



**Jodhpur City Knowledge and  
Innovation Foundation**  
JODHPUR SCIENCE AND TECHNOLOGY (S & T) CLUSTER



**Office of the Principal Scientific Adviser  
to the Government of India**  
Science & Technology Cluster



**BCKIC**  
Bhubaneswar City  
Knowledge Innovation  
Cluster Foundation

# LIVELIHOOD THROUGH SCIENCE & TECHNOLOGY





## Foreward

The Office of the Principal Scientific Adviser to the Government of India initiated Science & Technology clusters in **eight** Indian cities viz. Bengaluru, Bhubaneswar, Chandigarh, Delhi, Hyderabad, Jodhpur, Pune and Vishakhapatnam. These clusters aim to provide a platform to academic institutions, research and development (R&D) labs, industries, etc to tackle local and regional challenges. The establishment of these clusters was recommended by the Prime Minister's Science, Technology and Innovation Advisory Council and are overseen by a Cluster Apex Committee led by the Vice-Chairman of NITI Aayog.

These clusters are working in various sectors Viz. Med-Tech, Handicrafts and Handlooms, I-Governance, Water and Environment, Thar Designs, Artificial Intelligence of Things, Livelihood, Health and Wellness , Urban Life, Biosciences, Polymer-Based Intervention, Wetland Management, Waste to Value, Solid Waste Management, Water Security, Air Pollution, AI/ML Healthcare, Sustainable Mobility, Effective Education, , Big data and AI, Capacity Building, Health, Sustainability and Environment, Food and Agriculture ,Sustainable Mobility and Life Sciences.

Among all the clusters Jodhpur & Bhubaneshwar are working on livelihood support through science and technology. The Jodhpur cluster has done significant work in uplifting local artisans, specially from unorganized sector by providing them an e-commerce platform **kalanubhav.in**. This platform help them to showcase and trade their craft products directly to customer(D2C).

The Bhubaneshwar cluster is actively engaged in supporting rural areas of Odisha through initiatives such as desilting community water bodies, establishing cashew processing units, processing lemongrass oil, capacity building for farmers and cultivation of indigenous aromatic paddy.

This compendium covers various activities of Jodhpur & Bhubaneshwar clusters in respect to livelihood support.

# Acknowledgements

The Government of India has established Science and Technology clusters in various cities across the country. The purpose of these clusters is to address local challenges by promoting science and technology in ways that are linked to improving livelihoods and fostering industrial growth.

The compendium provides information regarding livelihood support activities of Jodhpur & Bhubaneswar clusters related to upliftment of local craft artisans from unorganized sector (Jodhpur) and supporting local agriculture producers in remote rural areas (Bhubaneswar).

In preparation of compendium several people from academia, industry and management have contributed and we acknowledge their support with gratitude.

We are extremely grateful to the Prof. Ajay Kumar Sood, Principal Scientific Adviser to the Govt. of India and Dr. (Mrs.) Parvinder Maini, Scientific Secretary for their support and encouragement. Dr. Vishal Choudhary, Scientist F and Mr. Vivek Kumar, Scientist D have been instrumental in promoting clusters activities and we are thankful to them. We also gratefully acknowledge the former colleagues of Office of PSA who contributed enormously in this activity of cluster.

We acknowledge all the local craft artisans and local agriculture producers and other related partners of both the clusters.

We are also grateful to all the stakeholders, institutes and organizations who have contributed, advised and motivated as well as local and state administration.

We express our gratitude to all Board of Directors- present and past and project Advisory committee members for their valuable suggestions and guidance time to time.

We would also appreciate all our colleagues in JCKIF and BCKIC for their tireless efforts and significant contribution.

Dr. G. S. Toteja  
**Chief Executive Officer, JCKIF**

Dr. Namrata Misra  
**Chief Executive Officer, BCKIC**

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## 1. INTRODUCTION

The City Science & Technology Clusters is a flagship initiative launched in 2020 by the Office of the Principal Scientific Adviser to the Government of India on the recommendation of the Prime Minister's Science, Technology, and Innovation Advisory Council (PM-STIAC). The objective is to tackle local challenges through S&T interventions by bringing together academia, R&D institutions, industries, startups and local governments.

There are eight Science and Technology (S&T) clusters set up across the country namely Bengaluru, Bhubaneswar, Chandigarh, Delhi, Hyderabad, Jodhpur, Pune and Vishakhapatnam with an objective of (i) Creation of a shared ecosystem, (ii) Becoming a regional solution provider, (iii) Becoming nationally and globally competitive.

**Jodhpur City Knowledge and Innovation Foundation** is a Section-8 company (Not-for-profit) was established on March 31, 2021, under the Companies Act 2013 to carry out and sustain the activities of the Jodhpur City Knowledge and Innovation Cluster (JCKIC) which was initiated on July 29, 2020. Indian Institute of Technology Jodhpur (IITJ) is nodal institute for JCKIC.

