Reviving **Commons**

Building Climate Resilient Communities

जलवैभव प्रकल्प

L&T Financial Services

Abbreviations

AWCI	Agriculture and Water Coalition of India
ADB	Asian Development Bank
bn	Billion
CCT	Continuous Contour Trench
CNB	Cement Nala Band
CGIAR	Consultative Group for International Agricultural Research
CO_2	Carbon Dioxide
COP	Conference of Parties
CRA	Climate Resilient Agriculture
CSR	Corporate Social Responsibility
CuM	Cubic Meter
CWMI	Composite Water Management Index
Dept.	Department
DoLR	Department of Land Resources
ENB	Earthen Nala Band
EPIC	The Economic and Policy Analysis of Climate Change
FAO	Food and Agriculture Organization
FFS	Farmer Field School
GDGS	Galmukt Dharan, Galmukt Shivar
GDP	Gross Domestic Product
HH	Household
IEC	Information, Education and Communication
ICAR	Indian Council of Agricultural Research
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IFAD	International Fund for Agricultural Development
INR	Indian Rupees
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Pest Management
IUCN	International Union for Conservation of Nature
IWMI	International Water Management Institute
IWRM	Integrated Water Resource Management
JSA	Jal Shakti Abhiyan
KVK	Krishi Vigyan Kendra
LBS	Loose Boulder Structure
LEISA	Lowering External Inputs for Sustainable Agriculture
LTFS	L&T Financial Services
M&E	Monitoring and Evaluation
MD	Managing Director
MDG	Millennium Development Goals
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MMT	Million Metric Tonnes
MoU	Memorandum of Understanding
MYRADA	Mysore Resettlement and Development Agency
NABARD	National Bank for Agriculture and Rural Development
NGO	Non-Governmental Organisation
NITI Aayog	National Institution for Transforming India
NRLM	National Rural Livelihoods Mission
PPP	Public-Private Partnership
PRA	Participatory Rural Appraisal
RVP	River Valley Project
SDG	Sustainable Development Goal
SIA	Social Impact Assessment
SROI	Social Return on Investment
ToC	Theory of Change
TMC	Thousand Meter Cube
UN	United Nations
UNDP	United Nations Development Programme
USD	United States Dollar
WADT	Water Accumulating Deep Trench
WEAP	Water Evaluation and Planning System
WOTR	Watershed Organisation Trust
WWF	World Wildlife Fund

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MESSAGE FROM THE

Managing Director and CEO

The year 2020 marks the completion of two decades of work towards achieving the Global Goals, first set by the United Nations in September 2000. The eight Millennium Development Goals (MDGs) worked towards a specific focus on the eradication of poverty, hunger, illiteracy and disease. The MDGs were narrow in focus and relied heavily on government initiatives which led to the adoption of the Sustainable Development Goals (SDGs) by 193 countries in 2015. The SDGs are broader, universal and more inclusive in nature.

To further enhance their reach, the SDGs have envisaged a larger role for the private sector including businesses for the achievement of goals.

Though the central underlying theme remains the 'eradication of poverty in all forms and dimensions', the SDGs address a wide spectrum of subjects ranging from gender equality to climate change.

Climate change has caused disruption in both macro and micro-economic aspects. It is an established fact that climate change is affecting lives, food security, health and general wellbeing, globally. But the scale of vulnerability is higher for South-Asian countries, because most of them are predominantly agrarian developing economies with high population density and poor infrastructure.

In 2014-15, districts in and around the Marathwada region of Maharashtra were struggling

DINANATH DUBHASHI
Managing Director & CEO
L&T Finance Holdings Ltd.

with recurrent meteorological droughts, creating water scarcity and agricultural drought in the region. The impacts of climate change in the region were clear as frequent droughts were intermittently followed by unprecedented hailstorms and unseasonal rainfall. These natural calamities had become the reason for disturbing the social, economic and ecological balance in the region. Agricultural production was largely disturbed, debt was increasing – so were the number of suicides. The declining groundwater levels with increasing borewells were paving the way for an ecological disaster.

In such a scenario, with an endeavour to support the marginalised communities, L&T Financial Services (LTFS) identified Integrated Water Resources Management (IWRM) as one of the core thematic areas of its Corporate Social Responsibility (CSR) interventions. The intent was to combat the severe effects of climate change on natural resources in Marathwada, while supporting the SDGs.

Under the ambit of IWRM, our program 'Jalvaibhav Prakalp' was initiated to take up water resources management and Climate Resilient Agriculture (CRA) practices. Diverse activities have been implemented in the sectors of water and agriculture at a larger landscape level, in and around the Marathwada region.

As part of climate change adaptation, interventions such as dense-forest plantation and promotion of horticulture crops have been made at individual as well as village levels, which have improved farm income and the resilience of farmers. These interventions have not only helped increase the water potential in the region but also changed the behavioural practices for promoting sustainable and efficient usage of water. Exercises like water-budgeting have led to fruitful discussions among farmers on better planning of resources. The institution-level interventions, such as formation of Water Users' Groups and Farmer Field Schools, aid in promoting collective action and building resilient communities. Through several interventions in Jalvaibhav, we have been able to benefit more than 60,000 farmers.

It is a matter of pride for me to introduce you to this white paper, where we have made an effort to understand the gravity of climate change, in light of the agriculture and groundwater situations in India. This document has provided us an opportunity to retrospectively study our efforts undertaken as part of Jalvaibhav, and we welcome your opinions and ideas on the same.

Executive Summary

Climate change is the most urgent global crisis of our times as it is no longer just a phenomenon of scientific curiosity but has started affecting our day-to-day lives.

At least 54 per cent of India faces high to extremely high water-stress as groundwater in the country has declined by 61 per cent between 2007 and 2017 and more than 70 per cent of surface water sources are polluted. Further, India has 96 million farmers, 85 per cent of whom are small and marginal farmers, dependent on rain-fed agriculture and hence, more vulnerable to the vagaries of nature. Extreme weather conditions are leading to reduced crop productivity and land degradation, directly endangering our food security. The UN SDGs 2030, especially SDG 6 (Clean Water and Sanitation), SDG 12 (Responsible Consumption and Production) and SDG 13 (Climate Action), have reinforced a clear direction for climate adaptation strategies to cope with these challenges that are being localised by central and state governments as well as various other stakeholders in various development sectors in India.

Earthen Nala Bund (ENB) at Ujjainpuri, Jalna, Maharashtra

PURSUIT OF CRA AND IWRM

Climate Resilient Agriculture is agriculture that reduces poverty and hunger in the face of climate change, improving the resources it depends on, for future generations.

Integrated Water Resources Management (IWRM) has been defined as a process which promotes the coordinated development and management of water, land and related resources, in order to maximise the resulting economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

CRA practices such as shifting from wasteful low-value crops can enhance flexibility and adaptability for climate change in India, where 40 per cent of national demand for food in 2020 would have to

be met through increasing the productivity of rainfed dryland agriculture. IWRM could support the same through decentralised irrigation systems including watershed development, rainwater harvesting and the development of village tanks and water bodies, as 69 per cent of people who have died from droughts in South Asia are from India. Multilateral agencies such as International Fund for Agricultural Development (IFAD) and Food and Agriculture Organisation (FAO) have taken initiatives to promote CRA globally while National Innovations on Climate Resilient Agriculture (NICRA) and Project on Climate Resilient Agriculture (POCRA) are major national and Maharashtra state-level policies for the same. IWRM has found global acceptance despite its gaps with 80 per cent countries having embarked on reforms, as per a 2018 UN Survey. In India, the approach has evolved from traditional water conservation methods and the focus on ecology to a more livelihoods-centric approach and the incorporation of IWRM in the National Water Policy of 2012. The global environmental and water crises still pose tough challenges to India, requiring a strengthening of efforts for better implementation of CRA and IWRM principles and practices, as the Composite Water Management Index (CWMI) states that otherwise, 40 per cent of the population will have no access to drinking water by the year 2030.

WATER REVOLUTION: IMPACT ON AVAILABILITY AND LIVELIHOODS

With the exponential increase in population, natural resources have been exploited at speeding rates. As per IFAD data, the rate of water usage grew at almost twice the population rate in the last 100 years. Among the water-consuming sectors, agriculture accounts for nearly 70 per cent of freshwater withdrawals and as per FAO, it is going to increase substantially due to the additional 60 per cent global food requirement by 2050. SDG 6.5 (by 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate), focuses on implementation of IWRM at all levels and it impacts all SDGs across the 2030 Agenda. As per National Institution for Transforming India (NITI) Aayog's SDG India Index 2019, India's focus on IWRM implementation and monitoring is limited to SDG 6.6 (by 2020, protect and restore water-related ecosystems, including mountains, forests, wetlands, rivers, aquifers and lakes) where 18 per cent blocks are over-exploited against a target of 0 per cent and SDG 12.2 (by 2030, achieve the sustainable management and efficient use of natural resources) where current groundwater withdrawal is 63 percent against the target of 70 per cent. India needs to focus on inputs for IWRM viz. soil and water-conservation methods, improved agricultural practices, and stakeholder engagement initiatives, to progress towards impacts of IWRM.

De-siltation of percolation tank at Ujjainpuri, Jalna, Maharashtra

MULTI-STAKEHOLDER INITIATIVES

IWRM is a concept that has been promoted by the UN Global Water Partnership. This further influenced many multilateral agencies such as the World Bank and the Asian Development Bank (ADB), to support and fund pilots and partnerships world-wide for adopting and implementing practices, as per their local context. National and state governments in India have further incorporated policies for its promotion such as the Jal Shakti Abhiyan (JSA) and other IWRM projects in various states. Further, the mandatory Corporate Social Responsibility (CSR) regulations were laid down in 2014 with an aim to streamline the philanthropic and social responsibility initiatives carried out by Indian corporations. Many corporate houses have come forward and invested in IWRM considering the severity of water challenges in their areas of operation and other distressed parts of India. Further, there is a need to document best practices of not-for-profit organisations and replicate them across regions. In Maharashtra, the legacy of successful water resources management by Anna Hazare and Popatrao Pawar at Ralegan Siddhi and Hiware Bazaar, respectively, has been carried forward by various initiatives. One such attempt, is the LTFS Jalvaibhav Project.

LTFS INTERVENTIONS FOR IWRM

This paper brings out the efforts made by LTFS through their CSR programme, Jalvaibhav, in and around the Marathwada region in the state of Maharashtra. The activities under this project were focused on addressing the issues on both, the demand and supply sides, to promote the sustainable use of natural resources and pushing agriculture systems towards a more climate-resilient ecosystem. This has helped in making a difference in the Marathwada region, which is known for its agrarian crisis, mainly due to frequent droughts resulting in depletion of groundwater levels. What started as a response to the water stress in the region, currently has footprints across seven drought-prone districts, 11 talukas and 122 villages of Maharashtra, while positively impacting more than 60,000 farmers across the region. The intervention includes water resource development, agricultural improvement and capacity-building initiatives that have collectively improved availability of water, increased area under irrigation, augmented household annual income and reduced migration. A recent Social Return on Investment (SROI) study establishes that more than 90 per cent of the changes experienced, are attributed to the Jalvaibhav project. In the intervention areas of Dharur, Parli and Ambajogai taluka of Beed district, the intervention has successfully created 3,501 tcm (thousand cubic meters) water-storage capacity through watershed structures that increased the groundwater level by more than 1 meter and brought more than 200 hectares under irrigation. The success of the Jalvaibhav project builds an excellent case for replication and scaling up of watershed activities across such regions.

THE WAY FORWARD

Adverse effects of climate change can continue impacting natural resources for years to come. To mitigate the same, appropriate innovations such as the Jalvaibhav project, need to be scaled-up. Furthermore, multi-sectoral approaches, promotion of advanced technology for smart agriculture, and the proactive role of government in enabling right policies, are key to heralding the desired impact on a large scale.

INTRODUCTION TO CLIMATE CHANGE

INTRODUCTION TO

Climate Change

This chapter explains the global context of the varied impacts of climate change and why South Asia, particularly India, is more vulnerable.

With the Intergovernmental Panel on Climate Change's Fourth and Fifth Assessment Reports, it is clear that climate change is for real. Basis this, some serious decisions to control further global warming were taken in the Conference of Parties (COP) 21 in Paris, 2015. However, in a recent report, the UN Environment Programme has expressed apprehensions about the steps being taken so far to control global warming.

Though the impacts of climate change are worldwide, South Asia, and India particularly, is more vulnerable because of its high dependency on agriculture, one of the most climate-sensitive sectors. With the increased occurrence and intensity of climatic hazards, agricultural production and water availability have by far, been disturbed.

Adaptive measures are the interventions and initiatives carried out by stakeholders for reducing vulnerability to the effects of climate change.

Adaptive measures like IWRM and CRA are key to combating the impacts of climate change, and successive governments in India have taken multiple steps to promote the programmes focused on IWRM and CRA practices.

1. GLOBAL CONTEXT

Climate change, is a change in the state of the climate that can be identified by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. It refers to any change in climate over time, whether due to natural variability or as a result of human activity. – Intergovernmental Panel on Climate Change (IPCC)

GLOBAL WARMING

From 1880 to 2012, the average global temperature increased by 0.85°C [1]

WATER SHORTAGE

2.2 billion people lack access to safely managed drinking water services [2]

RISING SEA LEVEL

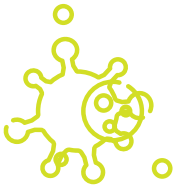
From 1901 to 2010, the global average sea level rose by 19 cm as oceans expanded due to the warming and melting of ice [1]

FOOD SHORTAGE

It is estimated that over two billion people do not have regular access to safe, nutritious and sufficient food [3]

EXTREME CLIMATE

Between1998-2017, climate-related disasters claimed approximately 1.3 million lives globally and direct economic losses from these disasters were estimated at USD three trillion [4]



DISEASES

During the last decade, 100 million people were pushed into extreme poverty as they had to pay for health services out of their own pockets for various diseases [5]

LAND DEGRADATION

Rainfed lands account for more than 80 per cent of global crop area and 60 per cent of global food output, but are susceptible to the impacts of climate change [6]

For the past two decades, the most debatable and sought-out topic globally, has been climate change. The Fifth Assessment Report of the IPCC has made it very clear that physical signs and socio-economic impacts of climate change are increasing rapidly as global temperatures have been rising to unprecedented levels. Since the mid-19th century the average temperature increase on the Earth's surface has been 0.85 degrees centigrade. Globally, sea levels have risen and at a much faster rate than ever in the past two millennia. The changes in the rainfall pattern and melting of snow or ice have been affecting the freshwater systems and disturbing the quantity and quality of water availability.

The Paris Agreement was established during COP 21 in 2015, aiming to keep global warming below 2°C above pre-industrial levels, in accordance with the recommendations of the IPCC Fifth Assessment Report. It was declared as an 'Action Agenda', governing climate change reduction measures from 2020, to ensure that efforts are pursued to limit the temperature increase to 1.5 °C.[1]

The recent Emissions Gap Report 2019 by the UN Environment Programme, explicitly states that by 2100, the temperature rise would range between 2°C and 4°C, even if all the countries meet their targets, as decided in the Paris Agreement. Thus, it can be clearly articulated that substantial efforts required for combating climate change and global warming, are lacking. Although the impacts of climate change are felt worldwide, the South Asian region has its own challenges. It is a rapidly urbanising region where districts have poor infrastructure and higher population density, due to which it rates high on the scale of vulnerability. Further, the South Asian countries are predominantly agrarian societies and agriculture is one of the most climate-sensitive sectors.

