

# SDG Blueprint for Sustainable Agriculture



## POLICY BRIEF



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*Creating Innovative Solutions for a Sustainable Future*



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The Energy and Resources Institute (TERI), Darbari Seth Block, India Habitat Centre, Lodhi Road, New Delhi - 110 003, India

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**STUDY TEAM**

**Authors**

*Lead Authors:* Madhuparna Maiti, Palak Khanna, Shailly Kedia, Shivangi Raj, Manish Anand

*Supporting Authors:* Rishikaa Sajeev, Aakriti Arora, Deeksha Modgil, Mansi Juneja

**Reviewer**

Prodipto Ghosh

**Advisors**

Marit Marie Strand, Vivek Kumar

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Centre for Sustainable Development Research and Leadership, TERI, Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi 110 003, India  
Tel.: +91 11 2468 2100 or 2468 2111 | Email: [pmc@teri.res.in](mailto:pmc@teri.res.in) | Web: [www.teriin.org](http://www.teriin.org)



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## 1. Introduction

In an era marked by global challenges, the 2030 Agenda for Sustainable Development stands as a beacon, envisioning a world free from the shackles of poverty and hunger, a world where quality education and healthcare are accessible to all, and where gender equality is not just an ideal but a reality. At the heart of this ambitious agenda lies the concept of sustainable development goals (SDGs), a set of 169 targets that span a spectrum of social, economic, and environmental dimensions. However, despite the noble aspirations articulated in the agenda, a critical gap persists—one that hampers the practical implementation and integration of the SDGs. The concept of indivisibility, a cornerstone of the 2030 Agenda, remains somewhat elusive in practical terms. The interactions between the myriad SDG targets and the nuanced ways in which they influence each other in real-world scenarios are not thoroughly understood. This gap is not merely academic; it is a chasm that impedes progress towards achieving the comprehensive vision of sustainable development. Existing studies, while valuable in identifying generic interlinkages, fall short of providing a detailed and quantifiable analysis of these connections.

This gap becomes even more pronounced in the realm of sustainable agriculture, a complex system with an extensive value chain encompassing pre-production, production, and post-production stages. Despite its crucial role in the global pursuit of sustainability, the linkages between SDGs and the components of the agricultural value chain are largely unexplored. The prevailing policy frameworks often neglect the intricate connections within the agricultural sector. Focused on crop-based agriculture systems and the associated value chains, the study adopts an exploratory approach, delving into the social, economic, and environmental aspects of the agricultural value chain. What sets this study apart is its commitment to understanding the integrated nature of these linkages and using this knowledge to inform evidence-based decision-making.

The approach of this study leans towards an exploratory exercise to understand the synergies and trade-offs between sustainable agriculture and SDGs and implications for policy and praxis.



This mapping exercise aims to unravel the complex relationships and interdependencies within the subject. Subsequently, the methodology involved stakeholder and policy mapping, illuminating the key players and policy interventions relevant to the nexus between sustainable agriculture and SDGs. Following this, a prioritization activity was undertaken based on specified criteria, adding a layer of strategic focus to the study. The data collection process encompassed a thorough triangulation approach for fact-checking and validation. Stakeholder consultation played a pivotal role, employing the nominal group technique, while key informant interviews, conducted through semi-structured questionnaires, provided rich qualitative insights and validation of the findings. The culmination involved consolidating inputs and conducting a detailed analysis of the findings, ensuring a robust and nuanced exploration of the study's objectives.

This study is not just an academic exercise; it is a clarion call for action. By uncovering the intricate web of connections between sustainable agriculture and the SDGs, the study aspires to guide policymakers towards more informed and effective decisions. It beckons a future where the goals of poverty eradication, food security, environmental sustainability, and other SDGs are not isolated pursuits but interconnected threads weaving the fabric of a truly sustainable world.




## 2. Sustainable Agriculture Indicators

To understand the state of sustainable agriculture practices and national schemes, eight indicators across four themes of water, land, energy, and climate were mapped and analysed using available data for the states of India (Table A).

