बिहार सरकार

Building Climate Resilience of East Champaran

2023

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FOREWORD

Shri Saurabh Jorwal, I.A.S.
District Magistrate,
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I congratulate Team ASAR for this analysis of the implementation of the Jal-Jeevan-Hariyali Mission in East Champaran District. This comprehensive report highlights the path taken by the government, local communities, and various stakeholders to build resilience in the face of a changing climate that poses numerous challenges.

Recognizing the urgent need for a comprehensive solution, the Government of Bihar has launched the Jal-Jeevan-Hariyali Mission, an ambitious, multi-pronged approach to ensure that the people of Bihar are well equipped to combat the vagaries of climate.

This report highlights the planning, efforts, and collaboration that led to the successful implementation of the Jal-Jeevan-Hariyali mission in the district. It highlights the various strategies, innovative approaches, and results achieved during this process.

This report may be useful to administrators and development practitioners seeking to build equitable and sustainable climate resilience.

I express my sincere appreciation to all the individuals, organizations and institutions that have contributed to this remarkable achievement. The unwavering commitment, collective action, and resilience of the people of East Champaran District are a shining example to follow.

PREFACE

Shri Sameer Saurabh, I.A.S.
Deputy Development Commissioner,
East Champaran District

Climate change has become an undeniable reality, manifesting as erratic rainfall, water scarcity, extreme heat, and flooding. Being a predominantly rural agrarian economy, the vulnerability due to these extreme weather events is palpable in East Champaran. The District Administration, being acutely aware of the mounting challenges and its implications on people's lives and livelihoods, has taken bold and transformative steps to safeguard communities and ecosystems. Implementing Bihar Government's visionary Jal Jeevan Hariyali Mission, which is multi-dimensional in its approach encompassing both adaptation and mitigation strategies further bolstered our on-going efforts.

Faced with the twin challenges of drought and flooding, the key to building climate resilience in the district is to ensure water security, especially for the rural community which relies heavily on agriculture for their sustenance. The district has therefore focused on water conservation, watershed management, and restoration of natural resources by setting up rainwater harvesting structures, building check dams, rejuvenating water bodies, and promoting afforestation. By adopting climate-smart agricultural practices, farmers and fisherfolk in East Champaran have been able to enhance productivity while reducing water consumption. Inclusivity has been a significant aspect of all the programmes, achieved by the active involvement of women through Jeevika.

The success of the Jal Jeevan Hariyali Mission in East Champaran can be attributed not only to the efforts of the district administration and government agencies but also in equal measure to civil society organisations, and, most importantly, the active participation and ownership of the local communities.

This publication provides an in-depth exploration of the initiatives taken by the District Administration towards building climate resilience. It offers valuable insights, best practices, and lessons learned from East Champaran's journey in this direction. It is our hope that these experiences will inspire and guide other regions grappling with similar challenges and serve as a blueprint for building climate resilience and transforming lives.

INTRODUCTION

About East Champaran

The historic district of East Champaran was carved out of the erstwhile Champaran District in 1971. According to the district gazetteer, 'Champaran' is derived from the words 'Champaka-aranya', meaning champaka forest. It is believed that the tracts of land along river Gandak, the lifeline of this district, was covered with forests of the fragrant chamapaka tree *(Magnolia champaka)*.

Geography

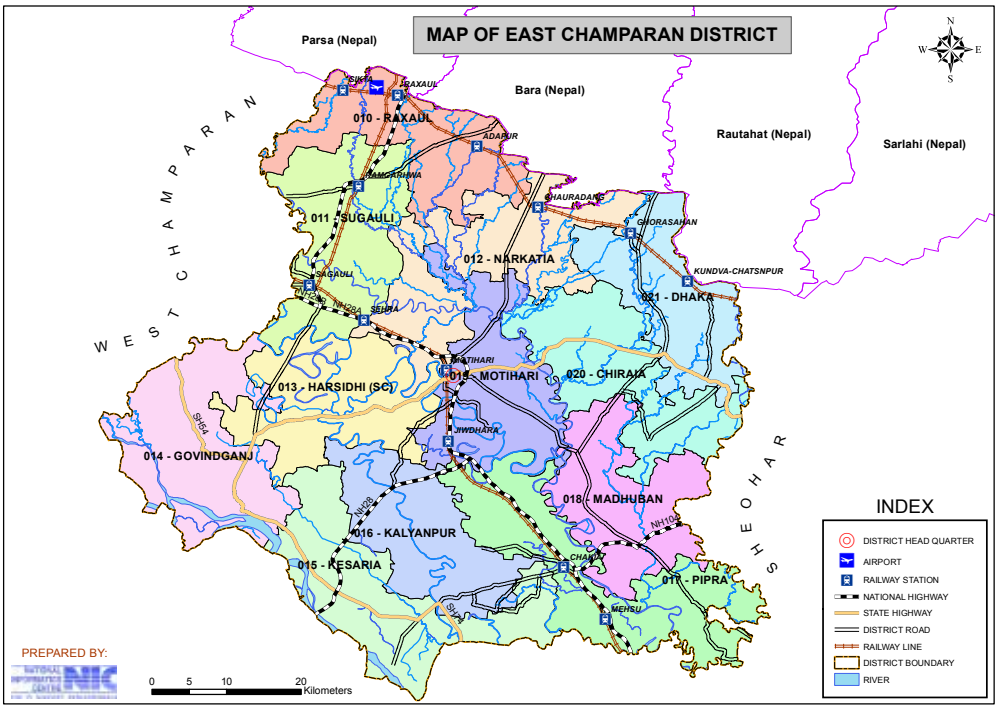
East Champaran, with its headquarters in Motihari, is located in the North West of Bihar, in Tirhut Division. It lies between N 26°15'10" and 27°01'30" and E 84°30' and 84°17'50" covering an area of 3,968 Km^2.

The north of East Champaran is bounded by Nepal. The district has six sub-divisions and 27 blocks. The district boundaries, administrative divisions, and major roads and railway lines are depicted in the map.

Major rivers that flow here include Gandak, Sikarhana, Bagmati, Lal Bakaya, Tilawe, Kachhna, Motia, Dhanauti.

