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# Sustainable Agriculture in India

## Water Management

Data Guide – July 2022

# National Mission for Sustainable Agriculture



National Mission for Sustainable Agriculture (NMSA) has been made operational from the year 2014-15. Main objectives of this mission is to make agriculture more

- Productive
- Sustainable
- Remunerative
- Climate resilient

and achieve this by

- Promoting location specific integrated /composite farming systems
- Soil and moisture conservation measures
- Comprehensive soil health management
- Efficient water management practices
- Mainstreaming rainfed technologies

# Water Management

One of the key objectives of NMSA is ***‘Efficient water management practices’***.  
Some means India has adopted to achieve this objective is through

- Rainfed Area Development (RAD)
- Micro Irrigation
- Infrastructure development for irrigation
- Watershed development

# Table of Contents

Section	Page
<a href="#"><u>Introduction</u></a>	2
<a href="#"><u>Summary</u></a>	6
<a href="#"><u>Rainfed Area Development</u></a>	8
<a href="#"><u>Micro Irrigation</u></a>	16
<a href="#"><u>Infrastructure Development</u></a>	22
<a href="#"><u>Watershed Development</u></a>	27

# Sustainable Agriculture in India

## Water Management - Summary

# Sustainable Water Management at glance



In 2018-19, more than 1 lakh hectares of land was covered under rainfed area development



~1171 thousand hectares of area was covered under micro irrigation in 2019-20



Achievement of land development for Watershed Development has been constantly less than 50% of the set target.



Budget for irrigation scheme has approx. doubled. 2.34 thousand crore in 2016-17 to 4 thousand crore in 2020-21.



Drip irrigation constitutes more than 50% of area covered under micro irrigation in states of Tamil Nadu, Maharashtra and Gujarat



Irrigation Capacity was developed most in the year 2016-17, and is mostly contributed by water conservation activities

# Sustainable Agriculture in India

Rainfed Area Development (RAD)



# Rainfed Area Development (RAD)

RAD (Rainfed Area Development) is one of the major components of NSMA.

Some key features include

- Adopt an area based approach for development and conservation of natural resources along with farming systems.
- Introduce appropriate farming systems by integrating multiple components of agriculture such as crops, horticulture, livestock, fishery, forestry with agro based income generating activities and value addition.
- Promote soil test/soil health card based nutrient management practices, farmland development, resource conservation and crop selection conducive to local agro climatic condition
- RAD clusters should have soil analysis/soil health card/soil survey maps to justify the interventions proposed and at least 25% of the farming system area will have to be covered under 'On Farm Water Management'.

## India-YoY funds released under RAD (INR Crore Rupee)

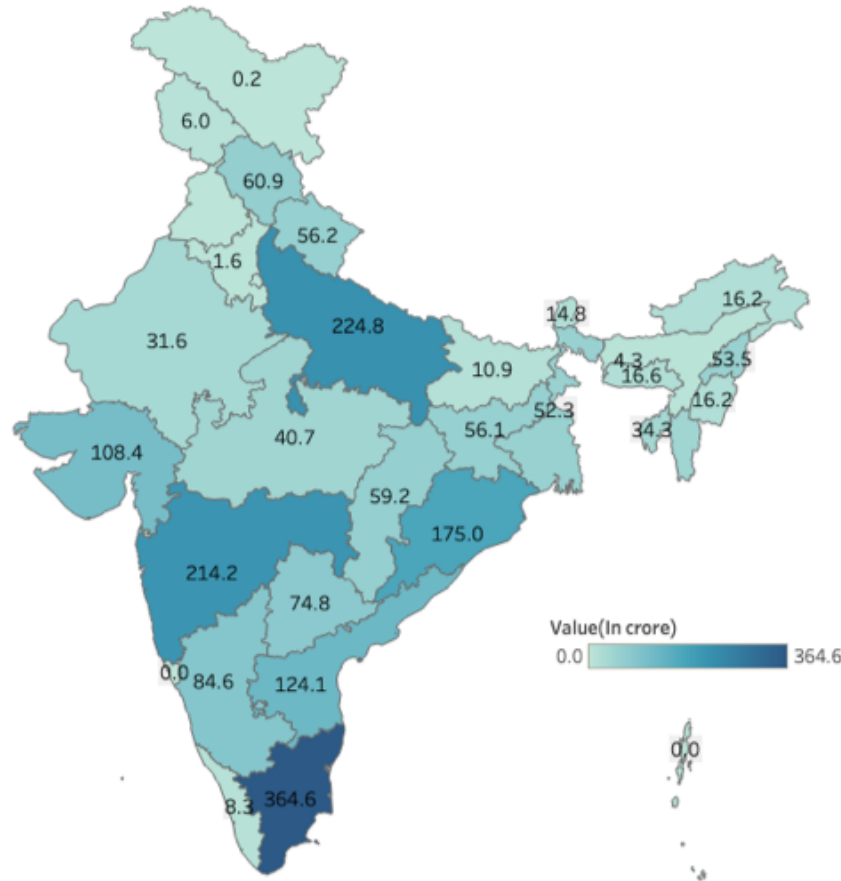


With inception of NMSA in 2014-15, funds are allocated for RAD by the center as well as the state.

Fund allocation was consistently increasing from 2014-15 to 2018-19 and then a downward trend from 2019-20 onwards.

Highest funds were released in year 2018-19 (595 Crores).

## Statewise Total Funds Recieved under RAD 2014-21

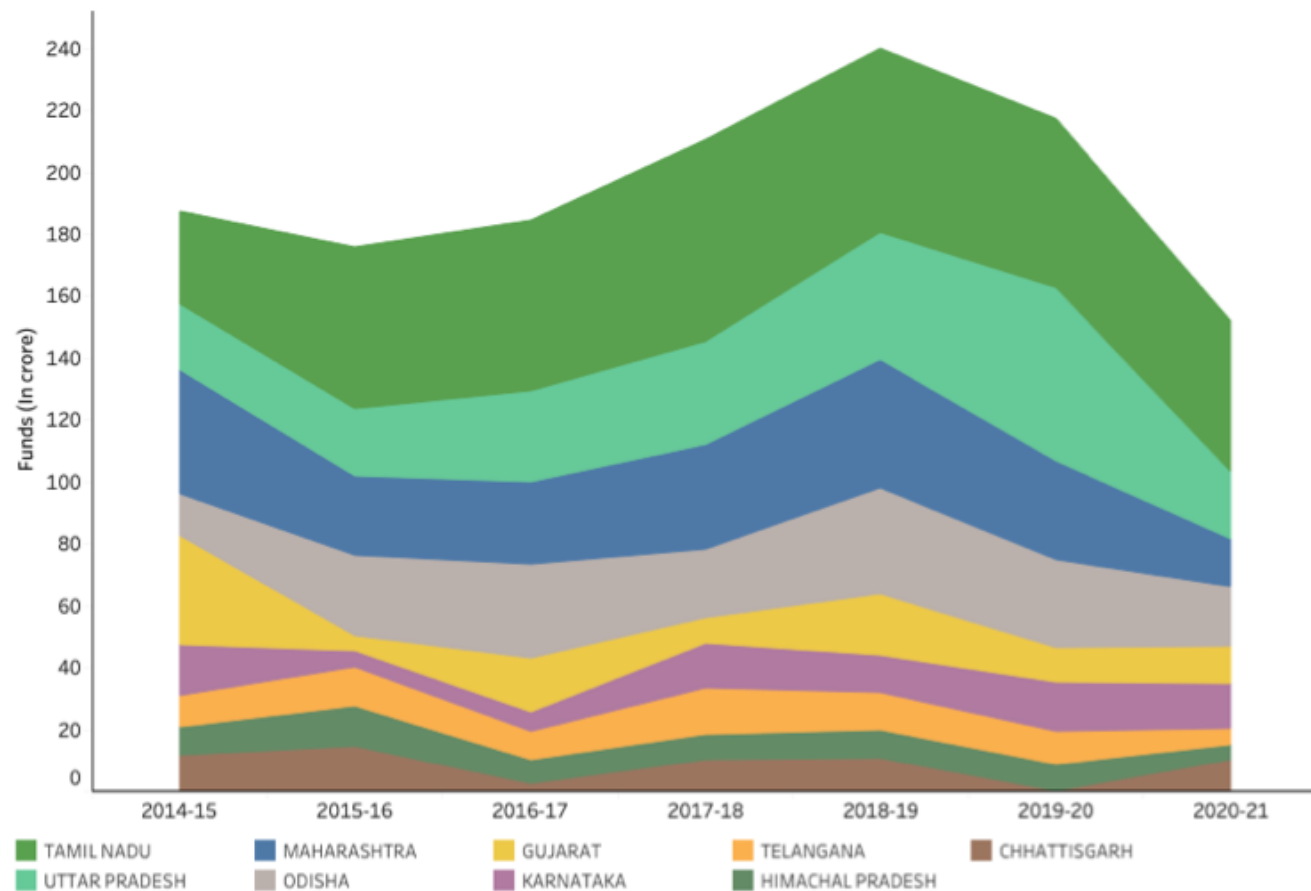


The rainfed area development in a state is funded by both the center and the state.