JCKIF acts as a facilitator for Jodhpur Cluster to create strong linkages among major Academic Institutions, R & D Institutes, National & State Research Laboratories, Government Agencies and Industries of the city of Jodhpur and its surroundings. The cluster has been working for the local artisans of handicraft & handloom from the unorganized sector through various projects using science & technology. The projects include the application of Augmented Reality & Virtual Reality in an E-commerce platform, and a 3D Experience center- an immersive space. The other verticals are Med-Tech, Water & Environment, I- Governance, AIOT and Thar Design.

**Bhubaneswar City Knowledge Innovation Cluster Foundation** is a Section 8 Company and is the bonafide legal entity of the Bhubaneswar City Knowledge Innovation Cluster, an initiative of the Office of the Principal Scientific Adviser to the Government of India. This cluster was set up to seamlessly connect research institutions, academia, industry, and corporates towards the creation of a Hub & Spoke Model, actively facilitating innovation and knowledge creation as well as technology development and deployment.

The vision of the BCKIC is to create strong linkages between existing academic institutions, national & state research laboratories, industries, start-ups, MSMEs, union ministries, state governments, philanthropic foundations, and international organizations, to propel scientific & technological innovations and develop market-ready products/solutions/technologies.

The compendium provides here with the various activities related to livelihood support by these two clusters.

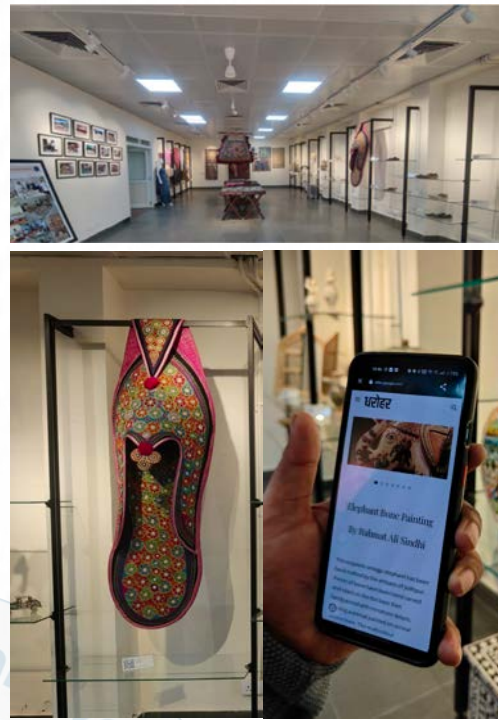
## 2. ACTIVITIES OF JODHPUR CITY KNOWLEDGE & INNOVATION FOUNDATION

### 2.1 Phygital Repository, 3D Experience Center 3D Documentation Phygital experience , AR enablement

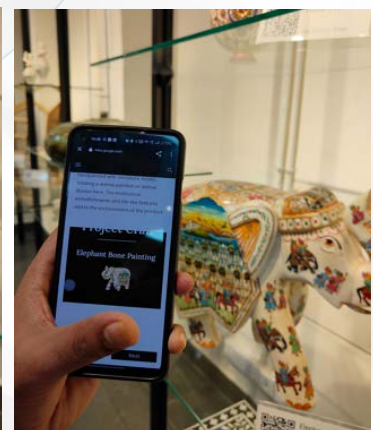
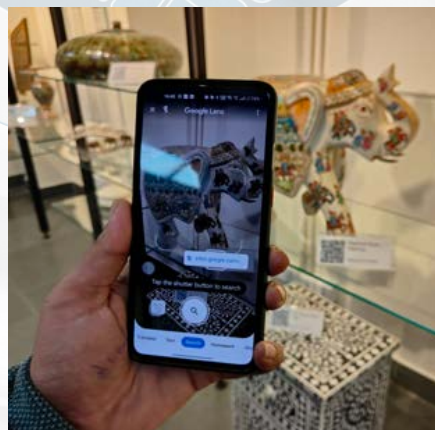
Technologies like Augmented Reality and Virtual Reality have been used to create a digital archive dedicated to crafts. This initiative aims to preserve and protect local heritage by promoting traditional handicrafts and handlooms. Top of Form This initiative offers a virtual platform where visitors can interact with traditional crafts and artisan-crafted artifacts. It provides an immersive experience that not only showcases the artistry but also educates on the rich histories embedded in each item. This online space effectively bridges the gap between digital interaction and cultural heritage, fostering a greater appreciation for the craftsmanship and the artisans' livelihoods.



**2.1 Phygital Repository "Dharohar":** An unique repository located at JCKIF Premises, IIT Jodhpur Campus that seamlessly blends the physical and digital realms. Exploring the physical museum, one can encounter a diverse array of craft products, from Bone & Horn creations to Block printing, leather Mojari, Salawas Durr, and Tie & Dye craft products. Each showcased item comes with a QR code, to scan and unlock the captivating story behind the craft and the product with just a swipe of fingertips, one can even rotate the item for a 3D view enhancing immersive journey into the world of traditional craftsmanship.