Demography

As per the 2011 census, it has a population of 5,099,371 (male: 2,681,209 and female: 2,418,162). The female sex ratio was 902 per 1,000 males (national average was 940 females per 1,000 males). Literacy rate stood at 55.8% with male literacy at 65.34% and female literacy at 49.31%.



Source: https://ceobihar.nic.in/PDF/District%20Map/EAST%20CHAMPARAN.pdf

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East Champaran's Climate Vulnerability

A report released by The Department of Science and Technology and Swiss Agency for Development and Cooperation in 2020 on climate vulnerability identifies Bihar has the fifth most vulnerable state with nearly 80% of the districts classified as highly vulnerable. Bihar is one of India's most flood-affected states which witnessed ten high magnitude floods from 1998-2019.

North Bihar's challenges are largely due to the snow-fed rivers that flow through the landscape, which renders the land more fluid than fixed. Most of North Bihar is prone to flooding during monsoon and river-beds constantly shift. Nearly 76% of Northern Bihar's population (5 crore people) are at risk due to floods. Fifteen districts are especially highly vulnerable and East Champaran is one of them. Summers too can be extremely harsh as the extreme heat can cause heatwaves.

This has direct adverse impact on food production and food security as Bihar is an agrarian state. Agriculture is a key sector which contributes to about 24% of the GSDP. Extreme weather events have a bearing on the local economy and also people's heath and wellbeing.

Jal Jeevan Hariyali Mission

Jal-Jeevan-Hariyali Mission can be said to be a comprehensive programme by Government of Bihar in tackling climate change. Even though the local administration has undertaken several other measures in response to the local challenges with locally available resources, the Jal Jeevan Hariyali Mission, has managed to creatively consolidate various efforts and schemes under one programme for better implementation and monitoring.

The mission was conceived in 2019 by the Government of Bihar in response to the growing challenges owing to climate change. It was implemented in Mission mode after it received a consensus from all parties in a joint meeting of both the Houses of Legislature.

The mission document states that this ambitious, multi-stakeholder programme aims to build climate sustenance, rejuvenate water bodies and make them pollution-free, maintain or improve ground water levels, ensure adequate water availability, promote climate resilient agriculture, implement energy conservation measures and promote climate awareness among people.

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The five specific objectives of Jal-Jeevan-Hariyali Abhiyan have been recognised as:

- To mitigate the effects of climate change and the challenges it poses.
- Development, conservation and rejuvenation of water harvesting sources.
- Adoption of weather-friendly crops and its rotation.
- Promotion of renewable energy.
- Increasing green cover.

Considering the multi-sectoral approach needed for the implementation of this comprehensive mission, nine departments have been identified. In most projects, there has been an involvement of more than one department. The Rural Development Department has been designated as the nodal department for coordination between various departments.

1. Electricity Department
2. Agriculture Department
3. Urban Development and Housing Department
4. Department of Environment, Forest and Climate Change
5. Department of Animal Husbandry and Fisheries
6. Building Construction Department
7. Minor Water Resource Department
8. Public Health Engineering Department
8. Rural Development Department

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There are eleven components under this scheme. Most of the components involve conservation and revival of water bodies, which is in tune with the unique challenges that Bihar faces both in terms of flooding and drought.

Component 1

Identify public water harvesting structures such as ponds / Ahar-pynes / streams and clear them of encroachment

Under this component, already existing water-harvesting structures such as ponds, ahar-pynes (traditional water harvesting structures), streams and canals are identified. The District Administration in coordination with the Revenue and Land Reforms Department implements this component. The process of making the water-harvesting structures encroachment-free has also been begun.

Component 2

Renovation and restoration of irrigation structures like old ponds, tanks, Ahar-Pynes

Several public water harvesting structures are in a state of disrepair and need to be renovated or restored. Recognising this need, renovation work of identified public waterbodies is being carried out by Rural Development Department, Urban Development and Housing Department, Minor Water Resource Department and the District Administration.

Component 3

Identification and restoration of public wells

Under this component, public wells which are overexploited or fallen into disuse for various reasons are identified and restored. This helps in conservation of water and recharge of ground water. Public Health Engineering Department, Panchayati Raj Department, Revenue and Land Reforms Department, Urban Development and Housing Department, District Administration and local public representatives are responsible.

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Component 4

Construction of new soak pits and water-harvesting structures near public wells, ponds, and tube wells

In order to hasten ground-water recharge, new soak pits, recharge pits and other water-harvesting structures are to be constructed near all public wells, ponds, and tube wells. The government has mandated the construction of water-harvesting structures near government/public hand pumps in rural areas using MNREGS funds.

People are also being encouraged to construct soak pits near private hand pumps. Rural Development Department, Minor Water Resources Department, Urban Development and Housing Department and Public Health Engineering Department are implementing this component.

Component 5

Construction of check-dams and restoration of natural water-bodies such as rivers and streams, especially in hilly areas

Recognising the need to conserve water in hilly areas where there is a lot of run off, the Jal Jeevan Hariyali Mission encourages the construction of check dams. There is also scope to restore natural water bodies such as rivers and streams. This component is being implemented by Rural Development Department, Minor Water Resources Department,

Department of Environment, Forest and Climate Change, and the District Administration. District-level committees under the chairmanship of the Deputy Development Commissioner have been constituted which will recommend the construction of check dams and water harvesting structures in non-forest areas.

Component 6

Transferring water from regions of excess water to water-scarce regions

Under this component, plans are afoot to create new water sources and transfer water from areas with surplus river water to water-deficient areas.

Rural Development Department, Department of Animal Husbandry and Fisheries, Agriculture Department, and the Minor Water Resources Department are responsible for implementing this component.

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Component 7

Construction of rain-water harvesting structures in buildings

Construction of roof-top rainwater harvesting structures have been mandated, especially for government buildings. Regulation and awareness for construction of roof-top rainwater harvesting structures in private buildings is also proposed.

This component is implemented by the Building Construction Department, Urban Development and Housing Department, Education Department, Health Department, and Panchayat Raj Department.

Component 8

Creation of nurseries and undertaking intensive tree plantation

Setting up of plant nurseries and intensive tree plantation is a major component of the Mission. Rural Development Department and Department of Environment, Forest and Climate Change are working in this direction. Jeevika has been entrusted the responsibility of procuring saplings from private nurseries set up specifically for this purpose by Jeevika Didis, members of women's SHGs.

