Enduring Value

Nature based Solutions for Natural Resource Management and Livelihood Enhancement in Gangetic Flood Plains




ITC Limited
Munger, Bihar

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Flow of presentation

- Uniqueness of the project
- Implementation strategy and methods
- Tangible and Intangible benefits
- Replication potential of the project
- Contribution in achieving National/International Standards

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Background

- BY 2050, the Global population would reach a mark of 09 billion
- World may convert another 1 billion hectares of natural habitat to agricultural land use - *Tilman et al. (2001)*
- Half of global GDP is dependent on nature
  – *World Economic Forum*
- Under business as usual we may be -
  - Doubling/tripling of nitrogen and phosphorous inputs,
  - A twofold increase in water consumption,
  - A threefold increase in pesticide use *(Rosegrant et al. 2002)*
- This means that we would be destroying and degrading ecosystem services, which are the natural base of agriculture

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ITC's Policy and Commitments towards Environment

- Pursue innovation in business models to synergise creation of wealth for nation with formation of ecological and social capital as unified strategy, by adopting the 'Life-cycle Sustainability' principle
- 'Environment, Health and Safety (EHS)' policy with goal to achieve greenest & safest operations across all its operations - minimise impact & create positive footprint wherever possible by progressively improving water, energy and waste efficiencies
- ITC's Low-Carbon Growth strategy inter-alia, focuses on reducing GHG emissions within & beyond fence
- ITC's CSR Policy directs Company to enhance environmental & natural capitals; support rural development; promote education & skilling; provide health, sanitation & drinking water; create livelihoods for people, especially from disadvantaged sections of the society. Drive 'Green and Inclusive Growth'

ITC only company in world of its size that is - Carbon Positive since 13 years, Water positive since 16 years & Solid Waste Recycling Positive since 11 years

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Introduction

Sustainable Agriscape in Future: Biodiversity and Ecosystem Services (BES) of surrounding ecosystems and their linkages with Agriculture and NRM based livelihoods

Agriscape: An agriscape is an agriculture landscape where surrounding ecosystem, their services and goods to the agriculture is identified, mapped and preserved.

Ecosystem services: The natural resource services supporting agriculture are derived from the ecosystems that are referred to as ecosystem services. Example- Nutrient cycling, pest regulation, pollination etc.

Project Initiation: Year 2016 onwards

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Sustainable Agriscape - Highlights

- Landscape mosaic development of 8.32 Lakh native species
- External input reduction in 4000 acres
- Revival of 243 Ahar and Pyne – Traditional Irrigation System
- Removal of invasive species (Water Hyacinth) from 36 water bodies
- Linkage of 1476 HH to LPG/Ujjawala for reducing forest dependency
- Additional Livelihood for 1600 HH in 24 villages – Fishery/Goat/ Horticulture

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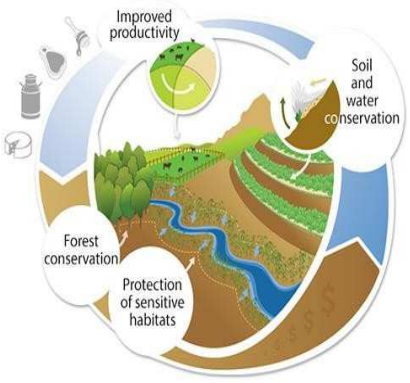
Uniqueness of the Project - Ecologically responsive agriculture



Source : IUCN Reference Study material

Important for agriculture to provide ecosystem services prevalent

contribute towards improving health of ecosystems and simultaneously reducing cost of agriculture or providing additional income to farmers.

Revival of soil biodiversity and soil nutrient enrichment cycle

Landscape matrix enhancement using multi-strata plantation - to improve habitats, stabilize pond embankments and to strengthen riverine buffers.

Conserving biodiversity to enhance resilience, acts as buffer against extreme events