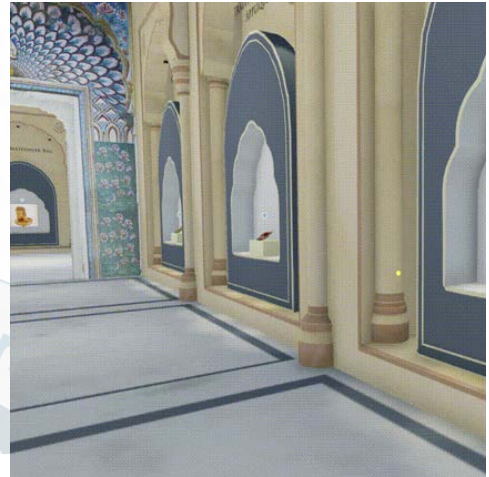


Phygital museum showcasing craft products at JCKIF Premises , IITJodhpur campus



Process of scanning code to interact with product and behind the story of craft and product

**2.2 3D Experience Centre Kalaanubhav:** A dynamic virtual space has been developed to seamlessly bridge the gap between the tangible and the digital. In the innovative environment, users have the ability to spawn and navigate freely, creating a unique and immersive experience that directly connects the virtual realm to the reality of craft products.



A theater space where documentaries on craftsmanship and interviews with artisans can be viewed.

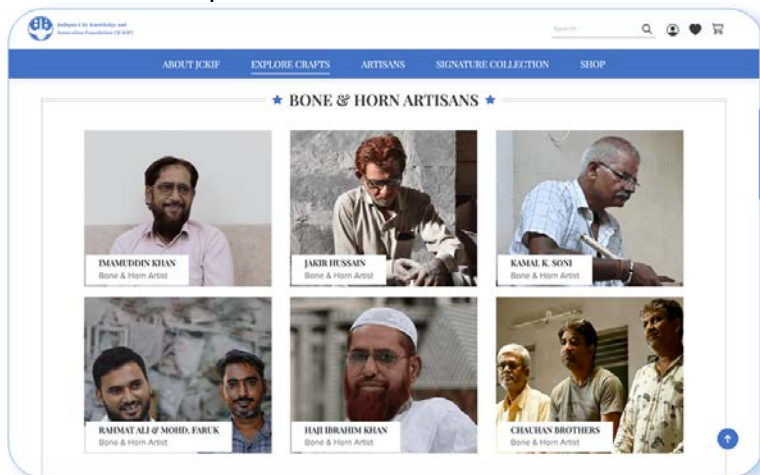


Displaying an artifact in a virtual environment to illustrate its appearance in the real world.

## 2.3: A D2C Platform for Artisans

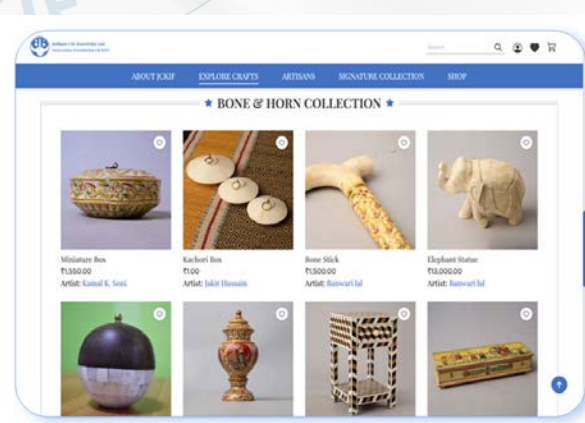
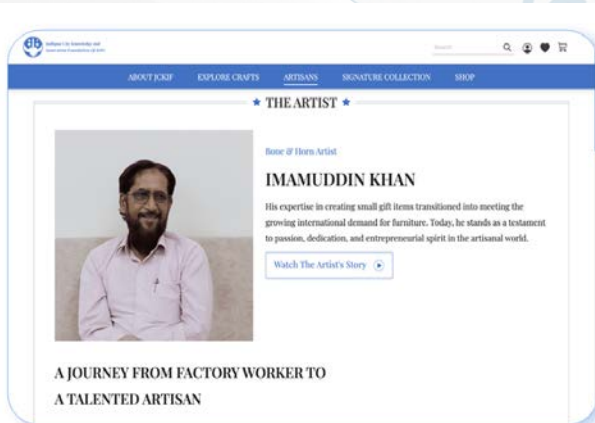
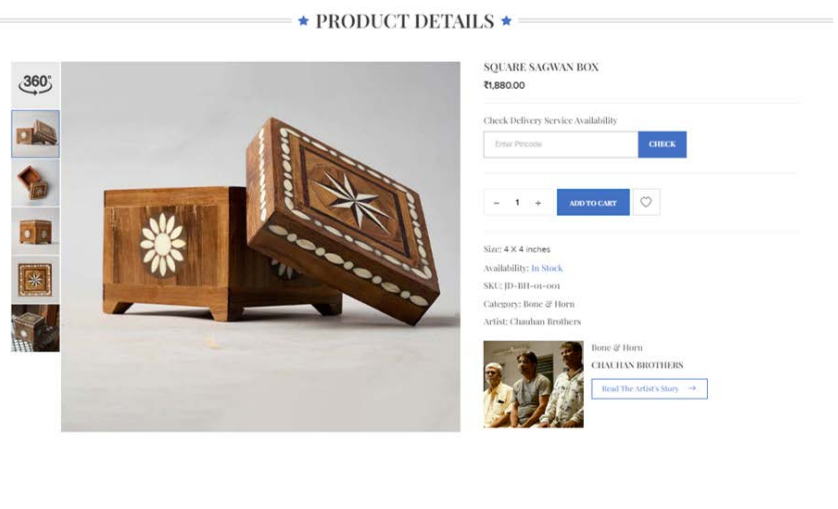
### Kalaanubhav.in

