

PART I: PROJECT INFORMATION

Project Title: Promotion of Sustainable Food Systems in India through Transforming Rice-Wheat Systems in Punjab, Haryana, Odisha and Chhattisgarh			
FAO Project Symbol:			
Country(ies):	India	GEF Project ID:	10480
GEF Agency(ies):	FAO	GEF Agency Project ID (FAO entity number):	666361
Project Executing Entity(s)/Operational Partner(s):	Ministry of Agriculture and Farmers Welfare (MoA&FW)		
GEF Focal Area (s):	Biodiversity, Climate Change, Land Degradation	Expected EOD (implementation start):	April 2023
		Expected NTE (implementation end):	March 2028
Name of Parent Program	Food Systems, Land Use and Restoration Impact Program	Parent Program ID:	10201

Contribution to FAO's Strategic Framework: (Indicate as appropriate)	FAO Strategic Objectives: SO2: Make agriculture, forestry and fisheries more productive and sustainable FAO's Strategic Framework seeks to support the 2030 Agenda through the transformation to MORE efficient, inclusive, resilient and sustainable agri-food systems for <i>better production, better nutrition, a better environment, and a better life</i>, leaving no one behind. Country Programming Priorities: Priority Area 1: Improve agricultural productivity through sustainable natural resource management Country Outcomes: Outcome 1: Create an enabling environment for policy support and demonstrate innovative models on productivity improvements in agricultural, farm and non-farm livelihood activities and sustainable natural resource management. Output 1.6: Support sustainability of the rice-wheat food system in four states of India and deliver multiple global environmental benefits Regional Initiative/Priority Area: • Sustainable Rice Landscapes Initiative
Environmental and Social Risk Classification:	low risk ☐ moderate risk ☒ high risk ☐
FAO Gender Marker ¹ :	GM ☐ GM1 ☒ G2 ☐
	Budget: USD 20,366,973 Co-financing: USD 378,685,207 Total Budget: USD 399,082,180
Executive Summary This five (5) year project, directly implemented by the Government of India (GoI) (in collaboration with other key stakeholders from civil society and private sector) supports the development, application, validation, and scaling out of a transformational model of sustainable integrated food systems. The project will: 1) result in	

¹ FAO's Gender Marker

GM0 - Projects where gender equality is not relevant because there is no human or social component.

GM 1 - Projects where gender dimensions are systematically integrated but promoting gender equality is not the main objective.

GM 2 - Projects where the main objective is to promote gender equality and/or women's empowerment.

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major global environmental benefits in terms of reduced land degradation, biodiversity loss and greenhouse gas emissions; 2) provide the country with win-win benefits in terms of improvements in the environmental sustainability of food systems and the income and resilience of farmers, and; 3) generate additional benefits for other food system stakeholders such as improved access to safe and healthy food and to employment opportunities.

The project adopts an innovative “whole food system” approach. At the core of this model, farmers are supported in managing their farming and livelihood systems in an integrated manner in accordance with principles of sustainability, resilience and agroecology, including locally-adapted best practices capable of delivering multiple and linked environmental, social and health benefits. Sustainable farming systems will be embedded appropriately in sustainably- and collaboratively-managed landscapes in order to maintain ecosystem services and secure global environmental values; they will also be supported by reliable and appropriate input supply, and supported and incentivised by favourable output value chains. National and global private sector entities will play central roles in both input and output sides.

This approach will be deployed in close consultation with local stakeholders in two areas of India, namely: i) Punjab and Haryana in the Indo-Gangetic Plain, where the project will complement and enhance Government investments aimed at addressing the currently unsustainable nature of intensive rice and wheat production systems; and; ii) Chhattisgarh and Odisha in the east, a frontier landscape where environmental values and productive sustainability are being undermined by watershed degradation and increasing production pressures.

The project comes at a critical time: its focus on diversified, sustainable and resilient farming systems and value chains will help the country’s food systems to “build back better” following the COVID-19 pandemic, and adapt to growing stresses imposed by climate change. The project also offers farmers attractive options for responding to evolving market and value chain conditions, and opportunities for interacting in a mutually beneficial and empowered way with private sector actors.

The project is closely integrated with, and co-financed by, a number of GoI’s key flagship programmes in relation to the environment, food systems and rural wellbeing, and will be implemented in collaboration with multiple sector institutions. FAO, as Implementing Agency, will bring major value-added in terms of its global expertise in sustainable integrated food systems, integrated landscape management and restoration, and participatory approaches to farmer support.

As one of the largest initiatives under the FOLUR IP, this “child project” will contribute significantly to the programmatic goal of the FOLUR IP in terms of enhancing the sustainability of rice and wheat-based food systems at global level (given the huge contribution of India to the global supply of these crops); and feeding knowledge on sustainable food systems models into the global portfolio of FOLUR IP projects and beyond.

A. FOCAL/NON-FOCAL AREA ELEMENTS

Programming Directions	Focal Area Outcomes	Trust Fund	(in \$)	
			GEF Project Financing	Co-financing
FOLU IP	Transformation of food systems through sustainable production, reduced deforestation from commodity supply chains, and increased landscape restoration.	GEFT F	20,366,973	378,685,207
Total project costs				

B. PROJECT DESCRIPTION SUMMARY

Project Objective: To promote sustainable, integrated landscapes and efficient food value and supply chains at scale in rice- and wheat-based food systems in India.						
Project Components	Component Type	Project Outcomes	Project Outputs	Trust Fund	(in \$)	
					GEF Project Financing	Co-financing
1. Integration of cross-sector sustainability provisions into food systems, and planning frameworks	TA	1.1: Multi-stakeholder consensus and collaboration on integrated food systems One food systems roadmap formulated at National level Four food systems roadmaps developed (one in each target State)	1.1.1: Coordinating committees to promote inter-sector convergence and dialogue 1.1.2: Multi-stakeholder policy dialogues on sustainable food systems	GEFTF	776,123	20,621,753
		1.2: Key policy and decision makers are effectively applying decision-support tools in relation to integrated land management and sustainable food systems 500,000 ha covered under improved planning to foster sustainable food systems	1.2.1: Decision Support Systems developed for integrated land use planning and management and sustainable food systems planning 1.2.2: Strengthened systemic capacities for decision making on integrated land use planning and management, and food systems planning	GEFTF		
2. Enhance capacities for promoting and investing in sustainable and climate-smart food production practices and responsibly sourced commodity value chains	INV	2.1: Farmers (men and women) adopt sustainable farming practices 160,000 farmers (40% women, 30% tribals) adopting sustainable practices over 80,000 ha	2.1.1 Capacities strengthened for providing technical, organisational and input support 2.1.2. Mechanisms established and operating for provision of inputs (consumables and equipment) needed for sustainable production	GEFTF	8,680,354	144,550,758
		2.2: Green value chains support environmentally-sustainable farming through collaboration between public and private sectors 40,000 farmers (40% women, 30% tribals) actively engaged in GVC networks that incorporate	2.2.1: Farmer Producer Organizations (FPOs) and community-based organizations (CBOs) supported, enabling pro-poor development of green value chains 2.2.2: Green Value Chain Development Cell established as a platform for collaboration between actors in the public sector and private sector actors operating on the input and output sides of value chains, and dialogue on green value chain			

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		<i>sustainability standards and principles, with effective information management and value chain coordination</i> At least 4 private sector partners onboarded through the GVCDC	development			
3: Enabling integrated landscape management and restoration to sustain food systems and deliver GEBs	INV	3.1: Capacities, support mechanisms, governance and management frameworks established for landscape management, restoration and conservation in target districts 250,000 ha under integrated landscape management and food systems plans	3.1.1 Capacities developed for community-based sustainable landscape management 3.1.2 Inter-sectoral institutional framework and mechanisms for ILM at district, inter-district and sub-district levels 3.1.3 Integrated district-level plans for food system sustainability, landscape management and restoration		8,198,077	156,236,390
		3.2 Ecosystems and landscape areas are subject to restoration and improved management 131,897 ha with restoration plans under implementation	3.2.1. Ecosystem/landscape restoration plans agreed among stakeholders 3.2.2 Sustainable livelihood options compatible with ecosystem restoration developed/promoted			
4. Knowledge management to guide policies and maximize impacts	TA	4.1: Effective knowledge management, dissemination and coordination	4.1.1 Knowledge management and communication systems 4.1.2 Innovation forum/platform established 4.1.3: Mechanisms are developed and applied to coordinate the project with global, regional and transboundary efforts under the FOLUR IP and beyond	GEFTF	1,554,920	27,879,998
		4.2: Project implementation is based on RBM	4.2.1: Project RBM system (including MIS and M&E system) developed and implemented			
Subtotal				GEFTF	19,209,474	349,288,899
Project Management Cost (PMC)				GEFTF	1,157,499	29,396,308
Total Project Cost					20,366,973	378,685,207

C. CONFIRMED SOURCES OF CO-FINANCING FOR THE PROJECT BY NAME AND BY TYPE

Sources of Co-financing	Name of Co-financier	Type of Cofinancing	Investment Mobilized	Amount (\$)
Recipient Country Government	Government of Chhattisgarh	Public Investment	Investment mobilized	34,054,795
Recipient Country Government	Government of Haryana	Public Investment	Investment mobilized	144,082,192
Recipient Country Government	Government of Odisha	Public Investment	Investment mobilized	74,383,562
Recipient Country Government	Government of Punjab	Public Investment	Investment mobilized	106,924,658
Private Sector	Olam Agri India Private Ltd.	Grant	Investment mobilized	16,000,000
Private Sector	Olam Agri India Private Ltd.	In-kind	Recurrent expenditure	900,000
Private Sector	World Business Council for Sustainable Development	Grant	Investment mobilized	1,440,000
GEF Agency	FAO	Grant	Recurrent expenditure	900,000
Total Co-financing				378,685,207

The amounts presented in the cofinancing letters from State governments are given in Indian rupees (INR). The conversions used to give the USD amounts in the above table are as follows (using a conversion rate of USD 1 = INR 73):

Name of Co-financier	Amount (INR)	Amount (USD)
Government of Chhattisgarh	2,48,60,00,000	34,054,795
Government of Haryana	10,51,80,00,000 ²	144,082,192
Government of Odisha	5,43,00,00,000	74,383,562
Government of Punjab	7,80,55,00,000	106,924,658

Investment Mobilized

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Government of Odisha	5,43,00,00,000	74,383,562
Government of Punjab	7,80,55,00,000	106,924,658

The four State Government cofinances are from national level and state level "schemes" or "missions", which are special projects of the government and, hence, are not considered regular 'recurrent' budget.

The cofinance from World Business Council for Sustainable Development is from Investment Partnership for the Just Rural Transformation and Norwegian funded FOLU, as specified in their letter that has been uploaded. FAO's grant will consist of technical cooperation projects funded from its core resources that are provided to India as part of FAO's commitment to support country government priorities. The Olam investment mobilized is their investment in India to promote sustainable rice production and value chains.

² Assuming a 5-year period applied to the annual commitment given in the cofinancing letter (the total figure given in the letter refers to 6 years)

D. TRUST FUND RESOURCES REQUESTED BY AGENCY(IES), COUNTRY(IES), FOCAL AREA AND THE PROGRAMMING OF FUNDS

GEF Agency	Trust Fund	Country Name	Focal Area	Programming of Funds	(in \$)		
					GEF Project Financing(a)	Agency Fee (b)	Total (c)=a+b
FAO	GEFTF		Land Degradation	IP FOLU	1,810,398	162,935	1,973,333
FAO	GEFTF		Biodiversity	IP FOLU	9,051,988	814,679	9,866,667
FAO	GEFTF		Climate Change	IP FOLU	2,715,596	244,404	2,960,000
FAO	GEFTF		Multifocal Area	IP FOLU	6,788,991	611,009	7,400,000
Total GEF Resources					20,366,973	1,833,027	22,200,000

E. DOES THE PROJECT INCLUDE A “NON-GRANT” INSTRUMENT? No

F. PROJECT’S TARGET CONTRIBUTIONS TO GEF 7 CORE INDICATORS

Project Core Indicators		Expected at CEO Endorsement
3	Area of land restored (Hectares)	131,897
4	Area of landscapes under improved practices (excluding protected areas) (Hectares)	244,784
	Total area under improved management (Hectares)	376,681
6	Greenhouse Gas Emissions Mitigated (metric tons of CO ₂ e)	35,076,781
11	Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment	270,000 (of which 50% female)

Explanations of Core Indicator values:

Core indicator	Ex-ACT	Results framework	
3.1 Area of degraded agricultural land restored	2.3 LUC: Other Land Use Changes (Degraded land → Annual cropland)	Sub-indicator 3.1: Area of agricultural land restored	42,000 ha
3.2 Area of forest and forest land restored	2.3 LUC: Other Land Use Changes (Degraded land → Shaded perennial)	Sub-indicator 3.2: Area of forest and forest land restored ³	84,653 ha
3.3 Area of natural grass and shrublands restored	2.3 LUC: Other Land Use Changes (Degraded land → Grassland)	Sub-indicator 3.3: Area of natural grass and shrublands restored ⁴	5,244 ha
3.4 Area of wetlands to be restored			TBD
Total for Core Indicator 3			131,897 ha
4.1 Area of landscapes under improved management to benefit biodiversity ⁵	5.1 Forest degradation reduced from moderate to low	BD target at objective level	101,584 ha

³ Calculated as 25% of the area of mosaic land use patterns in the target districts

⁴ Calculated as 30% of the area under grasslands/ shrublands in the target districts

⁵ It is assumed that 30% of all area that are classified as ‘mosaic landscape’ (open forests) in the project areas will be brought under sustainable biodiversity practices through watershed approaches, and NTFP approaches. This is a conservative approach since the project will also promote agroforestry approaches in Punjab and Haryana, but they have not been included in the target.

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Core indicator	Ex-ACT	Results framework	
4.3 Area of landscapes under sustainable land management in production systems	3.1.2 Cropland: Annual cropping systems remaining annual cropping systems ⁶ 3.3.1 Cropland: Improved flooded rice management ⁷		143,200 ha
Total for Core Indicator 4			244,784 ha
Core Indicator 6	Total Ex-ACT result		35,076,781 t CO₂eq
Core Indicator 11		Total number of FFS graduates (Outputs 2.1.1 and 3.1.1)	270,000

⁶ 98,800 ha improved annual wheat systems; 13,320 ha improved annual systems (pulses/ oil seeds)

⁷ 98,800 ha continuously flooded, straw burnt → multiple drainage periods, straw exported; 44,000 ha rain fed, deep water (straw exported → straw incorporated)

Abbreviations

List of Abbreviations

Abbreviation	Meaning
ABD	Agrobiodiversity
AE	Agri-Entrepreneur
APMC	Agricultural Produce Market Committees
ATMA	Agricultural Technology Management Agency
AWD	Alternate Wetting and Drying
AWP/B	Annual Work Plan and Budget
BAIF	Bharatiya Agro-Industries Federation
BCM	Billion Cubic Metres
BFTs	Block Facilitation Teams
BGREI	Bringing the Green Revolution to Eastern India Initiative
BH	Budget Holder
BoD	Board of Directors
C&O	Chhattisgarh and Odisha
CBO	Community-Based Organization
CC	Climate change
CCM	Climate change mitigation
CDP	Crop Diversification Programme
CHC	Custom Hiring Centre
CIHL	Central Indian Highland landscape
CP	Causal Pathway
CRB	Crop Residue Burning
CSO	Civil Society Organizations
CT	Conventional Tillage
DPIU	District Project Implementation Unit
DPSC	District Project Steering Committee
DSR	Direct-Seeded Rice
DSS	Decision Support Systems
FCI	Food Corporation of India
FFS	Farmer Field School
FIG	Farmer Interest Group
FLO	Funding Liaison Officer
FOLUR	Food Systems, Land Use and Restoration
FPO	Farmer Producer Organization
FRA	Forest Rights Act
GAP	Good Agricultural Practice
GCF	Green Climate Fund
GCP	Government Cooperative Programme
GEB	Global environmental benefits
GHG	Greenhouse gas
GoI	Government of India
GP	Global Platform
GPSU	Gram Panchayat Project Support Unit
GVC	Green Value Chain
GVCDC	Green Value Chain Development Cell
GWP	Global Warming Potential
HYV	High Yielding Varieties
IA	Implementing Agency
IARI	Indian Agricultural Research Institute

Abbreviations

Abbreviation	Meaning
ICT	Information and communications technology
IFOAM	International Federation of Organic Agriculture Movements
IGP	Indo-Gangetic Plain
ILM	Integrated landscape management
INV	Investment
IP	Impact Programme
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Pest Management
IRRI	International Rice Research Institute
IUCN	International Union for the Conservation of Nature
JS	Joint Secretary
KCC	Kisan Call Centre
KVK	<i>Krishi Vigyan Kendras</i>
LD	Land Degradation
LDN	Land Degradation Neutrality
LTO	Lead Technical Officer
M&E	Monitoring and Evaluation
MIS	Management Information System
MKSP	Mahila Kisan Sashaktikaran Pariyojana
MoA&FW	Ministry of Agriculture and Farmers' Welfare
MoEF&CC	Ministry of Environment, Forest and Climate Change
MSP	Minimum Support Price
NAFED	National Agricultural Cooperative Marketing Federation of India Ltd
NBS	Nature-based solutions
NCA	Natural Capital Accounting
NFSM	National Food Security Mission
NGGB	Narwa, Garwa, Ghurwa and Baadi
NGO	Non-Governmental Organization
MORD	Ministry of Rural Development
NITI	National Institution for Transforming India
NPMU	National Project Management Unit
NPOP	National Programme for Organic Agriculture
NPSC	National Project Steering Committee
NRLM	National Rural Livelihood Mission
NTFP	Non-Timber Forest Product
OED	Office of Evaluation
OP	Operational Partner
OPA	Operational Partner Agreement
OPIM	Operational Partners Implementation Modality
P&H	Punjab and Haryana
PA	Protected Area
PACS	Primary Agriculture Cooperative Societies
PDS	Public Distribution System
PES	Payment(s) for environmental services
PESA	Panchayat (Extension to the Scheduled Areas) Act
PGS	Participatory Guarantee System
PIF	Project Identification Form
PKVY	Paramparagat Krishi Vikas Yojana
PMKSY	Pradhan Mantri Krishi Vikas Yojana
PMU	Project Management Unit
PPP	Public-Private Partnership

Abbreviations

Abbreviation	Meaning
PRADAN	Professional Assistance for Development Action
PSC	Project Steering Committee
PTF	Project Task Force
PVTG	Particularly Vulnerable Tribal Groups
RBM	Results-based management
RF	Results framework
RWCS	Rice-Wheat Cropping System
SAU	State Agricultural Universities
SDG	Sustainable Development Goal
SEA	Strategic Environmental Assessment
SFM	Sustainable forest management
SFS	Sustainable Food System
SHG	Self-Help Group
SMART	Specific, Measurable, Achievable, Relevant and Time-bound
SMS	Short Message Service
SPMU	State Project Management Unit
SPSC	State Project Steering Committee
SRLI	Sustainable Rice Landscapes Initiative
SRP	Sustainable Rice Platform
STAP	Scientific and Technical Advisory Panel
TAPE	Tool for Agroecology Performance Evaluation
ToT	Training of Trainers
TRFA	Targeting Rice Fallow Areas
TSA	Targeted Scenario Analysis
VCA	Value Chain Analysis
VDVK	Van Dhan Vikas Kendras (Forest Wealth Development Centres)
WB	World Bank
WBCSD	World Business Council for Sustainable Development
WUA	Water User Associations
ZT	Zero Tillage

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- B. Response to Project Reviews**
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PART II: PROJECT JUSTIFICATION

1.a Project Description

1. This project will support the Government of India (in collaboration with other key stakeholders from civil society and private sector) in developing and applying a model of sustainable integrated food systems, that will provide the country with win-win benefits in terms of improvements in the environmental sustainability of food systems and the income and resilience of farmers, with additional benefits for other food system stakeholders such as improved access to safe and healthy food and to employment opportunities. This will also result in major environmental benefits of global importance in terms of the reduction of land degradation, biodiversity loss and greenhouse gas emissions.
2. This initiative responds to a recognition by the GoI that the high-input rice/wheat production systems that currently predominate, especially in the Indo-Gangetic Plain, are productively unsustainable, and generate major environmental and health impacts of national and global concern, including soil degradation, groundwater depletion, air pollution and greenhouse gas emissions. Production systems, in the mainly hilly landscapes of the east of India (where the GoI proposes to increase agricultural production to take advantage of the abundant water resources available), are also facing sustainability challenges, both on-farm and due to the degradation of the watersheds on which they depend for ecosystem services.
3. The project will operate in close partnership with the major initiatives of GoI in support of the environmentally sustainable development of the agricultural sector, including the National Mission on Sustainable Agriculture, the Crop Diversification Programme, the Targeting Rice Fallow Areas programme and the Bringing the Green Revolution to the Eastern India initiative, working through these to deliver impact at scale and to assist them in optimizing their environmental outcomes. It will also engage the private sector in the scaling out of sustainable production models, the strengthening of value chains to incentivise sustainable production, and the shaping of consumer demand for environment- and nutrition-friendly products.

Box 1. Sustainable food systems⁸

The **food system** includes the related resources, inputs, production, transport, processing and manufacturing industries, retailing, and consumption of food as well as its impacts on environment, health, and society.

A **sustainable food system** is understood as one that delivers food security and nutrition for all in such a way that the economic, social, cultural, and environmental bases to generate food security and nutrition for future generations are safeguarded.

⁸ Food Systems – Definition, Concept and Application for the UN Food Systems Summit. Joachim von Braun, Kaosar Afsana, Louise Fresco, Mohamed Hassan, Maximo Torero. A paper from the Scientific Group of the UN Food Systems Summit Draft December 20, 2020 (for discussion). United Nations Food Systems Summit 2021. Scientific Group <https://sc-fss2021.org/>

1) *The global environmental and/or adaptation problems, root causes and barriers that need to be addressed (systems description).*

The national context

Box 2. The national context - key points:

- India is a megadiverse country and a major contributor to global food supply
- Agriculture continues to be of vital importance to the national economy and livelihoods
- Increases in food production have transformed India from a state of food insecurity to one of security and surplus
- In the future there will be a continued surplus of rice and wheat but a deficit of coarse cereals, pulses and oilseeds
- Productivity gains to date are largely due to the Green Revolution, which has mostly benefited rice and wheat
- Production of rice and wheat is driven by the strong focus of Government procurement and price support on these crops
- The agriculture sector is highly regulated, but the private sector is playing a growing role
- Food expenditure patterns are changing, with a move away from cereals
- Strong progress has been made in tackling undernutrition and to a lesser extent anemia, overnutrition is a growing problem.

Biodiversity

4. **India is a megadiverse country** that harbours 7-8% of all species recorded globally, including over 45,000 species of plants and 91,000 species of animals, on only 2.4% of the world's land area. Situated at the trijunction of Afro-tropical, Indo-Malayan and Paleo-Arctic realm, India has a wide array of ecosystems and habitats. Total evaluated fauna as reported in India's Fifth National Report to the Convention on Biological Diversity (NR5) in 2014 was 4,681 species, of which 646 were in "threatened" categories: evaluated fauna in 2018 increased to 5,507, of which 675 species were threatened. Total conservation areas add up to approximately 9 million km², i.e., 27 % of the geographical area of the country.

Agrobiodiversity

5. **India is one of the 12 Vavilov centres of origin and diversification of cultivated plants** of the world, known as the "Hindustan Centre of origin of crop plants". It is fourth globally in coarse warm-weather annual cereal production of short duration crops such as sorghum, pearl millet, maize, and finger millet in rainfed agro-climatic regions. The Protection of Plant Varieties and Farmers' Rights Authority (PPVFRA) has identified 22 agrobiodiversity (ABD) hotspots in India based on the number of species, crop varieties, wild relatives of cultivated crop species, social relevance, ancientness of agriculture, number of species domesticated and the uniqueness of the agroecosystem⁹.

Contribution to global food supply

6. **India is also of huge global significance as a food producer and consumer (Box 3)**, making it a vital player in relation to global food systems, and specifically the GEF-7 Food Systems, Land Use and Restoration (FOLUR) Impact Programme.

⁹ Implementation of India's National Biodiversity Action Plan: An Overview 2019. Ministry of Environment, Forest and Climate Change, Government of India, 2019

Box 3. The importance of India for global food supply

- With 1.27 billion inhabitants, India is the world's second most populous country and is home to almost a fifth of the global population.
- In 2019, India accounted for 23% of global rice and 13% of global **wheat** production, and was the largest global **rice** exporter (>25% share).
- It is the largest producer (25% of global production), consumer (27% of world consumption) and importer (14%) of **pulses** in the world.
- Total foodgrain production in 2020-21 is estimated at 305.44 MT (an increase of 7.94 MT on 2019-20 and 26.66 MT higher than the 2015-20 five year average¹⁰..
- It is also the second-largest **fruit** and **vegetable** producer, accounting for 10.9% and 8.6% of global production, respectively¹¹.
- Total production of **rice** during 2020-21 is estimated at a record 121.46 MT (a 9.01 MT increase over the last five years' average); production of **wheat** during 2020-21 is estimated at a record 108.75 MT (an 8.32 MT increase over the last five years' average)¹².
- India has been the world's leading rice exporter since the Government removed the export ban on coarse grain rice exports in 2011: more than 85% of the global Basmati export (by quantity and by value) is from India. In the five years between 2014-15 and 2018-19, India's Basmati exports increased from around 3.7 to 4.5 million metric tonnes.

The agriculture sector in India

7. Despite increasing urbanization and growth of the industrial and service sectors, **agriculture, with its allied sectors, continues to be the largest source of livelihood support in the country** (see Box 4):

Box 4. The national importance of the agriculture sector

- 90.2 million agricultural households, which represent about 57.8% of the total estimated rural households, still depended primarily on agriculture for their livelihood¹³ (86% of farmers in 2015-16 were small and marginal, holding 46.94% of operated area¹⁴);
- In 2011, 54.6% of the total workforce was engaged in agricultural and allied sector activities¹⁵
- Agriculture is set to cushion the shock of the Covid-19 pandemic on the Indian economy in 2020- 21 with a growth of 3.4% – resulting in an increase in its share in GVA to 19.9% in 2020-21 from 17.8% in 2019-20¹⁶.

8. **India has achieved a massive transformation of national food supply systems**, from a highly food-insecure condition at the time of Independence, and a high level of dependence on overseas food aid in the 1960s, to a situation today where the country is the second largest producer of wheat and rice in the world, and the largest global exporter of rice.

9. **This transformation is largely attributable to the use of high yielding crop varieties and modifications to farming practices, initially associated with the “Green Revolution”** from the 1960s on. Figure 1 shows how rice and wheat production grew as a result of the Green Revolution, compared to the “business as usual” scenario extrapolated from trends prior its onset. There has been a shift from traditional, subsistence farming of non-commercial crops to commercial/cash crops¹⁷; cropping intensity increased from 123.1% in 1980/81 to 141.5% in 2015/16; and the

¹⁰ Third Advance Estimates 2020-21 (<https://pib.gov.in/PressReleaseIframePage.aspx?PRID=1721692>)

¹¹ <http://www.fao.org/india/fao-in-india/en/>

¹² https://eands.dacnet.nic.in/Advance_Estimates.htm

¹³ http://mospi.nic.in/sites/default/files/publication_reports/KI_70_33_19dec14.pdf

¹⁴ https://agcensus.nic.in/document/agcen1516/ac_1516_report_final-220221.pdf

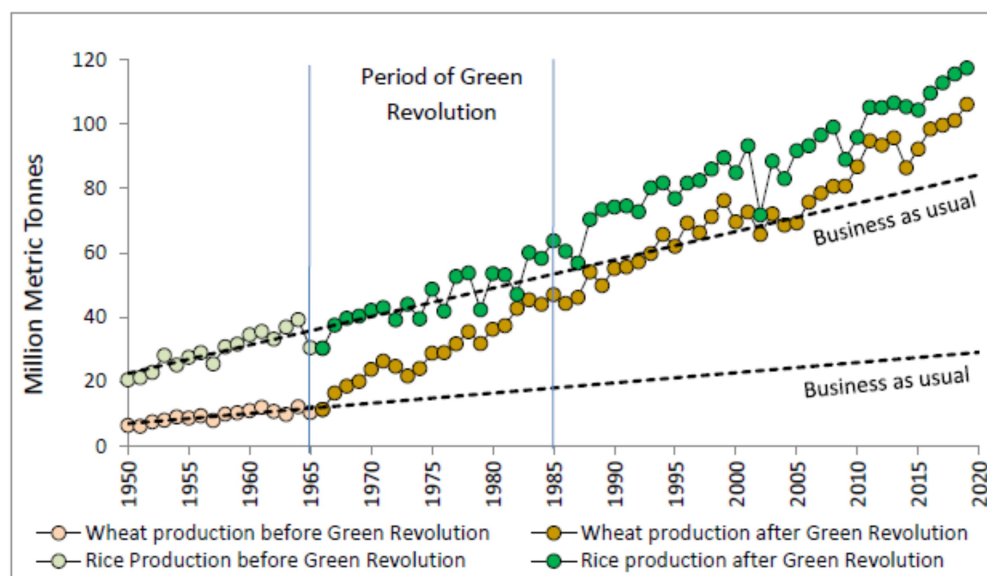
¹⁵ https://www.indiabudget.gov.in/economicsurvey/doc/vol2chapter/echap07_vol2.pdf

¹⁶ https://www.indiabudget.gov.in/economicsurvey/doc/vol2chapter/echap01_vol2.pdf

¹⁷ Majhi, B. and Kumar, A. 2018. Changing cropping pattern in Indian agriculture. Journal of Economic and Social Development, 14(1): 37-45.

contribution of mechanical sources of farm power increased from 8% in 1960-61 to 88% in 2013-14.

Figure 1. Growth in the production of rice and wheat in India due to the Green Revolution¹⁸



10. **Crop production is dominated by food grains** (cereals, millets, and pulses). Nationally, the cropping area covered by rice and wheat increased from 31.6% of the total in 1962-65 to 37.7% in 2012-14, while the area under nutri-cereals and pulses fell from 43.1% to 24.7%.

11. The State plays a major role in food procurement and price support in India (see Box 5). **The emphasis of public procurement and price support on rice and wheat has been a major driver** for the increase in area of these two crops, which in 2018-19 accounted for 95% of public procurement nationally (with a shift in recent years from rice to wheat, from 70 and 29% respectively in 2007-08 to 37 and 58% in 2018-19).

Box 5. Public Procurement and Price Support in the Agriculture Sector in India¹⁹

The Central Government extends price support to paddy and wheat through the FCI and State Agencies across the country. The procurement policy is open ended. Under this policy, whatever wheat and paddy are offered by farmers, within the stipulated period & conforming to the specifications prescribed by Government of India, are purchased at Minimum Support Price (MSP) by the State Government agencies including Food Corporation of India (FCI) for Central Pool. However, if producer/farmer gets better price in comparison to MSP, they are free to sell their produce in open market i.e. to private trader/ anyone. The objective of food grains procurement by Government agencies is to ensure that farmers get remunerative prices for their produce and do not have to resort to distress sale. It aims to service the NFSA and other welfare schemes of the Government so that subsidised food grains are supplied to the poor and needy, and to build up buffer stocks of food grains to ensure food grain security.

Further, the different types of coarse grains are procured by State Governments itself in consultation with FCI to the extent that the concerned State Govt. may utilise the same for distribution under National Food Security Act (NFSA) as well as Other Welfare Schemes (OWS).

Under the Centralized Procurement System, the procurement of food grains in Central Pool are undertaken either by FCI directly or State Government agencies procures the food grains and

¹⁸ Majhi, B. and Kumar, A. 2018. Changing cropping pattern in Indian agriculture. *Journal of Economic and Social Development*, 14(1): 37-45.

¹⁹ <https://dfpd.gov.in/Procurement-Policy.htm>

handover the stocks to FCI for storage and subsequent issue against GOI allocations in the same State or movement of surplus stocks to other States. The cost of the food grains procured by State agencies is reimbursed by FCI as soon as the stocks are delivered to FCI as per cost-sheets issued by GOI.

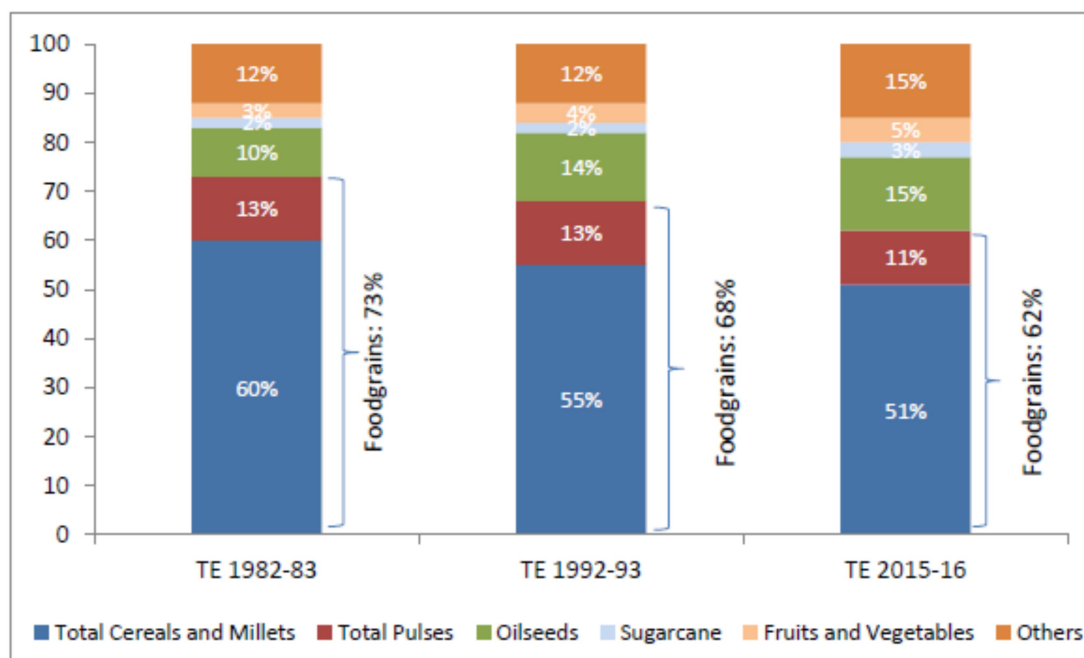
The scheme of Decentralized Procurement of food grains was introduced by the Government in 1997-98 with a view to enhancing the efficiency of procurement and PDS and encouraging local procurement to the maximum extent thereby extending the benefits of MSP to local farmers as well as to save on transit costs. This also enables procurement of food grains more suited to the local taste.

Under this scheme, the State Government itself undertakes direct purchase of paddy/rice and wheat and also stores and distributes these foodgrains under NFSA and other welfare schemes. The Central Government undertakes to meet the entire expenditure incurred by the State Governments on the procurement operations as per the approved costing. The Central Government also monitors the quality of foodgrains procured under the scheme and reviews the arrangements made to ensure that the procurement operations are carried smoothly.

In 2020-21, 10.2 million farmers nationally benefited from public rice procurement (46.5 million tons) and 4.3 million from public wheat procurement (38.9 MT): of the total rice procurement volume, Punjab, Haryana, Chhattisgarh and Odisha accounted for 13.6, 3.8, 4.0 and 4.3 MT respectively, while Punjab and Haryana accounted for 12.7 and 7.4 MT respectively of the total wheat procurement²⁰.

12. Despite the continued emphasis of public procurement and price support on rice and wheat, **the proportional contribution of food grains (cereals, millets and pulses) to total cropping area has declined over recent years**, relative to other crops such as oilseeds, fruits and vegetables (see Figure 2).

Figure 2. Changing cropping patterns (percentage area under major crops)²¹



13. Looking forward²², it is projected that by 2032-33 India will have **sufficient supply of food grains overall**, with **significant surpluses of rice and wheat** but a **deficit of pulses and coarse**

²⁰ <https://dfpd.gov.in/writereaddata/Portal/Magazine/March2021.pdf>

²¹ Land Use Statistics at a Glance (DES, 2017)

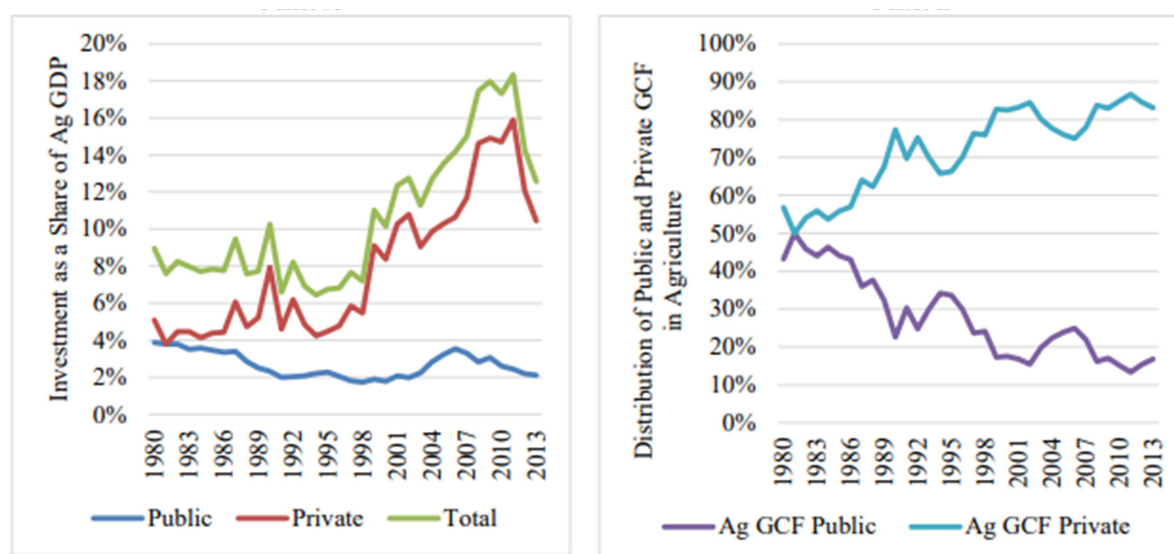
cereals. Given that the indirect demand of coarse grains as feed for the growing livestock and poultry sector is likely to increase at a rapid pace, **chronic shortage of feed and fodder** is also expected. A **massive deficit of oilseeds** is predicted.

Table 1. Aggregate demand and supply estimates, 2032-33 (millions of metric tonnes)

Commodities	Demand Estimates	Supply Projections	Net Surplus
Rice	120.84	151.6	30.76
Wheat	113.46	138.8	25.34
Coarse cereals	67.48	61.7	-5.78
Total Cereals	301.78	352.3	50.52
Pulses	35.23	33.9	-1.33
Total Food grains	337.01	386.2	49.19
Oilseeds	99.59	29.9	-39.69
Milk and derivatives	292.15	392.7	37.55
Fruits	203.55	202.6	-0.95
Vegetables	360.77	362.8	20.3

14. There has been a significant **increase in the role of the private sector in Indian agriculture** in recent decades (Figure 3). Private investment attained almost 16% of agricultural GDP in 2011 but declined to between 12 and 13% in 2013 in a context of rising inflation. In 2013, the private sector accounted for 83% of gross capital formation in agriculture, the public sector for 17% (Panel B).

Figure 3. Trends in public and private roles in agriculture in India (Gross Capital Formation in Agriculture as Percentage of Agricultural GDP (Current Prices))²³



15. Before the Green Revolution (GR), a majority of seeds, manure, draught and labour was sourced at the farm level. GR technologies shifted the orientation of input access to a greater reliance on markets for seeds and inputs such as chemical fertilizers and pesticides. Initially, State-owned Enterprises (SoEs) played an integral role in the production of inputs. In the late 1980s onward with the liberalization of the Indian economy and post-WTO agreements, **private firms have emerged to be significant players in agricultural inputs**. The opening up of the economy marked the second stage of the input industry transformation. Besides fertilizer production, the private sector dominates the sales of other inputs, namely, seeds and pesticides Table 2). Concerning farm implements and machinery such as tractors, the private sector has always been

²² NITI Aayog Working Group on Demand and supply projections towards 2033

²³ Ferroni M and Zhou Y (2018). The Private Sector and India's Agricultural Transformation. Global Journal of Emerging Market Economies 9(1-3) 28-37.

the dominant player. Concerning issues of diversification and resilience and the inputs that are needed to achieve them, the private sector has emerged as the front-runner. Multinational companies (MNCs) account for 44% of the seed industry R&D and have been responsible for a majority of biotechnology-based research²⁴.

Table 2. Changing share of private and public sectors in agricultural inputs (1991 – 2009)²⁵

Industry	1991		2009	
	Public sector	Private sector	Public sector	Private sector
Share of seed sales	35	65	20	80
Share of pesticide sales	8	92	<1	>99
Share of tractor sales	16	84	1	99
Share of fertilizer sales	60	40	50	50

16. Despite the productive transformation described above, **agriculture in India continues to be smallholder-dominated**: small and marginal farmers with less than 2 ha of land continue to account for 86.2% of the total of 146.4 million operational land holdings, increasing from 70% in 1970/71 to 82% in 2000/01; and **the average size of land holdings declined** continuously from 2.28 ha in 1970-71 to 1.08 ha in 2015-16, due in large part to population growth and sub-division of holdings among family members.

17. As further explained below, although the Green Revolution approach to agriculture has had major benefits for the national food supply situation, serious concerns have emerged about its environmental sustainability. Large-scale high-input production of rice/wheat monocrops in the Indo-Gangetic Plain has caused degradation of soil and groundwater resources, air pollution and agricultural emissions of greenhouse gases. In eastern India, landscapes and biodiversity are already affected by unsustainable production and extraction, and watershed degradation is undermining the potential of irrigated agriculture in areas downstream; unless done sustainably, shifting the focus of intensive cereal production to eastern India raises the potential of increasing these pressures.

Trends in food demand

18. India's rice consumption is around 100 million tonnes per annum, and per capita consumption has been stagnant in recent years. Over the last decade, the GoI has expanded various food security programs to ensure the supply of food, mainly rice, to the impoverished segment of the population. However, with the growing economy and expanding middle/upper class, consumers are increasingly replacing a 'basic' food staple like rice with higher protein and higher nutrition items such as pulses, meat, dairy, fruits, and vegetables²⁶ (Figure 4). One indirect implication of this will be increased demand for cereals for livestock feed.

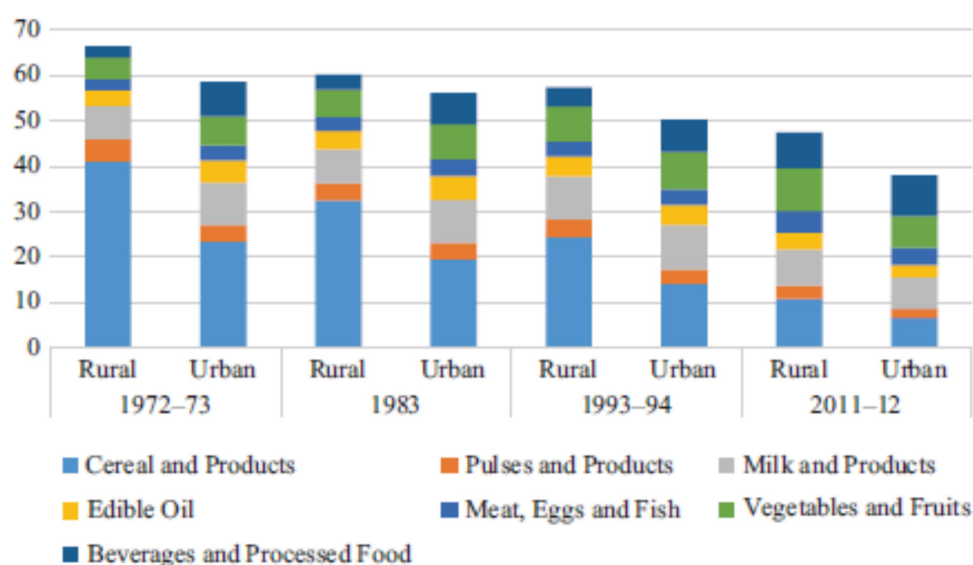
19. Due to predominately vegetarian population of India, the demand of pulses has also increased over time. Between 2004-2005 and 2011-2012, per capita consumption of pulses and their products rose from 705 g per month to 783 g in the rural sector and from 824 g to 901 g in the urban sector.

²⁴ Pingali et al (2019): Transforming Food Systems for a Rising India. Palgrave Studies in Agricultural Economics and Food Policy.

²⁵ Pray CE and Nagarjan I (2014). The transformation of the India agricultural input industry: Has it increased agricultural R&D? *Agricultural Economics*, 45(1), 145-156.

²⁶ USDA 2019

Figure 4. Food expenditure patterns in India are changing²⁷



The target states

Box 6. The target states - key points

- The project will work specifically in four states: Punjab, Haryana, Chhattisgarh and Odisha.
- The target states are central to the Government's policies of diversifying away from currently dominant cereals in traditional Green Revolution areas (including Punjab and Haryana), and shifting the focus of intensive production to moister areas (including Chhattisgarh and Odisha)
- Punjab and Haryana are the main wheat producing states in the country (accounting for 65% of national contributions to the Central Pool²⁸)
- Average holding sizes are significantly larger in Punjab and Haryana than in Chhattisgarh and Odisha
- Chhattisgarh and Odisha contain high levels of globally-important and threatened biodiversity, including agrobiodiversity
- Poverty levels in Chhattisgarh and Odisha are significantly higher than in Punjab and Haryana
- Chhattisgarh and Odisha contain significant numbers of tribal peoples, whose livelihoods depend strongly on forest use and agriculture.

20. The four states in which the project will work directly (Punjab and Haryana in the Indo-Gangetic Plain, and Chhattisgarh and Odisha in the centre/east of the country, see Table 3 and Figure 5) have been selected on the basis of their importance for global food systems and, in the case of Chhattisgarh and Odisha, their globally important biodiversity (one of the major threats to which is unsustainable food production and landscape management systems).

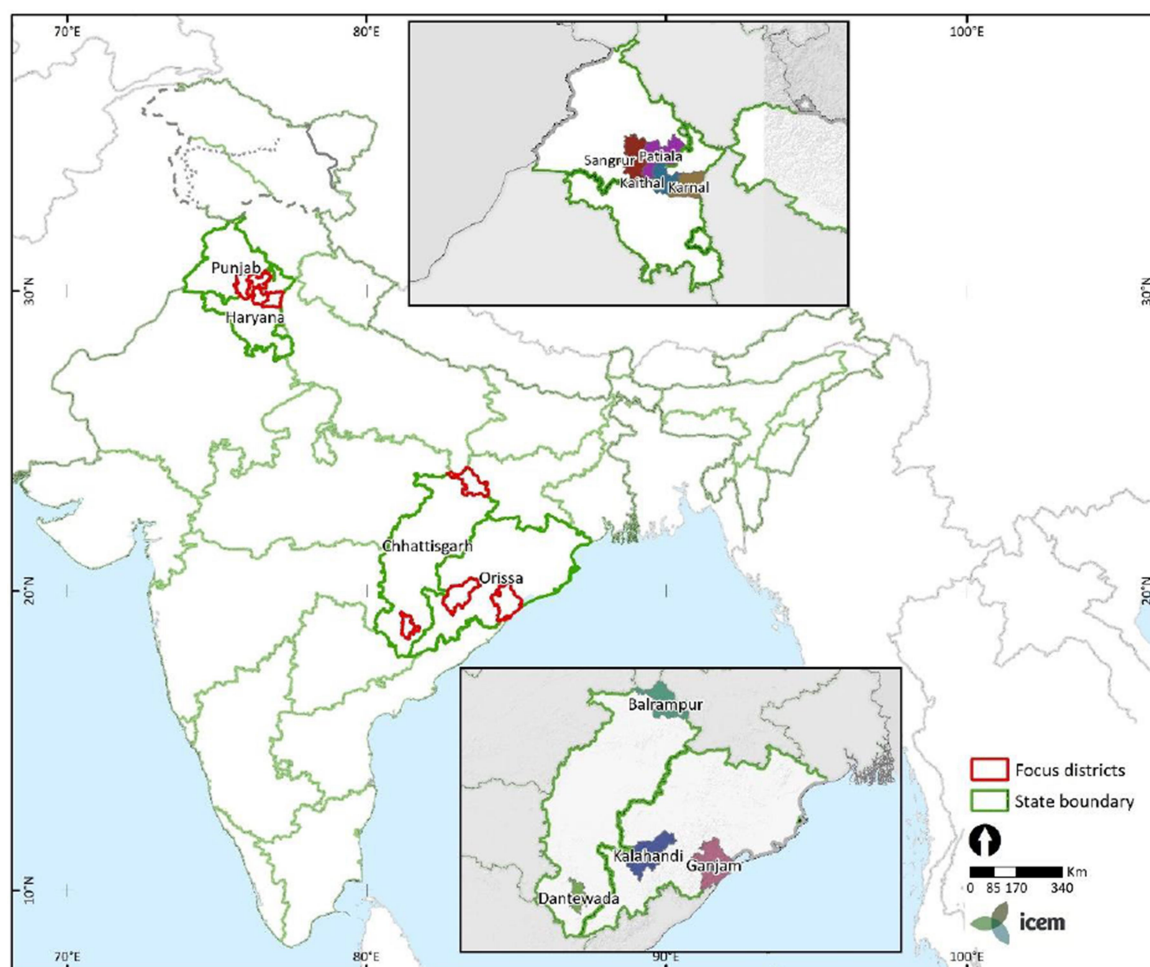
21. Detailed information on the target districts is presented in Supplementary Annexes 1.1 (socioeconomic data), 1.2 (climate, physiography and soils), 1.3 (water resources) and 1.4 (agricultural production).

²⁷Adapted from Pingali et al (2019): Transforming Food Systems for a Rising India. Palgrave Studies in Agricultural Economics and Food Policy.

²⁸ Source: Food Corporation of India; 2019-20

Table 3. Target districts and blocks

State	District	Blocks
Punjab	Patiala	Bhunerheri Patiala, Sanaur
	Sangrur	Andana, Ahmedgarh, Bhawanigarh
Haryana	Karnal	Gharunda, Karnal, Indri
	Kaithal	Guhla, Siwan, Rajaund
Chhattisgarh	Balrampur	Ramchandrapur, Balrampur, Wadrafnagar, Shankargarh, Kusmi, Rajpur
	Dantewada	Geedam, Dantewada, Katekalyan, Kuwakonda
Odisha	Ganjam	Digapahandi, Surada, Kabisuryanagar
	Kalahandi	Gloamunda, Kokasar, Thuamul-Rampur

Figure 5. The target states and districts of the project

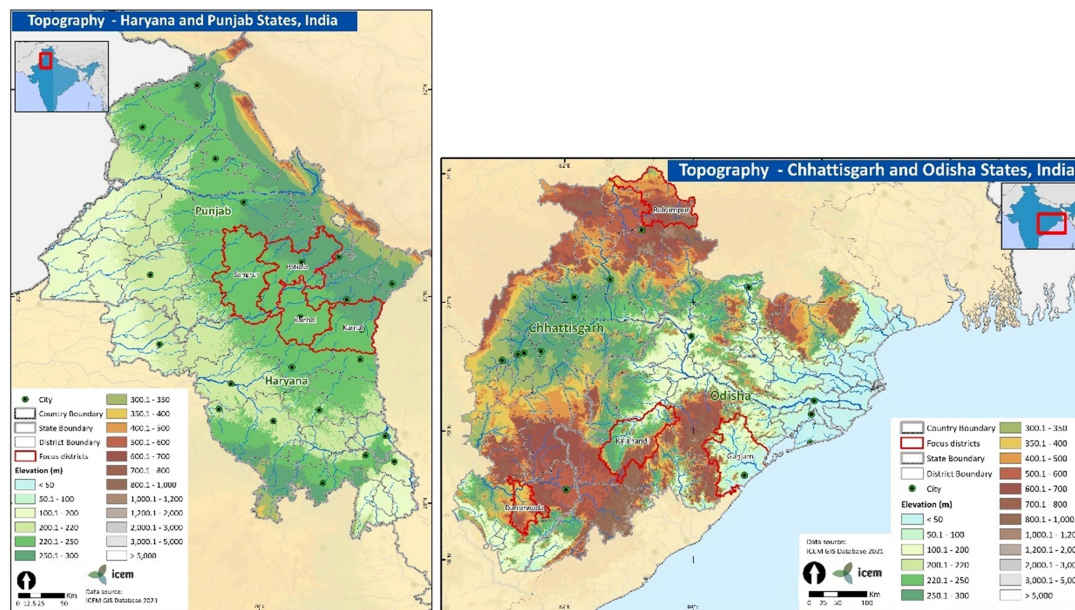
22. These two groups of States, and the areas of which they are representative, are central to the Government's strategy for addressing sustainability issues in cereal production. Key elements of this include:

- Diversifying away from rice in traditional "Green Revolution" areas such as the Indo-Gangetic Plain (including Punjab and Haryana), which face increasing levels of water stress and environmental degradation;

PART II 1a. Project Description 1) Global environmental problems (context)

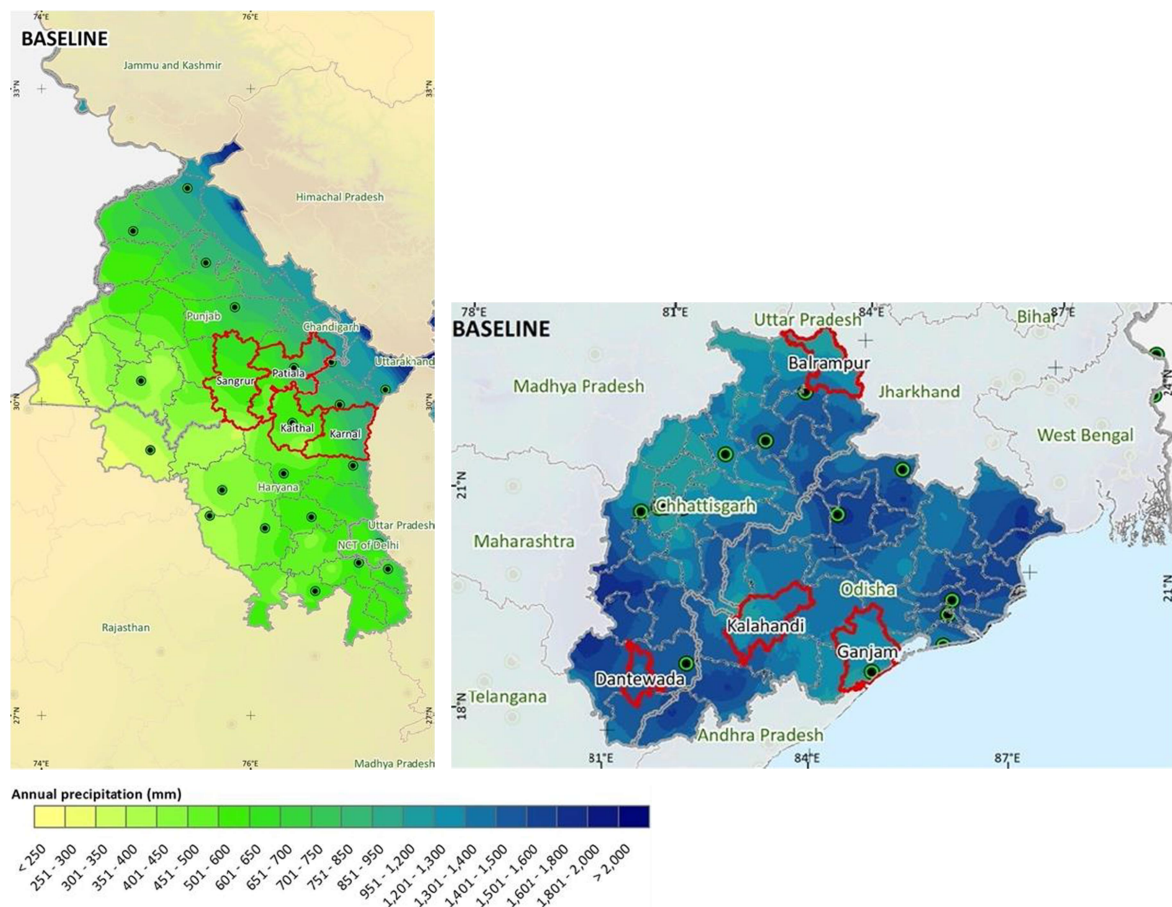
- Shifting the focus of intensive production to moister areas in the east of the country such as the states of Chhattisgarh and Odisha (under the “Bringing the Green Revolution to Eastern India Initiative, or BGREI).
23. By covering the two geographical poles of this strategy, the selection of these two groups of States will thereby allow the project address the “push” factors of environmental degradation in Punjab and Haryana and, in a complementary and coherent way, help to develop conditions and capacities in Chhattisgarh and Odisha to meet the challenge of increased production (the “pull” factors) in an environmentally and socially sustainable manner, without negative consequences for these States’ globally important environmental and cultural values.
24. These target states and landscapes all comply with the three suitability criteria defined in GEFSec guidance for participation in the FOLUR Impact Program:
- 1) **Evidence of environmental threat from commodity driven deforestation or unsustainable agricultural systems:** in Punjab and Haryana, the unsustainable application of GR approaches has led to land degradation, aquifer depletion, chemical contamination, greenhouse gas (GHG) emissions and crop residue burning, with associated health impacts. In Chhattisgarh and Odisha, unsustainable agriculture is also accelerating land and aquifer degradation, eroding globally important agricultural biodiversity and accelerating forest degradation (affecting globally important wildlife). Forest/landscape degradation also undermines watershed functions essential for irrigated agriculture downstream.
 - 2) **Potential for applying a comprehensive land use approach linking production, biodiversity conservation, and restoration at scale:** Land Use Boards in Punjab and Haryana provide policy direction and coordination to support integrated planning for optimum use of available land resources. Chhattisgarh State Watershed Management Agency sanctions watershed projects based on state perspectives and strategic plans. The Orissa Watershed Development Mission is responsible for planning, implementing and monitoring Watershed Development programmes in the State. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (Forest Rights Act or FRA for short) allows for integrated participatory land use.
 - 3) **Willingness to work across national borders for supply chain needs and other market driven demands:** India has historically been a net exporter of wheat: it is also the largest exporter of Non-Basmati Rice and accounts for 25% of global rice trade. India’s rice industry has seen a transformation, with growth of branded business in the domestic market and strong impetus to export. The Indo-Gangetic Plain contains 85% of India’s rice-wheat area, and Punjab and Haryana account for 11.3% of national rice production: Punjab is the country’s third largest rice producing state the two states are the country’s second and third largest wheat producers.
25. Chhattisgarh and Odisha are also major rice producing states (see below).
26. The two groups of states have contrasting biophysical conditions. Coinciding with the Indo-Gangetic Plain, Punjab and Haryana have general level topography (draining gradually towards the south-west) with elevations mostly in the range of 200-300 m above sea level (m.a.s.l.); by contrast, the topography in Chhattisgarh and Odisha is much more diverse and dissected, dominated in the north and south by hills mostly in the range of 400-500 m.a.s.l., and with the large basin of the Mahanadi river sloping progressively eastwards from elevations of 200-350 m.a.s.l. to the coast of the Bay of Bengal (Figure 6).

Figure 6. Topography in the target states (Punjab and Haryana on the left, Chhattisgarh and Odisha on the right)



27. Total annual precipitation in Chhattisgarh and Odisha is much higher than in Punjab and Haryana (in the range of 1,000-2,000mm/annum vs. 200-600mm -Figure 7): rainfall in Chhattisgarh and Odisha is, however, highly seasonal. The Koppen classification shows eastern India as tropical savannah (Aw) or humid subtropical (Cwa).

Figure 7. Total annual precipitation in the target states (Punjab and Haryana on the left, Chhattisgarh and Odisha on the right)



28. There are also major contrasts between the two project areas in terms of land use (Figure 8 and Figure 9). In common with most of the Indo-Gangetic Plain, landscapes of Punjab and Haryana have largely been converted to agriculture, while land uses in Chhattisgarh and Odisha are much more diverse, including agricultural landscapes in major river valleys and coastal lowlands, and mosaics of cropland and natural vegetation, as well as significant areas of natural forest, now primarily located on the hills.

Figure 8. Land uses in Punjab and Haryana

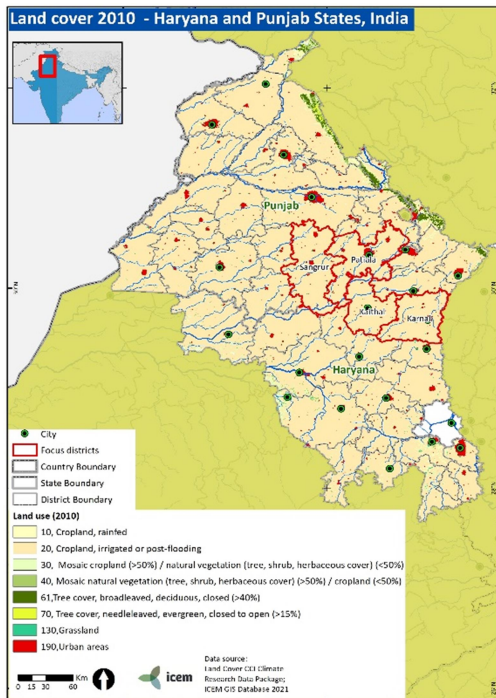
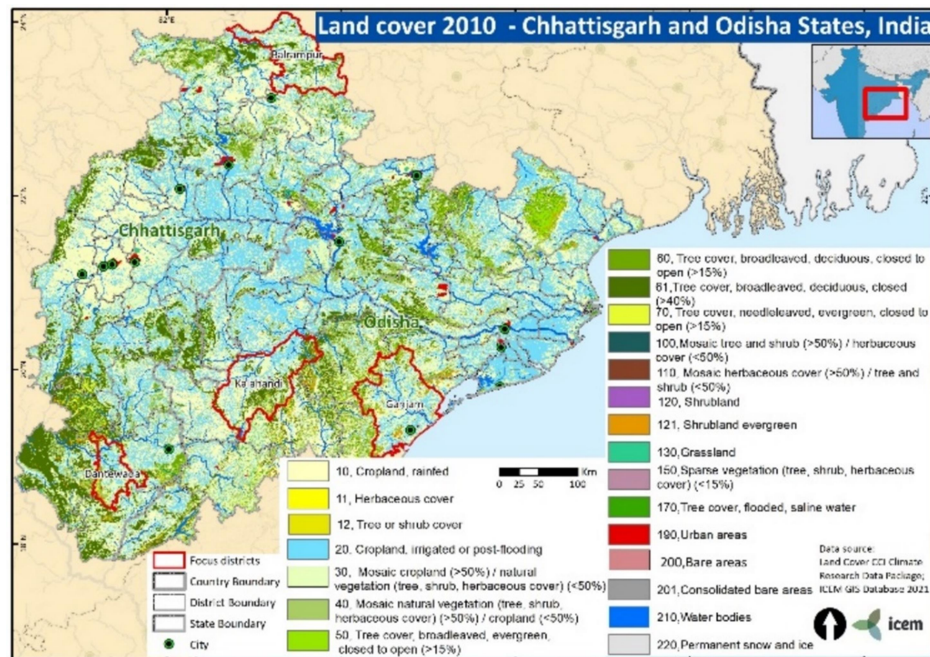


Figure 9. Land uses in Chhattisgarh and Odisha



Biodiversity in the target states (detailed assessments are presented in Supplementary Annexes 2.2.1 and 2.2.2)

29. Detailed information on the biodiversity of the target states is presented in Supplementary Annex 2 (2.1 Protected Areas; 2.2 Biodiversity assessment and management proposals in Punjab and Haryana; 2.3 Biodiversity assessment and management proposals in Chhattisgarh and Odisha).

Punjab and Haryana

30. Although, in common with much of the Indo-Gangetic Plain, the landscapes of Punjab and Haryana have largely been converted to agriculture, they still contain significant globally-important biodiversity (see Box 7). The States' numerous small wetlands (both natural and man-made) and forest remnants are vital for biodiversity.

Box 7. Bird diversity in intensive agriculture landscapes and wetlands in Punjab

A survey of more than 200 villages of 19 districts in Punjab between 2011 and 2013, recording avian fauna in the crop fields around canals, ponds and wetlands, found 189 species of birds, including 111 resident species, 47 resident migrants and 30 migrant species, including 10 IUCN Red List species:

- **Endangered (1):** Egyptian vulture (*Neophron percnopterus*)
- **Vulnerable (1):** Eastern Imperial eagle (*Aquila heliaca*)
- **Near Threatened (8):** Ferruginous pochard (*Aythya nyroca*), River lapwing (*Vanellus duvaucelii*), River tern (*Sterna aurantia*), Oriental white ibis (*Threskiornis melanocephalus*), Painted stork (*Mycteria leucocephala*), European roller (*Coracias garrulous*), Pallid harrier (*Circus macrourus*), and Snake bird (*Anhinga melanogaster*).