**Table A: Sustainable agriculture indicators analysed in the study**

Theme	Indicators
WATER 	<p><b>Percentage of area covered under <i>Pradhan Mantri Krishi Sinchayee Yojana</i> (2020–21)</b></p> <p>Micro-irrigation schemes such as On Farm Water Management (OFWM) and Per Drop More Crop (PDMC) under PMKSY play a crucial role in advancing sustainable water utilization in agriculture, aligning closely with SDG 6 and SDG 9. These schemes contribute significantly to efficient water use, ensuring sustainable use of water sources for agricultural activities.</p> <p><b>Top three states:</b> Kerala, Meghalaya, Manipur  <b>Bottom three states:</b> Gujarat, Uttar Pradesh, Goa</p>
	<p><b>Percentage of assessment units with overexploited groundwater levels (2021–22)</b></p> <p>Assessing groundwater level serves as a vital indicator for the health and long-term viability of farming. It helps prevent the overuse of water resources and enables communities and farmers to prepare for and respond to climatic conditions, thus aligning with various SDGs like SDG 2, SDG 6, and SDG 14.</p> <p><b>Top three states:</b> Tripura, Sikkim, Nagaland  <b>Bottom three states:</b> Rajasthan, Punjab, Haryana</p>
LAND 	<p><b>Percentage of area under organic farming under NPOP (2020–21)</b></p> <p>Adopting organic inputs in agriculture can be regarded as a strategy to contribute to SDG 2 and SDG 15. In India, two organic certification systems are the National Programme for Organic Production (NPOP) and the Participatory Guarantee System for Organic (PGS-Organic).</p> <p><b>Top three states:</b> Sikkim, Goa, Madhya Pradesh  <b>Bottom three states:</b> Punjab, Telangana, West Bengal</p>
	<p><b>Crop diversification index (CDI) (2020–21)</b></p> <p>Crop diversification aligns with SDG 2, SDG 12, and SDG 13. CDI is a measure used to assess the extent to which agricultural practices on a farm or a region are diversified using the Herfindahl–Hirschman Index (HHI) formula.</p> <p><b>Top three states:</b> Odisha, Assam, Chhattisgarh  <b>Bottom three states:</b> Karnataka, Maharashtra, Gujarat</p>



<p>LAND</p> 	<p><b>Consumption of chemical fertilizers (in kilograms per hectare) (2020–21)</b></p> <p>The utilization of fertilizers, specifically Nitrogen, Phosphorus, and Potassium (NPK), serves as a crucial gauge for sustainable farming practices within a region and is relevant to SDG 2, SDG 3, and SDG 15.</p> <p><b>Top three states:</b> Mizoram, Tripura, Goa  <b>Bottom three states:</b> Punjab, Haryana, Andhra Pradesh</p> <hr/> <p><b>Fund expenditure under the National Agro-Forestry and Bamboo Mission (2018–19)</b></p> <p>Through the promotion of agroforestry practices that improve soil fertility, enhance crop yields, and diversify income sources for farmers, the mission actively contributes to SDG 2 and SDG 15.</p> <p><b>Top three states:</b> Madhya Pradesh, Mizoram, Manipur  <b>Bottom three states:</b> Jharkhand, Tripura, Uttarakhand</p>
<p>ENERGY</p> 	<p><b>Percentage of components installed under <i>Pradhan Mantri Kisan Urja Suraksha evam Utthaan Mahabhiyan Yojana (PM-KUSUM) (2021–22)</i></b></p> <p>Agri-solar pumps align with the SDG 7 goals of ensuring access to affordable, reliable, and clean energy.</p> <p><b>Top three states:</b> Gujarat, Karnataka, Maharashtra  <b>Bottom three states:</b> Goa, Kerala, Jharkhand</p>
<p>CLIMATE RISK</p> 	<p><b>Percentage of farmers who benefitted from <i>Pradhan Mantri Fasal Bima Yojana (PMFBY) (2019–20)</i></b></p> <p>PMFBY aims to mitigate risks for farmers and promotes sustainable agricultural practices by providing financial support to farmers affected by natural calamities, addressing the objectives of SDG 13.</p> <p><b>Top three states:</b> Manipur, Meghalaya, Kerala  <b>Bottom three states:</b> Gujarat, Goa, Uttar Pradesh</p>

