Sustainable Finance Flows to India's Agriculture Sector

Approach and Methodology

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CLIMATE
POLICY
INITIATIVE

CONTENTS

1. Introduction **iii**

2. Definition **iv**

2.1 Defining finance flows to sustainable agriculture iv
2.2 Defining sources and intermediaries v
2.3 Defining public and private vi
2.4 Defining disbursement and end use activities vi
2.5 Defining sectoral coverage under activities 1
2.6 Defining financial instruments 3

3. Data collection and scope of accounting **4**

3.1 Accounting by data source 5

4. General assumptions and principles **13**

4.1 Exclusions and inclusions 13
4.2 Exchange rate 13
4.3 Data consideration and limitations 13
4.4 Corporate social responsibility (CSR) and domestic philanthropy 15

5. Ground truthing and double counting **16**

6. Annexure 1: Sustainable agriculture sector policy mapping framework **17**

7. Annexure 2: Defining instruments **19**

8. References **21**

1. INTRODUCTION

Increased finance will be critical for transitioning the agriculture sector to sustainable practices that ensure food security, enhanced climate resilience while also reducing greenhouse gas (GHG) emissions. India's current landscape of sustainable agriculture finance faces lack of clarity over the role of public and private stakeholders, the quantum of current financial flows, the efficiency of different financial mechanisms and which beneficiary sectors/activities of agriculture value chain that are critical for achieving sustainable agriculture.

India's agriculture system itself is experiencing a "grand challenge"[i] (Robertson & Swinton 2005), which involves managing agriculture-climate co-dependency, necessitating a transition to sustainable practices. Climate change has an adverse impact on agriculture, which has implications on livelihoods and food security. Furthermore, agriculture is also the second highest emitting sector in India, with 18% of the gross emissions coming from agriculture as per India's latest Biennial Update Report (BUR)(Indian Network for Climate Change Assessment, 2010).[ii]

India is an agrarian economy, with about 45.5% of its workforce engaged in agriculture and related activities (PIB, 2023).[iii] Furthermore, 92.02% of the total agricultural sector employment is in rural areas (Ministry of Statistics and Programme Implementation 2013)[iv] and 89.4% of India's farmers hold less than two hectares of land and are focused on subsistence farming (MoSPI 2021).[v] India's climate action policy therefore considers emissions from the agricultural sector as "survival emissions," (PIB 2023a)[vi] which are necessary for food security and socioeconomic development, given that the burden of emissions reduction cannot be put on small and marginal farmers (MoEFCC, 2023).[vii]

The focus has been on enhancing climate adaptation and resilience in the agricultural value chain, including downstream, upstream and farming/agricultural activities, to manage the adverse impacts of climate change and ensure food security. From a governance and structural perspective, agriculture falls under the state subject list in the Indian constitution, meaning that the central government cannot fulfil major policy objectives without state cooperation.

For India to transition to sustainable agriculture, careful assessment of the possible sources and volumes of finance e is essential. In this context, Climate Policy Initiative (CPI) has conducted a first-of-its-kind study, following CPI's 2-year tracking cycle, to measure and evaluate the finance flows to sustainable agriculture in India. The report leverages CPI's decade experience of tracking and analysing sustainable finance such as CPI's global and national climate finance tracking reports.

2. DEFINITION

2.1 DEFINING FINANCE FLOWS TO SUSTAINABLE AGRICULTURE

Sustainable agriculture is known by various terminologies[viii] (Khurana and Kumar 2020) and has a multidimensional focus to enhance agricultural productivity, improve water use efficiency, soil health management and synergizing resource conservation.[ix] However, there is no single, comprehensive framework that defines sustainable agriculture from a value-chain perspective in India. Therefore, the study has adopted a value chain approach, which considers the entire agricultural system from **upstream activities** (such as input provision and resource management) to **farming/agriculture activities**, and finally **downstream activities** (such as post-harvest management and market linkages).

To demystify definition of sustainable agriculture, the study reviewed existing literature and government policies utilizing the three objectives' criteria of sustainable agriculture: (1) **Food Security**, (2) **Emission Reduction**, and (3) **Climate Resilience**. Such a holistic view helped us identify the sectors relevant under activities (Check Figure 2) for integrated sustainability across all stages of the agriculture value chain.

The literature review found various national schemes and initiatives addressing aspects of agricultural sustainability that remained fragmented and lacked a unified structure. In response to this gap, this study has developed a comprehensive, criteria-based framework, presented in Annexure 1: Sustainable Agriculture Sector Policy Mapping Framework, which is grounded in government policies and initiatives, designed to guide the identification and implementation of sustainable agriculture practices across the country.

This framework was developed to provide guardrails for identifying finance flows and was finalized based on a literature review, engagement with stakeholders from the Impact Investors Council, National Agriculture Bank for Agriculture and Rural Development (NABARD), as well as closed-door stakeholder discussions at Shakti Sustainable Energy Foundation. This study follows India's policy emphasis on overall sustainability in agriculture, including food security and emissions reduction.