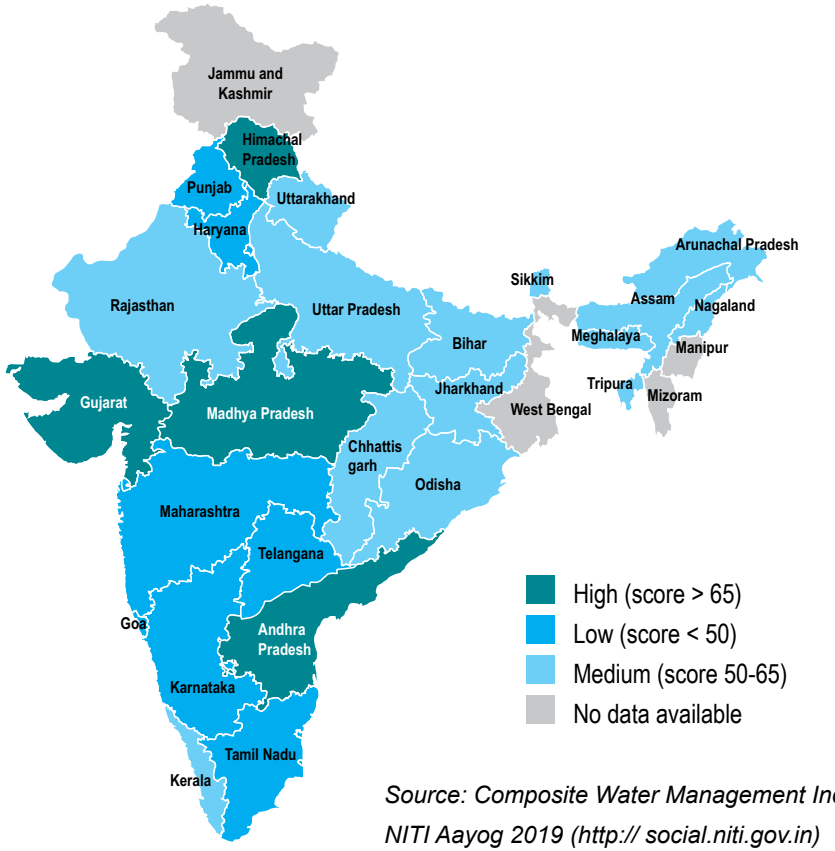
Doha structure at Pathan Mandawa, Beed, Maharashtra

2. INDIAN CONTEXT

Research studies on multi-decadal surface temperature trends in India, reflect continuous increase in surface temperatures across the country over the past seven decades, continued over the 21st century, as well. The studies have reflected that though there is no significant trend for rainfall at an all-India basis, there are clear patterns of increasing/decreasing rainfall at regional levels. This is concomitant with increased occurrence of intense climatic hazards/events such as droughts and erratic rainfall. As a result, the availability of water is impacted, which, in turn, has increased the number of water- stressed areas. As per CWMI 2017-18, only four states namely Gujarat, Madhya Pradesh, Uttarakhand and Andhra Pradesh scored high (score of above 65 out of 100) in India on water resources management.[7]

India, in particular, is more vulnerable to climate change because its agricultural system feeds 17.5 per cent of the global population with only 2.4 per cent of land and 4 per cent of water resources of the planet. Weather conditions largely control the factors responsible for crop production that are getting influenced by the changing trends in surface temperature and precipitation. The weather conditions during the agricultural season decide the crop productivity and yield. Slight deviations in the weather conditions during this period can result in significant

FIGURE: HIGH, MEDIUM AND LOW-PERFORMING STATES ON WATER RESOURCES MANAGEMENT



Source: Composite Water Management Index NITI Aayog 2019 (http:// social.niti.gov.in)

CLIMATIC CONDITIONS THAT AFFECTS AGRICULTURE

Soil moisture, run-off & erosion

Biodiversity

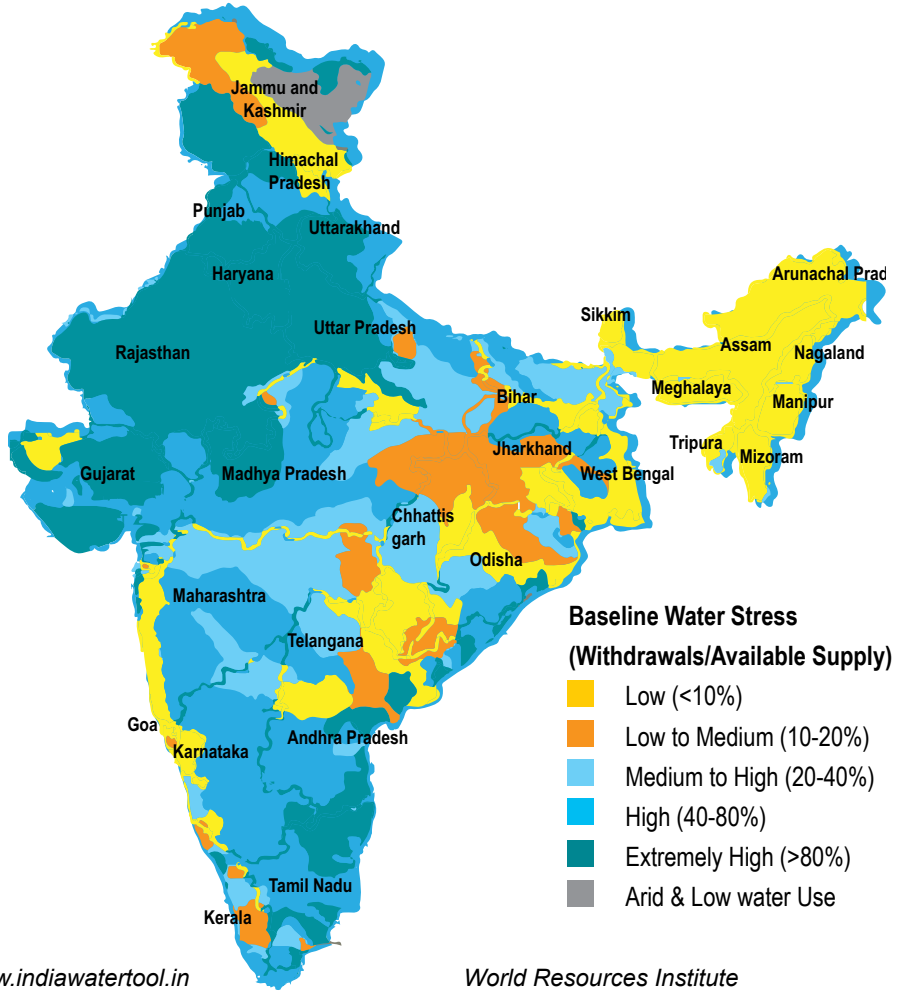
Salinisation

Organic Carbon and Nitrogen content

reduction in crop production. An estimated reduction of 4.5-9 per cent (extent of reduction depends on magnitude and distribution of warming) in crop yield is anticipated, basis mid-range projections of climate change for the period 2020–2039. [2]

In 2016, agriculture was a source of primary livelihoods to 58 per cent of the population in India. Thus, agriculture is the most critical sector impacted by climate change as it directly affects the livelihoods of more than half of India's population and the country's food security. The situation worsens with the fact that 85 per cent of India's 96 million farmers are small and marginal farmers (with less than 2 ha land) as per Census 2011. Because of poor coping mechanisms and high dependence on agriculture, these small and marginal farmers are more vulnerable to climate change. What aggravates the situation is that more than half of Indian regions are under high water stress and they face direct threats from climate change.[8]

54% of India Faces High to Extremely High Water Stress[8]



www.indiawatertool.in *World Resources Institute*

1871 - 2015[9]

In these 145 years, there were **26** major **Drought Years**

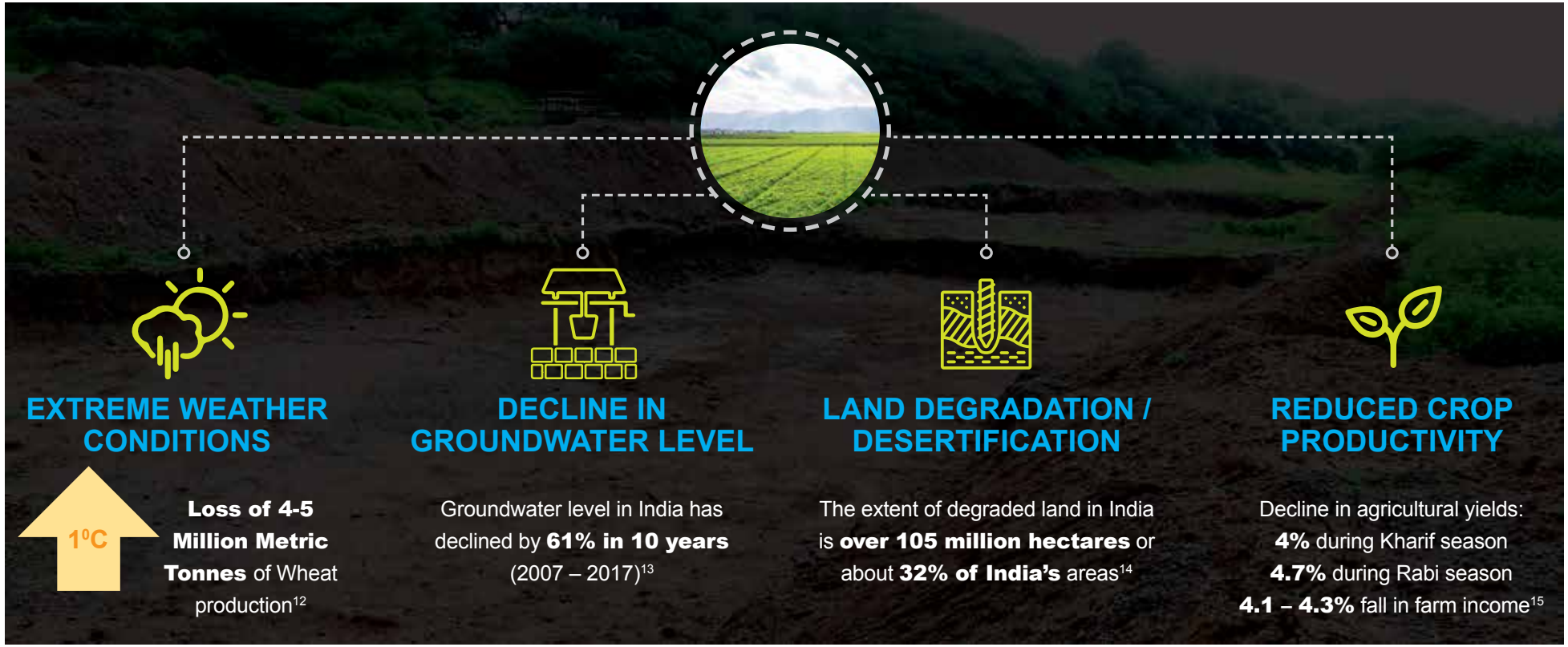
2002 - 2017[10]

Deficit Monsoon in **13** of **17** years

2011 - 2013[11]

Land Degradation in >29% of total land area

3. IMPACT ON INDIAN AGRICULTURE



The projections for the impact of climate change in the coming decades reflect that there will be significant reduction in the yield of major staple crops, like wheat and rice in India. With the possibility of decline in agricultural productivity, food production and food security are both, set to be affected. Estimates suggest that by the middle of this century, the majority of the food- insecure populations would be in the South Asian countries.

Among the South-Asian countries, India will be the most exposed to the effects of climate change since it has a huge population dependent on agriculture. And in India, agriculture, apart from economic development, also contributes significantly to social development.

There are two major crop-growing seasons — Rabi and Kharif — in India. The Kharif or summer season crop period, is generally from June to September. The crops being grown during this season are mainly rainfed. The summer monsoon coincides with the Kharif crop production period. The Rabi or winter season crop period starts post the Kharif season, and is spread over

October to March. The crops being grown during this season are dependent on irrigation facilities. However, the summer monsoon also plays a critical role in the productivity of Rabi crops. It provides soil moisture and fills up aquifers for the rest of the year, which supports irrigation facilities.

Thus, the summer monsoon in India controls the crop production in both the seasons, to a large extent. Any variability in monsoon (late/weak/heavy) leads to large-scale droughts or floods, which, in turn, affects the crop production. Any disruption in crop production, results in social and economic impacts, at the national level.

4. ADAPTATION TO CLIMATE CHANGE

Better understanding of climate change and its impact could enable us to design programmes to ensure an optimum level of adaptation. Strategies that will be focused more on managing and conserving water, land and biological resources to maintain and restore healthy, effectively functioning and climate change-resilient ecosystems, will have a much larger impact on adaptation planning.

In India, most of the farming population consists of small and marginal farmers. Thus, a planned approach towards adaptation is very critical to ensure their livelihoods security. Focusing on enhancing agricultural productivity would go a long way to not only ensure livelihoods security but also food and nutritional security. The adaptation plan must be done at all levels — individual farmer, village, watershed and national levels. The interventions implemented at the community institution level promote collective action and build resilience among communities.

The most efficient way of adaptation is to work with nature's capacity that may absorb the negative effects of climate change. However, for it to become a reality, focus needs to be on restoring and developing natural resources, especially land and water. Some of the possible adaptation options that promote CRA practices in India could be soil organic carbon build-up, in situ moisture conservation, residue incorporation instead of burning, water harvesting and recycling for supplemental irrigation, growing drought and flood-tolerant varieties, water-saving technologies, location-specific agronomic and nutrient management and improved livestock feed and feeding methods. Central and State Governments in India are implementing various strategies focused on water conservation, agriculture and natural resource management to maintain and restore effective functioning of the CRA ecosystem. These strategies help ensure improvement in the soil's carbon and water-storage capacity, conservation of water in natural systems, and organic and efficient means of practicing agriculture.

Beneficiary farmer Ramhari Chavhan from Choramba, Beed, Maharashtra

PURSUIT OF
CRA AND IWRM

PURSUIT OF

Climate Resilient Agriculture and Integrated Water Resources Management

1. Coping mechanisms for climate change

2. Climate Resilient Agriculture (CRA)

3. Integrated Water Resources Management (IWRM)

4. Persisting need for CRA and IWRM in India

This section uncovers aspects of CRA and its connection with IWRM. IWRM is not a goal but a comprehensive process that avoids piecemeal approaches and co-ordinates efforts for sustainable governance of land and water resources. The objective of IWRM is equitable and sustainable ecological, economic and social development.

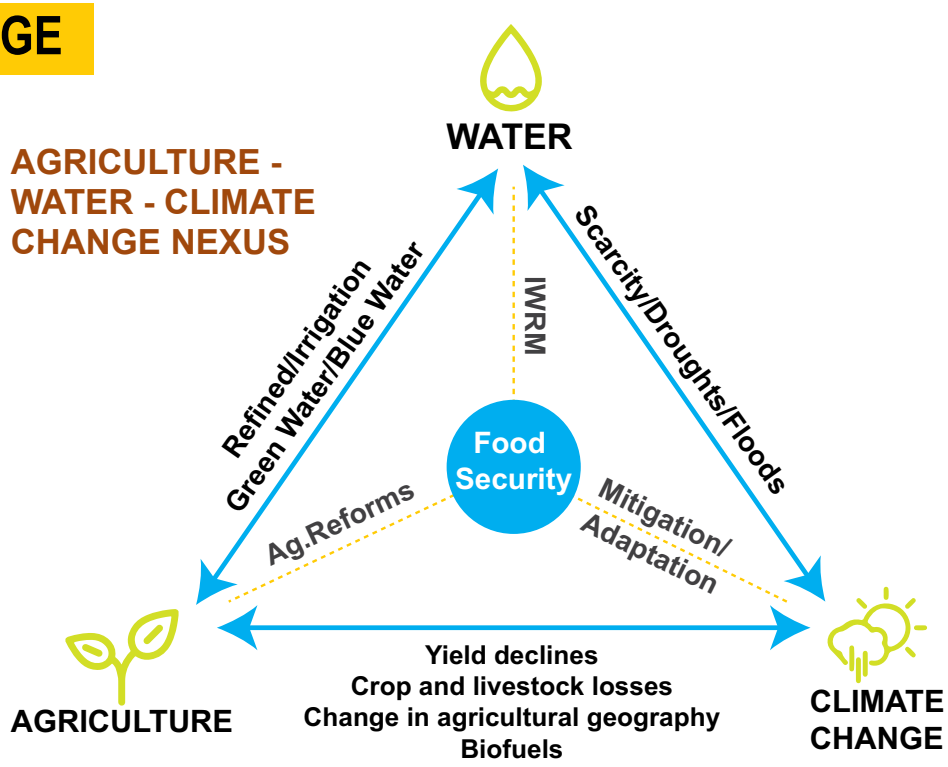
Continuous contour trenches (CCT) at Pathan Mandwa, Beed, Maharashtra

While India has had a rich history of traditional practices and policy initiatives of water conservation, the more holistic concept of IWRM was revived globally in 1996 and incorporated and developed for implementation and impact, through various stakeholders in the Indian context.