Component 9

Use of alternative crops, drip irrigation, organic farming, and other techniques

Under this component of the mission, new techniques of agriculture and eco-friendly farming which require less irrigation are to be promoted. Special efforts are being made to promote organic farming.

For efficient use of water for irrigation, emphasis is being laid on drip irrigation. Awareness programmes for farmers are being conducted. This component is implement by the Agriculture Department.

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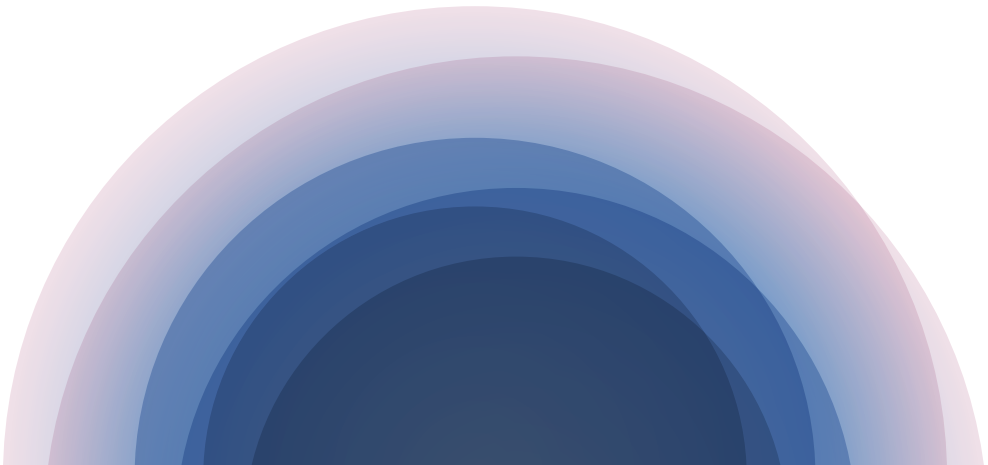
Component II

Awareness campaigns on the Mission

Awareness programmes are being organised by various departments at different levels. By adopting new and traditional methods of communication, the Information and Public Relations Department and all related departments are working on this component to bring awareness among the people on the environment and the need to protect it.

On 09 August 2019, on the occasion of Bihar Earth Day, the awareness program of Jal-Jeevan-Hariyali Abhiyan was launched by the Honourable Chief Minister. Various programmes such as meetings, workshops, tree plantation drives, oath-taking ceremonies, awareness rallies, film screenings, publicity art, painting competition, essay, debate competition, plastic waste cleaning campaign, signature campaign etc. were organised. Information, Education, and Communication (IEC) has been integrated into the execution of all components.



SOCIAL FORESTRY

Bihar's pioneering social forestry efforts have helped in creating a blueprint for increasing green cover, not just for the state but also for the country. Having lost most of the forested area to Jharkhand, Bihar's forest cover was abysmally low. Partly in response to this and partly to provide employment to flood-affected communities under MNREGA, large-scale social forestry programmes were taken up in North Bihar in 2009.

This programme further got a boost under Jal Jeevan Hariyali Mission. It can be said that in East Champaran, social forestry has been taken up on a war-footing. More than 30 lakh saplings have been planted in the district from 2019-20 to 2022-23. The plantation drive has been mainly done through Forest Department, MGNREGA and Jeevika. Owing to continuous efforts by the field level officers, workers and citizens, the survival rate of the trees has been quite high even in flood-prone areas which also helped raise confidence about such measures among people. In the current year, 6.95 lakh saplings have been planted under MGNREGA.

Plantations are taken up on a unit basis, with each unit comprising 200 saplings and employing 2 van poshaks (forest custodians) for the upkeep of the saplings. The responsibility of a van poshak is to clear weeds around the saplings, water them when necessary and ensure they are protected from pests and livestock. Most of the van poshaks are Jeevika Didis. Wages are paid through MGNREGA and from Jeevika's funds. Most of the Van Poshaks earn about ₹1,600 to ₹2,600 per month (₹1,600 per month from MGNREGA @₹210 per day and ₹1,000 from Jeevika)

SOCIAL FORESTRY

Case Study

As part of studying the implementation of JJH Mission for this report, three project sites were documented in detail. In the following section, each of these sites have been discussed.

Areraj Block

Under the Jal Jeevan Hariyali Mission, 16,200 saplings have been planted along stream banks in Radia Gram Panchayat since 2021-22. In 2021-22, a total of 4,000 saplings (20 units) were planted and 12,200 saplings in 2022-23 (61 units). The site was selected keeping in mind not only the water availability for the saplings but also the safety of women since it is close to their village and can work together. Saplings of Arjun, Teak, Mahogany, Guava and Jamun have been planted. A total of 122 Van Poshaks are employed here.

Paharpur Block

In Purvi Sareya Gram Panchayat, planting has been done along roadsides and the banks of an existing pond. Here, a total of 26,000 saplings (130 units) have been planted since 2019-20. Both fruit trees and timber trees have been chosen. For the upkeep of the saplings, 260 van poshaks are employed. The saplings have now grown to a height of more than 5ft.

SOCIAL FORESTRY

Harsiddhi Block

In Beriya-Dih Gram Panchayat, plantations have been taken up along a river bank. This is a relatively new project which started in 2022. A total of 1,200 (6 units) saplings of Jamun and Arjun have been planted. Currently this plantation employs 12 vanposhaks. Women, especially widows, Dalits and those belongings to marginalised sections are employed here. This five-year project is envisaged to provide 1,954 person-days of employment. A total of ₹6,92,512 has been budgeted with ₹4,10,668 for workers and ₹2,81,744 for materials.

Didi ki Paudhshala

Bihar Government has come up with several innovative ways to involve Jeevika in the social forestry programme at multiple levels. As mentioned in the previous section, most of the van poshaks employed to care for the saplings are members of Jeevika. Another significant contribution of Jeevika towards the social forestry programme, especially in Jal Jeevan Hariyali Mission has been to supply saplings from nurseries raised by the SHG members. An SHG member is normally referred to as Didi (elder sister) and this project, jointly managed by the Department of Environment, Forest and Climate Change and Jeevika, is referred to as 'Didi ki Paudhshala'

In East Champaran, the JJH Mission procured saplings from a total of 43 nurseries, of which 35 were owned by Jeevika Didis and 8 by the Forest Department. Didis have raised 7,05,000 saplings for the government and about another 9 lakh saplings for selling. Saplings are a mix of different species but 50% are fruit trees and 50% are timber trees. They have a survival rate of about 80%. Didis have earned a total profit of about ₹1.07 cr.