Village ponds to provide critical habitat (for nesting, feeding and breeding) for water birds²⁹.

Kler and Parshad (2011) recorded 48 and 32 bird species in wheat and rice fields of Punjab, respectively. The number of bird species increased with successive life-cycle or phenological stages of these two major crops, like tillage, sowing, seedling, vegetative and ripening.

Sarus crane, the world's tallest flying bird (IUCN Red List Vulnerable) is recorded in Punjab and Haryana. In Punjab it is found regularly in Shalla Pattan and Keshopur-Miani wetlands (where it is now breeding).

Chhattisgarh and Odisha

31. The percentage forest covers in Chhattisgarh and Odisha, at 41.14% and 33.15% respectively, is significantly higher than the national average of 21.67% (Figure 10)³⁰.

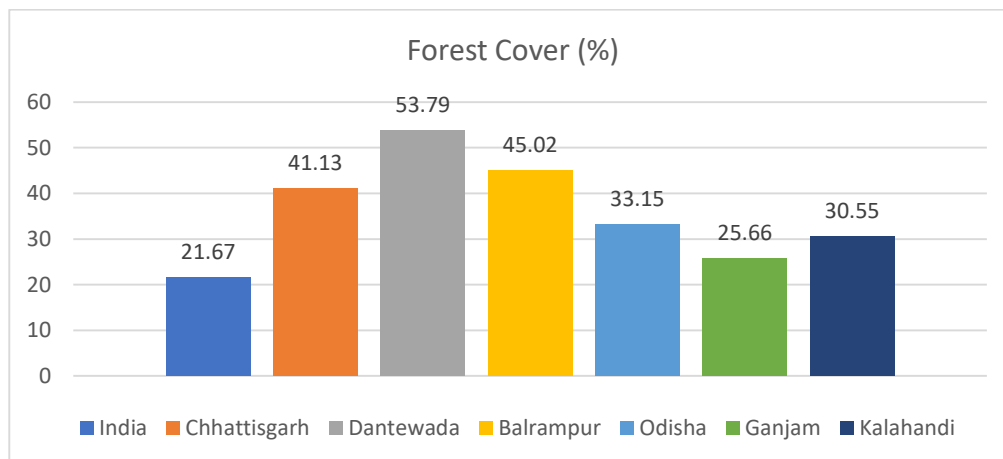
²⁹ Kaur, S., Kler, T. K. and Javed, M. 2018. Abundance and diversity of water bird assemblages in relation to village ponds in Punjab. J. Entom. Zoology Stud., 6: 1375-1380.

Kler, T.K. and Parshad, R.K. 2011. Bird composition in relation to phenological stages of wheat and rice crops. Agri. Res. J. 48: 163-171 (<http://www.indianjournals.com/ijor.aspx?target=ijor:jre&volume=48&issue=3and4&article=011>).

Kaur, J., Kler, T.K., Kang, J.S. and Kumar, M. 2017. Impact of zero tillage agriculture on the avian fauna in Ludhiana, Punjab. J. Env. Biol. 38:689-695

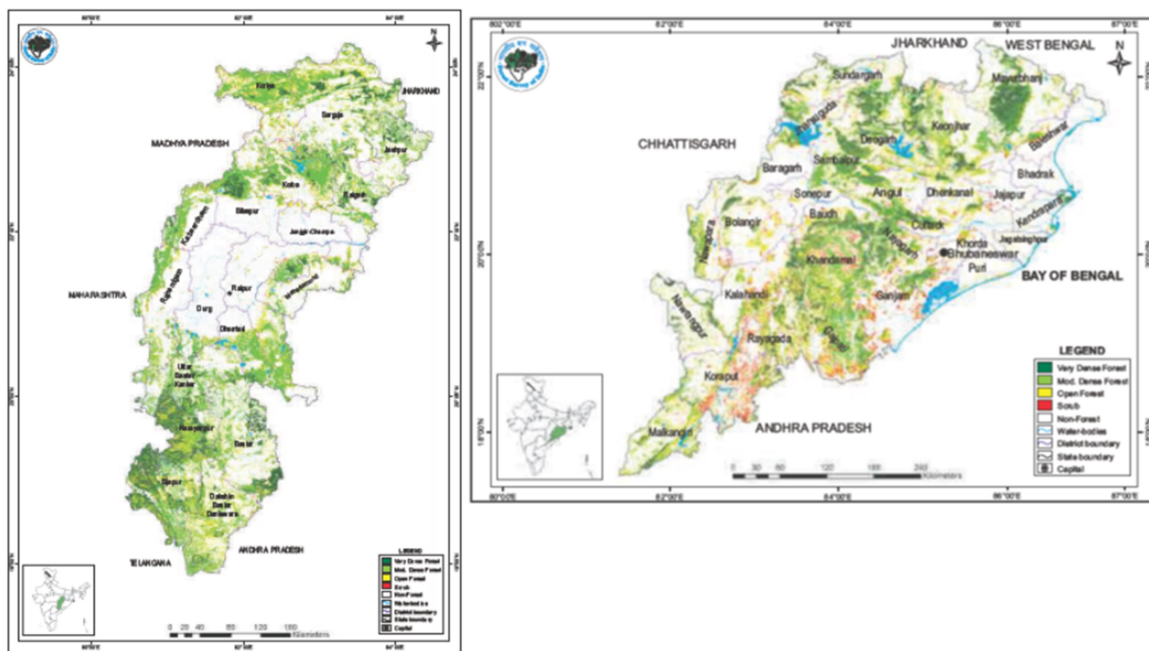
³⁰ <http://fsi.nic.in/isfr19/vol11/chapter2.pdf>

Figure 10. Forest cover in Chhattisgarh, Odisha and the target districts³¹



32. As shown in Figure 11, forest cover in both Chhattisgarh and Odisha is unevenly distributed: forests are concentrated on the highlands, where they occur both as large contiguous blocks and as more dispersed areas within a forest/agriculture mosaic (more than 20% of the tree cover outside of Recorded Forest Area and Green Wash areas³² is in patches of <1ha); while the lowlands and valleys are more dominated by agriculture and have relatively little forest cover.

Figure 11. Forest cover in Chhattisgarh (left) and Odisha (right)



³¹ National and State level Data <https://fsi.nic.in/isfr19/vol1/chapter2.pdf>.
District Level Data: Odisha <https://fsi.nic.in/isfr19/vol2/isfr-2019-vol-ii-odisha.pdf>
Chhattisgarh: <https://fsi.nic.in/isfr19/vol2/isfr-2019-vol-ii-chhattisgarh.pdf>

For Balrampur, the data for erstwhile district Surguja is used. Likewise, for Dantewada, the data for erstwhile Dakshin Bastar Dantewada is used

³² Tree cover outside of Recorded Forest Area and Green Wash areas are defined as Trees Outside Forests (TOF). Green Wash areas are the wooded areas shown in light green colour on the Survey of India toposheets.

33. Chhattisgarh and Odisha contain critical habitats of globally threatened wildlife, including the Bengal tiger (*Panthera tigris tigris*), Asian elephant (*Elephas maximus*), wild dog (*Cuon alpinus*) and sloth bear (*Melursus ursinus*). Odisha contains 4 high priority elephant corridors connecting designated wildlife reserves and other protected areas: Similipal-Satkosia, Baula-Kuldiha, Tal-Kholgarh and Kotgargh-Chandrapur. These States coincide in part with the Central Indian Highland landscape (CIHL), which represents a complex, diverse, and highly human-modified system, of which tigers are an iconic feature: their conservation is the primary goal for the network of 32 protected areas in the CIHL, some connected by corridors of remaining forest. The CIHL supports about 30% of the total tiger population in India and has been identified as a Global Priority Landscape for tiger conservation: it includes a number of large blocks of Class I Tiger Conservation Landscapes as well as large and widespread, yet highly fragmented, areas of tiger habitat³³. The upland forests of these States are also vital for water flows for irrigated lowland agriculture, and also provide essential goods and services for local people, especially tribal people.

Agrobiodiversity in the target states

34. Prior to Green Revolution, Punjab used to support rich crop varietal diversity, including 41 varieties of wheat, 37 of rice, 4 of maize, 3 of bajra, 16 of sugarcane, 19 of pulses, 9 of oil seeds and 10 varieties of cotton. Currently the number of varieties in use by farmers has decreased to 13 of wheat, 8 of rice, 4 of Basmati rice and 4 of pulses.

35. Many of the “weed species” commonly found in cultivated land in Punjab have important use values: *Eclipta alba* is used for hair treatment and commercial purposes; *Cyperus rotundus*, *C. iria*, *C. difformis*, *Fimbristylis tenera*, *Digitaria sanguinalis*, *Echinochloa colona*, *E. crus-galli*, *Paspalum conjugatum*, *Eragrostis japonica*, *Dactyloctenium aegyptium* and *Acrachne* spp. Are used extensively as fodder for livestock; and *Amaranthus viridis* is used as a vegetable³⁴.

36. Forming part of a Vavilov Centre of Origin and Diversity of Rice, Chhattisgarh and Odisha coincide with 2 of the country’s 22 ABD hotspots (Bastar and Koraput regions). Chhattisgarh is traditionally known as the Rice Bowl of India and over 20,000 rice varieties have been recorded in the region³⁵. Jeypore tract in South Odisha has been identified as a putative secondary centre of origin of cultivated rice³⁶.

Land use in the target districts

37. Figure 12 exemplifies the contrasting land use conditions in the two project areas: the selected target districts in Punjab and Haryana are almost completely dominated by crop land, while those in Chhattisgarh and Odisha are dominated by complex mosaics of forest and agriculture (albeit with the forests being largely concentrated on the hills and the flatter lowland areas being dominated by agriculture).

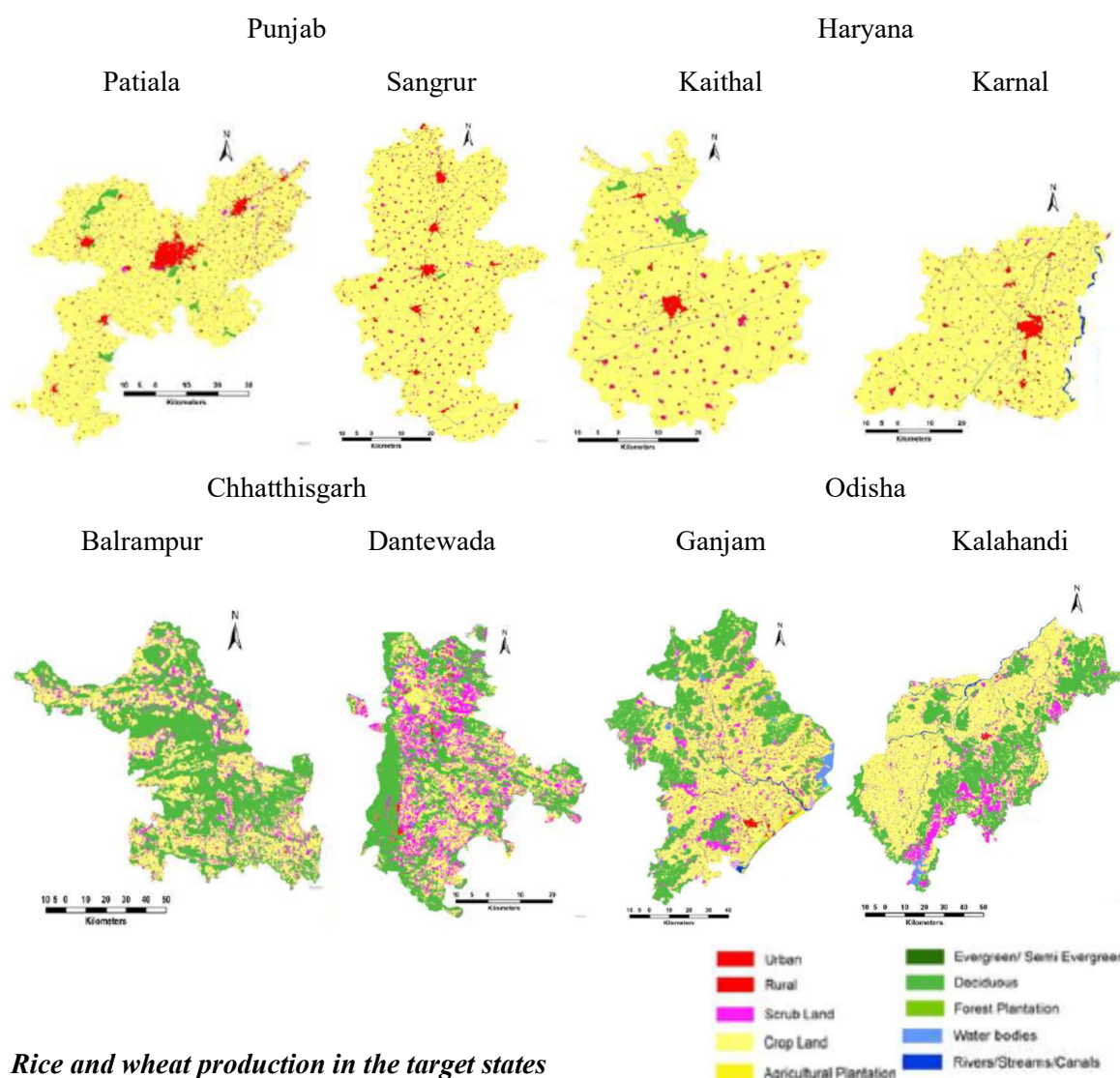
³³DeFries, R., Sharma, S. & Dutta, T. A landscape approach to conservation and development in the Central Indian Highlands.. Reg Environ Change (2016) 16(Suppl 1): 1. <https://doi.org/10.1007/s10113-016-1014-3>

³⁴ Singh, Y. and R. Singh (2019). Weed diversity in rice crop fields of Fatehgarh Sahib District, Punjab, India. Journal of Threatened Taxa 11(5): 13611–13616.

³⁵ Dwivedi AP, Chand P, Mishra A, Athare T and Singh SRK 2017. Identification of traditional rice varieties in Chhattisgarh: An institutional arrangement Ecology, *Environment and Conservation* 23 (Special):S313-S320 January 2017

³⁶ Das SR. 2012. Rice in Odisha. IRRI Technical Bulletin No. 16. Los Baños (Philippines): International Rice Research Institute. 31 p.

Figure 12. Land use in the target districts.



Rice and wheat production in the target states

38. The Indo-Gangetic plain, where the states of Punjab and Haryana are located, is of particular global significance for food production: Punjab is known as the ‘bread basket’ of India, accounting for 12% of the country’s rice production and 18% of wheat production in 2017-18³⁷, despite occupying only around 1.5% of the national territory.

39. Chhattisgarh and Odisha are also of major global significance for food production: Chhattisgarh is known as the ‘rice bowl’ of India: around 80% of the net area sown in *kharif* (monsoon) season is rice, and the State contributes around 70% of national rice production³⁸, despite accounting for only just over 4% of the national territory.

40. Additional data on agricultural production in the target states are presented in Supplementary Annex 1.4.

Agriculture in the target states

41. There are major differences in the agricultural sector between the two regions targeted by the project, with much higher levels of cropping intensity, irrigation and fertilizer consumption in the

³⁷ <https://www.esopb.gov.in/Static/PDF/EconomicSurvey-2019-20.pdf>

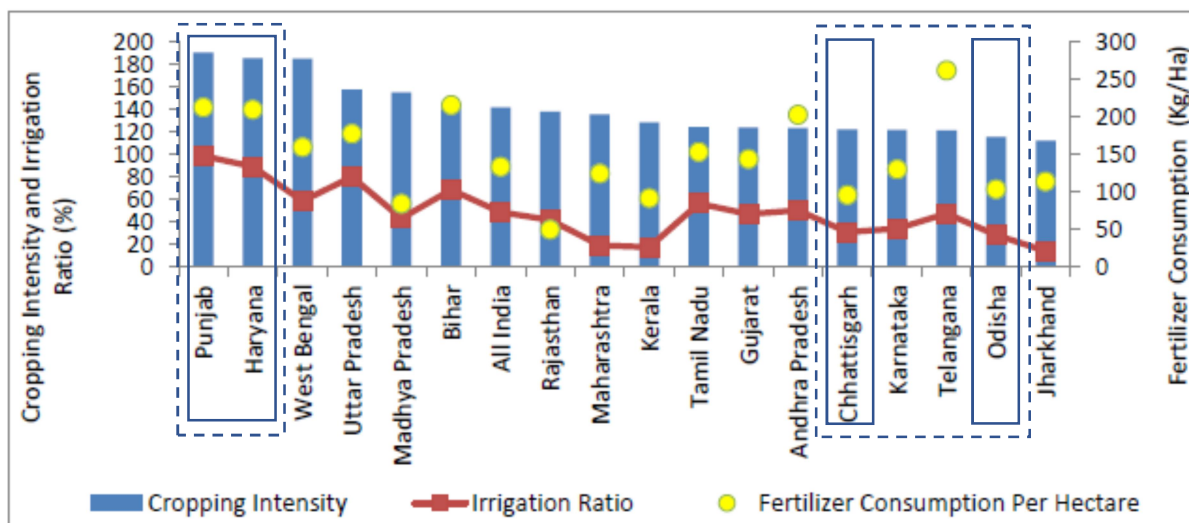
National Horticulture Board

(http://agriexchange.apeda.gov.in/india%20production/India_Productions.aspx?cat=Agri&hscode=1011)

³⁸ <https://www.nabard.org/auth/writereaddata/tender/2002204154Chhatisgarh%20-%20SFP.pdf>

Indo-Gangetic Plain states of Punjab and Haryana than the eastern states of Chhattisgarh and Odisha (Figure 13).

Figure 13. State-wise cropping intensity, irrigation ratio and per hectare fertilizer consumption, 2014-15⁶



42. **Punjab and Haryana** are dominated by the rice-wheat cropping system (Box 8) and have been at the centre of the country's Green Revolution-based transformation of food production systems.

Box 8. The rice-wheat cropping system (RWCS) in Punjab and Haryana

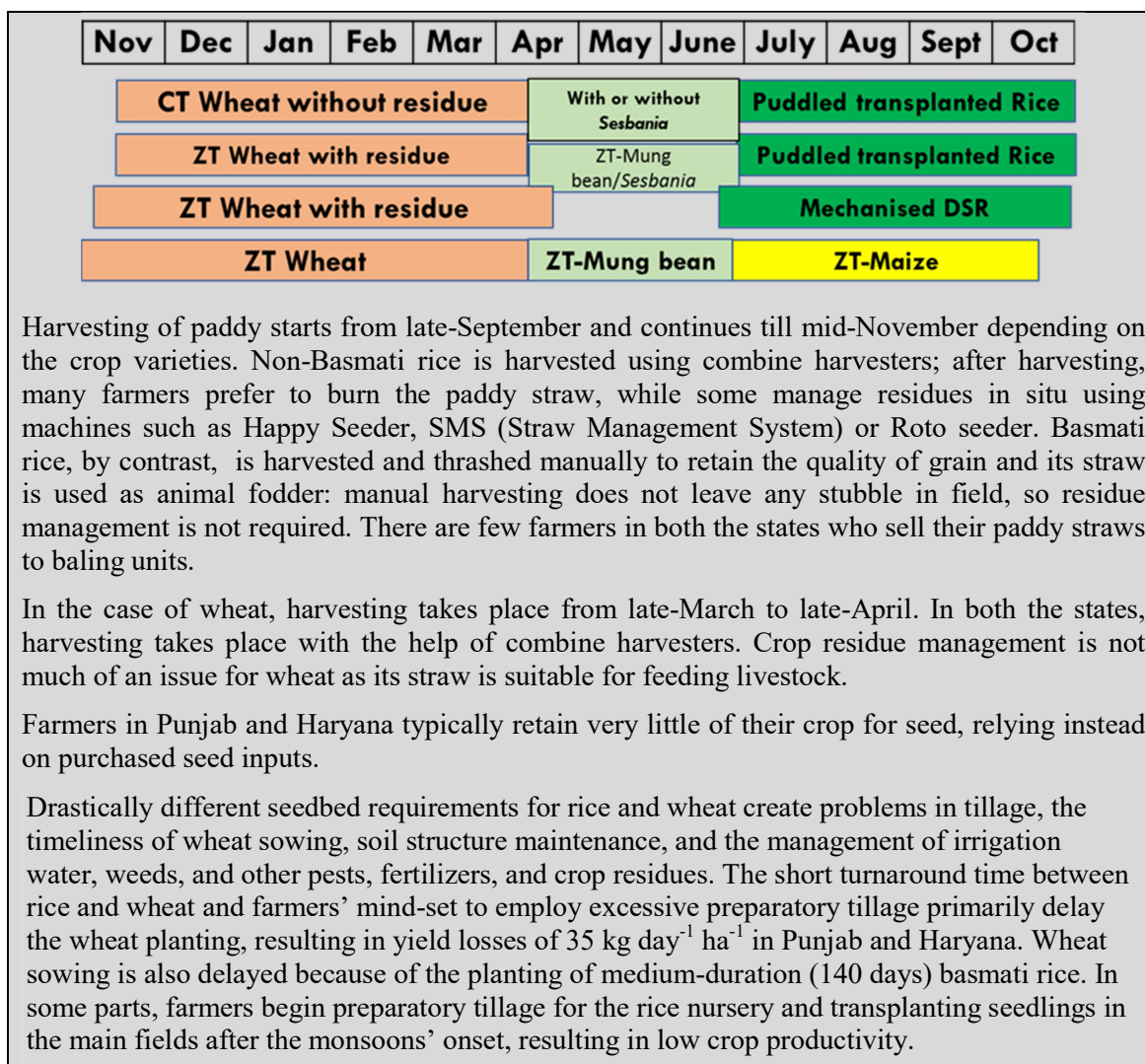
The rice-wheat cropping pattern of South Asia encompasses the four countries of Bangladesh, India, Nepal and Pakistan along the Indo-Gangetic Plains (IGP) and into the mid-hills of the Himalayas. Traditionally, wheat was grown mostly in the northwestern belt and rice in the eastern belt of the IGP. **With the introduction of improved high yielding, input responsive, short duration rice and wheat varieties, the rice-wheat pattern became feasible and saw both crops grown in the same year.** In this pattern, rice is grown during the summer months (*kharif* or monsoon) followed by wheat in the winter months (*rabi*). It is now found as a major system throughout the IGP³⁹.

Conventionally in the region, rice is established by repeated wet tillage (puddling) followed by transplanting of the seedlings in the puddled soil; while wheat is established by broadcasting seed, or using machines (such as happy seeder, roto seeder, super seeder) following disking, tilling and planking operations⁴⁰.

Figure 14. Annual rice/wheat system crop calendars along with crop establishment methods in Punjab and Haryana (CT = Conventional Tillage), ZT = Zero Tillage, DSR = Direct-Seeded Rice

³⁹ Kataki PK, Hobbs P, Adhikary B (2001). The Rice-Wheat Cropping System of South Asia: Trends, Constraints and Productivity—A Prologue. Journal of Crop Production Volume 3, 2001 - Issue 2.

⁴⁰ Bhatta R, Kukal SS, Busarid MA, Arora S, Yadave M (2016): Sustainability issues on rice-wheat cropping system. International Soil and Water Conservation Research Volume 4, Issue 1, March 2016, Pages 64-74.



43. The landscapes in Punjab and Haryana are largely flat: in common with much of the rest of the Indo-Gangetic Plain, they are dominated by high input, high yield agriculture, with major growth in agricultural production over the last few decades (there was a seven-fold increase in food grain production from Haryana between 1966-67 and 2018-19)⁴¹. This growth has mostly been in the area of wheat and rice (Figure 15 and Figure 16).

⁴¹ <https://www.phdcci.in/wp-content/uploads/2019/02/Progressive-Haryana-The-Agricultural-Hub-of-India.pdf>

Figure 15. Increases in area and productivity of rice and wheat in Punjab

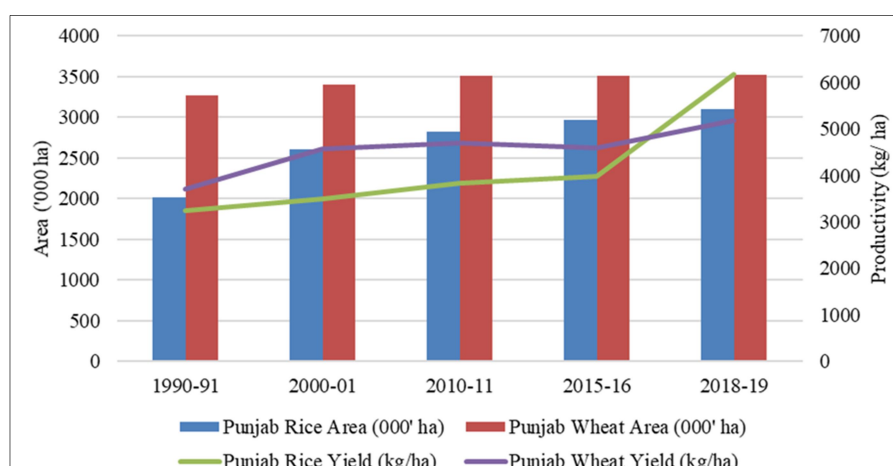
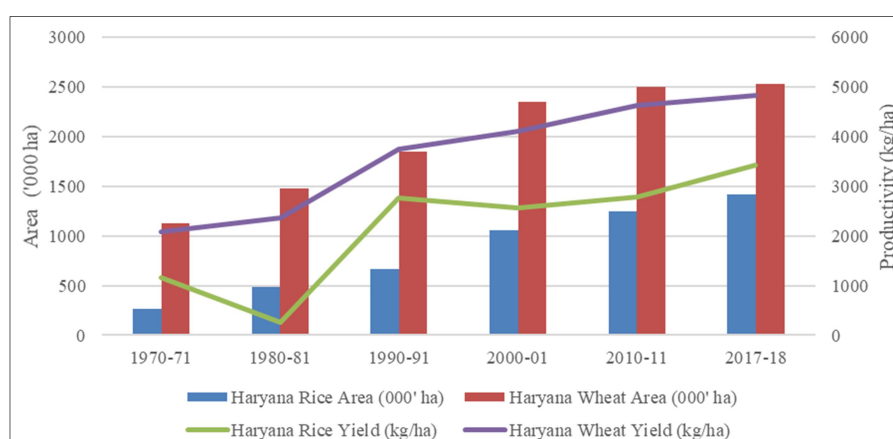
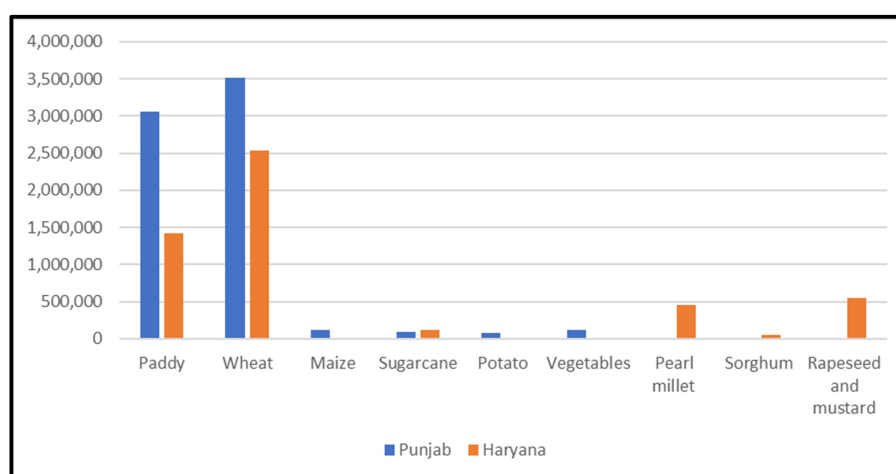


Figure 16. Increases in area and productivity of rice and wheat in Haryana



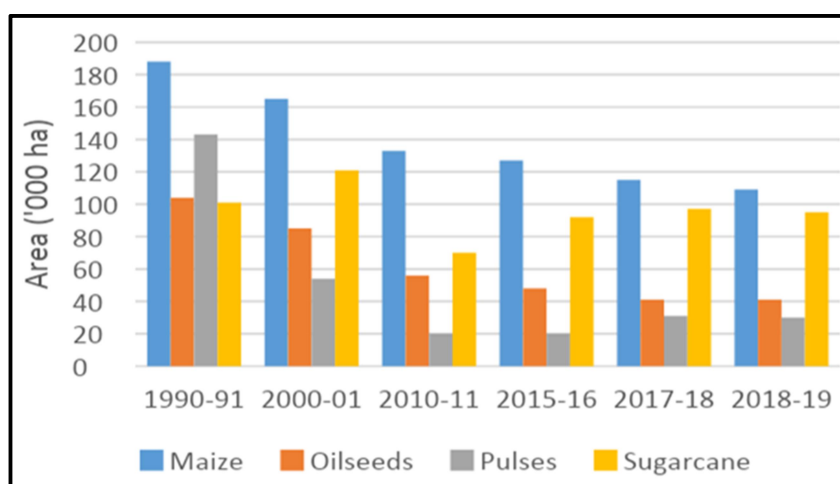
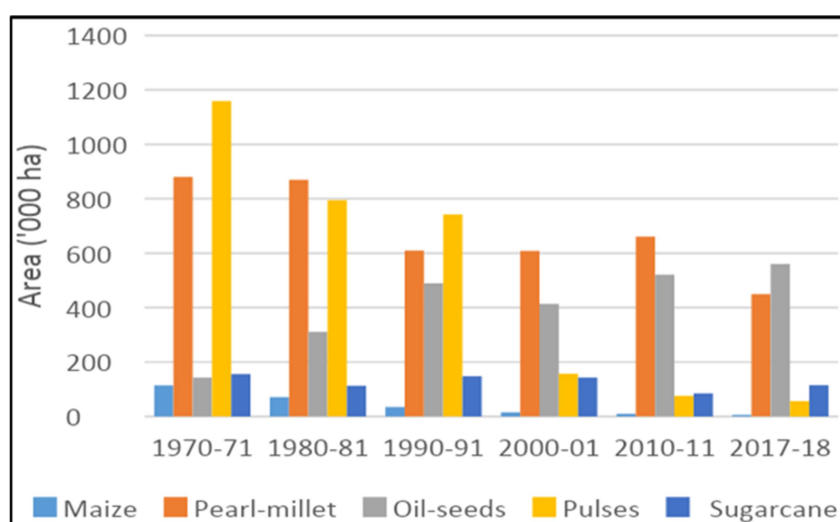
44. Rice and wheat now dominate production in both states (Figure 17), at the expense of other crops including pulses, maize and oilseeds⁴² (Figure 18). This trend has been more pronounced in Punjab than Haryana (Figure 19), where crops such as oilseeds and vegetables continue to make important contributions to economic wellbeing and livelihood systems.

Figure 17. Major crops in Punjab and Haryana, 2017-18⁴³



⁴² <https://www.esopb.gov.in/Static/PDF/EconomicSurvey-2019-20.pdf>

⁴³ DACNET

Figure 18. Decline in areas of other crops in Punjab**Figure 19. Decline in areas of other crops in Haryana**

45. The dominant rice variety grown in Haryana is Basmati (where it accounted for 62% of the Basmati acreage in the 2019 *kharif* season⁴⁴): this contrasts with Punjab, where 81% of production is of non-Basmati rice. Basmati rice is largely produced for export markets, typically by wealthier farmers, and non-Basmati is largely produced for the Public Distribution System (PDS). Exports of Basmati in 2019-20 from Haryana and Punjab were worth US\$7.05 million and US\$3.4 million respectively.

46. Growth in agricultural production in the two States has largely been based on the application of intensive “Green Revolution” (GR) approaches to agriculture, featuring high levels of inputs (Box 9).

Box 9. Increases in agricultural inputs associated with the Green Revolution

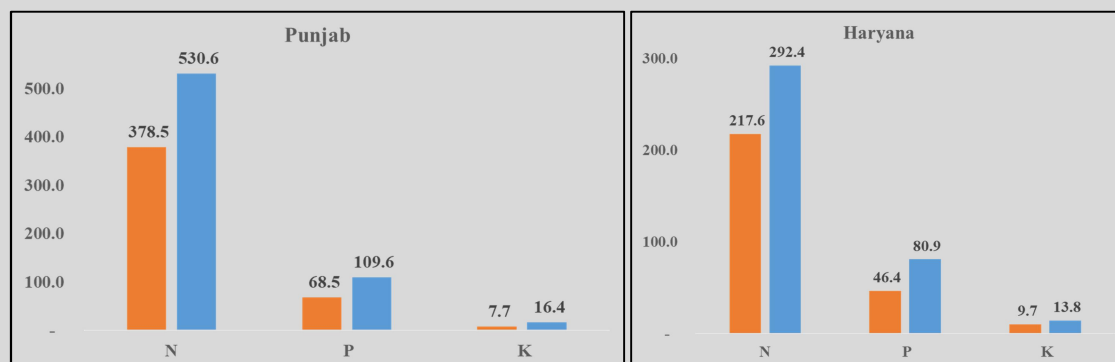
- **Fertilizer use:** in Punjab, fertilizer use increased from 37.5 kg/ha in 1970-71 to 162.6 kg/ha in 1990-91 and 243 kg/ha in 2010-11, before declining to 228 kg/ha in 2018-19. In 1990-91, per ha use of fertilizer in Punjab was over twice the average for India⁴⁵. Currently, Punjab consumes about 17% of total pesticides used in India, of which more than 90% are used in the cultivation of rice, cotton and vegetables. The Malwa region (cotton belt), where the two target districts of Sangrur and Patiala are located, accounts for nearly 75% of

⁴⁴ https://apeda.gov.in/apedawebsite/Announcements/Basmati_Crop_survey_Report_1_Season_2019.pdf

⁴⁵ <https://www.esopb.gov.in/Static/PDF/EconomicSurvey-2019-20.pdf>

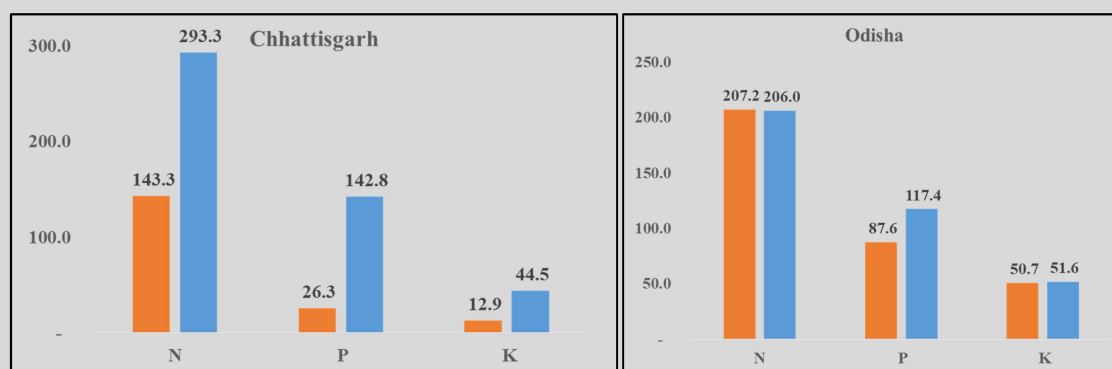
pesticides used in the State.

Figure 20. Increases in levels of agricultural inputs (inorganic fertilizer) in Punjab and Haryana, from 2006-7 (in orange) to 2011-12 (in blue) (million kg)



- While much lower than in the Indo-Gangetic plain states, both in absolute terms and in proportion to the overall area of the states, levels of fertilizer application in the eastern states have also shown major increases in recent years, especially in Chhattisgarh (Figure 21).

Figure 21. Increases in levels of agricultural inputs (inorganic fertilizer) in Chhattisgarh and Odisha, from 2006-7 (in orange) to 2011-12 (in blue) (million kg)



- Total **pesticide use** in Punjab peaked in 2000-01 reaching 6970 MT, falling to 5717 MT in 2011-12 and increasing again to 5843 MT in 2016-17, possibly in response to the pest attack in the previous year.
- **Irrigation:** nearly 99.9% of net sown area in Punjab and 90.8% of that in Haryana is irrigated, compared to less than half the cropped area under irrigation at the all India level; irrigation in these states is almost entirely dependent on groundwater, and around 95% of the water extracted in Punjab is for irrigation purposes. Most irrigation is from tube wells, while at the all India level, the sources of irrigation are diversified.
- **Electricity use:** irrigation in Punjab and Haryana is also predominantly, and increasingly, powered by electricity: in Punjab, increasing demand led to an increase in the number of tube wells in the State from 1,073,000 in 2000-01 to 1,476,000 in 2018-19, with the number of tube wells operating with electricity increasing from 788,000 to 1,336,000 over the same period.
- **Mechanisation:** there is an average of one tractor per 8.71ha of cultivable land in Punjab compared to a national average of one per 62ha; as a result, only 26% of the labour force in Punjab is involved in agriculture, compared to a national average of 44%⁴⁶. Labour use in

⁴⁶ Gulati, Roy, & Hussain, 2017

rice cultivation in Punjab declined from 68 persons per ha per season in 1993-1995 to 52 persons per ha per season in 2007-10. The corresponding figures for wheat were 42 and 23 persons per ha per season, respectively.

47. Agriculture in **Chhattisgarh and Odisha**, is more varied than in Punjab and Haryana, comprising both smallholder-dominated agriculture, largely on the hills, and more intensive mono-cropping in fertile lowland/valley areas. The smallholder-dominated agriculture on the hills includes traditional shifting slash-and-burn practices, which are principally carried out by tribal peoples⁴⁷.

48. Agriculture is much less intensive in these States than in the IGP: in Chhattisgarh, **the area under double cropping is low**, with a cropping intensity of only around 137%, due to the **limited coverage of irrigation** (the net irrigated area in the State is only around 36% of the net sown area, although about 75% of the gross sown area is potentially irrigable)⁴⁸.

49. The **main crop in both of these states is rice**, and the other main crops grown are wheat, maize, groundnut, pulses and oilseed as well as **a range of other crops** including *jowar* (sorghum), *bajra* (pearl millet), *ragi* (finger millet), sesame, *kodo-kutki* millet, mung beans. Lentils and *urd* (black gram). In Odisha, mono-cropping of rice (rice-fallow) is the most prevalent cropping system, followed by rice-pulses and rice-rice systems: in Chhattisgarh, major rotations include rice-fallow, rice-pulses, rice-vegetables, rice-wheat, and rice-oilseeds.

50. **Cropping patterns are highly seasonal**: in the *kharif* (monsoon) season, the major cereal crops are rice and maize, and the major pulse and oilseed crops are, respectively, pigeon pea (*arhar*) and soybean. During the *rabi* (winter) season, the principal cereal crops are wheat and maize, while the major pulses are gram, peas and lathyrus, and the main oilseed crops are mustard and linseed.

51. Out of the total GCA of 8.4 m ha in Odisha, 50% is covered by cereals, 25% by pulses, 16% by horticulture crops and 7% by oilseeds.

Box 10. Rice production practices in Chhattisgarh and Odisha

Uplands:

- With **limited access to farm machinery**, farmers in this region mostly use the traditional method of ploughing with the help of livestock to prepare their land for paddy cultivation.
- Farmers sow paddy during the pre-monsoon showers and harvest them in September⁴⁹:
- Upland farmers typically establish rice by **broadcast sowing**.
- Paddy **harvesting is done manually**, and often communally, from September through to October.
- In most cases, the **farmers use paddy straw for livestock feed**, storing it in humps in their fields. In tribal households, paddy straw is also used for thatching the houses.
- Farmers typically **retain a greater proportion of their harvest for consumption and for seed** than farmers in areas such as Punjab and Haryana, and **in-kind payments** more for labour.

Lowlands:

- Farmers having **more access to farm machinery** use machines such as laser levelers, disc harrow, rotavator, etc. for land preparation.
- **Kharif/monsoon rice** is more common: land preparation starts after the arrival of monsoon in the rainfed areas, while those who have irrigation facilities start land preparation even before monsoon arrival.

⁴⁷ Singh, S., Purohit, J. K., & Bhaduri, A. (2016). Shifting Cultivation in Odisha and Chhattisgarh: Rich agro-biodiverse systems under risk. *Jharkhand Journal of Development and Management Studies* XISS, 14(2), 7023-7036.

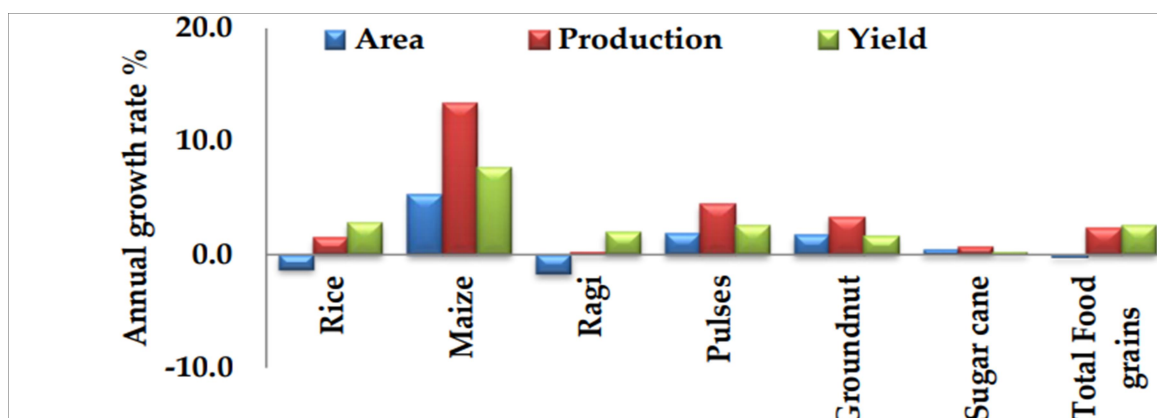
⁴⁸ <https://www.nabard.org/auth/writereaddata/tender/2002204154Chhattisgarh%20-%20SFP.pdf>

⁴⁹ Coincides with kharif but harvested in autumn. Das SR. 2012. Rice in Odisha. IRRI Technical Bulletin No. 16. Los Baños (Philippines): International Rice Research Institute. 31 p.

- While lowland farmers use **nurseries and transplanted puddled rice**, with high levels of chemical and labour inputs.
- Harvesting occurs from late October through to November: most farmers engage hired labourers and/or are helped by friends and neighbours.

52. The cropping pattern of agriculture in Odisha has witnessed some changes in the last decade, with the share of rice declining and that of other crops including pulses, groundnut, sugar cane and especially maize increasing (Figure 22).

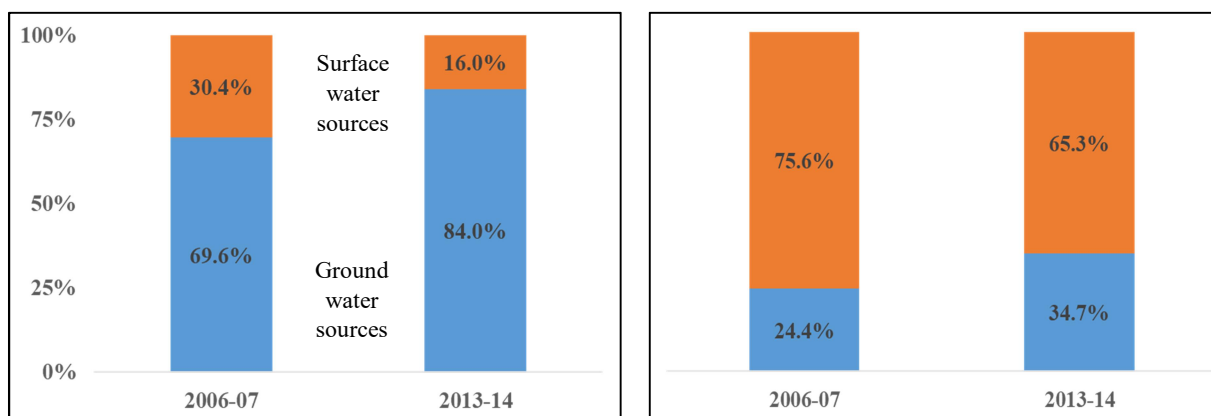
Figure 22. Compound annual growth rates of area, production and yield of major crops during (2004-05 to 2013-14) in Odisha⁵⁰



53. Agriculture in Odisha is characterised by a **high level of dependency on monsoon rains**, which results in wide variations in agricultural output, a situation which has led the State Government to prioritize the expansion of irrigation potential since 2014-15, with corresponding increases in public investment in the sector.

54. In Chhattisgarh, most of the area under minor irrigation depends on groundwater, but in Odisha irrigation is still principally reliant on surface water; in both States, the **dependence on groundwater is growing relative to surface water** (Figure 23). Wells are also predominantly powered by electricity in Chhattisgarh, but not in Odisha, although the numbers of electric irrigation structures is increasing there too.

⁵⁰ Source: Odisha Agriculture Statistics; Official website of Agriculture & Farmers' Empowerment, Govt. of Odisha

Figure 23. Proportions of area under minor irrigation in Chhattisgarh (left) and Odisha (right) that uses groundwater and surface water⁵¹

55. The diverse agro-climatic conditions in these two eastern States are favourable for diverse agricultural production, including various horticultural crops and fruits. The major fruits grown in Chhattisgarh are mango, banana, papaya, guava, lime, cashew-nuts, custard apple and lichee. In the past seventeen years, the acreage and production of horticulture the State have significantly increased, to 864,000 ha and 10,225,000 tons respectively⁵². The main fruits and vegetables grown in Odisha include mango, banana, papaya, eggplant, tomato and cabbage, as well as spices and flowers⁵³. The State is also diversifying its crop production and area into spices, most notably turmeric and ginger. Flower production is in an infant stage in the State, with a total area of around 6,000 ha under flowers including marigold, rose, tuberose and gladioli⁵⁴.

56. Forest products are particularly important to the economy and livelihoods in Chhattisgarh and Odisha, including timber, bamboo, rubber, cashew, kendu leaves, medicinal plants, honey, and other non-timber forest products (NTFPs) from trees that include *Shorea robusta* (sal), *Madhuca indica*, *Buchanania lanzan*, *Schleichera oleosa* and *Semecarpus anacardium*⁵⁵. Over the years, the revenue generated from all these products has been rising steadily. In addition, the Government of Odisha has focused on sericulture (silk production) as a sustainable livelihood programme for scheduled tribes and scheduled caste sectors⁵⁶.

Water resources and use in the target states

57. Information on the water resources in the target districts, taking into account the water demands of the principal crops, is presented in Table 4, Table 5 and Supplementary Annex 1.3. In Punjab and Haryana, irrigation accounts for 96.5 and 92.4% respectively of groundwater extraction

58. In all four target districts in Punjab and Haryana, available surface flow and groundwater (“blue water”) is insufficient to meet the current demand from crops and other sectors: there is a large deficit of groundwater, meaning that current groundwater abstraction is unsustainable. Only in two of the target districts are there any outflows⁵⁷, there accounting for only between 12 and 21% of gross inflows.

⁵¹ Source: 4th and 5th Minor Irrigation Census

⁵² <https://www.nabard.org/auth/writereaddata/tender/2002204154Chhatisgarh%20-%20SFP.pdf>

⁵³ Strategy for Doubling Income of Farmers in India’, (2017) Policy Paper 31, ICAR– National Institute Of Agricultural Economics And Policy Research (NIAP)

⁵⁴ https://pc.odisha.gov.in/Download/Economic_Survey_2018-19.pdf

⁵⁵ ISFR Vol II 2019, Odisha, <http://fsi.nic.in/isfr19/vol2/isfr-2019-vol-ii-odisha.pdf>

⁵⁶ https://pc.odisha.gov.in/Download/Economic_Survey_2018-19.pdf

⁵⁷ It is not possible at this stage to break down outflows into components (such as beneficial and non-beneficial water use, return flows etc.)

Table 4. Groundwater resources of Punjab, Haryana as compared to India in 2017⁵⁸

Items	State		India
	Punjab	Haryana	
A) Annual extractable groundwater resources (in BCM)	21.58	9.13	392.7
B) Current Annual groundwater extraction (in BCM)			
Irrigation	34.56	11.53	221.46
Industrial	0.20	0.34	2.38
Domestic	1.01	0.63	24.87
Total	35.78	12.5	248.69
C) Status of groundwater extraction (%)	166%	137%	63%

Table 5. Groundwater resources in GEF-7 targeted districts of Punjab and Haryana

Items	District			
	Sangrur	Patiala	Karnal	Kaithal
A) Annual extractable groundwater resources (in BCM)	1.441	1.372	0.699	0.460
B) Current Annual groundwater extraction (in BCM)				
Irrigation	3.685	2.903	1.135	1.020
Industrial	0	0.001	0.020	0.005
Domestic	0.061	0.07	0.033	0.023
Total	3.746	2.975	1.187	1.048
C) Status of groundwater extraction (%)	260%	217%	170%	228%

59. In all four target districts in Chhattisgarh and Odisha, available blue water is more than enough to meet current crop demand, as well as current unmet demand from rainfed areas; only between 10 and 31% of available groundwater is currently abstracted. In all target districts there are large outflows, equivalent to between 67 and 83% of the rainfall.

Social and demographic conditions in the target states

60. The combined total population of the four target States of Punjab, Haryana, Chhattisgarh and Odisha in 2019 was 120.60 million people⁵⁹ (with a gender ratio around 0.905 in 2013-2015⁶⁰), or almost 10% of the national total. In all four states, the population is predominantly rural, especially in Chhattisgarh and Odisha (76.8 and 83.3% rural population respectively, compared to 62.5 and 65.1% in Punjab and Haryana). There are significant gender disparities in social conditions in all states (see Gender Analysis in Annex I.1): female literacy rates in 2011, for example, were between 12 and 25% lower than among men⁶¹. The average age of agricultural labour force in Punjab and Haryana is 37 and 36 years respectively, compared to 42 and 39 years among cultivators in Chhattisgarh and Odisha⁶².

61. In all four states, the population is growing, but (in line with the trend in India as a whole since the 1970s) growth rates are slowing and rural population growth is slower than urban.

62. Fertility rates have declined (below the replacement level of 2.1% in Punjab): this has led to a concomitant growth in the proportion of the population that is of working age (15-64 years of age), and will lead to a progressive overall ageing of the population.

⁵⁸ Dynamic Groundwater Resources of India, 2019

⁵⁹ http://censusindia.gov.in/2011census/population_enumeration.html

⁶⁰ <http://niti.gov.in/content/sex-ratio-females-1000-males>

⁶¹ Punjab: 80.44% male, 70.73% female; Haryana: 84.06% male, 65.94% female; Chhattisgarh 80.27% male, 60.24% female; Odisha: 81.59% male, 64.01% female. <https://www.census2011.co.in/literacy.php>

⁶² RGCC-GoI. (n.d.). Retrieved from Office of the Registrar General & Census Commissioner, India: https://censusindia.gov.in/2011census/population_enumeration.html

63. Punjab is the focus of significant in-migration from other states: it is the state with 8th largest share of migrants from other states. Male in-migration is principally motivated by the search for work opportunities, while the majority of the females shift for family reasons. The main states of origin of the migrants are Uttar Pradesh and Bihar: these migrants typically work as casual labour in farms or daily wage earners, resulting in pressures on labour markets in the State.

64. The predominant trend in Odisha, by contrast, is rural to urban migration⁶³. Females continued to be the dominant migrants, though the proportion of female migrants to total migrants has reduced between 2001 and 2011 from 57% to 53% in Odisha, and from 54% to 52% at national level.

Table 6. Demographic statistics for the target states

	Punjab	Haryana	Chhattisgarh	Odisha	Totals
Total population (million) (Census 2011)	27.7	25.4	25.5	42	120.60
% of national total (Census 2011)	2.29	2.09	2.11	3.47	9.96
Annual population growth rate (2001-11) (%)	1.4	1.99	2.26	1.4	1.8
Decadal Growth Rate (2001-11) (%) ⁶⁴	13.9	19.9	22.6	14.0	17.7
Rural population (million)	17.3	16.5	19.6	35	88.4
Decadal Growth Rate (2001-11) (%) ⁶⁵	7.58	10.00	17.75	11.71	12.18
Annual growth rate of rural population (period) (%)	0.76	1.00	1.77	1.17	1.21
% rural (Census 2011)	62.5	65.1	76.8	83.3	73.3

65. There are marked contrasts in social conditions between the two western States of Punjab and Haryana and the poorer eastern States of Chhattisgarh and Odisha. **The eastern States have higher poverty levels** than Punjab and Haryana (and lower Human Development Index levels, HDI): they also fare worse in both regards than the national average, and have experienced relatively little reduction in poverty levels over the last two decades. By contrast, **Punjab and Haryana fare better in both regards than the national average**, and have experienced major reductions in poverty levels over the last two decades.

66. While at national there has been greater progress in reducing urban poverty than rural, this situation is only reflected at State level in Odisha: in Punjab and Chhattisgarh, there has been a greater reduction in rural than in urban areas, and in Haryana there is a negligible difference.

Table 7. Poverty and Human Development

	% of Population Living below poverty line				Human Development Index (2018)
	2004-05	2009-10	2011-12	% change	
Punjab					
Rural	22.1	14.6	7.7	-65.2	0.723
Urban	18.7	18.1	9.2	-50.8	
Total	20.9	15.9	8.3	-60.3	
Haryana					
Rural	24.8	18.6	11.6	-53.2	0.708
Urban	22.4	23.0	10.3	-54.0	

⁶³ https://codesria.org/IMG/pdf/8-inequality_climate_change_velan_mohanty.pdf

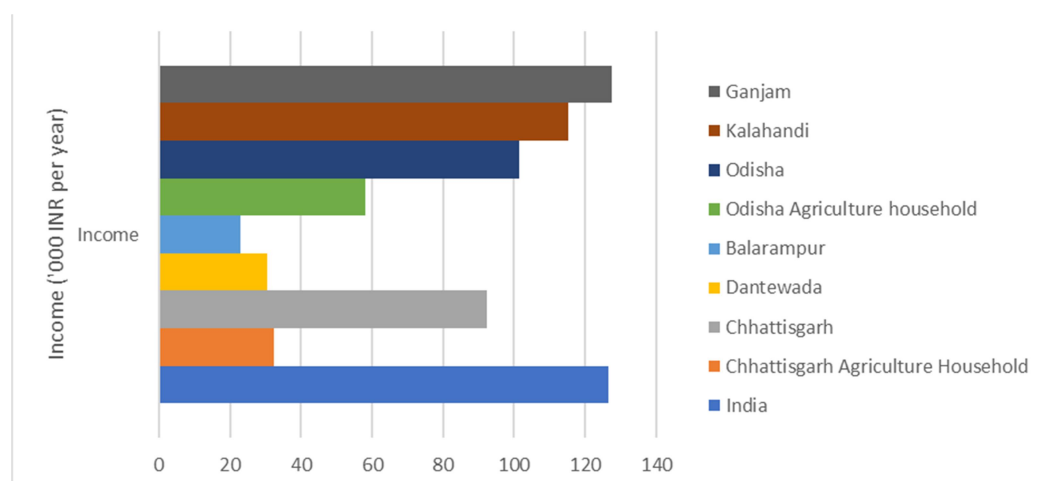
⁶⁴ Registrar General & Census Commissioner, India (RGI);

<https://pib.gov.in/PressReleasePage.aspx?PRID=1602755>

⁶⁵ https://censusindia.gov.in/2011-prov-results/paper2/data_files/india/paper2_1.pdf

	% of Population Living below poverty line				Human Development Index (2018)
	2004-05	2009-10	2011-12	% change	
Total	24.1	20.1	11.2	-53.5	
Chhattisgarh					
Rural	55.1	56.1	44.6	-19.1	0.613
Urban	28.4	23.8	24.8	-12.7	
Total	49.4	48.7	39.9	-19.2	
Odisha					
Rural	60.8	39.2	35.7	-41.3	0.606
Urban	37.6	25.9	17.3	-54.0	
Total	57.2	37.0	32.6	-43.0	
All India					
Rural	41.8	33.8	25.7	-38.5	0.647
Urban	25.7	20.9	13.7	-46.7	
Total	37.2	29.8	21.9	-41.1	

Figure 24. Household income in Chhattisgarh and Odisha, and the target districts



67. These contrasts in poverty levels are also reflected to a large degree in indicators of health and nutrition. For most indicators related to poor **health care and malnutrition, conditions are significantly worse in Chhattisgarh and Odisha** than in Punjab and Haryana. The major exception, linked to poor (rather than insufficient) diet, is **obesity, which is significantly higher in both Punjab and Haryana** than in the eastern States; **the rate of increase in obesity levels in both Chhattisgarh and Odisha is far greater**, however, suggesting that levels there will over time come close to those in Punjab and Haryana.

68. In Chhattisgarh and Odisha, health and nutrition indicators are in general significantly lower among younger age groups, in rural areas, and among those belonging to Scheduled Tribes and “Other Backward Classes”, and children of higher birth orders. Conversely, overweight and obesity are most prevalent in older adults, those in urban areas, those with at least 12 years of schooling, and those who are not in a scheduled caste, a scheduled tribe, or other backward class⁶⁶.

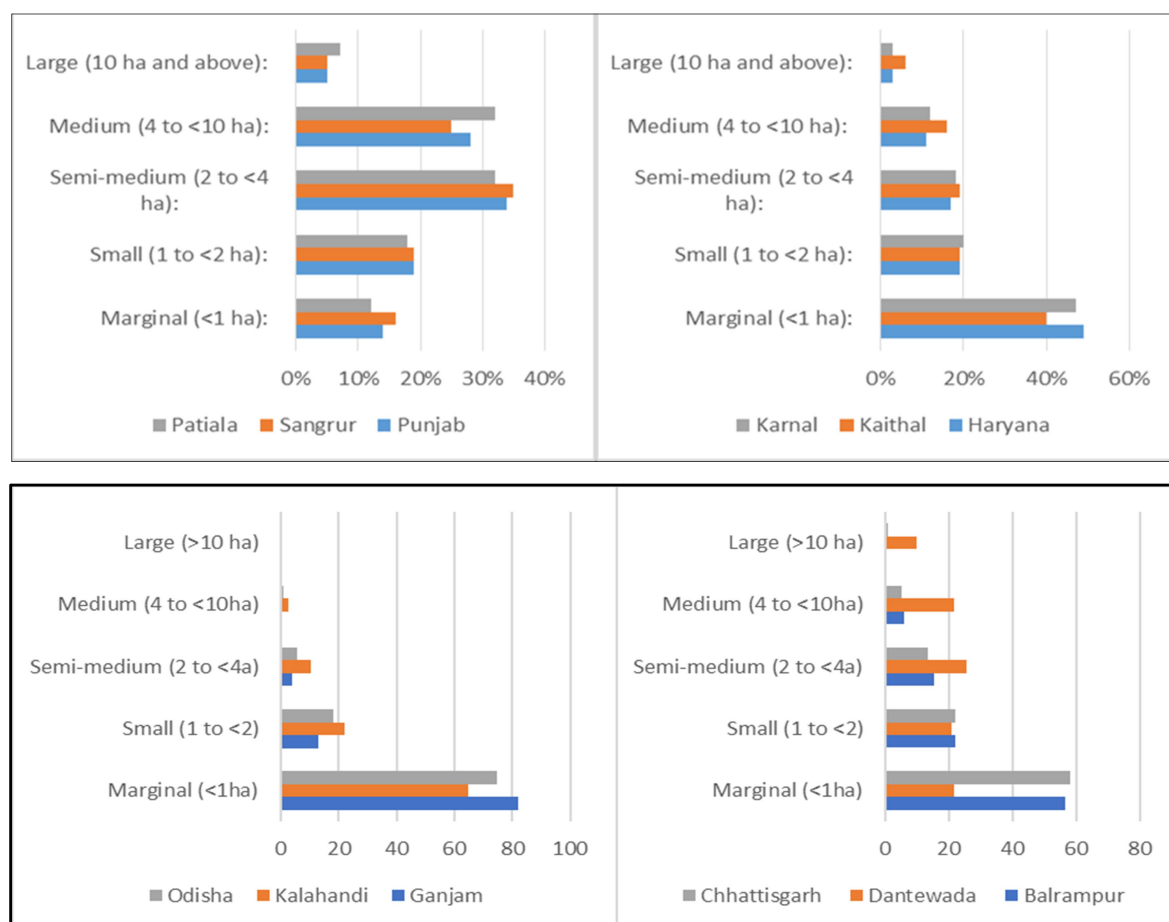
Landholding characteristics and tenure in the target states

69. Average farm size in Punjab is 3.6 ha: 34% of operational landholdings fall into the semi-medium category, and only around 5% are large. By contrast, the average farm size in Haryana is

⁶⁶ <http://rchiips.org/nfhs/NFHS-4Reports/Chhattisgarh.pdf>

2.2 ha, with 49% of operational landholdings in the marginal category, and only 3% are large (see Figure 25 for land holding categories).

Figure 25. Operational landholdings by size in Punjab and Haryana (top) and Odisha and Chhattisgarh (bottom), and target districts⁶⁷



70. In both Punjab and Haryana, there is a high incidence of land leasing to fellow farmers in the villages⁶⁸. Lease rates are typically in the range of Rs 50-60,000 per acre (around USD 1,700-2,000/ha) per year. Migration of youths and other family members to foreign locations is a major reason for this frequency of absentee landownership. The high cost of renting tends to motivate lessees to undertake “land mining” in order to obtain the maximum possible return from the land in the shortest possible time, at the expense of considerations of environmental sustainability such as soil conservation and improvement.

Tribal peoples in Chhattisgarh and Odisha

71. Between them, in 2011 Chhattisgarh and Odisha had 17.4 million tribal people (16.7% of the total tribal population of the country): Scheduled Tribes⁶⁹ comprise around 30.6% and 22.85% respectively of the populations of the two states. Odisha is home to 62 tribes and has 13 Particularly Vulnerable Tribal Groups (PVTGs). Population growth rates among tribal peoples are

⁶⁷ Agricultural Census 2015-16 -Phase I

⁶⁸ In Punjab, tenants acquire the right to purchase leased land after a specific period of tenancy (generally six years). As a result, the tenancy laws in the state are restrictive and discourage recording of tenancy. As a result, tenancy of land is generally informal. The percentage share of leased-in land declined from 39.8% in 1953-54 to 17.84% in 2002-03, rising again to 24.42% in 2012-13, mainly because of farmers leaving agriculture for other means of livelihood. Bansal, S. and Grover, D.K. (2019). Tenant farming in Punjab: nature, pattern and constraints. *Economic Affairs*, 64(4): 813-819.

⁶⁹ Schedule to Article 342 of the Constitution of India

lower than that of the overall national average, and are also significantly lower in rural areas than urban areas. Punjab and Haryana, by contrast, had no notified Scheduled Tribes as of 2011⁷⁰.

72. Traditionally, tribal communities have had symbiotic relations with forest landscapes and depended on them for their livelihoods, using the forests for hunting and gathering: the target states have significantly higher forest cover than the national average. However, notwithstanding the rich vegetation and good rainfall in parts of the tribal belt such as Chhattisgarh and Odisha, the belt is home to one of the largest concentrations of rural poverty in the world: the proportion of the rural populations in these two states below the poverty line are 74% and 39% higher than the national average, respectively. Tribal regions perform poorly in terms of infrastructure, returns from agriculture and almost all human development indicators. Detailed analyses of socioeconomic conditions among tribal peoples are provided in Annex J1.

73. The relations between tribal peoples and the forest landscapes in which they live were undermined in the 19th century with the reservation of forests and introduction of “scientific forest management”, which led to tribal people being excluded from forests and their rights largely curtailed to a great extent. The Forest Rights Act (FRA), 2006 recognizes the rights of the forest dwelling tribal communities and other traditional forest dwellers to forest resources, on which these communities were dependent for a variety of needs, including livelihood, habitation and other socio-cultural needs. Despite this, with growing population and resource pressure, the region is now witnessing a rise in livelihoods based on settled farming, and some tribal groups are at risk of losing their cultural identity.

74. The agriculture of tribal peoples is predominantly rainfed and mono-cropped: horticulture is marginally developed, and the ratio of net irrigated area to net sown area is significantly lower than the national average. Tribal women participate in all agricultural operations excepting ploughing and sowing of rice seed, and they contribute the majority of total labour.