1. COPING MECHANISMS FOR CLIMATE CHANGE

The resilience adaptation measures involve a trilogy of agriculture, water and climate change, with both proactive and reactive coping mechanisms. Most agriculture in India and other similar countries is characterised by small and marginal farmers with less than two hectares of land holdings, dependent on rainfall, unlike in more developed nations. CRA practices such as shifting from wasteful low-value crops can enhance adaptability for climate change. IWRM could support the same through decentralised irrigation systems including watershed development, rainwater harvesting, development of village tanks and water bodies.

The Global Water Partnership, an international network set up by the United Nations Development Programme (UNDP), World Bank and Swedish International Development Agency (SIDA), stated in 2004 that, 'the IWRM approach seeks to address a country's key water-related development problems – water for health, for food, for energy, for environment – more effectively and efficiently than is possible using traditional approaches'. In India, the National Water Mission also proposed in the National Action Plan on Climate Change, a focus on IWRM to ensure conservation of water. Understanding the concepts of blue and green water, water footprint and the virtual water trade would further help enhance crop-water productivity and act as an insurance against the uncertainties caused by climate change.



Agriculture-Climate Change-IWRM Triangle (Aid Kati 2010)

Cement Nala Bund (CNB) at Sugaon, Beed, Maharashtra

2. CLIMATE RESILIENT AGRICULTURE (CRA)

According to the charity, Christian Aid, CRA can be defined as 'agriculture that reduces poverty and hunger in the face of climate change, improving the resources it depends on, for future generations'. It supports food production systems at local, regional and global levels, that are socially, economically and environmentally sustainable. The main objective is to ensure food security and increase resilience along the agricultural value chain.

The approach goes beyond on-farm activities and considers off-farm options viz. livelihoods diversification, viable in the context of enhancing resilience. It goes one step forward and looks at each link in the agricultural value chain through a much-needed climate change lens. Intensive application of CRA results in sustainable food production and improved food security and incomes for small and marginal farmers.

To continue and expand the work and the good results of CRA, more political and financial support is needed. This can be done by including the CRA approach in government policies and practices, and by provisioning of further support from donor agencies. This needs to be supplemented by knowledge development and peer-to-peer learning regarding CRA best practices. CRA initiatives need to be sustained, increased and improved, to face the current challenges of food insecurity, environmental (soil, water) degradation and climate change.

By further supporting CRA, a contribution can be made by different stakeholders to achieve the UN SDGs 2030, particularly SDG 2 (food security) and SDG 13 (climate action), as well as, SDG 1 (poverty reduction), SDG 11 (resilient communities) and SDG 15 (protect ecosystems).

2.1 Global Initiatives on CRA

IFAD provides rural finance support for climate change resilience at the micro, meso and macro levels. IFAD works with both government institutions and the private sector to scale up access to finance for all, and improve the quality of services, without distorting the market. The Economic and Policy Analysis of Climate Change (EPIC) programme was created to fill the gap between research and action in the interactions between climate change, agriculture and food security. EPIC closely works with governments, research centers, universities and other institutional partners to build evidence on climate change adaptation and mitigation, as well as food security.

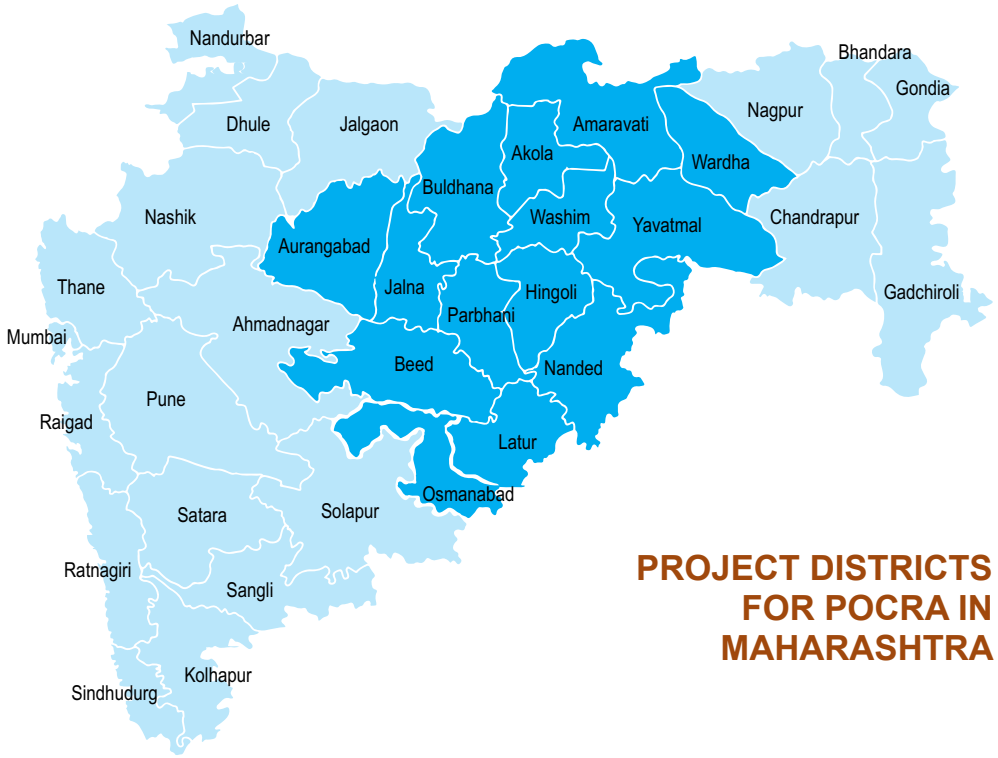
2.2 NICRA & POCRA

NICRA is a network project of the Indian Council of Agriculture Research (ICAR) launched in February 2011[16]. It is being implemented in 151 villages across 28 districts and 1 Union Territory. The project aims to enhance resilience of Indian agriculture to climate change and climate vulnerability through strategic research and technology demonstrations. It involves strengthening the existing network research on adaptation and mitigation (food crops, horticulture, livestock, fishery) with more infrastructure and capacity building.

POCRA, was launched from 2018-24 as a state initiative by the Dept. of Agriculture to help small farmers adapt to climate change and improve farm productivity. The 3,886-crore project is funded by a World Bank loan.

It involves a three-pronged strategy:

i) Enhanced water security at the farm level
ii) Improved soil health
iii) Increased farm productivity and crop diversification



PROJECT DISTRICTS FOR POCRA IN MAHARASHTRA

www.krishi.maharashtra.gov.in

3. INTEGRATED WATER RESOURCES MANAGEMENT (IWRM)

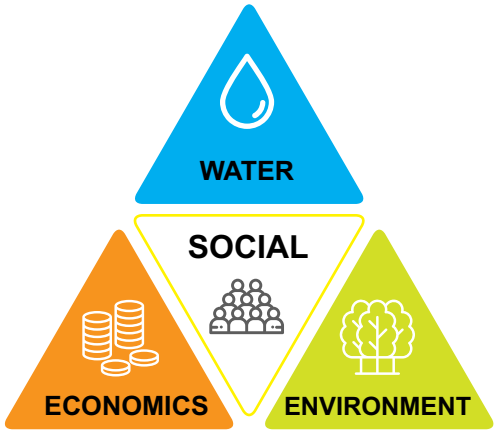
Apart from various convergence initiatives across the world from 1900s and the work of the UN since the 1950s, particularly the Mar del Plata Conference 1977, the Dublin-Rio principles of 1992 were formally adopted in 1996 by the Global Water Partnership, to articulate the “equitable and efficient management and sustainable use of water”.

DEFINITION OF INTEGRATED WATER RESOURCES MANAGEMENT (IWRM)

A process which promotes the coordinated development and management of water, land and related resources, in order to maximize the resultant economic and social welfare in an equitable manner without compromising the sustainability of vital ecosystems.

-Technical Committee of the Global Water Partnership (GWP), 2000

IWRM emerged as a bottoms-up, normative and strategic utopia useful for guiding vertical and horizontal integration of functional, social and institutional fragmented approaches and aligning the natural system and human system for balanced governance and contextual decision making. Embedded in an IWRM approach is the understanding that, truly sustainable water resources management involves managing demand and not just supply.



IWRM FEATURES

PRINCIPLES

- ***Economic Efficiency***
- ***Equity***
- ***Environmental Sustainability***

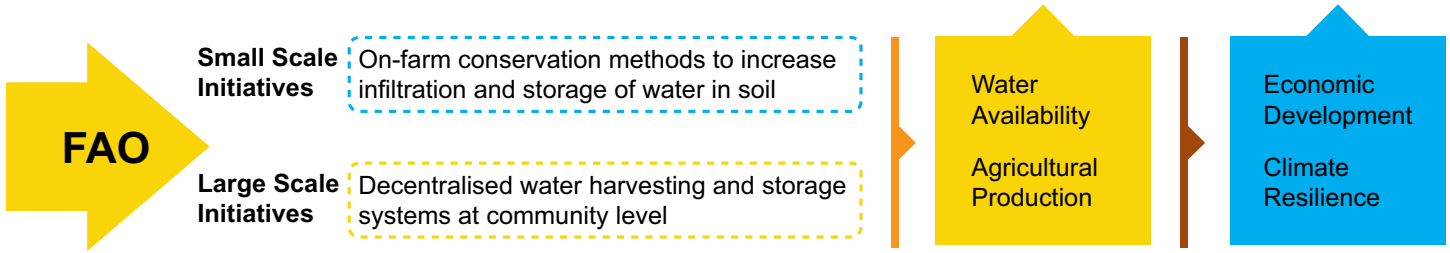
STRUCTURES

Management Instruments
- Assessment
- Information
- Allocation Instruments

Enabling Environment
- Policies
- Legislation

Institutional Framework
- Central-Local
- River Basin
- Public-Private

Balance ‘Water for Livelihoods’ and ‘Water as a Resource’



A toolbox for IWRM has also evolved with software such as Water Evaluation and Planning System (WEAP) 21, developed by the Stockholm Environment Institute's U.S. Center, which takes an integrated approach towards water-resource planning. It has applications in agricultural management for water use effciency and optimal crop planning.

Concepts such as 'adaptive governance' and 'ecosystems management' have also been developed to enhance understanding from the learnings of IWRM implementation.

3.1 IWRM in India

In India, an approach towards water-resource management could be seen in three major phases:

80s

Projects emphasised natural resource management by focusing on hydrological externalities (such as sedimentation/ flooding) and technical interventions such as large dams in the Nehruvian era to resolve the same

90s

Water-based community movements led the attention to be shifted to participatory approaches and sustainable use of natural resources for local livelihoods with interventions targeted towards agricultural systems

2Ks

More focus is being given to rural development through sustainable increase in incomes of the poor by development of the natural asset base of communities

Landmarks of water management initiatives in India

- **1928** — Setting up of ICAR (Indian Council for Agricultural Research)
- **1945-50** — Setting up of Central Water Commission and Central Groundwater Board
- **1980** — Beginning of Integrated Watershed Management with World Bank in India
- **1987** — National Watershed Development Programme of Rainfed Areas (NWDPRA) under the first National Water Policy
- **2012** — Integration of Water Resources Management into National Water Policy
- **2019** — Setting up of Jal Shakti Ministry

National Water Policy of 2012:

"The Policy under para 2.3 states that there is a need for comprehensive legislation for optimum development of inter- State rivers and river valleys to facilitate inter-State coordination ensuring scientific planning of land and water resources taking basin/ sub-basin as unit with unified perspectives of water in all its forms (including precipitation, soil moisture, ground and surface water) and ensuring holistic and balanced development of both the catchment and the command areas. Such legislation needs, inter alia, to deal with and enable establishment of basin authorities, comprising party States, with appropriate powers to plan, manage and regulate utilization of water resources in the basins."

Impacts of IWRM

Water Security	**Food Security**	**Sustainable Livelihoods**
Land Development	**Flood and Drought Resilient**	**Green Economy**
Agriculture	**Energy Security**	**Contributing to SDGs 6, 12, 13**
Aquaculture	**Restoration and protection of environment, ecosystem and biodiversity**	
Livestock Rearing		

WATERSHED PROJECTS IN INDIA

Objectives

- Soil and water conservation
- Enhancing livelihoods of the rural poor

De-silted percolation tank, Roshangaon, Jalna, Maharashtra

Earthen Nala Bund at Kalwati tanda, Beed, Maharashtra

Cement Nala Bund, Khadgaon, Aurangabad, Maharashtra

3.2 Illustrative model of inputs and value map for impacts of IWRM

The model below illustrates what majority of IWRM initiatives worldwide invest into, in the form of inputs, and the value map provides an explanation of the generation of outcomes and impacts:

ILLUSTRATIVE INPUTS FOR IWRM

SOIL AND WATER CONSERVATION

- Check-dam
- Bori-bund
- Gabion
- Contours
- Farm Bund
- De-siltation

IMPROVED AGRICULTURE PRACTICES

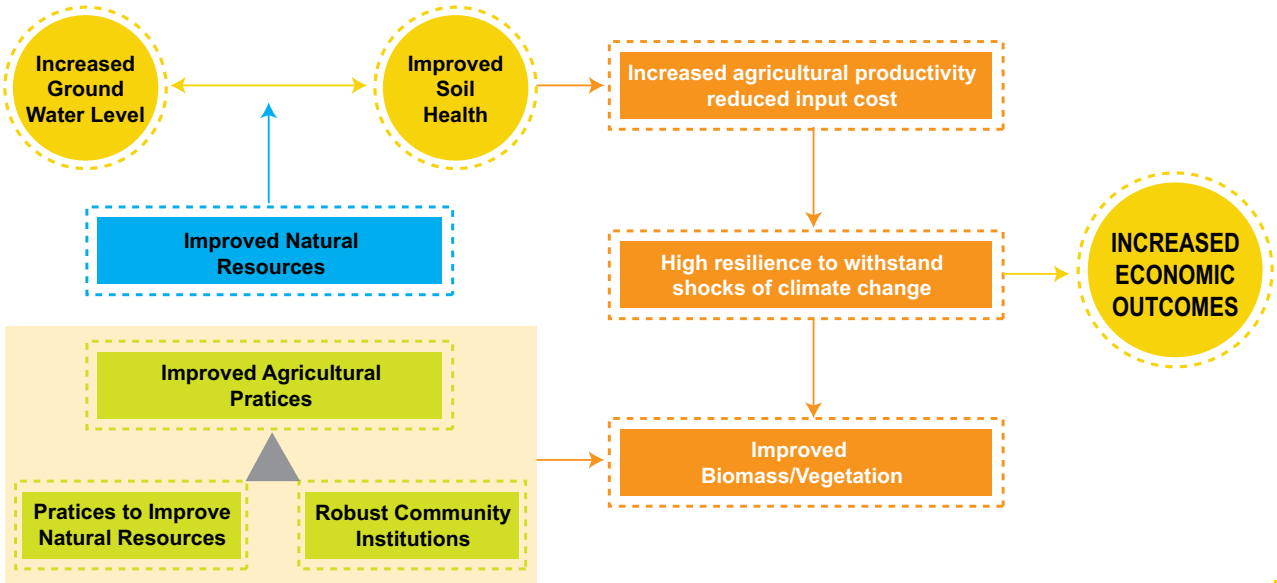
- Seed replacement
- Seed treatment
- Water efficient irrigation
- Improvement of organic soil carbon
- Crop water budgeting
- Adoption of Lowering External Inputs for Sustainable Agriculture (LEISA)

STAKEHOLDER ENGAGEMENT

- Capacity building on improved agriculture techniques
- Efficient use of common resources
- Effective governance mechanism for the resources

The growth and sustainability of rural livelihoods is inextricably linked to the status of natural resources. Any changes in these resources directly impacts the economic outcomes of people. Therefore, a holistic approach which accounts for ecological and social sustainability, is essential. The illustrative value map shows the inter-linkages between natural resources, agriculture, and communities, which need to be strengthened in order to build resilience towards the effects of climate change. The adaptation measures require combined efforts towards improving natural resources, adopting superior agricultural practices and building the capacities of the community.

