



## Integrated Watershed Development for Rehabilitation of Degraded Soils and Climate Change Adaptation (KfW Soil Programme)



**National Bank for Agriculture and Rural Development**

## Background

NABARD entered into natural resource management space in 1992 through KfW assisted Indo German Watershed Development Programme (IGWDP), wherein participatory approach of watershed development was attempted. Subsequently, based on the success of IGWDP, Watershed Development Fund (WDF) was set up in NABARD in 1999-2000 with an initial corpus of Rs. 200 crore contributed equally by Govt. of India and NABARD. The fund is augmented annually with the interest differential earned under Rural Infrastructure Development Fund (RIDF). Over the years, the watershed development programme supported by NABARD has evolved with the changing ecosystems and requirements. As on 31st March 2022, a total of 3557 projects covering an area of 24.63 lakh ha in 28 states have been sanctioned. The cumulative disbursement stood at ₹2010.49 crore. The watershed development projects helped the communities in conservation of natural resources and ensured their livelihood security.

The regular watershed development interventions are planned to address issues in rainfed farming. However, over the recent years, climate change has impacted agricultural production, productivity, livelihood and income of the farmers severely due to uncertain and erratic changes in weather parameters especially rainfall, temperature and humidity.



Thus, in order to integrate climate change adaptation and climate risk mitigation measures into regular watershed programme interventions, NABARD, in collaboration with KfW, is implementing 'Integration of Watershed Development strategies with Climate Change Adaptation for Rehabilitation of Degraded Soils' programme since 2016. The programme is implemented with the support from the German Government (BMZ) under its initiative "One World, No Hunger" (SEWOH) for controlling soil erosion and rehabilitation of degraded soils especially in areas with communities, who are

significantly vulnerable to negative impacts of climate change. It incorporates issues of Climate Change Adaptation (CCA) in watersheds threatened by degradation, by improving soil health through climate sensitive investments.

Through effective additional soil and water conservation measures, soil health restoration, productivity enhancement measures, climate change adaptation initiatives, etc., the programme is expected to build crop resilience to climate change; thereby improving income levels and income generation opportunities for the communities in the completed watershed project areas.

## Programme goal

The purpose of the projects under the programme is to reduce the vulnerability to climate change of farmers in selected watersheds through stabilization, enhancement and sustainable use of soil and water resources.

Investments in improvement, stabilisation, and conservation of natural resources mainly soils is made to minimise the risk of climate change and to increase the productivity and income of communities living in watersheds.

## Programme outcome

Strengthening the Adaptive capacity of the watershed communities and reducing their vulnerability to climate change.



## Programme components

The Project Facilitating Agencies (PFAs) are given a clear mandate to assess the vulnerability of identified areas, to climate change. Their teams engaged with villagers, Village Watershed Committee(VWC) and Self Help Group (SHG) members to analyse the impact of climate change on communities in each sector. The PFAs also study the availability of natural resources in each of the identified districts besides understanding level of environmental degradation and issues that influence the area's socio-economic dynamics. Depending on analysis of vulnerability to climate change, the PFAs can choose one or more of the following components for investment for climate proofing of watersheds:

- **Additional Soil and Water Conservation Measures:** Redesigning of existing or construction of additional soil and water conservation measures such as continuous contour trenches, stone bunds, nala bunds, farm ponds, check dams, etc. along with land reclamation, irrigation management and vegetation enhancement measures are undertaken under this component.
- **Soil Health Improvement and Productivity Enhancement Measures:** Under this output, interventions such as soil testing and introduction of soil health cards, treatment of soils, deep ploughing, application of organic fertilizers, vermi- compost, tank silt, etc. are taken up.
- **Promotion of Sustainable NRM, CCA Farming Practices and Food Security:** Interventions such as crop diversification, crop intensification e.g. System of Rice Intensification (SRI), seed replacement, agro-forestry, additional livelihood and income generation, establishment of fodder bank, etc. are taken up.
- **Measures to Mitigate CC Risk:** Weather based advisory services, market information collection and dissemination, promotion of Farmer Producer Organizations (FPOs), crop insurance, market linkages for better price realization, etc. are covered under this component.
- **Capacity Building, Institutional Building and Knowledge Management:** Training and capacity building of watershed families, knowledge dissemination through publication material, exposure visits, workshops for knowledge sharing, documentation of best practices/ success stories are promoted under this component.