SOCIAL FORESTRY

Reshmi Devi's Nursery

One of the most successful nurseries in the district belongs to Reshmi Devi of Balua Village, Mahua Gram Panchayat in Chakia Block. She has been an active member of Jeevika and a mobiliser for the SHG since Feb 2014. The SHG she heads has about 300 other members.

She, along with her husband, worked as daily wage labourers in Gujarat earlier. When their three sons and a daughter had to be schooled, they returned to Bihar so that they could be educated in their native language. Due to lack of work opportunities, Reshmi Devi started selling knick-knacks from a very small shop, barely 10 sq ft, outside her house.

Since 2020 Reshmi Devi, with the help of her family, has raised a nursery to supply saplings to the Government as well for selling to individuals. On their 2 acre of land, they have dedicated about 0.3 acres (10 *katha*) for the nursery. For the initial investment needed to buy raw materials, she got loan for 1% interest from Jeevika. For the JJH mission, she is required to raise 30,000 saplings within six months. Jeevika buys back these saplings which are 6 inches tall at the rate of ₹20 per sapling. She makes a profit of about ₹5 to ₹7 per sapling. Even though Reshmi Devi takes the lead in this operation, her entire family is involved in raising the nursery and selling the saplings. They continue to have a shop, which is now much bigger. She also raises saplings for the Forest Department, which procures once in two years.

WATERSHED MANAGEMENT

Of the eleven components of Jal Jeevan Hariyali, seven are dedicated to the conservation of water resources or for watershed management. This includes, but not limited to, identifying and renovating public water harvesting structures, constructing rain-water harvesting structures, and construction of check dams.

The District Administration of East Champaran has undertaken several measures for watershed management by creating water assets on a large scale, which are augmented by awareness campaigns on water conservation.

These measures are implemented through JJH Mission with convergence of various other government schemes such as 'Catch the Rain', Amrit Sarovar Scheme, Jal Shaki Mission, MGNREGA, Pradhan Mantri Krishi Sinchayi Yojana, etc. Jeevika, the women-led SHGs, has been recognised as a water user group in the newly constructed Amrit Sarovars in the district, thus enabling them to play an active role.

Table 1: Number of completed projects under watershed development

Type of Project	Numbers Completed
Restoration and rejuvenation of public water bodies such as Ponds/Tanks/Aahars/Payeens	1,563
Renovation of public wells	1,461
Construction of soak pits/recharge pits and other water conservation structure near public wells and hand pumps	1,801
Construction of check dams and water conservation structures near small rivers	50
Construction of new water Resources such as farm ponds	1,490
Roof Top Rain-Water Harvesting Structure	275
Adaptation of alternative agriculture, drip irrigation bio-farming and other new techniques	383

This table is illustrative of the scale of the works that have been undertaken in the district.

WATERSHED MANAGEMENT

Mapping and Identification of Waterbodies

The first component of the JJH Mission is to identify public water bodies and make them free from encroachment. In East Champaran, waterbodies have been mapped, geotagged and the details have been entered into portals of Catch the Rain and Jal Jeevan Hariyali Abhiyan.

A total of 4,208 water bodies have been geotagged, among which encroachments were found in 686 structures. A total of 626 structures have been made encroachment-free and have been entered in revenue records of the district. Revival of 1,750 water bodies have been completed. So far details of 374 water bodies have been entered in Catch the Rain portal in the year 2022-23.

At the District Jal Shakti Kendra Motihari, inventory of water bodies is maintained and updated regularly.

WATERSHED MANAGEMENT

Restoration of Ponds: Pratyek Gram Me Ek Talab

The Bihar Government, under a scheme called Pratyek Gram Me Ek Talab (A pond in every village), is encouraging either creation of public ponds or rejuvenation of existing ones. Funds are obtained from various sources such as MGNREGA, MLA's Local Area Development Funds, and wherever feasible, the Central Government's Mission Amrit Sarovar. In East Champaran, a total of 315 ponds have been rejuvenated under this programme.

Dakshai Chapra Bahas Gram Panchayat, Sugauli Block

The restoration of a pond in Dakshai Chapra Bahas Gram Panchayat in Sugauli Block is an example of public work that has been done keeping in mind the interests of multiple stakeholders.

The pond is located between a National Highway and a railway track. It is an old pond that was restored by carrying out about 5.5 ft of desilting. About 400 saplings were planted along the banks comprising fruit trees such as Jamun, Mango, Bael, and timber trees such as Ashok, Mahogany, Poplar, Arjun, Seesham, & Semul (Silk cotton).

On one side of the bank, leading from the entrance, a walkway has been created by paving interlocking tiles without concrete in order to allow for people to use this walkway and at the same time allow percolation of rainwater.

WATERSHED MANAGEMENT

Benches too have been provided for visitors to rest and relax. Being located in a flood prone area, flood water is regulated with inlet-outlet pipes as mandated by Central Government's Amrit Sarovar Scheme. The pipes are netted in order to prevent the fish from escaping. Water in the pond never dries but the level depends on how much water is pumped in the surrounding farms. A gate at the entrance, boating and further beautification is also planned in order to promote local tourism.

Apart from agriculture and fisheries, since restoring the pond, several groups of stakeholders have started using it. It is used by local villagers as a picnic spot, for resting and for morning walks both by local men and women.

Chhath pooja is one of the most important festivals in Bihar during which the rising and setting sun is worshipped, mostly by women, by making offerings while standing in water. Water bodies, therefore, have a significant cultural importance. Keeping this in mind, the administration has made provisions for carrying out these rituals. There are plans to construct changing rooms for women.

The paved walkway is used by wedding parties for some of the rituals and for resting. Some communities marry a mango tree with mahua tree as part of the wedding ceremony. Both the trees have been planted side by side in order to facilitate this ritual.

Being located on the highway, several truck drivers use the shaded areas for resting.