ILLUSTRATIVE VALUE MAP FOR IMPACTS OF IWRM



4. PERSISTING NEED FOR CRA & IWRM IN INDIA

GROWING POPULATION

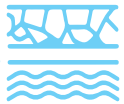
India's population is expected to increase to 1.6 billion by 2050 while annual per capita availability of water is expected to drop to 1140 bn cubic meters[17]

GROWING DEPENDENCY

More than 200 million of India's poor live in rural areas without irrigation and 40% of national demand for food in 2020 will have to be met through increasing the productivity of rainfed dryland agriculture[18]

POLLUTED WATER SOURCES

More than 70% of surface water resource in India are polluted due to industrial waste and lack of civil infrastructure for sewage disposal[19]



SHRINKING GROUNDWATER

Groundwater reserves have declined 61% from 2007 to 2017, according to the Central Ground Water Board[20]

DRINKING WATER UNAVAILABILITY

Composite Water Management Index states that 40% of the population will have no access to drinking water by the year 2030[21]

WOMEN'S DRUDGERY

Women spend 150 million workdays every year fetching and carrying water, equivalent to a national loss of income of INR 10 billion to USD 160 million[22]

HARSH GROUND REALITIES

Nearly 6.1 million people have died from droughts in South Asia, of which 69% are from India.[23]

EFFORTS TOWARDS WATER AVAILABILITY

WATERSHED MANAGEMENT

Overall, states have moderate scores, with an almost equal split above and below the 50% mark. a collaborative and grassroots- based approach to watershed development and management is necessary for ensuring long- term benefits. [24]

GROUNDWATER RECHARGE

Overall, states have displayed improvement in recharge of their groundwater resources between FY 15-16 and FY 17-18, but the median continues to remain below 50% of the total achievable score.[25]

RESTORATION OF WATER BODIES

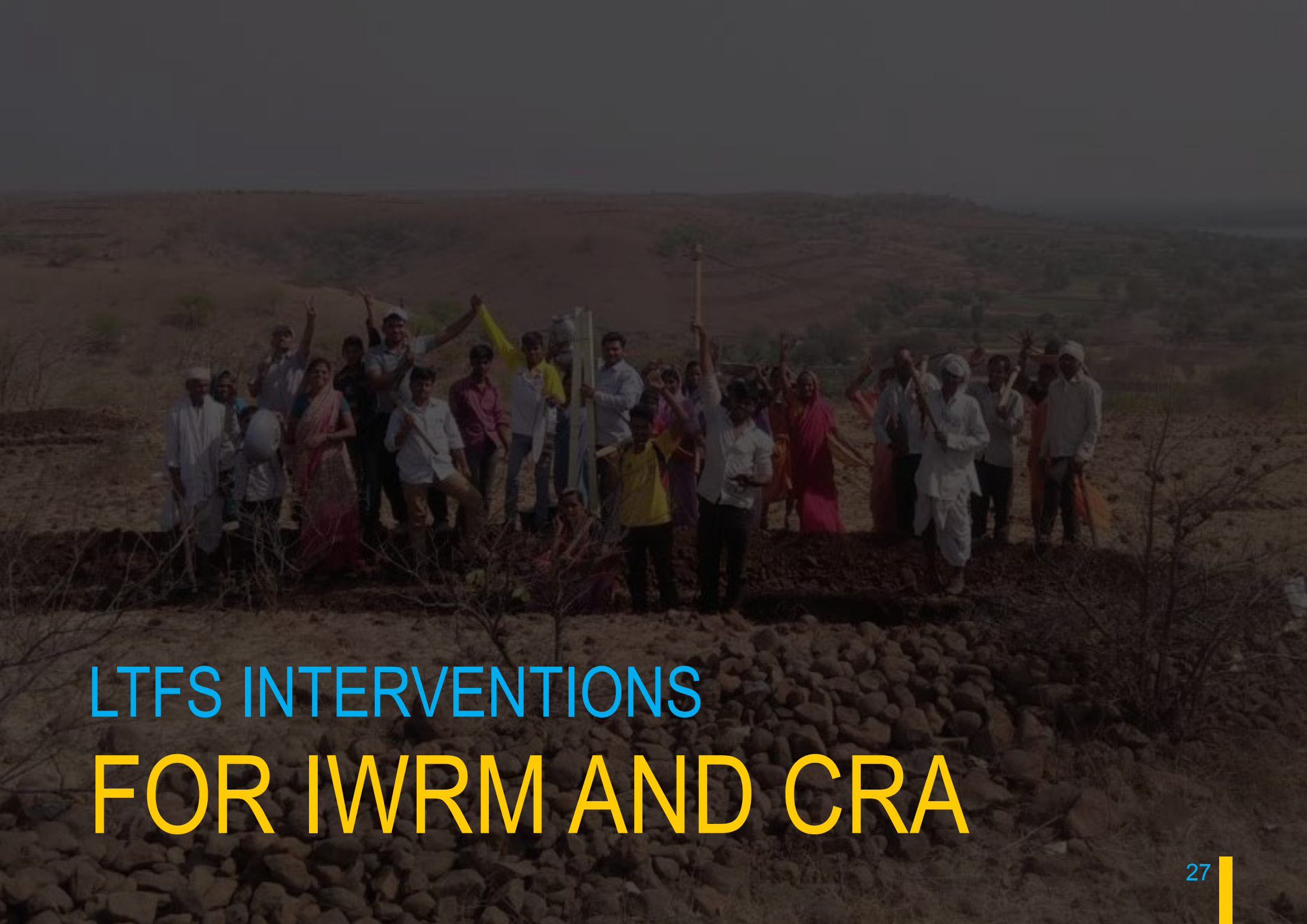
Overall, the performance on surface water restoration slipped during FY 17-18 compared to FY 16-17, due to the decline in the performance of Maharashtra, Chhattisgarh, and Nagaland.[26, 27]

PARTICIPATORY IRRIGATION PRACTICES

Overall, the performance declined marginally in the past three years. Despite most states having legal frameworks to promote water users' association's involvement, actual implementation remains low.[28]

SUSTAINABLE ON-FARM WATER USE PRACTICES

Overall, states have failed to show any significant improvement in on-farm water use efficiency. This is a pressing concern given the large-scale national push towards the adoption of micro-irrigation.[29]



LTFS INTERVENTIONS
FOR IWRM AND CRA

for IWRM AND CRA

This section elaborates on the nature and number of activities implemented by LTFS, in and around the Marathwada region. These activities are focused on addressing the issues, on both demand and supply sides, to promote the sustainable use of natural resources and push agricultural systems towards a more climate-resilient ecosystem.

1. RATIONALE

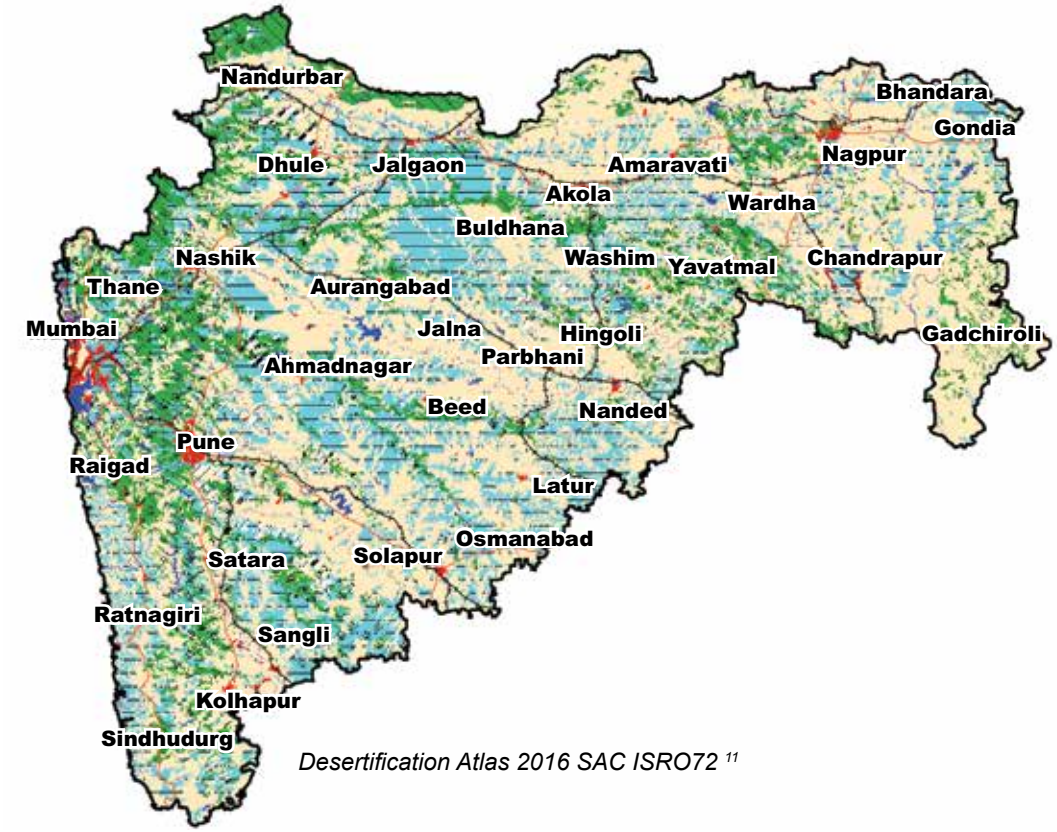
With a mission to reach marginalised farmers in rural communities and to work towards rejuvenating their ecosystems, thereby creating sustainable livelihoods, LTFS has been implementing CSR projects in rural areas, in and around the Marathwada region, for the past many years. In all CSR projects that LTFS implements, a strategic approach to create maximum value for the marginalised communities is ensured by adopting the 3S framework - Social Impact, Scale and Sustainability. The 3S framework ensures that it is a win-win situation for each stakeholder in the value chain. Right from the stage of planning for any project, it is ascertained that the outcomes and outputs of the project will be such that they will add significant value to the lives of the stakeholders.

With the same approach, LTFS has identified IWRM and CRA as one of their core thematic areas.

By working on this theme LTFS ensures that the most vulnerable sections of the society get sustainable livelihoods opportunities and they can also become a part of mainstream economy. Jalvaibhav project was started in the FY 2015-16 in the Marathwada region. That was the period when the state of Maharashtra was struggling with the recurring droughts.

Hundreds of farmers were under stress and groundwater levels

DESERTIFICATION/LAND DEGRADATION STATUS MAP MAHARASHTRA (2011-13)



Desertification Atlas 2016 SAC ISRO72 [11]

LEGEND

SYMBOL	CODE	DESCRIPTION
	Fv1,2	Forest, vegetation degradation
	Sv1,2	Land with scrub, vegetation degradation
	Iw1,2	Agriculture irrigated, water erosion
	Dw1	Agriculture unirrigated, water erosion
	Sw1,2	Land with scrub, water erosion
	Ds1	Agriculture unirrigated, salinity / alkalinity
	Tm1,2	Others, man made
	B	Barren
	R	Rocky
	S	Settlement
	W	Water body/Drainage
	NAD	No Apparent Degradation

were declining very rapidly in many parts of the state, especially in the Marathwada region. These were clear indicators of the impact of climate change. Failure of monsoon caused a meteorological drought which further caused agricultural droughts (due to the failure of Rabi and Kharif crops) and hydrological droughts (groundwater depletion). The scarcity of water in the region led farmers to take very hard choices sometimes, where they had to make a trade-off between their livestock or crops (especially those practicing horticulture). In their desperate efforts to find water, many farmers opted for sinking borewells. Several were drilled at the onset of summer, when the availability of surface water started decreasing and it became difficult to manage both farmland and livestock. The uncontrolled proliferation of borewells, which tampered with the deep aquifer in the Marathwada region, creating alarming situations, as even with a good monsoon groundwater was depleting in majority of the districts in Marathwada.

International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in 2012 had released an analysis on vulnerability to climate

change, which had specifically highlighted the high vulnerability of Semi-Arid Tropics of Maharashtra (Marathwada). The impact of the same was seen in the increase of incidences of extreme weather events, such as hailstorms and unseasonal rainfall. Similar incidences were observed during the Rabi season in FY 2013-14 when in addition to other parts of Maharashtra, Marathwada also had to bear immense losses because of such hailstorms and unseasonal rainfall. Districts like Solapur and Latur experienced 772% and 146% higher rainfall in the month of March of 2014 as compared to the highest rainfall ever recorded in the respective districts, in the last 100 years in the month of March. IPCC also in its Fifth Assessment Report had predicted that the rainfall patterns in peninsular India will be more erratic. The assessment report also predicted that the overall rainfall will decrease; however, the extreme weather events are set to increase. Rainfall variability in the Marathwada region has led to yield uncertainty for both the Kharif and the Rabi seasons and have made agriculture a very risky livelihood.

Continuous contour trenches, Khandari Bk, Jalna, Maharashtra

The Jalvaibhav project was initiated by LTFS to address these challenges of climate change, wherein the focus was to strengthen the resilience and adaptive capacity of the rural communities to natural hazards. Jalvaibhav was not just about IWRM. It also went a step ahead to help make the agricultural system more resilient to climate change.

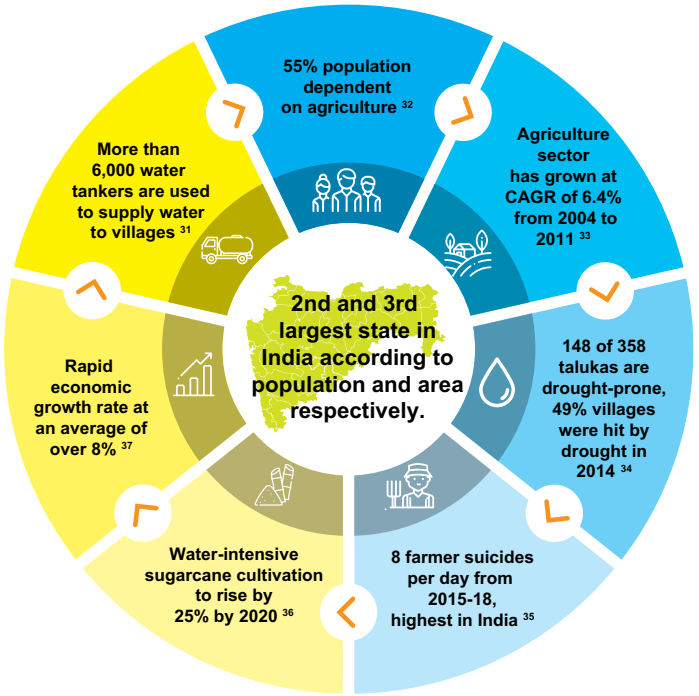
LTFS first implemented the Jalvaibhav Project in 12 villages of Dharur block, in Beed district. Later, it was extended to 20 more villages of Ambajogai and Parli blocks of the same district. In recent times, LTFS has expanded the projects to six other districts (Osmanabad, Latur, Solapur, Aurangabad, Jalna and Buldhana) in and around the Marathwada region. The project covers cumulatively 122 villages and has reached out to 60,000 farmers. LTFS had decided to work in the Marathwada region as it has a long history of facing severe droughts and the number of farmer suicides was very high.