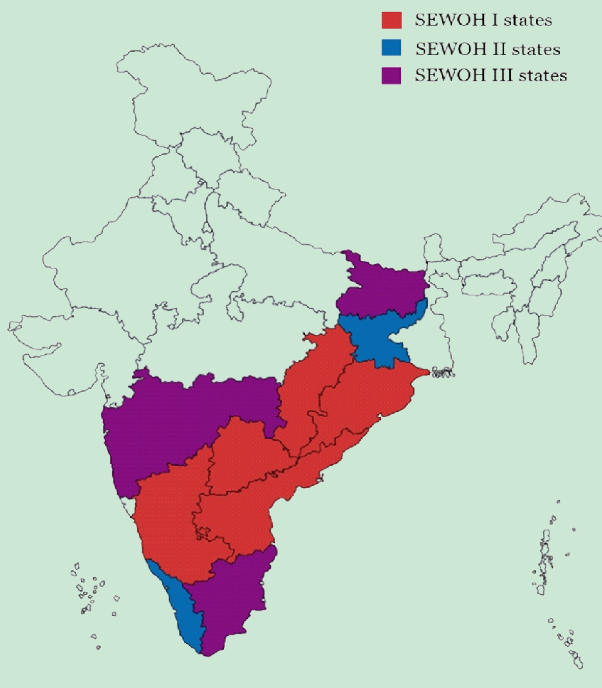
## Programme coverage

The KfW Soil programme is implemented in three phases viz., I, II and III, across ten states of the country. The details are given below:

Item	Phase I	Phase II	Phase III
Duration	Feb 2016–Dec 2020	Jan 2019–Dec 2022	Jan 2021–Dec 2024
No of Projects	123	55	48
Allocation	€ 10 million (₹ 70.0 cr)	€ 5 million (₹ 40.0 cr)	€ 4.5 million (₹ 33.75 cr)
Utilization	€ 9.45 million (₹ 64.95 cr)	€ 2.82 million (₹ 22.55 cr)	€ 0.37 million (₹ 2.79 cr)
Status	Completed	On-going	On-going

The KfW Soil phase I was implemented successfully in 123 completed watersheds in 32 districts of five states viz., Karnataka, Telangana, Andhra Pradesh, Odisha and Chhattisgarh. Under Phase II of the programme, the interventions were continued in Kerala (43 projects) and Jharkhand (12 projects) with committed financial support of €5 million from KfW. Based on the success of Phase-I & II, KfW Soil programme was extended to Bihar (10 projects), Maharashtra (13 projects) and Tamil Nadu (25 projects) under Phase III.

## Programme coverage



## Achievement

The physical achievement of the projects under all the three phases is as follows:

- 46054 ha area covered under various additional Soil and Water Conservation measures against the target of 67,800 ha.
- 36391 ha of area treated with different Soil Quality Improvement measures against the target of 45,200 ha.
- 46985 farmers adopted soil testing. Based on soil analysis, various measures such as, application of bio fertilizers, Gypsum application, application of major and micronutrients, organic/natural farming etc., are implemented.
- 74769 farmers trained through 3761 training programmes on climate change adaptation, water budgeting and water management, organic farming, sustainable agriculture, soil sample collection for soil testing, integrated farming, crop diversification, etc.

### Box item 1: Salient findings of impact evaluation study under Phase I

The major outcomes of the KfW soil projects (Phase I) include:

- 74.1% of beneficiaries have taken up soil testing and adopted the recommendations on the Soil Health Card
- 69.4% increase in income of beneficiaries from agriculture and allied activities
- 53.2% have reported increase in the crops taken and 47% increase in area under cultivation
- 40.3% of beneficiaries reported that there was an increase in the number of livestock (milch animals and poultry) owned by them, resulting in increase in per capita consumption of milk and consumption of chicken/meat.
- Usage of farm machinery by the beneficiaries has increased by 39.2% by hiring of agriculture machinery
- 73.2% of beneficiaries have indicated change in their nutritional status due to adoption of various cultivation practices, vegetable gardening and others.



## Box item 2: Monitoring of watersheds covered under KfW Soil (Phase I) using Geo Spatial Technologies

National Remote Sensing Centre (NRSC) was engaged for monitoring of 123 watersheds under KfW Soil (SEWOH Phase I) programme using geospatial technologies.

The change detection analysis showed that there was overall increase in the area of agriculture, plantation, built up, forest, mining and waterbody, while scrubland and wastelands went through remarkable decrease in area. The details are given below.

- Build Up area increased by 374.21 ha
- Area under agriculture increased by 635.88 ha
- Area under plantation increased by 654.56 ha
- Area under waterbodies increased by 191.14 ha
- Forest/Plantation area increased by 26.82 ha
- Scrubland decreased by 1480.09 ha
- Wasteland decreased by 482.88 ha

In-house Remote Sensing Cell set up at NABARD HO is engaged to monitor the watershed projects under KfW Soil Phase II and III using geospatial technologies.