75. Additional data and analyses on tribal peoples in the target States are presented in Annex J.1 (Indigenous Peoples Report).

Institutional, policy and regulatory frameworks

Box 11. Institutional, policy and regulatory framework – key points:

- Central and State Government institutions are organized along strongly-defined sector lines
- Numerous policy instruments (in the environmental, agriculture, water and other sectors) support environmental sustainability
- Policy responses to environmental degradation in Green Revolution states prioritise productive diversification and shifting the focus of intensive production to eastern India
- There is specific recognition in a number of policy instruments (notably, the Draft State Farmers’ Policy in Punjab) of need for diversification and to reconsider subsidy and PDS frameworks that promote resource degradation based on rice and wheat production
- There are strong Constitutional and regulatory provision to protect the rights of tribal peoples

76. In central Government, issues related to the agriculture and environment sectors are addressed, respectively, by:

- **The Ministry of Agriculture & Farmers Welfare (MoAFW)**, which is the apex organization for all agriculture-related activities in the country. It provides a policy framework for

⁷⁰ <https://tribal.nic.in/ST/Statistics8518.pdf>

agriculture in India, and state counterpart departments broadly follow this framework with necessary customization of some schemes or programmes with respect to their states.

- The **Ministry of Environment and Forests and Climate Change (MoEFCC)**, which is the nodal agency in the administrative structure of the Central Government for the planning, promotion, co-ordination and overseeing the implementation of India's environmental and forestry policies and programmes. MoEFCC is also home to India's GEF Operational Focal Point.

77. This sector-based institutional framework is mirrored at State level by the Forest, Environment and Wildlife Departments and the Departments/Directorates of Agriculture Cooperation and Farmers Welfare (DAC& FW) of State Governments (see the Institutional Stakeholder Analysis in Annex H4.2 for more detail).

Crop procurement and price support

78. The assured procurement policy that commenced in the late 1960s targeted increasing production of paddy and wheat. The policy—underpinned by a plethora of input subsidies on energy, fertilizers, and credit—had multiple long-term effects. It has quadrupled output, altered regional production patterns, and decreased crop diversification, and has also had damaging ecological consequences, especially in terms of water use in certain regions. Over time, procurement coupled with the Minimum Support Price (MSP) emerged as a de facto insurance mechanism, further incentivizing the cultivation of paddy and wheat over other crops.

79. Later, states adopted their versions of what came to be known as Agricultural Produce Marketing Committee (APMC) Acts in the 1950s and 1960s. Indeed, in its initial years, regulated markets led to substantial improvements in agricultural trade and farmer incomes, with diminishing inter-regional mismatches of supply and demand within India. But over time, many APMCs were also captured by entrenched interests and what began as a facilitative instrument enhancing farmers' incomes became viewed by policymakers more as a roadblock.

80. In more recent years, the GoI's priority has shifted to increasing farmers' incomes. In 2016, the Indian government announced plans to double farmers' incomes by 2023. To achieve this goal, the Government of India created a Committee on Doubling of Farmers' Incomes, which identified improvement in real prices received by farmers as a key source of growth for farmer's incomes and, to this end, prioritized post-production interventions, including agri-logistics and agricultural marketing.

81. The first Model APMC Act, which called for various reforms, was put forth in 2003. Subsequently, modest attempts at reforms continued, including clarifying provisions for contract farming and allowing processing companies to buy produce directly from farmers in many states, albeit remaining within the regulatory ambit of the APMC. Renewed attempts were made with a second Model APMC Act. A more ambitious attempt was a new software-led architecture called eNAM, which linked various APMC mandis in the country to create a National Agricultural Market.

Sustainable agriculture:

82. The focus of the project on promoting sustainability within the agriculture sector is fully in line with the emphasis of the New Agriculture Policy (NAP)⁷¹ of 2014, brought out by the Ministry of Agriculture and Farmers' Welfare (MoA&FW), which stipulates that the growth in the sector, which it proposes, must be based on the efficient use of resources and the conservation of soil, water and biodiversity. Baseline investments in response to this policy focus on sustainable agriculture, under the National Mission on Sustainable Agriculture (NMSA) are described in Box 25.

⁷¹ <http://rrtd.nic.in/agriculture.html>

83. Likewise, the earlier National Policy for Farmers (NPF) of 2007⁷², of MoA&FW, supports sustainability through, for example, the issuing of soil health passbooks to the farmers and integrated pest management system; support services for women; agricultural bio-security systems; the use of Information and Communication Technology (ICT) and the setting up of farm schools to revitalize agricultural extension; the definition of special categories of farming including organic farming; and rural non-farm employment initiatives for farm households.

84. At the State level, Odisha's Agricultural Policy 2020, also known as SAMRUDHI aims to actualize the vast untapped potential of agriculture in Odisha and strengthen the economic and social well-being of its farmers, sharecroppers and landless agricultural households while ensuring the growth process is environmentally, economically and technologically inclusive, scalable and sustainable. More specifically, the sector-specific strategy in the policy is designed on eight pillars or components: "SAMRUDHI", which include leveraging Science and Technology; Adaptation to Climate Change; Markets; Resource use efficiency; Upscaling appropriate infrastructure; Diversification of production to high value agriculture; Human resource upgrading and skilling; and Strengthening of Institutions⁷³.

Organic farming

85. Organic farming is specifically supported through the Organic Farming Policy of 2005⁷⁴, of MoA&FW, which seeks to promote technically sound, economically viable, environmentally non-degrading, and socially acceptable use of natural resources in favour of organic agriculture, in order to sustain soil fertility, conserve bio-resources, strengthen rural economies, promote value addition, accelerate the growth of agro-business and secure a fair standard of living for the farmers and agricultural workers and their families. The Paramparagat Krishi Vikas Yojana (PKVY) scheme of the NMSA promotes organic farming through adoption of organic villages, by cluster approach and PGS certification (see Supplementary Annex 8.9 for additional information on PKVY): by 2019, there were 118,000 ha, 71,000 ha, 17,000 ha and 7,000 ha of organic agriculture in Odisha Chhattisgarh, Punjab and Haryana respectively, out of a national total of 2,777,000 ha⁷⁵.

86. At State level, the Organic Farming Policy of Odisha (2018) aims to promote organic farming to improve soil fertility and productivity, judicious use of water resources and to encourage farming with use of local resources: default organic areas will be targeted to intensify agro-ecological approaches; 200,000 ha of agricultural area will be brought under organic farming; and State interventions will include knowledge dissemination, soil health management and promotion of seed sovereignty.

Environmental management and sustainability:

87. The overarching national policy in relation to environmental management and sustainability is the National Environment Policy of 2006⁷⁶, brought out by the Ministry of Environment, Forest and Climate Change (MoEF&CC). The dominant theme of this policy is that while conservation of environmental resources is necessary to secure livelihoods and well-being of all, the most secure basis for conservation is to ensure that people dependent on particular resources obtain better livelihoods through conservation (for example through Joint Forest Management⁷⁷), than through

⁷² <http://agricoop.nic.in/sites/default/files/nppf2007.pdf>

⁷³ <https://agriodisha.nic.in/Content/pdf/SAMRUDHI%20-Agriculture%20Policy%202020.pdf>

⁷⁴ http://ncof.dacnet.nic.in/Policy_and_EFC/Organic_Farming_Policy_2005.pdf

⁷⁵ Of this, 1.94 million ha is under National Programme for Organic Production (NPOP); 0.59 million ha under Paramparagat Krishi Vikas Yojna (PKVY); 0.07 million ha under Mission Organic Value Chain Development for North Eastern Regions (MOVCDNER) and 0.17 million ha under state schemes or non-schemes.

<https://vikalpsangam.org/article/on-a-tardy-trail-state-of-organic-farming-in-india/>

⁷⁶ https://ibkp.dbtindia.gov.in/DBT_Content_Test/CMS/Guidelines/20190411103521431_National%20Environment%20Policy.%202006.pdf

⁷⁷ The basic rationale of the Joint Forest Management (JFM) approach is the cooperation of local communities and the state government in the protection of forest resources from fire, illegal grazing, and timber cutting, in exchange for which they receive non-timber forest products. Patra P. (2015) Joint Forest Management in India. In: Dutt A., Noble A., Costa F., Thakur S., Thakur R., Sharma H. (eds) Spatial Diversity and Dynamics in Resources and Urban Development. Springer, Dordrecht. https://doi.org/10.1007/978-94-017-9771-9_24

resource degradation. The policy also seeks to stimulate partnerships of different stakeholders, i.e. public agencies, local communities, academic and scientific institutions, the investment community, and international development partners, in harnessing their respective resources and strengths for environmental management.

Integrated water resources development and management:

88. The National Water Policy of 2002⁷⁸ 2012, brought out by the Ministry of Jal Shakti, emphasizes integrated water resources development and management for optimal and sustainable utilization of available surface and groundwater; the creation of a well-developed information system; water conservation and demand management; quantity and quality aspects as well as environmental considerations; and involvement of beneficiaries and stakeholders in project planning, with a participatory approach to water resource management.

89. The Chhattisgarh State Water Policy (2012)⁷⁹ also prioritises the creation of incentives for efficient and productive water use, and the empowerment of local farmer institutions (Water User Associations)

Forest management:

90. The National Forest Policy of 1988⁸⁰, brought out by the MoEF&CC, set the stage for participatory forest management in India. It marked a significant departure from the earlier National Forest Policy of 1952, as it envisages people's participation in the development and protection of forests. The basic objective of this policy is to maintain environmental stability through the preservation of forests as a natural heritage. It also places emphasis on substantially increasing the forest/tree cover and the productivity of forests in the country to meet national needs. The most distinctive feature of this policy is the creation of a massive people's movement with the involvement of women, for achieving the objectives and to minimize the pressure on the existing forests.

Agroforestry:

91. The National Agroforestry Policy of 2014, brought out by MoAF&FW, provides for a coordinated framework for the promotion of agroforestry across diverse missions, programmes, schemes, agencies and sectors, in order to provide employment, income and livelihood opportunities of rural households, and meet ever-increasing demands for agroforestry products (such as timber, food, fuel, fodder, fertilizer and fibre), while conserving natural resources and forests, protecting the environment and providing environmental security, and increasing forest and tree cover.

Wildlife conservation

92. Wildlife conservation is a particularly significant issue in Chhattisgarh and Odisha, is addressed through the National Wildlife Action Plan for 2017-2031. The priorities of this plan include strengthening and promoting the integrated management of wildlife and their habitats, and promoting ecotourism, nature education and participatory management.

Rationalisation and diversification of agriculture:

93. The principal expression of Government policy priorities on crop diversification is the Crop Diversification Programme of the National Agricultural Development Plan (RKVY), which promotes alternative crops such as maize, pulses, oilseeds and intercropping with agroforestry; the Bringing the Green Revolution to Eastern India (BGREI) programme responds to the recognised current unsustainability of rice production and over-exploitation of groundwater in the Indo-Gangetic Plain, and aims to shift the focus of rice production to eastern India.

94. At State level, the Draft State Farmers Policy in Punjab states that the objective of enhancing farmers' incomes makes promotion of diversification imperative from economic and ecological points of view it also proposes rationalization of the power subsidy in order to reduce the

⁷⁸ <http://nwm.gov.in/sites/default/files/nwp20025617515534.pdf>

⁷⁹ <https://cgwrdr.in/wrdmis/2012-06-21-05-26-50/17-policycirculrs/58-state-water-resources-development-policy.html>

⁸⁰ <http://asbb.gov.in/Downloads/National%20Forest%20Policy.pdf>

unsustainable use of ground water (with the power subsidy strictly restricted to non-income tax payee farmers, and the possibility of it being provided as a direct benefit transfer). The Policy recognises that improved economic prosperity across India is leading to fast changing consumer preferences along with a conspicuous and welcome shift to more protein-rich diets, further dampening demand for the Public Distribution System (PDS) oriented produce of the State. The Price Deficiency Payment Scheme (Bhavantar Bhugtan Yojana) and the Direct Benefit Transfer Mode, are envisaged to adversely impact food procurement under the Minimum Support Price (MSP) programme⁸¹. It also makes specific provision for climate resilient agriculture, sustainability and biodiversity, including the use of village common lands to provide required biodiversity to protect agriculture, and the planning of village-level biodiversity reserves; a multi-pronged approach to take care of crop residues, including a paddy straw challenge fund; exploration of the use of carbon credit for improved agricultural practices; strengthening horticulture research and education for diversification and research into alternative crops; and establishment of a fund for need-based research and price stabilization of milk and non-MSP crops, through a 20% cess (levy) on the commission of arthyias (commission agents) for procurement of wheat and paddy.

95. The Haryana Agri-business and Food Processing Policy 2018 also supports crop diversification, with a target of bringing 14% of the total cropped area under horticulture crops by 2022. A total of 340 villages have been declared as “Baagwani/horticulture villages” and are being developed in phased manner with the development of infrastructural facilities, provision of funds and extension services. Currently, in the 1st phase, 140 clusters with horticulture potential have been selected and work has started for the development of infrastructure facilities⁸².

Tribal peoples

96. The project will work within the framework of the strong regulatory provisions that exist to protect the rights of **tribal peoples**, of which there are significant numbers in the States of Chhattisgarh and Odisha,:

- The Fifth Schedule of the Constitution of India protects the interests of tribal peoples in ten states of India with a predominance of tribal populations, by identifying **Scheduled Areas**⁸³. These are subject to a special governance mechanism wherein the central government plays a direct role in safeguarding cultural and economic interests of scheduled tribes in the area; the state governor has special responsibilities including limiting the effect of acts of the central or state legislature on the Schedule Area.
- The Panchayat (Extension to the Scheduled Areas) Act, 1996, or PESA, aims to protect tribal populations from exploitation by **making Gram Sabhas and Gram Panchayat centres of self-governance**.
- The Scheduled Tribe and Other Traditional Forest Dwellers (Recognition of Forest Rights Act), 2006, better known as FRA or Forest Rights Act, of the GoI provides **entitlements for forest dwelling communities**. The FRA is also significant as it changed the narrative around ecosystem conservation and has recognized forest dwellers as “integral to the very survival and sustainability of the forest ecosystem”. This legislation has had a substantial impact on addressing land tenure issues in forest landscapes and can be leveraged by the project to promote an integrated landscape approach especially in areas characterised by forest-agricultural mosaics.

97. Although the State Government of Chhattisgarh has made substantial progress in respect of compliance of concerned State subject laws with the PESA Act (see below) and made its

⁸¹ <https://www.psfc.org.in/english.pdf>

⁸² <http://www.indiaenvironmentportal.org.in/files/file/Haryana%20Agri%20Business%20and%20Food%20Processing%20Policy%202018%20.pdf>

⁸³ Andhra Pradesh, Chhattisgarh, Gujarat, Himachal Pradesh, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, and Telangana. The states of Assam, Meghalaya, Tripura and Mizoram are covered by the Sixth Schedule.

Panchayati Raj Act compliant with the section 4 of PESA Act, it has not yet framed PESA Rules⁸⁴. Similarly, the State Government of Odisha has largely made its Panchayati Raj Act compliant with Section 4 of the PESA Act and has made good progress in respect of compliance of concerned State subject laws, but a few subject laws are yet to make PESA compliant and the State Government has not yet framed the PESA Rules either.

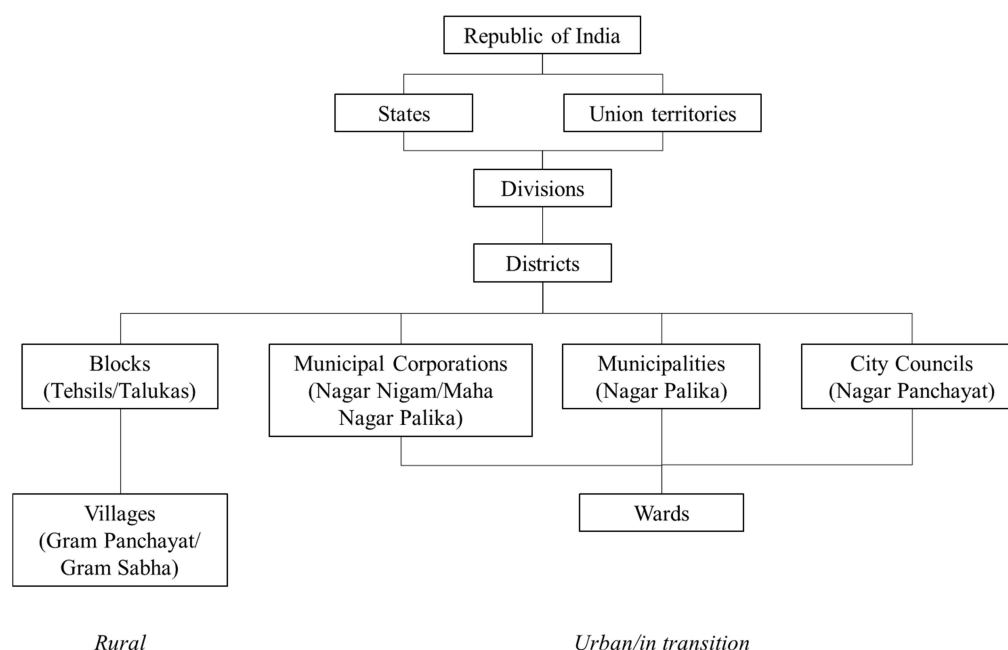
Governance structures

Box 12. Key points regarding governance structures:

- There is a strong baseline of governance structures at community level in the form of *gram panchayats* and *gram sabhas*

98. India has a solid and well-tested framework of local governance structures, which will enable local stakeholders (including women) to engage and participate meaningfully in the project and will serve to sustain its impacts in the long term (Figure 26). Central to this framework are the *gram panchayats* (councils) at District level, intermediate and village levels, whose members are directly elected by villagers (the Secretary of the panchayat is a non-elected representative, appointed by the state government, to oversee panchayat activities). Gram panchayats are the executive committees of the *gram sabhas*, which elect their members: gram sabhas are assemblies of all people in a village, who have reached 18 years of age and are registered on the voters list⁸⁵.

Figure 26. Administrative and governance structure in India



Value chains.

Box 13. Key points regarding value chains:

- Value chains for rice and wheat are strongly dominated by public (Government) procurement
- Farmers in Punjab and Haryana have much higher levels of market insertion than those in Chhattisgarh and Odisha
- Crop sales are mostly through regulated markets (mandis) in Punjab and Haryana, but

⁸⁴ Ministry of Panchayati Raj (PESA Division), <https://pesadarpan.gov.in/documents/30080/45009/Chhattisgarh.pdf/419ec0ef-4a40-4ab4-97fd-2d8c105a96e1>

⁸⁵ Gram panchayats are at the lowest level of panchayat raj institutions (PRIs), whose legal authority is the 73rd Constitutional Amendment of 1993, which is concerned with rural local governments

- mostly at farmgate or unregulated open air markets (haats) in Chhattisgarh and Odisha
- Farmers in Punjab typically sell produce through commission agents (*arhatiyas*) who intermediates between them and the state agency charged with procurement.
- In Odisha, traders dominate the market, followed by Primary Agriculture Cooperative Societies (PACS) and other cooperatives.

99. One of the core strategies of the project will be to work with value chains and value chain actors (both public and private) to generate leverage, in the form of standards and market-based incentives, for improved sustainability in the practices used for the crop production, particularly of rice and wheat; it will also work to a lesser degree with value chains for other products such as vegetables.

100. Additional information on agricultural value chain structures is presented in Supplementary Annex 7.1.

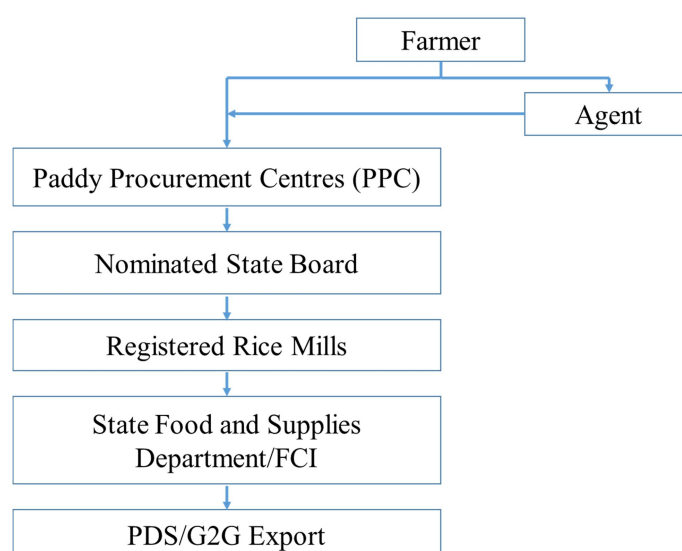
101. Rice and wheat value chains are dominated by **public (Government) procurement** (see Figure 27 for public procurement value chains for rice), which accounts for more than 75% of total procurement in all four target states. The Government procures food grains under the National Food Security Act to provide subsidized food grains to two-thirds of the country's population.

102. The **Food Corporation of India (FCI)**, which is the designated authority to manage the procurement and distribution systems, procures wheat through NAFED, MarkFed, Pungrain and other similar institutions at the *mandis* (regulated markets) and designated procurement points, at the Minimum Support Price (MSP) declared by the Government.

103. **Agricultural Produce Market Committees (APMC)**, established by State governments, oversee the *mandis*, ensuring that farmers are safeguarded from exploitation by large retailers, and that the farm-to-retail price spread does not reach excessively high levels.

104. In addition to supplying the required quantity of food grains for the Public Distribution System (PDS) and Mid-Day Meal Scheme, **the FCI sells surplus grains through a tendering process to private buyers.**

Figure 27. Simplified structure of public procurement value chains for rice



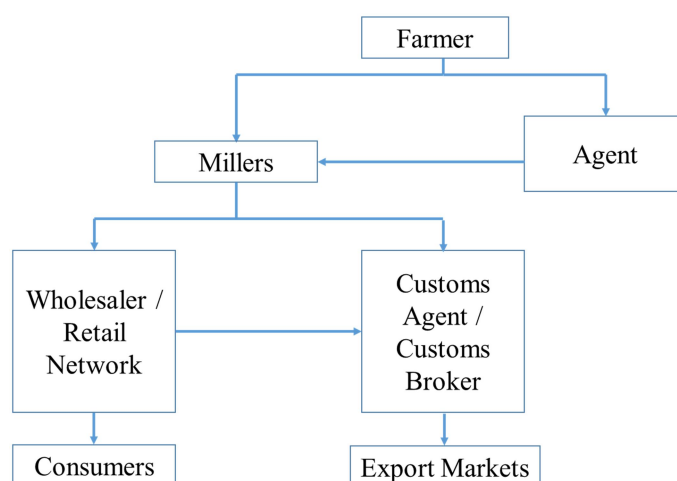
105. There is also private sector involvement in the public procurement chains: **traders** (acting as commission agents of the APMC *mandis*) procure paddy and wheat from the farmers and supply them to the government procurement agencies. They handle the loading, unloading, and cleaning of grains at the mandi level and are paid 2.5% of the value of the total procurement by the Government agencies. The predominance of commission agents is manifest in Punjab and Haryana

while they are mostly absent in Chhattisgarh and Odisha. Despite the very large quantities of paddy and wheat procured in Punjab and Haryana, farmers rarely interact directly with officials of the procurement agencies. Their point of contact is the agent who intermediates between the seller (the farmer) and the state agency charged with procurement. In Punjab and Haryana, the relationship between the farmer and his agent is long term. One reason for this is that the agents don't compete on price, which is fixed at the MSP. The state procurement agencies do not pay the agent immediately, with payments often delayed by several months. The agent, however, pays the farmer partly out of his pocket, and the long-term relationship ensures that the farmer trusts that the agent will make the balance payment in due course. However, the agents have limited role in the decision making of farmers and will have little role in the project. The agents are mostly absent in Chhattisgarh and Odisha due to the low levels of state procurement.

106. **Millers and processors** then act as a bridge between the procurement players such as FCI and local traders, and the market players such as the brands and wholesalers. They are also the first level of secondary value addition in both paddy and wheat, transforming paddy and wheat grain into products such as rice, flour, semolina and bran, as well as performing the role of large aggregators of rice and wheat products. There are also many millers who have their own distribution channels and sell rice and wheat products under their registered brand names.

107. **Market-driven private value chains** involve a myriad of players, including **traders/agents, rice millers, Farmer Producer Organizations (FPOs)** dealing in various agro-commodities, and **large national players** such as KRBL Ltd and Chaman Lal Setia Exports, with state of the art vertically-integrated rice and wheat supply chains.

Figure 28. Simplified structure of private procurement value chains



108. Until now, under the provisions of the APMC Act, private players such as corporate brands or local wholesalers have been unable to buy from farmers directly and have had to depend upon other supply chain players, such as local traders/agents and millers/processors, who aggregate the desired volumes and mill, segregate and supply the final produce to them. This has allowed the purchasers to obtain the value-added products in the quality and quantity desired, without needing to be involved in aggregation and value addition; there are, however some private sector players, such as ITC Limited⁸⁶, who have their own milling, procurement, and distribution systems.

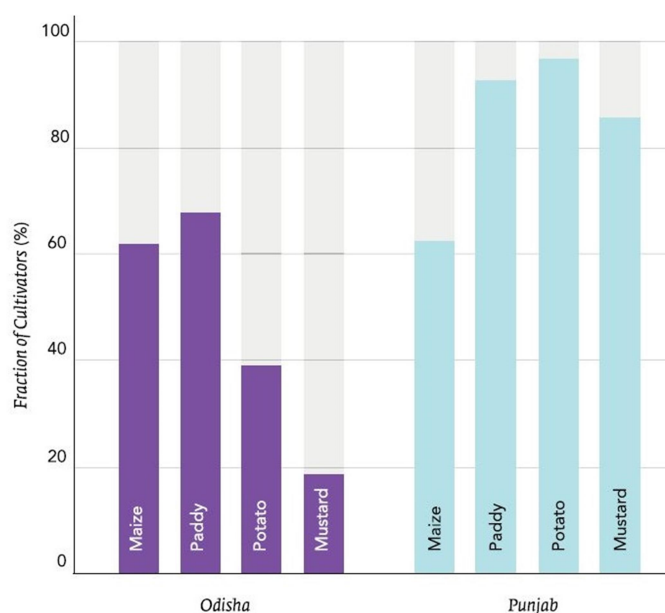
109. Farmers in Punjab sell a greater proportion of their produce (through regulated markets⁸⁷) than those in Odisha (Figure 29); the situation in Haryana is similar to that in Punjab and that in

⁸⁶ <https://www.itcportal.com/>

⁸⁷ 'Markets' here refers only to APMC markets: transactions with private players outside of these markets are not tracked/reported.

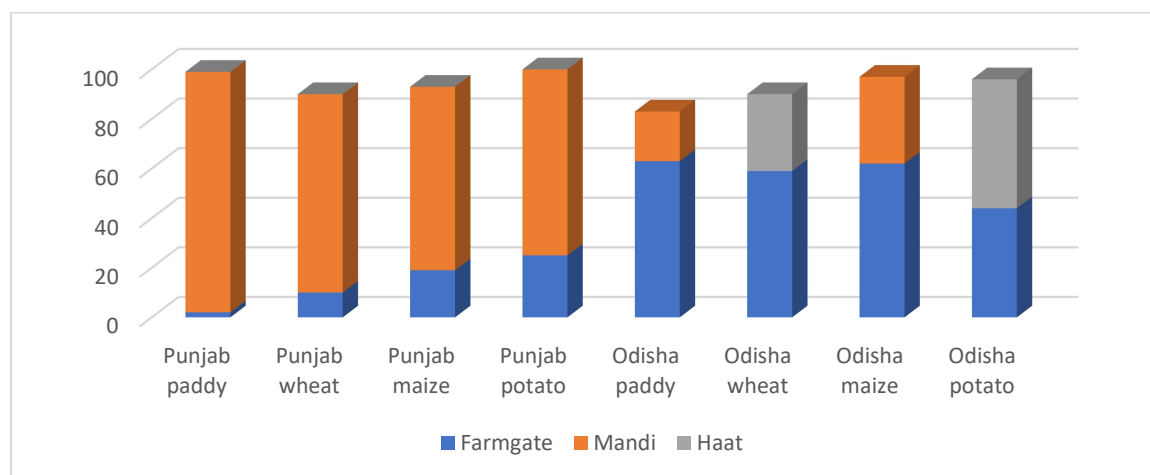
Chhattishgh is similar to that in Odisha⁸⁸. Across all the target states, larger scale farmers have higher levels of market insertion than smaller scale ones.

Figure 29. Greater proportion of farmers with market insertion in Punjab than Odisha



110. Crop sales are mostly through regulated markets (*mandis*)⁸⁹ in Punjab, but mostly at farmgate or unregulated open air markets (*haats*) in Odisha. Despite the presence of a strong *mandi* system in Punjab, many transactions related to non-MSP crops—about a fifth for maize and a quarter for potato—are carried out at the farmgate.

Figure 30. Point of sale of different crops in Punjab and Odisha (% of transactions)



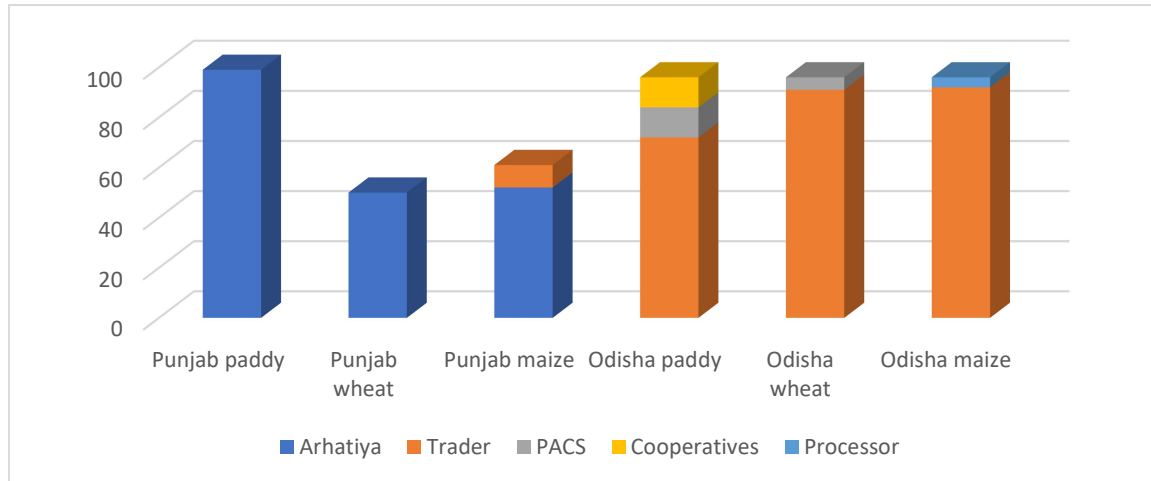
111. Despite the very large quantities of paddy and wheat procured in Punjab, farmers there rarely interact directly with officials of the FCI or state procurement agencies. Their point of contact is

⁸⁸ Chatterjee S., Krishnamurthy, M., Kapur, D. and Bouton, M. 2020. A Study of the Agricultural Markets of Bihar, Odisha and Punjab. Final Report. Center for the Advanced Study of India, University of Pennsylvania: Philadelphia. The study did not cover Haryana or Chhattisgarh, but conditions in those states are similar to those in Punjab and Odisha respectively.

⁸⁹ Regulated markets are those markets that have notified by the state government under the APMC Act. Legally, any transaction between farmer and traders (government or private) has to happen physically within these markets. The number of such markets is large in Punjab and Haryana and fairly low in Chhattisgarh and Odisha. Since the bulk of the government procurement at MSP happens for rice and wheat, farmers (especially in Punjab and Haryana) have an incentive to come to these mandis.

the *arhatiya* (commission agent)⁹⁰ who intermediates between them and the state agency charged with procurement (farmers sell to *ahartiyas*, and the *ahartiyas* then sell to FCI/NAFED: this transaction happens within the *mandi*). In Odisha, by contrast, traders dominate the market, followed by PACS and cooperatives.

Figure 31. Most common primary buyers by crop in Punjab and Odisha



112. In Punjab, the relationship between the farmer and the *arhatiyas* is long term: *ahartiyas* may also provide other services to farmers such as credit, sale of agrochemicals etc., as well as sometimes making spot payments to farmers to avoid delays in Government payments reaching the farmer, leading to a relation of trust. In contrast, farmers in Odisha find a new buyer almost every season, selling to the trader offering them the best price. One reason for this is that *arhatiyas* in Punjab are not competing on price, which is fixed at the MSP. In Punjab, the state procurement agency does not pay the *arhatiya* immediately, with payments often delayed by several months. The *arhatiya*, however, pays the farmer partly out of his/her pocket, and the long-term relationship ensures that the farmer trusts that the *arhatiya* will make the balance payment in due course.

113. The procurement system involving *mandis* and *ahartiyas* is not well established in Odisha and Chhattisgarh, as it is in Punjab and Haryana, and the governments there have invested heavily in building up procurement systems over the last two decades. These include seasonal Regulated Marketing Committees that function only during the harvest season, and Primary Agriculture Cooperative Societies that help with the government procurement. Paddy procurement at MSP, to support farmers' income, has come to represent a key development strategy of the States and has attracted considerable Government investment. However, on ground there are considerable regional differences in the extent of investment and the support to procurement: in Odisha, for example, paddy procurement is significantly more prevalent in the west of the state (where farmers are also better mobilized) than in central and coastal districts. In Chhattisgarh, the investments are concentrated in the central plains. In these States the medium and large farmers are significantly more likely to participate in public procurement than sharecroppers and tenant farmers with ambiguous legal status. Sharecroppers who want to register in Odisha's paddy procurement system have to overcome barriers set by the need to get consent from landholders, certification from *sarpanchs*⁹¹, or verification by district agricultural officers.

114. Overall, alongside the government's high-profile commitment to paddy procurement by the public sector, there is considerable illegal private trade in paddy carried out through middle men rather than between established private players and farmers.

⁹⁰ *Arhatiyas* are appointed by the APMC Board, and may be independent or work for companies or mills): in principle, they are intended to act as auction agents who help facilitate trade between a farmer and a procurer.

⁹¹ A decision-maker, elected by the village-level Gram Sabha (village government), who acts as the focal point of contact between government officers and the village community and retains power for five years.

PART II 1a. Project Description 1) Global environmental problems (context)

115. Food processing is a major thrust in Punjab and Haryana, with several mega food processing parks and cold storage chains. Chhattisgarh and Odisha are home to small and medium 1,141 food processing units. Chhattisgarh acts as a gateway to Eastern India and is a major agri-trading hub with 69 agricultural markets (*mandis*) of which 14 are connected to the e-NAM (online trading platform).

116. Millers play an important role in converting paddy to rice for government procurement as well as for the private parties. Most of these millers suffer from profitability issues and hence lack capacity to modernize and comply with environmental and safety standards. However, there are a number of private players (KRBL Limited, LT Foods Ltd, Chaman Lal Setia Exports Ltd., etc.) who use an integrated value chain approach for serving both domestic and export markets and operate at a large scale.

117. Punjab and Haryana are areas of operation of global corporates including Nestle, PepsiCo (both of which have mills in the States), Olam (which sources from Haryana) and Mars.

118. Please see Section 4 on Private Sector Engagement for more information on private sector actors active in the target States and value chains, and their potential relevance to the project.

Participatory Guarantee Systems

119. Participatory Guarantee Systems (PGS) are defined by the International Federation of Organic Agriculture Movements (IFOAM) as “locally focused quality assurance systems. They certify producers based on active participation of stakeholders and are built on a foundation of trust, social networks and knowledge exchange.”

120. The Participatory Guarantee System-India (PGS-I) is a key element of the Paramparagat Krishi Vikas Yojana (PKVY) scheme of the National Mission on Sustainable Agriculture (NMSA). This is a free domestic organic certification system aimed at promoting organic farming and domestic organic market, implemented by Department of Agriculture, Cooperation and Farmers Welfare (DAC&FW), Government of India through National Centre of Organic Farming (NCOF), Ghaziabad and its seven Zonal Councils: in addition to these Zonal Councils, “Regional Councils (RC)” under PKVY also are authorized to work under PGS-India Programme. PGS India is a quality assurance initiative that is locally relevant and emphasizes the participation of stakeholders, including producers and consumers, and operates outside the frame of third party certification; it is based on participatory approach, a shared vision, transparency and trust.

121. There are currently 40,747 PGS groups in India, with a total of 1,111,239 approved farmers and 1,457,570 active PGS certificates⁹².

Organic Certification

122. India Organic is a certification mark for organically farmed food products manufactured in India. The certification mark certifies that an organic food product conforms to the National Standards for Organic Products established in 2000. Those standards ensure that the product or the raw materials used in the product were grown through organic farming, without the use of chemical fertilizers, pesticides, or induced hormones. The certification is issued by testing centres accredited by the Agricultural and Processed Food Products Export Development Authority (APEDA) under the National Program for Organic Production (NPOP) of the Government of India. The certification scheme and hence the certification mark came into existence in 2002.

123. The NPOP involves the accreditation of Certification Bodies, standards for organic production, promotion of organic farming and marketing etc. The NPOP standards for production and accreditation system have been recognized by European Commission and Switzerland for unprocessed plant products as equivalent to their country standards. Similarly, USDA has recognized NPOP conformity assessment procedures of accreditation as equivalent to that of NOP of US. With these recognitions, Indian organic products duly certified by the accredited

⁹² <https://www.pgfindia-ncof.gov.in/home.aspx>

certification bodies of India are accepted by the importing countries. APEDA is also in the process of Bilateral equivalence with South Korea, Taiwan, Canada, Japan etc.

124. As of 31st March 2020 total area under organic certification process (registered under NPOP) was 3.67 million ha (2019-20). This includes 2.299 million ha cultivable area and another 1.37 million ha for wild harvest collection⁹³.

Agricultural extension systems

Box 14. Key points regarding agricultural extension systems:

- The project aspires to working with existing extension systems as vehicles for the delivery of knowledge and capacities on sustainable production and value chains.
- The Agricultural Research and Education (R&E) system in India is dominated by the public sector
- Private sector agricultural extension is mostly delivered by input dealers, such as those marketing seeds, fertilisers, pesticide and farm machinery.
- There are numerous, often thematically-specialized, NGOs providing technical support to farmers and communities.

125. The transformation of food systems and landscape management towards sustainability also requires farmers to have the knowledge and technical capacities to be able to apply improved, sustainable practices. The project will wherever possible work with (and strengthen) existing extension systems as vehicles for the delivery of this knowledge and capacities. As described below, there is a strong baseline framework of public and private farmer support systems for the project to work with in this way

Government extension

126. Currently, the Agricultural Research and Education (R&E) system in India is dominated by the public sector and is led by the Indian Council of Agriculture Research (ICAR). The Government's Agriculture Technology Management Agency (ATMA) provides a platform for convergence of human and financial resources available in the government, civil society, farm community and private sector. District level ATMA's coordinate and target all extension efforts in each district (they now cover 676 districts of 29 States & 2 Uts²⁰). At the state level, the State Agricultural Management and Extension Training Institute (SAMETI) is an apex planning and training body, which has the aim of training various levels of extension staff in the convergence-led approach of ATMA. ATMA's are guided by MANAGE (National Institute of Agricultural Extension Management), an institution promoted by MoA&FW.

127. In 2014-15, the Government introduced The National Mission on Agriculture Extension and Technology (NMAET) in order to take a holistic view of extension by making the system farmer-driven and increase accountability by restructuring and strengthening existing agriculture extension programmes, under four sub missions: (i) Sub Mission on Agricultural Extension (SMAE), (ii) Sub-Mission on Seed and Planting Material (SMSP), (iii) Sub Mission on Agricultural Mechanization (SMAM) and (iv) Sub Mission on Plant Protection and Plant Quarantine (SMPP).

128. Other major players providing extension services in the public sector are *Krishi Vigyan Kendras* (KVK), State Agricultural Universities (SAU) and ICT-led extension interventions by the Government's Department of Agriculture Cooperation and Farmers' Welfare (DAC&FW). KVKs are field research units of the ICAR and are meant to test new seed varieties, agronomic practices, machinery etc. in field conditions across different agro-climatic zones before these are cleared for adoption by farmers. Additionally, they conduct farmer outreach programmes through on-farm demonstration plots, training etc. The SAUs are another important arm for promoting extension activities in the states. While their main mandate is formal degree programmes in major agricultural disciplines, they provide extension and training support through the directorate of

⁹³ http://apeda.gov.in/apedawebsite/organic/Organic_Products.htm

extension and education. The information flow is mainly from the universities to the KVKs which are responsible for training farmers. An important reform undertaken in recent years by the Ministry of Agriculture at the national level has been the increasing use of modern technologies and communication strategies to help educate farmers. Since ICT Ltd has significant potential to reach large numbers of farmers in a cost effective manner, several schemes have been initiated such as Farmer's Portal, m-Kisan, Kisan Call Centre, Kisan TV channel, Agriculture Clinic and Agriculture Business Centres, Agriculture Fairs and Exhibitions and community radio stations.

- **Farmers Portal:** Farmers Portal is a platform where farmers can access information on crop insurance, storage, crop advisories, extension activities, seeds, pesticides, farm machinery, fertilizers, market prices etc. Farmers can download a handbook, which provides details of schemes and guidelines of various schemes and programmes.
- **mKisan:** mkisan is an SMS portal that enables authorities at the central and state level to give information to farmers in the local language. There are several free, mobile-based applications (or apps as they are commonly referred to), such as KisanSuvidha, PusaKrishi, Agricultural Market, Bhuvan Hailstorm etc. providing various types of information to farmer through mobile phones.
- **Kisan Call Centre:** These toll-free, phone based agricultural advisory services in local languages are operational in most States with financial assistance provided Government of India. A single number is offered to farmers for seeking information and advice on a range of agriculture related issues. Subject matter specialists are available at these centres to respond to calls, in case the queries require specialist consultation, a call back facility is also operational. In several States, the KCC has achieved fairly impressive levels of penetration.
- **Kisan TV Channel:** A dedicated 24-hour television channel on agriculture was launched by the national broadcaster, on its terrestrial network of regional centres which produced (in-house developed) programme content on agriculture.
- **Agriculture Clinic and Agriculture Business Centres (ACABC):** The ACABC scheme was launched in 2002 and was targeted at young rural agriculture graduates who wanted to turn entrepreneurs seeking to provide fee-based agriculture services to farmers. A mandatory two-month training at the National Institute of Agricultural Extension Management (MANAGE), at Hyderabad was designed to instil the basis of business management among aspiring agriculture entrepreneurs. As of November 2013, a total of 34,883 graduates were trained under the scheme, 13603 of whom went on to set up agriculture clinics⁹⁴.
- **Agriculture Fairs and Exhibitions:** These events have become a common feature in most States and are often effective in demonstrating new technologies and products. These fairs also provide an opportunity for exchange of ideas as well as knowledge and experience among farmers.
- **Community Radio Stations:** Community radio stations are narrow broadcast channels, which seek to generate locally relevant content and advice within a small area (typically about a few hundred villages). They are an effective means of dissemination of local knowledge and good practices, help to showcase success stories and mix entertainment, news and other non-technical content along with their core mandate of agriculture extension.

Private sector extension

129. Agriculture extension services by the private sector are mostly delivered by input dealers, such as those marketing seeds, fertilisers, pesticide and farm machinery. A few examples from across India are:

⁹⁴ MANAGE, <http://www.manage.gov.in/>

PART II 1a. Project Description 1) Global environmental problems (context)

- Hyderabad-based Nuziveedu Seeds does extension related work through its programme, 'Subeej Krishi Vignan';
- Fertiliser companies, such as IFFCO (Indian Farmers Fertiliser Co-operative Limited) and KRIBHCO (Krishak Bharati Cooperative), undertake extension activities by conducting farmer meetings, organizing crop seminars, arranging for soil testing facilities, adopting villages etc;
- Tata Chemicals initiated Tata Kisan Kendras with the objective of empowering and enabling farmers towards improved agronomic practices and higher returns.
- Syngenta does farmers' training programs on crop protection and how best to use pesticides etc.
- DCM Shriram, which also produces seeds and fertilizers, established Hariyali Kisan Bazaar (HKB), a chain of agriculture input retail stores which also offered marketing support for select produce. Farmers could also access technical information, information on agri-inputs and banking and farm credit facilities through the HKBs.
- AGROCEL an agro-chemical company, provided inputs and necessary technical guidance to farmers through its "Agrocel Service Centres" in many states.

130. ITC Ltd., another major agribusiness actor, launched its e-Choupal initiative in extension over a decade ago (see Supplementary Annex 8.7). A VSAT-enabled internet connection at the village level allowed farmers to check prices in the local *mandis* before they moved their produce for sale. This helped to reduce information asymmetry to a great extent and forced the mandis to adopt fairer price discovery processes. ITC Ltd. also purchased small quantities of select commodities at these centres for its own trading and processing needs. The e-choupal also provided access to information about weather and innovative farming practices to the farmers. Other initiatives taken by ITC Ltd. include the "ChoupalSaagars" and "ChoupalPradarshanKhet" (CPK). ChoupalSaagars mainly comprise of collection and storage facilities which create a hypermarket in rural areas that serves multiple services under one roof. ChoupalPradarshanKhet is a demonstration plot which helps farmers to learn best agronomic practices to enhance their farm productivity.

131. Companies like Pepsico and Heritage Foods, which undertake contract farming of potato and vegetables respectively, also work closely with farmers to provide inputs, technical advice and marketing services. None of these models, however, operate at a scale of over a few thousand farmers at the limit, thereby restricting the scope of impact that they make on the wider farming ecosystem.

NGO extension

132. Additionally, NGOs, such as Professional Assistance for Development Action (PRADAN), BAIF Development Research Foundation (earlier registered as Bharatiya Agro-Industries Federation) and Action for Food Production (AFPRO) are actively involved in promoting extension activities in more than one state. PRADAN has mainly focused on promoting livelihood of the poor in different sectors ranging from agriculture and natural resource management to micro-enterprise in rural areas across eight states in India. BAIF is also working on the development of livelihoods by engaging in livestock development, environment conservation, and water resource management across 16 states.

Environmental threats and drivers to be addressed by the project

Box 15. Key points on threats and drivers:

- Large-scale high-input production of rice/wheat monocrops in the Indo-Gangetic Plain has caused degradation of soil and groundwater resources, air pollution and agricultural emissions of greenhouse gases
- Landscapes and biodiversity in eastern India are already affected by unsustainable production and extraction, resulting in land degradation and consequent loss of productive potential, loss of on-farm and forest biodiversity, and degradation of soil and vegetation GHG stocks both on farm and in forests
- Watershed degradation in eastern India undermines the potential of irrigated agriculture in areas downstream
- Unless done sustainably, shifting the focus of intensive cereal production to eastern India raises the potential of increasing these pressures
- The environmental implications of demand-side drivers will depend on how consumption patterns change: “affluent” diets will have greater negative impacts than “healthy” diets.

133. The environmental threats to be addressed by the project are summarized in Figure 32. The project will specifically address these threats in selected districts in two *target landscapes* (represented by the dark grey boxes in Figure 32), constituted by the States of **Punjab and Haryana (P&H)** in the Indo-Gangetic plain, and **Chhattisgarh and Odisha (C&O)** in the east of the country.

134. The landscapes of Punjab and Haryana are relatively uniform and flat (Figure 6), with little spatial variation across the landscape in the nature of the threats.

135. By contrast, the target areas in Chhattisgarh and Odisha show a diversity of landscape types, of which the main categories are the i) forest/agricultural mosaic that primarily dominates the hilly areas, and ii) the flatter and more uniform agricultural plains of the lowlands and valleys. The differences in conditions between these parts of the landscape are reflected in differences in the nature of the environmental problems affecting each, as well as flows of environmental impacts between them, as portrayed in Figure 33.

Figure 32. Summarized problem tree, relating environmental threats in the two target landscapes to demand-side issues, under an integrated food systems perspective

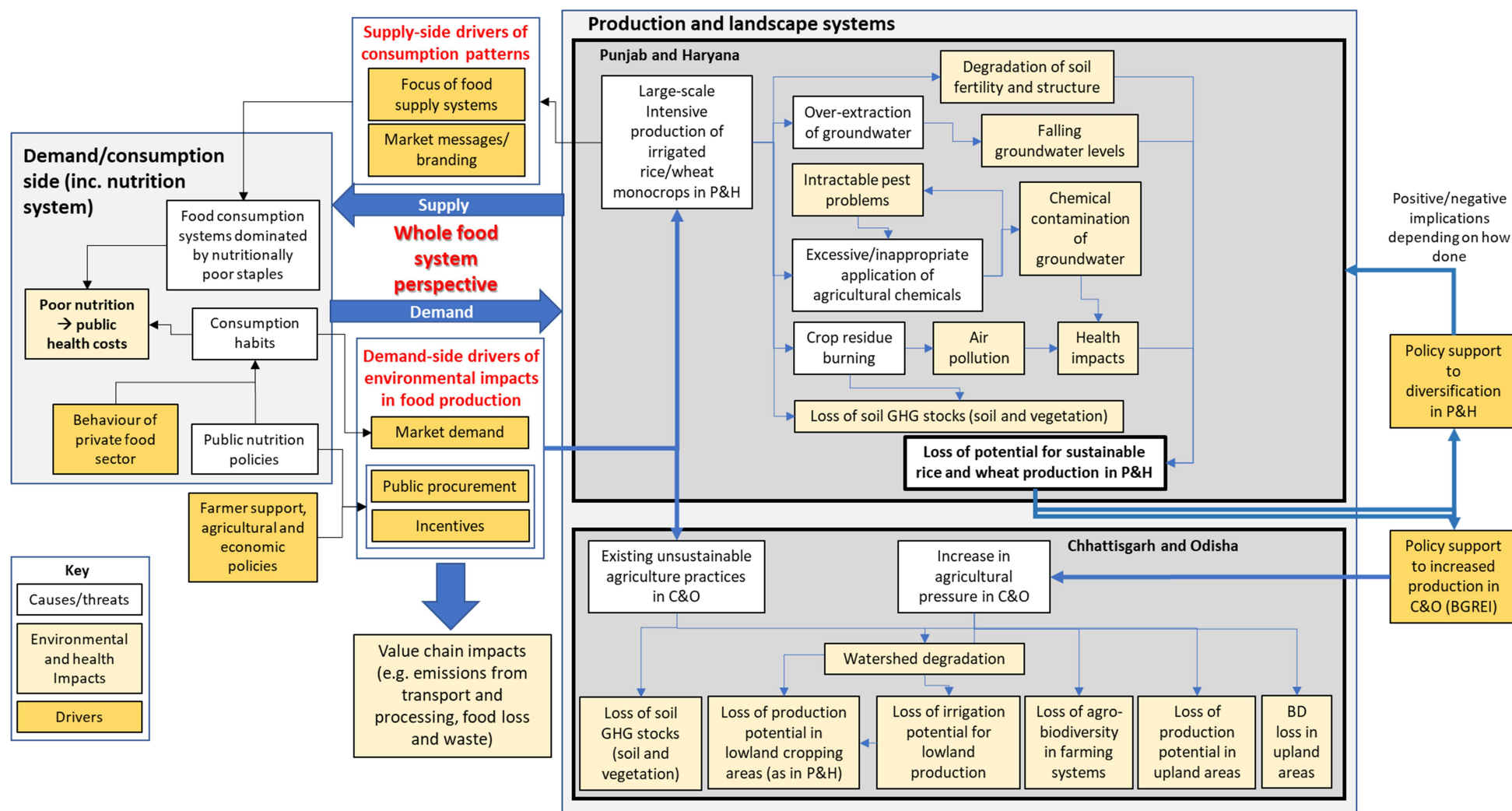
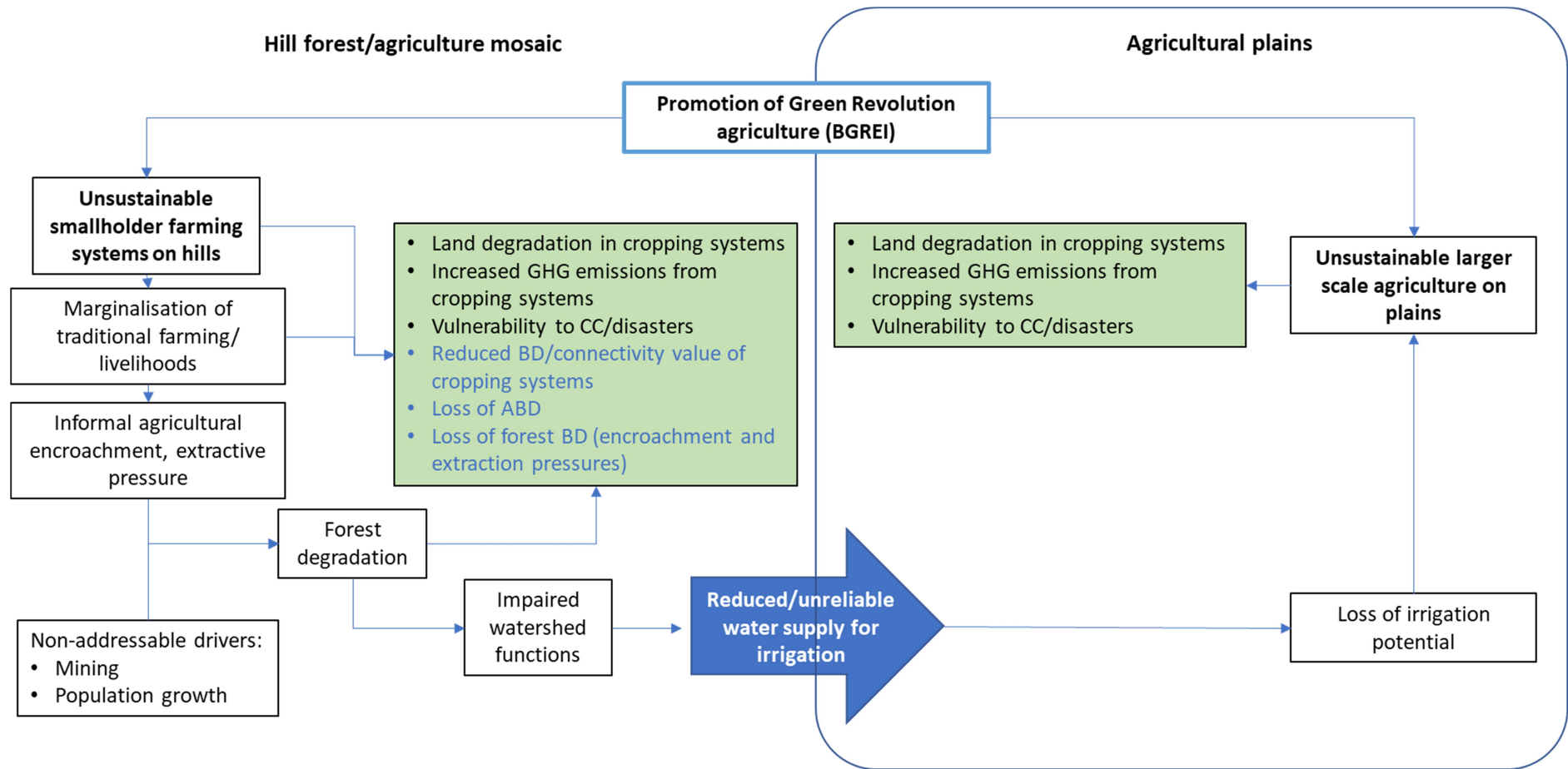


Figure 33. GEBs in C&O are affected by unsustainable high-input agriculture on the plains and smallholder agriculture on the hills, and loss of landscape-wide ecosystem service flows



136. As will be explained below, the threats and drivers that affect these selected States are repeated in a number of other States, and their main elements affect Indian agriculture nationwide. Supply-side factors in relation to agricultural production are inextricably linked to demand-side factors, requiring the application of an integrated food systems perspective.

137. The **large-scale high-input production of rice/wheat monocrops**, especially in P&H since the 1960s, is leading to a range of environmental problems, detailed in Boxes 16-20, including severe **degradation of soil and groundwater resources, air pollution** and agricultural **emissions of greenhouse gases**. The flatter, more uniform agricultural plains in C&O are increasingly subject to similar problems, and there is potential for these problems to increase in scale and severity in the future as a result of increases in productive pressures on these landscapes.

138. This is of global environmental concern as it is seriously undermining the long-term potential of the landscapes to sustain food production and livelihoods. The generation of GHGs also contributes significantly to the problem of global climate change.

Box 16. Land degradation in the target states

As a result of **excessive irrigation** and **over fertilization** associated with the Green Revolution, about 39% of the soils in Punjab are completely degraded, while 50% of the soil is acutely low in nitrogen and 25% is low in phosphorus; soil organic carbon content has fallen from around 4% in the 1970s to approximately 0.4%: this reduces soil water retention capacity, which in turn increases the need for irrigation and exacerbates pressures on groundwater resources⁹⁵. Soil organic carbon is low and **organic matter recycling is not practised**, as **wheat and paddy straw is mostly burnt in the fields** and **cow dung is mostly used as fuel**.

The **puddling operation of the rice phase** in the RWCS adversely affects soil physical properties as it destroys soil aggregates, reduces permeability in subsurface layers, induces high bulk density and forms hard-pans at shallow depths⁹⁶, all of which negatively impact the succeeding wheat crop⁹⁷. Wheat yield has been found to be 10% lower when grown after puddled soil compared to when grown after non-puddled soil (e.g. dry direct-seeded rice)⁹⁸.

In Haryana, due to land degradation there is deceleration in total factor productivity, particularly in rice, one of the main crops of the State. In view of degrading natural resources (soil, water), the State has already banned cultivation of summer rice, which has already resulted in water savings of around 7%.

Sodic soils cover 4% of Haryana and 3% of Punjab: these adversely impact crop productivity due to changes in physical structure and nutrients⁹⁹. In the South Western Zone of Punjab, increased soil salinity (together with reduced water percolation and increased insect pest populations) has resulted from the **shift from cotton to long grain paddy varieties**, due to the waterlogging and pest problems associated with cotton¹⁰⁰.

⁹⁵ <https://www.nabard.org/auth/writereaddata/tender/2002204215Punjab-SFP.pdf>

⁹⁶ 126. Sharma, P. K. and De Datta, S. K. (1985). Puddling Influence on Soil, Rice Development, and Yield. *Am.Soc.Soil Sci.* 49 (6): 1451-1557 <https://doi.org/10.2136/sssaj1985.03615995004900060024x>

⁹⁷ Kumar V., Ladha J.K. (2011). Direct seeding of rice: recent developments and future research needs. *Adv. Agron.*, 111 (2011), pp. 297-413

⁹⁸ 79. Kumar V., Jat H.S., Sharma P.C., Singh B., Gathala M.K., Malik R.K., Kamboj, B.R., Yadav, A.K., Ladha, J.K., Raman A., Sharma D.K., McDonald A. (2018). Can productivity and profitability be enhanced in intensively managed cereal systems while reducing the environmental footprint of production? Assessing sustainable intensification options in the breadbasket of India. *Agriculture Ecosystems and Environment* 252: 132-147. <https://doi.org/10.1016/j.agee.2017.10.006>

⁹⁹ Economics of Desertification, Land Degradation and Drought in India Vol I: Macroeconomic assessment of the costs of land degradation in India Prepared for Ministry of Environment, Forest and Climate Change New Delhi, 2018, https://www.teriiin.org/sites/default/files/2018-04/Vol%20I%20-%20Macroeconomic%20assessment%20of%20the%20costs%20of%20land%20degradation%20in%20India_0.pdf

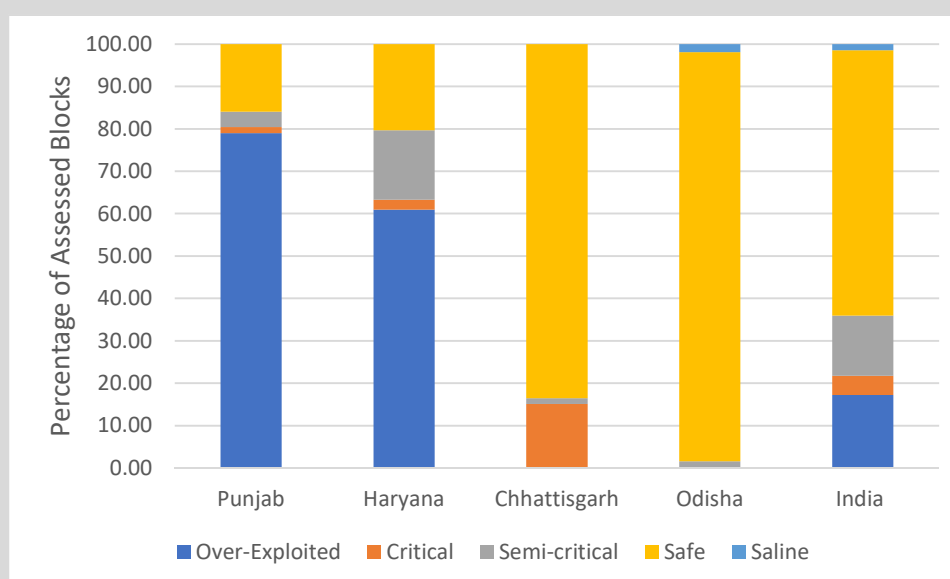
¹⁰⁰ <https://www.nabard.org/auth/writereaddata/tender/2002204215Punjab-SFP.pdf>

Odisha is among the top ten states with the highest percentage of geographical area under water erosion¹⁰¹.

Box 17. Overexploitation of water resources in the target states

A state-wise assessment of the groundwater resources in the country showed that almost 80% (109) blocks have been categorized as ‘Over exploited’, 2 as ‘Critical’ of 138 blocks assessed in Punjab¹⁰². Likewise, in Haryana, out of total 128 assessed blocks taken for study, 78 (61%) have been categorized as ‘Over-exploited’, 3 as ‘Critical’¹⁰³ (Figure 34): 84% of the area of Punjab is under severe stress and 16% area of the State is facing the problem of brackish water, which is unfit for irrigation¹⁰⁴. Over-extraction is exacerbated by decreasing rainfall in recent years, which has adversely affected the flow of water in major rivers and natural recharge of groundwater resources.

Figure 34. Levels of exploitation of groundwater resources in Project Target States in 2017¹⁰⁵



Overall, the average decline in groundwater table in Haryana from 1999 to 2016 was 9.3 metres¹⁰⁶. Most of the districts in Punjab and Haryana have seen a reduction in groundwater levels of more than 83% in the decade from 2008 to 2018: in Chhattisgarh, according to district, the decline ranges from 15% to 83%, while in Odisha most districts have shown declines of less than 15%, and in a number of cases increases.

The decline in groundwater levels is reflected in an increasing reliance on deep tubewells in Punjab and Haryana, needed to access ever deeper water tables: the number of deep tubewells increased by 53% in Punjab and 340% in Haryana between 2006-7 and 2013-14 (Figure 35).