Marathwada is a landlocked region which is drained by the Godavari river. There are multiple rivers in the region which are tributaries to the River Godavari, but other than Godavari, no other river is perennial. With frequent droughts, it is not only the surface water which dries up, but the groundwater level has also fallen drastically. Earlier, farmers were using wells to irrigate their agriculture fields, thus tapping the shallow aquifers which were recharged during the monsoon period. However, with erratic and less rainfall over the years, aquifers were not getting recharged, and farmers started tapping into deep aquifers by digging more borewells. This further resulted in a decline in the groundwater levels. This phenomenon poses a very serious ecological crisis that needs to be addressed at a larger scale. LTFS's Jalvaibhav Project was a strategic response planned to address this severe and growing challenge faced by the rural communities of Marathwada.

2. NEED FOR INTERVENTION

The cluster of Beed, Jalna, Aurangabad, Osmanabad and Latur is called Marathwada. The region is infamously known nationwide for its agrarian crisis. Buldhana is a part of Vidarbha region while Solapur is part of the western Maharashtra region. These seven districts fall under the Hot Semi-Arid Eco-Region and Western Maharashtra Scarcity Zone, in terms of agro-climatic zones. The entire geographical region receives less rainfall compared to the state average of 1007.3 mm[30]. Soil of the region is deep black, medium black, medium red and shallow red. The economy of these districts is mainly dependent upon agriculture which is rainfed. The data given in the table below, presents how meager the area under irrigation is, owing to depleted groundwater levels and unavailability of surface water irrigation. Most of the suicide cases were reported among non-irrigated landowners/regions because lack of water had a severe impact on agricultural production, leading to loss of crops and low annual income levels.

2.1 Need for Intervention in Maharashtra

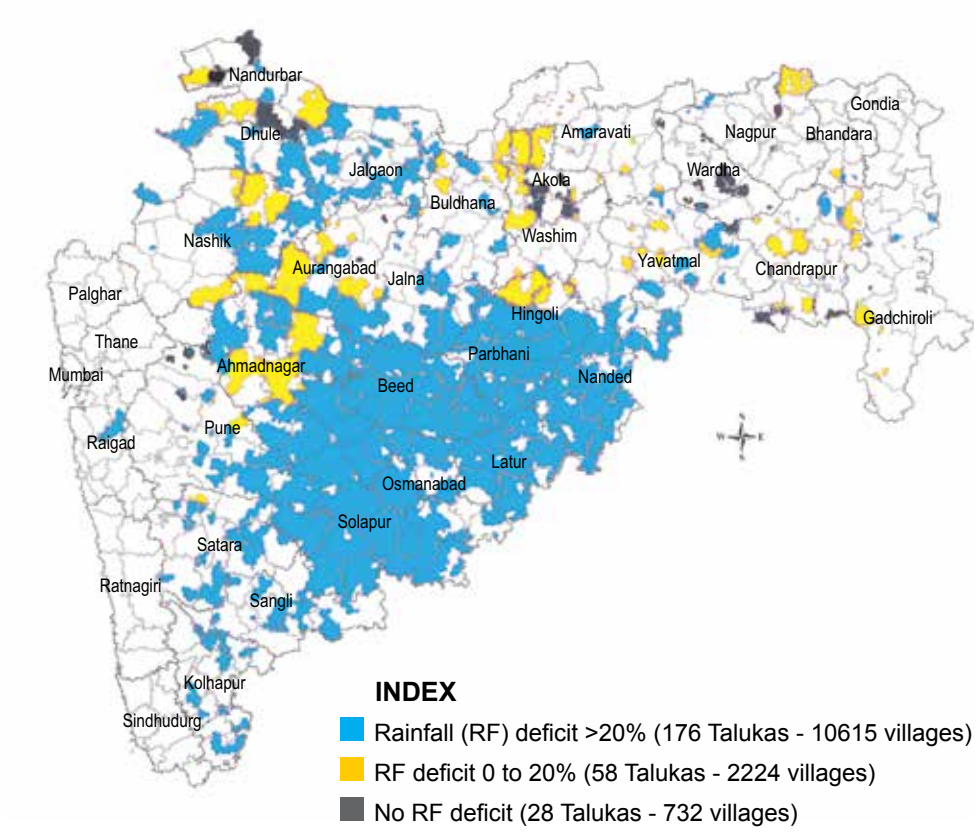


INDICATORS / DISTRICT	JALNA	BEED	AURANGABAD	OSMANABAD	LATUR	SOLAPUR	BULDHANA
Average Normal Rainfall	752.8	674.77	741	833	801.04	713	832
Cultivable area'000 HR	712.8	1019	812	582.9	657.5	1030.9	740
Net Sown area	596.5	876	654	519.3	529	919.7	712
Net Irrigated area	22.17%	16%	20.80%	15.60%	60%	27.30%	6%
Cultivators' in 000	535	652	531	357	389	668	588
Major Crops	Soybean, Cotton, Pearl Millets & Maize	Pearl Millet, Cotton, Sorghum & Soybean	Cotton, Maize, Bajra, Jowar, Soybean, Pulses & Oilseeds	Pigeon Pea, Black Gram, Soybean & Sunflower	Soybean, Sorghum, Pigeon Pea & Black Gram	Sorghum, Wheat, Chickpea & Sunflower	Soybean, Cotton, Tur (Kharif) & Gram, Wheat (Rabi)

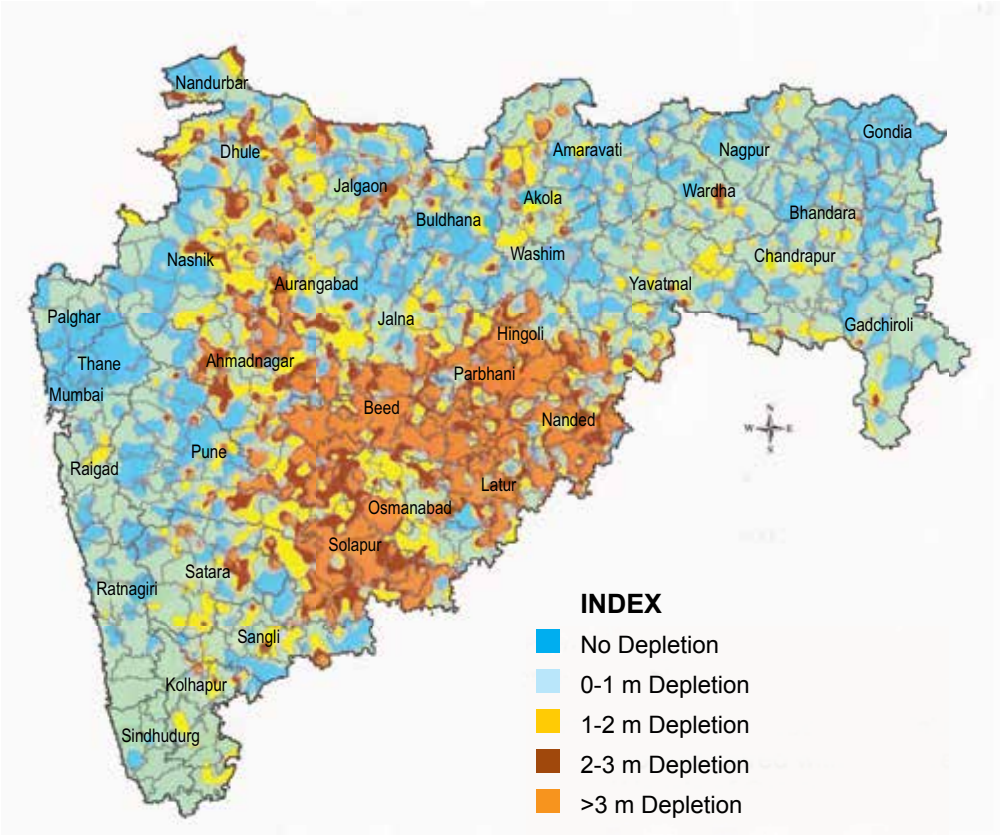
Source:- Agriculture Contingency Plan for District: Beed, Aurangabad, Jalna, Buldhana, Solapur, Latur and Osmanabad

2.2 Water Stress

Majority of the talukas in these districts are facing >20% deficit rainfall and >1 m groundwater depletion. Despite this, the area has a huge number of cultivators depending upon agriculture, which further deepens the agrarian crisis, turning it into a hotspot of farmers' suicides. The Groundwater Survey and Development Agency of the Government of Maharashtra published the following maps in its report in 2016, which depicted the alarming picture of the intervention area.[36]



Map showing villages having groundwater level depletion > 1 m compared with Rainfall deficit >20% , September 2015 (176 Talukas - 10615 villages)



Depletion in groundwater levels observed in 262 talukas - 13571 villages in October 2015, compared with last five years average groundwater levels of October

2.3 Soil Health

Soil is an integral component in the agricultural production value chain, which largely controls agricultural productivity. There are multiple factors that determine soil health. To ensure good agricultural production, certain macro- nutrients (Nitrogen, Organic Carbon, Phosphorus, Potassium) are essential. Furthermore, the health of soil is also determined by the moisture level which not only helps crops but also retains and grows crucial nutrients such as organic carbon. Soil moisture also helps to ensure biomass over the soil which prevents desertification. Thus, frequent droughts and constant dryness of soil play a major role in the degradation of soil health.

However, soil tends to get polluted by the accumulation of various heavy metals sourced from various means. Historically, it is the large amount of chemicals, in the form of fertilisers, insecticides and pesticides, that have polluted the soil. Though the application of chemicals in agriculture is an easy and quick solution for higher growth and controlling weeds and insect pests, it comes at a significant cost - the degradation of soil productivity over a period.

The Parliamentary Standing Committee on Agriculture, in its 29th report presented in FY 2015-16, had highlighted the fact that the excessive use of chemical fertilisers and pesticides is largely responsible for decreasing soil fertility. In the same report, the committee also talked about the lack of awareness among farmers as a reason for the same. FAO has also confirmed that chemical-induced agriculture is responsible for loss of arable soil and water contamination, among other issues which in turn pushes farmers in indebtedness to buy inputs, also leading to suicides.

MACRO NUTRIENT STATUS - MAHARASHTRA CYCLE - I (2015-16)[38]

Sr. No.	District	Soil Deficiency in terms of Nutrients in			
		N	OC	P	K
1	Aurangabad	51.00%	62.51%	44.42%	3.66%
2	Beed	88.65%	63.27%	29.66%	3.54%
3	Buldhana	38.93%	49.95%	22.05%	3.86%
4	Jalna	83.74%	58.97%	42.75%	4.47%
5	Latur	73.97%	74.92%	74.70%	1.40%
6	Osmanabad	18.79%	37.49%	73.54%	0.41%
7	Solapur	50.74%	63.18%	25.66%	11.49%

Farm Bunding, Pokhari, Beed, Maharashtra

3. INTRODUCTION TO JALVAIBHAV PROJECT

BACKGROUND

Jalvaibhav is one of the key CSR initiatives of LTFS. Started as a response to a major drought in the Marathwada region in 2015, the project gradually evolved through experience and adopted a more holistic approach that includes building the resilience of farmers while increasing the water infrastructure in the area.

OBJECTIVE

To improve the crop yield of marginalised farmers in semi-arid regions, through IWRM and CRA, in the villages of Marathwada. The project lays special emphasis on water sustainability and protective irrigation in order to improve crop productivity.

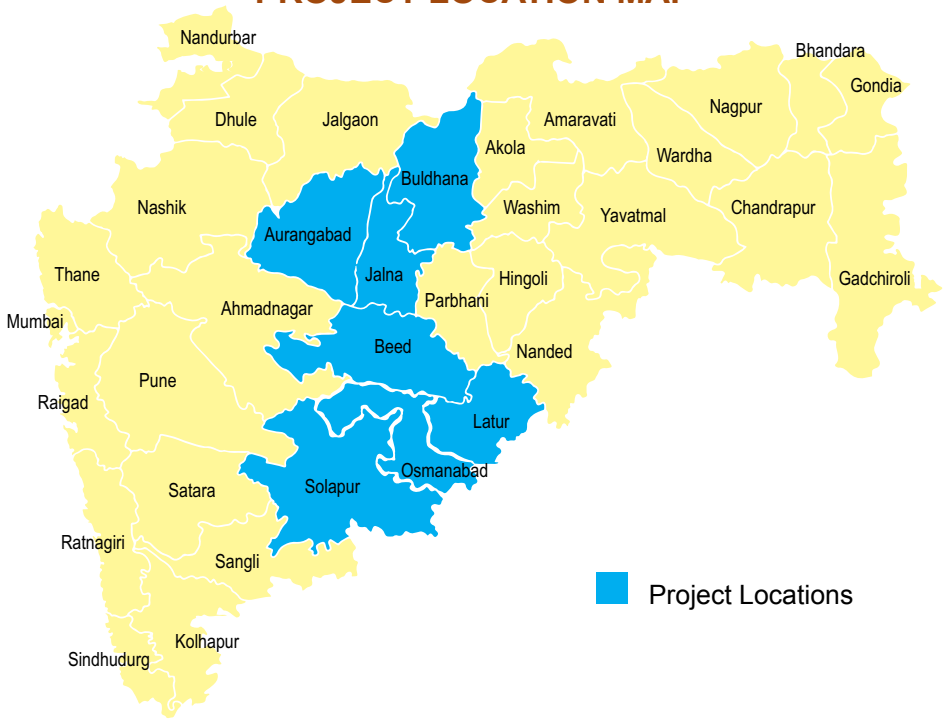
GEOGRAPHY OF INTERVENTION

122 villages in seven districts — Beed, Jalna, Latur, Solapur, Osmanabad, Aurangabad, and Buldhana — of Maharashtra.

MAJOR INTERVENTIONS

Water harvesting and recharge structures, CRA, strengthening community institutions, capacity building and technology.