### 3. Synergies and Trade-offs

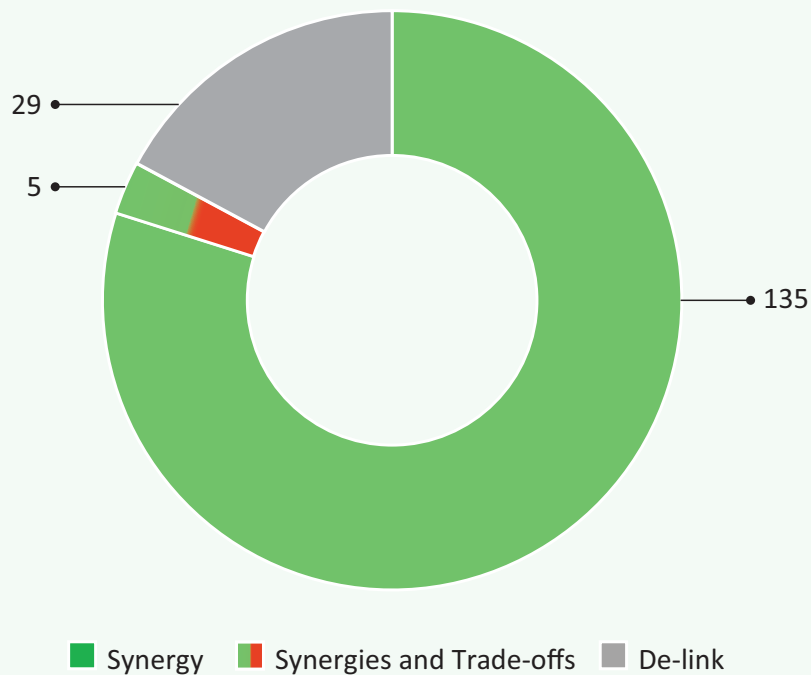
In the study, to identify synergies and trade-offs between SDGs and sustainable agriculture, all 169 targets were scrutinized based on predefined criteria (Figure A). Synergies are marked in green, trade-offs in red, and SDG targets that exhibit both synergies and trade-offs are highlighted in red and green. This involved assessing the direction of impact, considering both the target's impact on sustainable agriculture and agriculture's impact on the target, across the entire value chain—encompassing pre-production, production, and post-production stages. The criteria also delved into studying both immediate and long-term impacts. Through an extensive review of literature, consultations with stakeholders, and validation processes, the study revealed the existence of synergies, trade-offs, and de-links between SDGs and sustainable agriculture. Specifically, 135 synergies were identified, along with 5 targets exhibiting a combination of both synergies and trade-offs (Figure B). Additionally, 29 targets were deemed delinked due to considerations of scope, with assessments based on a working definition of sustainable agriculture and direct environmental impacts on agriculture.

**Table B: Synergies and Trade-offs of SDG Targets**

Goals	Targets																		
Goal 1	1.1	1.2	1.3	1.4	1.5	1.a	1.b												
Goal 2	2.1	2.2	2.3	2.4	2.5	2.a	2.b	2.c											
Goal 3	3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	3.a	3.b	3.c	3.d						
Goal 4	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.a	4.b	4.c									
Goal 5	5.1	5.2	5.3	5.4	5.5	5.6	5.a	5.b	5.c										
Goal 6	6.1	6.2	6.3	6.4	6.5	6.6	6.a	6.b											
Goal 7	7.1	7.2	7.3	7.a	7.b														
Goal 8	8.1	8.2	8.3	8.4	8.5	8.6	8.7	8.8	8.9	8.10	8.a	8.b							
Goal 9	9.1	9.2	9.3	9.4	9.5	9.a	9.b	9.c											
Goal 10	10.1	10.2	10.3	10.4	10.5	10.6	10.7	10.a	10.b	10.c									
Goal 11	11.1	11.2	11.3	11.4	11.5	11.6	11.7	11.a	11.b	11.c									
Goal 12	12.1	12.2	12.3	12.4	12.5	12.6	12.7	12.8	12.a	12.b	12.c								
Goal 13	13.1	13.2	13.3	13.a	13.b														
Goal 14	14.1	14.2	14.3	14.4	14.5	14.6	14.7	14.a	14.b	14.c									
Goal 15	15.1	15.2	15.3	15.4	15.5	15.6	15.7	15.8	15.9	15.a	15.b	15.c							
Goal 16	16.1	16.2	16.3	16.4	16.5	16.6	16.7	16.8	16.9	16.10	16.a	16.b							
Goal 17	17.1	17.2	17.3	17.4	17.5	17.6	17.7	17.8	17.9	17.10	17.11	17.12	17.13	17.14	17.15	17.16	17.17	17.18	17.19

■ Synergies 
 ■ Synergies and Trade-offs 
 ■ De-link





**Figure B: Number of Synergies and Trade-offs for SDGs**

In the intricate web of SDGs, the interconnectedness reveals complex relationships that goes beyond linear relationships (Figure C). However, the pursuit of these goals may also present trade-offs, as interventions to address one goal may inadvertently impact another negatively. Table C depicts the key ministries as stakeholders who are key when it comes to a national policy interface on SDGs and sustainable agriculture. The findings revealed the existence of 34 key stakeholders within the value chain related to SDGs and sustainable agriculture.