¹⁰¹ Economics of Desertification, Land Degradation and Drought in India Vol I: Macroeconomic assessment of the costs of land degradation in India Prepared for Ministry of Environment, Forest and Climate Change New Delhi, 2018, https://www.teriin.org/sites/default/files/2018-04/VolI%20I%20-%20Macroeconomic%20assessment%20of%20the%20costs%20of%20land%20degradation%20in%20India_0.pdf

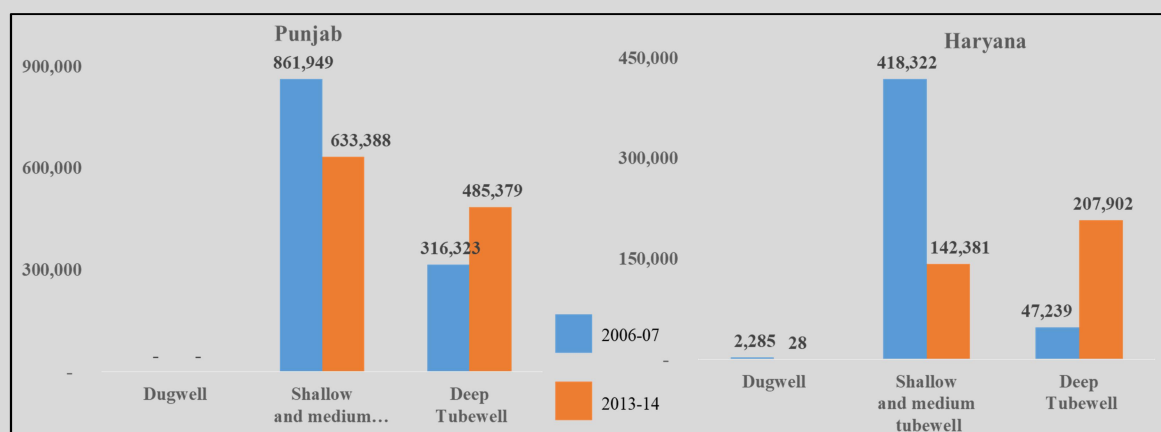
¹⁰² <https://www.esopb.gov.in/Static/PDF/EconomicSurvey-2019-20.pdf>

¹⁰³ <http://cgwb.gov.in/GW-Assessment/GWRA-2017-National-Compilation.pdf>

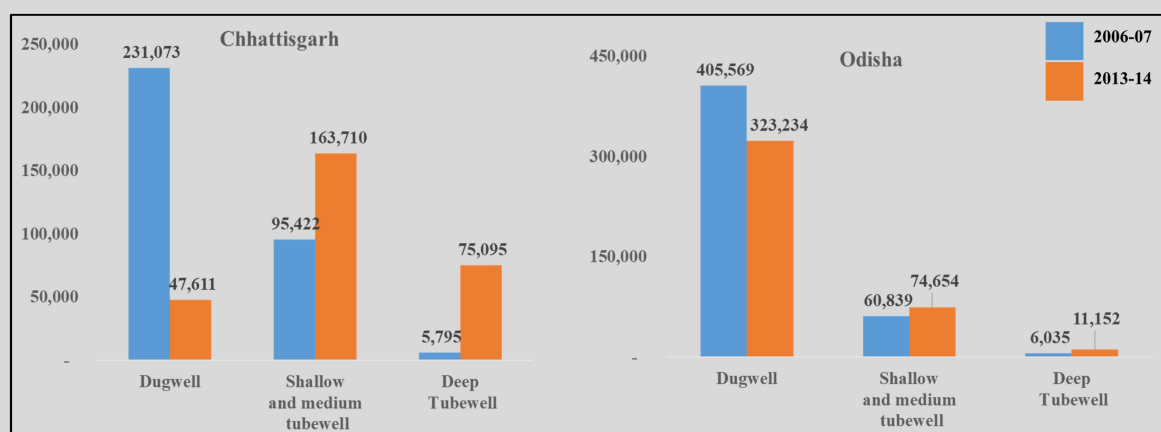
¹⁰⁴ <https://www.nabard.org/auth/writeraddata/tender/2002204215Punjab-SFP.pdf>

¹⁰⁵ Source: CGWB Report - <http://cgwb.gov.in/GW-Assessment/GWRA-2017-National-Compilation.pdf>

¹⁰⁶ The report on Dynamic Ground Water Resources' of Central Ground Water Board (July 2019)

Figure 35. Numbers of dug, shallow and medium tubewells and deep tubewells in Punjab and Haryana, 2006-7 and 2013-14¹⁰⁷

Irrigation in the eastern states is still largely reliant on shallow dugwells, but these are increasingly being substituted by deeper tubewells, especially in Chhattisgarh: the number of deep tubewells increased by almost 1,200% between 2006-7 and 2013-14, and by 85% in Odisha (Figure 36).

Figure 36. Numbers of dug, shallow and medium tubewells and deep tubewells in Chhattisgarh and Odisha, 2006-7 and 2013-14¹⁰⁸

Box 18. Degradation of groundwater quality

Many districts in the four target States are affected by ground water contamination, most notably with high levels of arsenic, fluoride, chloride, iron, nitrate and salinity, as well as heavy metals and uranium. Elevated levels of arsenic in groundwater can give rise to health problems including arsenicosis (keratosis and melanosis), skin lesions and cancer. Use of arsenic-contaminated groundwater is not only problematic to vegetable growers, but it also leads to the accumulation of arsenic in rice grain grown under flooded conditions.

Around 16% of the area of Punjab¹⁰⁹ and 55% of the area of Haryana¹¹⁰ is affected by poor quality (brackish) underground water, which negatively affects crop production and productivity (Table 8).

¹⁰⁷ Source: 4th and 5th Minor Irrigation Census

¹⁰⁸ Source: 4th and 5th Minor Irrigation Census

Table 8. Numbers of districts in target states with elevated values of groundwater quality indicators

	Punjab ¹¹¹	Haryana ¹¹²	Chhattisgarh ¹¹³	Odisha ¹¹⁴
Fluoride (>1.5 mg/l)	11	14	12	11
Chloride (>1000 mg/l)	2	2		
Iron (>1.0 mg/l)	9	17	4	20
Nitrate (>45 mg/l)	16	19	12	28
Salinity (EC>3000 µS/cm at 25°C)		11		
Arsenic (>0.05 mg/l)			1	

The organic and inorganic fertilizers (especially nitrate, potassium and phosphate), pesticides, insecticides and other chemicals used in the agricultural fields are often leached to the groundwater¹¹⁵. This is due in part to the massive increases in the levels of fertilizer application since the introduction of the Green Revolution (**Box 9**) and in part to the imbalanced application of fertilizers (due to urea subsidies aimed at bolstering the Green Revolution), exceeding plant uptake capacity and resulting in nitrogen runoff: the NPK ratio in Punjab was 28.8:6.9:1 in 2017-18 and 26.6:6.2:1 in 2018-19¹¹⁶ (the ideal ratio is 4: 2: 1).

Application of sewage sludge to agricultural soils, and irrigation of field crops with sewage water and untreated industrial effluents alone, or in combination with ground/canal water, is a common practice in Punjab, especially in the vicinity of large cities, as these are considered reusable sources of essential plant nutrients and organic carbon. More than 50% of the industries are in the red category of water pollution indicating large scope for untreated effluent to cause pollution.

139. There are also significant levels of surface water pollution. The water quality of river Sutlej in Punjab, in 2010, at various sampling points indicated elevated concentrations of heavy metals (Fe, Zn, Cr, Cu, Pb & Ni) and pesticides like DDT, BHC, Endosulfan and Aldrin. The River Ghaggar, which passes through the target districts of Patiala and Sangrur, has its surface water quality in D category throughout its entire stretch, and further falls to E category of designated best use classification downstream of Jahrmal River.

Box 19. Impacts on surface water flows

In Odisha, it is predicted that surface water availability within the drainage boundary of the state will remain more or less fixed up to 2051, but the inflow of surface water from neighbouring states will be reduced from 37.556 BCM to 25.272 BCM¹¹⁷.

140. Current production and resource management practices generate major greenhouse gas (GHG) emissions. Typically, conventional rice-wheat cultivation systems (RWCS) have a global warming potential (GWP) of more than 10,000 kg CO₂ eq./ha, which is 2 to 5 times more than alternatives such as zero-till wheat and direct-seeded rice (see Table 12 in section 6). Flooded rice systems are a particularly significant source of emissions of methane, which is a highly potent GHG, as well as nitrous oxide (N₂O). Crop residue burning (CRB) generates GHG gases in the form of CO₂, N₂O,

¹⁰⁹ <https://www.nabard.org/auth/writereaddata/tender/2002204215Punjab-SFP.pdf>

¹¹⁰ http://cgwb.gov.in/gw_profiles/st_Haryana.htm

¹¹¹ http://cgwb.gov.in/gw_profiles/st_Punjab.htm

¹¹² http://cgwb.gov.in/gw_profiles/st_Haryana.htm

¹¹³ http://cgwb.gov.in/gw_profiles/st_Chhattisgarh.htm

¹¹⁴ http://cgwb.gov.in/gw_profiles/st_Orissa.htm

¹¹⁵ <http://cgwb.gov.in/Regions/GW-year-Books/GWYB-%202016-17/Chhattisgarh.pdf>

¹¹⁶ <https://www.esopb.gov.in/Static/PDF/EconomicSurvey-2019-20.pdf>

¹¹⁷ Annual Report 2016-17, <http://www.dowrodisa.gov.in/WaterResources/WaterResourcesOverview.pdf>

and CH₄, as well as air pollutants (CO, NH₃, NO_x, SO₂, NMHC and volatile organic compounds), particulate matter and smoke (see Box 20). Further emissions are generated through the use of artificial fertilizers, and, in Chhattisgarh and Odisha, the intensification of production systems with consequent reductions in on-farm vegetation, the encroachment of agriculture into forest areas, and the degradation of forests due to unsustainable management and extraction practices.

Box 20. Crop residue burning (CRB)

Crop residues are typically burned in-field in order to prepare the field for the next sowing. CRB results in environmental pollution, nutrient loss (100% C, 90% N, 60% S, and 25% each of P and K)¹¹⁸, and GHG emissions, with estimates of 110, 2306, 2, and 84 Gg of CH₄, carbon monoxide (CO), nitrous oxide (N₂O), and nitrogen oxides (NO_x), respectively, in India¹¹⁹. CRB releases black carbon, a potent climate modifier that blackens glaciers in the Himalayas, thereby exacerbating melting and eventual disappearance¹²⁰; these snowfields feed the Ganga, Indus and Brahmaputra Rivers, which in turn provide water to millions of people. Black carbon has also been implicated in the seasonal changes to monsoon patterns that have been accelerating in recent years, and agricultural yield reductions in India¹²¹.

Particulate air pollution from CRB affects the local population and downwind communities, including the 19 million people living in Delhi; it is estimated to contribute as much as 26% of Delhi's air pollution in the winter months¹²², resulting in acute illnesses and lost workdays, as well as long-term effects including increased lung and heart diseases. Beyond health effects, the release of GHG from burning contributes to climate change. In particular,

CRB is driven by i) **labour scarcity** and ii) **increases in cropping intensity** (crops per year), driven by Green Revolution approaches to agriculture, which give farmers less time between crops to apply alternatives.

Burning is mostly carried out when harvesting is mechanised, as is the case with non-Basmati rice, which predominates in Punjab. Basmati rice, which predominates in Haryana, is harvested and thrashed manually to retain the quality of grain, and its straw is used as animal fodder, so no stubble is left in the field.

One of the possible impacts of COVID-19 is that labour shortages may lead Haryana farmers to shift to less labour-intensive non-Basmati rice, with a corresponding increase in the extent of crop residue burning.

Figure 37. Average fire detections on cropland in January-June (2003-5 vs 2016-18) – approximate locations of project target areas as circled

¹¹⁸ Doberman, A. and Fairhurst, T.H. (2002). Paddy straw management. Better Crop International, 16:7-11

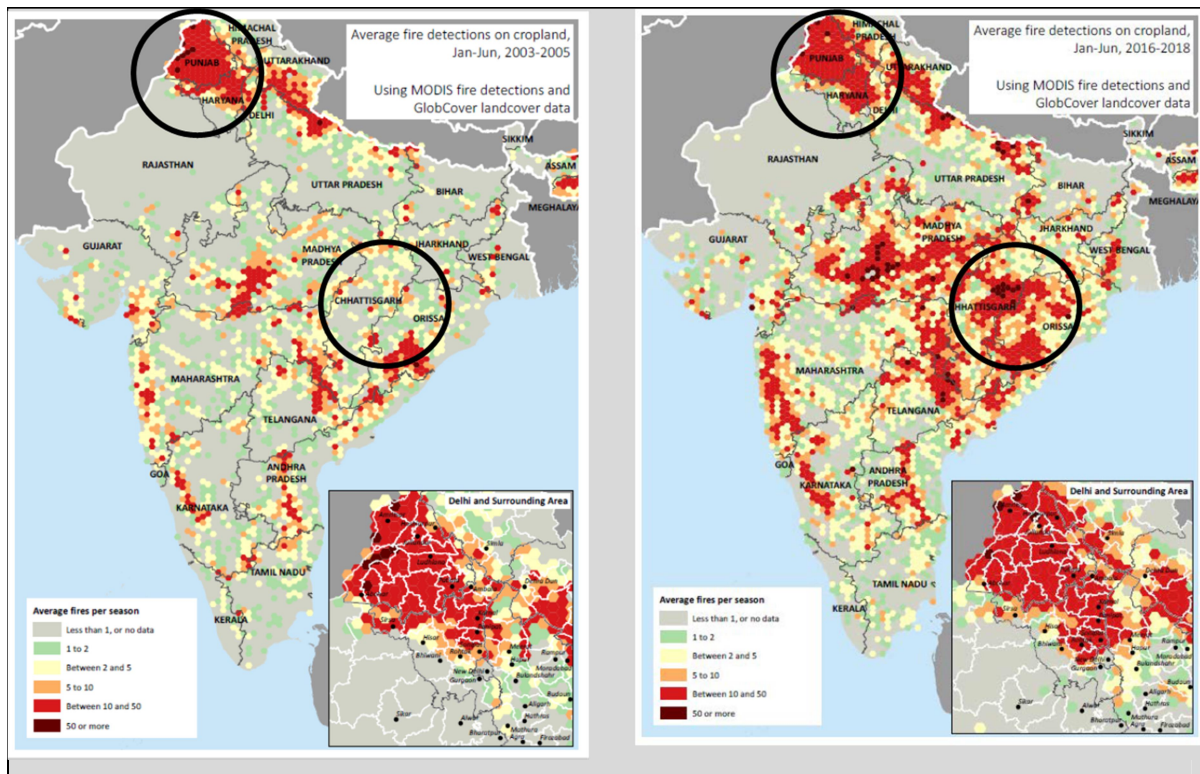
¹¹⁹ Gupta, P., S. Sahai, N. Singh, C. Dixit, D. Singh, C. Sharma, M. Tiwari, R. Gupta, S. Garg (2004). Residue burning in rice-wheat cropping system: causes and implications. Curr. Sci., 87 (12), pp. 1713-1717.

¹²⁰ EPA. (2012). "Report to Congress on Black Carbon." EPA-450/R-12-001. Department of the Interior, Environment, and Related Agencies Appropriations Act, 2010.

<https://www3.epa.gov/airquality/blackcarbon/2012report/fullreport.pdf>

¹²¹ Burney, Jennifer, and V. Ramanathan. (2014). "Recent Climate and Air Pollution Impacts on Indian Agriculture." Proceedings of the National Academy of Sciences 111 (46):16319–24. <https://doi.org/10.1073/pnas.1317275111>

¹²² Sharma, M., Dikshit, O., (2016). Comprehensive study on air pollution and green house gases (GHGs) in Delhi. http://delhi.gov.in/DoIT/Environment/PDFs/Final_Report



141. The main driver of the predominance of these unsustainable high-input systems is the promotion by the Government of “Green Revolution” practices, from the 1960s to the present day, in order to increase national food production and thereby ensure food security. More specifically, the main driver of the predominance of rice and wheat monocrops in these systems is the focus of Government procurement, 97-98% of which is of these two crops. This further exacerbates the environmental unsustainability of the systems, given these crops’ high water demands (especially in the case of rice). This procurement profile is also eventually destined to obsolescence given the gradual changes that are occurring in food demand in India, with a reduced dependence on staple grains (see Figure 4): in the meantime, the continued narrow focus of Government procurement and subsidised food supply on these two resource-intensive crops will continue to deter dietary transition as well as generating negative externalities on natural resources and health.

142. The overwhelming supply-side predominance of rice and wheat in turn has downstream public health implications, as it serves to perpetuate the dominance in the diets of national consumers of nutritionally-poor staples. While under-nutrition is principally driven by poverty, poor dietary quality and the rapidly-growing problem of over-nutrition are driven by a combination of narrowly-focused food supply, increasing income levels, urbanization, and commercial pressures.

143. A further problem in Chhattisgarh and Odisha, especially in the agriculture/forest mosaics of the hill areas, is the **simplification and marginalization of traditional farming systems**.

144. **Traditional rice varieties in the eastern states, and associated traditional farming systems, are being lost.** Over 20,000 traditional rice varieties have been recorded in India, but these are under serious decline: in 1955-60 the Central Rice Research Institute, Cuttack (India), collected about 1,800 landraces of rice, but in a similar effort during 1995-96, only about 350 land races of rice could be collected from the same area (in the Jeypore tract of Koraput district)¹²³. This is largely a result of the incursion of production systems featuring high levels of inputs such as synthetic fertilizers and pesticides, and the increasing dominance of High-Yielding Varieties (HYV), to which farmers are moving in order to take advantage of Government procurement channels offering guaranteed Minimum Support Price (MSP). Traditional varieties and production

¹²³ <http://www.fao.org/3/a-bp792e.pdf>

systems are also increasingly perceived as low yielding and backward. These trends have been accompanied by a major loss of traditional knowledge regarding traditional varieties, agroecosystems and production practices.

145. Shifting cultivation systems are declining in area and facing problems of sustainability. Although shifting cultivation (which is especially typical of tribal areas) is often perceived as being environmentally damaging and backward, in fact it has helped certain tribal groups to be food secure and has acted as a globally-important repository of agrobiodiversity. The decline in the area under shifting cultivation is due to factors including the land use regulations of the authorities, population growth, other sources of livelihoods, migrant work, supply of food grains from the public distribution system, and the institutional promotion of plantation crops like coffee and rubber. Fallow periods are also reducing due to increased population and production pressures. A study in Odisha also found that women felt that the labour required from them in shifting cultivation was too high and hence they preferred settled agriculture.

Box 21. Shifting cultivation in Odisha: benefits and threats¹²⁴

Shifting cultivation has many advantages over sedentary agriculture in terms of climate resilience, as it includes a diverse set of crops mostly requiring low to moderate water supply. The other advantage is of low pest infestation, as the process of burning biomass before cropping reduces soil borne pests, and even the practice of mixed cropping decreases pest attacks. Ecologically the practice scores higher than sedentary agriculture with its high diversity of crops, no use of chemicals, and the practice of fallow periods in between facilitating growth of forest species.

The reduction in fallow period in shifting cultivation has brought down the overall biomass production, while the demands for fencing, firewood and housing has reduced the amount of biomass being burnt. During their fallow period, areas under shifting cultivation regenerate into open forests with lots of undergrowth in some locations, though invasive species like lantana are taking ground. This means that the claims of loss of nutrients from top soil, burning of biomass and other ecological impacts of shifting cultivation are exaggerated.

Although shifting cultivation continues to play a critical role in maintaining the lives and livelihoods of tribals, there seems to be a limited understanding of the practice. With the impact of market forces, institutional efforts for change, and growing aspirations of the youth, there is bound to be a lot more changes to this practice in the years to come.

146. These pressures on traditional livelihood and farming systems are occurring within a broader context of threats to natural resources and traditional rights and cultures, including **mining**, the establishment of **monoculture plantations** (for example of biofuels such as *Jatropha curcas*) and related **land-grabbing**: extractive activities such as mining have led in some cases to the involuntary displacement of tribal peoples, and their lands being passed to non-tribals: the alienation of tribals from their land is one of the important reasons of poverty and dispossession of tribals in Odisha, and is linked to issues of environmental degradation, deforestation and loss of agricultural land¹²⁵.

147. A significant cause of forest degradation in Chhattisgarh and Odisha is the **unsustainable or destructive harvesting of Non-Timber Forest Products (NTFPs)**, through for example uprooting trees/plants, cutting or lopping, debarking, tapping for gum/resin/latex using deep cuts, premature harvesting, and overharvesting.

¹²⁴ Singh, S., Purohit, J. K., & Bhaduri, A. (2016). Shifting Cultivation in Odisha and Chhattisgarh: Rich agro-biodiverse systems under risk. *Jharkhand Journal of Development and Management Studies XISS*, 14(2), 7023-7036.

¹²⁵ **Paltasingh T and Paliwal G (2014):** Tribal Population in India: Regional Dimensions and Imperatives. *Journal of Regional Development and Planning*, Vol. 3, No.2, 2014 27

148. These unsustainable practices are of global environmental concern because they undermine the long-term productive potential of the land; they lead to the loss and degradation of globally-important ecosystems and their constituent biodiversity, as a result of encroachment and unsustainable extraction; the loss of carbon stocks in soil and vegetation results in GHG emissions; and changes in farming systems are leading to the loss of globally-important agricultural biodiversity.

149. The **degradation of watersheds** due to the unsustainable productive and extractive practices on the hills also contributes to the unsustainability of the production systems on the agricultural plains, as it affects the stability of runoff and the recharge of aquifers, on which the irrigated lowland production systems depend.

Climate change and hydrometeorological risks

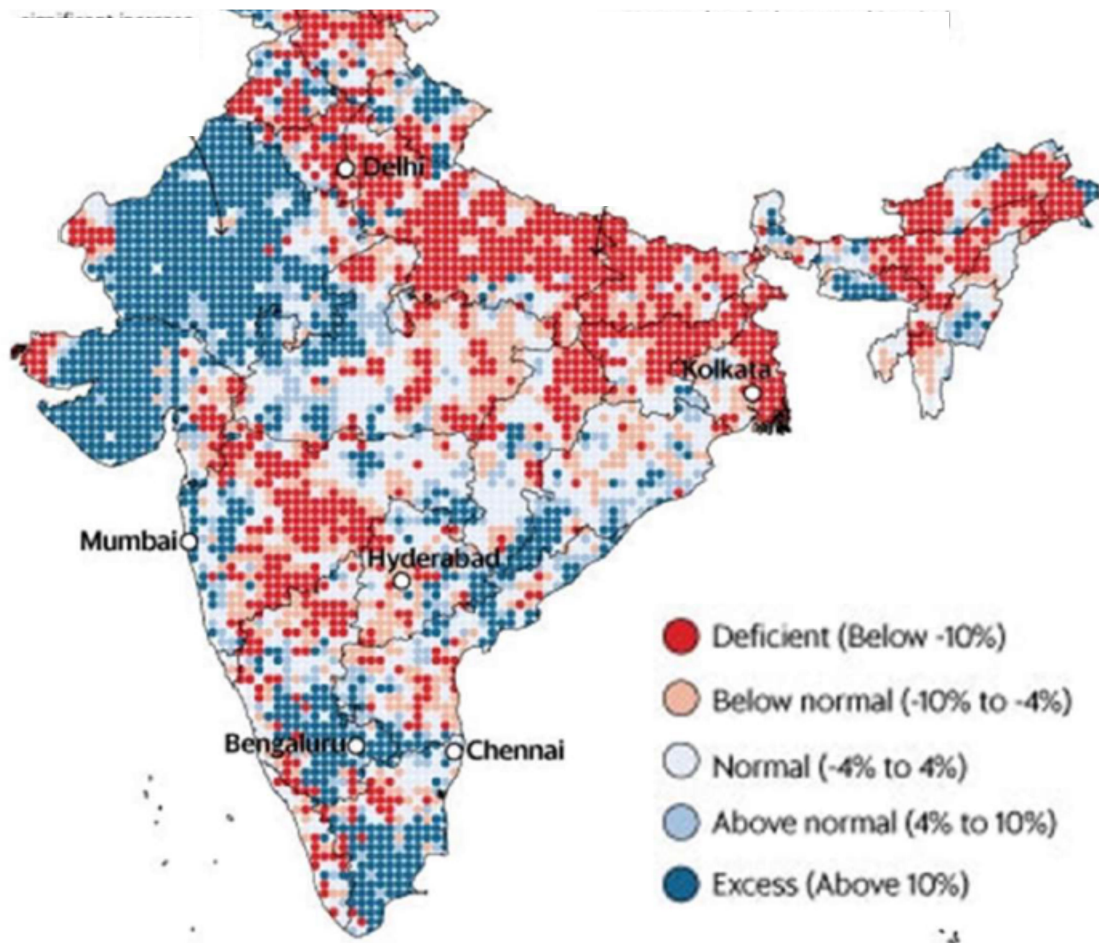
Box 22. Key points on climate change:

Climate change is expected to result in:

- Increased seasonal water deficits, affecting rainfed systems and irrigated systems fed by surface flows
- Increased extreme rainfall events, leading to flooding
- Increased temperatures, affecting crop productivity
- Increased coastal flooding, erosion, and saltwater intrusion into surface and groundwater, in coastal areas of Odisha

150. The IPCC 5th Assessment Report (AR5) foresees the following trends in South Asia, associated with global climate change:

- **Seasonal water deficits may becoming increasingly significant** in South Asia, as a result of climate change. Seasonal mean rainfall in South Asia shows inter-decadal variability, noticeably a declining trend with **more frequent deficit monsoons** under regional inhomogeneities (WGI AR5 Section 14.8.11).
- Over India, the **increase in the number of monsoon break days** and the **decline in the number of monsoon depressions** are consistent with the overall decrease in seasonal mean rainfall (WGI AR5 Section 14.8.11)
- An **increase in extreme rainfall events** at the expense of weaker rainfall events over the central Indian region and in many other areas (WGI AR5 Section 14.2.2.1).
- In South Asia, the frequency of heavy precipitation events is increasing, while **light rain events are decreasing** (WGI AR5 Section 14.8.11).

Figure 38. Rainfall levels in India, 2010-2018

151. These trends may be particularly significant under the BGREI scenario because Green Revolution crops are typically more demanding in terms of consistent soil moisture (more “thirsty” in general due to higher productivity, and less resilient to dry periods), than traditional crops and cropping systems. This potentially could affect rainfed (dryland) systems, flooded paddy systems currently fed by surface flows, and flooded paddy systems supplemented by groundwater extraction.

152. Significant declines in climatic potential rice yields in the Indo-Gangetic Plain have been found to be the result of a decrease in solar radiation and an increase in minimum temperature, which influence rice yields through decreased photosynthesis, increased respiration, and a shortened vegetative and grain-filling period^{126,127}.

Box 23. Impacts of climate change on wheat productivity in the Indo-Gangetic Plain (Punjab, Haryana, Uttar Pradesh and Bihar)¹²⁸

Comparison of the 1986-2005 climate and future climate using the RCP8.5 scenario (2046–2065) shows an increase in mean temperature (up to +2 °C) as well as T_{max} (up to +3 °C) during

¹²⁶Pathak, H., Ladha, Aggarwal, P. K., Peng, S., Das, S., Singh, Y., Singh, B., Kamra, S. K., Mishra, B., Sastri, A. S. R. A. S., Aggarwal, H. P., Das, D. K., Gupta and R. K.: (2003), and ‘Trends of climatic potential and on-farm yields of rice and wheat in the Indo-Gangetic Plains, ‘Field Crops Research 80, 223–234.

¹²⁷ 62. Horie T, Nakagawa H, Centeno HGS, Kropff HJ (1995) The rice crop simulation model SIMRIW and its testing. In: Matthews RB, Kropff MJ, Bachelet D, Laar Van HH (eds) Modelling the Impact of Climate Change on Rice Production in Asia. Pub. CABI in association with IRRI, pp 51–83

¹²⁸ Daloza AS, Rydsaa JH, Hodnebrog Ø, Sillmann J, van Oort B, Mohr CW, Agrawal M, Emberson L, Stordal F and Zhang T (2021) Direct and indirect impacts of climate change on wheat yield in the Indo-Gangetic plain in India. Journal of Agriculture and Food Research Volume 4, June 2021. <https://doi.org/10.1016/j.jafr.2021.100132>

the different stages of the Rabi season over the IGP.

During the growing season, temperatures in the present and future climate are often outside of the optimal conditions for wheat, and even exceed the critical range at the end of the season, during harvest. Under the future warming scenario, this critical threshold is reached sooner than in the present climate, and in some years, already during the ripening stage. Increases in mean precipitation in the IGP are mostly not significant.

The climatic changes simulated with regional Weather Research and Forecasting (WRF) model produce a general wheat yield loss for Punjab, Haryana, Uttar Pradesh and Bihar, ranging between -1% and -8%, when only taking into account the effects of changes in climatic conditions. Relative losses are generally higher for higher crop yield potential which is reached when using a higher number of irrigations. Reducing irrigation under future climate conditions dramatically enhances the yield losses to between -4% and -36% when considering future limitations in water availability for irrigation.

153. In the eastern Indian states, especially Odisha where 60% of land is rain-fed agriculture, climate change (including **decreases in overall rainfall** and **increased variability of rainfall**) has the potential to tremendously aggravate water stress and enhance food insecurity.

154. The “normal” 120 day period of monsoon rain in Odisha has shrunk to 60–70 days, and unusual spikes in rainfall, with torrential rainfall of over 200–250 mm/day, are more frequent during the monsoon, frequently resulting in floods. This situation has had a strong influence on agricultural crops, especially during rabi season, because of the reduced residual moisture. Pulses and cereals have been affected, in that order.

155. Odisha is the most exposed of the four target states to cyclones, and the only one with a coastline. According to AR-5, the frequency and intensity of **tropical cyclones** in Odisha are likely to rise, while future rates of **sea level rise** are expected to exceed those of recent decades, thereby increasing coastal flooding, erosion, and saltwater intrusion into surface and groundwater.

156. Global warming with high surface warming in Odisha, the sensitivity of its precipitation to the El Niño Southern Oscillation (ENSO), and its coastal position are likely causes of a predicted increasing trend in the probability of severe and extreme **droughts** toward the end of the 21st century, with a modest decrease in the probability of near-normal conditions¹²⁹.

Barriers to Food System Sustainability and Integrated Landscape Management

157. Barriers to the sustainability of food systems and the integrated management in food-producing landscapes, and specific issues in relation to each barrier, as identified through PPG studies and consultations, are set out below.

Barrier 1. Food systems and planning frameworks do not address food systems and landscape management in an integrated way

Policy and planning frameworks do not address food systems and landscape management in an integrated way, considering externalities and inter-sector implications

158. Policy makers have **limited access to options for reconciling multiple policy objectives** on agricultural production, rural incomes, nutrition and the environment, for example, given the sector-specific approach that tends to dominate planning and investment (see Institutional Stakeholder Analysis in Annex H4.2). This has been due to limited inter-sectoral participation in policy formulation, and low participation of stakeholders outside of government – such as the private sector. These have led to several unintended impacts. Examples of current or potential policy misalignments, leading to unintended negative inter-sector effects, include:

¹²⁹ Ghosh, S., and P. P. Majumdar. 2007. "Nonparametric Methods for Modelling GCM and Scenario Uncertainty in Drought Assessment." *Water Resources Research* 43 (7).

- Green Revolution approaches to agriculture have in general tended to prioritise production and farmer incomes without full consideration of longer-term environmental sustainability;
- The strong focus of Government procurement schemes on rice and wheat has tended to overshadow other crops which have potentially greater nutritional value and greater resilience to climate change, and does not reflect changing patterns of food consumption and market demand;
- The environmental risks associated with some of the alternatives to the conventional crops of rice and wheat, such as horticulture, are not fully considered in food system planning;
- The promotion of water efficiency in agriculture risks stimulating increases in overall productive activity, with the effect of increasing total demand on water resources.

159. Planning and management frameworks do not respond adequately to the scales at which social and environmental processes operate, or the relations among multiple food system actors. Examples include:

- The structuring of water management, by the Central Ground Water Board and its State-level equivalents, according to administrative units, means that whole basin/aquifer dynamics are not adequately taken into account;
- The potential for negative overall impacts of “water efficiency” measures on water resources is due to the application of a narrow field/farm level “more crop per drop” vision to irrigation management, which fails to consider net basin-level impacts or the fact that much of the water not taken up by crops is not in fact lost but is available for other users or for the environment;
- Natural resource management and conservation measures do not always respond to watershed-level dynamics, as evidence for example by cases where investments are made in dams in lower parts of watersheds, to check runoff and erosion, without adequate attention being paid to management of the upper watershed areas which mostly determine runoff dynamics and sediment flows.

160. There is inadequate dialogue, coordination and collaboration between public and private sector food system actors, meaning that the Government does not take adequate advantage of the opportunities for the private sector to complement and enhance its programmes, for example by opening up additional value chain options to beneficiaries, sharing knowledge on production and management options (for example on crop residue management), or making available technical tools (for example for information management, traceability and value chain insertion).

Policy-makers and planners have inadequate tools and systemic capacities for considering the externalities and inter-sector implications of food systems

161. The concept of sustainable integrated food systems requires the balanced, evidence-based and negotiated consideration of multiple factors and interests at diverse levels and in diverse sectors, including for example environmental, economic, social and health issues, and spanning short, medium and long timeframes. Currently these issues are typically addressed in sector-based “silos” and with a short-term time horizon. This is in part due to the sector-based way that institutional, policy and planning frameworks are structured, as well as the political necessity of prioritizing short-term benefits: in addition, most planners have inadequate access to tools for analysing and balancing the implications of alternative scenarios (such as Natural Capital Accounting, NCA; Targeted Scenario Analysis TSA; and Strategic Environmental Assessment, SEA), and also inadequate capacities to apply them and to digest and apply their results.

Barrier 2: Inadequately developed frameworks and capacities for mainstreaming sustainability into production systems and value chains

Farmers and communities have inadequate capacities, incentives and support for sustainable production

162. Knowledge and awareness among farmers of options for sustainable production and management are limited. Typically farmers are familiar with options for maximizing productivity, with a short-term time horizon, but have limited knowledge and awareness of options for reconciling this with longer-term considerations of environmental sustainability, at farm or landscape level: they tend therefore to perceive (often correctly) that adjustments towards sustainability may in the short term affect their yields or the prices that they receive for their products. This is especially the case among farmers whose production is incentivised by Government programmes focused on maximizing productivity of, and procuring, a limited range of crops produced using Green Revolution measures.

163. There are by contrast many farmers, including tribal peoples and those participating in extension schemes focused on sustainable agriculture, such as those listed in Annex J.1, who are more familiar with viable sustainable alternatives: their knowledge is often undervalued and not shared with other farmers who might also be able to benefit from it.

164. The Government's extension support system has limited capacity. The public sector extension support system (through the Department of Agriculture, KVKs, ATMA) is wide-ranging but is still insufficient, in terms of both outreach and content, to bring about the desired transformational change in farmers' capacities to produce sustainably. Extension agents often have a narrow technical focus on issues of agricultural productivity, with relatively limited knowledge of or ability to provide support on environmental issues, such as options for agroecological management, details of approved or banned chemicals, or information on sustainability standards.

165. There is limited coordination or knowledge exchange between public and private extension systems (see Supplementary Annex 8 for information on private sector extension systems), largely due to the limited levels of dialogue and coordination referred to under Barrier 1. This means that public and private systems do not complement each other effectively in addressing the scale and nature of farmers' needs, and further contributes to the limited vision of many public-sector extension agents, who miss out on the opportunity to learn from the often innovative approaches applied by the private sector (see also Annex Y for examples of private sector farmer/community support programmes).

Inadequate value chains for sustainable production

166. There is no guaranteed price premium for farmers on sustainable produce, though there is a latent market with a willingness to pay for produce with assured quality. Most farmers that adopt sustainable farming practices do not have any mechanism of price discovery, and as a consequence tend to be paid prices decided by agents.

167. There is a known yield decline in the period of transition towards organic production, which may be as high as 30%: organic farmers thus expect a higher price as compensation for this. However, although farmers who have access to market through private companies/FPOs may receive premiums for sustainable production, those who depend on local traders typically do not. This situation limits the growth of the area under sustainable/organic cultivation, and many farmers who find it unremunerative have reverted to conventional high chemical input agriculture.

168. Government programmes and policies are limited for supporting or incentivising the adoption of Sustainability Standards. While the *Paramparagat Krishi Vikas Yojana* (PKVY) scheme (see Box 25) does focus on organic farming, other Standards provide additional rigour on water conservation, soil mapping, habitat protection, etc. These are presently driven by private initiatives which are limited by funding sources, market demand, and availability of on-ground implementation partners. While several government policies, schemes, and programmes have also been introduced to enable better soil fertility and water usage, the processes in availing benefits are perceived to be long and involves multiple bureaucratic layers, and thus less favoured by farmers. For instance, financial assistance for installation of drip structures under *Pradhan Mantri Krishi Vikas Yojana* (PMKSY).

169. Farmers have limited access to the inputs required for sustainable agriculture. Certification standards, such as organic, only permit approved inputs for production, but access to

such inputs is typically limited and many farmers struggle to find them of a good quality and in a cost-effective and timely manner.

170. Farmers' practices and input purchases are commonly subject to influence by private sector retailers, who often work on a commission basis and whose motivation is typically to maximize sales of profitable and available products which may be incompatible with agricultural sustainability. The distribution and supply chain network of pesticides with harmful elements are often the strongest, and hence the harmful chemicals tend to be sold to the farmers more. Farmers' limited purchasing power may also lead them to use cheap counterfeit or non-branded chemical inputs, with the risk of negative environmental and health impacts.

171. **High certification costs**, particularly third party certification costs, adversely impact the appeal of Standards (even though costs can be aggregated over farmer groups). The Participatory Guarantee Scheme (PGS) certification model has thus found favour among farmers as it does not entail large fees, however at the same time PGS-certified farmers tend not to receive price premiums on their produce.

172. The **capacity limitations among farmers and FPOs**, described above in relation to sustainable production, also affect their ability to participate effectively in green value chains. Farmers and FPOs often depend upon CSOs/NGOs personnel or KVK personnel to initiate procedures for licensing and certification. Models such as organic certification require entity registration and management, which would require significant handholding support for smallholder farmers covering issues such as assurance and audit processes.

173. **Processing, marketing and market linkages:** poorly developed capacities for post-harvest care and processing may reduce product quality, thereby neutralizing the price benefits that might otherwise result from compliance with environmental sustainability standards¹³⁰.

174. Farmers in Chhattisgarh and Odisha in general face greater challenges to effective insertion into value chains than those in Punjab and Haryana. Their typically **low quantities of crop surplus** (due to **low productivity** and their domestic consumption needs), combined with a **poorly developed transport network**, result in their having **limited ability to participate in government-notified markets**. They are therefore forced to sell their produce at **below-par prices** to traders, who then sell to the Government at the MSP. Farmers may also be forced to sell at low prices under conditions of distress due to their **limited storage capacities**, especially during rainy periods where there is added risk of spoilage. The inability of the farmers residing in hinterlands in both these states to access the government's MSP scheme for paddy has added to their economic insecurities.

175. Many farmers in Chhattisgarh and Odisha buy their farm inputs from suppliers at block level towns, who also act as buyers of their produce. There is a prevalence of a **non-cash engagements** between the farmers and input suppliers, whereby farmers buy the inputs on a credit basis and then repay this credit by selling their produce to these input suppliers themselves. This practice of has led to many farmers falling into a **debt trap** with the suppliers/buyers.

176. Despite the heavy focus on paddy procurement, produce in Chhattisgarh and Odisha is frequently sold at the village level to an intermediary for a price lower than the MSP. The states have attempted multiple ICT measures to break the nexus between rice millers, Primary Agriculture Cooperative Societies (PACS) officials and village intermediaries, which keeps the farmers out of the market, most recently introducing centralized token issues and Aadhar-based procurement at the paddy purchase centers. Odisha has also started including self-help groups and *pani panchayats* to act as procurement agent/centers. With the low number of mandis in the

¹³⁰ Most post-harvest loss are at the level of farm operations: a 2015 study found that post-harvest losses of wheat and paddy were 4.93% and 5.53% respectively, with only 0.86% in both cases due to loss in storage. Study conducted by Central Institute of Post Harvest Engineering and Technology, Ludhiana (CIPHET) based on production data of 43 crops and livestock produce in 2012-13 and wholesale prices of 2014. The study was conducted in 120 districts in 14 agro-climatic zones and the report was published in March 2015

districts, procurement operations are heavily dependent on the PACS. For commodities, other than paddy for which there is little state procurement, marketing of produce is dependent on farmer-trader interactions.

Barrier 3: Inadequate capacities and instruments for integrated landscape management and restoration

Limited capacities for formulating and implementing ecosystem restoration and management in accordance with ecosystem and landscape conditions

177. Although India is a world leader in relation to the silvicultural management of natural forests, and community-based approaches to natural resource management, an integrated landscape vision is inadequate in the prioritisation, planning and implementation of ecosystem restoration and management. As a consequence, their full potential to complement sustainable food production systems by contributing to the maintenance of ecosystem services on which these depend, or effectively to complement the other (agricultural and non-agricultural) elements of local peoples' livelihoods, is not realized. This is in large part due to limitations in the processes whereby such initiatives are defined and prioritised, particularly in relation to the need for in-depth, informed and fully participatory approaches that consider landscape, ecosystem and livelihood dynamics and the interrelations among them.

Inadequate governance and planning frameworks for ILM

178. The natural resource management practices (including farming, livelihood and food systems) of the multiple actors in the target landscapes are in many cases located and executed in ways fail adequately to reflect spatial variations in conditions across the landscape, to take into account their implications for other actors in the landscape, or to provide for the maintenance of the ecosystem service flows on which environmental and social sustainability depends.

179. This is due to a number of factors:

- Inadequate mechanisms for analysing, negotiating and reconciling the interests of diverse landscape stakeholders;
- Limited awareness among landscape stakeholders as a whole regarding the environmental, productive and social interdependencies among different landscape elements, and of the options for addressing them;
- Limited access to relevant, science-based and understandable information on landscape-level conditions, dynamics and trends over time;
- Limited capacities and mechanisms for planning landscape management based both on stakeholder consensus and science.

Barrier 4: Inadequately coordinated and ineffective information management

180. Although there are high levels of scientific and technical capacity at numerous levels in India, in relation to issues of relevance to food systems and landscape management, and major resources of experience have been generated at field level, knowledge is typically managed in a piecemeal manner and not effectively channelled to policy- and decision-makers in ways that would help them to identify and promote innovative options.

1b) Project Map and Coordinates

Please see Annex E.

2) *The baseline scenario and any associated baseline projects*

Box 24. The baseline scenario - key points:

The Government is investing in agricultural sector growth and increasing farmer incomes, as well as improved sustainability in the agriculture sector; there is also significant commitment and investment in environmental sustainability by some private sector actors.

Without additional GEF investment, under the baseline scenario there is the potential that:

- **Food systems will be addressed in a piecemeal manner;** and there will be limited integration and synergy among diverse policy goals, raising potential for unintended cross-sector consequences
- **Policies and plans may continue to be formulated based on narrow sector-specific visions,** failing to reflect landscape and market conditions or to take advantage of knowledge on best practices
- **Improvements in productivity, crop diversification, and irrigation efficiency may lead to unintended net negative consequences** for sustainability if inappropriately applied
- There may be **limited development, and farmer awareness, of viable options** for combining productivity, sustainability and income objectives at farm level;
- **Food system sustainability will remain a relatively marginal, niche issue** at the retail/consumption end
- **Public/private initiatives on green value chain development will continue to be piecemeal** in nature
- **Limited value chain integration** will mean farmers and purchasers/retailers do not full take advantage of mutually-beneficial value chain opportunities
- **Ecosystem restoration and management may have limited effectiveness** due to inadequate reflection of landscape/ecosystem conditions and dynamics
- **Knowledge continues to be managed in a piecemeal manner** and not effectively channelled to policy- and decision-makers

181. More detailed information on the baseline initiatives mentioned below is provided in Supplementary Annex 4.

182. The **Government of India** (GoI) aims to achieve **4% annual growth in the agriculture sector, and double farmers' incomes** between 2016 and 2023, through the National Agricultural Development Plan (RKVY). Likewise, the National Food Security Mission (NFSM), launched in 2007-08, aims to **increase the production of rice, wheat, pulses and coarse cereals**.

183. At the same time, GoI recognises the need to **move away from unsustainable high-input rice and wheat production**, especially in the Indo-Gangetic Plain (IGP), and is investing in this through support to crop diversification (under the Crop Diversification Programme (CDP) of RKVY); water efficiency in agriculture; and the shifting of the geographical focus of agricultural production away from the IGP to the less moisture-limited east (including Chhattisgarh and Odisha), through the Bringing the Green Revolution to Eastern India (BGREI) initiative.

184. GoI is also promoting the **production of pulses and oilseeds in rice fallow areas** in eastern India, through the Targeting Rice Fallow Areas (TRFA) sub-scheme of RKVY. This initiative responds to a situation where the country has achieved self sufficiency in food grains but has a deficit in the production of oilseeds and pulses; it is difficult to expanding the area of pulses and oilseeds due to competition from other crops; and there are large areas of unused rice fallow.

185. GoI is also investing significantly **sustainable and organic production**, through the National Mission on Sustainable Agriculture (NMSA) focuses on improved crop seeds, livestock and fish cultures, water use efficiency, pest management, improved farm practices, nutrient management, agricultural insurance, credit support, markets, access to information and livelihood diversification. Examples of NMSA sub-schemes and investments by State Governments and international cooperation in support of sustainable and organic agriculture are given in **Box 25**.

Box 25. Government baseline investments in sustainable and organic agriculture

- The *Paramparagat Krishi Vikas Yojana* (PKVY) scheme of the NMSA promotes organic farming through adoption of organic villages, by cluster approach and PGS certification (see Supplementary Annex 8.9 for additional information on PKVY).
- The ‘*Promotion of Agricultural Mechanization for In-Situ Management of Crop Residue* in the States of Punjab, Haryana, Uttar Pradesh and NCT of Delhi’ programme, provides farmers with financial assistance for the purchase of in-situ crop residue management machines, in order to address the air pollution caused by crop residue burning.
- The *Narwa, Garwa, Ghurwa and Baadi* (NGGB) scheme of the Chhattisgarh government is promoting sustainable and closed farming system, focused on water management, composting for building soil health, promotion of animal husbandry and sustainable agriculture around homesteads.
- The World Bank supported *Chhattisgarh Inclusive Rural and Accelerated Agriculture Growth Project* aims to leverage the NGGB scheme to improve access to quality essential services and to enhance and diversify sources of income in select tribal dominated areas;
- The World Bank supported Odisha *Integrated Irrigation Project For Climate Resilient Agriculture* aims to intensify and diversify agricultural production, enhance climate resilience and improve water productivity in selected areas.

186. The **private sector** remains heavily focused on increasing agricultural productivity, especially through **high-input agriculture** based on the use of agrochemicals, inorganic fertilizers and high-yielding varieties, as well as technologies for increasing **water efficiency** in agriculture. These approaches constitute the core business of most private sector agricultural input suppliers, and are also the main focus of the technical support provided by most private sector purchasers of agricultural products.

187. The private sector is increasingly supporting environmental sustainability, through commitments sustainable sourcing, the provision of technical support for sustainable production, and investments in Corporate Social Responsibility (CSR) initiatives.

Box 26. Examples of baseline private sector investments in farmer support (see Supplementary Annex 8 on Extension Systems for more information)

- **Ambuja Cement Foundation (ACF)** is a Corporate Social Responsibility wing of Ambuja Cement Limited. It implements agricultural and rural development projects with rural communities and farmers surrounding the company’s factories. Currently works in 770 villages across 22 locations in 12 states, reaching around 2 million people. Key implementing partner of sustainable agriculture projects including Better Cotton Initiative and Sustainable Spice Initiative-India. In Punjab, ACF is working with close to 32,000 farmers in Bhatinda and Ropar districts, on crops such as cotton, wheat and paddy.
- **Syngenta Foundation India (SFI)** as an independent not-for-profit organization, with the mission of having small and marginal farmers participate in agriculture development by improving their access to better seeds and other inputs, technology, information, credit, and market access. The Agri-Entrepreneur (AE) Model, SFI’s flagship initiative, is active in Andhra Pradesh, Assam, Bihar, Jharkhand, Madhya Pradesh, Maharashtra, Odisha, Rajasthan, West Bengal, and Punjab. In January 2020, there were 2666 AEs associated with SFI (including around 300 women), with over 40 partner organizations the program has reached to 220,000 smallholder farmers.
- **ITC e-Choupal** is a market-led extension initiative of ITC Ltd.’s agribusiness division. It uses the combination of digital technology and trained manpower to disseminate information, provide extension service and procure quality grains. It makes use of the physical transmission capabilities of current intermediaries, while disintermediating them from the chain of information flow and market signals. ITC Ltd. works with farmers to improve the productivity and quality of various crops and source grains (wheat and rice),

oil seeds (soya), pulses, and a range of value-added agri-products such as processed fruits, coffee and shrimps across multiple geographies in India. ITC Ltd.'s agribusiness division has a presence in more than 20 states and over 160 districts, operates through 65 hubs and over 300 warehouses spread across India. After the food corporation of India, It is also the second-largest procurer of Wheat in India.

188. The baseline also includes two important GEF-funded projects:

- The Green-Ag project (Transforming Indian Agriculture for Global Environmental Benefits and the Conservation of Critical Biodiversity and Forest Landscapes: GEF ID 9243) is focussed on the landscape approach to ensure long term integrity of existing protected areas and secure critical ecosystem services that underpin sustainable agriculture. The project is also expected to help secure buffer zones and corridors around and between protected areas. Healthy, functioning ecosystem services, including better water provision and soil fertility, will also provide positive incentives for communities, and help ensure long-term sustainability of agriculture.
- The UNEP and IUCN project “Transforming agricultural systems and strengthening local economies in high biodiversity areas of India through sustainable landscape management and public-private finance: GEF ID 10204”. This project will focus on (i) the market-driven application of sustainable agriculture practices that can lead to Rainforest Alliance certification; and (ii) Zero Budget Natural Farming (ZBNF), a system type of low-input, climate-resilient farming that encourages farmers to use low-cost, locally-sourced inputs, eliminating the use of artificial fertilizers, and industrial pesticides. Under the project, a transformation of land management into sustainable agricultural systems, land degradation neutrality, biodiversity conservation and rural economic development in two priority states (Karnataka and Andhra Pradesh) is envisaged.

189. Despite these significant levels of investment, under the baseline scenario it is unlikely that conditions will emerge that will allow food systems in India to undergo the transformational changes needed for them to be environmentally and socially sustainable or to meet evolving food needs.

190. Outcomes without GEF investment may therefore include the following:

- Although GoI is investing in crop diversification, the **types and quantities of crops produced by the agriculture sector may not may not coincide with the agroecological requirements of the area;**
- Even if inter-sector communication is achieved, **value chain actors and policy makers may be reluctant and slow to make the changes** to incentives, subsidies, market structures and infrastructure that are needed in order to move to a situation of sustainable food systems, unless presented with clear evidence of the potential of this to generate win-win outcomes (in terms of enhanced business opportunities and enhanced balances of public goods) and unless provided with tools, guidance and other support;
- The **environmental outcomes of investments in support of sustainable agriculture may be limited** if these are not accompanied by integrated management of the landscapes in which they are located;
- Investments in crop diversification, water use efficiency, farming systems modifications and shifts in the geographical focus of production may have **unintended negative environmental and health consequences** unless they are carried out in accordance with adequate environmental and social safeguards, and fully take into consideration the nature and complexity of the farming, livelihood, community and landscape systems in which they are embedded.
- Although a number of private sector actors have made clear commitments to environmental sustainability, including significant investments in corporate social (and

environmental) responsibility schemes, **food system sustainability is likely to remain a marginal, niche issue at the retail/consumption end of food value chains** unless private sector actors work in a concerted manner with Government and consumer groups to influence public perception and demand in relation to food systems, adjust their business models accordingly, and negotiate favourable market and incentive conditions for this to be viable.

3) *The proposed alternative scenario*

Theory of change

Box 27. Theory of change - key points:

- The project will promote an integrated Sustainable Food Systems (SFS) approach, delivering win-win benefits by working through value chains to support environmentally and socially sustainable farming systems (within sustainably managed landscapes);
- The promotion of sustainable farming systems and integrated landscape management at field level will be progressively scaled out within and beyond the target districts, and will inform policy development at the level of the target States and beyond;
- The project will facilitate the mainstreaming of the SFS approach in policy agendas in the four target states, leading in the medium and longer term to broad inter-sector uptake and modifications to policy, regulatory and incentive frameworks in favour of the approach.

191. The objective of the project is **to promote sustainable, integrated landscapes and efficient food value and supply chains at scale in rice- and wheat-based food systems in India.**

192. Its long term goal will be **to support the Government of India in achieving a progressive transformation of food systems, away from the current emphasis on unsustainable high-input systems, towards a model of sustainable integrated food systems, sustained by policy and resource commitments**, which will permit durable reductions in environmental impacts, accompanied by enhancements of farmers' incomes and resilience. These sustainable integrated food systems will be characterised by:

- The **diversified, resilient and economically viable production** of healthy food;
- The embedding of food production in **resilient and socially-sustainable farming and livelihood systems**, and **sustainably managed landscapes**.

193. As explained in the previous sections, the current situation is no longer viable, as **the high-input systems that have been prioritized since the 1960s have become critically unsustainable** in many areas, jeopardising the long-term productive potential of the landscapes where they are applied and generating globally-significant negative environmental impacts (in relation to biodiversity, land degradation and climate change).

194. The project will build on the major advances that have been made to date in India and elsewhere with the formulation and application of sustainable approaches to agricultural production; the management and restoration of degraded ecosystems capable of providing environmental services; integrated landscape management and governance; the use of market-based instruments to improve the environmental outcomes of production systems and value chains; and the promotion of healthy consumption habits.

195. The innovativeness of the project lies in its proposal to integrate these issues as interrelated and interdependent elements of a sustainable food system model. Under this model:

- **Production systems** will be able to generate environmental benefits at farm and landscape levels, to enhance farmers' incomes and livelihoods, and to meet evolving consumer needs;
- **Markets (private and public)** will provide farmers with the incentives (prices and market security) that they require in order to make the environmentally sustainable production an attractive option to them;
- **Public incentives** (e.g. input or price subsidies) will be tailored to optimize their impacts in terms of net "public goods", i.e. their implications for the environment and public health issues and the human and financial costs associated with these, in addition to agricultural productivity.
- The system will be supported by **governance** conditions, ensuring that the interests of different stakeholder groups are effectively represented, and that the costs, benefits and

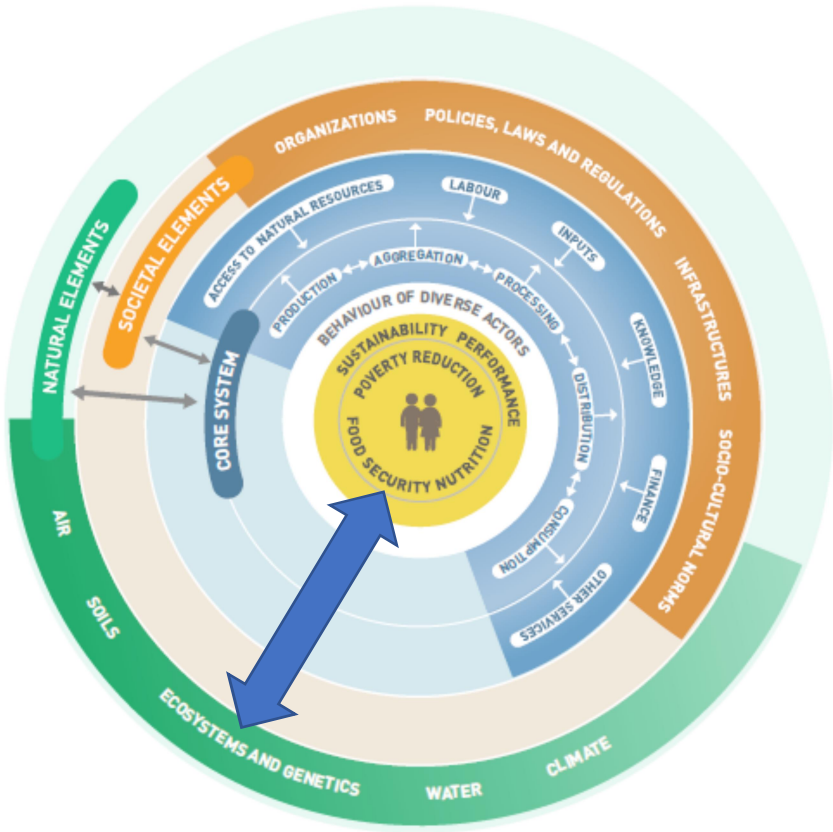
responsibilities inherent in the functioning of the model are equitably distributed among them.

196. In order for this to occur, a range of conditions need to be ensured:

- 1) Access by farmers and their organizations to **sustainable production models**, and to the **technical, financial and logistical capacities** to be able to implement them;
- 2) Effective **linkages between food producers and private sector value chain actors**: these will provide farmers with the **attractive and secure markets** and favourable **input supply chains** needed to motivate them to invest in sustainable production, and will provide purchasers with the **consistency and quality of supply** of these products that they require in order fully to commit to them;
- 3) Effective **engagement of private sector actors** (whose role in Indian agriculture has greatly increased over recent decades), so that they can both respond to and help shape demand for food (taking advantage of the market opportunities associated with sustainable production), as well as facilitating farmers' access to the technical, financial and material inputs they require in order to be able to produce sustainably;
- 4) Effective **landscape governance mechanisms**, providing for equitable and responsive representation, dialogue, planning, decision-making and sanctions;
- 5) **Increased awareness among policy makers** of the net benefits to society that are achievable by transitioning food systems towards improved environmental sustainability;
- 6) **Dialogue and coordination among sectors** and along the length of the value chain, in order to achieve synergies and efficiencies.

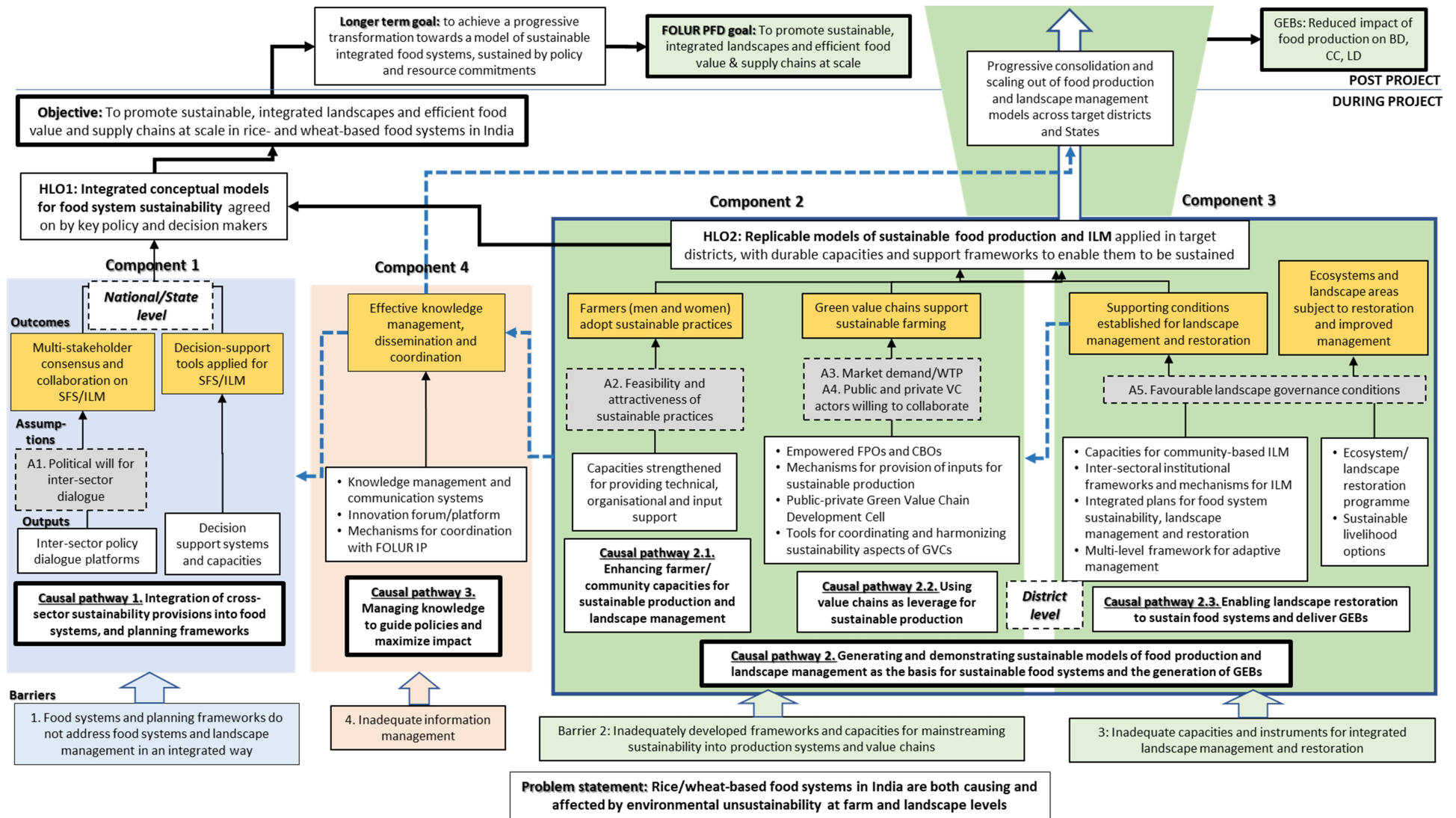
197. The FAO “food system wheel” (Figure 39) shows the interrelatedness and interdependence of these multiple factors that constitute a sustainable integrated food system. While being essentially people-centered, food systems both depend on and determine the existence of natural resources; and in order to be effective, equitable and sustainable, they also need to be supported by functioning systems made up of societal elements (enabling conditions of policies, laws, regulations, infrastructure and organizations) as well as value chains and input supply mechanisms.

Figure 39. The FAO food system wheel



198. **Figure 40** sets out the theory of change of the project.

Figure 40. Theory of change diagram



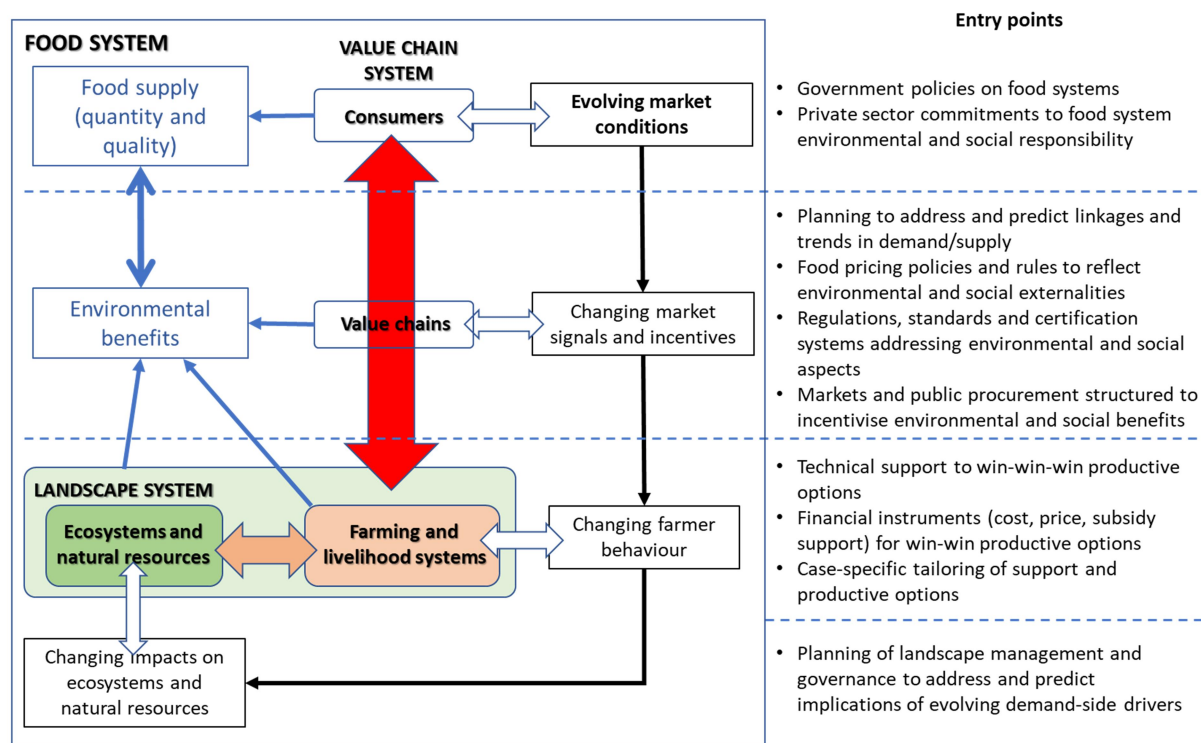
199. According to this theory of change, the project will work towards two higher level outcomes (HLOs):

- **HLO1: A conceptual model for integrated sustainable food systems (SFS)** agreed on by the Government of each target State (including identification of policy, regulatory and incentive adjustments needed), supported by emerging evidence of feasibility at field level.
- **HLO2: Replicable practical models of sustainable food production and integrated landscape management (ILM)** applied in target districts, with durable capacities and support frameworks to enable them to be sustained.

200. The development of replicable models of sustainable production and ILM (**HLO2**) in the target districts, when supported by effective knowledge dissemination and management, will set in motion a process of progressive consolidation and scaling out of these models both within the target districts and elsewhere in the target states, which will continue beyond the life of the project. It will also contribute to providing the concrete evidence of the practical feasibility of the field-level elements of the model (in environmental, social and economic terms), that is needed to ensure the uptake of the model as a whole among policy-makers, as foreseen under **HLO1**.