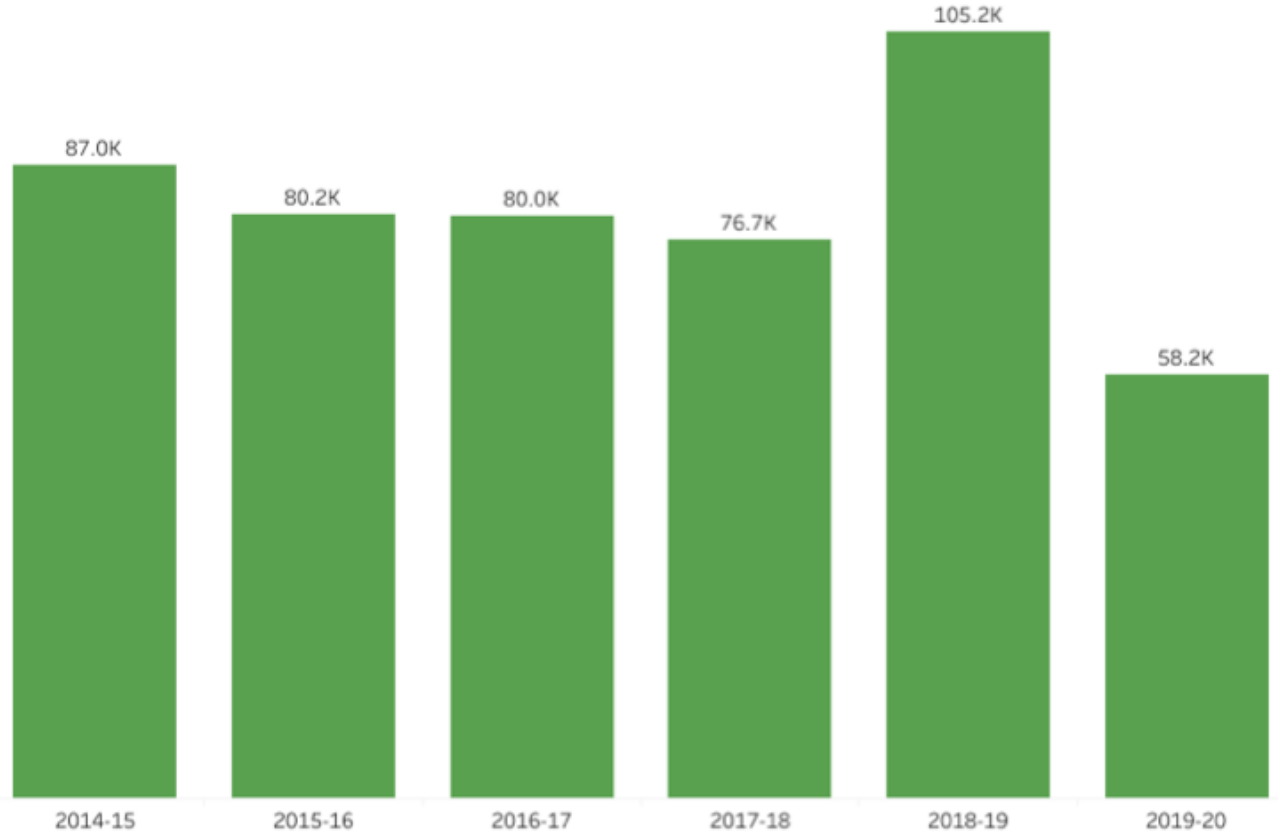
As per Total funds distributed across the states from 2014-21, Tamil Nadu received the most funds of 350+ crores, followed by Uttar Pradesh, Maharashtra and Odisha.

Note: State fund amounts are unavailable for certain years for certain states.

## RAD funds recieved by Top 10 States (INR Crores)- 2014-21

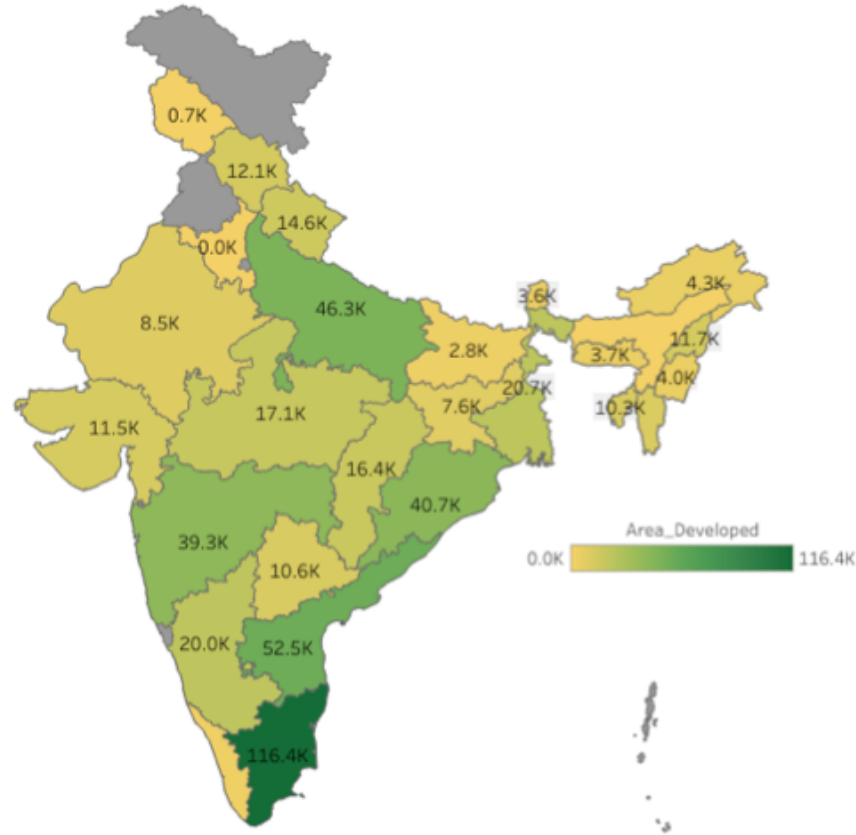


## India-YoY Rainfed Area Development Coverage Achieved (2014-20) (In Hectares)



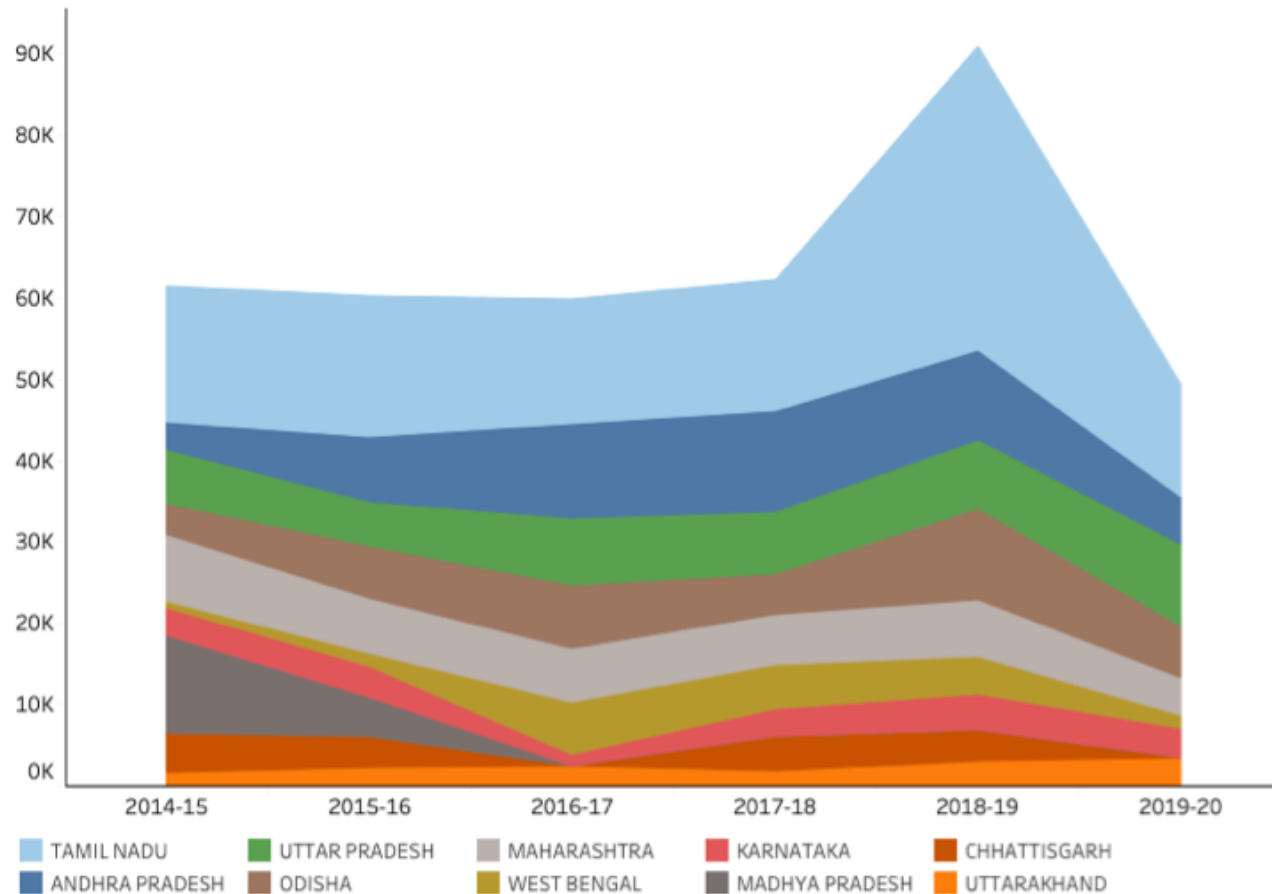
In 2018-19, Rainfed Area Development (RAD) achievement was highest (1,05,200 Hectare) and the least was in the consecutive year, 2019-20 (58,200 Hectare).