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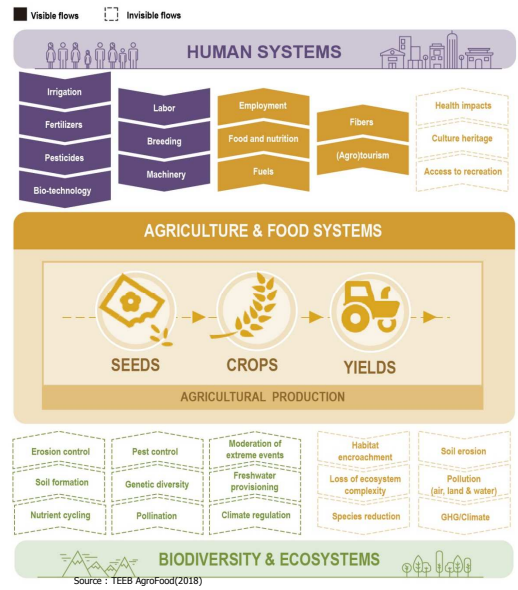
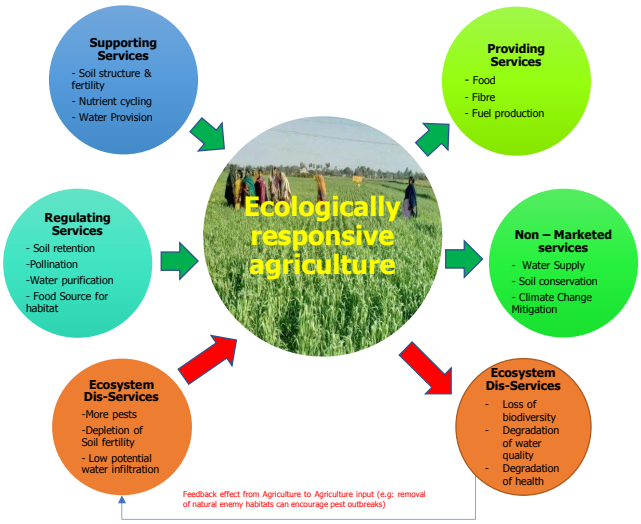
Landscape (Agriscapes) based approach



Source : TEEB AgroFood(2018)



Source: Zang W. *et.al* 2007. Ecosystem Services and Di-services to & From Agriculture.

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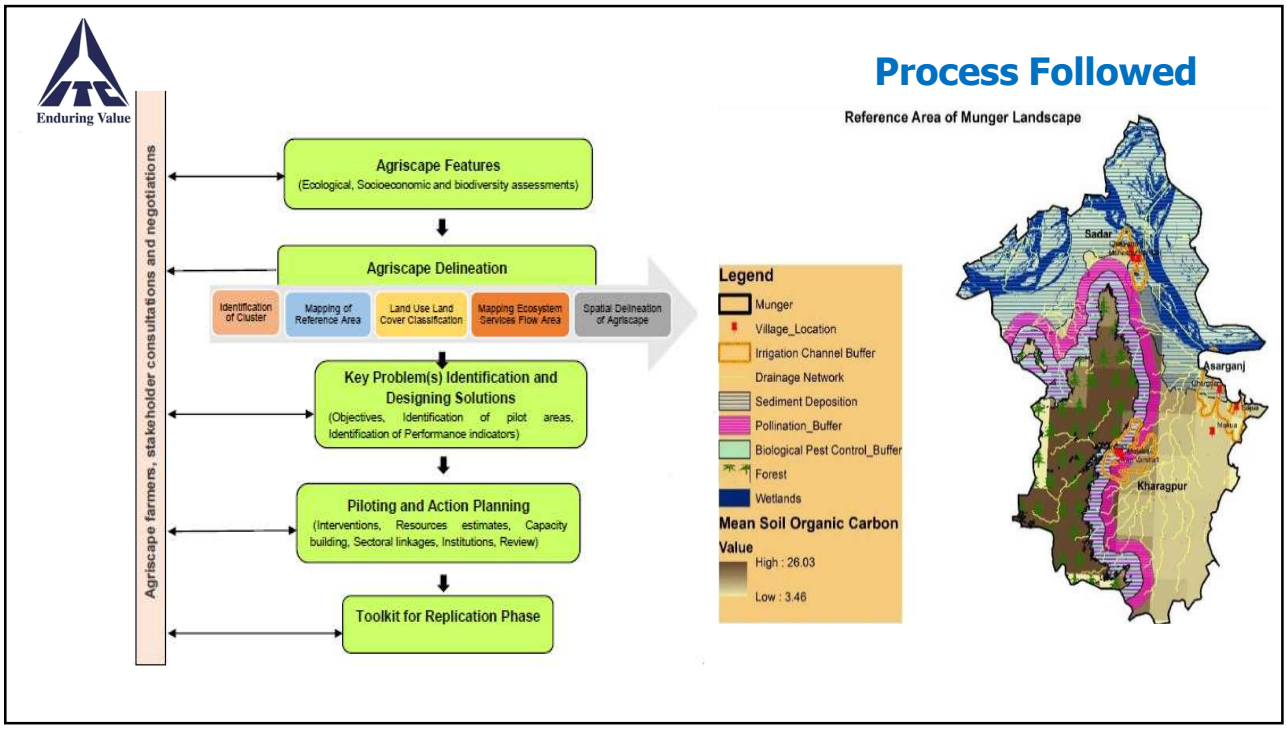
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Process Followed
Agriscape farmers, stakeholder consultations and negotiations
Agriscape Features
(Ecological, Socioeconomic and biodiversity assessments)
Agriscape Delineation
Identification of Cluster
Mapping of Reference Area
Land Use Land Cover Classification
Mapping Ecosystem Services Flow Area
Spatial Delineation of Agriscape
Key Problem(s) Identification and Designing Solutions
(Objectives, Identification of pilot areas, Identification of Performance indicators)
Piloting and Action Planning
(Interventions, Resources estimates, Capacity building, Sectoral linkages, Institutions, Review)
Toolkit for Replication Phase
Legend
Munger
Village_Location
Irrigation Channel Buffer
Drainage Network
Sediment Deposition
Pollination_Buffer
Biological Pest Control_Buffer
Forest
Wetlands
Mean Soil Organic Carbon Value
High : 26.03
Low : 3.46
Reference Area of Munger Landscape
Sadar
Asarganj
Kharagpur