201. Agreement to the conceptual model for SIFS by policy-makers in the four target states will put the model firmly in the mainstream of policy formulation processes across the country as a whole. The longer-term aspiration of the project (which it is beyond its role or capacity to achieve by itself) is that this will eventually lead to concrete modifications to policy, regulatory and incentive frameworks nationwide, in support of the durable application of the SIFS model, thereby contributing to the FOLUR goal of increasing the sustainability of national and global food supply. The actions foreseen in the theory of change, in support of the achievement of these HLOs, respond to the identification of addressable “entry points” in the SIFS structure, as set out in Figure 41.

Figure 41. Entry points into linkages between consumption, value chains, farming and landscape elements of food systems



202. The actions in relation to these identified entry points will lead to the achievement of the higher level objectives (HLOs) set out above through three “causal pathways”. The relations between these causal pathways and the barriers explained in the previous section, and project components and outcomes, are set out in Table 9.

Table 9. Relations between Causal Pathways, Barriers, Components and Outcomes

Causal pathway 1 (Component 1): Integration of cross-sector sustainability provisions into food systems, and planning frameworks		Causal pathway 2. Generating and demonstrating sustainable and scaleable models of food production and landscape management as the basis for sustainable food systems and the generation of GEBs				Causal pathway 3 (Component 4). Managing knowledge to guide policies and maximize impact
		Component 2: Enhancing farmer and community capacities to apply sustainable production and landscape management, and engage with sustainable and inclusive value chains		Component 3: Enabling landscape restoration to sustain food systems and deliver GEBs		
		Sub-pathway 2.1 Enhancing farmer capacities for sustainable production	Sub-pathway 2.2 Working with public and private sector actors to use value chains as leverage for sustainable production	Sub-pathway 2.3 Enabling landscape restoration and management to sustain food systems and deliver GEBs		
Outcome 1.1: Multi-stakeholder consensus and collaboration on integrated food systems	Outcome 1.2: Policy and decision makers applying decision-support tools.	Outcome 2.1 Farmers (men and women) adopt sustainable farming practices	Outcome 2.2: Green value chains support environmentally-sustainable farming through collaboration between public and private sectors	Outcome 3.1: Capacities, support, governance and management frameworks for landscape restoration and conservation	Outcome 3.2: Ecosystems and landscape areas are subject to restoration and improved management	Outcome 4.1: Effective knowledge management/communication Outcome 4.2: Project implementation based on RBM
Barrier 1. Food systems and planning frameworks do not address food systems and landscape management in an integrated way		Barrier 2: Inadequately developed frameworks and capacities for mainstreaming sustainability into production systems and value chains		Barrier 3: Inadequate capacities and instruments for integrated landscape management and restoration		Barrier 4: Inadequately coordinated and ineffective information management

203. **Causal Pathway 1, Integration of cross-sector sustainability provisions into food systems, and planning frameworks** will create the conditions that will lead to the agreement of conceptual models of SIFS by stakeholders in the target States (HLO1), and provide planners with the decision-support tools to enable the models to be able to put the models into practice. Actions related to this pathway will constitute Component 1 of the project.

204. Actions under this pathway will move the current situation, in which *policy and planning frameworks do not address food systems and landscape management in an integrated way, considering externalities and inter-sector implications* (Barrier 1), and *Policy-makers and planners have inadequate tools and capacities for considering the externalities and inter-sector implications of food systems* (Barrier 2), to one where there is multi-stakeholder (including public/private) consensus and collaboration on integrated food systems (**Outcome 1.1**), and where Key policy and decision makers are effectively applying decision-support tools in relation to integrated land management and sustainable food systems (**Outcome 1.2**).

205. The functioning of this pathway depends on the assumption (**A1**) that there is political will for reviewing and adjusting food systems frameworks: without this, it will be difficult to get the stakeholders to the table and for them eventually to commit to policy changes. There are, however significant impact drivers which are favourable for the foreseen changes, such as the National Mission for Sustainable Agriculture.

206. **Causal Pathway 2, generating and demonstrating sustainable models of food production and landscape management as the basis for sustainable food systems and the generation of GEBs**, will lead specifically to the generation and application of replicable models of sustainable food production and ILM in the target districts, with durable capacities and support frameworks to enable them to be sustained (HLO2). This pathway consists of three interdependent elements (sub-pathways): **sub-pathways 2.1 and 2.2 constitute Component 2 of the project, and sub-pathway 2.3 corresponds to Component 3.**

207. Actions under **Sub-pathway 2.1, enhancing farmer capacities for sustainable production**, will address Barrier 3 (*farmers lack capacities and support for sustainable production*) and lead to a situation in the target districts where farmers have the capacities and support required to enable them to undertake sustainable production (**Outcome 2.1**). The effectiveness of this sub-pathway depends on the assumption (**A2**) that sustainable practices are feasible for and attractive to farmers. As shown in Supplementary Annex 5.2, concrete evidence has been generated at field level that a wide range of sustainable practices are indeed feasible and attractive: in addition, practices will be subject to participatory selection and validation in order to ensure their appropriateness to farmers' needs and conditions.

208. Actions under **Sub-pathway 2.2, working with public and private sector actors to use value chains as leverage for sustainable production and nutrition**, will address Barrier 4 (*poorly developed value chains for sustainable production*) and result in a situation where value chain actors (farmers, traders, millers, retailers, exporters and input suppliers) are collaborating in sustainable and inclusive value chains that incentivize environmentally-friendly production, while helping to meet and positively influence emerging food demands (**Outcome 2.3**). The project will promote this collaboration at three levels:

- Strengthening the **capacities of FPOs** to access and participate effectively in environment- and nutrition-friendly value chains that provide them with the market-based incentives needed to make sustainable and nutrition-friendly production attractive to them;
- Engaging **private sector actors** so that they can both respond to emerging patterns of demand and consumption (taking advantage of the new business opportunities that these offer), and help shape demand, moving it towards environmentally-friendly and nourishing options;
- Supporting **tools for value chain management and coordination**, through the promotion of information flow, standards and certification mechanisms to provide downstream value chain stakeholders with confidence about the environmental and nutritional quality of the products

that they receive, and to help ensure that farmers are adequately, appropriately and equitably rewarded by value chains for providing environment- and nutrition-friendly products.

209. The functioning of this sub-pathway is dependent on the assumption (A3) that value chains and markets prefer and reward sustainable and nutrition-friendly production. Project actions can contribute to this assumption being met, through for example public education initiatives under Component/Causal pathway 1, and engaging with private sector actors to influence demand through branding and advertising. Rising incomes are also likely to result in increasing willingness to pay increased prices for products with positive environmental and/or nutritional credentials.

210. Another important assumption (A3) is the willingness of value chain actors to collaborate, which may be constrained by concerns over potential loss of competitive advantage, and scepticism regarding the potential benefits of collaboration. Impact drivers that are likely to be favourable for collaboration include the existence of well-functioning multi-actor public/private sector platforms such as the World Business Council for Sustainable Development (WBCSD) and the Sustainable Rice Platform (SRP).

211. **Sub-pathway 2.3, enabling landscape restoration and management to sustain food systems and deliver GEBs**, constitutes the third pillar of the field-level application of the SIFS model. Actions under **Outcome 3.1** will ensure that productive and extractive activities across the target district are carried out in accordance with the regenerative potential of natural resources, provide for the maintenance of ecosystem services on which sustainability depends, and take into account the needs of different stakeholder groups in an equitable manner. These two aspects are closely interrelated, in recognition of the fact that farms form integral elements of landscapes: farming systems both affect, and are affected by, landscape dynamics and the interests and spheres of action of community members span both levels. Actions under **Outcome 3.2** will include field level actions to restore ecosystems and landscapes, and to support target communities in applying alternative livelihood strategies that are compatible with ecosystem restoration and sustainable management, thereby addressing Barrier 6 (*limited knowledge and capacities for ecosystem restoration*). Actions under this sub-pathway are dependent on the assumption (A4) that there are adequate baseline governance conditions in the target landscapes for the project to build upon, enabling landscape stakeholders to define in a consensus-based and equitable way how address issues of ecosystem degradation.

212. **Causal Pathway 3, managing knowledge to guide policies and maximize impact**, will have importance in ensuring the relevance, effectiveness and scale of the impacts resulting from the other causal pathways: it is constituted by the actions foreseen under Component 4 of the project. This pathway will involve:

- Effective dissemination of knowledge on sustainable food production and ILM models across target States (**Outcome 4.1**), contributing to the probability of the models being scaled out beyond the immediate target population and area of the project; and
- Supply of inputs of knowledge and concepts from farm/landscape level into the development of integrated food system models (**Outcome 4.2**): this will constitute the “bridge” between Components 2/3 and 1, and will help to persuade policy-makers of the feasibility and practical benefits of the models, and also to ensure that the outcomes of policy deliberations under Component 1 are grounded in practical reality.

213. The “sub-pathways”, outcomes and outputs at field level will be closely integrated: support to farmers’ capacities for sustainable production under Outcome 2.1 will be carried out within the overall framework of community-based landscape planning proposed under Outcome 3.1, and closely integrated with support to farmers’ capacities for green value chain insertion under Outcome 2.2.

214. As explained in Section 1a, central to the design logic of the project (and the selection of its target localities) is the need to provide, in an integrated and simultaneous consideration, for i) sustainable diversification away from rice in traditional “Green Revolution” areas such as the Indo-Gangetic Plain (including Punjab and Haryana); and ii) shifting, in a sustainable way, the focus of intensive production to moister areas in the east of the country such as the states of Chhattisgarh and

Odisha (under the “Bringing the Green Revolution to Eastern India Initiative, or BGREI). The relation between the “push” and “pull” dimensions in these two landscapes is portrayed in Figure 32. **The transformation and channeling of the BGREI to take a sustainable approach is critical to achieving intended impacts of the project.** Close attention will therefore be paid to engaging and working with the critical players involved in the BGREI, in the planning and implementation of this project. Of key importance in this regard will be the project’s approach of working through respective State Agriculture Departments, as channels for interacting with other actors of relevance to BGREI, and for promoting SFS and ILM through intersectoral coordination with other State departments, such as the Forest Department.

Project Objective

215. The objective of the project is to promote sustainable, integrated landscapes and efficient food value and supply chains at scale in rice- and wheat-based food systems in India.

Outcomes and Outputs

Component 1: Integration of cross-sector sustainability provisions into food systems, and planning frameworks

216. As explained above, actions under Component 1 (which corresponds to Causal Pathway 1 of the Theory of Change) will move the current situation to one where there is multi-stakeholder (including public/private) consensus and collaboration on integrated food systems (Outcome 1.1), and where stakeholders (especially at State level) involved in the formulation of policies have access to the capacities and mechanisms required to enable them to carry out informed analysis of food systems issues, and to formulate proposals for effective and equitable responses (Outcome 1.2).

Outcome 1.1: Multi-stakeholder (including public/private) consensus and collaboration on integrated food systems

End of project outcome targets:

- 1 food systems roadmap formulated at National level
- 4 food systems roadmaps formulated at State levels (1 per target State)

Output 1.1.1: Coordinating committees to promote inter-sector convergence and dialogue

End of project output target:

- 1 coordinating committee established and functioning per target State (4 in total)

217. Based on the model applied under the Green Ag project, the project will support the establishment of multi-sectoral coordinating bodies at the National level as well as in the four target States. These committees, which will bring together government institutions working in agriculture and allied sectors, forestry and natural resources management, and economic development, will work to bring convergence between various government policies, plans and investments to promote key principles of sustainable food systems and integrated landscape management, with a special focus on the achievement of global environmental values. The committees will promote information exchanges amongst their agencies and they will facilitate the adoption of policy improvements related to the nexus between sustainable food systems and integrated landscape management, considering also the climate change context.

218. These committees will also play a central role as mechanisms for the engagement of key institutional stakeholders in project implementation (see Section II.6).

Output 1.1.2: Multi-stakeholder policy dialogues on sustainable food systems

Mid-term output target:

- 1 policy dialogue meetings have occurred since project start in each target state

End of project output target:

- 2 policy dialogue meetings have occurred since mid-term in each target state

219. While the Coordinating Committees at national and State levels will primarily provide policy guidance for project implementation, the project will support additional dialogues that will bring together members of these committees and other senior policy makers (experts from the government, academia, the private sector, non-governmental organizations and farmer representatives) to prioritize, analyse and discuss priority issues and concerns related to mainstreaming of SFS and ILM.

220. The dialogues may be built around key themes identified by FAO's Sustainability Assessment of Food and Agriculture Systems. The project will also take into consideration FAO's Strategy on Climate Change and FAO Policy on Gender Equality as formulated in the context of Attaining Food Security Goals in Agriculture and Rural Development and ensure that such dialogues include gender and social equity issues.

221. These dialogues may receive facilitation support, as needed, by project-funded experts. Dialogue participants will assess the wider policy context for food systems, agriculture, environment and development in their respective States and at the national level and prioritize key issues driving unsustainability in food systems and agriculture. Participants of these dialogues will identify and prioritize critical issues at the national level and each of the States that are in need of in-depth analyses for informed decision making.

222. Upon request from dialogue participants, the project will commission analyses and studies to other relevant experts and/or think tanks. These reports are intended to be used as policy briefs on options to shift current investments/ policies/ programmes driving unsustainability in food systems and landscape management to more sustainable practices, based on national and international experiences.

223. These policy briefs will be:

- Built on issues identified by national and state dialogues as priority issues and will include lessons from around India and from other parts of the world
- Built specifically on lessons and experiences of this project
- Jointly developed with other GEF and/or other projects/ programmes as appropriate
- Aimed primarily to promote SFS and ILM into programmes and investments.

224. The project will also develop other advocacy and awareness raising materials aimed at multiple stakeholders- and these may be linked to addressing key threats or overcoming key barriers to promoting SFS and ILM.

225. These Dialogues will lead to formulation of policy recommendations to be considered by the agriculture and other relevant sectors to support mainstreaming of SFS and ILM. In addition to providing important information and analyses to decision makers on relevant issues, the Dialogues are expected to be a mechanism to cement inter-sectoral partnerships and to raise awareness and capacities of key policy makers on SFS and ILM. It is expected that senior policy makers at National and State levels will participate in these dialogues and benefit from increased awareness on issues and policy options related to SFS, ILM and global environmental benefits.

226. It is expected that analyses from the dialogues above, combined with field experiences of the project will contribute to integration of SFS and ILM approaches into National and State Development Plans/ development visions and sectoral plans, so that these plans include support actions, including funding for maintaining and expanding SFS/ILM activities. By the end of the project, several national policies/plans and State policies and plans are expected to integrate SFS and ILM issues. At the national level, the project will work with MoAFW and MoE to identify and better incorporate indicators and monitoring related to the achievement of GEBs in the nation's policy framework related to SFS and ILM.

Outcome 1.2: Key policy and decision makers are effectively applying decision-support tools in relation to integrated land management and sustainable food systems.

End of project outcome target:

- 500,000 ha covered under improved planning to foster sustainable food systems

Output 1.2.1. Decision- and planning-support systems for integrated land use planning and management and sustainable food systems planning

End of project output target:

- 4 Departments (Agriculture, Horticulture, Watersheds/Irrigation, MGNREGA) using and contributing to DSS interface/portal etc

227. An innovative aspect of the project will be the development of systems to support decision-making and planning in relation to both integrated landscape management and sustainable food systems. Through the knowledge management and communication mechanisms set out under Outcome 4.1, the development of the DSS by the project will be supported by lessons learned on similar mechanisms employed by other projects such as Green-Ag, and will in turn share lessons learned with them.

228. ILM decision support will take the form of a digital platform, accessible to users at national, state and district levels, covering issues that may be found on different platforms, but aggregated here. This Decision Support System (DSS), developed on a GIS Platform will sit at State Level, but to start with it will be primarily used at the level of the project districts. The DSS will be a single platform, but it will have separate units for each of the four states.

229. Issues to be covered by the DSS may include:

- Locations of stressed (e.g. water-stresses, degraded) areas
- Soil conditions (soil health, salinity, water-logging, soil carbon)
- Water resources¹³¹
- Community Forest Areas covered by the Forest Rights Act
- Suitability for alternative management and crop diversification options
- Priority areas for restoration, conservation and ecosystem management (taking into account biodiversity conditions including priority species and connectivity)
- Mapping of areas particularly prone to crop residue burning
- Mapping of institutional and technical resources (e.g. custom hiring centres) in relation to needs.

230. Related decision support in relation to food system planning will include variables such as:

- Spatial and temporal data in relation to agricultural production and productivity
- Value chain structures, market conditions and price trends.

231. Support to food system planning will also include making analytical tools available in an easily usable manner, in order to help policy makers and planners to understand the direct, indirect and inter-sector implications of alternative food system planning scenarios, and the trade-offs that these might imply between the interests of different stakeholders. These tools may include Natural Capital Accounting (NCA), which will enable the intangible, non-monetary and/or longer term implications of decisions affecting natural resources to be balanced against more easily-quantified financial and shorter term values such as agricultural productivity and incomes; Targeted Scenario Analysis (TSA)¹³² which allows decision-makers to weigh up the pros and cons of alternative development

¹³¹ Taking advantage of FAO capacities and experience in relation to water accounting (<http://www.fao.org/land-water/water/water-management/water-accounting/en/>)

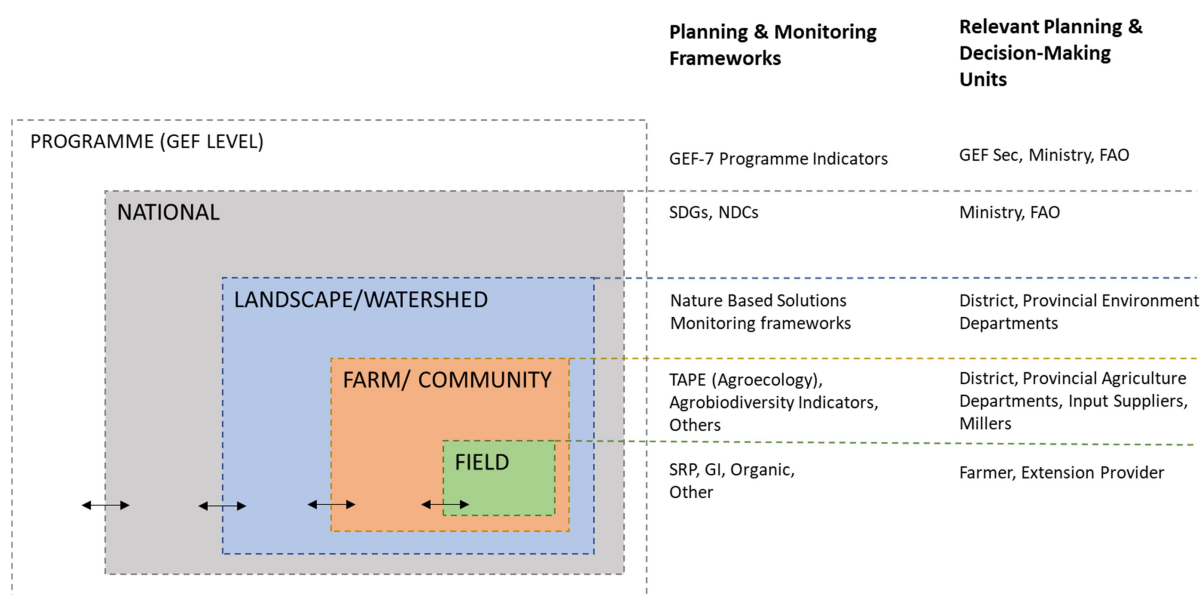
¹³² https://www.undp.org/content/undp/en/home/librarypage/environment-energy/environmental_finance/targeted-scenario-analysis.html

scenarios in a balanced way; and Strategic Environmental Assessment (SEA), which involve the balanced assessment of policies, programmes and plans at a macro level.

232. The Decision Support Systems (DSS) will include indicators which will allow the results of their application, in terms of food system sustainability and integrated landscape management, to be tracked and guided in an integrated manner at multiple levels, thereby helping to ensure that field-level management is compatible with and supported by appropriate management at farm, community and landscape levels, and vice versa. The selection of appropriate indicators will be a collaborative effort involving environment and agricultural sector entities at national, provincial and local levels, as well as private sector entities and farmer organizations.

233. Figure 42 provides examples of different indicators of potential relevance at different levels ranging from field through to impact programme, and the relations among them. The Sustainable Rice Platform (SRP) Standard, for example, has the potential to act as an indicator of sustainability at field level; the Tool for Agroecology Performance Evaluation (TAPE) aims to produce global and harmonized evidence (information and data) on the multidimensional performance of agroecological systems in order to inform policy making and to support the process of transition to agroecology; and the Agrobiodiversity Index brings together data about the agrobiodiversity and the genetic resources that underpin it, thereby helping countries, companies and projects to identify policy and business levers, risks and opportunities, and to guide public and private sector investments for future adaptability and resilience.

Figure 42. Multi-level framework for adaptive management



Output 1.2.2: Strengthened systemic capacities for decision-making on integrated land use planning and management, and food systems planning

End of project output targets:

- 10 multi-stakeholder workshops (at national and State levels) held on Decision Support System for integrated land use planning and management and sustainable food systems
- 160 officials trained on DSS for integrated land use planning and management (10 from each state department)

234. The results of the initial systemic capacity assessments carried out during the PPG phase, shown in Supplementary Annex 6, will be complemented by more detailed enhancement needs analyses at project start, focusing in particular on systemic aspects such as information access; availability of and familiarity with tools for information management and decision support; and inter-sector/stakeholder relations.

235. Based on the results of those needs analyses, a detailed systemic capacity enhancement programme will be developed, including a range of tools such as participatory training workshops; inter-sector agency planning meetings; on-the-job support and facilitation, and the provision of printed and on-line guidance and trouble-shooting tools.

Component 2: Enhance capacities for promoting and investing in sustainable and climate-smart food production practices and responsibly sourced commodity value chains

236. As explained above, actions under Components 2 and 3 of the project (which correspond to Causal Pathway 2 of the ToC) will lead specifically to the generation and application of replicable models of sustainable food production and ILM in the target districts, with durable capacities and support frameworks to enable them to be sustained.

237. Actions under Component 2 will focus on the integrated management of farming systems and landscapes in order to promote food system sustainability and global environmental benefits, while Component 3 will focus specifically on landscape restoration in the same landscapes..

Outcome 2.1 Farmers (men and women) adopt sustainable farming practices

End of project outcome target:

- 160,000 farmers, of which 40% are women and 30% are tribals, adopting sustainable practices over 80,000 ha

238. Project investments in support of this outcome will focus on promoting the maintenance and enhancement of sustainable farming systems, as the core of sustainable food systems, that are capable of contributing to sustainable land and water management, as well as greenhouse gas emission reduction and global biodiversity conservation (whilst enhancing resilience of production systems).

239. The actions of the project under Outcomes 2.2 and 2.3 will result in farmers having access to an attractive and innovative integrated package of benefits, as summarized in Box 28.

Box 28. Main benefits of the project “package” for farmers

- 1) Co-development of **integrated sustainable farming systems** with farmers, generating benefits for productivity, income and sustainability relative to the baseline scenario that is primarily focused on individual farm elements and their productivity. The focus on ensuring productivity and income benefits will serve to make these systems attractive to farmers, thereby allowing them to function as effective vehicles for delivering global environmental benefits. Wherever possible sustainable farming systems models will build on farmers’ experiences and knowledge of existing systems with which they are familiar,
- 2) Supporting the availability of accessible and appropriate **input supply** (including decision-support tools; custom-hiring schemes; appropriate seed, nutrients and pest control materials; technical assistance and finance) to help make the integrated farms productively and financially viable, as well as specifically favouring pro-sustainability inputs where possible.
- 3) Helping farmers with the **insertion of crop production into green value chains** (focusing on production other than that procured by Government), to provide them with incentives for sustainable production.
- 4) Supporting the use of the **sustainability standards** (such as SRP) in order to provide productivity and efficiency benefits, improved market access (in some cases) and GEBs.

240. The specific farming practices to be supported by the project will be confirmed at community-level through participatory, gender-sensitive needs assessment and planning processes, during project implementation. Fundamental principles and criteria with which the practices will conform in order to qualify for inclusion and support are presented in Box 29.

Box 29. Criteria for selection of production and management options to be supported by the project

- Improved environmental outcomes relative to the baseline alternative, in terms of implications for environmental values of local, national and global importance (including biodiversity, GHG stocks and ecosystem function) and environmental sustainability;
- Resilience to the effects of external factors that are not directly addressable by the project, including climate change and global market conditions;
- Compatibility with principles of livelihood and food security, especially among the poorest and most vulnerable sectors of the population, including the potential to provide resilient livelihood alternatives to those affected by downturns in their current livelihood options;
- Compatibility with, and where possible contribution to, the specific needs of women and (where relevant) indigenous peoples;
- Feasibility, competitiveness and sustainability in agronomic, economic and social terms, taking into account for example considerations of availability of attractive, stable and robust markets, and of factors of production (including labour given the current trends of rural-urban migration and potential disruption to labour supply from crises such as COVID-19).

241. Examples of the agricultural production and water management practices to be promoted through the project are detailed in Supplementary Annex 5.2. The project will emphasize the promotion of these practices not as stand-alone crop-specific technologies, but as complementary and interrelated components of integrated farming and livelihood systems, that are also integrated with the management of the landscapes in which they are embedded.

Box 30. Examples of agricultural and water management practices to be promoted through the project (see Supplementary Annex 5.2 for more detail)

- **Agroecological and climate-resilient production:**
 - 1) Zero-Budget Natural Farming
 - 2) Women-led climate resilient farming model (WCRF)
 - 3) Traditional sustainable tribal agriculture practices¹³³
 - 4) Conservation, preservation and promotion of landraces
 - 5) Agri-horti-forestry¹³⁴
- **Sustainable Intensification**
 - 1) Direct Seeding Mulch-based Cropping (DMC)
 - 2) No/reduced till mechanized dry-seeded rice (DSR) with residue retention on soil surface
 - 3) Zero-till wheat (ZTW) with residue retention on soil surface as mulch
 - 4) Delayed Transplanting of Rice to Save Water and Energy
 - 5) High yielding shorter duration rice varieties (inbred or hybrid)
 - 6) Alternate Wetting and Drying (AWD) in Rice Production
- **Alternative residue management options**
 - 1) Microbial decomposer spraying
 - 2) Biochar
 - 3) Rice straw mushrooms (*Volvariella volvacea*)
 - 4) Cattle feed
 - 5) Mechanised composting
 - 6) Energy generation
- **Water management options** (all water management options will be promoted in accordance

¹³³Understanding Tribal Agriculture: Author - Bharat Dogra and Baba Mayaram, Published on - 23.2.2016.
<https://www.resilience.org/stories/2016-02-26/understanding-tribal-agriculture/>

¹³⁴ Water Policy Briefing Issue 27 (IWMI/TATA)

with the results of basin-level water accounting, and subject strengthened water governance at watershed, district and block levels)

- 1) Sprinkler and Drip Irrigation:
- 2) Underground Pipeline (UGPL) System for Groundwater and Canal Water Conveyance and Distribution
- 3) Use of Climatic Sensors and Tensiometers
- 4) Laser land levelling
- 5) Rejuvenation and Retrofitting of Village Ponds
- 6) Safe Disposal and Use of Wastewater, and Saline- alkali Waters and Affected Soils:
- 7) Multiple Water Use Systems (MUS) for medium to High Rainfall Areas (C&O)

- **Crop Diversification:** the project will support the Government's Crop Diversification Programme in identifying and promoting sustainable crop diversification options
- **Fallow enrichment:** the project will support the Government's Target Rice Fallow Areas programme in identifying options for fallow management that are environmentally and socially sustainable within the context of integrated farming and livelihood systems

242. The project will promote the use of standards against which to measure progress towards improved environmental and social performance in farming systems. In the case of rice, the project will focus on the SRP Standard. Rather than necessarily aim to enable farmers to achieve SRP certification as such, it will help them to reach a situation where they are able to comply with elements of the Standard: this will be viewed as an entry point that will also allow them to satisfy their own needs for sustainability and resilience and, if they wish, to achieve certification under other standards.

Table 10. Elements of the SRP Standard for Sustainable Rice Cultivation

Farm management	Preplanting	Water use	Nutrial management
- Crop calendar - Record keeping - Training	- Heavy metals - Soil salinity - Land conversion and biodiversity - Invasive species - Levelling - Pure seed quality	- Water management - Irrigation system at community level - Inbound water quality - Groundwater extraction - Drainage	- Nutrient management (organic and/or inorganic) - Organic fertiliser choice - Inorganic fertiliser choice
Integrated pest management	Harvest and postharvest	Health and safety	Labour rights
- Weeds - Insects - Diseases - Molluscs - Rodents - Birds -	- Timing of harvets - Harvest equipment - Drying time - Drying techniques - Rice storage - Rice stubble - Rice straw	- Safety instructions - Tools and equipment - Training of pesticide application - Personal protective equipment - Washing and changing - Applicator restrictions - Re-entry time - Pesticides and chemical storage - Pesticide disposal	- Child labour - Hazardous work - Education - Forced labuor - Discrimination - Freedom of association - Wages

243. The project will build on FAO's global experience on climate smart practices to assist farmers to adopt practices such as improved tillage, alternative cropping patterns, better agricultural land management, and reduction or alteration of chemical inputs. Conversion of current agriculture lands

with particularly low fertility to agroforestry systems will be encouraged –especially, deep-rooted locally adapted vegetation that are better suited for soil stabilization, land reclamation and for economic benefits will be promoted (such as local fruit trees that can help local women farmers to produce products for sale, but at the same time these can be of high biodiversity importance as well – especially for pollinators and bats). Some key focus of the project will be to:

- Promote organic farming and certification, including participatory guarantee schemes: as noted in the baseline, in many States, organic production is being championed by policy makers. ILM plans will identify opportunities to support organic production by farmers as a mechanism to enhance ecosystem services and promote CCM. This may include linking farmers to existing government subsidies and market support measures. The project will also strengthen value chains for organic production that yields significant conservation benefits. There is strong potential to promote organic vegetable, and spice production in many States to market to rapidly growing urban centres as well as for tourism enterprises. One of the mechanisms that the project will support is the Participatory Guarantee System. Around 6626 farmer groups have already been involved in this System in India.
- Complement organic certification with alternatives, as appropriate, such as Good Agricultural Practices (GlobalGAP, of key importance for accessing European markets)¹³⁵ and the Sustainable Rice Platform (SRP) Standard, which is the world's first voluntary standard for rice¹³⁶.
- Promote local traditional varieties of crops for in-situ conservation (agrobiodiversity conservation). Farmers will be encouraged to pursue conservation and production of agrobiodiversity crops. Many of these traditional species, varieties, breeds, and associated practices evolved with the associated ecosystems are often better adapted to local conditions, require fewer inputs to generate high-value production, and increase biodiversity benefits. The project will work with local communities and agriculture research and extension agencies to improve the quality of indigenous crops through better seed production, storage and other agronomic practices. Community seed banks will be supported, if required. The project will support better linkages between growers of local varieties of crops to local value addition and strengthened marketing strategy through the formation of clusters and farmer groups. The project will also support purchase of such products through the Public Distribution System – and link to local school feeding programmes.
- Greenhouse gases emission reduction practices: mitigation-focused management practices in agriculture, such as: reduced CH₄ emissions from rice from better water management such as alternate wetting and drying; reduced CO₂ emissions from burning of crop residues; reduced NO_x emissions from fertilizers through integrated nutrient management, such as urea deep placement (UDP), whereby urea briquettes placed near roots can reduce urea use 50-60% and significantly increase yields, and; increased soil organic matter (and soil organic carbon) from reduced tillage and improved residue and manure management.

Box 31. Risk mitigation measures in relation to production systems:

Risk Issue 7.2: The project will operate in sectors or value chains that are dominated by subsistence producers and other vulnerable informal agricultural workers, and more generally characterized by high levels “working poverty”

As set out in Section 11 of the ProDoc on Decent Rural Employment, the project will contribute to FAO Organizational Outcome 2 (Under FAO Strategic Objective 3 "Reduce rural poverty") that “The rural poor have greater opportunities to access decent farm and non-farm employment.” by:

- Supporting the Government in achieving a transition from high-input to diversified low-input

¹³⁵ <https://www.sgsgroup.in/en-gb/agriculture-food/food/gfsi-certification/globalgap>; <https://www.eurocert.asia/globalgap/>

¹³⁶ <http://www.sustainablerice.org/Resources/>

production systems: in addition to delivering improved GEBs, this will contribute to reducing farmers' exposure to harmful agricultural chemicals in the workplace;

- Where feasible and appropriate (subject to the results of participatory processes of situation analysis and technology formulation/ validation in Farmer Field Schools), supporting the introduction of alternatives for sustainable mechanization in accordance with principles of appropriate technology, in order to reduce drudgery in agricultural work;
- Supporting the diversification of farming and livelihood systems: in addition to delivering improved GEBs, this will increase the diversity and the resilience of the employment opportunities open to farmers (women and men);
- Assisting farmers in achieving compliance with the SRP Standard, which combines the delivery of environmental benefits and increase opportunities for income with compliance with standards on decent working conditions;
- Overall, the support by the project to the sustainability and resilience of production systems will contribute to sustaining the rural economy (including opportunities for decent rural employment) in the face of the current trends of rural-urban migration.

Risk Issue 7.5: The project will operate in areas or value chains with presence of labour migrants or that could potentially attract labour migrants

The project will sensitise farmers who hire migrant workers on decent work conditions, minimum wage standards, etc.

Output 2.1.1 Capacities strengthened for providing technical, organisational and input support

End of project output targets:

- 80 district officers oriented on SFS themes
- 110 Master Trainers, of whom 40% are women and 30% are tribals, trained in SFS methods
- 270,000 FFS farmer graduates , of which at least 40% are women and 30% are tribals,

244. The project will learn from and build on the extensive experience of FAO and partners (public and private) in India with the development and application of innovative, participatory and pro-poor models of farmer support (see case studies in Supplementary Annex 8).

Farmer Field Schools

245. The Farmer Field Schools (FFS) model has been highly effective in many parts of the world to build farmer skills to improve production and sustainability. FFS will be organized in all four target landscapes. These will focus on priority issues such as sustainable land and water management, organic and/or reduced input farming, integrated pest management, in-situ agrobiodiversity conservation and agroforestry. The FFS curricula will be linked back to relevant standards (e.g. organic, GlobalGAP, SRP) and coordinated with project support to green value chains under Outcome 2.2, to provide farmers with clear pathways toward possible market-linked opportunities.

246. The FFS model will be implemented in two tiers: firstly, FFS will be conducted by the team of Block Facilitators working with the project, and then graduates of these (Farm Facilitators) will conduct further FFS among farmers.

247. These field schools will ensure that there is strong participation of women, poorer farmers, youths and that these also include issues of occupational health and prevention of child labour.

Enhanced extension systems

248. Technical capacity building of district technical/extension staff from different government line departments will be supported by the project so that they able to mainstream project's objectives in

their own work and support communities and farmers to implement SFS-compatible production and ILM/restoration. The SFS/ILM Unit will undertake or commission capacity needs assessment and design and implement appropriate capacity building actions. Such capacity building work will complement and build on existing capacity building activities in each landscape, district and at the State level.

249. The project will work closely with the network of government extension services in each district within the target landscapes, especially the Agricultural Technology Management Agency (ATMA). ATMA leads the preparation of district level Strategic Research and Extension Plan (SREP), using Participatory Rural Appraisal (PRA). Capacity enhancement will include exposure to best international principles and practices on sustainable agriculture, landscape management and the resultant delivery of GEBs – including greenhouse gas emission reduction from land use and land use change.

Output 2.1.2. Mechanisms established and operating for provision of inputs (consumables and equipment) needed for sustainable production

End of project output targets:

- 12 custom hiring centres (CHCs) (at least 3 in each target district in Punjab and Haryana) collaborating with the project in making available machinery for sustainable production

250. The project will also support the establishment and/or operation of **custom hiring centres (CHCs)**¹³⁷ for machinery, through the provision of advice on the location-specific priorities for different kinds of machinery (linked to the decision-support systems proposed under Output 1.2.1), and advising users and CHC managers on the range of machinery options available (in collaboration where possible with research and technology institutions on the development of such machinery). CHCs will be particularly important in ensuring that farmers have access to machinery required for the management of crop residues in Punjab and Haryana, in order to reduce the extent of crop residue burning, and project support there will complement the Government's baseline initiatives in this area (see Box 32). CHCs are also relevant to Chhattisgarh and Odisha, where the intent is to support mechanisation and machinery, mostly in the form of small farm implements.

251. The project will seek to “bundle” its own technical support to farmers with the provision of inputs of consumables, materials and equipment by private sector input suppliers: this will further incentivise buy-in by the input providers as it will provide them with an assured client base among the project's target farmers, also allowing the scaling up foreseen by the project to go hand in hand with scaling up of demand for these inputs.

Box 32. Government baseline support to agricultural mechanization

To address the issues of crop residue management in Punjab and Haryana, the Government has introduced a specific scheme “Promotion of Agricultural Mechanization for in-situ management of crop residue in the States of Punjab, Haryana, Uttar Pradesh, and NCT of Delhi”. Under this scheme financial assistance has been provided to group and individual-based CHCs on specific equipment such as Happy seeder²³, MB Plough, Slasher, Tractors, etc. Under this scheme, more than 10,000 CHCs have been established in both states. The State Governments of Chhattisgarh and Odisha states have also introduced the scheme and subsidy programs for establishing CHCs in their respective states.

¹³⁷ CHCs are basically a unit comprising a set of farm machinery, implements and equipment meant for custom hiring by farmers. Though certain implements and equipment are crop specific, the traction units like tractors, power tillers etc., and self-propelled machinery like combine harvesters etc., are used in common. These are generally privately run but equipment (especially those relevant for CRB such as Happy Seeders, straw management system machinery) are heavily subsidised by the government.

Outcome 2.2 “Green value chains” support environmentally-sustainable farming through collaboration between public and private sectors

End of project outcome target:

- 40,000 farmers, of whom 40% are women and 30% are tribals, are actively engaged in GVC networks that incorporate sustainability standards and principles, with effective information management and value chain coordination
- At least 4 private sector partners onboarded through the GVCDC

252. The project will ensure that efforts to encourage farmers to shift to production practices and farming systems that are compatible with environmental sustainability and good nutrition make business sense. Therefore, the project will ensure that farmer capacities are also enhanced to allow them to take advantage of market opportunities that favour environmentally-sustainable production (either through the “greening” of existing value chains or through the development of new value chains), in addition to the use of FFS and strengthened extension mechanisms, under Outcome 2.1, to enhance their capacities to meet environmental standards in their production practices. The project will support generation of additional incomes to farmers by value addition to their farm products. Support will include promotion of processing, market analysis and marketing (such as branding) initiatives. These will be complemented by project activities to also increase demands for such products by consumers through awareness raising (such as to local supermarkets, restaurants) and linking to programmes such as government funded school children feeding programmes (“midday meals”).

Output 2.2.1: Farmer Producer Organizations (FPOs) and community-based organizations (CBOs) supported enabling pro-poor development of green value chains

End of project output target:

- 8 FPOs (at least 1 in each target district) are supported through the GVCDC

253. FPOs will play vital roles in ensuring that farmers are able to access green value chains in ways that provide them with equitable rewards for engaging in sustainable production, as well as providing frameworks within which extension support will be provided and Farmer Field Schools organized in support of sustainable production (under Outcome 2.1). FPOs can serve to aggregate the crop production of their members in order to generate economies of scale in post-harvest management, value-adding, storage and transport; coordinate sowing and harvesting among multiple farmers in order to ensure reliability and timeliness of the arrival of products at market; and negotiate fair market access and prices from a position of strength.

254. At village level, the project will work with Farmer Interest Groups (FIGs), which are common affinity groups working on common goals such as improving production, natural resource management etc. FIGs will be strengthened through Farmer Field Schools on sustainable food systems and integrated landscape management, and will also act as the nodes (under the “hub and spoke” model) on which a FPO will function serving as local aggregation points in villages, conducting optimal production planning, maintaining common infrastructure to support production etc., and linking with the local government at panchayat level to obtain access to governmental programmes.

Output 2.2.2: Green Value Chain Development Cell established as a platform for collaboration between actors in the public sector and private sector actors operating on the input and output sides of value chains, and dialogue on green value chain development

End of project output target:

- GVCDC fully established and functioning
- 47 agripreneurs (of which at least 30% are women and 30% are tribals) providing input support to farmers and FPOs in relation to sustainable farming systems

255. A Green Value Chain Development Cell (GVCDC) will be established under the National Project Management Unit with linkages to each of the four states, working towards building robust value chains that promote sustainable production in accordance with market-recognised sustainability standards. The GVCDC will initially be established within the framework of the GEF-7 FOLUR project, but during the life of the project opportunities will be explored to transition it into a permanent, institutionally sustainable mechanism with the potential for acting as an umbrella body linking other initiatives in India that will be promoting sustainable agriculture.

256. The GVCDC (see Supplementary Annex 9 for more detail) is envisaged as a platform and resource centre for the private sector players, FPOs and State level Federation of FPOs and other willing value chain players to facilitate creation of market-led extension models, sustainability standards based production system, and designing Public Private Partnerships (PPP), targeted towards addressing value chain gaps on a collaboration or a turnkey basis. Mandates of the GVCDC may include reinforcing the agribusiness knowledge base, human resource development, enhancing investment in agribusiness, strengthening FPOs, identifying private sector entities and onboarding them, and commissioning need-based value chain and market studies. Private players having a commensurate product and/or service may find it relevant to join the platform and play their role in strengthening existing and developing new value chains.

257. The proposed GVCDC will help undertake a more collaborative approach with the private sector, leveraging both private and public funds for a common goal of promoting sustainable agriculture. The GVCDC will support consultations between Government agencies and the private sector on common areas of investments, and policy support needed. It will also help Government agencies enter into MoUs with some of these agencies and undertake pilot projects in remote areas with Standards such as SRP. Incentives may be provided to private sector for expanding the initiatives to remote locations with public funding. Dedicated government programmes on capacity building and testing support will be designed to leverage private efficiency and resources. Government programs such as PPP-IAD/IHD, Organic Mission, and other State initiatives will be dovetailed to channelize funds. This approach would enable larger coverage of the Government schemes and more equitable benefits to the farmers.

258. The effective functioning of value chains, and their utility in support of the delivery of environmental and social benefits, depends on the existence of mechanisms to govern the relations among the numerous value chain actors: in particular, to give downstream actors (purchasers, retailers, millers and consumers) confidence that value chain products meet their requirements in terms of quality and the delivery of environmental and/or social benefits; and to allow producers to be adequately and equitably rewarded for their efforts in ensuring that their production delivers these benefits. The project will facilitate the application (and, where necessary, the development) of such mechanisms, which will include the following:

- In the case of rice, the project will focus in particular on the **Sustainable Rice Platform (SRP) Standard**, which is relevant, broadly achievable and widely accepted by Governments, farmers and traders in many Asian countries, including a number of large downstream actors. The SRP Standard can be used by farmers as a benchmark against which to measure their own progress towards sustainability, or as a market-based instrument to demonstrate compliance with sustainability criteria to downstream actors. FAO is closely

involved with SRP members in the promotion of the SRP Standard throughout the region, through the Sustainable Rice Landscapes Initiative (SRLI), of which this project forms a part.

- The project will also support the application of **Participatory Guarantee Systems (PGS)**, which are focused more on connecting producers and consumers along short, typically local, value chains. The Government has already introduced PGS in parts of the project area, and there is great potential to expand this in the four target States. The project will support activities to create value-added products through training of households, with significant involvement of women.
- **Third party certification**, such as Organic, provides clear externally-verified evidence to consumers of producers' compliance with environmental (and, with some schemes, social) standards.

259. “**Agri-preneurs**” (often local agricultural input suppliers) will play key roles as the field-level elements of the GVCDC structure proposed in Supplementary Annex 9: they will helping to build the ecosystem needed to support FPOs in rural areas, helping to address the difficulties that FPOs commonly face in connecting with value chain actors to obtain technical support and inputs and to access markets. Agri-preneurs may, for example, be responsible running Custom Hiring Centres, micro-enterprises, etc. related to sustainable production; they may also act as the field agents of private sector agencies, thus contributing to monitoring and tracking.

Component 3: Enabling landscape management and restoration to sustain food systems and deliver GEBs

Outcome 3.1 Capacities, support mechanisms, governance and management frameworks established for landscape management, restoration and conservation in target districts

End of project outcome target:

- 250,000 ha under integrated landscape management and food systems plans

Output 3.1.1 Capacities developed for community-based sustainable landscape management

End of project output target:

- 80 district officers oriented on community-based sustainable landscape management
- 110 Master Trainers (of which at least 40% are women and 30% are tribals) trained in community-based sustainable landscape management
- 200,000 community members trained in community-based sustainable landscape management (of which at least 40% are women and 30% are tribals)

260. Field Schools on ILM governance will be organized in each Gram Panchayat/Village Council levels for their members as well as others to help them make rational, collective, evidence-based, empowered choices in ILM governance for areas that fall within their Gram Panchayats/Village Councils and to work across landscapes through partnerships with other Gram Panchayats/Village Councils. Representatives of community institutions in the landscape will meet regularly throughout the year, to discover and develop an understanding of the landscape and its functions during the different seasons, and the relations between food systems and natural ecosystems. They will also be given training on climate change issues and how changing climate is likely to impact local ecosystems and livelihoods. These field schools will engage participants in a discovery learning process to develop deeper understanding of their landscape—such as characteristics and importance of ecosystems within the landscapes, and assessing demand and carrying capacity of the landscape. Based on the improved understanding of the landscape, the community institutions are expected to contribute effectively in the implementation of ILM and develop supportive local policies for their implementation.

261. These ILM Field Schools and the Farmer Field Schools described under Outcome 2.1 will build on and be closely coordinated with each other, normally having many of the same participants in the target blocks.

Output 3.1.2 Inter-sectoral institutional framework and mechanisms for ILM at district, inter-district and sub-district levels

End of project output target:

- Frameworks have been established in 8 Districts

262. Inter-sectoral coordination mechanisms and capacities will be built at inter-district, District and sub-district levels to support ILM. The aim is that, as a result, the actions of different institutional stakeholders, with remits at different spatial scales and in different sectors, will respond to ILM principles in a harmonised and coordinated manner, through the mainstreaming of these principles in their respective plans and operations. The focus will therefore be on enhancing and harmonising existing planning and operational instruments, rather than seeking to generate new models: this approach will offer advantages in terms of uptake and sustainability.

263. These institutional frameworks for ILM will be based on, and evolve from, the project implementation structures: these, and the relations between them and the long-term institutional frameworks, are explained in detail in Section II. 6. Water User Associations (WUAs) will be of particular importance at village level in relation to ILM planning: these are groups of water users who pool financial, material, technical and human resources for the operation and maintenance of the water system within their jurisdiction for the benefit of all the members. WUAs will be strengthened to manage, distribute, and conserve water from a source used jointly by the members. Further, their capacities will be developed to exchange information and ideas (including water budgeting) on water resource use, monitor water availability, provide technical assistance in areas such as soil, water, and crop management, livelihood diversification, etc., discuss potential projects and development (including climate change) that may affect water usage in the area, operate and maintain a water service or structure, management of a water distribution system, including setting tariffs and collecting fees for long term operation and management activities.

Output 3.1.3 Integrated district-level plans for food system sustainability, landscape management and restoration

End of project output target:

- Integrated landscape management and food systems plans developed covering 250,000 ha

264. Building on the capacities and frameworks described above, and guided by the Decision-Support Systems proposed under Outcome 1.2, the project will facilitate the multi-stakeholder formulation, led by District authorities, of integrated plans that will set out principles and medium-term roadmaps for the implementation in practice of ILM and food system sustainability (providing frameworks for the implementation of farmer support to sustainable production and value chain insertion under Outcomes 2.1 and 2.2, as well as for the restoration, management and alternative livelihood options under Outcome 3.2).

265. It is foreseen that these plans will include:

- Vision statements for ILM and SFS;
- Problem analyses, focusing in particular on the relations between food systems (especially production and nutrition) and landscape elements, and taking into account landscape trend analyses;
- Definition of priority issues for action, with corresponding definition of responsibilities and resource requirements;

PART II 1a. Project Description, 3) The proposed alternative scenario (outcomes and outputs)

- Broad-brush indicative zoning to define the spatial priorities for the action areas defined (including, as appropriate, consideration of biodiversity and wildlife management issues, OneHealth risk management strategies and opportunities for Nature-Based Solutions).

266. Mirroring the approach applied to the Decision-Support System proposed under Outcome 1.2, these district-level plans will also take into account considerations of costings and trade-offs, through the application of multi-criteria analysis tools to support the planning process: this will allow for participatory planning that balances economic issues alongside the environmental and social implications of ILM priorities, as well as allowing the decision-making/planning criteria to include long-term options that may not be cost effective with market discount rates.

Outcome 3.2 Ecosystems and landscape areas are subject to restoration and improved management

End of project outcome target:

- Restoration plans under implementation, together with provisions for governance and financial sustainability, over 131,897 ha (GEF-7 Core Indicator 3)

Of which:

- Degraded agricultural land: 42,000 ha (sub-indicator 3.1)
- Forest and forest land: 84,654 ha (sub-indicator 3.2)
- Natural grass and shrublands: 5,243 ha (sub-indicator 3.3)
- Wetlands: area to be determined (sub-indicator 3.4)

Output 3.2.1. Ecosystem/landscape restoration plans agreed among stakeholders

End of project output target:

- Restoration plans developed covering 42,000 ha

267. With the full participation of District authorities and local communities, the project will support the formulation and implementation of programmes for restoring key landscape/ecosystem areas in order to promote the maintenance or recovery of ecosystem functions and services, including (but not limited to) aquifer recharge, watershed protection and biodiversity habitat/connectivity.

268. These programmes will be formulated in accordance with the integrated district-level plans to be developed under Output 3.1.3, but focusing specifically on aspects related to restoration.

269. The project will directly finance restoration activities where this is needed in order to “jump start” ecological recovery processes (for example, stabilizing highly eroded lands to allow subsequent revegetation to gain a “toehold”) and to raise awareness of currently unfamiliar restoration options and their benefits. It will also invest in nurseries when these are needed in order to introduce types of planting stock (for example medicinal plants or NTFP species) that are not otherwise available through Government of private sector nurseries. Wherever possible, however, such limited direct investment by GEF will be associated with co-financing investments by public and/or private sector programmes in order to maximize impact at scale.

270. Restoration activities will wherever possible focus on nature-based solutions (see Supplementary Annex 5.2) in order to foment cost-effectiveness, relevance and sustainability.

Box 33. Risk Mitigation Measures in relation to landscape management and restoration:

Risk Issue 3.4 The project may directly or indirectly involve the establishment and management of planted forests

The project will:

- Adhere to existing national forest policies, forest programmes or equivalent strategies.
- Ensure observance of principles 9, 10, 11 and 12 of the Voluntary Guidelines on Planted Forests, in full compliance with ESS 9 on Indigenous People and Cultural Heritage.

- Incorporate conservation of biological diversity as fundamental in the planning, management, utilization and monitoring of planted forest resources.
- Ensure that only indigenous species are used in the establishment of planted forests.
- Work together with stakeholders to develop and derive appropriate and efficient response options in planted forest management, in order to reduce the environmental risk, incidence and impact of abiotic and biotic damaging agents and to maintain and improve planted forest health and productivity

Risk Issue 4.7 The project will be located in or near an internationally recognized conservation area e.g. Ramsar or World Heritage Site, or other nationally important habitat, e.g. national park or high nature value farmland

- The project will adhere to national legislation relating to internationally and nationally recognised conservation areas and agriculture heritage sites and support strategies for conservation of the same where relevant.

Output 3.2.2 Sustainable livelihood options compatible with ecosystem restoration developed/promoted

End of project output targets:

- 12 NTFP enterprises supported
- 6,000 beneficiaries participating in value chains for sustainably harvested NTFPs

271. The project will support local communities in developing and sustainably applying livelihood support options that will contribute to the sustainability and stability of their members' livelihoods. These will be selected and implemented in accordance with the provisions of the ILM plans that will be developed under Output 3.1.3.

272. In Punjab and Haryana, the project will support the establishment and sustainable management of agroforestry systems on degraded land, through a combination of assisted natural regeneration and enrichment planting: there is extensive experience in these states that has shown tree management in mosaic agricultural landscapes to be an economically viable option. Through the project, support will be provided to ensure that the biodiversity values of such systems are optimized through, for example appropriate choice of species mixes and management methods (see Supplementary Annex 2.2 for more detail).

273. In Chhattisgarh and Odisha, the project will focus in particular on non-timber forest products (NTFPs): as these represent a direct economic/livelihood benefit from the forest, when sustainably managed they have the potential to catalyse improved natural resource governance by providing local communities with increased motivations to protect and manage their forests sustainably, under the principle of "conservation through use" (CTU). NTFPs also have particular potential to benefit women and the poor in terms of harvesting and processing of the same. Project support will enable local communities to switch from unsustainable to sustainable management of NTFPs, and also (under the principle of CTU) will empower and motivate them to protect their forests against unsustainable extraction of NTFPs by others.

274. Supplementary Annex 3 provides information on the main NTFPs in the target States and districts, including guidelines of management and harvesting practices for ensuring sustainability.

275. The project will take advantage of the following opportunities:

- The Panchayat (Extension to Scheduled Areas) Act, 1996 (PESA) grants *gram sabhas* (village assemblies) in tribal Scheduled Areas the rights over the natural resources such as minor forest products;
- The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (FRA) provides a comprehensive and empowering framework for recognition of

both individual and community forest rights of the Scheduled Tribes (STs) and other traditional forest dwellers who primarily depend on forest for their livelihood and socio-cultural activities.

- The Mechanism for Marketing of Minor Forest Produce through Minimum Support Price (MSP) and Development of Value Chain, 2013, which intends to provide social safety measures for NTFP gatherers and collectors, who are primarily members of ST communities.

276. The project will in particular partner with the *Van Dhan Yojana* (Forest Wealth Plan) scheme and the MKSP scheme under the NRLM. These aim to strengthen livelihoods based on non-Specified/non-monopolized NTFPs, through value addition at the local level through *Van Dhan Vikas Kendras* (VDVKs, Forest Wealth Development Centres) and the NTFP-based enterprises promoted under MKSP.

277. Although there 35 VDVKs have already been established in the target districts of the project in Chhattisgarh and Odisha¹³⁸, the scheme is still in its early stages of implementation. The project will support the implementation of the scheme in its target districts, by: building capacities of stakeholders in sustainable collection and harvesting practices; strengthening management of common resources; supporting proper identification of NTFPs and business planning at the local, district and state level; strengthening community institutions in business processes; and creating incentives for the primary collectors through effective value chain development, linking with the private sector and exploring certification opportunities.

278. Information on value chains for NTFPs is presented in Supplementary Annex 7.1. The private sector actors involved with NTFPs are mostly different from those in the agriculture markets. The FPOs will be the same, however, and the capacity building aspect of FPOs will cover both NTFPs and other agricultural commodities (NTFPs are important from a working capital management point for the FPOs since agriculture is seasonal).

279. Specifically, project resources will be used for:

- **Development of resource materials:** the project can strengthen the literature (training material, guidelines, learning papers etc) on sustainable harvesting practices for NTFPs, as well as building monitoring mechanisms.
- **Organization of trainings and workshops:** the identification of gaps and, subsequently, enhancing capacities of key government agencies and other stakeholders (Civil society partners, technical agencies, research agencies etc) on community management of forests in VDVK catchment areas.
- **Piloting of models on certification:** this would entail exploring possibilities of certification of products, engaging with the certification agency and piloting the model in a few VDVKs in the sampled districts.
- **Private sector engagement:** this has the potential to bring in sustainability across the Green Value Chain.
- **Identification of commercially important species,** including the selection of species for value chain development based on indicators such as volume of production, proportion of households involved in collection, scope for value addition, potential markets and demand.
- **Value Chain Analysis of potential species:** identification and characterisation of markets (key players, required quality standards, type of processed products, volume of products etc) and gaps across the chain, to support the definition of intervention strategy for different products selected under a VDVK.

¹³⁸ NTFPs included are harida, bahada, amla, neem seed, sal seed, tamarind, mahua flower, mahua seed, honey, myrobalan and chironjee

- **Support to VDVK Business Planning**, based on the VCA study and intervention strategy, the project would support business planning for the VDVK (given that there is a fixed allocation to each VDVK under the scheme, the project will allocate additional funds to cover the potential requirements of these centres).
- **Capacity building of key stakeholders**, on governance, management and operation of Green Value Chains, targeting district level implementation teams for VDVKs and self-help groups (SHGs) associated with VDVKs.
- **System for sustainable harvesting**: promotion of SHG-based monitoring system for sustainable harvesting of NTFPs and monitoring of trends in extraction/production over time.
- **Strengthening market linkages**: in coordination with the state team, facilitation of private sector participation with a view to bring in quality standards, and piloting of certification to access premium markets.

Component 4: Knowledge management to guide policies and maximize impacts

Outcome 4.1: Effective knowledge management, dissemination and coordination

Outcome targets:

- Knowledge is exchanged and efforts coordinated at national and global actors within the framework of the FOLUR global platform and/or regional hubs, at least every 3 months
- The project is participating in global, regional, national and local networks and knowledge hubs

Output 4.1.1 Knowledge management and communication systems

Output targets:

- Lessons learned and knowledge generated or acquired are reviewed on a monthly basis

280. A major focus of this Output will be on generating and sharing knowledge within the four project States, between States involved in this project and with other stakeholders nationally and internationally. Information will be shared through existing government, FAO and GEF portals, as well as through organization of special seminars, workshops, events, and audio-visual materials. Publication of relevant posters, articles and reports will be supported – including publications in relevant State languages.

281. The project's communications and knowledge management team, working closely with the Crops Division of DAC&FW, will be responsible for the initial design and operationalization of a knowledge management plan and communication strategy and programme. The strategy will be discussed with the four project supported States and finalized. This will include identifying key stakeholders and target audiences, identifying their communication needs, and designing appropriate communication mechanisms to enable them to access and utilize knowledge generated. The communications team will work with project technical staff to develop knowledge management approach that is relevant, appealing and useful for stakeholders, including local extension agencies. The team will be tasked with assisting extension services to support relevant portions of project implementation, particularly those related to knowledge management. This will help facilitate the mainstreaming of best-practices with national, state, district and village level policies and investments. By project close, the extension system will have mainstreamed the project-initiated communications and capacity building programme. This will include making certain that it is adequately financed, staffed, and equipped.

282. The project's communications strategy will ensure the following:

- **Project Progress Reporting and Updates:** The communications team will ensure that the target audiences are regularly receiving information they require. The project's annual report will collate information generated via the monitoring programme noted in an earlier Output, and highlight lessons learned on options for SFS and ILM, in order to assist decision-makers at all levels understand the ramifications of investment in food system sustainability and integrated landscape management. Documented lessons learned and other relevant information about project achievements will also be shared with local communities (including indigenous communities) using relevant media.
- **Media Outreach:** The project's communication team will design and implement a comprehensive programme to make certain project efforts are effectively covered on national and state level media. This will include both traditional media (e.g., print, television) and social media (e.g., Facebook). One of the key mechanisms that the project will promote will be web-based knowledge sharing and learning on a continuous basis across and between different levels. This platform will promote sharing "best practices" for SFS and ILM, and for practitioners from each landscape to place queries. The Crops Division of DA&FW, MoA&FW will host this. The team will build upon and incorporate, as appropriate, existing electronic knowledge and capacity building tools such as:
 - "Farmers' Portal" (a national government website that provides a 'one stop shop for farmers'), "Digital India" (a flagship government programme designed to promote e-Governance),
 - "Kisan Call Centres" (a national toll-free call in number that links farmers with national agricultural specialists), and
 - "Digital Green" (an NGO that links technology and social organizations to improve agriculture, health and nutrition).
- **Thematic project's lessons learnt reports:** The project will also commission specific analyses and reports on environmental, social and economic aspects of the project. One such example is economic valuation of ecosystem services provided by farmers by adopting on-farm agroecological approaches.
- **Obtaining and disseminating technical and other knowledge available from national centres of excellence to project stakeholders**
- **Ensuring that local communities have all relevant information on their rights, responsibilities and obligations.** This will include their right to Free Prior Informed Consent to project supported activities. The project will design a participatory communication plan and carry out iterative discussions through which project information will be disclosed in a transparent way and will, document Indigenous Peoples' needs that are to be included into the project, and agree on a feedback and complaints mechanism".

Output 4.1.2 Innovation forum/platform established

Output target:

- One innovation forum/platform established at national level

283. The project will be launch the FOLUR Innovation Forum (FIF), which will be a platform for innovations on food systems, climate change, biodiversity and other related themes with potential to generate global environment benefits, addressing both supply and demand-side issues including improved access to public and private services such as sustainable energy, financial services for supporting green value chains, and rural markets and technology for small/marginal producers.

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284. The FIF will provide a platform for innovators including Social Entrepreneurs and Private Sector Organizations to showcase their innovative ideas and possibly enter into partnership with the project, the project implementing agencies, or other agencies, to test ideas at scale.

285. Innovations will cover the following two aspects: a) Scalable models for the Underprivileged; and b) Innovative Services using Digital Technology. All innovations will be grouped along thematic lines, which will include (but not be limited to):

- Innovations in agriculture and allied sectors with potential to lead to increasing production and/or productivity, localized value addition and access to markets resulting in higher value realization per unit of production while reducing the GHG/water footprint of agricultural produce.
- Innovations in technology and rural energy – lack of power has stifled the growth of rural economy by either imposing a huge operating cost (alternate sources such as diesel generators) or lost business opportunity. Apart from that, a lot of innovative ideas are tried out as an end solution in various allied sectors. Thus, there will be a focus on technological innovations including rural energy (both conventional and non-conventional).
- Information communication including ICT based solutions, as tools for delivering services at the last mile. There are multiple innovative ideas in this area, and the need is to enhance the scope to a wider network, so this category would be considering such scalable options.
- Innovations in up scaling waste: this category will recognize innovations made in up scaling from agricultural produce, reduced pre-harvest and post-harvest losses, losses from food processing, etc.

286. Criteria for identifying and selecting the innovations will be: a) applicability, as measured by relevance to improving rural livelihoods; b) scalability, whether it is possible to be expanded in terms of geographical reach and beneficiary coverage; c) outreach, measured in terms of number of beneficiaries reached; d) impact, assessed in terms of growth in income or savings in expenditure (either household or at large); and e) potential for replication and sustainability without external assistance. Initiatives which have been implemented in the last five years, will be invited to participate.

287. This forum will be coordinated with the ongoing initiatives of the German ONE WORLD - No Hunger Initiative regarding the Green Innovation Centres for the Agriculture and Food Sector.

Output 4.1.3: Mechanisms are developed and applied to coordinate the project with global, regional and transboundary efforts under the FOLUR IP and beyond

Output target:

- The project is coordinating with other countries as part of the FOLUR global platform

288. Under the guidance of the Global Platform of the FOLUR IP, project strategies and activities will be formulated and programmed in such a way as to optimize their contribution to the IP at regional and global levels. In addition to the two-way exchange of knowledge resources proposed under Output 4.1.1, this will include, for example:

- Coordination of communications and partnerships with private sector actors operating across multiple countries in order to maintain clarity, consistency and cost-effectiveness, and maximize the magnitude of impacts on regional and global markets.
- Coordination and harmonization of activities between countries in order to minimize the risk of transboundary leakages of impacts.

289. Budgetted project activities related to the FOLUR GP will include those listed in Box 34:

Box 34. Budgeted project activities related to the FOLUR GP

- Participation in Global meetings of FOLUR partners and CPs
- Participation in Regional commodity platform gatherings / discussions with private and public sector representatives
- Participation / contribution to training workshops, regional communities of practice (sharing knowledge, successes)
- Contribution of achievement and success stories for the FOLUR IP Annual report
- Engagement with media within country, as well as consultation toward annual work planning
- Contributions to global knowledge products and flagship reports (peer reviews, technical inputs)
- Annual M&E results reporting to the GP for consolidation and reporting to GEF.

290. Similar strategies will be used to ensure that the project (as part of the Sustainable Rice Landscapes Initiative) is coordinated with the Sustainable Rice Platform and its public and private members: this will facilitate access by the project to technical and financial resources and value chain opportunities, and at the same time will allow lessons learned through the project to contribute to regional and global knowledge on approaches to integrated, inclusive and sustainable management of rice landscapes.