This underscores the interconnected nature of stakeholders in the realm of Sustainable Agriculture, emphasizing the need for a collaborative rather than a siloed approach. The diverse involvement of ministries and departments reflects a convergence on the common issue of agriculture, highlighting the necessity for collaboration. Stakeholder mapping proves instrumental in not only pinpointing the key domains of their work but also identifying potential areas for future collaboration and intervention.



Figure C: Interlinkages between SDGs and Sustainable Agriculture



Table C: National Policy Interface on SDGs and Sustainable Agriculture – Stakeholder Mapping

Stakeholders	Sustainable Development Goals																	
	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	Goal 6	Goal 7	Goal 8	Goal 9	Goal 10	Goal 11	Goal 12	Goal 13	Goal 14	Goal 15	Goal 16	Goal 17	
Ministry of Rural Development	●	●			●			●	●	●		●	●		●	●		
NABARD	●	●						●					●		●			
Ministry of Tribal Affairs	●								●						●			
Ministry of Agriculture and Farmers Welfare	●	●	●	●			●	●	●	●	●	●	●	●	●	●		
Ministry of Power	●						●											
Ministry of Jal Shakti		●				●	●			●	●	●	●	●	●			
Ministry of New and Renewable Energy							●	●										
Ministry of Chemicals and Fertilizers		●	●															
Department of Science and Technology		●																●
Ministry of Food Processing and Industries		●		●				●	●		●	●	●					
Ministry of Environment, Forests and Climate Change			●			●							●	●	●	●		
Ministry of Education				●														

(contd.)

Stakeholders	Sustainable Development Goals																	
	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	Goal 6	Goal 7	Goal 8	Goal 9	Goal 10	Goal 11	Goal 12	Goal 13	Goal 14	Goal 15	Goal 16	Goal 17	
Ministry of Minority Affairs				●														
Department of Biotechnology				●														
Ministry of Finance	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
NITI Aayog	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Ministry of Skill Development and Entrepreneurship				●	●			●										
Ministry of Electronics and Information Technology								●					●			●		
Ministry of Earth Sciences										●			●	●				
Ministry of Women and Child Development			●		●			●		●								
Ministry of Panchayati Raj					●					●						●		
Ministry of Social Justice and Empowerment										●						●		
Ministry of Housing and Urban Affairs						●					●							
Ministry of Labour and Employment								●										

(contd.)



Stakeholders	Sustainable Development Goals																	
	Goal 1	Goal 2	Goal 3	Goal 4	Goal 5	Goal 6	Goal 7	Goal 8	Goal 9	Goal 10	Goal 11	Goal 12	Goal 13	Goal 14	Goal 15	Goal 16	Goal 17	
Ministry of Development of North-Eastern Region								●										
Ministry of Commerce and Industry								●										●
Ministry of Road Transport and Highways								●										
Ministry of Consumer Affairs, Food and Public Distribution								●	●	●	●	●						●
Ministry of Petroleum and Natural Gas											●	●						
Ministry of Home Affairs											●							●
Ministry of Law and Justice																		●
Ministry of Personnel, Public Grievances and Pensions																		●
Ministry of Health and Family Welfare			●															
Ministry of External Affairs																		●

## 4. SDG-wise Policy Recommendations



**SDG 1:** It is imperative to further integrate MGNREGS with eco-friendly technologies and sustainable farming practices. Bridging this gap involves incorporating innovative solutions such as solar-powered pumps and energy-efficient machinery into the programme, fostering sustainable infrastructure development. By seamlessly integrating these eco-friendly technologies, MGNREGS can significantly contribute to promoting environmentally conscious practices within the agricultural sector. This holistic approach also ensures a positive impact on both poverty reduction and sustainable development.