The pond has also been used for shooting several Bhojpuri songs and reels, especially by the youth in this region.

Mirpur Village, Chiraiya Block

In Mirpur Village in Chiraiya Block, an overgrown pond in a flood-prone area has been restored. This pond has paved pathway and concrete steps on all sides. MLA's LAD funds have been utilised for restoration. A marble statue of Mahatma Gandhi has been installed for the purpose of beautification. Four Vanposhaks have been appointed for the upkeep of the pond.

Planting of both fruit trees and timber trees along the bund started in 2021. An existing Ficus species, which is worshipped by some communities has been preserved. Concrete platforms have been constructed around some of the larger trees. Compared to the pond in Sugauli, this pond is more concretised.

WATERSHED MANAGEMENT

Role of Jeevika

Jeevika didis have been entrusted with the upkeep of both ponds. They nurture the trees and keep the surroundings clean. They also manage crowds, especially wedding parties and ensure that they don't litter the ponds. Wages for Jeevika Didis are from MGNREGA funds.

WATERSHED MANAGEMENT

Restoration of Motijheel

Motijheel is a natural oxbow lake located right in the middle of Motihari Town, the district headquarters of East Champaran. It is about 277 sq km and fed by Dhanauti river and Budhi Gandak river. In 2022, a total of 108 encroachments that were blocking the feeder canals from the two rivers were removed. Apart from this, water hyacinth that had overgrown due to eutrophication was removed using machines that were specially procured for this purpose. Desilting was also carried out. Pathways were renovated or newly laid, and proper lighting was installed wherever required. Floating fountains that served the dual purpose of oxidising the water as well as beatification were also installed. The excess water from the rivers during the monsoon of 2023 is expected to replenish the water levels in the lake. Like the restoration of other water bodies, the cultural and other uses have been incorporated into the planning and execution of lake restoration. Here too, provisions have been made for religious use during Chhath Pooja. Apart from this, the rowing club has been revived. At the time of field visit to collect information in February 2023 for this report, a group of boys from surrounding towns and cities, including Patna who were practicing water sports to represent Bihar in various National-level games were seen practicing here.

WATERSHED MANAGEMENT

Construction of Check Dams

One of the components of the Jal Jeevan Hariyali Mission is the construction of check dams, especially in hilly areas. Since East Champaran's landscape is largely flat, the scope to construct check dams is much reduced. However, in Shivnagar Gram Panchayat, a check dam was built in 2019-20. The cost of the project was ₹19,64,002. Two blocks, Ramgarwa and Adapur, have benefited from this project.

There was pressure from the local people for the construction of this check dam. Recognising the need for it and responding favourably to the demands, the local administration including the MP, MLA and local leaders got involved in the construction.

There have been multiple benefits from the construction of this check dam. Water is being used for irrigation by farmers of both the blocks, who largely cultivate rice and wheat.

Being located in a flood-prone area, the check dam also helps in controlling flooding.

However, as testified by the villagers themselves, the most important benefit of this project has been to provide all-weather connectivity to villages in Adapur block, which would otherwise be completely cut off for 3-4 months during the monsoon months due to flooding.

WATERSHED MANAGEMENT

River Restoration

As mentioned in the first section, the district of East Champaran is endowed with several rivers such as Gandak, Budhi Gandak, Sikrahna etc. Channels from these rivers such as Pasah, Dudhaura, Dora, Dhanauti feed several oxbow lakes (locally known as Mans), ponds, and canals. These rivers, which originate in the Himalayas, bring with them immense quantities of silt and sediments which settles in the water bodies, leading to floods every year, which often have devastating effects on human lives and property.

In order to tackle this situation and break the vicious cycle, the District Administration, has come up with a comprehensive programme for rejuvenation of rivers such as Dhanauti, Pasah, Dudhaura, Tilawe, and Dora. Smaller projects were also taken up at Sugauli, Banjariya, Ramgarhwa and Chauradano blocks through MGNREGA to protect embankments of the rivers and clearing their flood plains. The strengthened embankments are now being covered with intensive plantations to contain soil erosion. The District Administration's special drive to clear and protect 10 km stretch of Dhanauti river at Banajariya and Turkauliya blocks and 8 km flood protection work at Sugauli block is worth mentioning.

Subsequently, large-scale river rejuvenation works have been taken up through water resource department. At Adapur block, the course of two rivers Pasah and Marudhar has been connected to manage excess floods of Pasah river, thus providing relief to surrounding villages.

WATERSHED MANAGEMENT

A Note on Fisheries Management by Matasjeevi Sangh

The Jal-Jeevan-Haryali mission has turned out to be a boon for the fishermen's community in Motihari. Hundreds of ponds and small waterbodies, rejuvenated by the district authorities, are not only helping the villages check the groundwater depletion, but are ushering in prosperity for the fishing community.

A district which relied on supply of fish from other states to meet the daily consumption need, is now selling its fishes to other parts of the state due to the state government's initiative to promote fisheries.

"Until about five years ago, markets were flooded with fishes from Andhra Pradesh and West Bengal. But, thanks to the state government's initiative to promote fisheries by doling out incentives and reviving the dying water bodies, fishermen's community are doing good business," said Mohanlal Sahni of Samgrampur village

The Matasjeevi Sangh or the fishermen's cooperative societies have played a significant role in transforming the economic condition of the community that is dependent on the fishery and hatchery business. The fishermen's cooperative societies are duly elected bodies, through which the district authorities manage about 1,200 ponds and waterbodies developed for fisheries under the Jal-Jeevan-Haryali mission. These waterbodies are spread over an area of about 5,084 hectares. This is apart from the ponds dug on the private land and used for fisheries by individuals.

WATERSHED MANAGEMENT

There are a total of 27 fishermen's cooperative societies in the district. Each society has one president, one secretary and 11 executive members. Every society is reconstituted at an interval of five years. Elections are conducted to elect new president or secretary in case of an unexpected vacancy. These cooperative societies are also associated with the state-level fishermen's cooperative society, headquartered at Patna, for technical support or attaining training about new technology in fisheries and hatcheries.

The district authorities, on their part, offer grants or arrange hatchlings for the fishermen's cooperative societies in designated ponds. The hatchlings grow into full size over a period of one year. A pond spread in one acre area can yield around 4 tonne fishes every year. Besides other support from the district authorities, fishermen's cooperative societies also get input subsidy on fisheries.