### Statewide RAD Coverage Achieved (2014-20)



Tamil Nadu tops the states with approximately 116 thousand hectares of area covered under RAD from 2014-20. Followed by Andhra Pradesh - 52.5 thousand Hectares and Uttar Pradesh - 46.3 thousand hectares.

## YoY RAD coverage achieved for top 10 states from 2014-20 (In Hectare)



Tamil Nadu has been consistently having large area of land under RAD.

Though Madhya Pradesh had large area under RAD in 2014-15, it has been on a decline and is almost nil since 2017-18.

# Sustainable Agriculture in India

Micro Irrigation



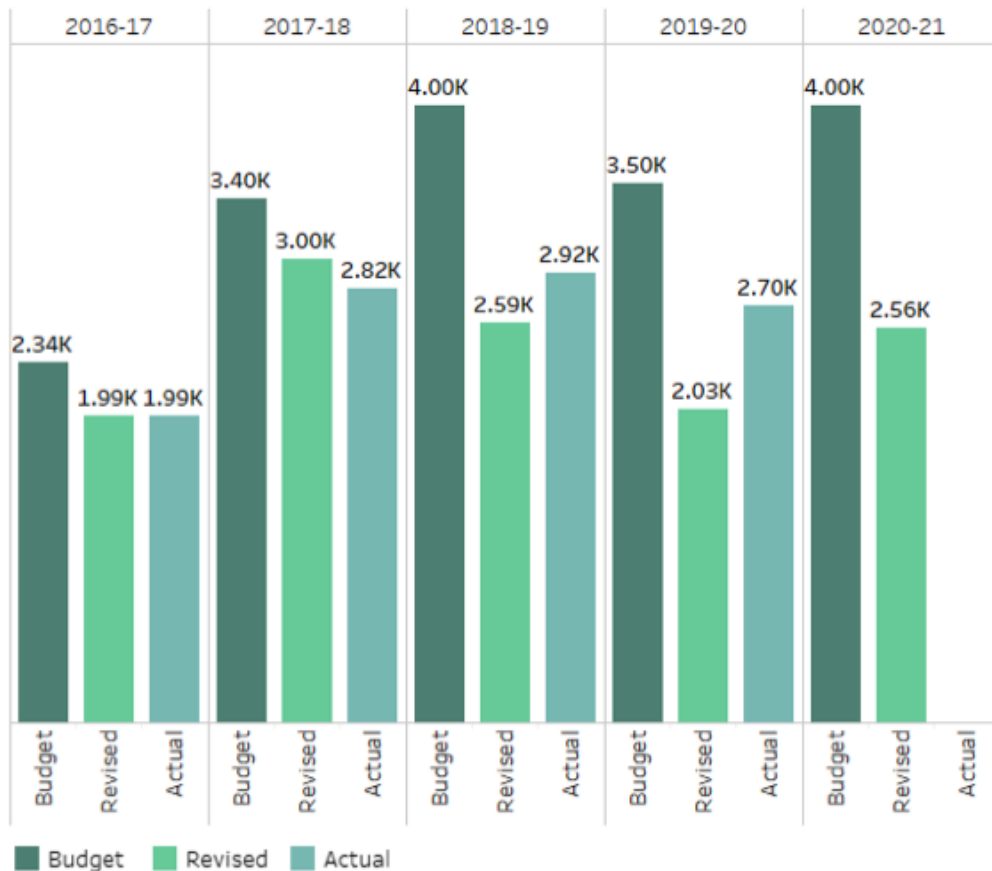
# Micro Irrigation

‘On Farm Water Management’ (OFWM) was implemented as one of the component of NMSA during 2014-15 with the objective of enhancing efficient use of water by promoting technological interventions like drip & sprinkler technologies, efficient water application & distribution system, secondary storage etc. Thereafter, these activities have been subsumed under the ‘Per Drop More Crop (PDMC)’ component of Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) during 2015-16.

The Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) was launched during the year 2015-16 with the motto of ‘Har Khet Ko Paani’ for providing end-to end solutions in irrigation supply chain, viz. water sources, distribution network and farm level applications.

Micro Irrigation technologies viz. drip and sprinkler irrigation not only helps in water saving, but also in reducing fertilizer usage, labour expenses, and other input costs and enhancing farmers’ income. With this technology, additional area can be irrigated with the same amount of water compared to conventional method of irrigation. In addition, water deficient, cultivable waste land and undulating land areas can easily be brought under cultivation due to ease of irrigation.

## India- PMKSY Budget (In Crores)

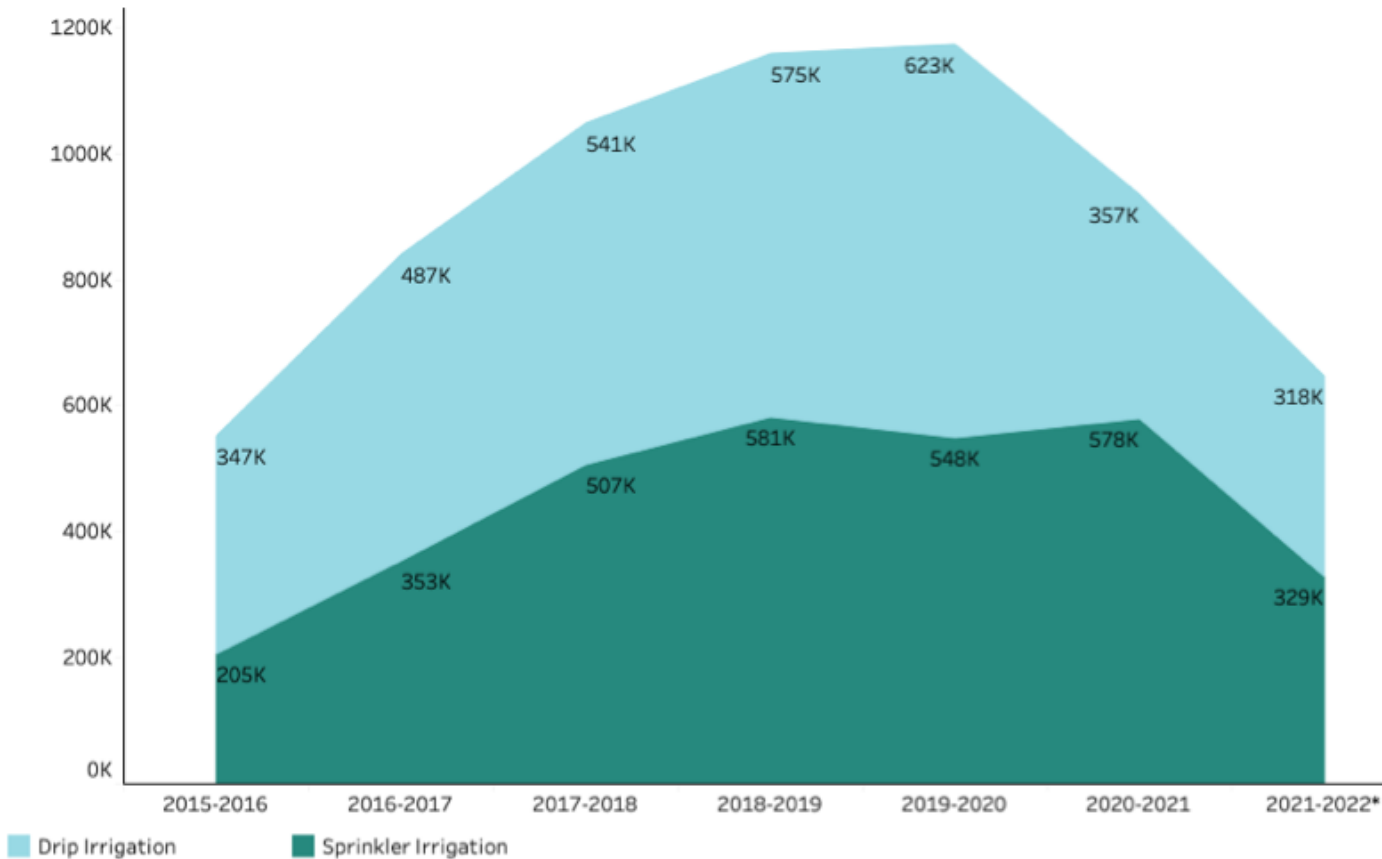


The budget for irrigation scheme has been approx. doubled from 2016-17 (2.34K Crore) to 2020-21(4.00K Crore).

Around 2-3 thousand crores of budget is being utilised from the allocated funds.