291. These mechanisms will also allow the project to be coordinated with other relevant GEF-funded initiatives, outside of the FOLUR-IP, including the following (described in more detail in the baseline section):

- The Green-Ag project: there is considerable learning from Green-Ag on the landscape approach, despite the fact that this project is not focussed on protected areas as Green-Ag is. Green-Ag will strengthen at least five key national and state level agricultural programmes (missions) with results based environmental indicators integrated in their policy and planning frameworks (or through revised guidelines and other tools based on project support): These will be of considerable use for the GEF 7 project.
- The UNEP and IUCN project “Transforming agricultural systems and strengthening local economies in high biodiversity areas of India through sustainable landscape management and public-private finance”. While the focus States of that project are different from this one, there will be considerable scope for learning, particularly from the Rainforest Alliance certification and lessons from the Zero Budget Natural Farming experience.

292. Coordination the exchange of lessons will also be supported with initiatives funded by other entities, such as the ongoing initiatives of the German ONE WORLD - No Hunger Initiative regarding the Green Innovation Centres for the Agriculture and Food Sector, and Soil Conservation and Soil Rehabilitation for Food Security.

Outcome 4.2 Project implementation is based on RBM

Project outcome target:

- Project performance is judged satisfactory or highly satisfactory by independent mid-term review and independent final evaluation

Output 4.2.1: Project RBM system (including MIS and M&E system) developed and implemented

Project output target:

- Overall annual project performance is satisfactory or highly satisfactory, as reported in PIRs

293. The objectively measurable SMART indicators set out in the project results framework and indicative M&E plan will be operationalized at project start through the formulation and implementation of a more detailed M&E plan and system through a consultative process. These will

specify responsibilities and (to ensure consistency over time) measurement methodologies, as well as procedures for analysing and reporting on M&E results.

294. As shown in Section II. 9 (Monitoring and Evaluation), the SMART indicators defined for the purposes of internal results-based adaptive management of the project itself, as set out in the results framework (Annex A1) are harmonized with, and will feed into, indicators at programmatic levels, including GEF-7 Core Indicators (see Annex F), Sustainable Development Goals and LDN indicators: progress in relation to these will be reported to the FOLUR Global Knowledge to Action Project (GKAP) in order to permit programmatic monitoring and adaptive management of the IP. In addition, results framework indicators 31 (Output 4.1.3) will measure the level of insertion of the project to the FOLUR IP as a whole, and as such will support the monitoring of the effectiveness of the GKAP in relation to IP-wide coordination and knowledge support to participating projects, and its corresponding adaptive management.

295. Mechanisms will be incorporated into the project management structure for ensuring that M&E results are used to guide adaptive results-based management (RBM). Adaptive RBM will be applied on a continuous basis through the project implementation period based on continuous feedback from the project implementation team and stakeholders (facilitated through the project's stakeholder participation mechanisms), as well as periodic measurements of project indicators in accordance with the programme set out in the M&E plan; the annual meetings of the Project Steering Committee, annual reporting of progress to GEF through Project Implementation Reviews (PIRs), and the external mid-term review (MTR) in particular, will provide more substantive opportunities for results-based management adaptation.

296. This will result in the co-formulation of an RBM plan to which participating Government agencies will be fully "bought in", including provisions for corresponding capacity development and the proposal of an exit strategy allowing the framework to be taken on by relevant Government institutions in accordance with their needs and interests.

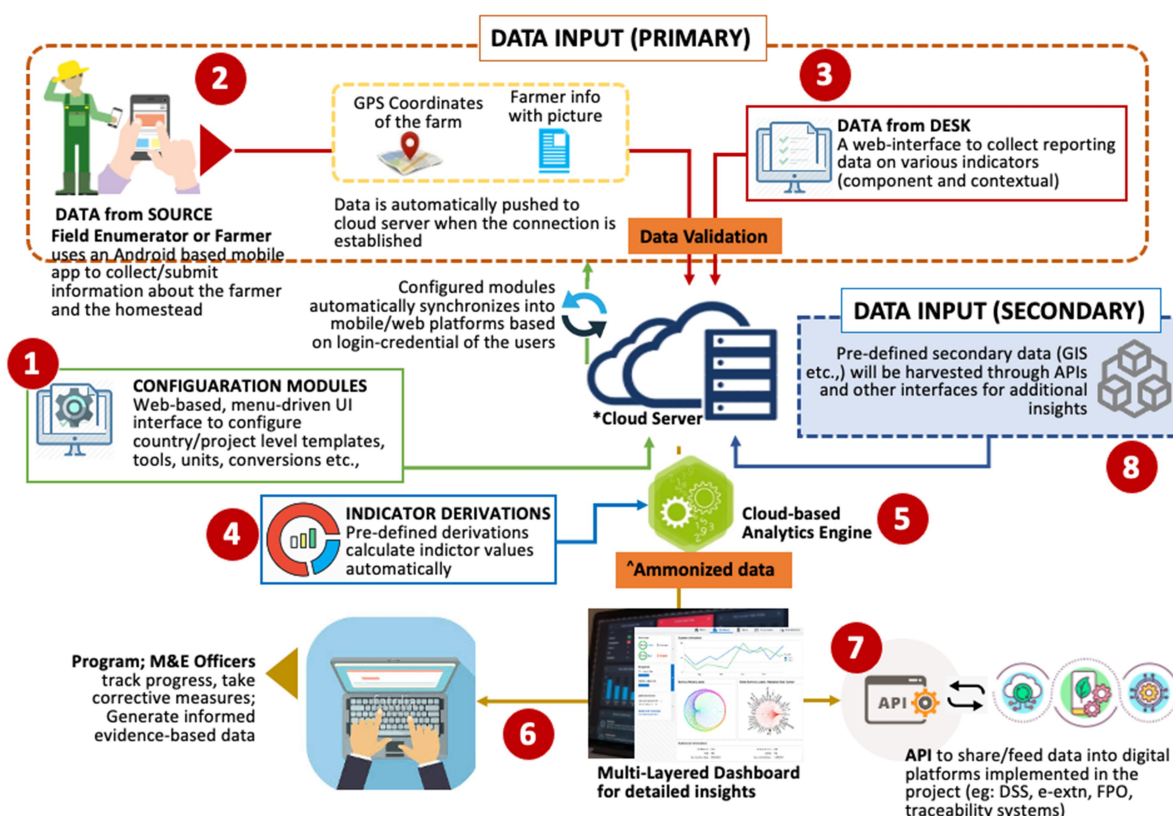
297. Executing the RBM framework will require quality monitoring data and analyses in real-time. The project Management Information System (MIS) will be designed in detail during the first year of the project. The MIS will use mobile- and web- based platforms along with geo-reference-based data and provide actionable insights for course correction and implementation, and is able to: (i) through pre-defined templates, enable the collection of geo-tagged data of the communities, producers, farmers, farmland, value-chain actors, interventions, and capacity building activities in real-time from the source of the data; (ii) enable the collection and aggregation of periodic reports, updates, and information from implementing partners, government and research institutions, NGOs, actors and other stakeholders; (iii) harvest M&E related information from different secondary sources; (iv) track the indicators and progress in project implementation; (v) provide spatial distribution of the project intervention sites and its adoption; and (vi) provide a web-based, multi-layered dashboard to visualize the reported data both spatially and temporally.

298. One of the options to be considered to this end will be to adapt, customize and implement a digital M&E system that has been developed in partnership with ICRISAT¹³⁹ for agriculture research for development projects. Options for deployment of such a system would aim to maximize the potential to address the M&E needs of the project and allow for integration with existing GoI agriculture monitoring and reporting systems and data management protocols.

299. The project M&E team would be capacitated to create and configure the templates, user roles, access, and dashboards; the reporting templates would be designed and digitized into the platform following extensive consultation with the project teams; and the reported data would be visualized in an insightful and interactive dashboard along with suitable derivations for the indicators in the different frameworks.

¹³⁹ The International Crops Research Centre for the Semi-Arid Tropics, a CGIAR centre.

Figure 43. Schema of the project-level configurable architecture for the M&E/RBM platform as proposed by ICRISAT



* Server identified & hosted by GOI. Options for on-premise hosting could be considered as required

^ Critical data concerning the privacy of stakeholders will be anonymized as per program design

300. In addition to supporting the RBM of the project, opportunities will be explored during project implementation for linkages between the MIS and other digital systems of the project including the DSS, e-extension and FPO management platforms. The digital M&E system will serve as an entry point for the project-related beneficiary and infrastructure data. Such linkages may take the form of flows of information on methodological approaches and tools for digital information management, as well as the direct flow of data.

4) Alignment with GEF focal area and/or Impact Program strategies

301. In accordance with GEF expectations under the FOLUR Impact Programme, the project will lead to systemic transformational change in the functioning of the globally important rice/wheat-based food system, in which India is a leading global actor. As described in Section II 1a above, this transformation will be towards a model of **sustainable integrated food systems** that will permit durable reductions in environmental impacts, accompanied by enhancements of farmers' incomes and resilience, and will be characterised by the **diversified, resilient and economically viable production of healthy food**, and the embedding of food production in **resilient and socially-sustainable farming and livelihood systems**, and **sustainably managed landscapes**.

302. As shown in the Theory of Change, the transformational, systemic change sought under the FOLUR IP will be achieved in a step-wise fashion, by:

1. **Generating and demonstrating sustainable models** of food production and landscape management as the basis for sustainable food systems and the generation of GEBs (Causal Pathway 2/Components 2 and 3);
2. **Managing knowledge** (Causal Pathway 3/Component 4), including the results of the models demonstrated at field level, and feeding it to decision- and policy-makers at State level and beyond to raise their awareness and knowledge of the existence of practically feasible options for food system sustainability;
3. **Support to informed and dialogue-based review** of food system frameworks in target States, and co-formulation of adjustments towards integrated models (Component 1/Causal Pathway 1): these evidence-based processes will feature real and full engagement of decision- and policy-makers at State level, so that the resulting agreements on integrated conceptual models for food systems will be fully owned by them and mainstreamed into policy thinking and discourse, leading to their eventual durable institutionalisation in policy instruments.

303. Support by the project to sustainable production systems and associated value chains will contribute directly to IP Objective 1 (*Promoting sustainable food systems to meet growing global demand*). Working with the major baseline investments of the Government, it will support the Government by demonstrating how to integrate and reconcile, in effective and socially and environmentally sustainable ways, its policy objectives focused respectively on increasing agricultural production and incomes, social protection, nutrition, crop diversification, rationalisation of the geographical configuration of crop production, and environmental sustainability.

304. "Food systems" in the context of the project will be understood in its broadest sense (as explained in the Theory of Change narrative) to encompass input supply systems, production systems and associated landscapes, and output (value) chains reaching all the way through to the consumer. Also in line with FOLUR IP expectations, the project will feature strong private sector engagement in all of these food system components, including the supply of the materials, consumables, machinery, information and finance needed for sustainable production; technical/extension support for sustainable production; and the creation of favourable (output) value chain conditions that provide farmers with market-based incentives for undertaking sustainable production.

305. Also in line with IP logic, support to sustainable agricultural production and value chains will be complemented and integrated with investments in promoting restoration of degraded landscapes, for sustainable production and to maintain ecosystem services (IP Objective 3). The multi-level landscape planning approach will permit the identification of areas for restoration and of appropriate species and management regimes, including diversification, taking into account the potential roles of restored ecosystems in relation to landscape-wide ecosystem functions, as well as the needs and knowledge of local communities.

306. The project will develop capacities and incentives for food system sustainability and resilience both in the degraded rice-wheat landscapes of Punjab and Haryana and in the "frontier" landscapes of Chhattisgarh and Odisha, that are at risk of degradation. Project will support an enabling environment for increased private sector participation in adoption of sustainable practices.

307. The project is also in accordance with GEF-7 focal area objectives, as shown in Table 11:

Table 11. Alignment of project elements with focal area objectives

Focal area objectives	Project elements/approaches
Biodiversity: <i>BDI-1, Mainstream biodiversity across sectors as well as landscapes and seascapes through biodiversity mainstreaming in priority sectors</i>	• Support to farm and landscape planning to ensure that land and resource use is appropriately situated to maximize production without undermining or degrading biodiversity; • Improving and changing production practices to be more biodiversity-positive (with a primary focus on the agriculture sector), through technical capacity building and implementation of market and financial mechanisms that incentivize actors to change current practices that may be degrading biodiversity; and • Supporting policy and regulatory frameworks that remove perverse subsidies and provide incentives for biodiversity-positive use of land and resources.
Climate Change: <i>CCM-2-6, Demonstrate mitigation options with systemic impacts for food systems, land use and restoration impact programme</i>	• The promotion of synergies between CCM and the simultaneous delivery of other global environmental benefits (biodiversity and sustainable land management) through integrated management of landscapes and farming systems, supported by information management and decision-support systems to address trade-offs.
Land Degradation: <i>LD-1-1, Maintain or improve flow of agro-ecosystem services to sustain food production and livelihoods through Sustainable Land Management (SLM)</i>	• The promotion of diversified agro-ecological food production systems to improve productivity and maintain or improve flow of services that underpin food production and livelihoods; innovative approaches to support the efficient use of land, soil, water, and vegetation in crop production systems; and private sector involvement, to link smallholder producers to markets, introduce sustainable supply chains, and create stable revenues based on sustainable management and production. • Integrated landscape management and restoration, transcending political and administrative boundaries (while respecting and promoting jurisdictional frameworks and responsibilities for action), aimed at maximizing the delivery of multiple benefits in the context of food security and livelihoods.

5) Incremental cost reasoning and expected contributions from the baseline, the GEFTF, and co-financing

Examples of key baseline investments	Baseline scenario and potential implications, without GEF investment	Increment: key areas of value-added resulting from GEF investment	Key areas of contribution from co-financing
- RKVY targets 4% annual growth in the agriculture sector, and doubling of farmers’ incomes (2016-2023) - NFSM aims to increase the production of rice, wheat, pulses and coarse cereals - CDP supports crop diversification - BGREI supports shift of geographical focus of agricultural production to eastern India - TRFA promotes the production of pulses and oilseeds in rice fallow areas in eastern India - NMSA PKVY scheme promotes organic farming (e.g. organic villages, PGS certification) - ‘Promotion of Agricultural Mechanization for In-Situ Management of Crop Residue’ scheme provides financial assistance for options to address CRB.	Component 1: Integration of cross-sector sustainability provisions into food systems, and planning frameworks		
	Outcome 1.1: Multi-stakeholder consensus and collaboration on integrated food systems		- NITI Aayog (Policy Commission) (abbreviation for National Institution for Transforming India) together with the Planning Boards/Commissions of State Governments (Punjab, Haryana, Chhattisgarh, Odisha) will provide platforms for the dialogue to be supported by the project.
	- Strong sector-specific advances towards environmental sustainability in agriculture, farmer support and food security, - Ongoing progress in policy discussions (e.g. NITI Aayog) But: - Food systems addressed in a piecemeal manner - Limited integration and synergy among diverse policy goals, raising potential for unintended cross-sector consequences	- An integrated cross-sector vision for sustainable food systems is negotiated among multiple policy-level stakeholders, identifying priorities and actions for promoting inter-sector synergies and optimizing the contributions of multiple public and private actors. - Lastingly-improved trust and dialogue among policy actors from different sectors, in recognition of the potential for synergies	
	Outcome 1.2: Key policy and decision makers are effectively applying decision-support tools in relation to integrated land management and sustainable food systems		
	- Strong technical knowledge base But: - Potential for policies and plans for be formulated based on narrow sector-specific visions, failing to reflect landscape and market conditions or to take advantage of knowledge on best practices	- Multi-level access to science-based, objective decision support on integrated food system planning and landscape management, reflecting evolving needs and conditions, and global/national/local best practice	
	Component 2: Enhance capacities for promoting and investing in sustainable and climate-smart food production practices and responsibly sourced commodity value chains		
	Outcome 2.1: Farmers with capacities and support to develop and apply sustainable farming practices		- CDP, BGREI, TRFA will provide opportunities for the mainstreaming and scaling out of options for sustainable agriculture and crop diversification in the target states
	- Strong continued public and private sector investments in support of agricultural productivity, sustainable agriculture and farmer incomes But:	- Increased and durable capacities among farmers to develop and apply sustainable farming options that combine improvements in productivity, sustainability and incomes at farm level - Sustainable farming options are reliably	

PART II 1a. Project Description, 5) Incremental cost reasoning

Examples of key baseline investments	Baseline scenario and potential implications, without GEF investment	Increment: key areas of value-added resulting from GEF investment	Key areas of contribution from co-financing
- Van Dhan Yojana (Forest Wealth Plan) scheme strengthens livelihoods based on non-specified/non-monopolized NTFPs - Chhattisgarh NGGB scheme promotes sustainable and closed farming systems - Chhattisgarh Inclusive Rural and Accelerated Agriculture Growth Project (WB) enhances and diversifies income sources in tribal areas; - Odisha Integrated Irrigation Project For Climate Resilient Agriculture (WB) intensifies and diversifies agricultural production, enhance climate resilience and improves water productivity in selected areas.	- Potential for improvements in productivity, crop diversification, and irrigation efficiency, to have unintended net negative consequences for sustainability if inappropriately applied - Limited development, and farmer awareness, of options for combining productivity, sustainability and income objectives at farm level	- supported by required technical, material and financial inputs - Production systems are integrated into sustainable and resilient farming, livelihood and landscape systems	- NMSA (especially the PKVY scheme), the ‘Promotion of Agricultural Mechanization for In-Situ Management of Crop Residue’ scheme, and State level schemes such as the Chhattisgarh NGGB, will directly complement the project by co-financing sustainable agriulture including organic farming and crop residue management.
	Outcome 2.2: Green value chains support environmentally-sustainable, healthy and pro-poor farming through collaboration between public and private sectors		
	- Growing demand for diverse, sustainably-produced and healthy food - Growing private sector interest in sustainable sourcing But: - Food system sustainability still remains a relatively marginal, niche issue at the retail/consumption end - Piecemeal public/private initiatives on green value chain development - Limited value chain integration means farmers and purchasers/retailers do not full take advantage of mutually-beneficial value chain opportunities	- Public/private coordination and harmonization of the development of, and provision of support to, green value chains - Increased availability, and access by farmers to, green value chain opportunities with potential to generate improved income and environmental benefits - Improved functioning of green value chains in delivering mutual benefits to farmers and demand-side actors, and in leveraging environmental benefits - Sustainable sourcing and farmer support are increasingly mainstreamed into the business models of private sector value chain actors	
	Component 3: Enabling landscape restoration and management to sustain food systems and deliver GEBs		
	Outcome 3.1: Capacities, support mechanisms, governance and management frameworks established for landscape restoration and conservation in target districts		- Ecosystem restoration and management optimize environmental benefits and ecosystem services in support of sustainable food systems, within a framework of integrated landscape management planning - Sustainable livelihood/NTFP initiatives options contribute effectively to natural resource governance, social and environmental sustainability and to
	- Ecosystem restoration and management may have limited effectiveness due to inadequate reflection of landscape/ecosystem conditions and dynamics		
			- Van Dhan Yojana (Forest Wealth Plan) scheme will complement the project by strengthening livelihoods based on non-specified/non-monopolized NTFPs - The Chhattisgarh Inclusive Rural and Accelerated Agriculture Growth Project will contribute to the enhancement

PART II 1a. Project Description, 5) Incremental cost reasoning

Examples of key baseline investments	Baseline scenario and potential implications, without GEF investment	Increment: key areas of value-added resulting from GEF investment	Key areas of contribution from co-financing
		addressing pressures on landscape elements	and diversification of income sources in tribal areas
	Component 4: Knowledge management to guide policies and maximize impacts		
	<i>Outcome 4.1: Effective knowledge management, dissemination and coordination</i>		
	- Major resources of knowledge and experience exist on options for food system and landscape management But: - Knowledge is managed in a piecemeal manner and not effectively channelled to policy- and decision-makers	- Knowledge is managed, shared and applied so as to optimize planning and decision-making in favour of the delivery of combined environmental and social benefits - The project contributes to knowledge resources at national, regional and global levels related to sustainable food systems and integrated landscape management - The project is supported by knowledge inputs from national, regional and global sources	
	<i>Outcome 4.2: Project implementation is based on RBM</i>		
	N/A	N/A	

6) Global Environmental Benefits

Land degradation:

308. The project will reduce land degradation processes in the target landscapes both by improving production and management practices in agricultural areas, and by conserving and restoring ecosystem remnants of importance for the provision of ecosystem services on which production systems depend.

309. The project will reduce land degradation in production systems by promoting farming options (please see also Box 28 under Output 2.1, and Supplementary Annex 5.2) that:

- Reduce overall groundwater depletion at basin level, through the application of water-efficient irrigation subject to basin-level frameworks of water accounting and governance. Options for water management include 1) Sprinkler and Drip Irrigation; 2) Underground Pipeline (UGPL) System for Groundwater and Canal Water Conveyance and Distribution; 3) Use of Climatic Sensors and Tensiometers; 4) Laser land levelling; 5) Rejuvenation and Retrofitting of Village Ponds and 6) Multiple Water Use Systems (MUS) for medium to High Rainfall Areas (C&O).
- Reduce the use of pesticides and fertilizers, and associated soil degradation, such as agroecological and organic farming and the use of integrated pest management and integrated nutrient management practices. Options include Zero-Budget Natural Farming; Women-led climate resilient farming model (WCRF); traditional sustainable tribal agriculture practices; conservation, preservation and promotion of landraces; and agri-horti-forestry.
- Reduce the loss of soil carbon and nutrients, through the promotion of zero/reduced tillage practices and mulching, the provision of alternatives to crop residue burning, and use of organic fertilizers and the promotion of agroforestry systems including nitrogen-fixing leguminous species.
- Reduce soil erosion (related to rainfall impact and runoff) through soil conservation, mulching and agroforestry measures focused in particular in maintaining soil cover.

310. Increased adoption of these sustainable farming practices (Outcome 2.1) will be achieved through the strengthening of institutional capacities for providing technical, organisational and input support (through Farmer Field Schools and enhanced extension systems) (Output 2.1.1), and the establishment and/or strengthening of mechanisms for the provision of inputs (consumables and equipment) needed for sustainable production (Output 2.1.2).

311. In Punjab and Haryana, wetlands play a crucial role in groundwater recharge, as do the upland forests of Chhattisgarh and Odisha, which also contribute to the stabilisation of runoff regimes and the protection of upper watershed areas against erosion, thereby underpinning the stable water flows required for irrigated lowland agriculture. The project will contribute to the conservation and restoration of such ecosystem remnants, and thereby to the maintenance of ecosystem services, by

- Direct investment and enhancement of community capacities for restoration (Output 3.2.1);
- Supporting sustainable forest-related livelihood options for local communities, to ensure that forest management is put on a sustainable footing and does not cause ecosystem degradation (Output 3.2.2);
- Supporting landscape planning and governance in order to help address the landscape-level threats affecting these remnants (Output 3.1.1, 3.1.2, 3.1.3).

Biodiversity:

312. Under Outcome 3.2, the project will deliver biodiversity benefits by supporting the conservation and restoration of areas of particular importance for biodiversity within the landscapes of the target districts, including (but not limited to) declared protected areas (see Supplementary Annex 2.1). This

will have the dual objectives of delivering biodiversity benefits and, as explained above, safeguarding and restoring flows of ecosystem services.

313. In Punjab and Haryana, these biodiversity priority areas include:

- Patches of forest (*birs*) of differing sizes and habitat quality;
- Water bodies of different size and periodicity;
- Rivers and streams of different types and drainage orders

314. As explained in Section I, despite their high level of anthropic intervention, the agricultural landscapes and wetlands of the Indo-Gangetic Plain are home to a high diversity of avifauna, comprising at least 189 species (including 47 resident migrants, 30 migrants and 10 IUCN Red List species) as found in a 2015 study in Punjab¹⁴⁰.

315. A related study found that zero till wheat and direct seeded paddy (which are practices to be promoted through the project) attract more bird species than intensively cultivated paddy: in zero till (one of the option to promoted under Output 2.1.1), farming stubbles and chaff from the previous crop remain undisturbed on soil surface, and undisturbed soil provides spilled grains, weed seeds, insects and small mammals for birds to feed on¹⁴¹.

316. In Chhattisgarh and Odisha, the potential for delivering biodiversity benefits is even greater, given the higher level of extant forest cover there and also the large numbers of trees outside forests. As also explained in Section I, the Central Indian Highland landscape (with which the target states coincide) contain critical habitats of globally threatened wildlife, including the Bengal tiger, Asian elephant, wild dog and sloth bear, as well as high priority elephant corridors connecting designated wildlife reserves and other protected areas. This landscape supports about 30% of the total tiger population in India and has been identified as a Global Priority Landscape for tiger conservation.

317. Biodiversity benefits will be generated in these landscapes through the project's interventions in conserving and restoring these ecosystem remnants, under Outcome 3.2: this will also constitute a cornerstone of the project's approach, focused on addressing the close interdependence between sustainable food systems and landscape management, given that these areas are also of major importance for the generation of ecosystem services on which the target production systems depend.

318. The project will also generate benefits for globally important agricultural biodiversity (ABD). Chhattisgarh and Odisha form part of a Vavilov Centre of Origin and Diversity of Rice, and coincide with 2 of the country's 22 ABD hotspots (Bastar and Koraput regions); Chhattisgarh is home to an estimated 23,000 native varieties of rice; and Jeypore tract in South Odisha has been identified as a putative secondary centre of origin of cultivated rice. Punjab also used to support rich crop varietal diversity, including 41 varieties of wheat, 37 of rice, 4 of maize, 3 of bajra, 16 of sugarcane, 19 of pulses, 9 of oil seeds and 10 varieties of cotton; and many of the "weed species" commonly found in cultivated land in Punjab have important use values (see Section II).

319. The project will contribute to the status of globally important ABD by supporting diverse agroecological farming systems (see Box 28 and Supplementary Annex 5.2 for details of technical options) and (under Output 2.1.1) through participatory "bottom-up" farmer field schools, working with farmers to review, value, adapt as needed, and apply their traditional knowledge including that related to traditional crop varieties. The inclusion of such varieties has the potential to increase farmers' resilience to climate stresses, and the project will also work with value chain actors to identify and develop markets for these varieties that provide them with economic benefits.

Climate change mitigation (CCM)

¹⁴⁰ Kaur, S., Kler, T. K. and Javed, M. 2018. Abundance and diversity of water bird assemblages in relation to village ponds in Punjab. *J. Entom. Zoology Stud.*, 6: 1375-1380.

¹⁴¹ Kaur, J., Kler, T.K., Kang, J.S. and Kumar, M. 2017. Impact of zero tillage agriculture on the avian fauna in Ludhiana, Punjab. *J. Env. Biol.* 38:689-695.
https://www.researchgate.net/publication/318082648_Impact_of_zero_tillage_agriculture_on_the_avian_fauna_in_Ludhiana_Punjab

320. The project will deliver CCM benefits in the following ways (please see Box 28 and Supplementary Annex 5.2 for details of technical options for farm management, to be promoted under Output 2.1.1):

- **Promoting resource conservation technologies (RCTs)**, such as the system for rice intensification (SRI), direct-seeded rice (DSR) and zero-till wheat (ZTW). These have lower global warming potential (GWP) than conventional practices (Table 12)

Table 12. Global Warming Potential (GWP) of conventional vs. resource conservation technologies in rice-wheat cultivation systems.

Practice	GWP (kg CO ₂ eq./ha)
Conventional Rice-Wheat Cultivation Systems (RWCS)	10,308 (±479) - 10,828 (±835)
Conventional farmers transplanting rice (CFTPR)	8,425 (±569)
Direct-seeded rice (DSR)	5,065 (±233)
Conventional till wheat (CTW)	2,180 (±112)
Zero-till wheat (ZTW)	2,062 (±92)

- **Promoting water management practices in rice production that reduce overall GWP.** Alternate wetting and drying has been calculated to reduce methane (CH₄) emissions by 48% compared to continuous flooding of rice fields, while a single aeration of the field (midseason drainage), reduces CH₄ emissions by 40%. Several studies have reported a mitigation potential of AWD that ranges from 48 to 93%. AWD may increase higher emissions of nitrous oxide (N₂O), but in most cases this trade-off does not eliminate the overall reduction in GWP associated with AWD. Some studies have suggested that the incremental N₂O emission through AWD is insignificant so long as the N fertilization remains within a reasonable range.
- **Reducing crop residue burning (CRB):** CRB generates GHG gases in the form of CO₂, N₂O, and CH₄, as well as air pollutants (CO, NH₃, NO_x, SO₂, NMHC and volatile organic compounds), particulate matter and smoke.
- **Increasing on-farm carbon sequestration** in soil organic matter and vegetation, in agroforestry systems and through the use of organic rather than chemical fertilisers;
- **Reducing forest degradation**, which will be achieved by i) increasing the sustainability of agriculture to reduce encroachment (through activities under Outcome 2.1); ii) supporting sustainable, non-degrading, forms of forest use, such as sustainable harvesting of NTFPs (see Output 3.2.2) and iii) improving NRM governance at community level (see Output 3.1.1).

7) *Innovativeness, potential for scaling, sustainability and capacity development*

Innovativeness

321. The project will reflect the overall innovative nature of the FOLUR IP as a whole, by moving beyond conventional “mainstreaming” approaches focused on individual crops, farming systems of ecosystems, to address the intersections between markets/value chains, food systems, livelihood systems, farming systems and landscapes in an integrated and balanced manner, addressing tradeoffs among diverse global, national and local priorities. This will also be specifically innovative for India, where issues of environmental sustainability, agricultural productivity and farmer welfare, and food security, are typically managed in separate thematic and sector-based “silos”.

322. Further innovative aspects of the project include the following:

- The establishment of a **Green Value Chain Development Cell** (Output 2.2.1, see Supplementary Annex 9 for more detail), which will act as a platform and resource centre for private sector players, FPOs, State level Federations of FPOs, and other willing value chain players, to design and participate in Public Private Partnerships (PPPs) targeted at addressing value chain gaps on a collaboration or a turnkey basis. Potential areas of attention of the GVCDC may include the creation of market-led extension models; the promotion (including jointly-funded pilots) of production systems based on sustainability standards; reinforcing the knowledge base of agribusinesses; human resource development; increasing and enhancing investments in agribusinesses; strengthening FPOs, and commissioning needs-based value chain and market studies. This approach would enable larger coverage of the Government schemes and increased benefits for farmers.
- Its inclusion of **multi-level decision-support systems** (Outputs 1.2.1 and 1.2.2) goes beyond the typical “project model” and focuses on enhancing the capacities of stakeholders, ranging from farmer through to policy makers, to innovate and adapt to evolving circumstances both during and beyond the project. The systems proposed under Outputs 1.2.1 and 1.2.2 respectively combine a range of multi-variable information technology solutions, including farmer-friendly mobile-based tools, together with economic valuation and scenario analysis tools that will allow trade-offs between the interests of multiple stakeholders to be analysed in a balanced, objective and transparent manner.
- Its specific attention to **Nature-Based Solutions** (NBS) and in particular its structured approach to the definition of opportunities for NBS to play an effective role in relation to identified needs (see Supplementary Annex 5.2).
- Its **linkages to regional and global dynamics and opportunities**, resulting from its inclusion in the FOLUR Impact Programme, in particular its links to the Sustainable Rice Platform, and its inclusion in the Sustainable Rice Landscapes Initiative (SRLI), which will in particular have the potential to catalyse systemic transformation (see Box 35). Table 13 shows the scale of the reach of the SRLI throughout the region, and therefore the extent of its potential impact as a regional catalyst for identifying and channelling resources and opportunities, and for managing and exchanging knowledge.

Box 35. The potential for transformation and scaling out through the SRLI

The Sustainable Rice Landscapes Initiative (SRLI) is a partnership of FAO, SRP, the WBCSD (World Business Council for Sustainable Development), GIZ, IRRI and UN Environment. Launched in 2018, during the 6th GEF Assembly meeting in Danang, Viet Nam, the SRLI has created a unique consortium of public, private and civil society partners, bringing together technological, ecological, policy and market-led approaches to the challenges of rice sustainability.

The main objective of the SRLI partners in this initiative is to harness multiple opportunities to meet the growing global demand for sustainable rice and associated benefits, using a public-private partnership approach towards achieving the UN Sustainable Development Goals (SDGs).

Insertion of the project in the regional framework offered by the SRLI will significantly increase its potential to contribute to achieving transformative impact both nationally and regionally, for

example as follows:

- The establishment of an action group with SRLI and other partners will facilitate engagement with finance providers regarding the development of blended finance products with potential for application across the region, linked to the provision of technical assistance on sustainable rice production.
- Links to the SRLI will increase access by producers in the target area to regional and global value chains, including “green” value chains that reward environmental sustainability: inter-country collaboration will also allow countries to achieve a critical mass of influence on markets.
- SRLI members have the potential to act as catalysts and conduits for knowledge management spanning the region on the integrated management of rice-based landscapes, allowing to lessons learned through this project and others in the region to be communicated widely and effectively and thereby to guide good practice.
- Regional coordination on M&E, for example through the SRLI, will allow the impacts of the GEF-7 FOLUR IP to be monitored at sub-programmatic (regional) level, thereby allowing synergies among FOLUR/SRLI countries in South and Southeast Asia to be captured and collaborative responses to be agreed among participating countries.

Table 13. GEF-7 Rice oriented FOLUR and LDCF projects under development

Country	Funding Source	Project Name	IA	GEF grant (\$)	Indicative co-finance (\$)
Vietnam	FOLUR	Food System, Land Use and Restoration Impact Program in Vietnam	FAO	5,354,587	83,000,000
China	FOLUR	Innovative transformation of China’s food production systems and agroecological landscapes	FAO/ World Bank	7,179,450	155,000,000
India	FOLUR	Promotion of Sustainable Food Systems through Transforming Rice-Wheat Systems in Punjab, Haryana, Odisha and Chhattisgarh	FAO	20,366,973	230,900,000
Thailand	FOLUR	Inclusive Sustainable Rice Landscapes in Thailand	UNEP	5,535,963	87,000,000
Indonesia	FOLUR	Strengthening sustainability in commodity and food systems, land restoration and land use governance through integrated landscape management for multiple benefits in Indonesia	JNDP/ FAO	16,163,762	147,471,429
Cambodia	LDCF	Promoting Climate-Resilient Livelihoods in Rice-Based Communities in the Tonle Sap Region	FAO	8,932,420	62,263,553
Myanmar	LDCF	RICE-Adapt: Promoting Climate-Resilient Livelihoods in Rice-Farming Communities in the lower Ayeyarwady and Sittaung River Basins	FAO	8,932,420	40,000,000
Totals				72,465,575	805,634,982

Potential for scaling

323. The project model combining sustainable food systems and integrated landscape management in rice- and wheat-dominated landscapes has massive potential for scaling both within India in elsewhere in Asia. Scaling up and out are core elements of the project's theory of change (ToC).

- Causal Pathway 2 (CP2) of the ToC is focused specifically on generating and demonstrating models of food production and landscape management that are both sustainable and *scaleable*: the scaling out of these models will occur progressively (both during and after the project) from the target farms and blocks across the target districts and thence across the target States and eventually to other States with similar conditions and opportunities. Of central importance to this scaling effect will be the combination of the generation of the models themselves at field level under CP2 with the actions under CP3 aimed at managing knowledge, which will serve to communicate knowledge on the models to the target audiences and areas for scaling.
- Causal Pathway 1 of the ToC focuses on scaling up and deep, so that the concepts of sustainable food systems and integrated landscape management, backed up by the knowledge generated at field level under CP2, are mainstreamed into the core thinking of policy- and decision-makers; they are provided with the platforms and inter-sector relations to enable them to discuss, develop and fully "own" the concepts; and they have tools to enable them to put the concepts into practice and adapt them as needed.

324. The principal potential geographical areas for scaling out within India include other leading rice- and wheat- producing states. The Indo-Gangetic plain is therefore one of the most important areas for scaling, as it includes other major rice-producing States such as West Bengal and Uttar Pradesh (which is also one of the most important wheat producing states); Madhya Pradesh is another of the leading wheat producing States, and also coincides with the central tribal belt and so has the potential for scaling out of the models for working with tribal peoples that will be developed in Chhattisgarh and Odisha.

325. The potential of the project to contribute to scaling out of rice landscape management options elsewhere in Asia, through the SRLI, is explained in Box 35. There is also major potential for scaling out of options for the rice-wheat system, as a whole, elsewhere in Asia, particularly in China.

Sustainability (durability) of impacts

326. In line with GEF STAP recommended guidance on scaling out, up and deep¹⁴², the project is designed to generate models combined with system-wide capacity development that can be upscaled and amplified to increase impact.

327. Key elements of project design that will maximize the durability and scale of impacts will be as follows:

- The project will be nationally executed, with the core structure of the Project Management Unit at national, State and District levels fully made up of the Government institutions. In accordance with Government and GEF policies, this will serve to maximise national ownership, and therefore the long-term durability, of the landscape management model to be promoted through the project.
- The project will further promote buy-in by local stakeholders, resulting in effective outreach, scaling out and sustainability, through the close involvement of established governance structures including *gram panchayats*, as well as through the District level Technical Support Groups that are also being implemented in the Green Ag project.
- The central basis for the exit strategy of the project is that, during the life of the project and beyond, the institutions responsible for the execution of the project will continue to exercise

¹⁴² See https://mcconnellfoundation.ca/wp-content/uploads/2017/08/ScalingOut_Nov27A_AV_BrandedBleed.pdf

their designated functions in support of the management of landscapes and food systems: these functions will be complemented by GEF support, which will be applied in a highly targeted manner to enhance their capacities to deliver and sustain the proposed model, drawing where needed on external capacities for the injection of technical and conceptual value-added. Support under Component 1 will help to ensure that the mainstreaming of ILM approaches is underpinned by policy, regulatory and financial commitments necessary to ensure long-term sustainability

- The project will be innovative in involving both public and private sector actors as key players essential for the delivery of durability and scale of impact. Under overall Government leadership, and in complement to Government initiatives, the private sector will play vital roles in sustaining the food system and landscape management model, including through the provision of reliable and favourable markets for sustainably-sourced produce, and of technical and financial support to farmers. GEF incremental support in complement to this will focus, for example, on advising on and facilitating the definition of specific sustainable technical options for inclusion into private sector sustainability criteria and extension systems: the uptake of these inputs by the private sector across their operations will constitute a major opportunity for leveraging scaling out of impacts.
- Social sustainability, and consequently the durability of the uptake and impacts of the proposed management models, will be promoted through the application of a gender-sensitive sustainable livelihoods approach, with a focus on integrating sustainably managed rice, wheat and “diversification” alternatives into diverse farm economies and farming systems that will allow farm families to satisfy their multiple livelihood needs (including nutritious food and cash income) in a sustainable, gender-sensitive, resilient and low-risk way. The definition of such socially-sustainable options will be supported through the application of the Farmer Field School model, which emphasized participatory problem analysis and farmer-based experimentation and technology validation. Gender analysis will be used as a basis for identifying the different roles, needs and barriers that women and men have to design curricula and initiatives that promote equal participation and engagement of women and men farmers.
- The proposed modifications to landscape management and production systems will be sustained by linking them to “green” value chains, which reward sustainable management either through easier and more reliable access to markets, or through price premia; and through the formulation and application of economic incentives to reward the delivery of public goods.

At the same time, instead of “locking farmers in” to specific value chains, production options and management models, in a static manner, the project will recognise that the viability of most such models is likely to be affected by the implications of climate change. While not specifically designated as an adaptation initiative, the project will therefore place a strong emphasis on enhancing the capacities of national, District and State-level institutions, and of farmers, to continuously innovate in order to adapt to evolving conditions.

System-Wide Capacity Development

297. This is primarily a capacity enhancement project that will incorporate a system-wide capacity enhancement approach to maximize country ownership, sustainability and scale of intended results¹⁴³. Its interventions are rooted in an inclusive and participatory analysis of country strengths, needs and priorities specifically designed to enable people, strengthen organizations, institutions and networks as well as enhancing the enabling policy environment interdependently across national and subnational levels to support the transformation transition towards a more regenerative and resilient food system. Fully aligned with the FOLUR global program’s approach, the project will build upon the existing

¹⁴³ See “System-wide capacity development for country-driven transformations“, page 38 in “Feeding People Protecting the Planet – FAO-GEF Partners in Action <http://www.fao.org/3/CA0130EN/ca0130en.pdf>

PART II 1a. Project Description, 7) Innovativeness, potential for scaling, sustainability and capacity development

policy and institutional frameworks as described in Section II 1a. 2 as well the catalysing and deepening the initial capacity enhancement strategy in Supplementary Annex 6.

298. The project integrates a number of elements to ensure that this occurs. This includes effective learning programs under several of the project components designed to strengthen the capacities required to achieve the desired food systems transformation. All envisioned training activities will apply effective learning practices including pre-event learning needs assessments, post-event follow-up support to facilitate the transfer of knowledge into practice as well as institutionalization of curricula through partnering with and enhancing the capacities of local universities and research centres. Efforts will also include organizational and institutional capacity strengthening efforts such as to strengthen multi-sectoral and multi-coordination and collaboration at all levels including landscape level. Taking a system-wide, country-driven approach, the project's capacity enhancement efforts will therefore result in a transformational and lasting change in the way India is able to address food system transformation. As noted, the project will complete a comprehensive sustainability/durability strategy prior to close. The sustainability/durability strategy will specify and document capacities enhanced and high-light any remaining capacity gaps that may inhibit sustainable results. Moreover, all capacity enhancement activities will be aligned with a harmonized approach across the GEF IP Programme including the capacity enhancement strategy of the global coordination project and individual child project strategies. Finally, the Project Management Unit (NPMU) will include a dedicated expert to follow the systemic capacity development components together with knowledge management and stakeholder engagement.

PART II 1a. Project Description, 8) Summary of changes in alignment with the project design with the original PIF

8) *Summary of changes in alignment with the project design with the original PIF*

328. There are no significant changes in project design relative to the original PIF.

2. Stakeholders.

Select what role civil society will play in the project:

- ☐ *Consulted only;*
☐ *Member of Advisory Body; contractor;*
☐ *Co-financier;*
☒ *Member of project steering committee or equivalent decision-making body;*
☐ *Executor or co-executor;*

Stakeholder Engagement

329. In line with GEF Policy on Stakeholder engagement and Implementation Guidelines, meaningful and continuous stakeholder engagement together with system-wide capacity enhancement approaches during the project design and implementation is key to maximize country ownership and contribute to more enduring results at scale. The project intends to strengthen polycentric, multi-stakeholder governance mechanisms within the identified landscapes building on integrated spatial planning and management to result in positive impacts within the productive landscapes and contribute to preserving the natural capital. The proposed stakeholder engagement plan is closely aligned with the overall social safeguards plans paying specific attention to ensure inclusion of key stakeholders and vulnerable groups. Moreover, the stakeholder engagement plan is closely aligned with the FOLUR global programmatic stakeholder engagement efforts including the dedicated global stakeholder engagement plan.

330. The NPMU will directly be responsible for implementing the stakeholder engagement as outlined in the Stakeholder Engagement Plan and Stakeholder Engagement Matrix (Annexes H3 and H4). It will also be responsible for monitoring and reporting on stakeholder engagement through the annual project implementation reports (PIRs). Relevant tasks will be incorporated into the Terms of Reference of the project staff. Budget for stakeholder engagement has been allocated through the meeting and travel budget lines.

331. In the annual PIRs, the NPMU will report on the following indicators:

- Number of government agencies, civil society organizations, private sector, vulnerable groups and other stakeholder groups that have been involved in the project implementation phase.
- Number of engagements (such as meetings, workshops, official communications) with stakeholders during the project implementation phase.
- Number of grievances received and responded to/resolved.

Stakeholder consultation

332. Despite the challenges posed by the COVID-19 pandemic, which severely restricted opportunities for travel for workshops and in person meetings, the PPG team was able to consult extensively with a wide range of project stakeholders, through a combination of workshops (which were largely held on line) and telephone calls, as well as face-to-face meetings. Given the limitations on travel by the New Delhi-based team to the target States, State-level PPG coordinators were contracted throughout the PPG phase, who were able to interact more directly with State-level stakeholders. A full list of consultations is presented in Annex H3: the principal consultation workshops held during the PPG are shown in Table 14.

Table 14. Institutional Stakeholder Consultation Workshops during Project Formulation

Event	Participants	Date
FOLUR Working Meeting held during the GEF Technical Mission	- GEF OFP: Ministry of Environment and Forests and Climate Change (MoEFCC) - Department of Agriculture, Cooperation and Farmers' welfare - International Rice Research Institute (IRRI) - International Water Management Institute (IWMI) - International Maize and Wheat Improvement Centre (CIMMYT) - World Business Council for Sustainable Development	20 - 22 August 2019

Event	Participants	Date
National PPG Inception Workshop	- Department of Agriculture, Cooperation and Farmers' welfare - Ministry of Environment and Forests and Climate Change - ICAR-National Bureau of Plant Genetic Resources - ICAR- Indian Agricultural Research Institute - ICAR-National Institute of Agricultural Economics and Policy Research (NIAP) - International Rice Research Institute (IRRI) - Directorate of Agriculture and Food Production, Department of Agriculture and Farmers' Empowerment, Government of Odisha - Directorate of Agriculture, Chhattisgarh Raipur, Department of Agricultural Development and Farmers Welfare and Biotechnology, Government of Chhattisgarh - Department of Agriculture & Farmer's Welfare, Haryana - Department of Agriculture & Farmer Welfare, Punjab - Punjab Agricultural University, Ludhiana - World Business Council for Sustainable Development	06-Mar-20
Orientation Meeting, Punjab	- Chief Agriculture Officers from Project Districts	06-Aug-20
Orientation Meeting, Odisha	- Chief District Agriculture Officers & Project Directors (Watersheds)	26-Aug-20
Orientation Meeting, Haryana	- Deputy Directors of Agriculture from Project Districts	27-Aug-20
Orientation Meeting, Chhattisgarh	- Officers of the Directorate of Agriculture and the Deputy Director Agriculture (DDA) from Project Districts	10-Nov-20
Odisha State Level Stakeholders Consultation	- Ministry of Agriculture and Farmers' Welfare - Department of Agriculture and Farmers' Empowerment, Odisha - Directorate Soil Conservation and Watershed Development Mission, Odisha - Scheduled Tribes and Scheduled Castes Development and Minorities and Backward Classes Welfare Department, Odisha - Department of Forest and Environment, Odisha - Department of Panchyati Raj and Drinking Water, Odisha - Directorate of Horticulture, Odisha - Odisha University of Agriculture and Technology - Directorate of Extension Education, Odisha - Institute on Management for Agriculture Extension - PRADAN - Foundation for Ecological Security (FES) - Indian Grameen Services (IGS) - Friends Association for Rural Reconstruction (FARR) - Centre for youth and Social Development (CYSD) - ICARDA-Food Legume Research - Nabakrushna Choudhury Centre for Development Studies - ICAR - Central Institute for Women in Agriculture (CIWA) - ICAR-National Rice Research Institute - Cuttack (Odisha) - NR Consultant Management India Pvt. Ltd - Keystone Foundation - International Water Management Institute (IWMI) - International Rice Research Institute (IRRI)	23-Mar-21

PART II 2. Stakeholders

Event	Participants	Date
	- Ecociate	
Odisha District Level Stakeholders Consultation	- Department of Agriculture and Farmers' Empowerment, Odisha - General Administration and Public Grievance Department, Odisha - Directorate Soil Conservation and Watershed Development Mission, Odisha - Scheduled Tribes and Scheduled Castes Development and Minorities and Backward Classes Welfare Department, Odisha - Department of Forest and Environment, Odisha - Department of Panchyati Raj and Drinking Water, Odisha - Directorate of Horticulture, Odisha - Krishi Vigyan Kendra (KVK), Directorate of Extension Education, OUAT - Watershed Organisation Trust (WOTR) - Keystone Foundation - International Water Management Institute (IWMI) - International Rice Research Institute (IRRI) - Ecociate	24-Mar-21
Haryana State Level Stakeholder Consultation	- Ministry of Agriculture and Farmers' Welfare - Ministry of Environment, Forest & Climate Change - Agriculture and Farmers Welfare Department, Government of Haryana - Animal Husbandry & Dairying Department, Haryana - Horticulture Department, Haryana - Irrigation & Water Resources Department (IWRD), Haryana - Chaudhary Charan Singh Haryana Agricultural University, Hisar - Haryana Seeds Development Corporation Limited - Haryana State Seed Certification Agency - Development & Panchayats Department, Haryana - Haryana State Co-Op. Supply & Marketing Fed. (HAFED) - Haryana Kisan Ayog - Haryana Agro Industries Corporation Limited - Central Soil Salinity Research Institute, Karnal - Central Ground Water Board, North Western Region (NWR), Chandigarh - State Agricultural Management and Extension Training Institute (HAMETI) - Centres for International Projects Trust - Sehgal Foundation, Haryana - Cogneesol Agtech Pvt Ltd - Fair Trade Forum India - Kheti Virasat Mission - Conserve, New Delhi - Northern Farmers - Vegetable Growers Association of India - International Maize and Wheat Improvement Centre - International Water Management Institute (IWMI) - International Rice Research Institute (IRRI)	15-April-21
Chhattisgarh State and District Level	- Ministry of Agriculture and Farmers' Welfare - Ministry of Environment, Forest & Climate Change	9-July-21

Event	Participants	Date
Stakeholder Consultation	- Department of Agriculture, Farmer's Welfare and Biotechnology, Government of Chhattisgarh - Horticulture Directorate, Government of Chhattisgarh - Mandi Board, Government of Chhattisgarh - International Water Management Institute (IWMI) - International Rice Research Institute (IRRI)	
Punjab State and District Level Stakeholder Consultation	- Ministry of Agriculture and Farmers' Welfare - Ministry of Environment, Forest & Climate Change - Department of Agriculture and Farmers Welfare, Punjab - Department of Horticulture, Punjab - Department of Forest, Punjab - Department of Water Resources, Punjab - Punjab Agricultural Management & Extension Training Institute (PAMETI) - Punjab Agri Export Corporation - Punjab Agricultural University, Ludhiana - Punjab Dairy Development Board - Centres for International Projects Trust - Ag Tech Private Ltd - Northern Farmers Mega FPO - Kheti Virasat Mission - International Water Management Institute (IWMI) - International Rice Research Institute (IRRI) - Milkfed	19-July-21
National Project Technical Committee Meeting	National Project Technical Committee Members: - Joint Secretary (Crops and Oilseeds), Department of Agriculture and Farmers' Welfare, Ministry of Agriculture and Farmers' Welfare (MoA&FW) - Additional Commissioner (Crops), MoA& FW - Ministry of Environment, Forest and Climate Change (MoEF&CC) - Indian Council of Agricultural Research (ICAR) - Central Ground Water Board (CGWB), Ministry of Jal Shakti - National Rice Research Institute (NRRI), Cuttack, Odisha - Indian Institute of Wheat and Barley Research (IIWBR-ICAR), Karnal	25-August-21
Odisha State Steering Committee Meeting	- Ministry of Agriculture and Farmers' Welfare - Department of Agriculture and Farmers' Empowerment, Odisha - Odisha University of Agriculture and Technology (OUAT), Bhubaneswar, Odisha - Directorate of Horticulture, Odisha - Directorate Soil Conservation and Watershed Development Mission, Odisha - Institute on Management of Agricultural Extension (IMAGE), Bhubaneswar, Odisha - State Biodiversity Board, Odisha - Odisha State Forest Department - Finance Department, Government of Odisha - Fisheries & Animal Resources Development Department,	29-October-2021

Event	Participants	Date
	Government of Odisha - Mission Shakti Department, Odisha	

333. The COVID-19 travel limitations posed a particular challenge for consultations with community-level stakeholders, including by the State-level PPG coordinators who face restrictions on travel outside of the State capitals. It was therefore necessary to rely to a large extent on secondary information, and on consultations with Government and civil society actors who have direct field-level experience and relations with the target populations.

334. Fuller consultations with target stakeholders will be carried out at inception, to allow the validation of the detail of the proposed strategies and activities of the project. Detailed proposals for the further engagement of social and institutional stakeholders are presented in Annex H4.1 and H4.2 respectively.

Indigenous peoples

335. A specific analysis of the situations of ethnic minorities (tribal peoples) in the project area is provided in Annex J. This analysis shows that the significant numbers of tribal peoples in the target states of Chhattisgarh and Odisha, who belong to a large number of different tribes, have very close relations with the forests and other natural resources with which the project will be working: at the same time, despite the provisions of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (Forest Rights Act or FRA for short), tribal peoples continue to suffer from a high level of social and economic marginalisation, and their traditional resource management systems are under threat especially from extractive industries and plantation development (see threats analysis in Section II 1a. 1).

336. Annex J2 indicates how the project will respond to these differentiated conditions. The results of the analyses presented in Annex J indicate that the project presents no risks to the interests of ethnic minorities that would make Free, Prior and Informed Consent (FPIC) processes necessary prior to project start. Annex J2 indicates how the proposed measures to optimize benefits for ethnic minorities, and to maximize their participation in project management and benefits, will be co-formulated in detail at project start, through highly participatory processes.

Women

337. Please see Section 3.

Private sector

338. Please see Section 4.

3. Gender Equality and Women's Empowerment

*Does the project expect to include any gender-responsive measures to address gender gaps or promote gender equality and women's empowerment? (yes ☒ /no ☐). If yes, please explain and upload/annex **Gender Action Plan** or equivalent.*

If possible, indicate in which results area(s) the project is expected to contribute to gender equality:

☒ closing gender gaps in access to and control over natural resources;

☒ improving women's participation and decision making; and or

☒ generating socio-economic benefits or services for women.

Does the project's results framework or logical framework include gender-sensitive indicators? (yes ☒ /no ☐)

339. A detailed Gender Analysis is presented in Annex I.1.

340. While India has had an impressive record of growth in recent decades, gender equality indicators provide continuing cause for concern. According to the gender inequality index (GII, 2016) of the United Nations Development Programme (UNDP), India's performance lags behind that of other countries in the region, - it is ranked 125 of 159 countries. The ratio of maternal mortality is 174 against every 100,000 live births. It ranks at 130 in the global arena. Of all women above the age of 15, only 26.8% are part of India's labour force — compared to 79.1% men.

341. Constraints to women's economic emancipation and returns reduce the quality of life of women and their families but also hold back progress toward national goals for poverty reduction and inclusive growth. Gender inequalities are even more pervasive in rural areas. Several indicators of women's position underline the pervasiveness of gender inequality and the need for efforts in all sectors to enhance women's rights and opportunities and decrease disparities:

- 79% of women vs. 63% of men continue to be engaged in agriculture. (2009–2010, National Sample Survey [NSS], 66th round); however women account for only 18.6% wage employment in the non-agriculture sector (2009–2010, NSS 66th round) and average wages for women workers are 68% of those of men in rural areas, 57% in urban areas (casual labourers, the largest category). (2007–2008, NSS 64th round).
- Women hold only 13.96% of cultivated holdings, accounting for 11.72% of cultivated area held by individuals; participation of female operational holders was highest under marginal category (72%) followed by small (17%) and semi-medium (8.1%); in terms of area, 54.2% (marginal and small - less than 2 ha), 23.5% (semi-medium 2-4 ha), 16.6% (Medium 4-10 ha) and 5.6% (Large above 10 ha) of the area in respective size classes are operated by female holders. (2015-2016 Agricultural Census¹⁴⁴).
- Women own less than one-third of deposits in commercial banks. (2010, Reserve Bank of India, Basic Statistical Returns).
- 68.4% of adult women are literate compared with 85.7% of men. (National Family Health Survey-4)¹⁴⁵.
- Only 34% of rural households and 81% of urban households have access to a toilet facility. (2007–2008, District Level Household Survey [DLHS-3]).
- Biomass (firewood, chips, and dung) remains the primary source of energy for cooking for 85% of rural households. (2007–2008, NSS 64th round).

342. Official statistics do not capture the invisible yet key contribution of women's unpaid labour on family farms. Even when land formally belongs to a woman, her actual control over it may be limited. Also widespread are customs and traditional practices that prevent rural women from inheriting or acquiring land and other property, especially those from scheduled castes and tribes.¹⁴⁶

¹⁴⁴ https://agcensus.nic.in/document/agcen1516/T1_ac_2015_16.pdf

¹⁴⁵ <http://rchiips.org/nfhs/pdf/NFHS4/India.pdf>

¹⁴⁶ Committee on the Elimination of Discrimination against Women, Concluding observations on the combined fourth and fifth periodic reports of India, CEDAW/C/IND/CO/4-5, 18 July 2014.

343. Rural women also have limited access to other productive resources and services, including water, agricultural extension services, technological inputs, knowledge of value addition techniques, training and finance, including formal sources of credit. Due to lack of collaterals, rural women own only 11% of total deposit accounts and 19% of borrowing accounts in scheduled banks¹⁴⁷. Group-based lending and microfinance have increased women's access to credit, but the amounts remain small and do not cover needs related to lifecycle events or entrepreneurship, including those women whose enterprises are ready to expand beyond the capacity of the microfinance available to them.

344. Women are often subsumed within the household and thus excluded from social benefits under major government interventions. Moreover, **rural women and women living in remote areas have difficulties in accessing health and other social services.** Gender inequalities are further exacerbated when they are compounded by other social differences, including age, ethnicity, caste, and class, all of which play an important role in shaping different people's relative status and position within communities and society. *Dalit*¹⁴⁸ women and women from scheduled tribes face multiple barriers in accessing justice, due to legal illiteracy, lack of awareness of their rights, and limited accessibility to legal aid as well as health services. In the agricultural sector, these social differences are likely to determine who has access to what, how and why. A recent study¹⁴⁹ has estimated the cost of inter-caste differences in productivity of output indicating that 64% of lower castes' poorer outputs can be attributed to the effects of caste discrimination. Social differences are also likely to increase the vulnerability of marginalized groups in case of livelihood and climatic shocks.

345. Female-headed households (14% of households in 2005–2006) are also more likely to be economically vulnerable than male-headed households (women household heads tend to be older and less educated than male household heads, and less educated than the average woman)¹⁵⁰. The category of "single women"—widowed, divorced, separated, and never-married women—has received less attention to date than female-headed households, but these women also face constraints. While some single women may be heads of households, others are not and there is growing awareness of the ambiguous and precarious position of widowed and divorced women who may live within families but remain responsible for maintaining themselves and their children.

346. The extent of women's involvement in decision making is limited but variable, ranging from 48% in activities like intercultural operations, 45.33% in harvesting of crops, 42.67% in storage of farm produce; 42.00% in sale of farm produce, 38.67% in subsidiary occupation like animal husbandry and dairy business; and only 36% in financial management .

347. The role of women in forest resource management in India is very important. Collection of forest produce for subsistence requirements and as an augmentation to the family incomes is generally the responsibility of women. **Awareness about trees, shrubs and grasses is higher amongst women** than in men because women devote more time than men to collect forest produce to meet family needs. About one-third of poor women are directly involved in forestry or forestry related works in the unorganized sector¹⁵¹. Women walk long distances on a daily basis to collect fuelwood, fodder and other Non-Timber Forest Products (NTFPs) from forests. While men are focused on commercial forestry, **women are concerned with biodiversity conservation and management of multiple products, which ensure fuelwood, fodder, water and other NTFPs**¹⁵². Women, therefore, remained

¹⁴⁷ Planning Commission. 2010. Mid Term Appraisal of Eleventh Five Year Plan. Chapter on Women's Agency, para. 11.48. www.planningcommission.gov.in/plans/mta/11th_mta/MTA.html

¹⁴⁸ A member of the lowest class in traditional Indian society, falling altogether outside the Hindu caste categories and subject to extensive social restrictions.

¹⁴⁹ Thorat, S. and Sabharwal, N. S., 2013, Farm Productivity, Income and Input Use: Does Caste Identity Matter?, New Delhi: Indian Institute of Dalit Studies.

¹⁵⁰ Kishor, S. and K. Gupta. 2009. Gender Equality and Women's Empowerment in India. National Family Health Survey (NFHS-3), 2005–2006. Ministry of Health and Family Welfare. www.rchiips.org/NFHS/sub_report.shtml

¹⁵¹ Nanavaty, Reena. 1996. Feminise our forests. Consultation World Commission on Forests and Sustainable Development, New Delhi. Feb., 1996. SEWA, Ahmedabad. 9 pp.

¹⁵² Singh, R. V. 2001. Contribution of participatory forest management in the livelihoods of rural communities in India. *Forest Trees and Livelihoods* Vol. 11:159-166.

at forefront in conservation movements like *chipko*¹⁵³¹⁵⁴. Explicit articulation, emphases, and the necessary specific enabling frameworks on women's roles in biodiversity conservation programmes are still very limited in India. Relatively few conservation organisations have proactively promoted a consideration of gender or the empowerment of women in their programmes. The Forest Policy of 1988 emphasised the need for conservation and also, the opportunities that forests provide in meeting subsistence requirements of forest-dependent people. It envisaged both women's and men's participation in the protection of forests. The Joint Forest Management (JFM) programme that emerged as a result of this policy was focused on the protection and management of forests through partnerships between Forest Departments (FDs) and local people¹⁵⁵. Further, the rules of the GoI Order of 1991 specified that at least two women should be on every village management committee in the JFM programme¹⁵⁶.

348. The exclusion – or lack of participation – of women in decision making over conservation and natural resource management can have implications for conservation outcomes because of their different roles and relationships with natural resources and their different knowledge of biodiversity. For example, **women are often the prime collectors of herbs, spices and medicinal plants** because they are responsible for their families' health and for preparing meals. **Women are also custodians of traditional seeds and species and possess considerable knowledge of biodiversity**. Tribal women in the Koraput region of Odisha, for example take the prime responsibility of mixed cropping when landholdings are small. Applying inherited knowledge and experiences they select appropriate varieties and proportion of different crops for a small patch of land to meet the family food requirement¹⁵⁷.

349. However, **gender issues are often overlooked or little addressed in biodiversity conservation and natural resource management (NRM) efforts**, even within those that are focused on community-driven efforts. Yet key factors influencing conservation management such as human-wildlife conflicts, unsustainable and illegal trade, tenure rights, poverty, and food and livelihood security, all have significant gender dimensions. If these are not addressed, they may considerably limit the effectiveness of the management measures adopted and exacerbate pre-existing gender inequalities. Taking gender issues into account in respect to natural resource management and biodiversity conservation involves addressing needs, priorities, knowledge and understanding of both women and men, and ensuring that both are actively involved in decisions-making in a way that leads to reconciling goals of gender equality and sustainable conservation and NRM. Women and men play important and complementary roles in the use, management and conservation of natural resources at the local level. Recognizing and analysing these so as to address gender inequalities is, therefore, as essential in achieving sustainability objectives as it is in advancing equal rights for women and men.

350. **Women are often excluded from decision-making structures that, at all levels, tend to be dominated by men**. Other major constraints include women's workloads and time and income poverty, which translate into lack of time or resources to invest in conservation and are forced to prioritise according to short-term needs. Women's levels of education or awareness, often caused by limited access to information, can also be a major constraint. For example, despite the reservation for women, the participation of women in JFM is constrained by a number of factors. Women

¹⁵³ The *Chipko* movement was a non-violent agitation in 1973 that was aimed at protection and conservation of trees, but, perhaps, it is best remembered for the collective mobilisation of women for the cause of preserving forests, which also brought about a change in attitude regarding their own status in society. The uprising against the felling of trees and maintaining the ecological balance originated in Uttar Pradesh's Chamoli district (now Uttarakhand) in 1973 and in no time spilled onto other states in north India. The name of the movement '*chipko*' comes from the word 'embrace', as the villagers hugged the trees and encircled them to prevent being hacked.

¹⁵⁴ Shiva, Bandanna and Bandyopadhyaya, J. 1986. The evolution, structure, and impact of the chipko movement. Mountain research and development 6(2):133-142.

¹⁵⁵ Khare, Arvind, (1987), Small Scale Forest Enterprises in India with Special Reference to the Roles of Women. National Review Paper, ISST, New Delhi.

¹⁵⁶ <https://assets.publishing.service.gov.uk/media/57a08d44e5274a27b2001741/R7640-fm-gender.pdf>

¹⁵⁷ <https://www.tribaltribune.com/index.php/volume-5/mv5i2/agrobiodiversity-conservation-and-tribal-women-of-koraput-odisha>

participation is greatly handicapped in view of social customs. In a male dominated society, women are often behind closed doors and do not mix with males. They are very shy of attending any meeting and if present in a meeting, they huddle together in one corner and very seldom participate in the discussions. Generally, the men respond when questions are directed even specifically to the women. At times, women are not even informed by male members about the meetings to be held for decision-making or for Participatory Rural Appraisal (PRA) exercises. Several studies conducted in the context of JFM showed that since women are not convinced about the likely benefits from JFM, they do not take adequate interest in JFM activities. The women from elite households who may venture to participate in JFM discussions do not normally represent the interests of women from poor households¹⁵⁸.