Various initiatives taken by the district authorities to promote fisheries has yielded impressive results over the years. Fish production has been on the rise on the last three years in the district. The district has produced around 62,902 MT of fishes in 2020-21, which rose to 71,210MT in the next fiscal and 71,457MT in the 2022-23 fiscal year.

Similar to Matasjeevi Sangh, there is scope for other water users' association for every pond. In East Champaran, there are about 19 kinds of water user associations. This is an exemplary case of democratic management of commons, which has scope for a detailed study and replication in other states.

CONSERVATION

Guardians of Champaran

While there is immense value in creating new plantations, there is also a pressing need to preserve heritage trees, which provide multiple ecosystem services such as recharge of ground water, prevention of soil erosion and provide habitat for several species of beneficial insects, birds, and mammals. Many such trees are worshipped and are therefore, culturally significant.

It is in this context that the East Champaran District Administration under the leadership of the District Magistrate, undertook a flagship programme called 'Guardians of Champaran' to protect heritage trees in the district. Launched in June 2021, at least 14,337 trees which are anywhere from 50 to 400 years old were identified and protected under this programme. MGNREGA funds are utilised to undertake any work that might be required to protect the trees such as filling of soil to strengthen the roots, pest control or even constructing platforms to protect the trees. Each tree is protected and nourished by a committee of local villagers and representatives of panchayati raj institutions called 'samrakshak samiti' who take an oath to protect the trees and also address issues such as pest control or mitigate any other immediate dangers. As with other programmes, Jeevika plays an active role here as well. About one lakh Jeevika Didis have been identified to care for the heritage trees across the state and are part of the local samrakshak samiti. They are paid ₹400 per month as pension to care for the tree. Jeevika Didis regularly hold meetings under these trees.

A poster prepared for social media by the District Administration. On the occasion of Rakshabandhan, Jeevika Didis from different areas of the district tied Rakhi, drew Rangoli and also took oath to protect the Guardian Trees.

CONSERVATION

All the trees have been geo-tagged and information such as location, local and scientific names, age, and girth are available on the 'Guardians of Champaran' app, which can be freely downloaded from Google Playstore. There is also an option to 'adopt' heritage trees for anyone using the app. The programme has been popularised through social media such as Twitter and Facebook. On the ground, several programmes and significant days such as World Environment Day, Earth Day, etc are celebrated under the trees to bring awareness among the local people, especially the youth. Raksha Bandhan and Dahi Handi too are celebrated under the trees. Women tie rakhi to the trees as well and take an oath to protect them.

As shown in the table below, at least 21 species of trees are protected. Nearly all trees are important fruit-yielding, timber trees or of immense cultural significance. State support in protecting them can further encourage people to care for them. All the protected trees have an estimated stored carbon content of about 31,40,658 tons.

A poster prepared for social media by the District Administration. On the occasion of Rakshabandhan, Jeevika Didis from different areas of the district tied Rakhi, drew Rangoli and also took oath to protect the Guardian Trees.

CONSERVATION

Table 2: Total number of saplings of each species planted under the Guardians of Champaran Project and estimated carbon capture.

Species Name	Common Name	Number of trees	Est carbon content *(in tons)*
Aegle marmelos	Indian bael	47	4,212
Artocarpus heterophyllus	Jackfruit	68	10,163
Azadirachta indica	Neem	194	43,084
Bombax ceiba	Silk Cotton tree	243	43,047
Cocos nucifera	Coconut	37	4,733
Dalbergia sissoo	Indian Rosewood	53	11,207
Ficus benghalensis	Banyan	1,444	5,07,723
Ficus religiosa	Peepul / Sacred fig	5,729	16,68,839
Ficus virens	White Fig	1,832	5,90,126
Madhuca longifolia	Mahua	128	24,951
Mangifera indica	Mango	1,046	1,27,144
Neolamarckia cadamba	Kadam/ Kadamba	173	17,152
Phyllanthus emblica	Indian Gooseberry	32	3,050
Santalum album	Indian Sandalwood	2	69
Saraca asoca	Ashoka Tree	49	3,852
Shorea robusta	Sal	14	998
Swietenia sp.	Mahogany	13	2,796
Syzygium cumini	Jamun/ Java Plum	152	24,173
Tamarindus indica	Tamarind	35	7,971
Tectona grandis	Teak	67	6,662
Terminalia arjuna	Arjun tree	44	4,677
Others		319	34,032
Total		**11721**	**31,40,659**

Data Source: Mr Tarun Kumar Jha, Project Officer, Motihari

He continues to be worshipped by the villagers even today. The river is visited by nearly 10,000 people every year for Chhath pooja, who also rest under the tree. It also attracts several migratory birds including Sarus Crane. The village is well known for a local fish variety and fishing used to be commonly practised earlier.

The local youth very strongly believe that there is immense potential for promoting tourism in the village.

CONSERVATION

Banyan Tree at Sonbarsa Gram Panchayat

One such tree that has been afforded protection under this programme is a banyan tree that the locals believe is at least 400 years old. Located by the banks of a river in a very scenic village called Kauleshwar Maayi in Sonbarsa Gram Panchayat, the prop roots of this tree has spread over at least one acre.

The banyan tree provides habitat to several birds and animals. Migratory bees colonise the tree every year but according to the locals, their numbers are dwindling. The shaded area under the tree is used for public gatherings and even for weddings.

Culturally too, this village is significant because Babu Amar Singh, a freedom fighter who played a significant role in the 1857 rebellion is believed to have taken shelter in this village.

CONSERVATION

Afforestation

Bimalpur Forest, spread over 82.6 Ha, is today a picturesque landscape planted with trees of various species. However, until 2007—08, the entire area was barren without a single tree. Due to the silt brought in by the Budhi Gandak River, land was filled with loamy and sandy soil. In the year 2007 - 08, intensive tree plantation was taken up. A total of 80,000 saplings of mostly Teak, Silk cotton and Arjun tree were planted. Apart from these species, Boss, Khair and Acacia was also planted. Today, about 50,000 saplings have survived. This forest provides habitat to variety of wild animals such as wild boar, Nilgai, Jackal, and several species of birds. It is currently under the Motihari Forest Division and is the only forest land in the whole of East Champaran District.