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**SDG 2:** To enhance agricultural adaptation and foster crop diversification, it is imperative to emphasize and focus more on the crop diversification programme within the NMSA. This integration should be accompanied by a substantial allocation of funds directed towards robust Research and Development (R&D) initiatives and comprehensive capacity building within the framework of NMSA. Moreover, incentivizing farmers to cultivate a broader spectrum of crops beyond the conventional rice-wheat cycle will play a pivotal role. Creating a market demand for diverse crops and offering incentives to farmers who embrace this diversification will encourage a shift towards cultivating a wider range of crops. This strategic approach will not only alleviate the pressure on specific crops but also bolster agricultural resilience while fostering market diversity.

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**SDG 3:** It is key to promote environment-friendly and health-friendly inputs through sensitization of farmers to adopting sustainable agricultural methods, which will not only enhance soil health but also contribute to long-term agricultural sustainability. National Rural Health Mission can also integrate mental health challenges faced by farmers. This approach will facilitate timely intervention and provision of appropriate referrals, thereby ensuring that farmers in distress receive the necessary support and access to mental healthcare services. This integration will acknowledge the holistic well-being of farmers, aligning mental health support with agricultural initiatives for a more sustainable and supportive farming community.



**SDG 4:** It is imperative to address language barriers hindering effective education, especially in linguistically diverse regions. To overcome this gap, implementing language-specific communication strategies is crucial, ensuring a better understanding and adoption of sustainable farming practices. Additionally, for the Skill India Mission, integrating skill development initiatives with existing agricultural schemes is essential to enhance farmers' income. There can be a larger focus on areas such as water budgeting and sustainable water management practices within the Missions. Furthermore, strengthening collaboration between the Agriculture Skill Council of India (ASCI) and the Food Industry Capacity and Skill Initiative (FICSI) from the planning stage enhances decision-making, outlook, and access to shared resources. To fortify ASCI, incorporating pre-production and post-production stages in training programmes is vital for addressing the entire agricultural value chain and ensuring the effectiveness of training programs.



**SDG 5:** Mahila Kisan Sashaktikaran Pariyojana (MKSP) can be enhanced by strengthening the components that are aimed at equipping women with sustainable infrastructure and diverse training across various stages of the agricultural value chain. By offering training programmes tailored to different stages of the agricultural value chain, women and women self-help groups (SHGs) can gain vital skills and knowledge necessary for sustainable farming practices, enhanced productivity, and improved access to markets. Furthermore, it is crucial to provide institutional support to women farmers to ensure their access to and manage land/other resources while facilitating the seamless transfer of assets as and when required. This support mechanism within MKSP will empower women to assert their rights, enabling them to secure necessary resources for sustained agricultural endeavours. To better comprehend the impacts of unsustainable farming practices, particularly on women farmers, it is essential to collect gender-disaggregated data. Prioritizing collection and analysis of such data to discern the specific challenges faced by women (such as drudgery and pesticide exposure) in agriculture. This data-driven approach will provide critical insights into the disproportionate impacts of unsustainable practices on women, enabling targeted interventions to mitigate these challenges effectively.

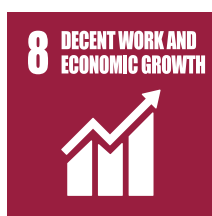


**SDG 6:** Atal Bhujal Yojana (ABY) can address existing gaps, such as the exclusion of water-stressed states like Punjab and Bihar, where the water tables are rapidly declining. The inclusion of these states within the scheme is essential for comprehensive groundwater management, mitigating depletion concerns. Furthermore, the policy should establish a unified framework to tackle both groundwater issues, treatment, and contamination from agricultural activities, enhancing

the prevention of agricultural contamination. Emphasizing integrated management of surface and groundwater resources is crucial for building resilience to changing environmental conditions. Similarly, the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) recognizes water efficiency as a separate component. By including water management under the NMSA scheme, the policy can elevate the importance of water management in agriculture, including monitoring for improved health assessment of water resources, thereby contributing to the overarching goals of SDG 6.

