indicators over 20 Years (1997-2017)*

Indicators	Before Watershed Development 1997	Year 2001-02	Year 2016-17
Drinking water supplied by tankers during the year	February to June	Tanker Free	Tanker Free
Number of Wells	63	85	138
Avg. water level below ground surface	6.5 m	3.5 m	2.0 m
No. of Wells with eight months irrigation	4	63	118
Annual Rainfall	368.5 mm	671 mm	610 mm
Land under Seasonal Irrigation (ha)	131.02	268.45	425
Monsoon crop (ha)	353.88	262.31	543
Winter crop (ha)	102.99	238.45	262
Net area sown	456.87	510.48	845.5
Main Crops <small>Source: WRI Working Paper " Watershed Development in India: Economic Valuation and Adaptation Considerations" by Erin Gray and Arjuna Srinidhi Dec 2013 and WOTR Reports</small>	2 varieties (cereals and fodder - pearl millet & Sorghum)	7 varieties (cereals, vegetables for food, fodder and some cash crops)	14+ varieties – cereals, oil seeds pulses, vegetable, (food, fodder, cash crops, horticulture)

In Drought year 2012 (rainfall 287mm) 318ha was cultivated taking 24 crop varieties

Land use Land cover changes in Kumbharwadi (Satellite images)



Class	Dec 1992 (ha)	Dec 2011 (ha)	% Change
Wasteland	362.45	255.29	-41.98
Water body	2.48	3.64	+31.88
Cropland	290.92	328.15	+11.35
Canopy Cover	81.85	114.47	+28.50
Seasonal Fallow	250.63	286.77	+12.60
Total	988.33	988.32	

Kumbharwadi Watershed: Costs & Benefits (1998-2012)*

- **Investment Costs** (WSD + opportunity costs of migration income, agriculture and livestock income)

US\$: 3,950,380

- **Total Project Benefit Costs: US\$: 9,020,520**

- **Net Present value results (exc. Carbon sequestration):**

	Total NVP (US\$)	NVP / Household (US\$)	NVP / hectare (US\$)
Low benefits & high costs	5,070,140	29,650	5573

Source: WRI Working Paper “Watershed Development in India: Economic Valuation and Adaptation Considerations”
by Erin Gray and Arjuna Srinidhi Dec 2013

What made the difference?

PARTICIPATORY WATERSHED DEVELOPMENT – People's Engagement



What made the difference?

STABILIZING THE RESOURCE BASE – Land

Land treatments from Ridge to Valley



Farm bunds



Re-forestation



Plantation to stabilize bunds



What made the difference?

STABILIZING THE RESOURCE BASE – Drainage line



WOTR's Outreach

- **Presence in India:** 8 states
- **Watershed development:** 1,516 villages
(Directly and indirectly)
- **Area treated:** 8,913 sq. km
- **Population benefitted:** 1,38 M people

- **Women's Empowerment:** Over 95,000 women mobilized into self-help groups; Women form 30-45% of members of the Village Development Committees
- **Capacity Building Support in Africa:** Somaliland & Malawi
Training support (through World Bank) Nigeria

New Challenges (post 2000) Needed New Responses

- **Weather variation being experienced**

- 3 consecutive years of drought experienced (bet 2000 and 2003)
- Intensive rains in short durations
- Unseasonal rainfall

- **Market Pulls**

- Changes to Cash crops
- Chemical intensive agriculture and new crops & seed varieties adopted
- Increased dependence and exploitation of ground water

**To reduce vulnerability to weather variability and other externalities
required Climate Change Adaptation**

Thematic Areas of Intervention

- 1. Watershed and Ecosystems Development, Natural Resources Management & Biodiversity promotion**
- 2. Climate Change Adaptation**
 - a. Sustainable Adaptive Agriculture
 - b. Agro-Meteorology and provisioning of locale specific crop weather advisories
 - c. Integrated Water Resources Management and Water Budgeting
- 3. Health, Nutrition and Sanitation**
- 4. Rural Livelihoods**
- 5. Alternate Energy**
- 6. Local Governance and People's Active Engagement**
 - i. Institutional Development
 - ii. Women's Empowerment & involvement
 - iii. Social Inclusion

Adaptive Sustainable Agriculture

1. Agriculture Practices:

- Package of practices for different crops
- Crop rotation & Inter Cropping
- Integrated Nutrient Management with a focus on organic formulations
- Integrated Pest Management using bio-pesticides
- System of Crop Intensification (SCI) with attention to crop geometry