PMKSY- Pradhan Mantri Krishi Sinchai Yojna

## India - Area Covered by Micro Irrigation - By Types (In Hectares)

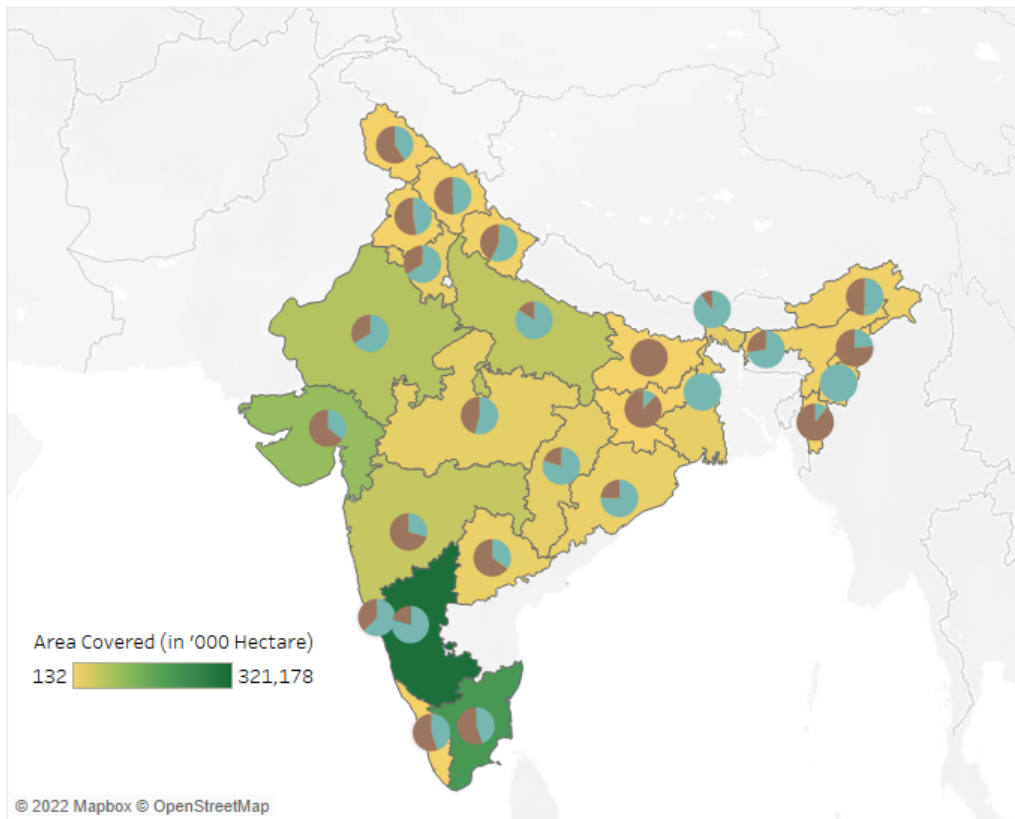


Area covered under micro irrigation was on rise from 2015-2020. However, since 2020-21, there has been a dip.

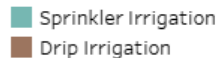
In 2019-20, ~1,171 thousand hectares of area was covered under micro irrigation.

Until 2019-20, area covered by drip irrigation has been slightly higher than the sprinkler type. However, from 2020-21, share of sprinkler irrigation type has been increasing.

## State-wise Area Covered under Micro Irrigation (2020-21)



Share of area under micro irrigation by types



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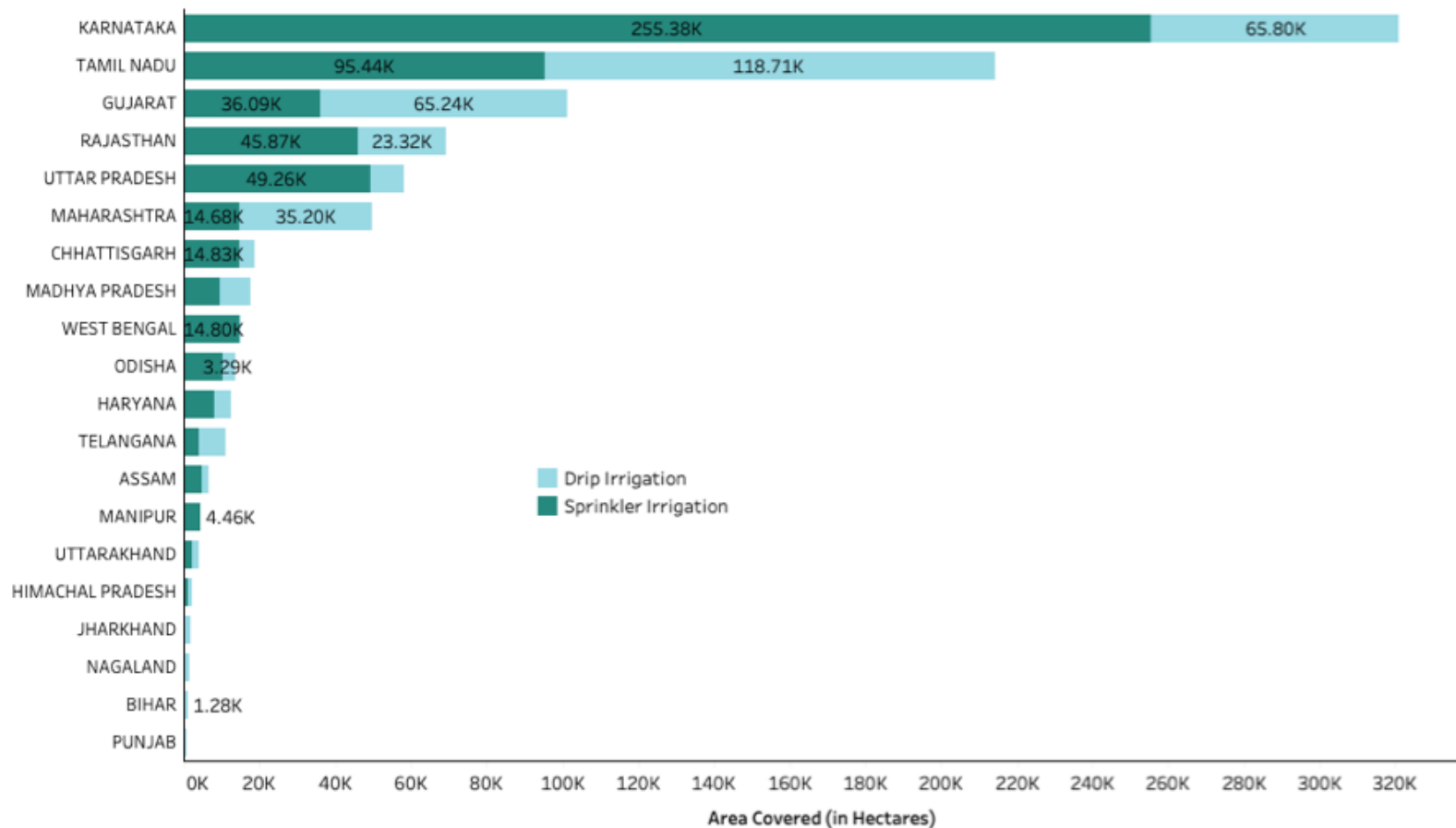
Note: Data not available for the missing states in the map

As of 2020-21, 34% of India's area covered under micro irrigation was in Karnataka.

More than 75% of Karnataka's area covered under micro irrigation is of type Sprinkler.

Drip irrigation is prominent in the states of Bihar, Jharkhand, Telangana, Maharashtra, Gujarat and North eastern states.

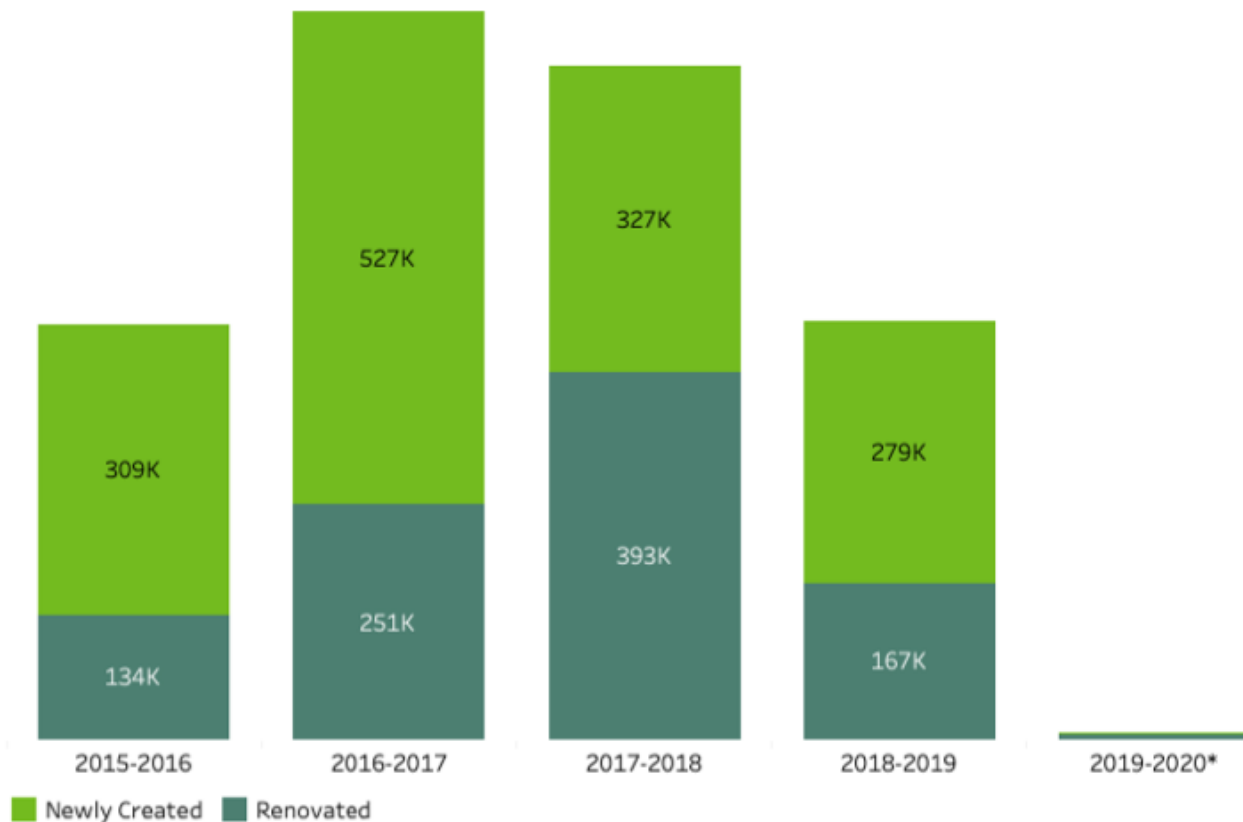
## Area covered under Micro Irrigation (Top States) - 2020-21