**Kalaanubhav.in** has been developed to serve as an E-Commerce platform enabling artisans to directly showcase and trade their handloom and handicraft products to customers. The platform offers the convenience of exploring these unique items from the comfort of one's home, bringing the beauty of artisanal creations to doorstep.



Total 536 products from five craft clusters Bone & Horn, Block Printing, Leather Mojari, Salawas Durrly and Tie & Dye by 23 artisans families and their associates numbering over 400 are showcased on website.

The standout feature of **Kalaanubhav.in** is its 3D viewing capability, allowing customers to virtually rotate and view products from various angles. This immersive experience enables a close inspection of intricate details, just as if holding the item in hands.



From this initiative the artisans can now have year-round business rather than relying solely on seasonal sales.

## 2.4 Artisans Product Design Copyright Registration

JCKIF plays a pivotal role in supporting artisans within the craft sector of Jodhpur by facilitating the registration of their product designs with the Government of India (GOI). This initiative of JCKIF empowers artisans to protect their creative work by ensuring recognition and documentation of their designs. This process not only safeguards the intellectual property of artisans but also contributes to the promotion and preservation of traditional craftsmanship. The registration of these designs will enable the promotion and integration of the craft sector into the formal economy, sustainability and a environment for the growth of indigenous artistic expressions.



JCKIF has been submitted designs of 23 different products made by 10 artisans skilled in crafts like block printing, leather mojari, tie and dye, salawas durry, bone and horn. We shall be getting six design registration by the end of May 2024.



## 2.5 Geographical Indication of Sindhi Sarangi



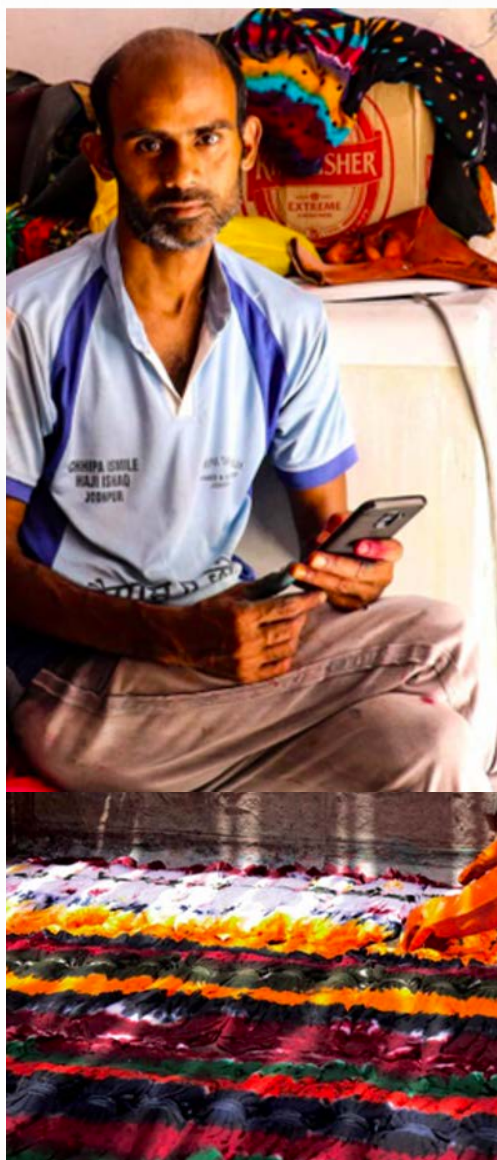
Sindhi sarangi is a short-necked bowed fiddle used by the 'Langa' caste musicians, known as 'sarangiya langa' of west Rajasthan. It is used to accompany their songs. This sindhi sarangi is handmade from a single block of tali or seesham wood in a rectangular slightly waisted body shape. There are four main parts: the pegbox at the top, the unfretted neck, the body, and the string holder at the bottom. The hollow body is covered with a painted goat skin. This sarangi has four gut strings and 22 metal sympathetic string that feed through the circular bone bridges (sundari) on the face of the neck to the pegs that are inserted in the string holder box behind the neck.