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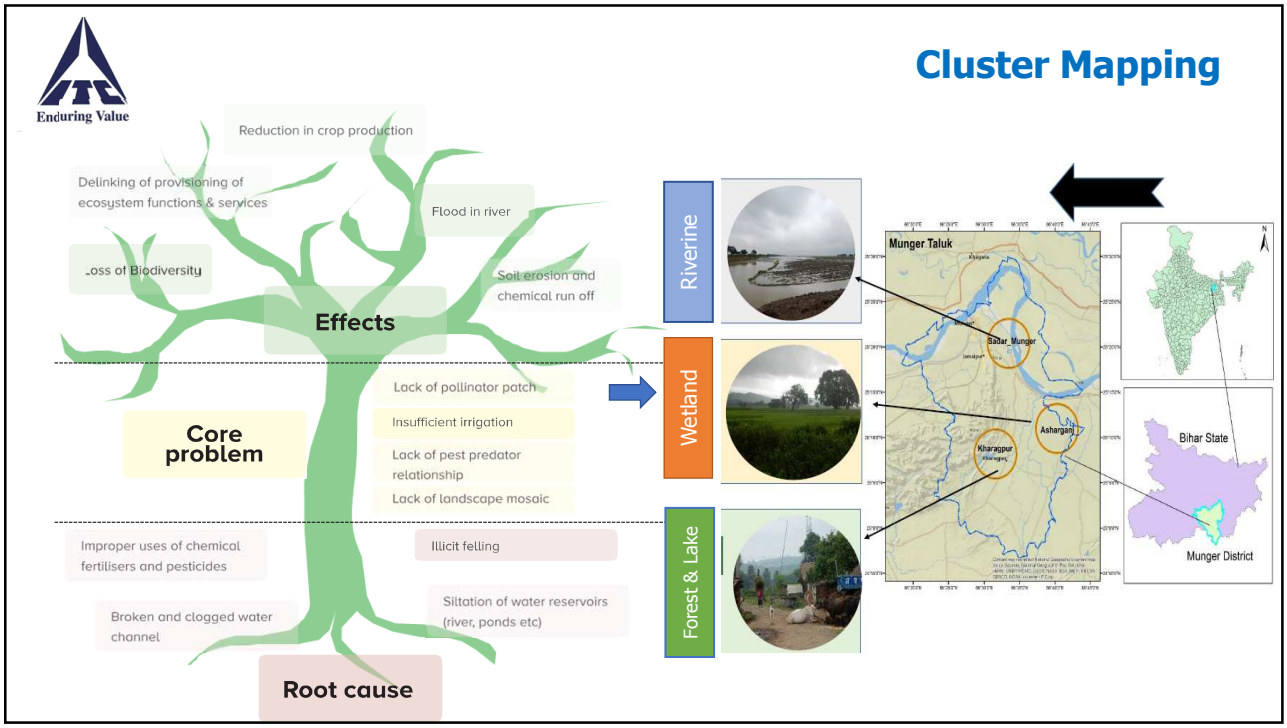
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Cluster Mapping
Reduction in crop production
Delinking of provisioning of ecosystem functions & services
Flood in river
Loss of Biodiversity
Soil erosion and chemical run off
Effects
Core problem
Lack of pollinator patch
Insufficient irrigation
Lack of pest predator relationship
Lack of landscape mosaic
Improper uses of chemical fertilisers and pesticides
Illicit felling
Broken and clogged water channel
Siltation of water reservoirs (river, ponds etc)
Root cause
Riverine
Wetland
Forest & Lake
Munger Taluk
Sadar_Munger
Ashargani
Kharagpur
Bihar State
Munger District