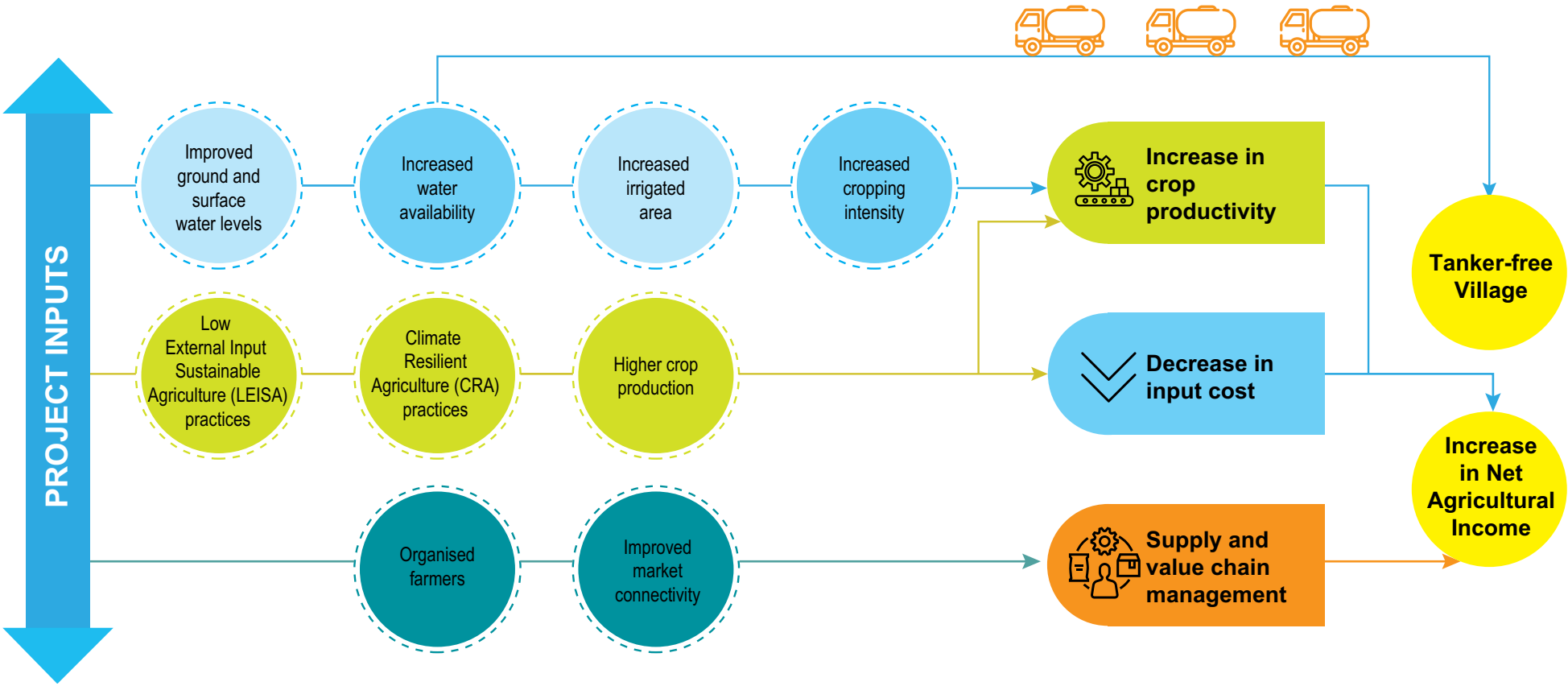
PROJECT LOCATION MAP



Selection of Geography → **Due Diligence and Selection of NGO partners** → **Baseline Assessment** → **Co-creation** → **Implementation** → **Social Impact Assessment** → **Sustainability**

3.1 TOC of Jalvaibhav Project

The Theory of Change (ToC) for the Jalvaibhav Project, revolves around the impact that LTFS aims to achieve through the provision of selected inputs. The below ToC explains the chain of results for the project leading to the buliding of climate resilient communities.



3.2 Projects implemented as part of Jalvaibhav

With the aim of addressing the challenges faced by farmers in and around the Marathwada region to sustain their livelihoods, Jalvaibhav – a step for shaping water wealth village — was initialised. The project was conceptualised around the issues related to water and agriculture – two core components of the livelihoods of villagers and most sensitive to any climatic shock.

The farming-related challenges faced by the villages were complex in nature and had heavy dependence on natural resources. In order to mitigate the stress, measures required to address these needed to be integrative and comprehensive. Action had to be taken to ensure the regular supply of necessary resources and moderating the demand of the resources so as to

ensure a sustainable and healthy agricultural ecosystem.

With this understanding, LTFS along with their implementing partners conceptualised this project. Based on the assessment of the area, a watershed was demarcated, and it was decided to follow the IWRM approach. The activities finalised were integrative in nature and comprehensive to address the challenges on demand and supply sides. While the idea was to increase the water availability and soil moisture in the area, efforts were made simultaneously to spread awareness and train different users' groups on sustainable practices.

LTFS selected implementing partners which have a strong grassroots presence in the target geographies as well as expertise in the areas of watershed management, agriculture and related livelihoods interventions. Factors such as previous experience for corporate and donor supported interventions and alignment of activities to government schemes, were also considered while selecting partners for the Jalvaibhav project.

DILASA JANVIKAS PRATISHTHAN

Dilasa Janvikas Pratishthan is a Non-Governmental Organisation (NGO) working for rural upliftment since 1993. Its primary focus areas are Natural Resource Management, Education, Women Empowerment and Livelihood. Dilasa has created a strong foundation in water management as means to sustainable natural resource management. Dilasa is implementing the Jalvaibhav project in 72 villages across Aurangabad, Jalna, Buldhana, and Beed district. With this project they are impacting more than 38,700 lives in the project area.

MANAVLOK

Manavlok is a registered organisation working in the Beed district since 1982. Manavlok works in around 200 villages in the Beed district. Their focus areas are water conservation, soil moisture conservation, agriculture, education, rural development, health and women empowerment. In partnership with LTFS, Manavlok has been implementing the Jalvaibhav project in 20 villages of Parli and Ambajogai blocks of Beed district with an estimated 40,000+ beneficiaries

AFARM

Action for Agricultural Renewal in Maharashtra (AFARM) is a registered not-for-profit organisation operating since 1969. AFARM has being implementing various programmes on IWRM. Based on this experience, AFARM has been recognised as a resource organisation for IWRM by the state government. AFARM implements the Jalvaibhav project in 30 villages of Latur, Osmanabad and Solapur districts of Maharashtra . The interventions are estimated to benefit 15,000+ farmers in these districts.

4. BASELINE

Before commencing the project, the implementing agencies conducted baseline assessments in their respective intervention areas using various social assessment tools like Participatory Rural Appraisal (PRA), Focus Group Discussions (FGDs), Socio-Economic Survey and Rapid Assessment Survey. The objective was to define and measure the scope of intervention and set standard indicators of progress. During the studies, quantitative data had been gathered through interviews of sample populations, whereas the qualitative insights were garnered through PRA exercises and FGDs with the communities.

THE METHODOLOGY FOR ASSESSMENT INCLUDED:

- Collection of hydro-geological and hydro-morphological data of the area
- Analysis of long-term climatic data for drought and surplus rainfall years and their frequency assessment for the present status of water resources and water demands in the area
- Identification of the most promising water-harvesting methods
- Quantification of possible surplus that would reach the groundwater and other water resources
- Socio-economic indicators of communities qualifying the intervention criteria.

Subsequent to analysing the findings of the studies, a set of structures were decided as per the feasibility of the region, joint analysis of geo-hydrological maps and rainfall data.

Farmer Field School (FFS), Veet, Solapur, Maharashtra

Farmer Field School (FFS), Akola, Jalna, Maharashtra

LOCATION-WISE BASELINE ASSESSMENTS FINDINGS FOR THE BELOW REGIONS ARE PRESENTED FURTHER:

BEED (DHARUR):
PRA and Rapid Baseline Survey in 12 villages

TOTAL AREA
13,256(HA)

TOTAL HOUSEHOLDS
7,217

TOTAL POPULATION
42,580

GROUND WATER LEVELS (M)
0.95

WATER POTENTIAL OF EXISTING WATER STRUCTURES (TCM)
41.56

RABI CROP AREA (HA)
3,002

IRRIGATED AREA FOR CULTIVATION (HA)
7,436

ANNUAL INCOME (INR)
42,000

BEED (PARLI AND AMBAJOGAI):
Baseline and Needs Assessment Survey in 20 villages

TOTAL AREA
22,530(HA)

TOTAL HOUSEHOLDS
8,751

TOTAL POPULATION
43,045

GROUND WATER LEVELS (M)
0.50

WATER POTENTIAL OF EXISTING WATER STRUCTURES (TCM)
21.89

RABI CROP AREA (HA)
7,962

IRRIGATED AREA FOR CULTIVATION (HA)
961

ANNUAL INCOME (INR)
79,000

LATUR, OSMANABAD AND SOLAPUR:
Rapid Assessment Survey in 37 villages (Project implemented in 30 villages only)

TOTAL AREA
40,638(HA)

TOTAL HOUSEHOLDS
19,844

TOTAL POPULATION
43,045

GROUND WATER LEVELS (M)
1.80

WATER POTENTIAL OF EXISTING WATER STRUCTURES (TCM)
143

RABI CROP AREA (HA)
8,188

IRRIGATED AREA FOR CULTIVATION (HA)
3,078

ANNUAL INCOME (INR)
70,669

AURANGABAD, JALNA AND BULDHANA: Baseline and Need Assessment Survey in 60 villages

TOTAL AREA
59,110(HA)

TOTAL HOUSEHOLDS
31,995

TOTAL POPULATION
1,53,485

GROUND WATER LEVELS (M)
1.68

WATER POTENTIAL OF EXISTING WATER STRUCTURES (TCM)
299.5

RABI CROP AREA (HA)
18,171

IRRIGATED AREA FOR CULTIVATION (HA)
24,405

ANNUAL INCOME (INR)
82,692

5. INTERVENTIONS

LTFS has defined a standard approach to be followed at the beginning of all Jalvaibhav projects. Initially, an assessment of the entire project area had been done to map the land use type, covering all the drainage lines, wasteland, and agriculture fields. Based on that and after multiple discussions with the community, interventions had been planned.

During the initial years of the Jalvaibhav project, interventions were majorly focused on developing the water potential in the region to support the groundwater recharge and increase in surface-water availability. In the later years, while water conservation remained the prime focus, equal attention was given to capacity building of farmers. To enable the same, interventions were taken up for the promotion of CRA practices and strengthening the overall agricultural ecosystem with the help of advanced technologies and methods.Throughout the project period, capacity building of community institutions remained the underlying principle. Multiple institutions were created to support the effective implementation of the interventions and create a framework for managing the resources sustainably. The details of the interventions done as part of the Jalvaibhav are mentioned in the following sections.

Water Accumulating Deep Trench (WADT), Radi, Beed, Maharashtra

5.1 Watershed Activities

With a larger objective of increasing the surface water availability, raising the groundwater level, and arresting soil erosion, multiple interventions have been undertaken. The terrain of Marathwada is undulated with multiple streams of varied orders and is coupled with some existing water-harvesting structures. All these factors along with water-flow and type of strata steered the decision on the interventions executed on wasteland, farmland and drainages. As part of Jalvaibhav, new structures had been constructed, non-functional existing structures had been revived, potential of functional existing structures was increased, damaged structures were repaired, and plantation was done.

The interventions undertaken as part of Jalvaibhav not just served the primary objective of the project, but also supported the ecological restoration process and farming requirements. Because of the structures, the water percolation increased, which, in turn, increased the soil moisture in the areas nearby. Increased soil moisture in the agriculture fields enhances the crop productivity and in the long run, this process will support the natural regeneration of grasses, bushes and herbs, especially in the common land (casually referred to as wasteland). The common land has a huge potential to serve as a major source of fodder for livestock, which would also supplement the primary source of income of farmers.

The structures, built within the project area, benefited the local villagers, but the indirect benefits of the same were also very critical and impacted a huge population in the downstream. As the drainages have been treated throughout, ranging from the ridge to valley, the silt was trapped there. These are drainages which combine in the downstream and merge with major river streams, on which the dams are constructed. By reducing the amount of silt in the water flow that goes in the river, it has been ensured that the capacity of the dams remains intact. These are the dams which serve the purpose of irrigation for a large number of farmers.

The activities that have been carried out in and around the Marathwada region as part of Jalvaibhav can be broadly categorised into two sections — water-harvesting interventions and water-recharge interventions. The purpose of water-harvesting interventions was to increase the surface-water availability, but water-recharge interventions were undertaken to increase the groundwater levels.

STRUCTURES CONSTRUCTED IN JALVAIBHAV

EARTHEN NALA BUND (ENB) - *These are kutcha structures that are generally constructed in areas with natural depression and less porous soil strata. This ensures the water availability for a longer period that can be used by the villagers for various purposes.*

DOHA - *These are constructed by widening and deepening existing drainage or small rivers. Primarily, this ensures more availability of surface water but also supplements the groundwater recharge.*

WATER ACCUMULATING DEEP TRENCH (WADT) – *These are the deep trenches dug in a stream or brook. This ensures availability of water in the stream or brook for a longer period.*

BOREWELL RECHARGE - *Borewell recharge technique was implemented where 100% groundwater can be percolated in the deeper aquifers. Monsoon water from the roof areas, tributaries or the water from the shallow depths is injected with the help of the drilling casing pipe through a slow sand filter into the borewell. It goes to deeper zones and gets stored in the cavities created due to the withdrawal of groundwater.*

CEMENT NALA BUND (CNB) – *These are concrete structures built in a stream or small river to harvest water.*

CONTINUOUS CONTOUR TRENCH (CCT) – *These are small trenches built along the contour lines in the common land to trap and percolate more rainwater.*

DEEP CONTINUOUS CONTOUR TRENCH (DCCT) – *The depth of DCCT goes up to 1 meter. These are generally constructed in areas with low slope and less evaporation.*

LOOSE BOULDER STRUCTURES (LBS) – *These are small check-dams constructed by stacking loose boulders in drainages with less flow of water. They arrest the silt and increase the water percolation.*

GULLY PLUG (GP) – *These are LBS and serve the same purpose, however these are constructed with some waste materials.*

STONE BUNDING (SB) – *These serve the same purpose as CCTs and are also constructed along the contour lines. In areas with hard strata and low soil depth where trenches can't be dug, small loose stones are stacked to form a bund.*

GABION – *These are similar structures as the LBS. The only difference here is that the loose boulders are bound with the wire mesh to increase its strength. Gabions are constructed in streams with heavy water flow.*

FARM BUNDING – *These are built in the agriculture fields to arrest the topsoil of the farm and increase the water percolation, thus maintaining the soil moisture for a longer period. This helps to mitigate the impacts of longer dry spells and increases productivity.*

COMPOSITE GABION – *These are Gabion structures only with a concrete base. The innovation helps increase the strength of the structure.*

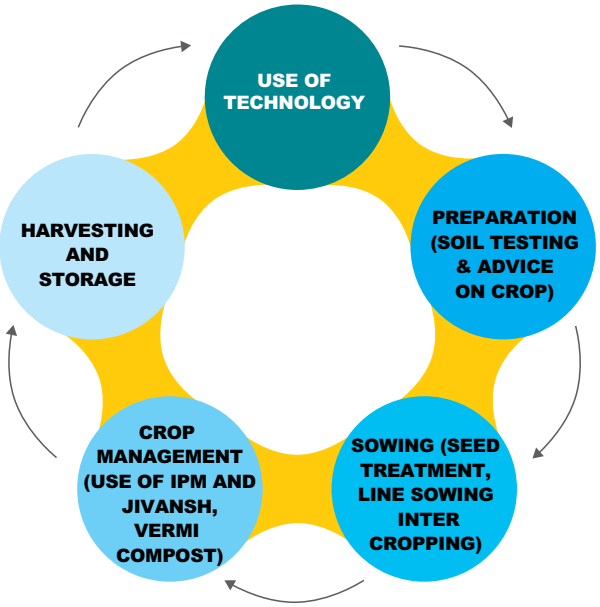
5.2 Building capacities to create climate resilient communities

OBJECTIVE:

To improve education, awareness and institutional capacity on climate change mitigation and adaptation and to further enhance livelihoods of the community.

STRATEGIES:

- Components of early warning and drought monitoring
- Contingency crop planning for drought proofing
- Improved agronomic (water saving) practices
- Alternative land use systems
- Management of livestock
- Animal health and feed and fodder resources
- Improving socio-economic status through LEISA, and alternate livelihood practices.