All the strings are fastened to the tailpiece called the targahan. The sarangi has the range of approximately 32 notes, the range of the human voice. This sindhi sarangi is played while sitting and is held against the left shoulder in a vertical position. The musician uses a bow held in an underhand grip in his right hand, while the fingernails of the left hand press against the strings to shorten the vibrating length of the string in order to produce various pitches. The music of the sarangi is said to resemble the sound of the human voice, with the ability to imitate vocal ornaments. Colorful painting adorns this sindhi sarangi.

JCKIF is helping in obtaining the Geographical Indication (GI) tag for the Sindhi Sarangi musical instrument. This recognition highlights the unique cultural and geographical identity of the Sindhi Sarangi, contributing to its protection and promoting the heritage associated with this traditional musical craft. The GI tag not only acknowledges the distinctive qualities of the Sindhi Sarangi but also provides a valuable platform for the artisans.



## 2.6 Geographical Indication of Tie & Dye Craft



Bandhini, also known as Tie and Dye, is an ancient resist-dyeing technique practiced in the state of Rajasthan. Skilled artists use this method to craft decorative patterns on fabric using dyes. The process involves intricately tying the fabric with nails, beads, or grains, preventing color seepage into the tied areas during dyeing. This technique is applied to various materials such as cotton, chiffon, and silk, producing small motifs or wave-like strips.



In Jodhpur, Rajasthan, the Bandhej technique is highly esteemed and finds application in a variety of garments like sarees, Jodhpuri coats, Rajasthani dresses, and Salwar-kameez sets, as well as yardages for turbans. The craftsmen of Jodhpur have perfected the art of Bandhini, demonstrating remarkable skill in creating intricate discharge patterns with vibrant backgrounds.

REG. No. COOP/2021/JODHPUR/201162



# जोधपुर बन्धेज क्राफ्ट डवलपमेन्ट सोसायटी



**JCKIF & IIT JODHPUR के सहयोग से जोधपुर बंधेज की  
GEOGRAPHICAL INDICATION (GI) प्राप्त एकमात्र संस्था।**



The Jodhpur Bandhej Craft Development Society, with the collaborative efforts of JCKIF and IIT Jodhpur, has successfully secured a Geographical Indication tag for the traditional tie and dye craft. This initiative aims to preserve and promote the unique art form, which is facing the threat of extinction, and also seeks to garner recognition for the craftsmanship involved.

## 2.7 Training Programs

### 2.7.1 Rope Making & Meshmat Making



Pal Village, Jodhpur



Rudiya Village, Jodhpur



Mathaniya Village, Jodhpur



Mokalawas Village, Jodhpur



Nandiya Kallan, Jodhpur

Within the framework of the National Skill Development Mission, a targeted initiative was implemented to empower more than 50 individuals from the Scheduled Caste (SC) and Scheduled Tribe (ST) communities in Jodhpur. This initiative focused on providing specialized training to the individuals, equipping them with the necessary skills to incorporate technological interventions into the traditional art of rope-making.

Trainings to more than 15 women's of various villages to learn how to make mesh mats. These mats not only turned out to be visually appealing but also opened up job opportunities for these women. So, besides making beautiful things, these training sessions helped the women earn money and support themselves and their families. Motive was to teach a new skill and having a way to make a living from it

### 2.7.2 Anugraha Loom Trainings



Anugraha Loom at CETSD, IITJ

The Anugraha loom is designed to be user-friendly, especially for women, making it easy for them to operate. With this loom, people can create geotextiles, which have various practical uses in desert regions. One significant application is preventing soil erosion. These geotextiles act as a protective layer, helping to keep the soil in place and reducing the impact of erosion caused by wind and water in desert areas.

### 2.7.3 Nursery Pouch Making



Mokalawas Village, Jodhpur

A sustainable alternative has been introduced to minimize the reliance on plastic in agricultural nurseries, marking a crucial move towards conservation agriculture. This eco-friendly product aims to reduce the environmental impact associated with the use of traditional plastic materials. By adopting this alternative in nurseries, farmers contribute to conservation efforts, promoting a more sustainable and eco-conscious approach to agriculture.