351. Gender mainstreaming may further face challenges in many research and conservation organizations in which **there remains a cultural divide between social scientists, advocating for inclusion, and natural scientists, some of whom view gender as a confusing and distracting concept in wildlife conservation.** Coupled with a lack of institutional expertise on gender, this leads to a gap between discourse and implementation. Gender mainstreaming activities may be included as add-ons to existing programmes, without being fully integrated or budgeted, limiting the success of such interventions.

State-specific considerations:

352. **Punjab:** gender inequalities have been and continue to be a major impediment to rights based sustainable development in Punjab. The right to life itself remains uncertain for the female gender in Punjab and captures the widespread discrimination prevalent in the State. Historically there have been lesser numbers of women than men in Punjab, contrary to the biological pattern. Punjab has been consistent in this imbalance since the first census in 1881, with a sex ratio of 844. In 2011, it remained among the lowest at 895 with the Indian average at 943. The 0-6 age Child Sex Ratios (CSR) is taken as a consolidated reflection of mortality in the most vulnerable age group, when medical access and child care affect survival the most. In Punjab, girl child discrimination is reflected with a CSR of 846 in contrast to 919 in India in 2011, with 952 being the ideal.

353. **Haryana** has emerged as an economically progressive state with a vibrant economy. The State has undergone significant changes since its creation in 1966. But the status of women in the State has been and still remains a cause for concern with low sex ratio and even lower child sex ratio, low female literacy, sex selective abortions, low economic participation, heavy burden of unpaid home care work, high child and maternal mortality rates, restrictions related to public space and low reproductive health status. One fact that is characteristic of Haryana is its sex ratio indicator. Due to unwarranted female foeticide, which here is one of the highest across the country, Haryana presents a gloomy gender ratio of 877 women per 1000 males, as per the 2011 Census. In other words, in the societal structure of the state, the girl child is not looked up to. The girl child, if reared, is, in most instances, not provided bright chances in education, health and food, in comparison with the male counterpart of the family. This imbalance in opportunities results squarely from the attitude towards women.

354. **Chhattisgarh:** at a time when the country's female labour force participation rate is declining sharply, Chhattisgarh's female labour force participation rate is among the highest in the country¹⁵⁹. It is also a positive trend that, 90.5 per cent women are participating in household decisions, which is significantly higher than the national average of 84 per cent¹⁶⁰. However, the issue of persistent poverty in the State, has made women more vulnerable than men and in turn exposed them to violence. Women's control over economic resources is significantly less than men. Moreover, women

¹⁵⁸ <http://www.fao.org/3/XII/0799-C1.html>

¹⁵⁹ The World Bank. (2016). Chhattisgarh—Gender Factsheet, The World Bank. Available online at:

<http://documents.worldbank.org/curated/en/916321467995642907/Chhattisgarh-Gender> - Accessed on 29 October 2017.

¹⁶⁰ International Institute of Population Sciences (IIPS). (2017). National Family Health Survey (NFHS-4), India, 2015-16, State Factsheet-Chhattisgarh. Mumbai: IIPS. Available online at: http://rchiips.org/NFHS/pdf/NFHS4/CT_FactSheet.pdf - Accessed on 30 October 2017.

receive lesser wages than men and there is also the issue of unpaid housework and caregiving, which is the sole prerogative of women. Following a patriarchal system, women inherit lesser assets and property than men and have little or no control over family resources including their own. Women are given less food, but are yet primarily responsible for looking after the young and old¹⁶¹.

355. The issue of women's empowerment through land rights and livelihoods in Chhattisgarh has to be seen within the broader rubric of tribals in the state and their growing alienation from the land and forests due to mining and other development projects. Chhattisgarh is rich in forests and natural resources and this is both a source of opportunity and challenge for the tribal population. Tribal community and other traditional forest dwellers (OTFDs) are entirely dependent on the forests for their livelihood and food requirements. This situation however is changing, ostensibly for the worse, for the tribals. Mining and other development projects undertaken in these mineral rich forest areas, coupled with the weak implementation of Panchayat (Extension to Scheduled Areas) Act (PESA) 1996 and Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act passed in 2006 (in short FRA 2006) make the tribal community vulnerable to displacement. While Chhattisgarh has passed some State-specific Acts with regard to FRA 2009, it is yet to pass State-specific law related to PESA 1996. The State has not taken any step to include women's voices in local governance structures such as *Gram Sabhas* as has been done in many other states.

356. Tribal women are suffering the twin effects of first, the transition from traditional shifting cultivation to settled cultivation; and second, from land alienation and displacement. Traditionally tribal men and women had equal access to land and they complemented each other in their labour relations with the land. With the shift from traditional land and forest related livelihoods to mining livelihoods, labour relations are changing and so are gender relations. It is also becoming more individualised. Men get jobs as unskilled workers in mines. There are stark differences in wages between men and women. Women neither have land at their disposal nor modern industrial jobs to help them substantiate their loss of income from traditional livelihoods. The introduction of patriarchal system by mainstream Hindu society into tribal communities has led to loss of status and prestige for women: women are increasingly barred from owning land without a male member of her family involved¹⁶².

357. **Odisha**¹⁶³: the sex ratio in Odisha declined drastically from 1086 in 1921 to 972 in 2001. However, it has improved marginally to 978 as per 2011 Census data. The decline in Child Sex Ratio (CSR) is the main cause of concern as it continues to decline consistently from 967 in 1991 Census to 950 in 2001 Census to even lower 934 as per the 2011 Census. Female literacy in Odisha has been lower than male and has consistently been below the Indian level. The gender gap also remains at a high 18 per cent (Male 82.40 and female – 64.36, 2011 Census) as an indication of gender bias. As per the 2011 Census, the overall literacy rate stood at 73.45 per cent. As a standalone indicator, it points to an increase from 4.5 per cent in 1951 to 64.36 per cent in 2011. Women have fared better in literacy because of a number of entitlements provided by the State. There is a wider gap in Scheduled Tribe (ST) literacy as girl children in many rural tribal areas remain out of school. Female work participation is considered as an important indicator of women's involvement in economic activities. As per the 1971 census the percentage of women workers in Odisha to total workers was 10.85 and increased to 31.35 by 2001, and rural work participation of women was at a higher 33.47 per cent while urban was only 15.45 per cent as per 2001 Census. 75 per cent or more of women are in agriculture and many in the unorganized sector such as mining, beedi manufacturing, NTFP collection and construction work¹⁶⁴.

Gender Action Plan:

¹⁶¹ PHRN. (2010). Mainstreaming Women's Health Concerns. Report No. 6. New Delhi: PHRN.

¹⁶² Verma, Madhurima. (2015). 'Changing status of tribal women in Bastar district of C.hhattisgarh', International Journal of Development Research, Vol. 5, Issue 3, pp. 3868-3872.

¹⁶³ <https://www.oxfamindia.org/sites/default/files/2019>

01/PB%20Towards%20Gender%20Inclusive%20Development%20in%20Odisha_1.pdf

¹⁶⁴ <http://magazines.odisha.gov.in/Orissareview/2012/Feb-March/engpdf/40-46.pdf>

The project will mainstream gender considerations into its outputs as set out in Table 15.

Table 15. Gender Action Plan (see Annex I.1 for additional information on timeline, responsibilities and budget)

Outputs	Gender-related indicators and targets
1.1.1: Coordinating committees to promote inter-sector convergence and dialogue	A report on achievements in gender participation and the gender mainstreaming strategies used will be presented at every half-yearly district, state and national level coordination meetings.
1.1.2: Multi-stakeholder policy dialogues on sustainable food systems	Policy dialogues sessions include discussions on gender roles, women participation, gaps and strategies to promote gender equality in promoting Sustainable Food Systems
1.2.2: Strengthened systemic capacities for decision making on integrated land use planning and management, and food systems planning	At least 30% of participants in Capacity building workshops for adoption of DSS are women.
2.1.1 Capacities strengthened for providing technical, organisational and input support	• ToRs and Letter of Agreements with resource agencies and experts include the requirement of integrating gender perspective in training curriculum, and developing gender sensitive teaching and learning materials. • 100% of training material and curricula integrate gender sensitive teaching and learning materials and are reviewed by Gender and Social Safeguards Expert at NPMU. • At least 30% of district officers in capacity development training/workshop on SFS are women. • At least one training of Project staff held on gender mainstreaming approaches. • At least 20% of training sessions in ToT and FFS is spent on discussions on gender mainstreaming (on constraints faced by women in agriculture, raise awareness of gender discrimination and to highlight women's contribution to agriculture and development, build women's leadership, decision-making and communication skills). • At least 40% of farmers participating in FFS are women (including youth, IP women and from female headed households) • At least 30% of women participate in training at demonstration plots.
2.1.2. Mechanisms established and operating for provision of inputs (consumables and equipment) needed for sustainable production	• ToRs of expert for CHCs include the requirement of integrating gender mainstreaming approach in the planning and management of CHCs. • 100% (all) of the guidelines for planning and management of Custom Hiring Centers (CHC) are reviewed for gender mainstreaming particularly improving access and participation of women and inclusion of women farm machinery, by Gender and Social Safeguards Expert at NPMU
2.2.1: Farmer Producer Organizations (FPOs) and community-based organizations (CBOs) supported through green value chain development cell (GVCDC)	• At least 20% of training sessions of VC facilitators and FPO members is spent on discussions on gender mainstreaming (Women's participation in value chains, capacity building of women for leaderships in FPOs, Financial and operational management, decision-making and communication skills). • At least 40% of FPO member trained on business planning, management and governance are women • At least 40% of FPO members trained on business planning, management and governance are youth (18 -35 years) • At least 30% of agro-entrepreneurs promoted are women • At least 30% of participants in buyer/seller meets and trade fairs are women.
2.2.2: Green Value Chain Development Cell established as a platform for public-private collaboration between actors in the public	• ToRs of expert for establishing GVCDC (at national, state and district level) includes the requirement of integrating gender mainstreaming in value chains to be supported by the project. • ToRs of scoping studies for GVCDC includes the requirement to incorporating gender perspectives and gender mainstreaming strategies in value chain development.

PART II 3. Gender Equality and Women's Empowerment

Outputs	Gender-related indicators and targets
sector and private sector actors operating on the input and output sides of value chains, and dialogue on green value chain development	
3.1.1: Capacities developed for community-based sustainable landscape management	• At least 30% of district officers in capacity development training/workshop on mainstreaming ILM are women. • At least 20% of training sessions in ToT and FFS for ILM is spent on discussions on gender mainstreaming (on constraints faced by women (youth, IP and female-headed HH, etc) in access and control over resources, raise awareness of gender discrimination and to highlight women's contribution to natural resource management, and in building women's leadership, decision-making and communication skills). • At least 40% of farmers participating in FFS are women (including youth, IP women and from female-headed households)
3.1.2: Inter-sectoral institutional framework and mechanisms for ILM at district, inter-district and sub-district levels	• At least 40% participants in village awareness and mobilization events are women (including youth, IP women and from female-headed households). • ToRs of experts for inclusive ILM approaches includes the requirement of integrating gender mainstreaming approach in ILM. • Field teams established by project have at least 30% of women members.
3.1.3: Integrated district-level plans for food system sustainability, landscape management and restoration	• ToRs and Letter of Agreements with resource agencies for ILM includes the requirement of integrating gender mainstreaming approaches in ILM • 100% (all) of integrated plans for food system sustainability, landscape management and restoration are gender sensitive and are reviewed by Gender and Social Safeguards Expert at NPMU
3.2.1: Ecosystem/landscape restoration plans agreed among stakeholders	• At least 40% participants in ecosystem restoration activities are women.
3.2.2: Sustainable livelihood options compatible with ecosystem restoration developed/promoted	• ToRs of experts for sustainable NTFP value chains includes the requirement of integrating gender mainstreaming approach in promoting NTFP value chains • 100% (all) of the guidelines on sustainable harvesting and NTFP VCs are reviewed for gender mainstreaming particularly improving access and participation of women, by Gender and Social Safeguards Expert at NPMU • At least 50% of participants in NTFP value chains supported by the project are women. • At least 30% of participants in pilot agroforestry based livelihoods supported by the project are women.
4.1.1: Knowledge management and communication systems	• Participants of National and State Inception and National Terminal workshop include representatives of organisations and agencies/departments/department units working for gender, youth, IPs, etc. • 100% (all) annual project review meetings holds focus group discussions to capture perspectives and feedback of women, including indigenous women, women headed households, and youth. • 100% (all) thematic studies (ToR and study reports), policy briefs and knowledge products are reviewed for incorporating gender mainstreaming perspectives by Gender and Social Safeguards Expert at NPMU. • 100% (all) of communication material and medium of communication reviewed by Gender and Social Safeguards Expert at NPMU for gender mainstreaming and gender sensitive approaches

4. Private Sector Engagement

358. A central and innovative feature of the project's interactions with the private sector (PS) in support of food system transformation will be the establishment of a **Green Value Chain Development Cell** (as project Output 2.2.2), more details of which are proposed in Supplementary Annex 9. As explained in paragraph 243, the GVCDC is envisaged as a platform and resource centre for the private sector players, FPOs and State level Federation of FPOs and other willing value chains players, to facilitate creation of market-led extension models, sustainability standard-based production systems, and designing Public Private Partnerships (PPP), targeted towards addressing value chain gaps on a collaboration or a turnkey basis. Mandates of the GVCDC may include reinforcing the agribusiness knowledge base, human resource development, enhancing investment in agribusiness, strengthening FPOs, identifying private sector entities and onboarding them, and commissioning need-based value chain and market studies. Private players having a commensurate product and/or service may find it relevant to join the platform and play their role in strengthening existing and developing new value chains.

359. The project will also work closely with the **World Business Council on Sustainable Development** (WBCSD) to promote the engagement of private sector actors. WBCSD is a global organization of over 200 leading businesses working together to accelerate the transition to a sustainable world. The organization works with its member companies to develop targeted business solutions in a partnership-based approach through its 6 work programs to achieve systems transformation. The India subsidiary office of WBCSD has a strong focus on sustainable Agriculture and water management and engages leading businesses in the food and agriculture sector in the country. WBCSD proposes to support FAO in operationalizing the GVCDC and delivering on its proposed functions through:

- Enabling engagement with key businesses in the food and agriculture sector. The target group of businesses will mainly be WBCSD members that are large multinational corporations with operations and interests in rice and wheat in the 4 project states. This directly supports GVCDC's purpose of providing a platform and a resource centre for private sector and facilitating the creation of market-led extension models and designing Public-Private Partnerships. Specifically, this action item would enable private sector inputs into the development of standards and certifications, and sustainability performance frameworks that will form the basis for interventions for value chain development as part of GVCDC. In serving this function, WBCSD has the potential to deliver high-level engagement and commitments from companies to engage in the GVCDC, to organize and facilitate consultation sessions with targeted companies and to organize, distill and synthesize inputs from targeted companies to key knowledge products
- Enable engagement with investors to leverage financing opportunities. As part of its current global priority area of financing food systems transformation, WBCSD is leading 2 initiatives: the Just Rural Transition Investment Partnerships initiative works to both strengthen the business case for investment in people-centred food systems as well as connect investors and support them with tools and knowledge products for decision-making; and the Agri SME digital finance platform, which connects agri-SMEs with finance providers creating an ecosystem that catalyzes the flow of debt, equity and grant funding, and WBCSD is initiating action on customizing the currently global platform to the Indian context.

360. Project engagement with the private sector (largely but not exclusively facilitated through the GVCDC) is expected to take the following forms:

- Support by the project to corporate PS actors (purchasers/exporters, input suppliers and corporate social responsibility schemes) in incorporating sustainability provisions into their interactions with client farmers, especially their technical assistance programmes;
- Support to the identification and operation of value chains for alternative crops to rice and wheat (procurement of which is dominated by the public sector) in accordance with the Government policy focus on crop diversification;

- Commitments by corporate PS actors to preferentially source sustainably-produced crops, contributing to the project's aim of mainstreaming sustainable production into global value chains (this preferential sourcing may represent a significant upfront cost to the companies involved relative to the "business as usual" option of sourcing solely on the basis of price and quality);
- Support/orientation to the adoption of sustainability standards, such as SRP, by the PS actors and their source farmers.
- Engagement with farmer- and community-based organizations, especially Farmer Producer Organizations (FPOs). Valuable lessons have been learnt in India to date regarding the involvement of FPOs, other civil society organizations (CSOs) and local "agro-entrepreneurs" or "agripreneurs" in community-based businesses focused on input provision and technical assistance, as well as marketing and value-adding businesses, with very strong gender and pro-poor dimensions, and the project will make a significant contribution to piloting and scaling these models further within the context of sustainable production and food systems.
- Facilitation of access by producers to the finance needed for investment in sustainable production. The "supply side" of production finance is generally well satisfied in India, so the project will largely focus on producer capacities for accessing and managing such finance. FPOs will again play an important role in channelling the available finance to farmers.
- Helping farmers to take advantage of private sector innovation in relation to information management, particularly IT/mobile-based systems (e.g. <https://www.nurture.farm/>) capable of providing them with information and advice on multiple crop-related variables including pest management, crop timing and irrigation, as well as on market and finance opportunities.

361. Market-related forms of PS engagement are expected to apply more to crops and farmers that are inserted into value chains which include purchasers, traders, retailers and/or consumers who exhibit preferences for sustainable sourcing. In the case of rice, this is likely to be more the case with export-focused Basmati value chains than non-Basmati destined for Government procurement and the domestic market. While the typically poorer non-Basmati producers constitute the core target population of project beneficiaries, the project will also interact with Basmati producers in support of the adoption of sustainability standards: there is potential for these actors to act as flagships showing the efficiency and sustainability benefits of following the SRP standard, with potential spillover replication effects into the non-Basmati sector targeted by the project.

362. Table 16 presents examples of private sector companies active in the target States, with indications of their potential roles in relation to the project. The specific nature of the relations with these actors will be confirmed through detailed discussions during the implementation phase of the project, facilitated through the GVCDC and supported as appropriate by the WBCSD. Initial discussions of potential relations have been held during the PPG phase with Olam and UPL, the results of which are summarized in Box 36 and Box 37:

Box 36. Potential forms of relation with Olam during project implementation

Olam is a global food supplier and one of the largest exporters of rice from India, selling products through its own brands and through third parties. It is a member of sustainability initiatives including the Sustainable Rice Platform (SRP), Sustainable Rice Landscape Initiative (SRLI) and Sustainable Spice Initiative, and has been working with farmers in many states of India to promote sustainable agricultural practices, promoting FPOs and sourcing 19 different commodities directly from farmers across the country. Olam collaborates with input management companies such as like Bayer Crop Sciences to keep up to date with developments in agricultural sciences and provide beneficiary farmers with better input management methods. It is also working with the Government, for example on the National Rural Livelihoods Mission (NRLM) to leverage their community cadre structure to increase their farmer reach and also, provide them with technical and handholding support through the Krishi Sakhis¹⁶⁵. Olam has been reaching farmers through its in-

¹⁶⁵ A cadre of community resource persons promoted by NRLM and deployed at village level

house digital app, which allows it to stay in regular connection with the them and provide them with advisory services and market-related information. More than 50,000 farmers are connected through this app.

The following potential areas of synergy were provisionally identified in meetings during the PPG phase:

- **Direct sourcing:** Olam can be a direct procurer of goods produced by project beneficiary farmers provided they are in a similar geography with Olam's current footprint and are able to produce goods that are in tandem with their crop varieties, food safety, and environmental standards.
- **Support to FPOs:** Olam has been working in promoting FPOs in different parts of the country and sees this as a proven way to reach the communities.
- **Technical orientation:** Olam has the experience and expertise in promoting sustainable agriculture with major focus on reducing pesticide usage, heavy metals, carbon, and water footprint and on tackling stubble burning practices and is in a position to share these experiences with the project.
- **Creating a superstructure or platform that binds together various initiatives:** Olam believes there should be a platform where the different initiatives/ organisations working in a similar theme can come and share their learning and resources to leverage each other's strengths. Converging with platforms such as SRP and/ or SRLI is seen as a potential opportunity to gain more traction among the global fraternity and corporates.

Box 37. Potential areas of relation with UPL during project implementation

United Phosphorus Limited (UPL), is an Indian multinational company that manufactures and markets agrochemicals, industrial chemicals, chemical intermediates, and specialty chemicals, and also offers crop protection solutions. It has been working across India to support farmers in accessing better and effective agricultural solutions in terms of inputs, machines, and post-harvest management technologies. The current efforts of UPL revolves around the following themes:

- **Food loss prevention:** UPL promotes the Decay Control (DECO) technology and Fruit Coating technology, which increase the storage life of potatoes and fruit respectively.
- **Reducing chemical usage in agriculture:** UPL promotes mechanized spraying machines, which uniformly distribute the input in the field leading to a saving of at least 20% in chemicals.
- **Optimizing water usage in agriculture:** UPL is promoting the "Zeba" technology, which involves the application of a cornstarch-based super absorbent polymer to reduces crop water usage and nutrient leaching.
- **Traceability through digitalization:** UPL is also providing digital advisory services for farmers, which allows the tracking of input procurement routes, and of marketing channels and points for agricultural produce.
- **Adarsh Kisan Centre:** this is the biggest private sector farmer contact centre with 2.3 million farmers currently registered, providing SMS updates and voice blasts on crop/pest related issues.
- **UNIMART** (Farmer advisory, training, and retail): this provides farmers with agri-input products and solutions through company-owned and franchised centres.
- **Adarsh Farm Services:** this provides farmers with mechanization technology and services through a service hiring mode.

The following potential areas of synergy were provisionally identified in meetings during the PPG phase:

- Project beneficiary farmers supported can be connected with the **Adarsh Kisan Centres** to

provide them with timely advice on pest management, pest forecasting and weather.

- **Adarsh Farm Services** platform can be leveraged to create better access to and awareness of farm mechanization for project beneficiary farmers covered under FOLUR.
- Project beneficiary farmers can be connected with the **Unimart** platform, or new Unimart centres can be opened in the project areas, to provide them with farm advisory, training and agri-input supply.
- The **Zeba technology** can be explored further to understand its efficacy in the project areas.

Table 16. Examples of private sector actors active in the target States

Entity	Role in the Value Chain	Place	Remarks and potential relevance to/relations with the project
Nurture.farm (wholly owned subsidiary of UPL)	Ag-tech	Punjab/ Haryana	Had multiple discussions during project design. Synergies with their Crop residue Project. Other areas of collaboration include promotion of sustainable agri-inputs. Capacity development of FPOs, etc.
Dehaat	Ag-tech	Pan India	Dehaat is an agtech firm that focusses on providing solutions to the farmers such as providing a platform for price dissemination, agro advisory and specializes in working with FPOs. It also provides platform for rural enterprises to be able to connect to large buyers and sellers. The project during implementation will seek the support of such ag-etch firms to provide tech based solutions to FPOs
CropIn	Ag-tech	Pan India	Cropin is an ag-tech firm that helps bringing technology for climate resilience to the doorsteps of smallholder farmers. Some of its services include: Climate smart advisory, scheduling and monitoring farm activities to implement traceability, weather forecasts derived from the best available weather observation systems and forecast models, web and mobile-based advisory dashboards for tracking at the village level. The project during implementation will seek the support of such ag-etch firms to provide tech based solutions to small holder farmers
Biocarve Seeds	Inputs and Markets Access	Punjab	Focuses on crop diversification with farmers in cultivation of flower, vegetables and cereal crops seeds which are sold in India through Retails & Online mode and exported to European countries
KASAM (Kandhamal Apex Spices Association for Marketing)	Purchaser/Certifier of Organic Products	Odisha	Social enterprise that helps generate employment, poverty alleviation, extension of species area, production of quality and value added hygienic spices and to set up viable marketing net- work to minimise the exploitation by traders through inculcating a feeling of self- confidence and self reliance among the producers. Kasam Organic is listed in Trade India's list of verified sellers offering supreme quality of Organic Turmeric Finger etc.
Chaman Lal Setia Exports	Purchaser	Punjab	One of the oldest rice millers cum Exporters of i rice of all varieties from India with a large number of state of the art processing units.
Gillco Agro Pvt. Ltd.	Miller	Punjab	The milling unit has all the mandatory certifications like FSSAI along with FSSC standard certification. It is involved in producing all major wheat products. It does not have its own brand and sells its produce to other large players. It is directly involved with purchase of wheat from farmers and FPOs and can play a role in introducing sustainable practices at the farm level.
Kartar Roller Flour Mill	Miller	Punjab	Deals in wheat and pulses. certifications like FSSAI along with voluntary certification of HACCP. It mostly focuses of producing refined flour and wheat flour and sells majority of its products through its own brand name of 'Swadeshi'. It also supplies wheat products in bulk quantity to reputed national brands such as Britannia and Reliance. Such players can help push standards which are demanded by larger national companies for their products
Ludhiana Flour and General Mills Limited	Miller	Punjab	The roller mill holds FSSC standard along with the mandatory licences of FSSAI and GST registration. It procures 70% of its raw materials from FCI and the remaining through and FPOs and can play a role in introducing sustainable practices at the farm level.

PART II 4. Private Sector Engagement

Entity	Role in the Value Chain	Place	Remarks and potential relevance to/relations with the project
SRI DANDESWAR RICE MILL PVT. LTD.	Miller	Odisha	Is a leading Manufacturer, Supplier, Trading Company of Rice , Raw Rice, Broken Rice in Odisha
Cargill	Feed manufacturer	Punjab	Cargill produces and markets animal nutrition products and provides consulting services to dairy farmers in the states. They can be a key player that can be targeted for maize as crop diversification picks up in Punjab and Haryana
Uttara Impex Private Limited (Venkys)	Feed manufacturer	Haryana	Specialises in animal health products, poultry feed, feed supplements. Owns a large number of fast food joints across India under the brand name “Venkys”. They can be a key player that can be targeted for maize as crop diversification picks up in Punjab and Haryana. They also have hatcheries and feed mills in Chhattisgarh from where they supply to other states in Eastern India.
Ama Sangathan	Processor	Odisha	Ama Sangathan started with brooms sticks and other forest produce. Initially, all the it was sold to local vendors who would offer extremely low prices. The group eventually started manufacturing finished products along with selling the raw material, and demanding fair price for both. There is now a sorting machine for millets like Ragi.
J.S. OIL INDUSTRIES PVT. LTD.	Processor	Odisha	Paddy procurement & processing, pulses procurement & processing, Mustard procurement & Oil extracting. Going for wholesale marketing of final products.
Jagannath Herbal And Foods Private Limited	Processor	Chhattisgarh	Manufacturer, Exporter (to USA & China) and Supplier of Forest, Herbal and Agro Products like Mahua Flower, Mahua Seeds, Amchur, Tamarind With seeds, Tamarind without seeds, Char Guthatli, Chirongi Dana, and all Oil Seeds, Cassia Meal, Cassia Split, Cassia Seeds, Sesame Seeds, Chironji Seeds, Soybean Seeds.
Paras Group	Processor	Chhattisgarh	Manufacturer And Exporters of Edible, Non Edible Oils, Soap Slabs, Rice Bran Wax, Soy Wax, Stearic Acid, Fatty Acids, Sal, Mango, Mahua, Kokam, Niger Seeds, Soya Bean, Rice Etc.
All India MFP Traders Federation	Processors/Traders	Chhattisgarh	An organization of the NTFP traders across India operating since 1937 and one of the largest traders of Cassia tora Seeds, Plants, Aromatic Oil, Cassia Tora Gum, Ayurvedic Herbs, Beheda, Essential Oil . The federation exports NTFP from Chhattisgarh across the World and is also a producer of some OEMs to Europe.
Olam Agro India Pvt.Ltd	Traders	Chhattisgarh	Had multiple discussions during project design. The primary export of OLAM Agro India from Chhattisgarh is Paddy and Broken Rice.

5. Risks.

Description of risk	Impact if occurs	Probability of occurrence	Mitigation actions	Responsible party
Limited commitment of local stakeholders to participating in and sustaining dialogue hinders the introduction of ILM	High	Low	Social outreach to stakeholders on the objectives and benefits of dialogue	District level Planning Bodies
Limitations in the effectiveness and/or continuity of partnerships for delivery of knowledge, and development and scaling out of farmer capacities	Medium	Low	Outreach on the mutual benefits of partnerships, in terms of scaling and sustainability	Central Ministries, State Departments and District level Planning Bodies
Limitations in the effectiveness and/or continuity of partnerships for delivery and scaling out of restoration	Medium	Low	Adaptive management approach, with ongoing review and adjustment to partnership opportunities	
Limitations in preference and/or willingness to pay for sustainable production in domestic and global markets	Medium	Medium	Avoidance of excessive reliance on market-based instruments as leverage for farmer behaviour and sustainability – emphasis on on-farm benefits for productive sustainability and resilience, plus exploration of financial incentives. Collaboration with value chain actors on developing sustainability-based branding to stimulate consumer demand	Central Ministries
Limitations in community buy-in to restoration	Medium	Low	Promotion of incentive to generate financial benefits for community participation in restoration and follow-up maintenance	Central Ministries, State Departments and District level Planning Bodies
Limitations in the effectiveness and/or continuity of partnerships for knowledge management hinder improvements to management and decision-making	Medium	Low	Budget flexibility to allow direct project investment in knowledge management where necessary, to reduce reliance on partnerships	Central Ministries, State Departments and District level Planning

PART II 5. Risks

Description of risk	Impact if occurs	Probability of occurrence	Mitigation actions	Responsible party
				Bodies
Limited receptiveness of resource managers and planners to information inputs hinders improvements to management and decision-making	Medium	Low	Outreach to resource managers and planners to raise awareness of the benefits of incorporating information inputs Development of capacities of resource managers and planners to incorporate and respond to information inputs	Central Ministries, State Departments and District level Planning Bodies
Limited commitment to collaboration on information management hinders improvements to management and decision-making	Low	Low	Outreach and facilitation of collaboration on information management	Central Ministries, State Departments and District level Planning Bodies
Limited receptiveness of farmers and other resource managers to applying monitoring results in support of adaptive management	Medium	Medium	Awareness raising among farmers and other resource managers and development of their capacities for applying monitoring results in support of adaptive management	District level Planning Bodies
Receptiveness of actors in India and other FOLUR countries to coordination and knowledge exchange	Low	Low	Awareness raising on the benefits of coordination and knowledge exchange, and development of capacities	Central Ministries, State Departments and District level Planning Bodies
Climate change	High	High	- Promote climate-resilient production and management options, within the context of diversified (and therefore resilient) farming and livelihood systems - Support information flow on climate-related variables into planning and decision-making	Central Ministries, State Departments and District level Planning Bodies

PART II 5. Risks

Description of risk	Impact if occurs	Probability of occurrence	Mitigation actions	Responsible party
COVID19 pandemic related impacts on the internal and international travel, operation of government/ partners/ project; health impacts on general population as well as economic impacts nationally and locally 1. Reduced financial (co-financing) support from Government, development partners, and private sector, due to limited overall funding availability resulting from the COVID-19-related economic downturn, and/or the reorientation of available funding to actions directly related to COVID-19 2. Government expenditure and prioritization of different programs and sectors, including agriculture, food security and natural resources might change. 3. Closure of offices, transport etc. will delay launch of project and its implementation. 4. Potential or partial disruption of food system supply chains, such as logistics 5. Increased losses and spoilage in high value commodities 6. Disruption of demand for products and markets, due to temporary closure of hotels and restaurants 7. Higher dependence on natural ecosystems, as people who lose employment and income from other sectors depend more on them for their livelihoods, thereby increasing pressures on them	High	High	1. If there are changes in cofinance, partners will work closely to seek alternative options for co-financing and ensure continuity of resource allocation to ongoing initiatives in project target areas. 2. It is anticipated that the project scope will help support the Government's response to COVID-19 through its focus on food security and livelihoods diversification of vulnerable communities. However, project activities will be further discussed with Government to ensure that emerging priorities and responses, as a result of the pandemic, are well reflected in the project's target areas during implementation. 3. It is likely that periodic closures of transport and offices as well as restrictions on organizing meetings/ training with large number of people will impact project implementation. The project will institute local mechanisms such as local facilitators, and work with local partners to ensure that some work can continue on the ground. Detailed planning will be done with government operational partners to mobilize their field offices and others and the project will ensure that all recommended safe practice are followed by the project team and by communities where the project is working. 4. Provide advice to farmers and government to meet immediate food needs 5. Conduct socio-economic impact assessment (as part of baseline assessment) to inform the project implementation 6. Ensure close collaboration with private sector entities and logistic companies to understand emerging barriers related to the pandemic and establish feasible options 7. Support producer organizations in linking with export markets and encourage use of online markets where	Project executing agency, FAO and partners

PART II 5. Risks

Description of risk	Impact if occurs	Probability of occurrence	Mitigation actions	Responsible party
			possible 8. FAO is planning to undertake more detailed analysis on the impacts of COVID-19. Based on this findings, the project will prioritize work in more impacted areas of the project sites to strengthen community management and alternative livelihoods.	

363. The models for sustainable production and management, proposed by the project, will contribute to the processes of “building back better” by supporting robust, environmentally sustainable and diversified food value chains, based on reliable and adaptive relations between producers and retailers/consumers, that will be better able to cope with external “shocks” such as those presented by crises such as COVID-19 than existing systems. Participatory Guarantee Schemes, for example, are based on producer/consumer relations typically at a local level, by-passing conventional value chains. The criteria for the selection of the production and management models to be supported by the project also include their feasibility, competitiveness and sustainability in agronomic, economic and social terms, taking into account for example considerations of availability of attractive, stable and robust markets, and of factors of production (including labour given the current trends of rural-urban migration and potential disruption to labour supply from crises such as COVID-19).

6. Institutional Arrangement and Coordination.

Institutional Arrangements

364. This project is designed to be implemented in four project States using FAO's Operational Partners Implementation Modality (OPIM), based on fiduciary assessments and development of appropriate risk mitigation plans. OPIM modality involves "implementation of projects/programmes through transfer of funds to Operational Partners for implementation of program/project components on the basis jointly defined and shared program/project goals where FAO retains overall accountability to the Resource Partner¹⁶⁶ and the Government for proper management of funds, technical quality and results achieved." Prior to confirmation of the use of this modality, an independent assessment by a qualified audit firm will assess the proposed partners' processes and mechanisms for Funds Flow, Organizational Structure and Staffing, Accounting Policies and Procedures, Internal Audit, Financial Audit, Reporting and Monitoring, and information Systems and Procurement. Based on the assessment, the partner's capacity will be classified into one of the following categories: high risk, significant risk, medium risk and low risk. Appropriate mitigation plan for fiduciary risks will have to be developed for partners based on risk assessment, which will need to be included as part of project implementation plan.

365. 72% of the GEF funds will be routed to the State Partners through the OPIM mechanism to implement project activities as outlined in the full project document. All disbursements will be in accordance with the Annual Work Plan and Budgets (AWPBs) approved by the National Project Steering Committee (NPSC).

FAO will sign an agreement with each of the OP using the OPIM modality, following a capacity assessment of the potential OP. Disbursement of funds to the OPs will be direct transfer through a dedicated bank account opened for the project by each OP. As all the OPs are government entities, they will open a dedicated bank account after securing requisite approvals of the respective Finance Departments.

366. The OP will be encouraged not to enter into a sub-contract.

367. The details on the endorsement mechanism for the Annual Work Plan and Budget (AWPB), and the fund flow are described below.

368. It should be noted that the identified Operational Partner(s) or OP, results to be implemented by the OP and budgets to be transferred to the OP are non-binding and may change due to FAO internal partnership and agreement procedures which have not yet been concluded at the time of submission of this funding proposal.

369. FAO, on request from the GOI, will execute the national coordination component of the project – on behalf of the government. This has been proposed by the Ministry of Agriculture and Farmers Welfare and endorsed by the GEF Operational Focal Point at the Ministry of Environment, Forest and Climate Change.

Roles and responsibilities of main institutions

370. The Ministry of Agriculture and Farmers Welfare (MoA&FW) is the lead Executing Agency of this project at the national level and will establish the National Project Management Unit (NPMU).

371. The Ministry of Environment, Forest and Climate Change (MoEF&CC), which hosts the GEF Operational Focal Point for India, and has overall responsibility to ensure that portfolio of GEF projects are well coordinated will also play critical role in overall project implementation. FAO will recruit and manage the national project management unit for the overall coordination with the four States.

¹⁶⁶ a funding entity which provides funding to FAO for projects/programmes. For this project, the Global Environment Facility (GEF) is the resource partner.

372. Operational Partners: The project will be implemented using FAO's Operational Partners Implementation Modality (OPIM) modality, with Operational Partners at the national-level and in each of the four project states—Chhattisgarh, Haryana, Odisha, and Punjab. The MoA&FW has approved FAO to host the NPMU at the national level for day-to-day project management, provision of technical assistance to state partners, effective implementation of project components, and monitoring and reporting tasks. The respective State Governments have nominated the OP in each state for the day-to-day project management, effective implementation of project components, and monitoring and reporting tasks at state-level. Also, they will be responsible for the selection and appointment of staff of the State Project Management Unit (SPMU), District Project Implementation Unit (DPIU) and Block Facilitation Teams (BFTs), in accordance with the ToRs approved by FAO. The following are the OPs for this project at state-level:

Table 17. Project Operational Partners (Nodal Agencies) in Four Project States

State	Nodal Agencies
Chhattisgarh	Directorate of Agriculture
Haryana	Directorate of Agriculture and Farmers' Welfare
Odisha	Institute on Management of Agricultural Extension (IMAGE)
Punjab	Directorate of Agriculture and Farmers' Welfare

Project GEF Implementation Agency Roles and Responsibilities

373. The Food and Agriculture Organization (FAO) of the United Nations is this project's GEF Implementing Agency.

Box 38. Comparative advantage of FAO as Implementing Agency

FAO is the recognized global leader in sustainable agriculture, food systems, and the reduction of malnutrition, and a world leader in south-south, north-south and triangular cooperation. This global leadership role will be of major importance in the context of this project, which is one of the most globally strategic initiatives under the FOLUR Impact Programme.

Working in close collaboration with the Global Coordination Project of the FOLUR Impact Programme, FAO has the potential to deploy its convening power through key fora (such as the bi-annual FAO Conference involving the world's Ministers of Agriculture and other leaders; the Ministerial level Technical Committees on Agriculture, Forestry, Fisheries and Commodities; and the Committee of World Food Security) to magnify the on-the-ground results of the project within the framework of the IP, feed into global policy change, coalesce new partnerships and mobilize additional investment.

Other specific areas of FAO value-added include the following:

- As global custodian of 21 SDG indicators at the core of food and agriculture, FAO will deploy the science and metrics of SDG compliance to meet private sector demand for SDG compliant food and food systems.
- FAO has major worldwide experience in employing Multi-Stakeholder Processes (MSP) to build consensus among public and private sectors through dialogue and joint analysis.
- FAO will draw upon its history of knowledge innovation to benefit the project and the IP as a whole, applying a range of innovations to support program/project formulation, implementation, oversight and coordination;
- FAO is a world leader in Farmer Field Schools, which are central to the project's strategies in the target areas.
- FAO's mandate and neutral position allows it to enter into productive partnerships with public and private actors at global and national levels, in order to maximize impact and resource mobilization in support of sustainable food systems and landscapes.

Of particular significance at national level is the fact that FAO is also the Implementing Agency of the Green Ag project¹⁶⁷, which will maximize the potential for lessons and experiences to flow between the two very complementary projects.

374. FAO's primary roles in the project as a GEF Implementing Agency¹⁶⁸ is summarized in Table 18. These services will be funded from the GEF agency fee it receives for this project, in consonance with the GEF's operational policies and procedures for GEF Implementing Agencies.

Table 18. Summary of GEF Implementing Roles and FAO Approach to fulfilling those roles

GEF Implementing Agency Roles	Summary of FAO approach for its IA role
Mount at least one supervision mission per year, including briefing operational focal points on project progress	FAO's Country Office (CO) in India (FAOIN) will have a supervisory role for this project. The FAO Representative in India will be the project Budget Holder (BH). FAO will nominate Lead Technical Officer (LTO) for this project from its Asia Pacific Regional Office with project-relevant background. LTO or his/ her nominee will mount at least one mission per year to supervise the project. In addition, a dedicated <i>technical</i> Funding Liaison Officer (FLO) will be also be associated with this project from the FAO GEF Coordination Unit (the Unit is based in FAO's Headquarters in Rome, Italy). She/he will also undertake supervision missions as necessary.
Provide technical guidance, as necessary, for project implementation.	The LTO, FLO and FAOIN will provide technical guidance as necessary. A committee composed of the LTO, FLO and BH, with other relevant FAO Officers is called FAO's "Project Task Force".. This Task Force will meet regularly (usually virtually).
As necessary, include technical consultants during supervision missions to advise government officials on technical matters and provide technical assistance for the project as needed.	The LTO, FLO and BH and/or his/her designate from the Country Office (CO) will provide technical support. The LTO has an additional task of clearing TORs of technical consultants and their reports to ensure high technical quality.
Oversee the preparation of annual project implementation reports for submission to the GEF Secretariat.	The LTO, FLO and BH all have roles in supporting this process and will also provide their ratings on project's annual implementation, as well as its overall progress since project start.
Organize the mid-term review of the project. The FAO-GEF CU (Corporation Unit) will appoint a MTR focal point who will provide	The BH will manage the mid-term review, in consultation with the FAO-GEF Coordination Unit.. The MTR will be undertaken by a team of

¹⁶⁷ GEF Project ID 9243: Green-Ag: Transforming Indian Agriculture for Global Environmental Benefits and the Conservation of Critical Biodiversity and Forest Landscapes

¹⁶⁸ https://www.thegef.org/sites/default/files/council-meeting-documents/C.39.9_Fees_and_Project_Management_Costs%2C_October_20%2C_2010_4.pdf

GEF Implementing Agency Roles	Summary of FAO approach for its IA role
guidance to the BH on GEF specific requirements and quality assurance. The FAO-GEF CU will submit the MTR report to the GEF Secretariat.	independent consultants following the “The Guide for planning and conducting Mid-Term Reviews of FAO-GEF projects and programmes”. The Government of India, the PSC members (including the GEF Operational Focal Point), the PTF members (including LTO and FLO) will contribute to the MTR.
Project completion and evaluation. Agencies are expected to apply their internal arrangements to conduct terminal evaluations to ensure that evaluation reports of GEF-financed activities conform to GEF evaluation principles as indicated in the GEF evaluation policy. The FAO-GEF CU will submit the terminal evaluation report to the GEF through the GEF Portal.	The BH will be responsible to contact the Regional Evaluation Specialist (RES) six months prior to the actual completion date (NTE date). The RES will manage the decentralized independent terminal evaluation of this project under the guidance and support of OED..
Prepare project closing documents	BH will lead this, in partnership with the executing agencies
In addition, FAO will also play important role in financial management of the project, such as: Pay advances to the executing entity and review financial reports. Monitor and review project expenditure reports. Prepare periodic revisions to reflect changes in annual expense category budgets. Prepare the financial closure of the project for submission to the GEF	Finance staff from FAO’s Country Office in India, Regional Office and FAO Headquarters will play a role in this. FAO’s GEF Coordination Unit (based in FAO HQ, Rome) will also have a <i>financial</i> Funding Liaison Officer (FLO) who deals exclusively on finance/ budget issues. She/he will also support the project.

375. The above summarized FAO specific roles and responsibilities are described in further detail below.

376. The FAO Representative in India will be the Budget Holder (BH) and responsible for the management of the GEF resources and all aspects of the Operational Partners Agreement that will be signed between FAO and the OPs. As a first step in project start-up, the FAO Representation in India will establish an interdisciplinary Project Task Force within FAO to guide the implementation of the project. The BH, working with the Project Task Force and the related government agencies, will be responsible for ensuring timely operational, administrative and financial management of the project. The BH (supported by FAO staff and/ or consultants) will be responsible for periodic monitoring of project progress, oversight of financial management, procurement, and project progress and financial reporting. Final approval of the use of GEF resources rests with the BH, as outlined in the FAO’s rules and procedures. The FAO Representative’s responsibilities will primarily be to:

- manage project resources and all aspects as per execution agreements between FAO and the OPs;
- represent FAO in National Project Steering Committee and in State Project Steering Committees as appropriate;
- authorize the disbursement of project’s GEF resources based on satisfactory reporting on project progress and statement of expenditures;
- ensure compliance with FAO’s standards and policies;

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- review financial reports and supervise the financial management and use of resources, including clearance of Budget Revisions in consultation with the FAO LTO, the CBC/GEF Coordination Unit;
- conduct procurement activities as required and in agreement with the government, based on the assessment of internal procurement capacity;
- monitor all areas of work and suggest corrective measures as required;
- submit to the GEF Coordination Unit, the OCB Budget Group and the LTO six-monthly financial reports on the use of GEF resources (due 31 July and 31 January) that show the amount budgeted for the year, amount expended since the beginning of the year, including un-liquidated obligations (commitments) including details of project expenditures on an output-by-output basis, reported in line with project budget lines as set out in the project budget included in the Project Document;
- ensure that project partners record and provide information on co-financing contributed during the year for inclusion in the PIR;
- be accountable for safeguarding resources from inappropriate use, loss, or damage;
- be responsible for addressing recommendations from oversight offices, such as Audit and Evaluation;
- establish a multi-disciplinary FAO Project Task Force to support the project
- ensure timely progress reporting as required by FAO and GEF
- support mid-term review and final evaluation missions
- review progress reports submitted by the Operational Partners and ensure compliance with the agreed deliverables in the detailed workplans, including technical quality of the work performed;
- review and certify both Requests for Funds and Financial Reports against progress reports and the Operational Partner Agreements' (OPA) requirements on eligibility of expenditures and advise the BH on next instalment of funds;
- advice to the OPs on the preparation of documents, workplans and reports ensuring compliance with FAO requirements;
- monitor and implement agreed risk mitigation and assurance plans which will include spot checks and audits. Based on findings and recommendation, ensure follow up on remedial actions by OPs;
- manage contracts and monitor the work and quality of deliverables of the services provided by the Third Party Service Provider (Audit, spot-check, monitoring Agent activities etc.);
- ensure that OPs maintain records of supporting documents for each financial transaction to be made available to potential Resource Partners' verification missions;
- review and advise the BH on any proposed revisions of approved plans and budgets of the project component implemented by the OPs;
- prepare financial and narrative consolidated reports for submission to GEF;
- prepare amendments to the Operational Partners Agreement, as required;
- represent FAO in the National Project Steering Committee and in State Project Steering Committees as appropriate; and
- ensure that project partners record and provide information on co-financing for inclusion in the PIR.

377. The FAO Lead Technical Officer: the LTO will ensure the application of FAO technical standards and policies during project implementation. S/he will provide technical advice and backstopping to the project and support the Budget Holder in responding to requests from the government for guidance on specific technical issues during project execution, in consultation with other relevant FAO technical Officers worldwide, as necessary. The LTO will:

- review and give no-objection to ToRs for technical consultancies and contracts to be performed under the project and to CVs and technical proposals short-listed by the project

team for key project positions, goods, minor works, and services to be financed by GEF resources;

- review and clear final technical products of the project financed by GEF resources
- review and approve project progress reports submitted by the project teams to the Budget Holder;
- support the Budget Holder in reviewing, revising and giving no-objection to AWP/B submitted by the government and to be approved by the Project Steering Committees at State and the national levels;
- contribute to the preparation of the annual Project Implementation Review report, to be submitted for clearance and completion by the GEF Coordination (CBC) which will subsequently submit the PIR to the GEF Secretariat and Evaluation Office as part of the Annual Monitoring Review report of the FAO-GEF portfolio.
- field annual (or as needed) project supervision missions;
- review and revise TORs for the midterm evaluation, participate in review mission, including the midterm workshop with all key project stakeholders, development of an eventual agreed adjustment plan in project execution approach, and supervise its implementation supported by the FAO Project Task Manager.

378. The Headquarter (HQ) Technical Officer is a member of the PTF. The HQ Officer will be identified, if such expertise is not available at the Asia Pacific Regional Office, within the relevant technical expertise that will complement technical capacities of the LTO - within FAO technical departments. The HQ Technical Officer will provide effective functional advice to the LTO to ensure adherence to FAO corporate technical standards during project implementation, in particular:

- supports the LTO in monitoring and reporting on implementation of environmental and social commitment plans for moderate projects, in particular the implementation of FPIC;
- provides technical backstopping for the project work plan;
- may be requested to support the LTO and PTF for implementation and monitoring;
- supports the LTO and BH in providing inputs to the TOR of the Final Evaluation.

379. The GEF Coordination Unit (OCB) hosts the two Funding Liaison Officers for this project (on technical and one financial). The Unit will review project progress reports, implementation reviews and financial reports and budget revisions. The GEF Coordination Unit will review and submit the annual Project Implementation Reviews (PIR) to the GEF Secretariat, and undertake in-country supervision missions as necessary. The PIRs will be included in the FAO GEF Annual Monitoring Review submitted to GEF by the GEF Coordination Unit. The GEF Coordination Unit will also participate in the mid-term and final evaluations and recommend corrective actions in the project implementation strategy as needed. For the mid-term review, the GEF Coordination Unit will designate an MTR Focal Point who will coordinate with the country office to provide guidance and quality assurance to the process and the report. The GEF Coordination Unit will, in collaboration with the FAO Finance Division, request transfer of project funds from the GEF Trustee based on four monthly projections of funds needed. The FLOs will maintain corporate relations with resource partners throughout the project cycle. During Implementation, she/he submits progress reports to resource partners and supports budget holders as required in all areas of operations, including budget revisions.

380. The FAO Finance Division will clear budget revisions, provide annual Financial Reports to the GEF Trustee and, in collaboration with the GEF Coordination Unit, call for project funds on a six-monthly basis from the GEF Trustee.

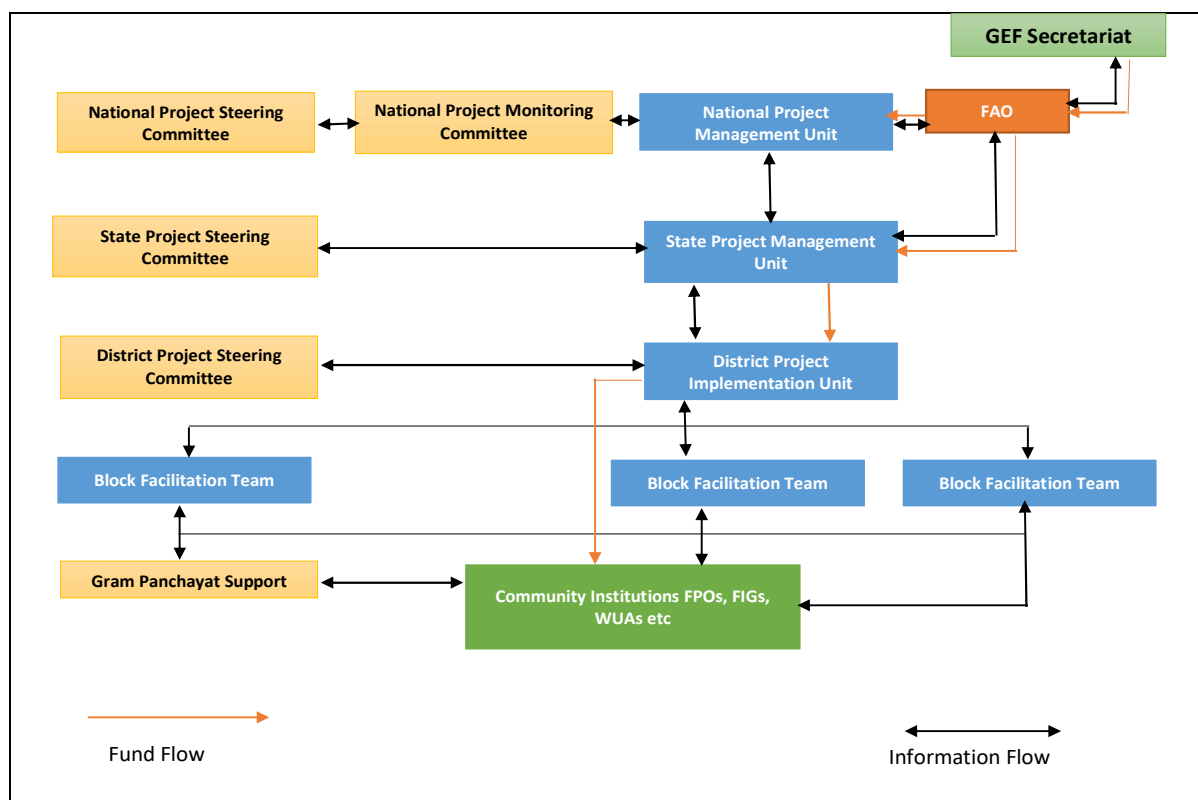
381. Project Task Force: FAO's project task force is a management body established for each of FAO field projects/programme. The PTF consists of representatives of FAO units which areas of specialization are covered by the project and which have an active role to play in the project

development and implementation. Members of the PTF are designated by their respective units from among staff capacitated and experienced to respond to the project needs. The PTF members constitute the right skill mix for the project. They pool their experience and expertise to work as a team mandated with ensuring that the project is formulated and implemented in a coherent and consistent manner and complies with the Organization's goals and policies as well as with the provision of adequate levels of technical, operational and administrative support throughout the project cycle. The PTF is established by the Budget Holder, who is the PTF Chairperson.. The LTO and FLOs will be members of this Task Force, as well as relevant FAO Headquarters Technical Officers, as appropriate.

National and State Project Implementation Arrangements

382. The project's implementation arrangements are summarized in Figure 44.

Figure 44. Project Implementation Arrangements



383. As illustrated by the colour codes above, the project has primarily three types of national institutions involved in the overall project implementation— yellow coloured bodies are primarily composed of government institutions that provide Policy Guidance and Coordination between multiple sectors, the green coloured “institutions” are primarily community institutions, and the blue coloured “institutions” are project financed project implementation teams.

Table 19. Project Policy Guidance and Coordination committees in brief

Project Policy Guidance and Coordination	Primary Responsibility
National Project Steering Committee (NPSC)	Provides overall guidance and strategic leadership to create synergies for a multi-sectoral coordination in project implementation; and facilitates ‘mainstreaming’ of relevant project findings and recommendations in National policy. The Project will work towards institutionalizing the NPSC as the ‘National Food Systems Coordination Unit, which will be responsible

Project Policy Guidance and Coordination	Primary Responsibility
	for the development of a national strategy and action plan that could eventually lead to the formulation of an Integrated Food Systems Policy.
National Project Monitoring Committee (NPMC)	Monitors project implementation and is responsible for providing general oversight in the project execution.
State Project Steering Committee (SPSC)	Provides overall guidance to the State Project Management Unit (SPMU) in project implementation; and facilitates mainstreaming of relevant project findings and recommendations into state policy. The Project will work towards institutionalizing the SPSC, in each state, as the ‘State Food Systems Coordination Unit’, which will provide strategic leadership to create synergies for a multi-sectoral coordination in managing food systems within the state and be responsible for the development of a state strategy and action plan, which could eventually lead to the formulation of an Integrated Food Systems Policy.
District Project Steering Committee (DPSC)	Under the leadership of the District Collector, monitor project implementation at the field-level and will be responsible for providing general oversight in the project execution. The DPSC will provide strategic leadership towards the management of food systems within the district.
<i>Gram Panchayat</i> Project Support Unit (GP-PSU)	Plays a critical role in project implementation. Facilitates synergy between GP development plans and project activities.

384. Farmer Producer Organizations (FPOs), Farmer Interest Groups (FIGs), or Water User Associations (WUAs) will be the key community institutions at the ground-level. The project will particularly work with the FPOs to strengthen their capacities. The FPOs will work in close coordination with the local governing bodies, such as *Gram Panchayats* (GPs) for integrated landscape management and sustainable food systems.

Table 20. Project community institutions in brief

Community Institutions	Primary Responsibilities
Farmer Producer Organizations	FPOs will be established or strengthened to enable farmers to access green value chains in ways that provide them with equitable rewards for engaging in sustainable production. FPOs will serve to aggregate the crop production of their members in order to generate economies of scale in post-harvest management, value-adding, storage and transport; coordinate sowing and harvesting among multiple farmers in order to ensure reliability and timeliness of the arrival of products at market; and negotiate fair market access and prices from a position of strength.
Farmer Interest Groups	Farmer Interests Groups are common affinity groups in villages who work together for common goals such as improving production, natural resource management etc. FIGs will be strengthened through Farmer Field Schools (FFS) on sustainable food systems and integrated landscape management. FIGs will also act as the nodes on which a FPO will function serving as local aggregation points in villages, conducting optimal production planning, maintaining common infrastructure to support production etc., and linking with the local government at panchayat level to obtain access to governmental programmes

Community Institutions	Primary Responsibilities
Water User Associations	Water user associations are groups of water users that includes the ordinary cultivators of land, individual members of lease-holding farms, owners of private farms, owners of homegarden plots, etc. They pool financial, material, technical and human resources for the operation and maintenance of the water system within their jurisdiction for the benefit of all the members. WUAs will be strengthened to manage, distribute, and conserve water from a source used jointly by the members. Further, their capacities will be developed to exchange information and ideas (including water budgeting) on water resource use, monitor water availability, provide technical assistance in areas such as soil, water, and crop management, livelihood diversification, etc., discuss potential projects and development (including climate change) that may affect water usage in the area, operate and maintain a water service or structure, management of a water distribution system, including setting tariffs and collecting fees for long term O&M activities.

385. Project implementation will be primarily supported by the National Project Management Unit (NPMU), State Project Management Unit (SPMU), District Project Implementation Unit (DPIU), and Block Facilitation Team.

Table 21. Project Implementation Units

Project Implementation Units	Primary Responsibilities
National Project Management Unit (NPMU)	Established by FAO at the national level. Provides technical assistance and ensures effective implementation of project components and coordinates all monitoring and reporting tasks at national-level.
State Project Management Unit (SPMU)	Established by the Operational Partner (OP) in each state. Works in close coordination with the NPMU for effective implementation of project components and coordinates all monitoring and reporting tasks at state-level.
District Project Implementation Unit (DPIU) and Block Facilitation Teams (BFTs)	Established by the Operational Partner (OP) in the landscape. The DPIU will be responsible for the day-to-day project implementation in the landscape. DPIU works in close coordination with the SPMU for effective implementation of project components and coordinates all monitoring and reporting tasks at state-level. The DPIU in consultation with the SPMU and DPSC will establish Block Facilitation Teams (BFTs) in the each of the project blocks within a district. The BFTs will comprise of Block Facilitators (BFs), who will be last mile project functionaries with adequate experience and skills to engage with officials, people's representatives, and communities.

386. *National Project Steering Committee (NPSC)*: The NPSC will provide overall guidance and strategic leadership to create synergies for multi-sectoral coordination during project implementation; and facilitate 'mainstreaming' of relevant project findings and recommendations into a national policies, strategies and action plans. The Secretary, Department of Agriculture, and Farmers' Welfare (DA&FW), the Ministry of Agriculture and Farmers Welfare (MoA&FW) will chair the National Project Steering Committee (NPSC). The Secretary, DA&FW, MoA&FW will be the Convener and the Joint Secretary (Crops), DA&FW will act as Secretary to this Committee. The NPSC will meet at least once a year and the meeting locations may be in one of the four project States, as well as in Delhi.

387. The FAO's India Representative will be a member of the NPSC. Additionally, state representatives from the project states will be invited as and when required. The NPSC may also

invite relevant experts/professionals as and when required. The National Project Management Unit (NPMU) will act as secretariat to the NPSC and be responsible for logistical arrangements related to the holding of such meetings.

388. The NPSC will:

- Endorse the project annual work plan and budget;
- Review and comment on technical quality of project outputs;
- Provide strategic leadership to create synergies for a multi-sectoral coordination to address Biodiversity, Land Degradation, Climate Change Mitigation, and Sustainable Food Systems issues in project implementation; and
- Facilitate ‘mainstreaming’ of relevant project findings and recommendations in National policy.

Table 22. Proposed composition of the National Project Steering Committee (NPSC)

S.N.	Name and Designation	Status
1	Secretary, Department of Agriculture, and Farmers’ Welfare (DA&FW) the Ministry of Agriculture and Farmers’ Welfare (MoA&FW)	Chair
2	Agriculture Commissioner, DA&FW, MoAFW	Member
3	Chair Person Protection of Plant Varieties and Farmers Rights Authority (PPV&FRA), MoA&FW	
4	DDG (Crops), Indian Council of Agricultural Research (ICAR)	Member
5	DDG (Animal Sciences), ICAR	Member
6	Joint Secretary (IC & Nodal GEF Project), MoEF&CC	
7	Joint Secretary (National Rural Livelihoods Mission), Ministry of Rural Development (MoRD)	Member
8	Joint Secretary (Integrated Watershed Management Programme), Department of Land Resource, MoRD	Member
9	Advisor (Agri.), NITI Ayog	Member
10	Chair of the State Project Steering Committee (SPSC) or representative from the States of Chhattisgarh, Haryana, Odisha, and Punjab	Member
11	Representative of Director General Forests, MoEF&CC (not below the rank of Inspector General of Forests)	Member
12	World Bank Representative in India (Global FOLUR Lead)	Member
13	FAO Representative in India	Member
14	Joint Secretary (Crops), DACFW, MoA&FW	Member Secretary

389. The National Project Coordinator will participate in the NPSC meetings as an observer. The NPMU will provide periodic updates to NPSC members on project progress in all the four project states. In addition, case studies (both project and other relevant experiences) and findings from project landscape impact, monitoring, and lessons captured will be shared.

390. Each NPSC member will assume the role of a Focal Point for the project in their respective departments/agencies. As the project’s Focal Point in their respective agencies, they will (i) will represent respective ministries and see how best to align their ministry/department’s activities with project’s interventions, (ii) ensure two-way exchanges of information and knowledge sharing between their ministry and the project, (iii) facilitate coordination and links between project activities and the work plan of their ministry, and (iv) facilitate provision of co-financing to the project.

391. The Project will work towards institutionalizing the NPSC as the ‘National Food Systems Coordination Unit’. This unit will provide overall guidance and strategic leadership to create synergies for a multi-sectoral coordination for the development of a national strategy and action plan that could eventually lead to the formulation of an Integrated Food Systems Policy across the country. This will include relevant national level policy directives for sustainable food systems.

392. National Project Monitoring Committee (NPMC): The National Project Monitoring Committee (NPMC) will monitor project implementation and provide general oversight in the project execution. It will be chaired by the Joint Secretary (Crops), DA&FW, MoA&FW. The Joint Secretary (Crops), MoA&FW will be the Convener and the Additional Commissioner (Crops), DA&FW will act as Member Secretary.

393. The NPSC may invite relevant experts/ professionals as and when required. The NPMC will meet twice in a year, with one meeting at the end of the calendar year focusing on work plans and progress of the project and one meeting primarily focusing on policy and strategy issues. As the project gains momentum, it is expected, however, that policy and strategy issues will feature on the agenda of both meetings. The National Project Management Unit (NPMU) will act as secretariat to the NPMC and be responsible for logistical arrangements related to the holding of such meetings. The NPMU will provide periodic updates to NPMC members on project progress in all the four project states. Also, case studies (both project and other relevant experiences) and findings from the project states and lessons captured will be shared.

394. The NPMC will:

- Review the project and state specific annual work plans and budgets;
- Review and comment on national and state specific technical progress reports related to project implementation;
- Ensure timely availability and effectiveness of co-financing support;
- Provide policy guidance to NPMU;
- Ensure synergy in project implementation between various Government departments, donors, private sector interventions, and project stakeholders;
- Facilitate policy dialogue and advocacy on project learning and outcomes; and
- Ensure sustainability of key project outcomes, including up-scaling and replication.

395. The composition of the NPMC will be as follows:

Table 23: National Project Monitoring Committee (NPMC)

S.N.	Name and Designation	Status
1	Joint Secretary (Crops), DA&FW, MoA&FW	Chair
2	FAO Representative	Member
3	Assistant Director General (Seeds), Indian Council of Agricultural Research (ICAR)	Member
4	Assistant Director General (Natural Resources Management), ICAR	Member
5	Director (IC and Nodal Officer GEF projects), MoEF&CC	Member
6	Representative of Chairman (rank of Director/Deputy Secretary), Central Groundwater Board (CGWB), Ministry of Jal Shakti	Member
7	Director of ICAR-Central Rice Research Institute (CRRI), Cuttack or representative	Member
8	Director of ICAR -Indian Institute of Wheat and Barley Research (IIWBR), Karnal or representative	Member
9.	Additional Commissioner (Crops), DA&FW, MoA&FW	Member Secretary

396.