INTERVENTIONS:

- Empowering farming communities through Farmer Field Schools
- Promotion of CRA practices
- Promotion of Integrated Pest Management and organic fertilisers
- Promotion of alternate livestock
- Organic farming
- Technical Support - Use of instruments to capture weather data
- Orientation Krishidoots towards use of soil moisture meters
- Development of Audio Visual on LEISA
- Dense forest creation on barren community lands through Miyawaki technique

FARMER FIELD SCHOOLS (FFS)

Educating and Empowering Farmers through Farmer Field Schools:

The FFS approach evolved from the concept that optimal learning derives from experiences. Likewise, when it comes to farmers, what matters, is present in the fields. FFS integrates the domains of ecology and non-formal education to give farmers the opportunity to better understand the crops they grow and learn from each others' experiences.

The larger objective that FFS serves is to increase the yield, which, in turn, ensures higher income for the farmers. To achieve the objective, multiple interventions must be implemented throughout the crop cycle. To get a good harvest, steps need to be taken right from the stage of field preparation and throughout the crop cycle (sowing, weeding, pest management, irrigation, adding fertilisers and harvesting). These interventions are low-cost, advanced, and easy to implement, and, most importantly, they build on the traditional

Farmer Field School (FFS), Massa, Osmanabad, Maharashtra

knowledge of the farmers. When farmers adopt these practices, it improves soil health. Besides, the farmers learn to optimally utilise the resources to maximize their net profit.

An FFS, which consists of a group of 20-25 farmers, is spearheaded by a lead farmer who gets nominated on the basis of his risk appetite to try out different procedures and practices on a 'demonstration plot'. Every month the group gathers at the demo plot to learn and experience the advanced crop-management practices, which they can try out on their farmlands. The FFS also acts as a platform where farmers share their experiences, ask questions and get technical support from local units of Krishi Vigyan Kendras (KVK) and other agriculture experts.

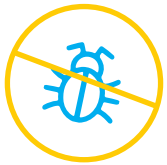
PROMOTION OF CRA PRACTICES

Regardless of the season, agriculture is highly sensitive to climatic conditions. That is why CRA practices are promoted by LTFS as part of the Jalvaibhav project. Using different means and mediums, farmers have been trained and encouraged to adopt such agriculture practices that makes the crops more climate resilient. To build resistance of a crop towards climatic hazards, multiple low-cost and natural interventions are planned throughout the crop cycle, leading to monetary gains for all farmers.

WATER BUDGETING: This is an exercise where farmers come together and discuss before each season (Kharif and Rabi) which crops shall be taken up. The selection happens based on water availability and the water requirement for the crops. By conducting this exercise in project villages, farmers were further encouraged to shift towards less water-intensive crops and efficient irrigation techniques. This ensured more area under irrigation and reduced vulnerability to water availability.

SEED TREATMENT: This is to be done before the sowing of seeds. In this process, seeds are treated with organic agents, such as Trichoderma, Phosphate Solubilizing Bacteria, Azotobacter, and Rhizobium. The selection of seed-treatment agents depends on the crop type. Seed treatment builds the resistance towards root diseases and ensures maximum germination. Because of the use of organic agents, the soil health also improves.

SEED SPACING: Besides better productivity, crop spacing also ensures higher resistance to climatic hazards. As part of this practice, farmers learn to keep the optimum distance between two seeds of any crop. This spacing varies from crop to crop. In the case of cotton seed, the spacing is approximately 4x1 to 4.5x1 feet to maintain the plant population between 8,000 to 11,000. Further, to follow this practice, the sowing method is also to be changed from seed broadcasting to line sowing.



INTEGRATED PEST MANAGEMENT (IPM): IPM is a chemical-free process to manage the pest infestation on crops, in order to avoid any harmful impacts on the environment or human beings. As part of IPM, the use of low-cost, locally prepared, organic pest-control solutions such as Amrut Mitti/Paani, Light Trap, Yellow Sticky Trap, Pheromone Trap, Lambit Ark, Nimboli Ark, and Vermi-wash have been promoted. Moreover, solutions like Amrit Paani improve soil health, thus reducing the need for additional fertilisers.

SOIL HEALTH IMPROVEMENT: The soil health by far decides the crop productivity and input cost. To improve soil health, there are multiple ways to prepare organic fertilisers, such as Shivansh Compost and Vermicompost. With some training and guidance, farmers themselves can prepare these and make them a regular component in the crop cycle. As these are composts, the value they add to soil health is much higher. Furthermore, depending on the type of compost, the manure can be prepared in 20-40 days.

CRA PRACTICES

Promotion of alternate livelihood activities:

Drumstick/fruit plantation/dry land horticulture: Awareness is created among communities on the importance of drumstick plantation and to impart knowledge on the cultivation methods. Drumstick is considered as a superfood and its yield can fetch a good amount of alternative income which can help farmers withstand the vagaries of nature due to the climate change scenario. Similarly, fruit plants also aid income enhancement while providing nutritional security to the family.

Drumstick plantation covering over 60 hectares by 150 farmers has been acheived in Aurangabad, Jalna and Buldhana districts.

Promotion of water-efficient technology:

In the past few years, extreme changes in the monsoon cycle have caused untimely rains, changed sowing periods, brought about climatic changes, led to unavailability of water and reduced soil productivity due to flood irrigation. This has created a huge demand for micro-irrigation among farmers. Its installation is not affordable for small and marginal farmers even though they receive irrigation systems at a subsidised cost because the overall net cost is high. The installation ensures water availability for at least two crops (mostly Kharif and Rabi) and increases overall income.

5.3 COMMUNITY INSTITUTIONS

AGRICULTURE DEVELOPMENT COMMITTEE:

- Constitutes the Village Sarpanch, Gram Panchayat (GP) members and Lead Farmers

ROLE OF AGRICULTURE DEVELOPMENT COMMITTEE:

- Facilitation and hand-holding support at village level during the implementation of sustainable agriculture activities including awareness camps, field demonstrations and FFS
- Promotion of the agriculture technologies at the village-level
- Facilitation during the execution of soil and water conservation activities at the village-level
- Making necessary arrangements for meetings and training events to be conducted at the village-level
- To provide a forum for sharing ideas and knowledge during project planning and implementation of project activities at the village-level
- To encourage community contribution from beneficiary farmers
- To maintain village-level documentation.

WATER USERS' GROUP:

- Comprises of direct and indirect beneficiaries who are in close proximity of water structures

ROLE OF WATER USERS' GROUP:

- To ensure the maintenance of water structures
- To promote practices that encourage equitable distribution among all users
- To provide a forum for sharing ideas and knowledge to ensure sufficient surface water availability throughout the year and increase groundwater levels
- To encourage community contribution from beneficiaries
- To maintain village-level documentation.

6. ACHIEVEMENTS OF JALVAIBHAV PROJECT

7 Districts, **11** Talukas
122 Villages

219 Ha Continuous Contour Trenches, **1,311** Ha. Deep CCT, **51** Ha Plantation

3,45,600 CuM Desiltation
893 Gully Plugs
3,302 Loose Boulder Structures

60,000 Beneficiaries and counting

PROJECT TIMELINE

FY2014-15
Severe drought in Marathwada region

FY2015-16
Jalvaibhav Project initiation in 12 villages, 1 Block, 1 District

FY2016-17
IWRM is included in LTFS CSR Policy as a Thrust Area
32 Villages
3 Blocks
1 District

FY2017-18
Stakeholders' Workshop of Jalvaibhav Project chaired by District Collector, Beed District

FY2018-19
62 villages
6 Blocks
4 Districts

FY2019-20
122 villages
9 Blocks
7 Districts

CASE STUDY

OUTCOMES OF JALVAIBHAV PROJECT

Dinkar Gaikwad is a marginal farmer hailing from the Radi village in Ambajogai block of Beed district. He used to cultivate cotton and soybean on his meagre land holding. His production was not sold in the market. He had even dug a well in his field to support his rainfed agriculture. However, the groundwater levels were not high enough to feed the well and provide a reliable water supply for cultivation. The recurrent droughts coupled with lesser water availability were proving to be a critical challenge for Dinkar in continuing cultivation in the future.

Then, Dinkar came across LTFS's Jalvaibhav project. As a part of this project, he was exposed to the techniques of silt spreading and compartment bunding. Dinkar accumulated his own savings and also borrowed money from friends and relatives for carting 400 trolleys of fertile silt from the local dam. Dinkar participated in the scheme of the local dam desilting and was benefited by spreading the fertile silt on the entire four acres of his farm. Along with this, he also received guidance on compartment bunding as part of the Jalvaibhav project.

He applied this technique on his farmlands before the monsoon season. Dinkar's effort saw success, due to the fertile soil spread on the farms. Moisture retention in the soil was also achieved through compartment bunding, boosting his agricultural production beyond the regular cycles.

The water-level in his well had risen by 2.4 m due to the desilting activity.Production of cotton and soybean increased by 50% & 60%, respectively, leading to an increase in income from agriculture. He had also cultivated bananas on half-acre of his land, which gave him a production amounting to INR 60,000. With a substantial increase in income, Dinkar purchased a crop harvester machine to support his existing business.

The success received through the desilting project has boosted the confidence levels among many other farmers like Dinkar. They have witnessed the benefits of applying fertile silt on farmlands and practicing compartment bunding. The project has been a ray of light in the lives of such farmers, who were earlier ushered into the darkness of despair by consecutive droughts.

WATER INTERVENTIONS

50
Recharge Shafts

893
Gully Plugs

356
Dohas

10,019
Running metres Stone Bunding

2,299
Water accumulating structures

3,302
Loose Boulder Structures to trap the soil erosion and enhance GW recharge

49
Earthen Nala Bunds to increase the availability of Surface Water

60
Gabion structures constructed to increase Ground Water (GW) recharge, soil moisture and natural regeneration

1,530 Ha
of common land treated with Continuous Contour Trenches (CCTs) to increase GW recharge and for ecological restoration

CASE STUDY

FARMERS FIELD SCHOOL

Hanumant Nale is a marginal farmer from the Morwad village in Solapur district. He had been cultivating onion, maize, gram and citrus on five acres of his seasonally irrigated land. He followed traditional agricultural practices for cultivation. Over a period of time, he began to realize that his input costs were increasing with every cycle, but not his production. In fact, his returns on investment were contracting every year.

Hanumant came across awareness camps on CRA organised in his village as a part of the Jalvaibhav Project. He got exposed to the FFS concept through this workshop. His interest in agriculture and innovations got him selected as a lead farmer for cultivation of the onion crop.

As a part of this demo exercise, Hanumant cultivated onions on one acre of his farm and followed all the guidance and recommendations provided during the training. He prepared and applied organic fertilisers and pesticides such as Jivamrut, Lamit Ark, Dashparni Ark and farmyard manure as a basal dose to enhance the microbial activity of the soil. Dashparni Ark, Lamitark and yellow sticky papers provided effective control against thrips and jassids. His only external input from the market was fungicide spray, while the rest all inputs were prepared by him on the basis of the training received.

During the crop duration, fellow farmers from FFS observed that all onion crops, except Hanumant's, were infected by pests. This encouraged them to practice the CRA practices with new vigour. Hanumant reaped multiple benefits as a part of this intervention. His cost of production for the same quantity of onion reduced to INR 27000 from previous cost of INR 33000. Also, his net profit from this onion produce more than tripled compared to the previous year.

Many farmers are now following Hanumant's steps and are reaping benefits through guidance and support on CRA, provided by LTFS through the Jalvaibhav Project.

WATER INTERVENTIONS

122

Villages using weather monitoring technology for better planning

130

Sprinkler irrigation demonstration to promote the water efficient technology

507

Shivansh demonstration for use of organic fertilisers

4,931

Farmers completed soil testing and planning on the basis of results

120

Farmer Field Schools for promotion of advanced, improved and organic agricultural practices

1,805 Ha

Farm bunding to arrest soil erosion and improve soil moisture

120

Demonstrations of vermicompost pits to promote organic fertilisers

175 Ha

Dryland horticulture

75

Training of users' groups

CASE STUDY

DEMO HOLDER OF FARMER FIELD SCHOOL

Shelgi, a small village in the Nilanga block of Latur, had been facing frequent droughts similar to those in other villages in the district. Most farmers from the village practiced rainfed irrigation and were primarily dependent on agriculture for their source of livelihood. Recurring droughts had already reduced their overall savings, with meagre agricultural productivity. In addition to this challenge, the increasing cost of agri-inputs was making a big hole in the farmers' pockets and reducing their returns from the field with every sowing and harvesting season.

Bhim Ganpati Birajdar was one such drought-affected farmer, who despite his hardships was putting in efforts to cultivate soybean on his small landholding of two acres. He owned five acres of land; however, drought limited his cultivation to only two acres. The returns from the produce were low, since the inputs costs, especially on fertilisers and insecticides were significantly higher. He was losing hope of getting a sustained income from agriculture, every year and feared the loss of his primary source of livelihood.

Bhim came across the Jalvaibhav project through the project information leaflet in 2019 and attended one of the awareness camps, where he got exposed to the technique of Farmer Field Schools. The session motivated him, and he reached out to the local coordinator of AFARM, Jalvaibhav's implementing partner. He volunteered for conducting demonstrations on his field during the Kharif season of 2019 for the soybean crop. During this demonstration phase, he undertook an inter-crop of tur along with soybean. Bhim adopted techniques like seed treatment, line sowing, utilising organic fertilisers and pesticides. He was applying these practices and techniques for the very first time in his fields. He used Jivamrut, LAMIT, Pheromone traps, trap crops, vermi-wash etc. for cultivating his soybean crop.

Bhim was expecting a good return from his efforts. Post-harvest, his efforts were met with success. With a total investment of INR 23,500, Bhim had gained produce worth INR 64,500. He had made a direct net profit of INR 40,500 through a single cycle of farm field demonstrations. His success motivated similar drought-stricken farmers to adopt sustainable agriculture practices and replicate such success on their own farmlands.

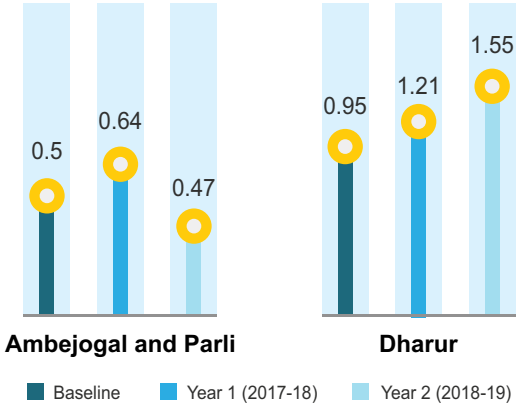
The FFS demonstrations and guidance, as part of the Jalvaibhav Project are emerging as a boon for needy farmers from drought-affected areas. Reducing input costs, is increasing their net income from agriculture, sustainably.

7. OUTCOMES

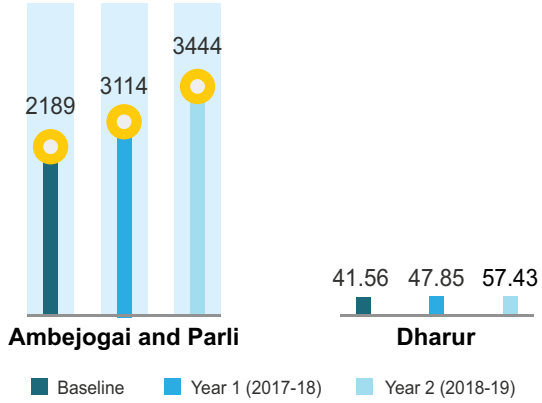
After almost four years of work in the Beed district of Marathwada region, there has been significant results in terms of improvement of groundwater levels, increase in agricultural productivity, rise in farmers' income and a high level of awareness among farmers on making agriculture a profitable livelihoods option. The dependency on natural resources is always there, but now there is an understanding to manage them efficiently and use them sustainably. The outcomes of the activities carried out as part of Jalvaibhav in Beed district, are verified by a third party through a Social Impact Assessment study.