RENEWABLE ENERGY

One of the components of the Jal Jeevan Hariyali Mission is to promote solar energy. However, the district administration, has successfully explored biogas as a form of renewable energy. Given that the district has a significant population of Yadav community, who traditionally raised buffalos for their livelihoods, biogas seems like a cheap, reliable, and decentralised form of providing energy security due to the availability of dung.

A biogas plant has been set up as a pilot in Machhargawa Gram Panchayat in Kotwa Block. The plant, known as Govardhan Gas Plant, has been in operation since its inaguration by the Chief Minister, Shri Nitish Kumar on February 15, 2023.

Currently, dung is purchased from about 70 farmers @ 50p/kg. The biogas plant produces 60-80 units of electricity per day. It is used to power street lights, sprinklers for about 6 acres around the plant, and 15HP to run the biogas plant itself (5HP dewatering and 2HP slurry tank). It has a 20 KVA generator

The biogas plant needs to be fed about 1500 kg of dung per day. It is capable of powering 25-30 houses consuming about 2 units per day.

The slurry that is generated from the biogas plant goes through a dewatering process in order to hasten the process of formation of compost. Dry compost is sold to the farmers. There are plans to bottle the slurry as well, which will be sold to the farmers as organic fertiliser.

The walls of the biogas plant have been decorated with Madhubani art with appropriate messages by local artists, which serve the dual purpose of educating as well as enhancing the aesthetics of the plant.

SOLID WASTE MANAGEMENT

In order to tackle the burgeoning problem of non-biodegradable waste that is polluting the soil, water and air, the Bihar government is setting up decentralised waste processing units (WPU) in different Gram Panchayats.

One of the WPUs that is currently fully functional in East Champaran is located in Champapur Gram Panchayat of Ramgarwa Block. The WPU was sanctioned under Lohia Swatch Bihar Abhiyan and inaugurated in June 2022. This Panchayat is also a model panchayat, which has implemented solid waste management, liquid waste management and IEC (Information, education and communication) on waste management practices.

The households have been encouraged to segregate their waste into wet and dry. This segregated waste is first collected door-to-door by peddle rickshaws and then picked up by e-rickshaws that deliver it to the WPU, which is about 5 km away from the village.

Once the waste reaches the WPU, there is further provision to segregate it into organic, plastic, electrical, menstrual, and medical waste.

Organic waste is converted into vermicompost in dedicated pits. The leachate is manually collected from the pits and discarded. The compost thus generated is sold to farmers.

Plastic waste is sold to vendors, who then recycle it.

The unit employs a total of 20 workers (for collection and segregation) and one supervisor. Workers are paid ₹3,000 per month and supervisor ₹7,000. Salaries are funded by SBMG for one year. Post this period, a small fee will be collected from all households which will be used to fund the running of the WPU, including staff salaries.

The total cost of the project was ₹6 lakh of which, ₹3.5 lakh was funded by MNREGA and ₹1.5 lakh sourced from 6th state finance commission.

CLIMATE RESILIENT AGRICULTURE

Bihar is an agrarian state where agriculture and allied activities form the backbone of the economy. Unpredictable weather owing to climate change is not only leading to crop loss but also severely impacting farm incomes and livelihoods, especially that of poor and vulnerable communities. The local administration in Bihar has taken several steps to mitigate these adverse impacts.

Drip Irrigation

In order to support farmers to move from traditional irrigation techniques to a more reliable irrigation practice that is not only less labour-intensive but also water-efficient, the Bihar Government is promoting micro irrigation techniques across the district. The agriculture department has taken up 429 such projects out of which 390 have been completed. The total area for Drip and Mini irrigation covered under Pradhanmantri Krishi Sinchai Yojna (PMKSY) increased from 181.8 acres in 2021-22 to 350.38 acres in 2022-23. These irrigation systems have supported livelihoods of farmers who are now practicing intercropping and growing cash crops like, turmeric, moringa, yam etc.

A successful model in East Champaran can be seen in Sonbarsa Gram Panchayat in Harsiddi Block. A group of five farmers, led by Shri Suman Kumar Sahni, who own a contiguous piece of land have switched to drip irrigation. They say that ever since the project was implemented, they are enjoying more efficient irrigation and have also less labour cost. They grow a variety of crops including fruit trees, wheat and paddy.

CLIMATE RESILIENT AGRICULTURE

This scheme can be availed either by individuals or a group of farmers who should own a minimum of 1 acre of land collectively. The beneficiaries choose up to three companies for implementing the project. About 10% of the cost is borne by the beneficiary but the cost of installation of pump and the rest of the cost is borne by the government. Boring is also provided by the government but only for a group, not for individual farmers.

Apart from these measures, about 1,870 traditional micro water storage structures, locally called as pyines have been completed.

Additionally, regular farm ponds of an average size of 30*30 metre with water storage capacities more than 1,000 cubic metres are also being constructed. So far, 1,453 farm ponds have been completed, which are now a good source of fisheries and agriculture related activities.

Agroforestry: The Living Dovetails

The ‘Living Dovetails’ is an innovative name to promote agroforestry by intercropping perennial tree crops among annual crops. Unlike the commercial models, farmers in Champaran have been traditionally following this practice, which is being documented, promoted and encouraged by the local administration.

The district administration has taken proactive steps to promote this practice by utilising MGNREGA funds for planting tree crops on small farms. This method of farming ensures a reliable income despite unpredictable weather, and thus helps in building climate resilience. Tree crops such as Mango, Moringa, Banana are planted with grains or with short duration crops such as turmeric or vegetables.

With an aim to promote local biodiversity and to promote financial stability of farmers, ‘The Living Dovetails’ programme was launched in 2021. A seminar was organised for 60 van poshaks to disseminate information on agroforestry and seeds and saplings of drumsticks, aloe vera, carom, guava, mint, etc were distributed. Apart from this, 5,000 seeds of drumstick were distributed to Didi Ki Paudhshalas in the district.

CLIMATE RESILIENT AGRICULTURE

Krishi Vigyan Kendra, Piprakothi

The Krishi Vigyan Kendra (KVK) located at Piprakothi was established by Indian Council of Agricultural Research in 2006. KVK has been doing some exemplary work in promoting agricultural practices that aid in building climate resilience among the farmers of East Champaran. This chapter briefly outlines some of their ongoing work in this direction.