# Sustainable Agriculture in India

Infrastructure Development

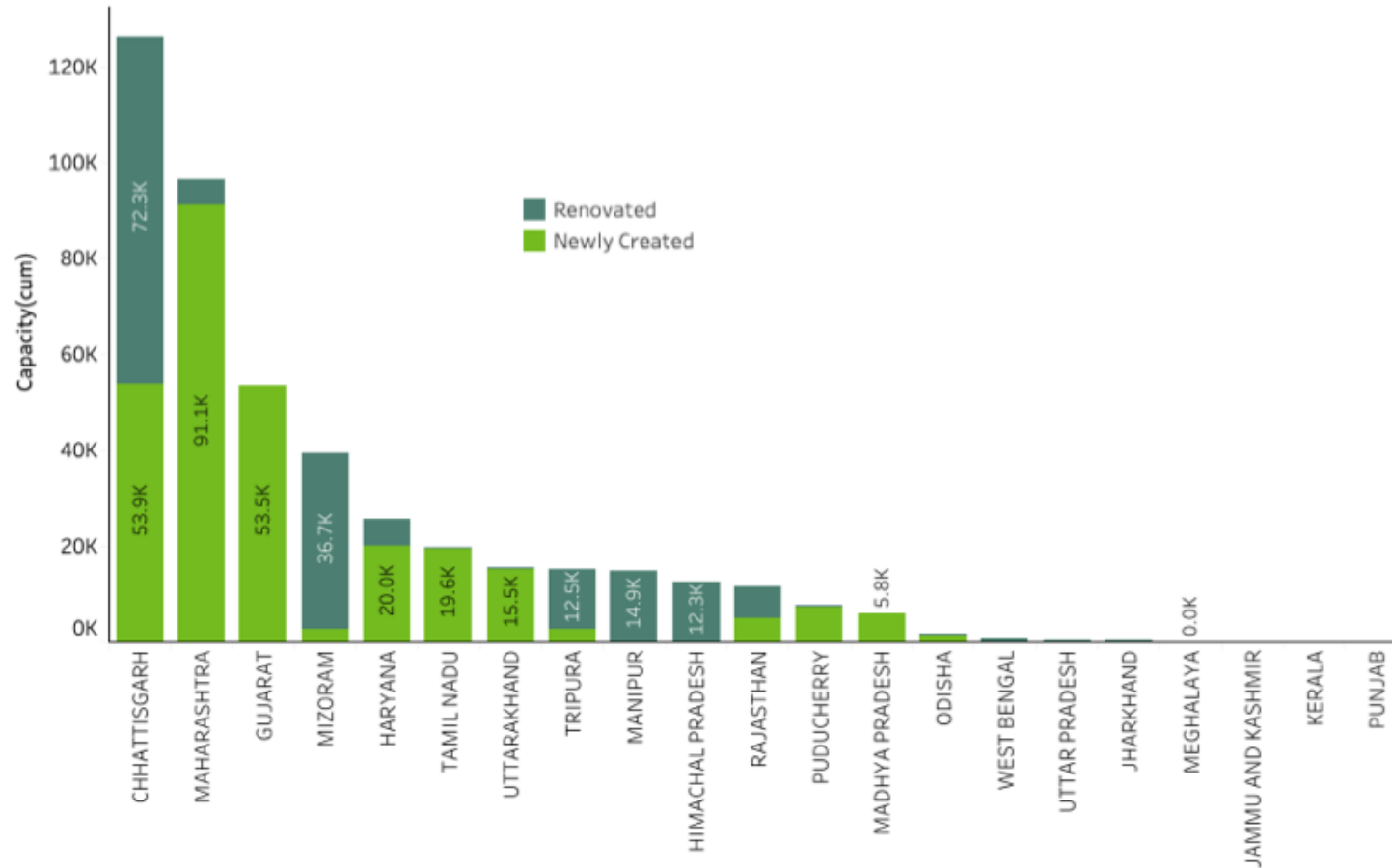
# India- Irrigation Capacity Development (Cubic Meter) 2015-20\*



Large share of capacity development for irrigation was newly created between 2015-17.

In 2017-18, more than 50% of capacity developed under irrigation infrastructure was of type renovation.

## Statewise- Irrigation Capacity Development 2018-19

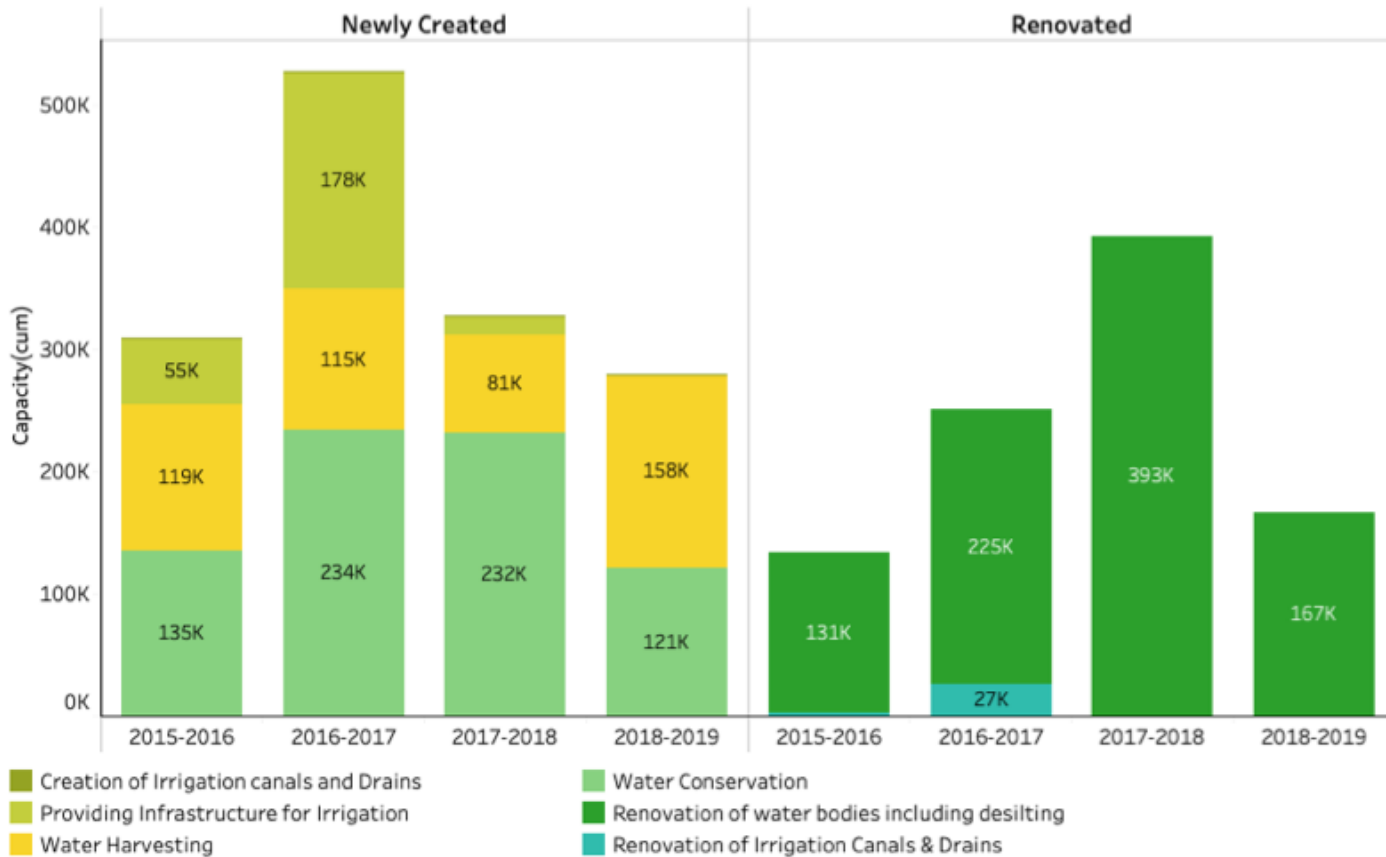


In the year 2018-19, most infrastructure for irrigation capacity building was developed in Chhattisgarh State.

New Structures were mostly developed in the Maharashtra State.