2. Soil testing and soil health cards:

10 important soil parameters:

pH, EC, Organic Carbon, Nitrogen, Sulphur, Zinc, Iron
Phosphorus, Potassium, and Boron



SOIL HEALTH CARD

Farmer Name : Thakaji Namdev Thokal	Village : Hivare Korda
Cluster : Parner	Tehsil : Parner
District : Ahmednagar	Area : 0.20 ha
Date of soil sample collection : 20/04/2016	Gat No. : 2
Survey No. : 125	Soil colour : Medium black
Previous season crop : Green gram	Source of Irrigation : Well
Next season crop : Rabi Sorghum	Type of Irrigation : Surface
GPS Coordinates :	

Soil Nutrient status

Elements	Availability	Category
Major Elements		
Organic carbon (%)	0.55	Medium
pH	8.3	Slightly alkaline
EC (dSm/m)	0.16	Normal
Nitrogen (kg/ha)	197	low
Phosphorus (kg/ha)	31.2	High
Potassium (kg/ha)	415	Very high
Secondary Elements		
Sulphur (ppm)	17.5	Medium
Micro nutrients		
Iron (mg/kg)	7.39	Medium
Zinc (mg/kg)	0.5	low
Boron (mg/kg)	0.2	low

Recommendations

Crop	Fertilizer dose (kg/ha)				
	FYM (t/ha)	Vermicompost (t/ha)	Urea	SSP	Time of application
Rabi Sorghum	3.5	1.5	25	50	Basal dose
	-	-	25	-	30 Days After Sowing

3. The APPROACH: Farmer Field School (FFS)

Village level Field schools

Exposure visits

Environmentally Friendly Farming Practices



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Locale and crop specific agro-met advisories

- **Crop-phenology specific advisories which integrate the following:**

- crops, varieties and cropping pattern
- cultural practices
- irrigation management
- Integrated nutrient management
- Integrated pest and diseases management
- Water management



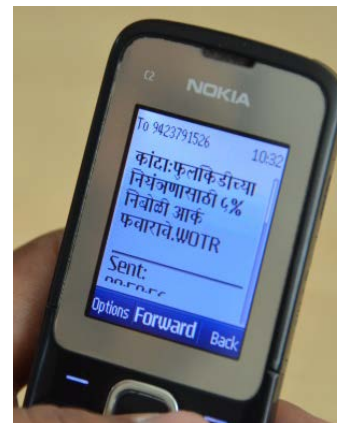
Automated Weather Station

A board displaying weather data for Agromete Station - Satichiwadi. The board is divided into a grid with columns for various weather parameters and rows for different dates. The data is handwritten in Marathi and English.

Agromete Station - Satichiwadi									
शेतीनिगडित हवामान केंद्र - सतिचिवाडी									
दिनांक	वर्ष	दिनांक	वर्ष	दिनांक	वर्ष	दिनांक	वर्ष	दिनांक	वर्ष
45/	2016	30	00mm	63mm	14 km	5.0	30.2		
45/	2016	31	0.0mm	mm	11km		31°C		

- **Multi-Institutional Collaboration (formal MOUs):**

- Indian Meteorological Department (IMD)
- Mahatma Phule Krushi Vidyapeeth (MPKV) agriculture university
- Vasanttrao Naik Krushi Vidyapeet (VNKV) an agriculture university
- Central Research Institute for Dryland Agriculture (CRIDA)



Some Impacts: Groundnut & Onion



Control plot



SCI Demonstration plot



नियंत्रित प्लॉट
वाण-सेंद्रिय लाल कांदा
एक वर्गमीटर मध्ये उत्पन्न
2.3 किलो

प्रात्यक्षिक प्लॉट
वाण-सेंद्रिय लाल कांदा
एक वर्गमीटर मध्ये उत्पन्न
4 किलो

**Agriculture work increased from
4 months to at least 8 / 9 months**

Some Impacts: Paddy



Water Management: Water Stewardship at Village

At Village and Cluster level

- Water Health Charts
- Crop plans based on Water Budgeting
- Water-use efficiency plans
- Water harvesting Plans
- Social norms
- 2 15 Simple rain gauges placed in 106 villages



Water budget chart

Water harvested: 51 billion litres



Measuring well water levels



Micro



irrigation

Stakeholder Engagement Workshops

- Village Representative Teams formed and trained to motivate and mobilize the community
- Stakeholder engagement workshops organized at cluster level
- Stakeholder workshops at block level, involving Government officials and other stakeholders in workshops