Millet Programme

Water-intensive crops are unsustainable and extremely unreliable in the face of changing weather patterns and unpredictable climatic conditions. Millets have been considered a viable alternative, not just for the hardiness of the crop but also for the nutritional value of the grain. Until the advent of green revolution, the people of Champaran used to grow and consume millets. However, now it is a long-forgotten grain. The KVK has introduced training programmes, not just in growing and processing of millets but also in cooking them and making value-added products. Their in-house training centre caters to this need. Women especially are encouraged to learn food-processing techniques and are also given financial support to start their own business. Farmers have welcomed this programme and finger millet has been especially popular.

CLIMATE RESILIENT AGRICULTURE

Climate Resilient Agriculture

As mentioned in the previous sections, East Champaran is prone to both flooding and drought. Recognising this, the KVK under the Climate Resilient Agriculture (CRA) programme, has introduced wheat and rice varieties that are resistant to both flood and drought in about 2,000 hectares in 13 blocks. These varieties do not require transplanting or tilling, which helps in conserving water. These varieties are also distributed keeping in mind the flooding and water-logging conditions of the region. For instance, a variety of rice Swarna Sub-1 that can tolerate upto 15 days of flooding without any impact on the yield is being promoted in low-lying areas.

Traditional landraces that are suitable for CRA have also been identified for promotion. A good example is a local variety of rice that is traditionally grown in low-lying areas, which grows in height with the increase in water-level. This crop is harvested using boats. The land is simultaneously used for fishery.

KVK is also promoting **Zero-Tillage technique** for growing wheat. In this method, drillers designed to sow seeds without tillage or land preparation are used. The straw from the previous crop is allowed to decompose on the land which eventually act as mulch and helps in providing nutrients and conserving soil moisture. This reduces water used for irrigation both before and after sowing.

If quantified, 1 ha of land needs 2,500 m^3 of water for pre-sowing irrigation, which can be completely avoided in this method. This method is very useful in reducing input costs and time while conserving water, increasing yields, and enhancing soil quality.

Other traditional practices such as **intercropping** is practiced in several areas and sometimes upto four crops are grown at the same time on the same piece of land. This method helps in cases when certain crops fail due to unpredictable weather. Such practices are being documented and promoted with a scientific understanding.

The campus also has ten long-term experimental plots where different cropping systems are being observed for their resilience and profitability.

There are also demonstration plots for various micro-irrigation techniques.

CLIMATE RESILIENT AGRICULTURE

Natural Farming

Natural farming methods which involve zero or low inputs so that farmers' income can be doubled are being promoted. In this method, organic and natural inputs such as jeevamrit, panchagavya, etc which can be easily prepared by farmers using available raw materials are used instead of harmful chemical pesticides and fertilisers.

KVK has created demonstration plots in collaboration with 8 farmers covering 3.2 hectares. In KVK campus itself there is a half-acre demonstration plot where vegetables and wheat are grown. So far 800 farmers in the district have been trained in this method of farming.

Nutri-Gardens

In order to address the nutritional challenges, the age-old practice of kitchen gardens is being revived with a scientific temperament. KVK has come up with seed kits, a holistic package of a variety of vegetable seeds which cater to the nutritional requirements of a family. This also reduces the financial burden of poor families, who would otherwise need to buy vegetables.

The district administration, has taken a keen interest in promoting this programme in schools. Anganwadi workers are trained to maintain nutri-gardens along with children. This programme has a twin advantage of addressing the nutritional requirements of school children while also aiding them to learn hands-on about food crops, gardening, and nutrition.

CLIMATE RESILIENT AGRICULTURE

Integrated Farming

Designed specially for small and marginal farmers, the KVK is promoting integrated farming method on a 1 hectare plot through their demonstration plot. This is an ICAR-approved model tweaked for local conditions so that there is there profitability throughout the year. In this method, farming and allied activities complement and supplement each other. This plot is an impressive demonstration of how a small piece of land can support fish, chicken, ducks, goats, cattle, and different kinds of crops — grain, vegetables as well as fodder crops. Land utilisation is maximised while ensuring income to the farmer through one means or the other. Input costs can be drastically reduced in this system as byproducts from one activity can be used for another. For instance, the poultry enclosure is designed in a way where the excreta from chicken can directly feed into the waterbody used for growing fish. Chicken excreta helps in increasing the population of planktons on which the fish feed. Raising ducks too can help in increasing the nutrient content and oxygen levels in the farm pond.

The overall income from 1 ha of land is estimated to be ₹5-7lakh and at the end of four years, farmers can started earning ₹ 5 lakh after recovering the investment cost. Farmers can utilise funds from MGNREGA for making farm ponds. Under the Bihar Livelihood Promotion Society, need-based funds are available for constructing goat-sheds and cow-sheds. Thus, this method can be said to be an exemplary case of planning and mitigation for unpredictable weather conditions with convergence of various government schemes.

CLIMATE RESILIENT AGRICULTURE

Solar Tree

A solar tree has been installed for demonstration on the campus. It is a structure where solar panels are arranged on a pillar resembling the structure of a tree. This can be used to run a 5HP motor generating 5 kw of energy, which can be used to irrigate 6 ha of land. However, if micro-irrigation methods increase efficiency by 40% and upto 8.5 ha of land can be irrigated. It costs about 5-6 lakh. If 6 farmers implement this together on 6 ha of land, the government provides a tubewell for free.

Apart from this, the campus has facilities for water distillation, where farmers can bring aromatic plants for extracting aromatic compounds free of cost. There are training centres for making bamboo products and furniture; for mushroom cultivation; and for growing crops in a poly-house.

About Asar

Asar Social Impact Advisors (Asar) is a start-up in the social and environmental impact space in India. We are incorporated as a for-profit company under Indian law. Our focus is the challenge and opportunity facing India today. The coming decade is critical to define the actions that the country and its people take in building a prosperous and climate-resilient future. Our solutions are predicated on the understanding that the systemic and transformative changes we require can only be catalysed by collaborative problem-solving and implementation. Asar exists to empower individuals, organisations and networks working on the climate crisis by collaborating, coordinating, and collectivising their efforts to amplify their effectiveness and impact.