**SDG 7:** Pradhan Mantri Kisan Urja Suraksha evam Utthan Mahabhiyaan (PM-KUSUM) initiative needs refinement as not all components currently incorporate the Renewable Energy Service Company (RESCO) model, and the exclusive promotion of solar pumps has increased to groundwater depletion concerns. To address this, implementing the RESCO model across all components is crucial, as well as adopting a holistic value-chain approach covering pre-production, production, and post-production stages. Integrating remote monitoring and control systems into solar pumps enhances energy conservation efforts. Meanwhile, the Agriculture Demand Side Management (AgDSM) initiative should extend its focus beyond energy-efficient pumps to encompass various technologies throughout the agricultural value chain, promoting energy conservation comprehensively. Similarly, the National Smart-grid Mission, currently emphasizing agri-solar pumps, should extend its promotion to post-production grids, ensuring a clean energy transition and adopting a whole-of-value-chain approach for sustainable energy practices. These strategic adjustments collectively contribute to cleaner energy transitions and maintain groundwater levels, aligning with the goals of SDG 7.

**SDG 8:** Priority Sector Lending (PSL) is vital for establishing effective monitoring mechanisms for subsectors and green loan provisions, promoting transparency. Overcoming challenges involves introducing provisions for tagging loans for green activities and implementing RBI-led green credits mapping, encouraging widespread adoption by financial institutions. Integration of crop loans with insurance provides guarantees, addressing regulatory issues. Collaboration with private players, particularly fintech, enhances checks, balances, and recovery processes. To strengthen the limited attention to women farmers, incentivizing women-led agribusinesses and providing training and technology access is crucial. These measures collectively foster improved transparency, informed decision-making, and strengthen the credibility of PSL, encouraging increased investment in green and sustainable agricultural practices while promoting gender mainstreaming in agriculture. Providing farmers with bundled services







(including credit, insurance, and benefits from schemes) through a single window will ease access to basic services for farmers.



**SDG 9:** The enhancement of the Pradhan Mantri Sampada Yojana (PMKSY) demands strategic adjustments. Prioritizing the inclusion of eco-labels and certifications within PMKSY is essential to encourage sustainable farming practices and informed decision-making. To address the limited adoption of energy-efficient technologies, promoting the use of smart warehouses and renewable energy sources is crucial, facilitating both cost reduction and environmental benefits. Collaboration between PMKSY and the Ministry of Agriculture and Farmers Welfare must be strengthened to ensure synergy in efforts across the entire agricultural value chain. Simultaneously, reinforcing the cold storage Infrastructure policy requires a broader focus beyond potatoes to encompass various perishables, ensuring increased availability and mitigating food loss. Additionally, enhancing the user interface of agricultural apps demands the resolution of accessibility issues, prioritizing user-friendly features, language support, and improving connectivity for market information.



**SDG 10:** The Pradhan Mantri Janjatiya Vikas Mission (PMJVM) necessitates recalibration to address existing gaps. To broaden its impact, there is a critical need to bolster tribal entrepreneurship and livelihood opportunities, incorporating traditional skills and fostering product diversification. This strategic approach not only addresses income disparities but also encourages sustainable practices, thereby optimizing natural resource utilization for tribal communities. Simultaneously, establishing dedicated insurance schemes tailored to the unique needs of tribal communities, including gender-specific options for women, is imperative. This ensures the mitigation of risks faced by tribal communities, fostering enhanced resilience. Moreover, interventions across the entire agricultural value chain should be integrated, with a specific emphasis on pre-production elements, ensuring the holistic inclusion of tribal communities in sustainable agriculture practices.



**SDG 11:** To promote urban agriculture and enhance sustainable practices within urban spaces, it is imperative to prioritize the identification and allocation of suitable lands for agricultural purposes. Integrating community-based farms within the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) can be essential to fostering sustainable agricultural practices through community engagement and participation in cities. Hydroponic farming holds

potential for enhancing agricultural infrastructure in urban spaces and can be explored for regions where natural ecosystems are not disrupted, such as terraces.



**SDG 12:** It is imperative to strategically strengthen the National Policy for the Management of Crop Residues by expanding its scope beyond specific states to encompass the entire nation, which is crucial for a comprehensive approach. To foster sustainable agriculture through the Rashtriya Krishi Vikas Yojana (RKVY)- Remunerative Approaches for Agriculture and Allied sector Rejuvenation (RAFTAAR) can provide incentives for crop diversification, and the provision of diverse seeds at a single window can be instrumental. Additionally, incorporating ecolabelling within RKVY infrastructure expedites sustainable practices. The focus on commercializing waste under RKVY, including support for startups converting crop wastage, is vital. RKVY-RAFTAAR can also expand its focus to other agricultural crops than just horticultural crops. Simultaneously, within Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), prioritizing eco-labels and embracing energy-efficient technologies can also promote sustainable practices. Post-harvest waste can be reduced by promoting smart warehouses through enhanced implementation of PMKSY, as also discussed in SDG 9.