Market Linkages

- Establishment of Farmer Producer Groups/ Companies
- Promotion of Agri-Input Enterprises and Advisory Services Centres
- Entering the Value Chain and Improved Market Access
- Mentoring, Capacity Enhancement and Linkage Building

WOTR's Outreach

- **Capacity Building and Training Outreach:**
 - **National:** Villagers, Practitioners, Donor agencies & govt projects
 - Trainings: 8770 events; participants over 380,000
 - **International programmes:** 55 events; participants 785
 - **Capacity Building Support in Africa:** Somaliland & Malawi
And Training inputs (through World Bank) Nigeria

Tools & Methodologies for Contextual Up-scaling

- **Participatory Net Planning** (Detail Project Report preparation for WSD)
- **People's Biodiversity Register** (handbook for PBR preparation) **and the Children's Biodiversity Register**
- **Community Driven Vulnerability Evaluation** (for assessing vulnerabilities to climate and non-climatic risks) *a Software based tool and the Preparation of Climate Adaptive Plans*
- **Water management and budgeting** (at village level)
- **Agro-met Advisories: A software platform for generating customised crop weather advisories to farmers**

WOTR Centre for Resilience Studies (W-CReS)

Objectives:

1. Acquire the required trans-disciplinary depth understanding of locale specific climate and non-climate risks and develop appropriate adaptive & resilience building responses that are
 - (i) low/no regret responses and (ii) incentivise behavioural change
2. Develop tools and methodologies for customized large scale application
3. Engage multi-stakeholders and networks in order to develop a PRAXIS of Adaptation
4. Contribute to evidence based insights and learnings to policy formulation, programmatic implementation, capacity building and behavioural change processes

Approach:

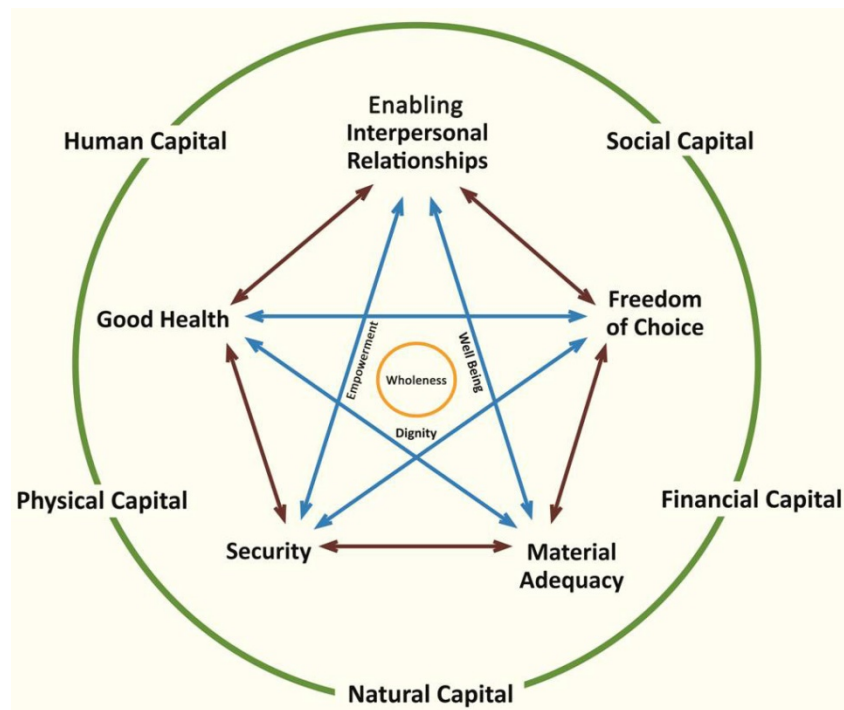
- a. Trans-disciplinary, rooted and action focused.
- b. Collaboration with various stakeholders across scales – expert institutions, government, private sector, civil society, practitioners, primary stakeholders and other partners

What Drives WOTR



- **Founded in 1993 with the Mission:** “To provide committed development support that motivates, energizes and empowers individuals, groups, communities and other organizations to undertake integrated ecosystems development for enhancement of well being on a sustainable basis”.

THE WOTR ENGINE FOR ADAPTIVE SUSTAINABLE DEVELOPMENT



We are Grateful to Our Numerous Partners

The Government of India

The State Governments of Maharashtra and other states

The Government of Germany through the GIZ and KfW

The Swiss Agency for Development Cooperation

The National Bank for Agriculture and Rural Development

Our various Private Sector & Funders (national and international)

And in particular

Our Village Partners who take the risks to experiment with us



THANK YOU!

Visit us at: wotr.org

PURUSHWADI 2005

2010