## India - Irrigation Infrastructure Capacity Development (in Cubic Meter) - by Category

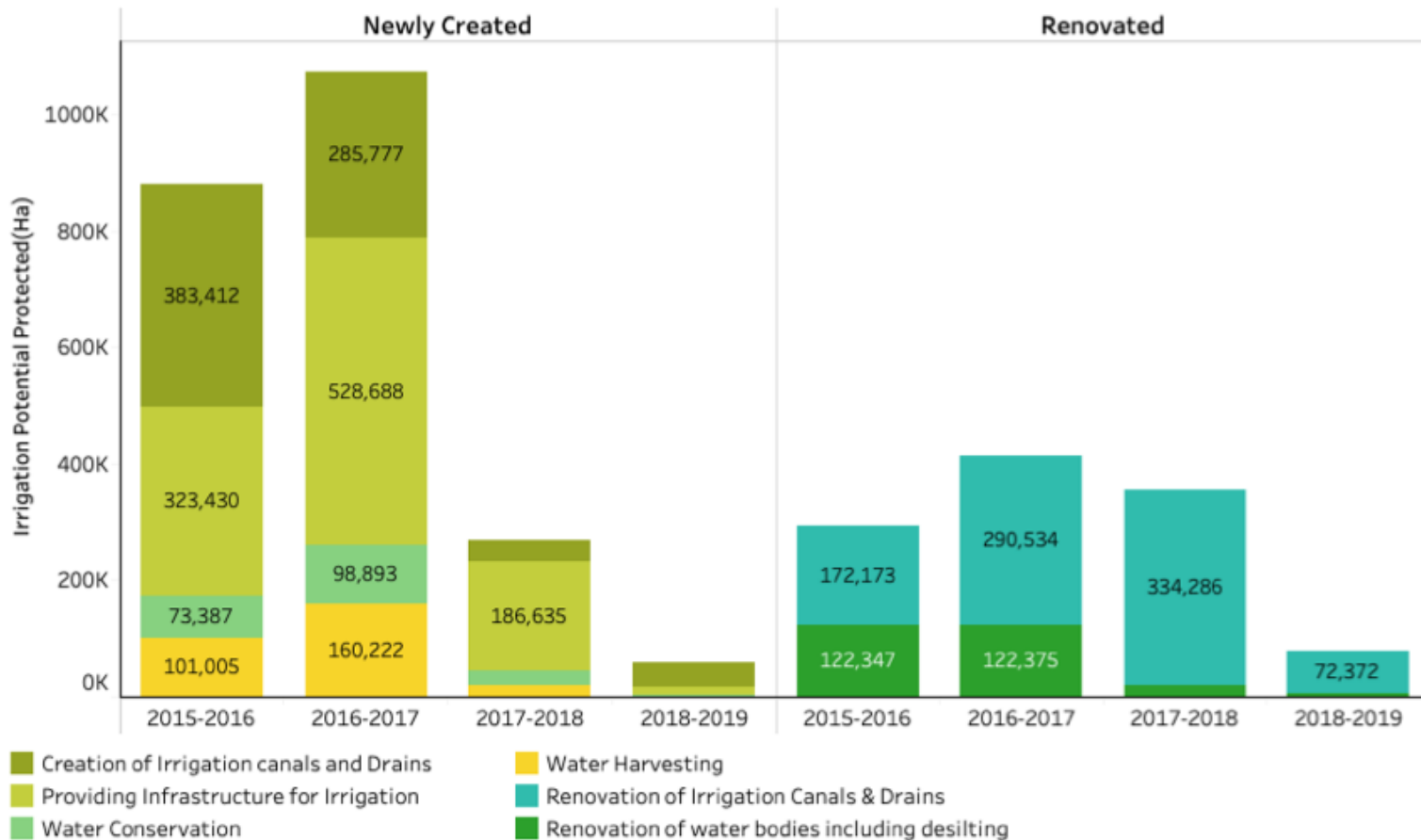


Largest infrastructure capacity development for irrigation happened during 2016-17.

For two consecutive years 2016-17 and 2017-18, large share of capacity development was for water conservation projects (~230 thousand cubic meters).

Most of the renovation development in 2017-18 was around renovation of water bodies including desilting.

## India - Irrigation Potential Protected Area (in Hectares) - by Category



Most of the development for irrigation potential protected area has been in creation of irrigation canals and drains and providing infrastructure for irrigation.

The renovation development has also been mostly in the renovation of irrigation canals and drains.

# Sustainable Agriculture in India

Watershed Development

# Watershed Development

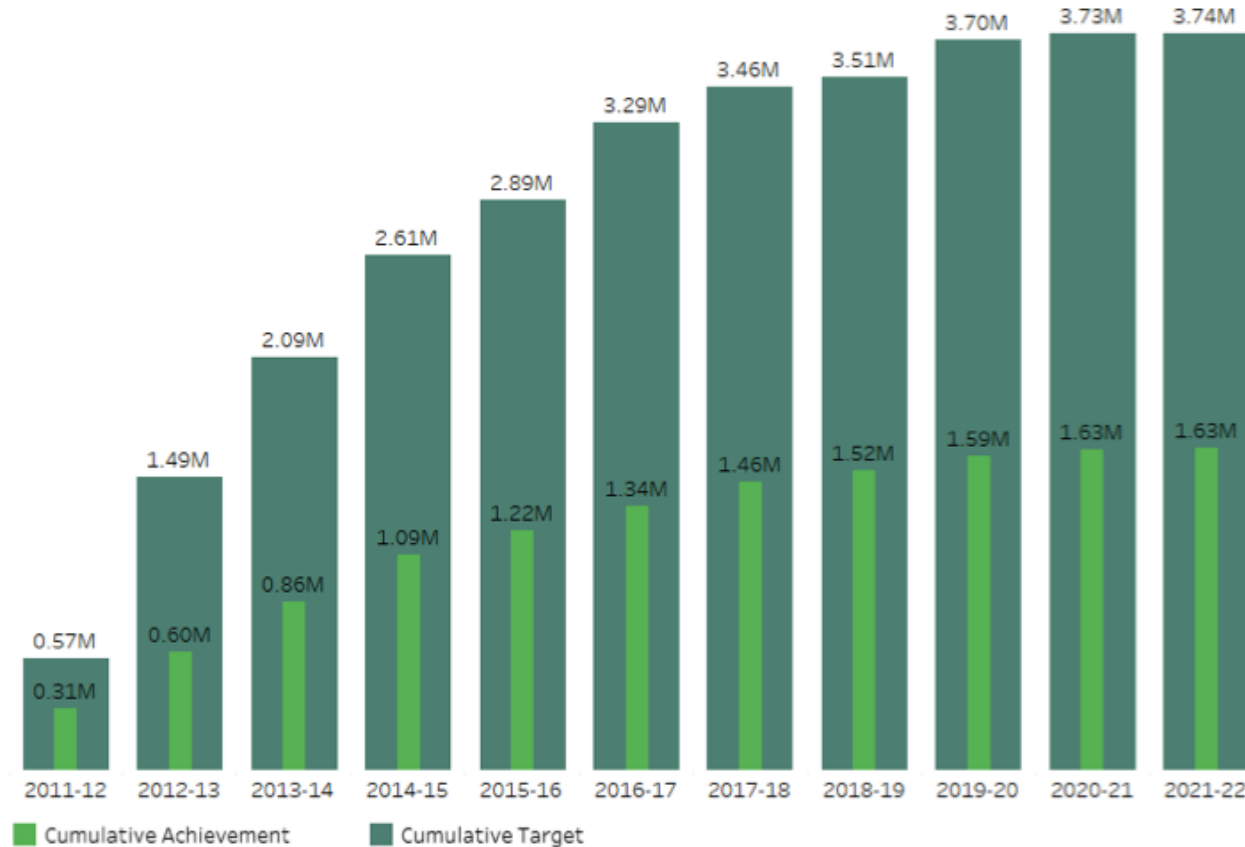
The main objective of the watershed development is to restore the ecological balance by harnessing, conserving and developing degraded natural resources such as soil, vegetative cover and water.

The outcomes of this are

- Prevention of soil erosion
- Regeneration of natural vegetation
- Rain water harvesting and recharging of the ground water table.
- Minimising over-exploitation of resources
- Wildlife preservation

Watershed development enables multi-cropping and introduction of diverse agro-based activities and also provide sustainable livelihoods to the people residing in the watershed area.

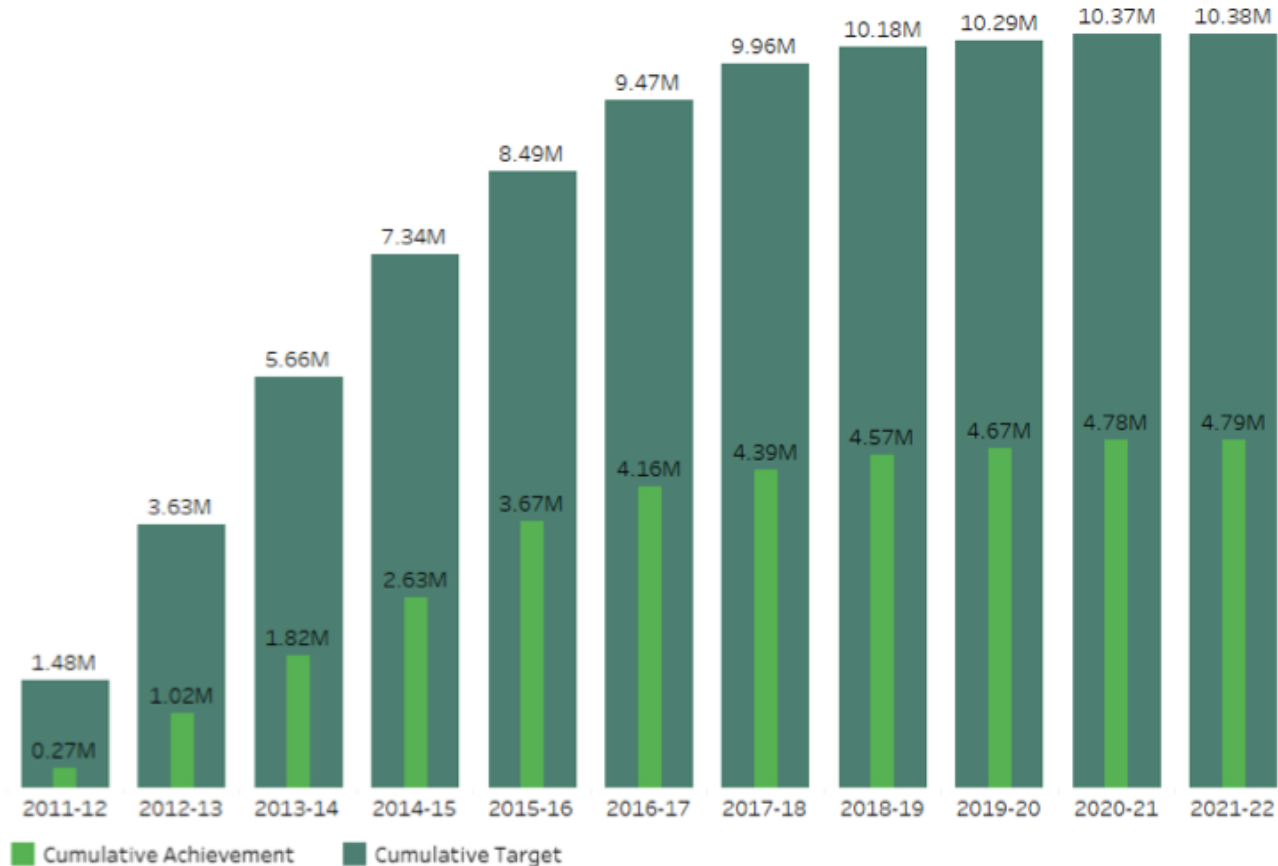
## Land Development for Watershed Development in India (in Hectares)