**SDG 13:** Various risk mitigation strategies and adaptation practices that can be adopted include expanding the coverage of crops included in Pradhan Mantri Fasal Bima Yojana (PMFBY). Diversifying the list of crops covered will ensure a more comprehensive and inclusive risk mitigation strategy for farmers and encourage them to diversify their crops for cultivation. Also, transitioning from indemnity-based insurance to index-based insurance mechanisms can streamline the claims process, simplifying claim procedures, mitigating inaccuracies in triggering claims for crop losses, reduce administrative overheads, and ensure quicker disbursement of pay-outs to affected farmers. Additionally, integrating a Multi-Hazard Early Warning System (MHEWS) within the National Disaster Management Plan (NDMP) can be essential to provide timely alerts and response mechanisms for various agricultural risks and potential associated effects, thus strengthening disaster risk reduction, as well as climate adaptation. A vulnerability matrix can be developed by Climate Change and Sustainable Agriculture: Monitoring, Modelling and Networking (CCSAMMN) and National Mission on Strategic Knowledge for Climate Change (NMSKCC) to map and track the amount of productivity lost in agriculture due to slow-onset events and devise methods on how international funds can compensate for the loss to the farmers.



**SDG 14:** To enhance sustainable agricultural practices and minimize environmental impacts on marine systems, it is crucial to implement rigorous monitoring and regulatory mechanisms to manage the rate of runoff from agricultural sources. Introducing comprehensive monitoring systems within Coastal Regulation Zones (CRZ) rules, Water Act, 1971, and Environment Protection Act, 1986 will effectively track and regulate runoff, ensuring minimal agricultural runoff into marine systems. Additionally, within the framework of the Paramparagat Krishi Vikas Yojana (PKVY), water quality monitoring protocols that specifically assess nutrient export from agricultural fields to adjacent water bodies can be integrated. By embedding robust water quality assessments into PKVY, managing the impact of agricultural activities on water bodies can be assessed.



**SDG 15:** Emphasizing the post-production component, specifically addressing access to markets, credit, and storage units within Sub-Mission on Agroforestry (SMAF), can help strengthen the agri-value chains and sustainable approach to farming practices. This includes allocating resources towards building storage infrastructure, the post-harvest handling of agroforestry produce, and implementing regulatory frameworks that support marketing prospects for agroforestry produce. This recommendation underscores the significance of focusing on the post-production phase within the SMAF framework. Facilitating access to markets and credit for farmers involved in agroforestry will not only enhance their economic prospects but also incentivize the adoption of sustainable agroforestry practices.



**SDG 16:** The Model Agricultural Land Leasing Act by NITI Aayog offers a framework to address the complexities of land tenancy scenarios, and it is crucial to encourage each state to adopt this Act. This will help ensure standardized regulations and a structured approach to land leasing, providing clarity and stability to the agricultural sector. This approach will not only address issues related to land tenancy but also foster a more inclusive and sustainable agricultural landscape that benefits all stakeholders involved. Collaborative farming presents a more feasible solution as it allows for a structured framework that safeguards the interests of marginal and tenant farmers. By fostering collaboration among farmers, this approach can lead to increased income opportunities, shared responsibilities, and equitable access to subsidies and support mechanisms. In exploring collaborative farming models, it is essential to acknowledge and address the challenges related to trust, uniformity, accountability, and varying contributions among farmers engaged in land leasing agreements.



**SDG 17:** Establishing partnerships with international organizations often faces challenges due to the lack of a common knowledge-sharing platform. To address this, there is a pressing need for the development of a comprehensive single-window platform that facilitates improved access to data and knowledge for sustainable agriculture. This platform would serve as a centralized hub, fostering collaboration by providing a shared space for the exchange of information and expertise. By bridging the gaps in knowledge sharing, this initiative aims to enhance cross-sectoral collaboration, particularly in the realms of environment and social protection and ensure sustainability in agriculture with shared resources and knowledge.

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## 5. Cross-cutting Issues

**Addressing Data Gaps:** The foundation of informed decision-making rests on the availability of reliable data. However, data constraints pose a significant hurdle, hindering the development of policies grounded in real-time insights. Addressing this gap involves a strategic overhaul of data collection mechanisms, leveraging technological solutions, and ensuring comprehensive coverage.