State level:

397. **State Project Steering Committee (SPSC):** A State Project Steering Project Committee (SPSC) will be established in each of the four project States to guide project implementation. Each SPSC will be chaired by the Chief Secretary of the State or his/ her designate. Principal Secretary of the nodal department will be the Convener and the Project Nodal Officer will act as Member Secretary.

398. The SPSC will be responsible for providing oversight to the Project at the state-level and will ensure that all inputs and processes required for the implementation of project activities agreed upon under the GEF project document are adequately prepared and carried out. The SPSC will facilitate inter-sectoral coordination, ensure the mobilization of co-finance, and support any conflict resolution as necessary. This committee will provide overall guidance to the State Project Management Unit (SPMU) in project implementation; and facilitate mainstreaming of relevant project findings and recommendations into state policy.

399. Proposed members of the SPSC are presented below and the committee can invite relevant experts as special invitees / observers as required. The SPSC will be chaired by the Chief Secretary or his/her designate.

Table 24. Proposed composition of the State Project Steering Committee (SPSC)

S.N.	Name and Designation	Status
1	Chief Secretary	Chair
2	Agriculture Production Commissioner/ Development Commissioner	Member
3	Secretary, Department of Agriculture and Farmers' Empowerment	Member
4	Secretary, Department of Forests and Environment	Member
5	Secretary, Department of Horticulture	Member
6	Secretary, Department of Scheduled Tribe and Scheduled Castes Development (if present)	Member
7	Secretary, Department of Rural Development	Member
8	Secretary, Department of Finance	Member
9	Member Secretary, State Biodiversity Board (SBB)	Member
10	Vice Chancellor, State Agriculture Universities (SAUs)	Member
11	Chairman, State Level Bankers' Committee or Representative not below the rank of Deputy General Manager	Member
12	Representative from NPMU	Member
13	FAO Representative	Member
14	District Collectors of project districts	Member
15	State Project Nodal Officer ¹⁶⁹ / Project Director	Member Secretary

400. The SPSC will:

- Provide overall guidance to the State Project Management Unit (SPMU) in project execution. It will also have the responsibility for endorsing the State Annual Work Plan and Budget (S-AWP/B) and the State Annual Project Report (S-APR) from the previous year's technical activities.
- Ensure all project outputs are as outlined in GEF approved Project Document;

¹⁶⁹ The Project Nodal Officer in each state is appointed by the Chief Secretary of the particular State Government.

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- Ensure synergy in project implementation between various government departments, donors, private sector interventions, and project stakeholders;
- Review, amend if appropriate, and approve the draft State Annual Work Plan and Budget of the project for submission to NPMU and FAO; and
- Facilitate the “mainstreaming” of relevant project findings and recommendations into state policies, plans and strategies.
- Appraise the project on any proposed government plans, policies, investments that might be relevant to the project and facilitate sharing of relevant good practices from other parts of the State
- Meet at least twice a year (or more as decided by the Committee)
- Support preparation of management responses’ for independent midterm review and final evaluation of the project
- Facilitate coordination and linkages of project activities with the national level work and sharing / learning with other states involved in this project

401. The SPSC members will include 10 to 12 members of the rank of Secretary, who will (i) provide support to project activities relevant to their departments, (ii) ensure two-way exchange of information and knowledge between their department/agency and the project, (iii) facilitate coordination and links between the project activities and the work plan of their department, (iv) facilitate better coordination across Departments and Ministries, and (v) facilitate the provision of co-financing to the project.

402. The State Project Management Unit will act as Secretariat to the SPSC and will be responsible for logistical arrangements related to the holding of such meetings, circulating the meeting agenda and sharing final meeting minutes.

403. **District Project Steering Committee (DPSC):** The project will be supported by 8 DPSCs—one per project district (across the four project States). The DPSC will be established in the District Collectorate under the leadership of the District Collector. The DPSC will provide multi-sectoral coordination and strategic leadership for project implementation in each of the project districts. They will facilitate creation of synergies, which will include dovetailing existing resources (line departments, KVKs, Universities/ Academic Institutions, CSOs/NGOs, PRIs, government and donor funded programs) with project resources; ensuring synergy between different project blocks within the district; and coordinating with local self-governing bodies (e.g. FIGs and WUAs) and FPOs to facilitate planning for integrated landscape management and sustainable food systems. The DPSC will meet at least once a quarter.

404. The District Collector will chair the DPSC and represent the DPSC in the SPSC. The District Project Implementation Unit (DPIU) will act as Secretariat to the DPSC and be responsible for providing members with all required documents in advance of DPSC meetings, including the quarterly implementation reports, draft quarterly action plan and budget. The DPIU will prepare written minutes of all DPSC meetings and be responsible for logistical arrangements related to the holding of such meetings

405. The composition of the DPSC will be as follows:

Table 25. Composition of the District Project Steering Committee (DPSC)

S.N.	Name and Designation	Status
1	District Collector cum Magistrate	Chair
2	DFO/ Dy.CF of Forests (Territorial/ Wildlife)	Member
3	District Head, Department of Horticulture	Member
4	District Head, Department of Scheduled Tribe and Scheduled Castes Development	Member
5	District Head, Department of Panchayat Raj & Rural Development	Member
6	<i>Krishi Vigyan Kendra</i> (KVK)	Member
7	Lead Bank Officer (District)	Member

S.N.	Name and Designation	Status
8	Representatives from relevant educational and research institutions	Member
9	Representatives of Gram Panchayat of project area (3, at least one should be woman)	Member
10	Representatives of Farmer Producer Organizations (as and when constituted, one male and one female)	Member
11	SPMU Representative	Member
12	State Project Nodal Officer/ Project Director or their representative	Member
13	District Head, Department of Agriculture and Farmers' Empowerment	Member Secretary

406. DPSC will support project implementation in the identified blocks in the district. This Group will monitor project implementation at the field-level, and provide general oversight in the project execution. Specifically, it will:

- Monitor project implementation;
- Provide overall guidance in project implementation to the District Project Implementation Unit (DPIU);
- Ensure all project outputs are in consonance with the S-AWP&B;
- Dovetail project activities with ongoing schemes and programs in the district;
- Ensure synergy in project implementation between various Government departments, donors, private sector interventions, and project stakeholders; and
- Facilitate the “mainstreaming” of relevant project findings and recommendations into state policy.

407. **Gram Panchayat Project Support Unit (GPSU):** The *Gram Panchayat* Project Support Unit will play a critical role in project implementation. A *Gram Panchayat* Project Support Unit (GPSU) will be established to facilitate synergy between GP development plans and project activities. The GPSU will be chaired by the GP *Sarpanch/Pradhan/Mukhiya* or Village head. The Village Secretary will be the convenor. The local Block Facilitator¹⁷⁰ (BF) will provide secretarial assistance to the GPSU. The GPSU will meet every quarter to review the implementation of the GP-level Sustainable Food Systems Management Plans.

Table 26. Gram Panchayat (Village Council) Project Support Unit

Name and Designation	Status
Head of GP/Village Council	Chair
Village Secretary	Convener
Officials of agriculture, horticulture, revenue, forest, SC & ST department, KVK, Watershed Technical Officer, Sericulture, Project Representative of any specific project aligned with agriculture sector	Members
Representatives of Civil Society Organization, SHG federation, FPOs, Indigenous communities, Farmer Interest Groups (FIGs), Water User Associations (WUAs), Watershed Committees, etc. (at least 50% of the community representatives will be women; and small and marginal farmers will be preferred)	Members
Representative of DPSC	Advisor
Block Facilitator	Advisor

¹⁷⁰ Community Resource Persons (CRPs) will be assigned the responsibility of project implementation at GP-level. Depending on the size of GP, one or two community organizers will be assigned the responsibility of coordinating project implementation in a GP.

Farmer Producer Organizations (FPOs)

408. Wherever possible, the project will work with existing FPOs, but new FPOs will be established in project districts where FPOs do not exist or when existing FPOs are not keen to partner with the project. These FPOs will be strengthened to enable farmers to access green value chains in ways that provide them with equitable rewards for engaging in sustainable production. FPOs will serve to aggregate the crop production of their members in order to generate economies of scale in post-harvest management, value-adding, storage and transport; coordinate sowing and harvesting among multiple farmers in order to ensure reliability and timeliness of the arrival of products at market; and negotiate fair market access and prices from a position of strength. Wherever the market needs arise, the FPOs will be formally registered under the Companies Act to comply with the statutory requirements. The FPOs will be encouraged to have an elected Board of Directors from among the members who will monitor the usage of FPO resources. The BoD will be headed by a Chairman, Secretary and Treasurer who will be elected from among the FPO members. Further, the FPOs will be encouraged to conduct quarterly Annual General Meetings to share information with all members of the FPOs on the financial status of the FPO.

409. Capacities of FPOs will be strengthened to access and participate effectively in environment- and nutrition-friendly value chains that provide them with the market-based incentives needed to make sustainable and nutrition-friendly production attractive to them. These interventions will be tailored to local conditions, contributing to the consolidation of village-level social capital and therefore socially-sustainable, and providing employment and business opportunities for community members. Capacities of FPOs will also be strengthened on monitoring mechanisms so that communities understand the principles of business planning, financial literacy, etc. Special attention will be paid on governance mechanisms of the elected members on social inclusion, development of scorecards for effective monitoring of FPOs' financial resources.

410. A Green Value Chain Development Cell (GVCDC) will be established under the National Project Management Unit with linkages to each of the four states, that works towards addressing these gaps and building robust value chains that promote sustainable production and work towards market recognised sustainability standards. The GVCDC is envisaged as a platform and resource centre for the private sector players, FPOs and State level Federation of FPOs and other willing value chains players to facilitate creation of market led extension models, sustainability standards based production system, and designing Public Private Partnerships, targeted towards addressing value chain gaps on a collaboration or a turnkey basis.

411. The GVCDC will develop the necessary resources for the formalization and operational management of the FPOs. This will include development of training materials, modules, protocols Standard Operational Procedures etc. The GVCDC will also help FPOs in upgrading their internal capabilities, systems and processes through towards improving overall business efficiency. It will also develop the entrepreneurial and managerial capacities of the FPO team through intensive trainings and exposures, and guide the FPOs in getting the required licenses, permits etc. It is expected that the FPOs formed under FOLUR would either strengthen or start agri businesses. The GVCDC would help these FPOs in preparation of bankable Detailed Project Reports (DPR) to avail formal institutional finance. It would act as an incubator of entrepreneurs / micro enterprises.

412. The FPOs will be encouraged to access resources available with the Gram Panchayats such as the use of Gram Panchayat building, leasing of land from the Gram Panchayat for construction of critical infrastructure for value chain development, etc. All such agreements between the FPO and the GP will through formal agreements. Such agreements will strengthen the oversight of the GP on the FPO activities and ensure wider participation and buy in of the community.

Project Implementation Units

413. **National Project Management Unit:** The Crops Division of the Department of Agriculture, Cooperation and Farmers' Welfare (DA&FW), the Ministry of Agriculture and Farmers Welfare (MoA&FW) has approved FAO to host the National Project Management Unit (NPMU) responsible for the day-to-day project operation. The NPMU will consist of a GEF-funded National Project Coordinator, and Admin/ Finance Officer to support the technical team. The NPMU staff will be

supported by the FAO Technical Support Services and FAO India in project implementation and supervision, including: (i) technical support service, supervision, and monitoring of the project; and (ii) preparation of the annual Project Implementation Review (PIR).

414. The primary responsibility of the NPMU will be to ensure the effective implementation of project components detailed out in the project document. The NPMU will:

- Prepare and coordinate the implementation of the Annual Work Plans and Budget (AWP/B);
- Implement a system to monitor project outputs and outcomes and perform all monitoring and reporting tasks as described in the project document;
- Design, implementation strategies;
- Build implementation capacity of the State Project Management Units (SPMUs), District Project Implementation Units (DPIUs) and Block Facilitation Teams (BFTs);
- Maintain quarterly/six monthly financial records (including support documentation) submitted by the Operational Partners for verification by FAO and external auditors and ensuring compliance with the monitoring and financial reporting requirements of the Operational Partners Implementation Modality (OPIM) agreement;
- Prepare and submit for approval by the FAO disbursement requests and corresponding justification of expenditures based on an updated AWP/B;
- Act as secretariat for the National Project Monitoring Committee and National Project Steering Committee; and
- Handle all day-to-day project issues and requirements and ensure a high degree of national, state and local inter-institutional collaboration.

415. Key positions and responsibilities for the NPMU are listed in Annex M.

416. **State Project Management Unit:** The Operational Partner (OP) in each state will set up the State Project Management Unit (SPMU). The SPMU will be responsible for the day-to-day project management in the state. The SPMU will consist of a State Project Director¹⁷¹, State Technical Coordinator¹⁷², a M&E and Communications Expert, a Value Chain Expert, and a Finance & Admin Expert. SPMU will be established by the State OPs. This Unit will work in close coordination with the NPMU for effective implementation of project components and coordinates all monitoring and reporting tasks at state-level.

417. The primary responsibility of the SPMU will be to ensure the effective implementation of project components detailed out in the project document. The SPMU will:

- Prepare and coordinate the implementation of the State Annual Work Plans and Budget (S-AWP/B) in close coordination with the District Project Implementation Unit (DPIU);
- Implement a system to monitor project outputs and outcomes and perform all monitoring and reporting tasks;
- Prepare and obtain approval from FAO for all documentation needed to hire consultancy services and for the limited acquisition of equipment necessary to provide the services, ensuring procurement processes comply with the OPIM agreement;
- Prepare all documentation for recruiting, monitoring and administering DPIU;
- Maintain accounting and financial controls, including adequate support documentation, filing systems for verification by FAO and external auditors and ensure compliance with all FAO monitoring and financial reporting requirements as established in the OPIM agreement between FAO and OP;
- Design, implementation strategies;
- Build implementation capacity of the DPIUs;

¹⁷¹ State Project Director will be co-financed by the state.

¹⁷² All other SPMU members will be financed by the project.

- Train DPIU and BFT teams on (a) FFS methodology and effective extension, (b) FFS Implementation Protocols (c) Monitoring FFS and (d) Enabling Environment (i.e. incentive systems for adoption of GEB friendly agricultural practices);
- Orient the DPIU and DPSC members of Sustainable Foods Systems strategies, Decision Support Tool, and Knowledge Management Tool;
- Prepare and submit for approval by the FAO Project Task Manager/FAOR disbursement requests and corresponding justification of expenditures based on an updated AWP/B;
- Act as a secretariat of the State Project Steering Committee; and
- The SPMU will provide periodic updates to SPSC members on project progress within the state. Also, case studies (both project and other relevant experiences) and findings from Sustainable Food Systems impact, monitoring, and lessons captured will be shared.
- Handle all day-to-day project issues (in the state) and requirements and ensure a high degree of state and local inter-institutional collaboration.

418. Key positions and responsibilities for the SPMUs are listed in Annex M.

419. **District Project Implementation Unit:** The Operational Partner (i.e. The SPMU) will establish District Project Implementation Units (DPIU) at the landscape level. The DPIU will be responsible for the day-to-day project implementation in the landscape.

420. The primary responsibility of the DPIU will be to implement the project activities as per the project components detailed out in the project document and the State Annual Work Plan and Budget (S-AWP/B). The DPIU will:

- prepare and coordinate the implementation of the S-AWP/B;
- implement a system to monitor project outputs and outcomes and perform all monitoring and reporting tasks;
- mobilize, engage and build capacities of local communities in the project Landscape;
- design variety of knowledge products catering to multiple stakeholders;
- document good practices and lessons learnt;
- maintain accounts, including adequate support documentation, filing systems for verification by the OP and external auditors and ensure compliance with all OP monitoring and financial reporting requirements;
- prepare and submit for approval by the State Project Director/ State Technical Coordinator disbursement requests and corresponding justification of expenditures based on Quarterly Work Plans and Budget;
- act as secretariat to the DPSC; and
- handle all day-to-day project issues and requirements and ensure a high degree of inter-institutional collaboration at the landscape-level.

421. The DPIU will host the technical experts outlined in Annex M. The expert team in the DPIU will focus on conceptualizing implementation strategies, designing a variety of knowledge products catering to multiple stakeholders, and documenting good practices and lessons learnt. The Block Facilitation Team will interface with the community stakeholders and undertake outreach activities.

422. The DPIU designs and implements project activities to achieve targets presented in the project document and the State Annual Work Plan and Budget (S-AWP/B).

423. Key positions and responsibilities for the DPIU are listed in Annex M.

424. **Block Facilitation Teams (BFTs):** The DPIU in consultation with the SPMU and DPSC will establish Block Facilitation Teams (BFTs) in the each of the project blocks within a district. The BFTs will comprise of four Block Facilitators (BFs), who will be last mile project functionaries with adequate experience and skills to engage with officials, people's representatives, and communities.

425. The BFs will facilitate interactions between District Project Implementation Team and local stakeholders. The BFs will also liaise with relevant Govt. officials at the Block level to facilitate convergence with government programs. Likewise, they will liaise with representatives of the Gram

Panchayats in the project area. For their effective functioning and discharging of project responsibilities, the DPSC must recognize the BF's as the project focal persons in the project blocks.

426. The BF's will also serve as the Master Trainers to train farmers and other community members on various technical aspects related to SFS and integrated landscape management practices. Additionally, they will also monitor and report the implementation of project activities through the project MIS for concurrent monitoring.

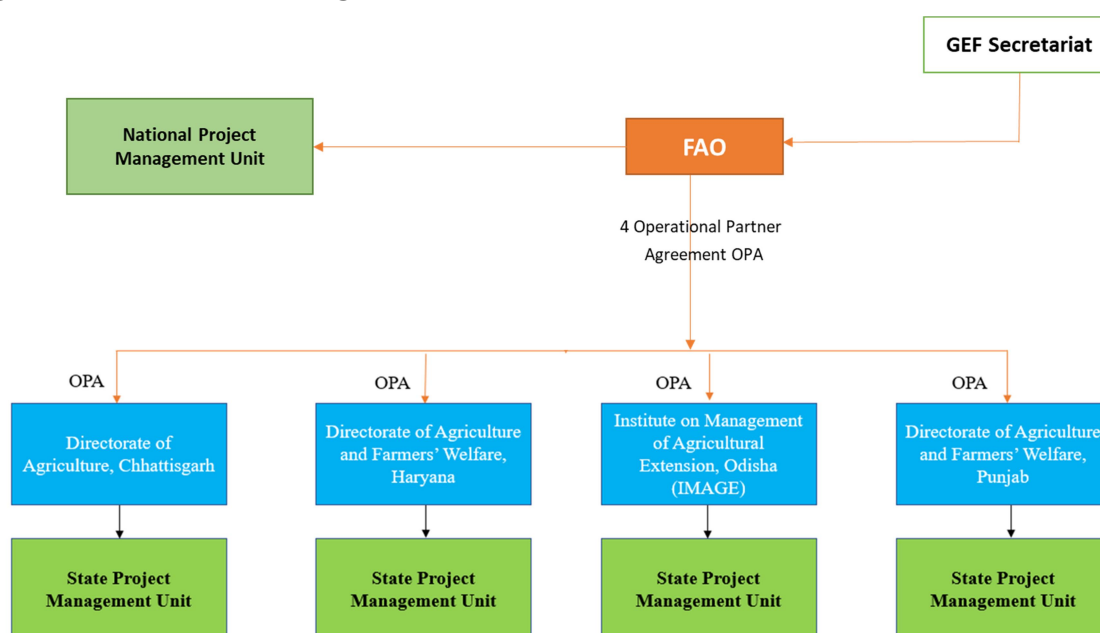
Annual Work Plan and Budget (AWPB) and Fund Flow Arrangements

Contractual Arrangements

427. FAO proposes to use the Operational Partnership Implementation Modality (OPIM—FAO's equivalent to National Execution) for project implementation. Funds will be routed through the OPIM mechanism directly to the National and State Partners. FAO budget holder will retain a small portion of funds to issue Letters of Agreement for specific technical support with relevant CGIAR and State Agriculture Universities (SAUs) in project implementation. The National Project Steering Committee (NPSC) will approve the project Annual Work Plan and Budget (AWPB).

428. FAO India will sign a Government Cooperative Programme (GCP) agreement with the Ministry of Agriculture and Farmers Welfare (MoA&FW). The GCP will be an umbrella agreement that includes all the five agreements that FAO will sign with the Operational Partners (OP) at the national and with the four states. The OPs will be encouraged not to undertake further sub-contracting.

Figure 45. Contractual Arrangements



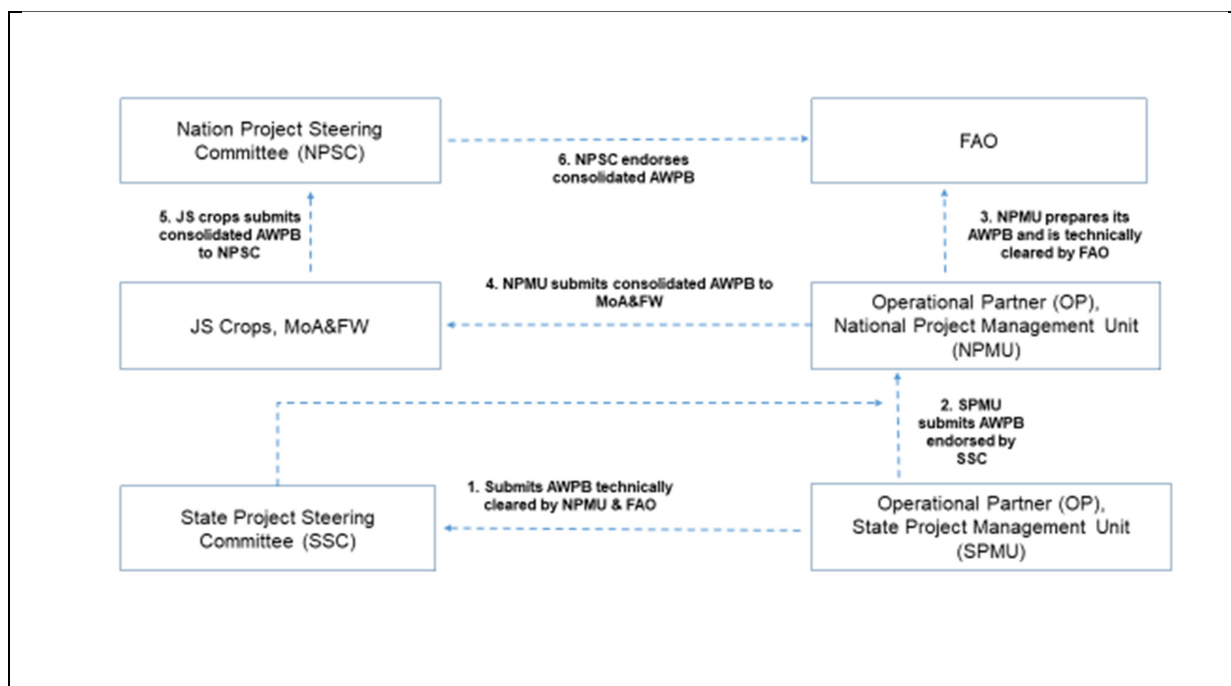
Annual Work Plan and Budget (AWPB)

429. The process for fund disbursement will be as follows:

1. The OPs in each state will prepare an Annual Work Plan and Budget (AWPB) in consultation with the NPMU and FAO.
2. After technical clearance from NPMU and FAO, each OP will submit the AWPB to the State Project Steering Committee (SPSC).
3. After obtaining SPSC's endorsement, each OP will submit the endorsed AWPB to the NPMU.
4. NPMU will prepare a consolidated AWPB (which includes AWPB of all OPs and that of the NPMU) and submit it to the JS Crops in MoA&FW.
5. JS Crops reviews and submits the consolidated AWPB to the National Project Steering Committee (NPSC) for approval.

6. For seeking NPSC's endorsement, the OP representatives will be invited as project participants to provide requisite clarifications to the NPSC.
7. After NPSC's approval, FAO makes arrangements for the disbursement of funds for project implementation.

Figure 46. Annual Work Plan and Budget (AWPB) Process

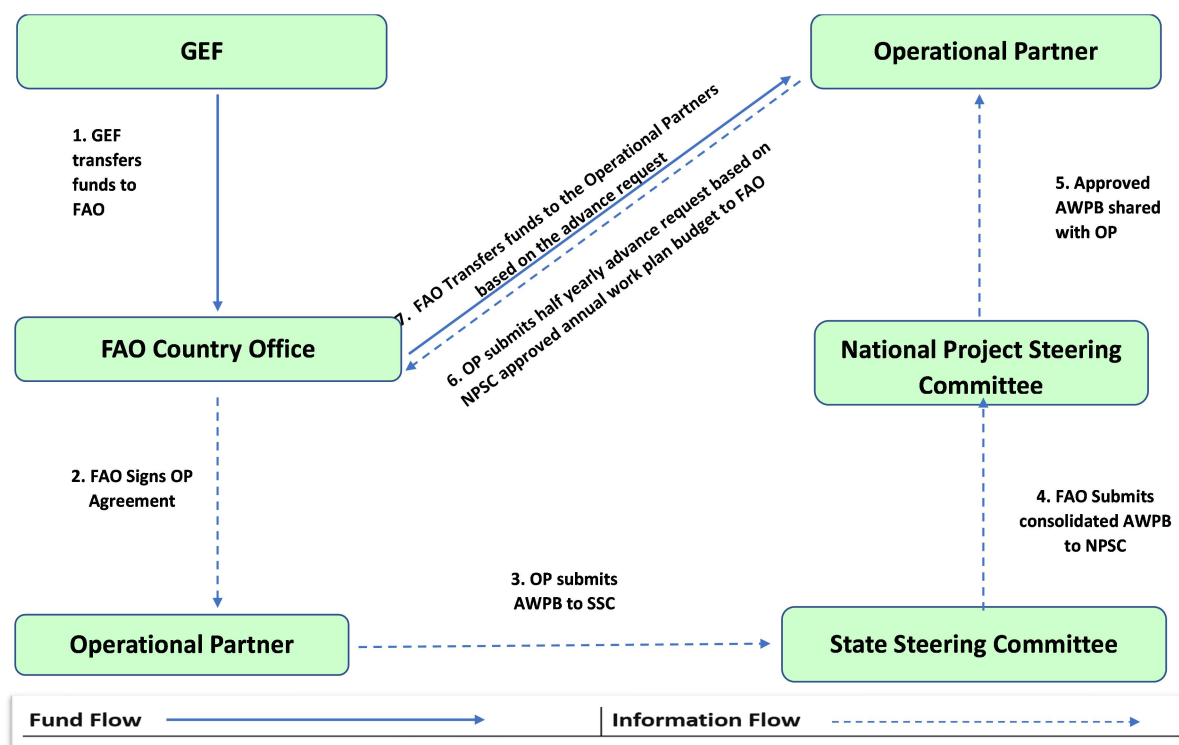


Fund Flow

429. Each OP (both at national and state levels) submits work plan and budget, a narrative report and expenditure statements with supporting documents for FAO's endorsement in line with the AWPB approved by NPSC. Each OP (both at national and state levels) submits work plan and budget, a narrative report and expenditure statements with supporting documents for FAO's endorsement in line with the AWPB approved by NPSC. After NPSC's approval, FAO makes arrangements for the disbursement of funds for project implementation to the OPs under Rules 237 (ii) and 238 (3) of the Government of India's General Financial Rules (GFR), Chapter 10, Budgeting and Accounting of Externally Aided Projects

430. OP submits advance payment request to FAO. FAO releases payment to OP. The OP opens a separate bank account for the project for receipt of funds and expending them.

Figure 47. Fund Flow Process



7. Consistency with National Priorities

430. The project will contribute to the goals of the National Agricultural Development Plan (RKVY), of achieving a 4% annual growth in the agriculture sector, and a doubling of farmers' incomes between 2016 and 2023, by opening up income generation opportunities in resilient green value chains.

431. The project will help GoI to achieve key agricultural policy goals in an environmentally sustainable manner, namely:

- The aim of the National Food Security Mission (NFSM) to increase the production of rice, wheat, pulses and coarse cereals;
- The aims of the Crop Diversification Programme and the Bringing the Green Revolution to Eastern India (BGREI) initiative to move away from unsustainable high-input rice and wheat production by supporting crop diversification and shifting the geographical focus of agricultural production to the less moisture-limited east;
- The aims of the Targeting Rice Fallow Areas (TRFA) sub-scheme of RKVY to promote the production of pulses and oilseeds in rice fallow areas in eastern India.

432. The project is also closely aligned with the policy goals of GoI in relation to sustainable and organic production, as expressed in the National Mission on Sustainable Agriculture (NMSA) and its sub-schemes.

433. Both directly (through actions under Component 3) and indirectly (through scaling out) the project will contribute to India's **Land Degradation Neutrality** target of restoring 26 million hectares of degraded land by 2030.

434. The project will contribute in particular to the following action points of the **National Biodiversity Strategy and Action Plan**:

- Promote conservation of biodiversity outside the PA network
- Ensure conservation of ecologically sensitive areas
- Integrate conservation and wise use of wetlands and river basins
- Identify hotspots of agrobiodiversity under different agro-ecozones and cropping systems and promote on-farm conservation
- Promote economically feasible and socially acceptable incentives such as value addition and direct market access in the face of replacement by other economically remunerative cultivars
- Secure integration of biodiversity concerns into inter-sectoral policies and programmes
- Support decentralized management of biological resources with emphasis on community participation
- Promote sustainable use of biodiversity in sectors [including] agriculture and forestry
- Promote best practices on traditional sustainable uses of biodiversity and devise mechanisms for providing benefits to local communities
- Promote capacity building at grassroots level for participatory decision-making to ensure eco-friendly and sustainable use of natural resources
- Encourage adoption of science-based, and traditional sustainable land use practices
- Promote reclamation of wasteland and degraded forest
- Promote sustainable alternatives to shifting cultivation when it is no longer ecologically viable, ensuring that the culture and social fabric of the local people are not disrupted.
- Encourage agroforestry, organic farming, environmentally sustainable cropping patterns, and adoption of efficient irrigation techniques
- Integrate wetland conservation into sectoral development plans
- Integrate biodiversity concerns across development sectors
- Take steps to adopt and institutionalize techniques for environmental assessment of sector policies and programmes
- Promote integrated approaches to management of river basins
- Promote organic farming of traditional crop varieties... facilitating marketing of organic produce in India and abroad

PART II 7. Consistency with National Priorities

- Strengthen participatory appraisal techniques and encourage formation of local institutional structures for planning and management of natural resources for ensuring participation of women.
- Develop a system of natural resource accounting reflecting the ecological as well as the economic values of biodiversity.

Table 27. Project contributions to National Biodiversity Targets¹⁷³

National Biodiversity Targets	Project contributions and related [Aichi biodiversity targets]
1. By 2020, a significant proportion of the country's population, especially the youth, is aware of the values of biodiversity and the steps they can take to conserve and use it sustainably.	Under Outcome 1.2, the project will support the establishment of Decision Support Systems for policy makers and planners, which will include information on biodiversity values and options for management [1]
2. By 2020, values of biodiversity are integrated in National and State planning processes, development programmes and poverty alleviation strategies.	Under Outcome 1.1, the project will support the mainstreaming of sustainable food systems and integrated landscape management issues (including biodiversity and its values) into policy agendas at national and state levels [2].
3. Strategies for reducing rate of degradation, fragmentation and loss of all natural habitats are finalized and actions put in place by 2020 for environmental amelioration and human well-being.	Improved management and restoration in production landscapes and ecosystems will result in a CCM benefit of -61,233,630 tCO ₂ eq [15].
4. By 2020, measures are adopted for sustainable management of agriculture, forestry and fisheries.	Through the project, XX ha will be under improved management to benefit biodiversity (core indicator 4.1) [7] The project will result in reduced levels of pesticide and nutrient application to production systems [8]
5. Ecologically representative areas on land and in inland waters, as well as coastal and marine zones, especially those of particular importance for species, biodiversity and ecosystem services, are conserved effectively and equitably, on the basis of PA designation and management and other area-based conservation measures and are integrated into the wider landscapes and seascapes, covering over 20% of the geographic area of the country, by 2020.	Restoration activities proposed under Outcome 3.1 will include wetland restoration. While the project will not work directly on PA management, the district level ILM/SFS plans will consider the relations between production systems and natural ecosystems (including PAs) in the landscape [11]. The improvement of ecosystem management through the project, under Component 2 and 3, will benefit the conservation status of a significant number of globally important and threatened species, as set out in section II. 1a. 6 on global environmental benefits [12].
6. By 2020, ecosystem services, especially those relating to water, human health, livelihoods and wellbeing, are enumerated and measures to safeguard them are identified, taking into account the needs of women and local communities, particularly the poor and vulnerable sections.	As a result of the project (Outcome 3.1), 131,897 ha of landscapes will be restored, with a priority focus on areas that generate ecosystem services [14].
7. By 2020, an effective, participatory and	The policy mainstreaming support proposed under

¹⁷³ <https://www.cbd.int/countries/targets/?country=in>

National Biodiversity Targets	Project contributions and related [Aichi biodiversity targets]
updated national biodiversity action plan is made operational at different levels of governance.	Outcome 1.1 will enable national and state level actors to review incentive mechanisms [3] An indicator of Outcome 1.1 is that food systems agendas (including sustainable production and consumption) will have been developed [4]

435. The project will in particular contribute to India's **Intended Nationally Determined Contributions** to the UN Framework Convention on Climate Change:

1. To put forward and further propagate a healthy and sustainable way of living based on traditions and values of conservation and moderation.
2. To adopt a climate friendly and a cleaner path than the one followed hitherto by others at corresponding level of economic development.
5. To create an additional carbon sink of 2.5 to 3 billion tonnes of CO₂ equivalent through additional forest and tree cover by 2030.

The project is also aligned to national priorities as articulated in agreed Country Partnership Framework for FAO in India. The project contributes overall to FAOs' Strategic Objectives: SO2: Make agriculture, forestry and fisheries more productive and sustainable and Priority Area 1: Improve agricultural productivity through sustainable natural resource management

The project directly contributes to the following Country Outcomes:

1. Outcome 1: Create an enabling environment for policy support and demonstrate innovative models on productivity improvements in agricultural, farm and non-farm livelihood activities and sustainable natural resource management.
2. Output 1.6: Support sustainability of the rice-wheat food system in four states of India and deliver multiple global environmental benefits

8. Knowledge Management

436. In line with GEF Knowledge Management Guidelines¹⁷⁴, knowledge generation, management and learning will be an essential component to achieving the expected transformative impact of the project in India. The actions of the project in relation to knowledge management are set out under project Outcome 4.1, which has a budget of US\$ 1193960. Specific outputs in relation to knowledge management (described in more detail in Section II. 1a. 3) are as follows:

- *Output 4.1.1 Knowledge management and communication systems:* a major focus of this Output will be on generating and sharing knowledge within the four project States, between States involved in this project and with other stakeholders nationally and internationally. Information will be shared through existing government, FAO and GEF portals, as well as through organization of special seminars, workshops, events, and audio-visual materials. Publication of relevant posters, articles and reports will be supported – including publications in relevant State languages.
- *Output 4.1.2 Innovation forum/platform established:* this will provide a platform for the identification, socialization and support of innovative ideas and enterprises in relation to issues of relevance to the FOLUR project, in relation to sustainable food systems and integrated landscape management.
- *Output 4.1.3: Mechanisms to coordinate the project with global, regional and transboundary efforts under the FOLUR IP and beyond:* the project will finance participation in Global meetings of FOLUR partners and CPs; participation in Regional commodity platform gatherings / discussions with private and public sector representatives; participation/contribution to training workshops, regional communities of practice (sharing knowledge, successes); contribution of achievement and success stories for the FOLUR IP Annual report; engagement with media within country, as well as consultation toward annual work planning; contributions to global knowledge products and flagship reports (peer reviews, technical inputs); and annual M&E results reporting to the GP for consolidation and reporting to GEF.

437. A detailed Knowledge Management and Communication Plan will be developed at project start, by the project's dedicated Knowledge Management Officer.

438. The project will be fully aligned with the FOLUR global knowledge management strategy and thus engage robustly with the FOLUR Global Platform (GP) to share lessons learned outward and bring lessons, investment and good practice to India. This engagement will be a two-way street with the GP enabling catalytic engagement by the child projects to benefit from global level dialogue and action. Lessons learned across this portfolio of programmes will strengthen global-level IP outcomes on leveraging global coalitions to pursue FOLUR objectives and outcomes and promoting public and private investments in ILM, deforestation-free commodities influenced by FOLUR, in FOLUR countries and globally.

439. The specific strategies and actions that the project will undertake to coordinate with the GP, on facilitating effective KM at project and programme levels, are shown in Supplementary **Error! Reference source not found.**, in relation to Pillar C of the GP on Strategic Knowledge Management and Communications.

440. The Asia Pacific Regional Climate Change Initiative hosted by FAO integrates a regional rice work programme focused on improving the sustainability of rice production and resource use efficiency, and ultimately improving food and nutrition security, based on conservation and sustainable management of goods and services from rice ecosystems and landscapes. The work under

¹⁷⁴ See GEF Approach on Knowledge Management
https://www.thegef.org/sites/default/files/council-meeting-documents/EN_GEF.C.48.07.Rev_.01_KM_Approach_Paper.pdf

the Initiative has proven to be successful among the rice producing countries in the region and will be used to share the knowledge across the region.

441. The Sustainable Rice Platform (SRP) is a multi-stakeholder platform established in December 2011 to promote resource efficiency and sustainability in trade flows, production and consumption operations, and supply chains in the global rice sector. It is expected that the India FOLUR project will contribute to and benefit from knowledge dissemination through the SRP network, and regional coordination. The SRP plays an important role in integrating research with private sector opportunities, and the technical knowledge, innovations and best management practices emerging from the project along with others in SRP partnership will of key value. For instance, the project's experience in promoting PGSs and SRP Standard adoption will be documented and used to inform future PGS and SRP activities.

442. Through measures to link smallholder producers and value chain actors to the sustainability standards developed under the SRP, the project will also engage a consortium of private sector commodity buyers and traders, NGOs, international development organizations and governments working to promote more sustainable rice products. This same approach will be integrated into other FOLUR commodity projects incorporating SRP standard in China, Indonesia and Thailand as well as countries outside of the FOLUR.

443. A priority approach will be to build on existing platforms at the global level as well. A key platform for food systems is the One Planet network (10YFP) Sustainable Food Systems (SFS) Programme, an important global multi-stakeholder partnership recognized by SDG 12, Target 12.1. The One Planet is the only truly multi-stakeholder (government, UN, civil society, private sector (national - global)) network. Its goal is to accelerate the shift towards more sustainable food systems¹⁷⁵

¹⁷⁵ <http://www.oneplanetnetwork.org/sustainable-food-system/about>

9. Monitoring and Evaluation

444. The project M&E and reporting will follow FAO, GEF and relevant government requirements. As required by the GEF evaluation policy the project will develop a detailed and fully budgeted Monitoring and Evaluation Plan for the entire duration of the project. This M&E plan will describe the intended approach to monitoring and evaluation across the project, project rationale, the theory of change, results framework and of Specific, Measurable, Achievable, Relevant and Time (SMART) indicators.

445. Logical frameworks and the project's theory of change should align, where appropriate, to the GEF's results frameworks. Project M&E Plan will contain the following:

- **SMART indicators** for results and implementation linked appropriately to the GEF results frameworks (including core indicators), and including the following:
 - Applicable GEF indicators on global environmental benefits identified at each replenishment cycle
 - Socioeconomic co-benefits and sex-disaggregated / gender-sensitive indicators (where relevant)
 - Project site geographic coordinates
 - Additional process and/or performance indicators that can deliver reliable and valid information to management
- Project **baselines**, with a description of the problem to be addressed and relevant indicators
- Periodic implementation **reports, midterm reviews, and terminal evaluation**
- Organizational set-up and budgets for both monitoring and evaluation, where the budget for evaluation should be explicit and distinguished from monitoring activities.

446. It is also recommended that the M&E plan and reporting also track risks and progress related to issues such as social and environmental safeguards, stakeholder involvement, cofinance and other relevant information.

447. The project results, as outlined in the project results framework (Annex A1), will be monitored regularly, reported annually and assessed during project implementation to ensure the project effectively achieves these results. Monitoring and evaluation activities will follow FAO, GEF and relevant government policies and guidelines for monitoring and evaluation. The M&E system will also facilitate learning, replication of the project's results and lessons that will feed the project's knowledge management strategy.

448. The project will address monitoring and evaluation (M&E) at a number of levels:

1. **Internal results-based adaptive management:** the project's results framework (see Annex A1) sets out SMART indicators at outcome and output level. These will be monitored in accordance with the M&E plan in
2. **GEF-7 Core Indicators** (see Annex F), which are linked to and reconciled with selected indicators in the results framework, will be used for reporting global environmental benefits to GEF at project mid-term and end, in support of programmatic monitoring and adaptive management across the GEF portfolio.
3. **Sustainable Development Goals:** monitoring of progress in relation to SDGs will support overall programmatic monitoring and adaptive management by the Government of India, FAO and GEF (see 0).
4. **LDN indicators:** monitoring of progress in relation to LDN indicators will also support overall programmatic monitoring and adaptive management by the Government of India, FAO and GEF.
5. **FOLUR Impact Programme:** progress in relation to GEF-7 Core Indicators, LDN targets and SDGs will be reported to the FOLUR Global Knowledge to Action Project (GKAP) in order to permit programmatic monitoring and adaptive management of the IP. In addition, results framework indicators 31 and 32 (Output 4.4) will measure the level of insertion of the project

to the FOLUR IP as a whole, and as such will support the monitoring of the effectiveness of the GKAP in relation to IP-wide coordination and knowledge support to participating projects, and its corresponding adaptive management.

449. The M&E system of the project will also be coordinated with that of the FOLUR IP as a whole, and supported by the FOLUR Global Platform (GP). The GP will support the project by providing harmonized technical guidance and oversight on M&E (including the application of indicators and the management, reporting and use of results) to all IAs/CPs, and by aggregating relevant indicators (especially GEF-7 core indicators and LDN indicators). The project will in turn support programmatic M&E by reporting to the GP in a timely and consistent manner on the values of GEF-7 core indicators and LDN indicators, as well as other indicators of programmatic relevance (especially indicator 31 in 0).

Monitoring Plan Monitoring Arrangements

450. **From FAO side** (as GEF Implementing Agency for this project), project oversight and supervision will be carried out by the Budget Holder (FAO representative for India) with the support of the Lead Technical Officer and Funding Liaison Officer and relevant technical units in FAO headquarters. Oversight will ensure that: (i) project outputs are produced in accordance with the project results framework and leading to the achievement of project outcomes; (ii) project outcomes are leading to the achievement of the project objective; (iii) risks are continuously identified and monitored and appropriate mitigation strategies are applied; and (iv) agreed project global environmental benefits are being delivered iv) appropriate social and environmental safeguards are being applied v) the project is being executed in highest possible technical standards, and (as appropriate) using best available FAO and other guidelines and tools

451. The FAO-GEF Coordination Unit and HQ Technical units will provide oversight of GEF financed activities, outputs and outcomes largely through the annual Project Implementation Reports (PIRs), periodic backstopping and supervision missions.

452. Day-to-day project monitoring will be carried out by the Operational Partners. Project performance will be monitored using the project results matrix, including indicators (baseline and targets) and annual work plans and budgets. At inception phase, the results matrix will be reviewed to finalize the identification of i) outputs ii) indicators iii) targets and iv) any missing baseline information

453. A detailed M&E plan, which builds on the results matrix and defines specific requirements for each indicator (data collection methods, frequency, responsibilities for data collection and analysis, etc) will also be developed during project inception by the Operational Partners, with support from FAO.

Monitoring and Reporting

454. In compliance with FAO and GEF M&E policies and requirements, the Operational Partners, in consultation with the PSC and PTF will prepare the following i) national and state level Project inception reports; (ii) State level and national (overall) Annual Work Plan and Budget (AWP/B); (iii) State level and overall project six monthly Project Progress Reports (PPRs); (iv) annual Project Implementation Review (PIR); (v) Technical Reports; (vi) co-financing reports; and (vii) Terminal Report. In addition, the Core Indicators included in Annex F will be used to monitor Global Environmental benefits and updated regularly by the OP.

455. **Project Inception Report.** Project inception workshops will be held within two months of project start date and signature of relevant agreements with partners. During this workshop the following will be reviewed and agreed:

- the proposed implementation arrangement, the roles and responsibilities of each stakeholder and project partners;
- an update of any changed external conditions that may affect project implementation;
- the results framework, the SMART indicators and targets, the means of verification, and monitoring plan;
- the responsibilities for monitoring the various project plans and strategies, including the risk matrix, the Environmental and Social safeguards and Management Plan, the gender strategy, the knowledge management strategy, and other relevant strategies;
- finalize the preparation of the first year AWP/B, the financial reporting and audit procedures;
- schedule the PSC meetings;
- prepare a detailed first year AWP/B,

456. The OPs will draft the inception report based on the agreement reached during the workshop and circulate among PSC members, BH, LTO and FLO for review within one month. The final report will be cleared by the FAO BH, LTO and the FAO GEF Coordination Unit and uploaded in FAO's Field Program Management Information System (FPMIS) by the BH.

457. Results-based Annual Work Plan and Budget (AWP/B). The draft of the first AWP/B will be prepared by the OPs in consultation with the FAO Project Task Force and reviewed at the project Inception Workshop. The Inception Workshop inputs will be incorporated and subsequently, the OP will submit a final draft AWP/B to the BH within two weeks after the workshop. For subsequent AWP/B, the OP will organize a project progress review and planning meeting for its progress review and adaptive management. Once PSC comments have been incorporated, the OP will submit the AWP/B to the BH for non-objection, LTO and the FAO GEF Coordination Unit for comments and for clearance by BH and LTO prior to uploading in FPMIS by the BH. The AWP/B must be linked to the project's Results Framework indicators to ensure that the project's work and activities are contributing to the achievement of the indicators. The AWP/B should include detailed activities to be implemented to achieve the project outputs and output targets and divided into monthly timeframes and targets and milestone dates for output indicators to be achieved during the year. A detailed project budget for the activities to be implemented during the year should also be included together with all monitoring and supervision activities required during the year. The AWP/B should be approved by the Project Steering Committee, LTO, BH and the FAO GEF Coordination Unit, and uploaded on the FPMIS by the BH.

458. Project Progress Reports (PPR): The PPRs are used to identify constraints, problems or bottlenecks that impede timely implementation and to take appropriate remedial action. PPRs will be prepared based on the systematic monitoring of output and outcome indicators identified in the Project Results Framework *indicate annex number*, AWP/B and M&E Plan. Each semester the *indicate as appropriate Project Coordinator (PC) or Project Manager* will prepare a draft PPR, will collect and consolidate any comments from the FAO PTF. The *PC / PM* will submit the final PPRs to the FAO Representation *indicate country* every six months, prior to 31 July (covering the period between January and June) and before 31 December (covering the period between July and December). The July-December report should be accompanied by the updated AWP/B for the following Project Year (PY) for review and no-objection by the FAO PTF. The Budget Holder has the responsibility to coordinate the preparation and finalization of the PPR, in consultation with the OP, LTO and the FLO. After LTO, BH and FLO clearance, the FLO will ensure that project progress reports are uploaded in FPMIS in a timely manner.

459. Annual Project Implementation Report (PIR): The PIR is a key self-assessment tool used by GEF Agencies for reporting every year on project implementation status. It helps to assess progress toward achieving the project objective and implementation progress and challenges, risks and actions that need to be taken. Under the lead of the BH, the Project Coordinator / Project Manager will prepare a consolidated annual PIR report covering the period July (the previous year) through June (current year) for each year of implementation, in collaboration with national project partners (including the GEF OFP), the Lead Technical Officer, and the FLO. The PC/PM will ensure that the

indicators included in the project results framework are monitored annually in advance of the PIR submission and report these results in the draft PIR.

460. BH will be responsible for consolidating and submitting the PIR report to the FAO-GEF Coordination Unit for review by the date specified each year *after each co-implementing agency's review for each respective output under their responsibilities (to be included for joint implementation only)*. FAO - GEF Funding Liaison Officer review PIRs and discuss the progress reported with BHs and LTOs as required. The BH will submit the final version of the PIR to the FAO-GEF Coordination Unit for final approval. The FAO-GEF Coordination Unit will then submit the PIR(s) to the GEF Secretariat as part of the Annual Monitoring Review of the FAO-GEF portfolio

461. **Technical Reports:** Technical reports will be prepared as part of project outputs and to document and share project outcomes and lessons learned. The LTO will be responsible for ensuring appropriate technical review and clearance of technical reports. Copies of the technical reports will be distributed to project partners and the Project Steering Committee as appropriate.

462. **Co-financing Reports:** The OP will be responsible for tracking co-financing materialized against the confirmed amounts at project approval and reporting. The co-financing report, which covers the GEF fiscal year 1 July through 30 June, is to be submitted on or before 31 July and will be incorporated into the annual PIR. The co-financing report needs to include the activities that were financed by the contribution of the partners.

463. **Tracking and reporting on results across the GEF 7 core indicators and sub-indicators:** As of July 1, 2018, the GEF Secretariat requires FAO as a GEF Agency, in collaboration with recipient country governments, executing partners and other stakeholders to provide indicative, expected results across applicable core indicators and sub-indicators for all new GEF projects submitted for Approval. During the approval process of the (insert short project title) expected results against the relevant indicators and sub-indicators have been provided to the GEF Secretariat. Throughout the implementation period of the project, the OP, is required to track the project's progress in achieving these results across applicable core indicators and sub-indicators. At project mid-term and project completion stage, the project team in consultation with the PTF and the FAO-GEF CU are required to report achieved results against the core indicators and sub-indicators used at CEO Endorsement/ Approval.

464. **Terminal Report:** Within two months before the end date of the project, the OP will submit to FAO *(to specify the unit in charge in HQ)* a draft Terminal Report. The main purpose of the Terminal Report is to give guidance at ministerial or senior government level on the policy decisions required for the follow-up of the project, and to provide the donor with information on how the funds were utilized. The Terminal Report is accordingly a concise account of the main products, results, conclusions and recommendations of the project. The target readership consists of persons who are not necessarily technical specialists but who need to understand the policy implications of technical findings and needs for insuring sustainability of project results.

MTR and Evaluation provisions

Mid-Term Review

465. As outlined in the GEF Evaluation Policy, Mid-Term Reviews (MTRs) or mid-term evaluations (MTEs) are mandatory for all GEF-financed full-sized projects (FSPs), including Enabling Activities processed as full-sized projects. It is also strongly encouraged for medium-sized projects (MSPs). The Mid-Term review will (i) assess the progress made towards achievement of planned results (ii) identify problems and make recommendations to redress the project (iii) highlight good practices, lessons learned and areas with the potential for upscaling.

466. The Budget Holder is responsible for the conduct of the Mid-Term Review (MTR) of the project in consultation with the FAO-GEF Coordination Unit halfway through implementation. He/she will contact the FAO-GEF Coordination Unit about 3 months before the project half-point (within 3 years of project CEO Endorsement) to initiate the MTR exercise.

467. To support the planning and conduct of the MTR, the FAO GEF CU has developed a guidance document “**The Guide for planning and conducting Mid-Term Reviews of FAO-GEF projects and programmes**”. The FAO-GEF CU will appoint a MTR focal point who will provide guidance on GEF specific requirements, quality assurance on the review process and overall backstopping support for the effective management of the exercise and for timely the submission of the MTR report to the GEF Secretariat.

468. After the completion of the Mid-Term Review, the BH will be responsible for the distribution of the MTR report at country level (including to the GEF OFP) and for the preparation of the **Management Response** within 4 weeks and share it with national partners, GEF OFP and the FAO-GEF CU. The BH will also send the updated core indicators used during the MTR to the FAO-GEF CU for their submission to the GEF Secretariat.

Terminal Evaluation

469. The GEF evaluation policy foresees that all Medium and Full sized projects require a separate terminal evaluation. Such evaluation provides: i) accountability on results, processes, and performance ii) recommendations to improve the sustainability of the results achieved and iii) lessons learned as an evidence-base for decision-making to be shared with all stakeholders (government, execution agency, other national partners, the GEF and FAO) to improve the performance of future projects.

470. The Budget Holder will be responsible to contact the **Regional Evaluation Specialist (RES)** within six months prior to the actual completion date (NTE date). The RES will manage the decentralized independent terminal evaluation of this project under the guidance and support of OED and will be responsible for quality assurance. Independent external evaluators will conduct the terminal evaluation of the project taking into account the “GEF Guidelines for GEF Agencies in Conducting Terminal Evaluation for Full-sized Projects”. FAO Office of Evaluation (OED) will provide technical assistance throughout the evaluation process, via the OED Decentralized Evaluation Support team – in particular, it will also give quality assurance feedback on: selection of the external evaluators, Terms of Reference of the evaluation, draft and final report. OED will be responsible for the quality assessment of the terminal evaluation report, including the GEF ratings.

471. After the completion of the terminal evaluation, the BH will be responsible to prepare the management response to the evaluation within 4 weeks and share it with national partners, GEF OFP, OED and the FAO-GEF CU. The BH will also send the updated core indicators used during the TE to the FAO-GEF CU for their submission to the GEF Secretariat.

Table 28. Monitoring plan

Indicator	Frequency
GEF-7 core indicators	
3.1 Area of degraded agricultural land restored (Hectares) - <i>RF indicator 23</i>	- Measured at project mid-term and end, as project indicator 23 - Reported at project mid-term and end, as GEF-7 Core Indicator
3.2 Area of forest and forest land restored - <i>SDG 15.3.1 Proportion of land that is degraded over total land area</i> - <i>LDN indicator 1 (land cover change)</i> - <i>RF indicators 23</i>	- Measured at project mid-term and end, as project indicator 23 - Reported at project mid-term and end, as GEF-7 Core Indicator
3.4 Area of wetlands (including estuaries, mangroves) restored - <i>RF indicator 23</i>	- Measured at project mid-term and end, as project indicator 23 - Reported at project mid-term and end, as GEF-7 Core Indicator
4.1 Area of landscapes under improved management to benefit biodiversity - <i>SDG 2.4.1 Proportion of agricultural area under productive and sustainable agriculture</i>	- Measured at project mid-term and end, as project indicator - Reported at project mid-term and end, as GEF-7 Core Indicator

PART II 9. Monitoring and Evaluation

Indicator	Frequency
4.3 Area of landscapes under sustainable land management in production systems - <i>RF indicator 8</i>	- Measured yearly as RF indicator 8 - Reported at project mid-term and end, as GEF-7 Core Indicator
6.1 Carbon sequestered or emissions avoided in the AFOLU sector - <i>LDN indicator 3: carbon stocks.</i>	- Measured and reported at project mid-term and end, as GEF-7 Core Indicator
11. Number of direct beneficiaries disaggregated by gender as co-benefit of GEF investment - <i>RF indicator 11</i>	- Measured yearly as RF indicators 11 - Reported at project mid-term and end, as GEF-7 Core Indicator
Results framework (RF) indicators for internal project results-based adaptive management	
1. Number of food systems roadmaps formulated at National and State levels	- Measured at mid-term and end
2. Number of coordinating committees established and functioning per State	- Measured and reported yearly in PIRs
3. Number of meetings of policy dialogues involving agriculture and environment sector actors	Measured and reported yearly in PIRs
4. Area covered under improved planning to foster sustainable food systems	Measured at mid-term and end
5. Number of departments and of jurisdictions (States, Districts, Blocks) using and contributing to DSS interface/portal etc.	Measured and reported yearly in PIRs
6. Number of multi-stakeholder workshops on Decision Support System for integrated land use planning and management and sustainable food systems	Measured and reported yearly in PIRs
7. Number of officials trained on DSS for integrated land use planning and management	Measured and reported yearly in PIRs
8. Number of farmers (by age, gender and ethnicity) adopting sustainable practices, and area covered	Measured at mid-term and end
9. Number of district officers oriented on SFS themes	Measured and reported yearly in PIRs
10. Number of Master Trainers (by age, gender and ethnicity) trained in SFS methods	Measured and reported yearly in PIRs
11. Number of FFS farmer graduates (by age, gender and ethnicity)	Measured and reported yearly in PIRs
12. Number of custom hiring centres (CHCs) collaborating with the project in making available machinery for sustainable production, by district (by age, gender and ethnicity of members)	Measured at mid-term and end
13. Numbers of farmers (by age, gender and ethnicity) actively engaged in GVC networks that incorporate sustainability standards and principles, with effective information management and value chain coordination	Measured at mid-term and end
14. Number of private sector partners onboarded through GVCDC	Measured at mid-term and end
15. Number of FPOs supported through GVCDC	Measured and reported yearly in PIRs
16. Status of GVCDC establishment and functioning	Measured and reported yearly in PIRs
17. Number of agri-preneurs (by age, gender and ethnicity) providing input support to farmers and FPOs in relation to sustainable farming systems, by district	Measured and reported yearly in PIRs
18. Area under integrated landscape management and food systems plans	Measured and reported yearly in PIRs
19. Number of district officers oriented on community-based sustainable landscape management	Measured and reported yearly in PIRs
20. Number of Master Trainers (by age, gender and ethnicity) trained in community-based sustainable landscape management	Measured and reported yearly in PIRs
21. Number of community members trained (by age, gender and ethnicity) in community-based sustainable landscape management	Measured and reported yearly in PIRs
22. Number of districts where inter-sectoral institutional frameworks and mechanisms for ILM frameworks have been established	Measured and reported yearly in PIRs
23. Area for which integrated landscape management and food systems plans developed	Measured and reported yearly in PIRs
24. Area with restoration plans under implementation (ha)	Measured at mid-term and end
25. Area with restoration programmes formulated	Measured and reported yearly in PIRs
26. Number of NTFP enterprises supported	Measured and reported yearly in PIRs

Indicator	Frequency
27. Number of beneficiaries participating in NTFP value chains (by age, gender and ethnicity)	Measured at mid-term and end
28. Frequency with which knowledge is exchanged and efforts coordinated at national and global actors within the framework of the FOLUR global platform and/or regional hubs	Measured and reported yearly in PIRs
29. Participation in global, regional, national and local networks and knowledge hubs	Measured and reported yearly in PIRs
30. State of establishment and operation of project KM and communication systems at project and district levels	Measured and reported yearly in PIRs
31. Number of innovation fora/platforms established	Measured and reported yearly in PIRs
32. Number of countries with which the project is coordinating with other countries as part of the FOLUR global platform	Measured and reported yearly in PIRs
33. Project performance is judged satisfactory or highly satisfactory by independent mid-term review and independent final evaluation	Measured and reported yearly in PIRs
34. Percentage of indicators measured in accordance with M&E plan	Measured and reported yearly in PIRs

Table 29. Monitoring and Evaluation Budget

	<i>Cost (USD)</i>
<i>Budget Lines M&E</i>	
Baseline assessment	70,000
Final Evaluation	100,000
Mid term review	65,000
National inception workshop	7,000
National terminal workshop	10,000
State level inception workshop	14,960
Total	266,960

1. Disclosure

472. The project will ensure transparency in the preparation, conduct, reporting and evaluation of its activities. This includes full disclosure of all non-confidential information, and consultation with major groups and representatives of local communities. The disclosure of information shall be ensured through posting on websites and dissemination of findings through knowledge products and events. Project reports will be broadly and freely shared, and findings and lessons learned made available.

10. Socioeconomic co-benefits

473. Under the project model, the delivery of improved global environmental benefits (in terms of biodiversity, climate change mitigation and sustainable land management) will be inextricably accompanied by socioeconomic co-benefits including the following:

- **Improved farmer incomes:** in line with the target of the National Agricultural Development Plan (RKVY) to increase farmers' incomes by 4% between 2016 and 2023, the project will improve farmers' access to favourable markets for their products by: strengthening value chain linkages (through the Green Value Chain Development Cell, Output 2.2.1); enhancing their capacities for compliance with environmental sustainability criteria, such as those set out in the SRP Standard and third-party certification schemes (Output 2.2.3); and supporting complementary income generation options under Output 3.1.3.
- **Improved resilience to the volatility in economic and food systems** at regional and global levels: the kinds of diversified production systems that are required to optimize GEBs also typically contribute to the resilience of farm families' food security and livelihoods;
- **Improved resilience to the effects of climate change:** diversified production systems capable of yielding GEBs are also typically climate-resilient, given that they contain a wide range of alternative crops and varieties and tend to foster stable micro-climates capable of buffering variations in temperature and humidity.
- **Improved nutritional quality:** sustainable diversification away from high-yielding varieties (HYV) of rice and wheat to, for example, traditional varieties of rice, as well as other crops including vegetables, pulses and millets, will increase the availability of nutritious food both among the farmers themselves and among downstream consumers. As a co-benefit of the project, this will help to address the problems of over nutrition (and its associated health impacts including obesity and diabetes), undernutrition and anemia, which affect a significant proportion of the country's population.

11. Decent Rural Employment

474. The project will contribute to FAO Organizational Outcome 2 (Under FAO Strategic Objective 3 "Reduce rural poverty") that "The rural poor have greater opportunities to access decent farm and non-farm employment." by:

- Supporting the Government in achieving a transition from high-input to diversified low-input production systems: in addition to delivering improved GEBs, this will contribute to reducing farmers' exposure to harmful agricultural chemicals in the workplace;
- Where feasible and appropriate (subject to the results of participatory processes of situation analysis and technology formulation/validation in Farmer Field Schools), supporting the introduction of alternatives for sustainable mechanization in accordance with principles of appropriate technology, in order to reduce drudgery in agricultural work;
- Supporting the diversification of farming and livelihood systems: in addition to delivering improved GEBs, this will increase the diversity and the resilience of the employment opportunities open to farmers (women and men);
- Assisting farmers in achieving compliance with the SRP Standard, which combines the delivery of environmental benefits and increase opportunities for income with compliance with standards on decent working conditions;
- Overall, the support by the project to the sustainability and resilience of production systems will contribute to sustaining the rural economy (including opportunities for decent rural employment) in the face of the current trends of rural-urban migration.

475. Table 30 **Error! Reference source not found.** provides a summary of how the project will support decent rural employment, based on the four pillars described in FAO's guidance material.¹⁷⁶

Table 30. Project support to decent rural employment (DRE)

Prioritized Groups
- Small-scale farm and forest producers, including contributing family workers - Small-scale processors and aggregators of farm and forest products - Farm workers - Women and youth within the above categories - Specific vulnerable groups (e.g., land poor and landless people, disabled people, elderly people, and single-adult households)
Pillar 1: Employment-creation and enterprise-development
- Participatory analyses with vulnerable groups on specific rural employment issues related to agriculture and landscape management - Consideration of the impact of technology options on the number and quality of jobs created - Effective engagement of the relevant groups in consultations - Support to women and men producers (especially the more vulnerable categories) in accessing fair markets, sustainable value chains, training, financial services, and other productive assets, with priority to rural businesses owned by women and youth - Provision of training in market analysis and development, on how to develop viable market options for forest and farm products. - Support farmers and FPOs to develop suitable climate-resilient production options for diversified farm products
Pillar 2: Social protection
- Empowerment of local organizations that directly represent the poor to achieve scale efficiencies in markets and strong collective voice in inputs to planning, policy and management decisions

¹⁷⁶ FAO, 2010. *Rural Employment, Guidance Material #1: Guidance on How to Address Decent Rural Employment in FAO Country Activities* (2nd ed.). <http://www.fao.org/3/i1937e/i1937e.pdf>

11. Decent Rural Employment

- Promotion of financial literacy programmes among smallholder producers - Introduce traceability measures in the targeted value chains
Pillar 3: Standards and rights at work
- Support FPOs to expand, associate and federate so that they spread best practice - Support to socially-responsible agricultural and forest production, specifically to reduce gender and age-based discrimination - Promotion of compliance with national labour legislation in the rural areas - Work to address the constraints of women, youth and other specific groups workers in getting organized
Pillar 4: Governance and social dialogue
- Promotion of the inclusive participation of local people, particularly women, in sustainable production and landscape management - Support to local communities in strengthening democratic organizations and networks of producers and workers - Building of capacity of public and private extension services to empower farmers producers to organize, and for women to undertake leading positions - Undertake national, regional, or global knowledge exchange events with FPOs to refine and endorse the most promising approaches for sustainable production and landscape management.

Annexes

Annexes in separate document