The cumulative target for the land development for the watershed development increased from 0.57 Million Hectare in 2011-12 to 3.74 Mn hectares in 2021-22 (more than 500% increase)

Achieved target has been consistently less than 50% across the years.

## Soil and Moisture Conservation for Watershed Development in India (in Ha)

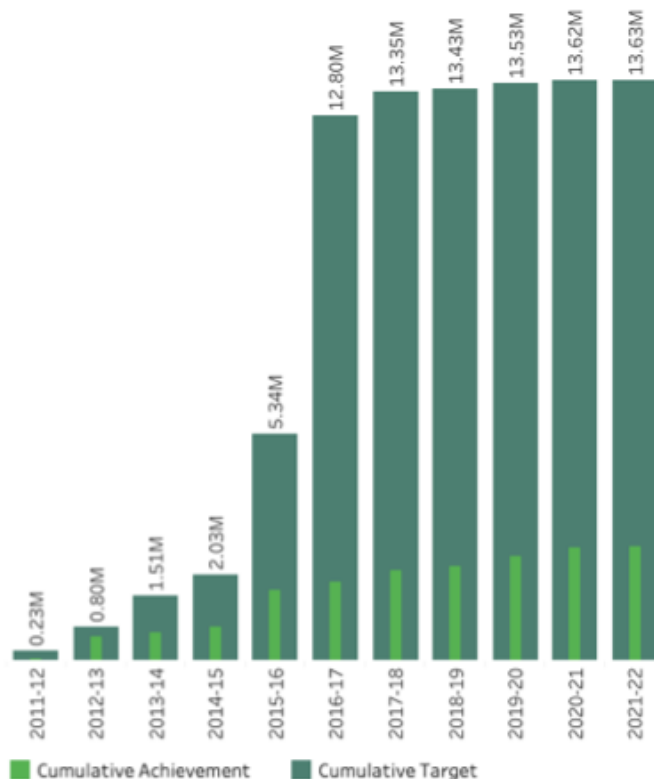


While the cumulative target for the Soil and Moisture Conservation for the watershed development increased from 1.48 Million Hectare in 2011-12 to 10.38 Mn Ha in 2021-22 (7 fold increase), the achievement has been around 50% of the set target.

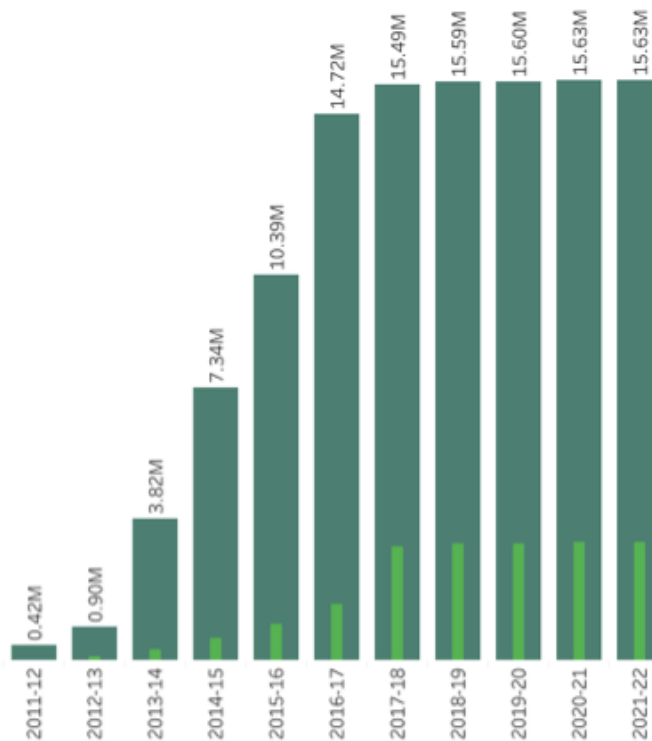
## Water Harvesting Infrastructure for Watershed Development in India (In Numbers)



### Newly Created



### Renovated



Till 2021-22, only 2.67 million structures has been completed out of the target of 13.63 million (~20%) in the newly created infrastructure.

Similar share (~20%) were renovated - 3.18 million renovated out of the target of 15.63 million.

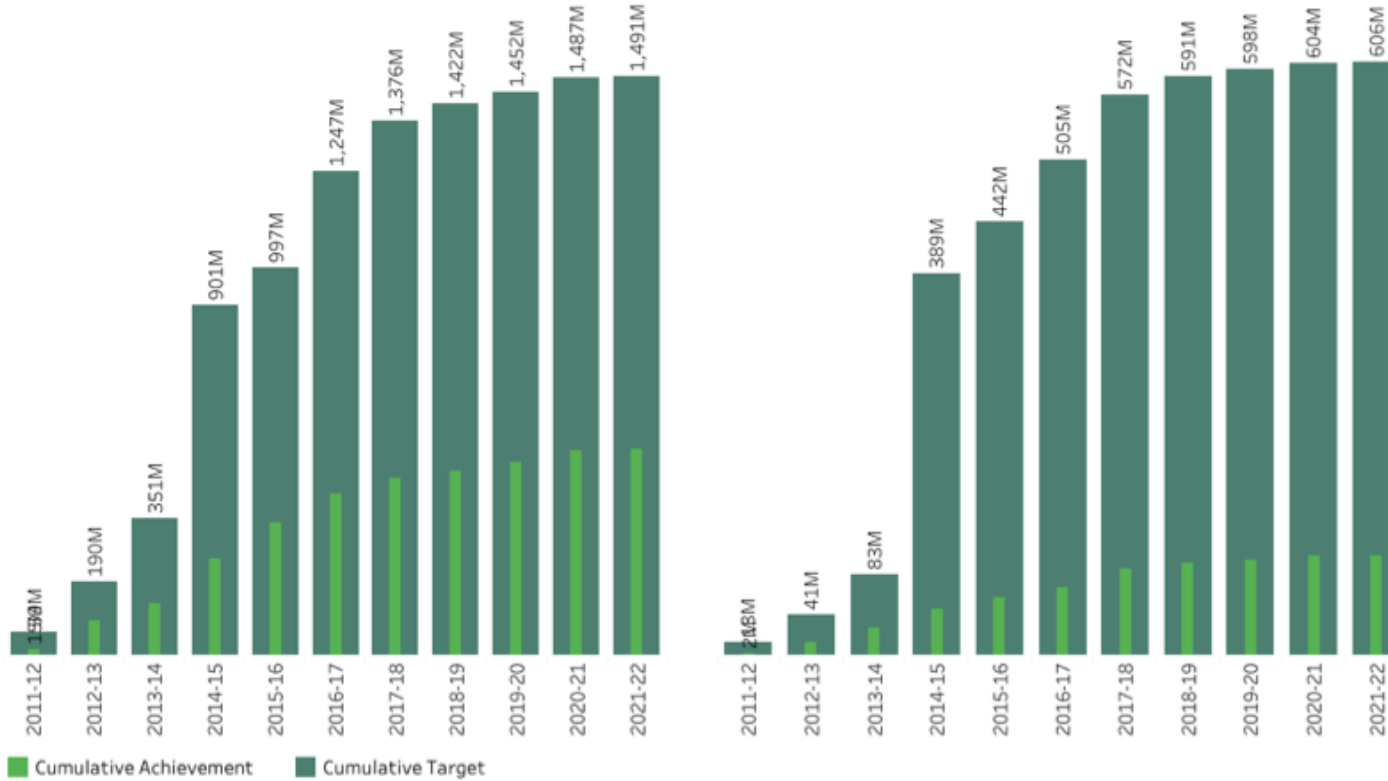
The targets for both newly created and renovation of structures were on upward trend until 2016-17. Post that the targets have been pretty constant.