**Non-Symmetry between State and Central Mandates:** Administrative misalignment can lead to disjointed efforts and a lack of cohesive strategies. Bridging the gap between state and central mandates requires enhanced coordination, shared resources, and a unified vision towards achieving SDGs in the agriculture sector.

**Strengthening SDG Index:** NITI Aayog's SDG Index and state SDG indicator frameworks can be further strengthened by aligning key agriculture-related indicators such as the crop diversification index.

**Inefficient Fund Utilization:** The financial backbone of sustainable agriculture initiatives is often hindered by inefficient fund utilization. Rectifying this gap necessitates a meticulous examination of funding mechanisms, ensuring optimal allocation, and implementing accountability measures to track the impact of financial investments.

**Absence of Post-Harvest Data:** Post-harvest data is crucial for understanding the efficiency and challenges within the agricultural value chain. The absence of this crucial data impedes the development of targeted interventions. Closing this gap involves implementing comprehensive post-harvest data collection methods and integrating this information into policy formulation.

**Market Inaccessibility and Non-adaptability:** Market dynamics play a pivotal role in shaping the success of sustainable agriculture. However, market inaccessibility and non-adaptability act as barriers. Addressing this gap calls for strategies that enhance market access for farmers, facilitate adaptation to market trends, and ensure fair returns for sustainable practices.

**Shelf Life of Schemes/Projects:** The sustainability of agricultural schemes and projects is often compromised by a limited shelf life. Prolonging the impact of these initiatives requires a shift towards long-term planning, community engagement, and adaptive strategies that can withstand the test of time.



**Focus on Interlinkages between SDGs:** Develop a comprehensive understanding of the interconnected nature of SDGs and their implications for sustainable agriculture. This involves mapping the synergies and trade-offs to inform integrated policy frameworks that transcend siloed approaches.

**Improve Sync Between State and Centre Government:** Enhance coordination and collaboration between state and central governments to ensure a synchronized approach. This involves aligning mandates, sharing resources, and fostering a cohesive strategy towards achieving SDGs in the agriculture sector.

**Robust Information System:** Establish a robust information system that integrates data from various sources, providing policymakers with accurate and timely information. This system should be designed to facilitate evidence-based decision-making and monitor the progress of sustainable agriculture initiatives.

**Improve Feedback Mechanisms:** Implement effective feedback mechanisms that allow for continuous evaluation and adjustment of policies. This iterative process ensures that policies remain responsive to the evolving needs and challenges within the sustainable agriculture landscape.

**Collaboration between Stakeholders from the Planning Stage:** Foster collaboration between diverse stakeholders, including government bodies, private sectors, civil society, and local communities, right from the planning stage. This inclusive approach ensures a holistic perspective and aligns the efforts of all stakeholders towards common goals.

**Strengthen Monitoring and Evaluation (M&E) and Projects Sustainability:** Strengthen M&E frameworks to monitor the impact and effectiveness of sustainable agriculture projects. Emphasize sustainability by incorporating long-term planning, resource optimization, and community engagement to ensure enduring positive outcomes.

In conclusion, the gaps in the policy interface between sustainable agriculture and SDGs are not merely challenges but opportunities for transformative change. At the crossroads of identified gaps, the road ahead should be paved with a blueprint that not only acknowledges these challenges but transforms them into opportunities. This study, in its pursuit of understanding the synergies and trade-offs between sustainable agriculture and SDGs, serves as a guide for crafting this blueprint. The road ahead requires a concerted effort to bridge these gaps, backed by a blueprint that understands the intricacies of interlinkages, values comprehensive data, and fosters collaboration among stakeholders. As we navigate this terrain, the study's contribution to identifying synergies and trade-offs becomes the cornerstone of policy recommendations, stakeholder mapping, and a nuanced understanding that will guide the sustainable agriculture landscape towards a resilient and equitable future.

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*Creating Innovative Solutions for a Sustainable Future*

**The Energy and Resources Institute (TERI)**

Darbari Seth Block, Core 6C, India Habitat Centre,

Lodhi Road, New Delhi - 110 003, India

Tel: (+91 11) 2468 2100, 7110 2100

Email: [mailbox@teri.res.in](mailto:mailbox@teri.res.in) Website: <http://www.teriin.org>

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