Nandiya Kallan, Jodhpur

Women from the nearby villages of Mokalawas and Nandiya Kallan have been provided with training sessions aimed at offering livelihood support. Specifically, as part of the National Skill Development Mission, these women received training in the craft of making nursery pouches. This initiative has a dual purpose: not only does it equip women with a valuable skill, but it also creates an avenue for them to generate income, thereby supporting themselves and their families.

## 2.8 Sub-Surface Porous Vessel Technology & G-filter

The Sub-Surface Porous Vessel Technology is an innovative product. SSPV is useful for drainage management, water conservation, root medication, landscaping, low energy irrigation, afforestation and enables remediation of contaminated/saline soils. An approximately 30% reduction in the consumption of water for irrigation. The overall benefits include water conservation, better nutrition for fruit crops, root medication and improved fertility at low costs. The SSPV technology can also potentially be used in setting up organic kitchen gardens for individual households and organizations to increase food self-sufficiency amongst people during a pandemic. 76 families from SC and ST communities have adopted this technique in their gardens.



Pal Village, Jodhpur



Sultana Village, Jaisalmer with support from Indian Army



Sangariya, Jodhpur



Sultana, Jaisalmer

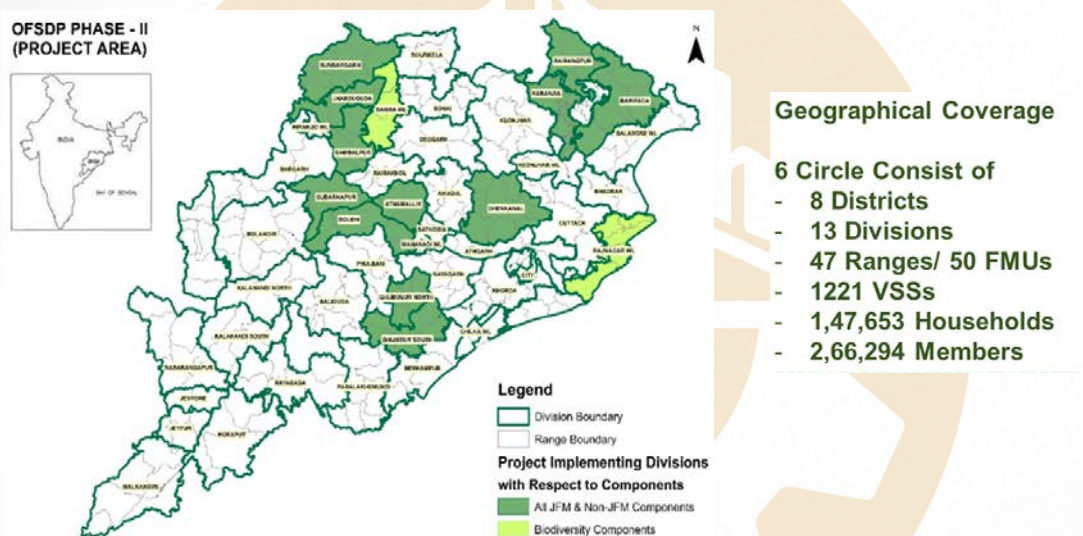
The gravity filtration technology using local clay and local skill of potters have been developed and deployed in many rural areas in different districts of Rajasthan as well as other states such as Bihar, Chhattisgarh, Tamilnadu and Kerala. 68 families from marginalized SC and ST communities have been enjoying the benefits of G-filter. It is a low-cost water filtration technology that increases the availability of potable water for villagers. Cluster has designed and installed several Ultra-Filtration membrane-assisted sorption based water purification units in rural schools of Sirohi, Jodhpur, Jhunjhunu and Pali. In the first phase water purification units have been installed in eight (8) schools.

### 3. ACTIVITIES OF BHUBANESWAR CITY KNOWLEDGE INNOVATION CLUSTER FOUNDATION

#### 3.1 Management & Marketing Support Agency

Consortium of Bhubaneswar City Knowledge Innovation Cluster Foundation (BCKIC) , Bhubaneswar, Kalinga Institute of Industrial Technology – Technology Business Incubator (KIIT- TBI), Bhubaneswar; and Indian Institute of Entrepreneurship (IIE), Guwahati.

MMSA is an initiative of Odisha Forestry Sector Development Society under OFSDS-II Project, Govt. of Odisha for establishing and operationalizing the Multi Product Cluster.



The Management and Marketing Support Agency (MMSA) is an initiative launched under the Odisha Forestry Sector Development Society's OFSDS-II Project, which is supported by the Government of Odisha. MMSA is a consortium involving the Bhubaneswar City Knowledge Innovation Cluster Foundation (BCKIC), Bhubaneswar, Kalinga Institute of Industrial Technology – Technology Business Incubator (KIIT-TBI), Bhubaneswar, and the Indian Institute of Entrepreneurship (IIE) in Guwahati.