AN OVERVIEW OF OUTCOMES OF THE JALVAIBHAV PROJECT IN BEED DISTRICT

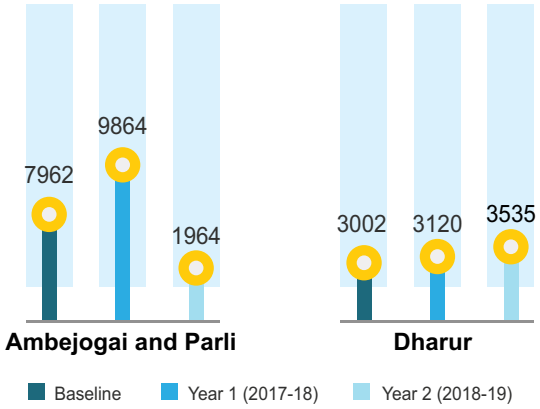
Groundwater Level (m)



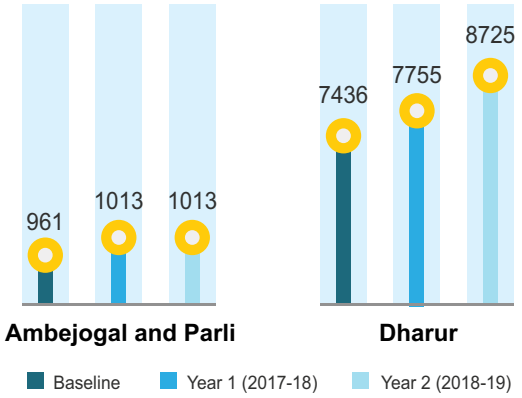
Water Potential Created (TCM)



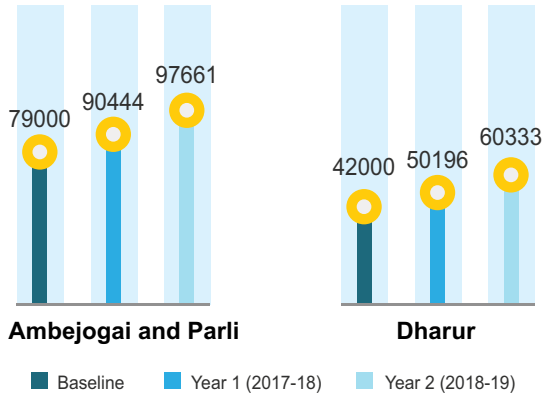
Acreage Of Rabi Crop (Ha)



Area Under Irrigation (Ha)



Household Income (INR)



7.1 OUTCOMES OF JALVAIBHAV PROJECT – SOCIAL

LTFS facilitated a SROI study for the interventions conducted in the 12 villages of Dharur block in Beed district. This study, which was carried out by KPMG (a third party), helped to articulate the ToC for all the stakeholders engaged (beneficiaries, LTFS and implementing partners).

APPROACH

1. Consultation and scoping
2. Research design and mapping outcomes
3. Data collection and evidencing outcomes
4. Data structuring and establishing impact

Stakeholders Mapping	Regions Studied
Govt. officials	12 project villages of Dharur block
Gram Panchayat	
LTFS and Dilasa	3 non-project villages of Dharur block
Control villages	
Beneficiaries	

THEORY OF CHANGE FOR STAKEHOLDERS

				LARGER IMPACT
Beneficiaries	Improved availability of water & area under irrigation	Increased household annual income	Reduced distress migration	**Improved wellbeing**
Dilasa Project Team	Improved learning and knowledge	Improved team-work	Improved communication	**Improved market visibility**
LTFS CSR Team	Capacity building on watershed activities	Improved LTFS M&E framework	Improved brand recall of LTFS among community	**Increased disposable income at HH level**
	Gram Panchayat	**Local Administration**	**Water Tanker Operators**	

Jalvaibhav project village entry point, Pahadi Pargaon, Beed, MH

SIA assessment, Pahadi Pargaon, Beed, Maharashtra

Group Discussion during SROI, Thetegavhan, Beed, MH

BENEFICIARY OUTCOMES	CHANGE
Improved availability of water	95%
Increased area under irrigation	57%
Increased household annual income	70%
Reduced migration	89%

> 90% change attributed to Jalvaibhav Project

SRoI of 1:2

i.e. against every rupee invested, Jalvaibhav Project has seen twice a return (return of INR 2).

Group Discussion during SROI, Sonimoha, Beed, MH

Group Discussion during SROI, Aranwadi, Beed, MH

Monitoring of water structures during SRoI, Sonimoha, Beed, Maharashtra

8. PROJECT CHALLENGES

During the course of the Jalvaibhav Project, there were several challenges observed at the various stages of the project by LTFS and its partners. This white paper discusses some of the key challenges which have affected the pace of the project and the realisation of its outcomes.

Villagers migrated due to consecutive drought spells in search for employment to nearby cities. This led to challenges for mobilisation of the farmers during the planning and awareness phase. Also, during the execution phase, the migration affected the availability of labourers for the development of watershed structures. Drought spells and the delay in rainfall resulted in delayed or no sowing during the Kharif and Rabi seasons. This practice also delayed the planned activity of FFS.

LTFS and its implementing partners faced other challenges such as the scheduling of Gram Panchayat (local government at the village-level) elections, busy times of crop harvesting and below-average rainfall which obligated the project teams to postpone their planned activities of the Jalvaibhav Project. The low rainfall also led to sudden spikes in demand among farmers for water-efficient irrigation devices (sprinklers) during the Kharif season.

Other problems which persisted and affected the project were reluctance of farmers to take up compartment bunding, local village-level political issues, unavailability of farmlands, reluctance from villagers for monetary contribution and varied demand from farmers as per their preferences.

Farm Bunding, Karewadi, Beed, Maharashtra

Awareness on soil testing, Anvi, Jalna, Maharashtra

Wana River (before desiltation), Patan Mandwa, Beed, MH

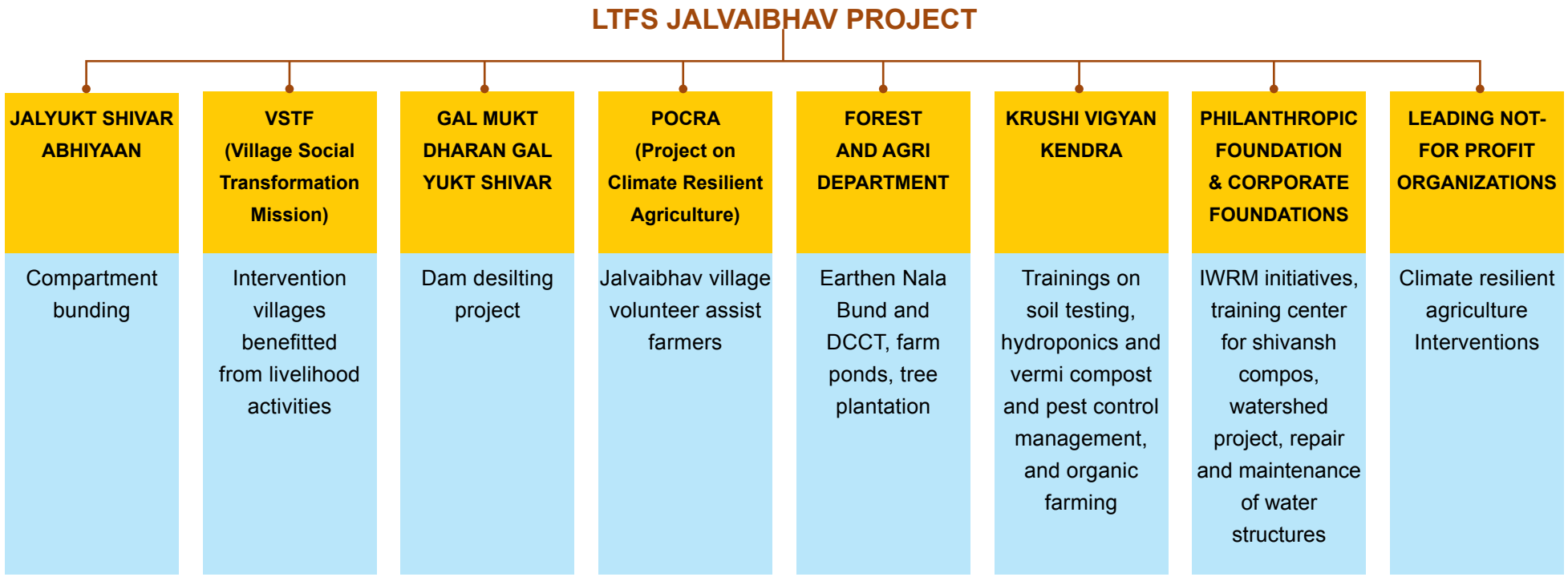
9. LEARNINGS FROM THE PROJECT

STAKEHOLDER INVOLVEMENT	The involvement of farmers in the project was gradual, with the shift from passive observers to active participants happening only after witnessing the impacts of the watershed development activities and the FFS, for the first few beneficiary farmers. The initial success boosted the confidence of other farmers and resulted in their participation.
CONVERGENCE	Alignment of the project activities by LTFS with existing Government schemes and initiatives related to IWRM were critical, in order to ensure benefits of the project to maximum number of villages in target geographies.
AWARENESS AND CAPACITY BUILDING OF BENEFICIARIES	Awareness and capacity-building of farmers on sustainable farming and micro-irrigation practices are essential, along with the creation of watershed structures if the project has to completely achieve the objective of increased crop production and the resultant income generation. Exposure to new techniques and practices related to water conservation/efficiency and sustainable agriculture is one of the major factors determining project success.
CAPACITY BUILDING OF PROJECT TEAM	Capacity building of the project implementation team enhances project delivery. This should be achieved through training of implementation partners on Impact Maps before project implementation, external training on watershed structure development and conducting training on delivery of training modules related to sustainable agriculture.

10. CONVERGENCE INITIATIVES

During the project implementation, LTFS team collaborated with other stakeholders to maximise coverage, avoid duplication of work and leverage existing Government schemes and models. Convergence involved co-creation, shared risks and responsibilities, interdependency, and organisational transformation. The convergence with local, state and national programmes, and other NGOs and foundations ensured sustainability of the project and creating shared value.

Water User Group Training, Aranwadi, Beed, Maharashtra



11. ALIGNMENT OF JALVAIBHAV WITH SDGs

In 2015, 193 countries came together to draft the 2030 agenda as a universal call to take action against the most challenging issues in order to ensure peace and prosperity for all, by 2030. The agenda had listed rising inequalities, natural resource depletion, environmental degradation and climate change among the greatest challenges that pose serious threats, globally.

In the pursuit to bring the agenda in action, the 17 SDGs, also known as Global Goals, were adopted by all UN Member States. The goals also recognise the balance that needs to be maintained between social development, economic prosperity and environmental sustainability. The way the goals and their specific targets were articulated, clearly highlighted their integrated nature, not to be looked at in isolation. Actions taken in one area would have a far-reaching impact and would affect the outcomes of the other goals as well.

Thus, among the 17 goals, are multiple goals which are interrelated and whose targets are indirectly affected by the contribution to the sectors of water, agriculture, and climate change.

SDG 6.5 states ***"By 2030, implement integrated water resources management at all levels, including through transboundary cooperation as appropriate"***. IWRM is a holistic approach that supports all SDGs across the 2030 Agenda.

As per the UN Water report on Progress on IWRM 2018, key components of the IWRM framework and their implementation progress, globally are as follows:

	Degree of implementation (2017/18)
• An enabling environment of policies, laws and plans	50%
• Institutional arrangements for cross-sectoral and multi-level coordination, and stakeholder involvement	53%
• Management instruments such as data collection, assessments and instruments for water allocation that facilitate better decisions	49%
• Financing for water infrastructure and on-going costs of water resources management	39%

Currently, India does not monitor progress towards IWRM implementation against SDG 6.5

Jalvaibhav also contributes to SDG 2 and SDG 11

SDG 2.4
Sustainable agriculture and food security

SDG 11.5
Disaster risk reduction and resilience

SDG 11.6, 11.9
Sustainable cities and communities

KEY SDGs IMPACTED

WAY FORWARD

Way Forward

Adverse effects of climate change would continue affecting natural resources negatively for the years to come and to mitigate these impacts, appropriate and innovative adaptive measure need to be taken. The issue of water security represents an opportunity for all stakeholders to come together and take immediate action. Water is part of the foundation on which the development of health, livelihoods, education and other sectors depends.

The interconnected nature of water has brought out very clearly the need for a collaborative and participatory approach while addressing the issue of water security. As climate change worsens, managing its impact on the water resources and the agricultural ecosystems will become increasingly urgent and complex.

Assessment of the existing resilience capabilities of the communities and development of new resilience building strategies is becoming increasingly important for the years to come. With this perspective, this white paper outlines a few recommendations for corporates to pursue as a part of their future CSR interventions in the field of IWRM and CRA.

Shramdaan by villagers, Mamdapur Parli, Beed, Maharashtra

AT CORPORATE LEVEL

- Funding stakeholders (corporates/ multilateral/bi-lateral organisations) and similar other stakeholders working in the areas of IWRM and CRA should leverage on the tools/ reports developed by the NITI Aayog, like the CWMI and the SDG India Index, in order to increase the effectiveness of their interventions.

- Donors should invest in building capacities of partners in the areas of baseline assessment, monitoring, impact assessment, reporting and communication.

- Future success of the interventions will be determined by the extent of the corporates' investment and focus in innovation and research.

- Revenue models need to be explored to cover costs for operations and maintenance and reduce dependency of the community.

- Over a period of time, institutions must change their focus from the development of infrastructure, to better use and conservation of water resources during the utilisation stage, and to the improvement of allocation and regulation of water resources.

- Stakeholders working in sectors of IWRM and CRA should dedicate their efforts and resources towards smart agriculture interventions, since farming will experience technological transformations in the coming years. IoT based approaches such as monitoring of climate conditions, greenhouse automation, crop management and similar others, should be explored.

POLICY AND ADVOCACY

- Corporates/donors working for multiple years in the field of IWRM and CRA by following multi-stakeholder approaches, should work actively with the Central/State Governments to develop the intervention model into a policy/scheme enforced through regulation. Recognition and standardisation through the state, will ensure a quicker and wider dissemination of the model and its implementation.
- Corporates can undertake advocacy for Government schemes around IWRM and CRA through their CSR interventions directly/ indirectly. Implementing partners' support for the promotion and percolation of Government schemes can be achieved through this approach e.g. Government schemes under the National Mission for Sustainable Agriculture.
- Recognition of the political nature of the CRA approach is required, to not look at it as a set of isolated technical interventions. Initiatives need to be integrated with Government priorities to generate political will, for CRA to be sustainable and institutionalised.

CONVERGENCE

- Convergence with existing Government schemes and policies will help in the effective and quicker outreach of CSR interventions.
- Maharashtra State Government sponsored schemes such as Galmukt Dharan Galyukt Shivar (GDGS) scheme, provide opportunities for carrying desilting of water bodies on a massive scale through collaboration of CSR support and the Government resources and machinery.
- Alignment of the interventions to the POCRA scheme of Maharashtra Government will help in amplifying outreach for the development of capacities of farmers for CRA.
- Collaboration with Government schemes across line departments such as Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) and National Rural Livelihoods Mission (NRLM), needs to be strengthened. Collaboration with various CSRs also may be explored as part of the scale-up strategy by sharing best practices and advocacy.

APPENDICES

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Communication Address :

Brindavan, Plot No. 177, CST Road,
Kalina, Santacruz (East),
Mumbai - 400 098,
Maharashtra, India.

Phone : +91 22 6212 5000
Fax : +91 22 6212 5398

Website : www.ltfs.com
Email : igrc@ltfs.com

L&T Financial Services