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Solution to strengthen ecosystem services

Process	Approach	Scale
Delineation of Agriscapes - Mapping of Reference Areas – Munger district - Land use land cover classification - Identification of cluster - Mapping ecosystem services flow & benefit areas - Spatial delineation of Agriscapes **Preparing Agriscape Plan** - Expert consultations - NGO & Line dept. consultation **Implementation of Plans** - Pilot Demonstrations - Capacity building	**Synergy Based Approach** - Multiple stakeholder involvement in the project. **Community led Approach** - Institution group – CSV Group/WUG group - Community owned interventions **Biodiversity enhancement** - Landscape mosaic development **Developing Agriscape Toolkit** - Compiling the learning - Developing Toolkit for Replication **Monitoring Tool** - Field Monitoring	**Issues with solutions** - Identification of challenges faced & solutions **Mapping of stakeholders** - Important stakeholders like Forest dept., MGNREGA, Namami Gange, Agri. Dept. **Mapping of schemes relevant to ecosystem services** - Organic corridor programme, input schemes, Plantation schemes, horticulture **Scheme Linkages** - Linkage of all prevalent schemes & engaging govt. stakeholders to scaling up

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Community Consultation & Capacity building

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Landscape Mosaic Development

Land scape mosaic development - Plantation

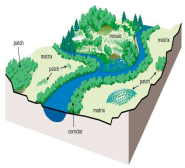
Private land – plantation on Agri bund

Common Land - Ahar and Pyne, farm ponds

Community led approach - Joint monitoring, Capacity building for plantation and survivality.

Survival – Scheme leverage, Suitable place, Linked to economic benefit.

Indicative



Munger

Open Canopy & Dense low scrub

Agriculture fields

Closed Canopy & Multi-strata

Water Channel

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Interventions

Nature based solution

Institution & Demonstration

Scheme linkage & Add. livelihood

MPTs Plantation Common & Farm

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Tangible and Intangible benefits achieved

Tangible Benefits	Intangible Benefits
Improve Natural Capital - Reduction in Rainfed land area - 41% to 22 %. - 7613 ha command area & water storage capacity of 4.17 lakhs cum **Climate Smart Agriculture** - Increase in crop area - Kharif, Rabi & summer season by 5.1 %, 74.8 % and 252.2 %. - Increase in yield of Paddy, Wheat and Moong by 24%, 30 % and 14 %. - Input reduction : by 108 MT fertilizer @INR savings of Rs 10 lakhs. **Livelihood Income enhancement :** - Average annual income from fishery in Ahar – Rs 60,619 from one-acre pond. - INR 19,600 economic benefits on fodder cultivation in Agriculture land	**Environmental Impact: Diversification through promotion of ToF (Tree Outside Forest)** : - 8.32 lakhs plants as ToF - Invasive species removal and composting - Reduced dependency on ground water. - Restoration of natural habitats - Species diversification through native plantation **Social Impacts : People Institution development for collective action** - Institutions in place to take care - Awareness on Natural resource conservation - Playing role in optimal utilization of natural resources - Cohesiveness - Dialogue platform created

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Scope of Replication

Integrated holistic Planning approach :

- **Sustainable Agriscape Toolkit:** prevalent to the projects site specific to natural surroundings
- Helps for better intervention planning of sustainable agriculture practices
- Planning a holistic model for achieving sustainable land use planning.

Creating Value Chain through landscape

- **Agriculture landscape with limited ecosystem services :** Absence of few ecosystem services, example - water body near the agriculture sites where rainfed farming is there.
- **Land use Plan:** In areas where the community , government or other relevant stakeholders are developing land use plan.
- **Areas with existing Land use planning:** Areas where land use plan is already in place but have ample scope of improvements for efficient planning to enhance the coverage under ecosystem services.

Agri productivity with NBS Toolkit :

- In areas where productivity is less
- Toolkit can be used to identify the problems and dis services to ecosystem

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Contributing national & international standards

- Contribution to ToF at state and National level
- State climate change adaptation plan
- Doubling farmers income
- SDG goals
- Carbon Sink

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