The main goal of MMSA is to establish and operate a Multi-Product Cluster with key objectives:

- **Product Aggregation:** Bringing together various regional products by collecting from local businesses, artisans, and producers.
- **Value Addition:** Enhancing product quality and appeal through improvements, features, and repackaging.
- **Market Supply Chain Development:** Creating efficient supply chains for timely delivery of products in good condition.
- **Financial and Technological Solutions:** Providing support such as funding, quality development, branding, and technology integration to enhance competitiveness and innovation.
- **Market Linkage:** Connecting products and businesses with relevant markets to increase access and opportunities.
- **Skill and Capacity Building Training:** Offering training programs to enhance skills and knowledge for sustainable business growth.

## 3.2 Restore Promise of Water, Rayagada

BCKIC Foundation in association with India Humanity Foundation,  
Rotary Water Conservation Trust, NBAW Foundation & PRABHAT NGO



A multi-faceted approach aimed at rural community development. Firstly, the initiative targets the desilting of waterbodies in the areas, utilizing the extracted silt to enhance the fertility of farmland soils.

The "Restore Promise of Water" initiative in Rayagada, led by the BCKIC Foundation in association with India Humanity Foundation, Rotary Water Conservation Trust, NBAW Foundation, and PRABHAT NGO, is a community-led program in the Chandrapur Block of Rayagada District with the following objectives:

- Desilt Rural Community Waterbodies:** The primary goal is to desilt rural community waterbodies. Silt often accumulates in these waterbodies, reducing their capacity and effectiveness. Removing the silt helps restore these waterbodies to their original or intended capacity.
- Use Silt for Farmland Soil Amelioration:** Instead of discarding the silt, the initiative aims to repurpose it for farmland soil amelioration. Silt can be a valuable resource for improving soil quality, increasing fertility, and enhancing crop production.
- Execution of 15 Modules:** The initiative plans to execute 15 modules during a specific season, from April to July 2023. Each module is equivalent to removing 10,000 cubic meters of silt from the waterbodies. This silt removal has the dual benefit of restoring top soil fertility and generating additional capacity for 1 crore liters of water.
- Reduce Fertilizer Consumption:** By improving farmland soil quality through silt amelioration, the initiative seeks to reduce the need for chemical fertilizers. Enhanced soil fertility can potentially lead to increased crop yields, reducing the dependency on external fertilizers.
- Promote Groundwater Percolation:** Enhancing the capacity of rural community waterbodies and restoring them to their original state can contribute to groundwater percolation. This can help replenish groundwater resources and support sustainable agriculture.

### 3.3 Initiatives & Programs

Training sessions held across various divisions focus on capacity building and the procurement of various commodities i.e, indigenous aromatic paddy, vegetables, sal leaf plates and bowls, cashews, harida and baheda, dhatki flowers etc from various forest management units in 12 forest divisions of the state of Odisha. from forest management units, along with cultivation techniques for indigenous paddy.

#### Baripada Division



FMU level capacity building training on procurement of Karanj seeds (Betnoti)



FMU level capacity building training on cultivation of Indigenous Aromatic Paddy (Udala)



Procurement of Karanj seeds from Kaptipada FMU



Procurement of Karanj seeds from Sanadei VSS (Kaptipada)

#### Rairangpur Division



DMU level capacity building training on sustainable harvesting of Sal leaf dwipatree



FMU level capacity building training on cultivation of Indigenous Aromatic Paddy (Bisoi)



VSS level capacity building training on sustainable harvesting of Sal leaf dwipatree (Baunsabudhi)



Procurement of Karanj seeds from Manada FMU

## Karanja Division



DMU level capacity building training on Indigenous Aromatic paddy



Procurement of Sal plate from Kendumundi Multi Product Cluster



VSS level training program on sustainable harvesting of Pongamia Beans (Sanndharikhman)



VSS training program on sustainable harvesting of Pongamia Beans (Tikasil)

## Dhenkanal Division



Procurement of Vegetables from Bhadrappalli VSS by VILLAMART



Procurement of raw cashew from Banasahi VSS



Interaction with SHG members of Gajamara VSS regarding feasibility analysis of Cashew Cluster

### Athamallik Division



Field visit to groundnut farmer at Aida VSS



Field inspection by KVK Anugul team

### Boudh Division



Interaction with Pulses farmer on market linkage



Procurement of Pulses from Goundiswar VSS



Interaction of PMU and Social Enabler with farmers on product mapping

### Ghumsur-N Division



Visit to Cashew Cluster along with DMU team

### Ghumsur-S Division



Interaction with the identified SHG members on operationalization and feasibility analysis of Cluster