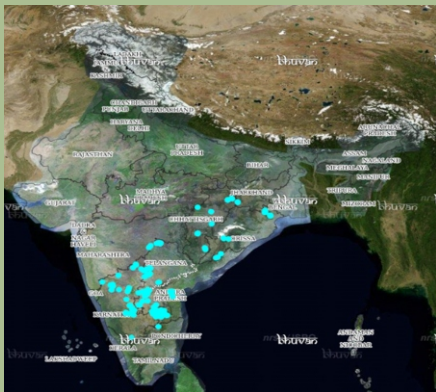


Figure 1 Map of India showing 123 watershed projects on NABARD Bhuvan portal

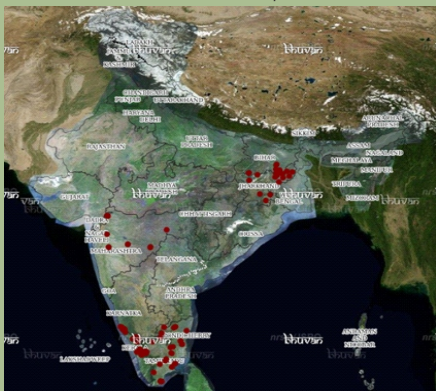
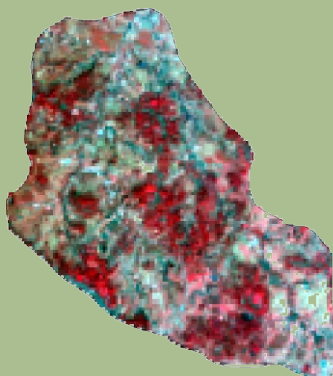


Figure2:Map of India showing the ongoing projects under SEWOH II & III programme on NABARD Bhuvan portal.

## Showcase 1: Land-use change detection in watersheds using remote sensing and Geographic Information System

Satellite images for the years 2014 and 2020 were analysed to study the impact of project interventions on land use/land cover changes in Lathibari watershed in Godda district of Jharkhand (covered under KfW Soil Phase II) below:

Date of pass: 17 April 2014



Date of pass : 10 November 2020



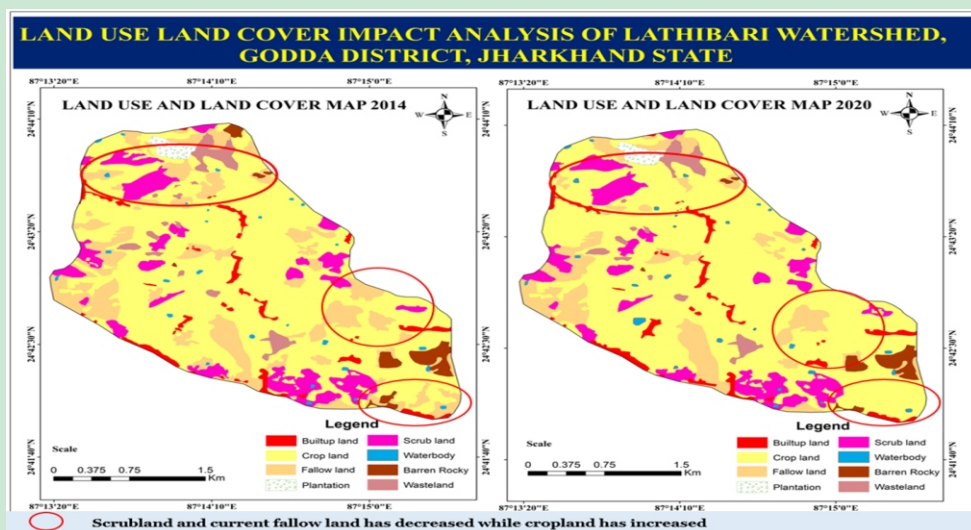
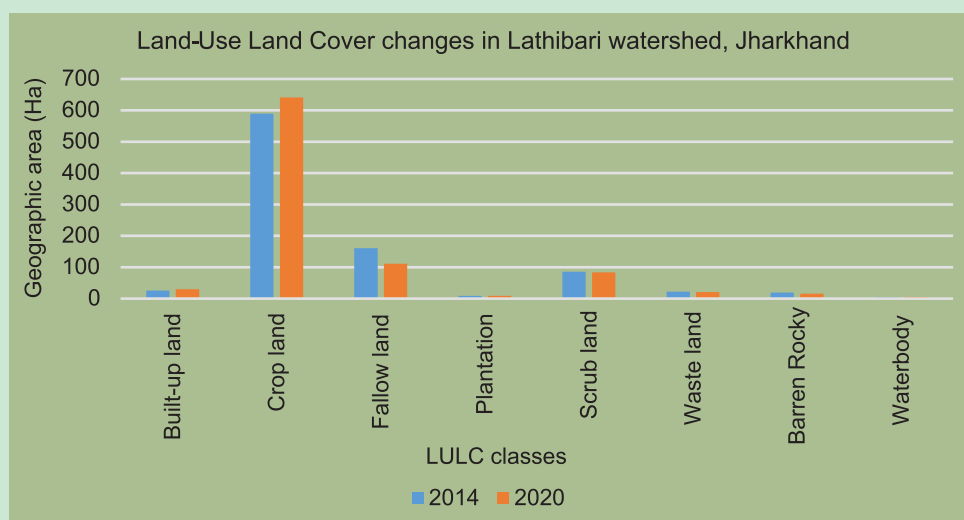


Figure 3 Multi temporal satellita data for Lathibari watershed.

The analysis of satellite data shows that the implementation of various activities in the project area has led to improve the crop land. The cropland area has increased from 589.67 ha to 641.37 ha. The current fallow land and scrubland area has decreased from 160.49 ha to 111.30 ha and 85.59 ha to 83.31 ha, respectively. The change trend of land use and land cover shows that mostly fallow land and some amount of scrubland and wasteland has been transformed into cropland.



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