# Water Harvesting Structure Capacity Developed in India (in Cubic Meters)

## Newly Created

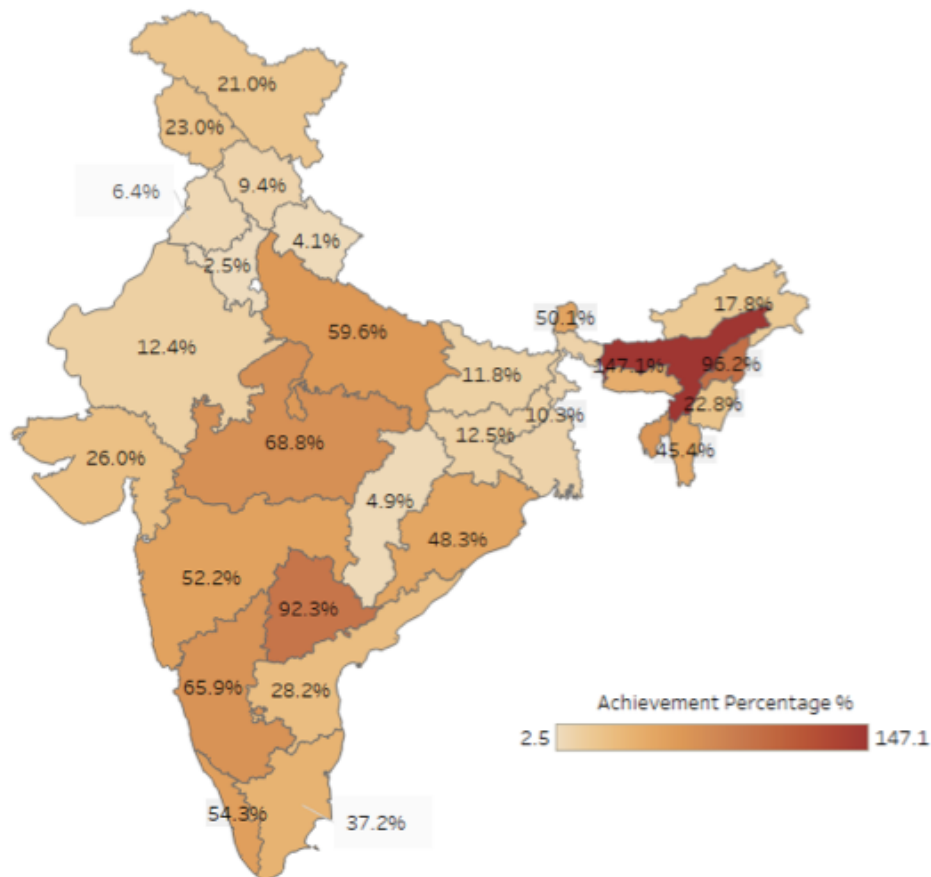
## Renovated

Only 1/3<sup>rd</sup> of the set target of newly constructed structure development has been achieved for water harvesting and only 1/6<sup>th</sup> of the target has been achieved under the renovation type.





## State-wise - % Achievement of Land Development for Watershed Development (2021-22)

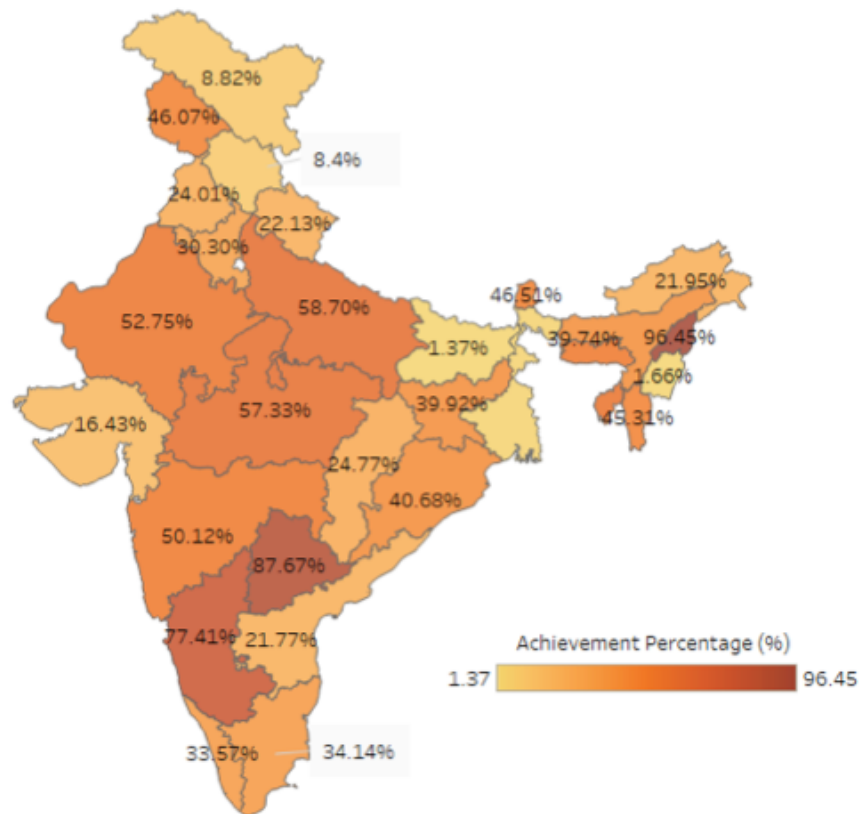


As of 2021-22, Assam has achieved more than the set target (147%).

Telangana is also close to achieving the set target (92.3% achieved).

The least has been in Haryana (2.5%).

## State-wise - % Achievement of Soil and Moisture Conservation for Watershed Development (2021-22)



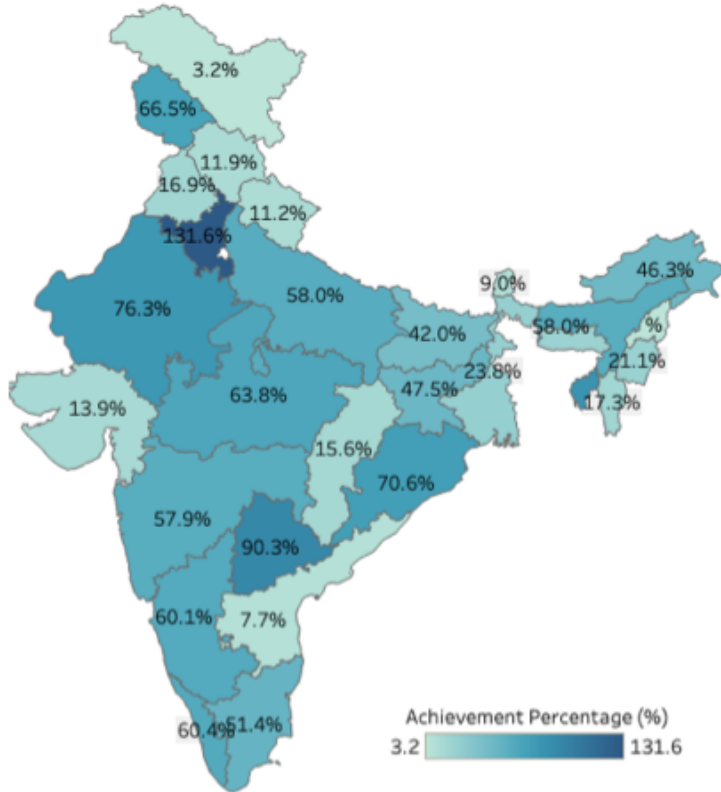
As of 2021-22, Nagaland was able to achieve 96.45% of its set target for soil and moisture conservation under watershed development.

Other top states included Telangana (87%) and Karnataka (77.41%).

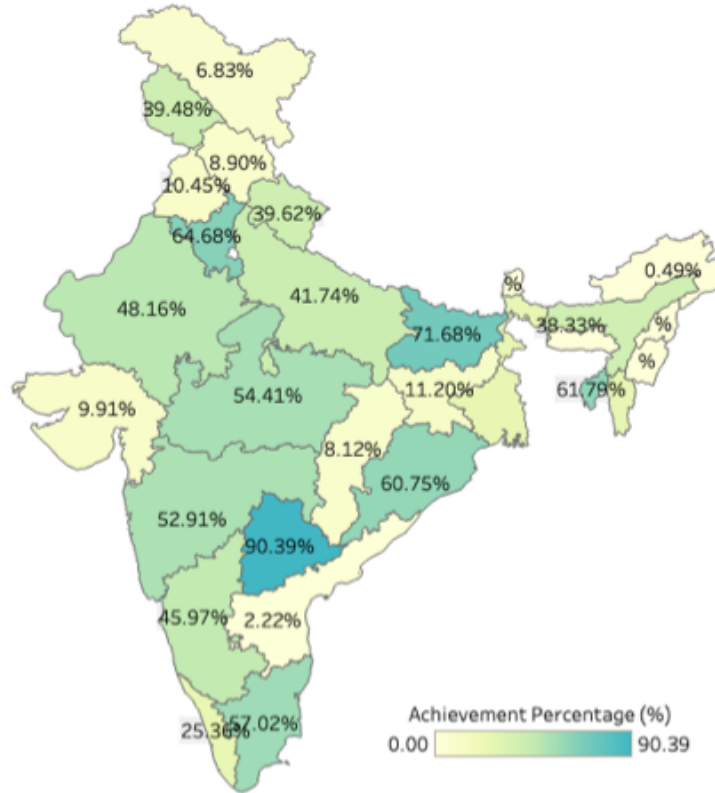
The least coverage was in Bihar.

## State-wise - % Achievement of Water Harvesting Structure Development (In Cubic Meters) (2021-22)

### Newly Created



### Renovated



In the water harvesting structure development, Haryana exceeded it's set target - 131.6% achievement in newly constructed development.

Under renovated type, Telangana topped with 90% achievement and Bihar with 64.68%.



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