Measurement of drying yard being taken at Surada Pulses Cluster building

## Jharsuguda Division



Trader identification and market linkage of Sal plates and bowls



Procurement of Tamarind by TDCC

## Sambalpur Division



Procurement of Sal seeds by TDCC

## Subarnapur Division



Interaction of PMU team with the farmers on product mapping



Market linkage of Sal leaves at Khemundiamunda VSS



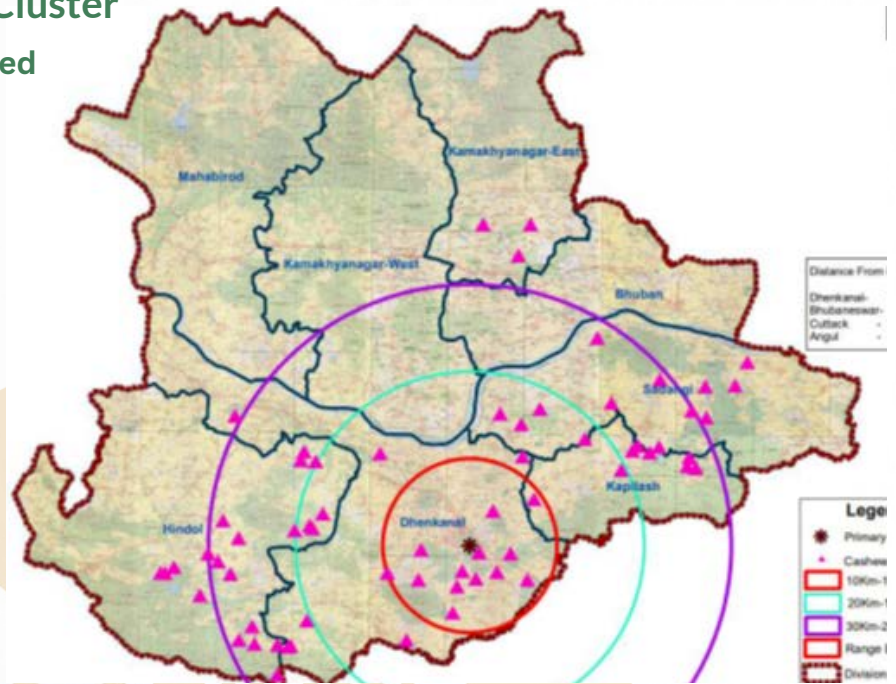
Procurement of broom stick



Procurement of vegetables at Titlipali VSS

### 3.4 Dhenkanal Cashew Cluster

VSS led and OFSDS supported  
Cashew processing cluster



Covering the Dhenkanal district, the cluster identifies potential Forest Management Units (FMUs) in Dhenkanal, Hindol, Sadangi, and Kapilash. Led by Village Forest Management Committees (VSSs) and supported by the Odisha Forestry Sector Development Society (OFSDS), the initiative aims to establish a cashew processing facility. This facility will focus on collecting and processing raw cashew nuts, sourced from 65 VSSs operating under the Odisha Forestry Sector Development Project (OFSDP). With approximately 17,000 quintals of raw cashew nuts available in the region, primarily sold to local traders and processing units, the cluster emphasizes value addition. Among the 65 VSSs, 50 significantly contribute to raw cashew nut collection, ranging from 50 quintals to 3,500 quintals annually. The involvement of over 2,500 households in primary collection and selling underscores the local community's engagement in the cashew sector. The core objective is to transform primary producers into processors, thereby enhancing their income and amplifying the sector's overall economic impact through value addition.

#### Cluster Vitals

Cluster Location: Cluster Location: Lambodarpur P.O:  
Bhapur, Dist: Dhenkanal,  
Pin- 759015, Odisha.  
Product of Focus: Cashew  
CFC Status: Under establishment  
Production Status: Yet to start  
Marketing and Sales: Primary Marketing functional  
No. of lives Impacted: 2500



Procurement of raw cashews from banasahi  
VSS

### 3.5 Jharsuguda Lemongrass Oil Cluster

#### VSS led and OFSDS supported Cashew processing cluster



The Jharsuguda Lemongrass Oil Cluster, a community-led initiative backed by the Odisha Forestry Sector Development Society (OFSDS), operates in the Jharsuguda region across 12 Village Forest Management Committees (VSSs), covering 136.5 acres.

#### Cluster Vitals

**Cluster Location:** Badimal vss & Bhatlaida VSS  
**Product of Focus:** Lemongrass Oil  
**CFC Status:** Both units established  
**Production Status:** One started other from Oct 23.  
**Marketing and Sales:** Primary marketing functional  
**No. of lives Impacted:** 2400

Lemongrass plantation is a primary focus, with successful completion of the first harvest. Processing facilities initially located at Bhatlaida have been bolstered with a new unit at Badimal, aimed at enhancing capacity and efficiency. These units are pivotal in converting harvested lemongrass into valuable lemongrass oil. The cluster's core objective is to add value to the primary agricultural produce by transforming lemongrass into oil, thereby improving local livelihoods. This transition enables communities to earn higher incomes, contributing to overall economic enhancement for stakeholders engaged in the cluster's activities.