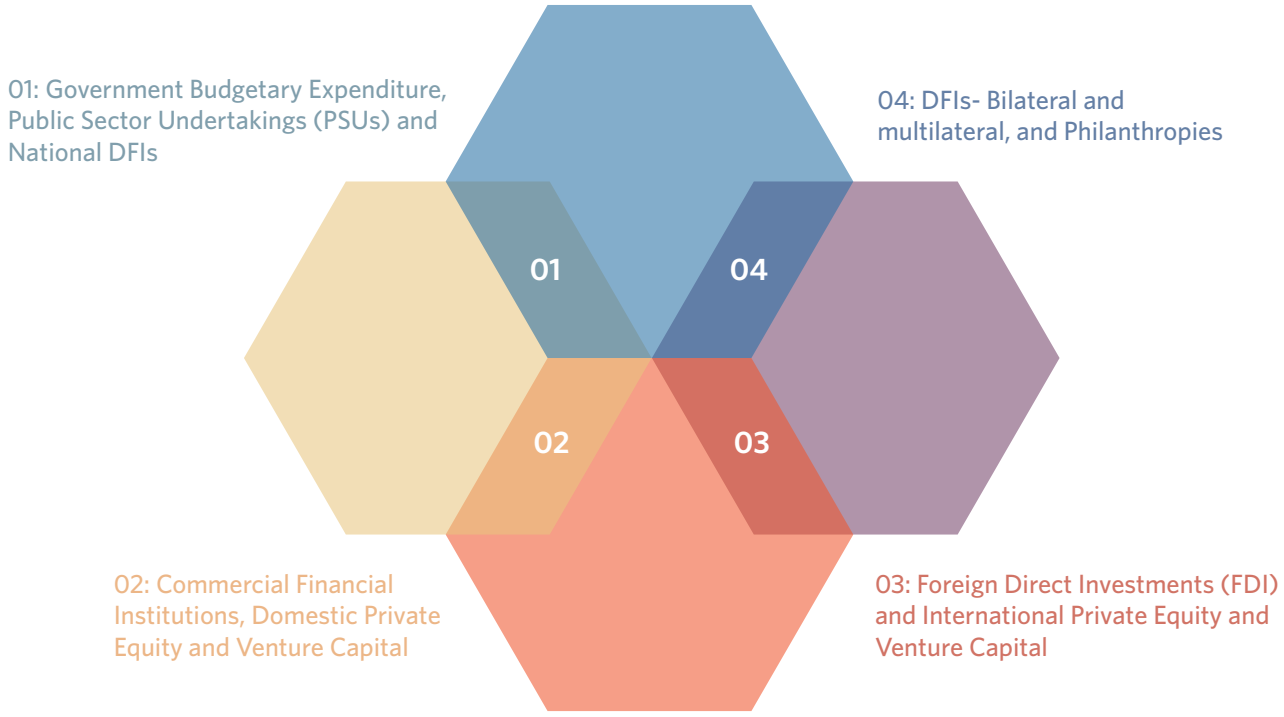
2.2 DEFINING SOURCES AND INTERMEDIARIES

Distinguishing between the source of capital and intermediaries can be challenging, particularly when there are multiple levels of disbursement. In this study, we categorize all funds originating from the Indian exchequer (Union and State Government) as **public sources, which also include Public Sector Undertakings (PSUs)**. Development Finance Institution (DFI) flows are classified as public into:

- **Multilateral**: Where public finance institutions have multiple countries as shareholders and finance flows internationally.
- **Bilateral:** Where there is single country ownership of the public finance institution and finance flows to India.
- **National:** Where there is Indian ownership of the public finance institution and finance is directed domestically.

For **private finance sources**, we consider corporate actors (including private equity/venture capital and balance sheet financing), project developers (involving project debt and equity, as well as balance sheet financing), households, and financial institutions as the primary sources of funds.

Figure 2: Sources of Sustainable Agriculture Finance



2.3 DEFINING PUBLIC AND PRIVATE

We are defining **Public** as government-owned/administered institutions such as bilateral or multilateral development finance institutions, climate and agricultural funds, national and state government department, line ministries, and central public sector undertakings etc. and **Private** as institutions not owned by the government such as commercial financial institutions, privately-owned Special Purpose Vehicles, non-governmental organizations, independent domestic and international institutional investors, households, corporations etc.

Table 3: Public and Private Finance Data

Entity	Suggested Classification
Climate and Agricultural Funds	Public
Commercial financial institutions (providers of private debt capital like commercial and investment bank)	Private
Corporate actors	Private
Government Budgets	Public
Households	Private
Institutional investors (insurance companies, pension funds, foundations, and endowments)	Private
NGOs, Philanthropic Institutions	Private
Private equity, venture capital, infrastructure funds	Private
Project developers (entities designing, commissioning, operating, and maintaining emissions reduction projects)	Private
Central Public Sector Undertakings	Public
Public Financial Institutions - Bilateral	Public
Public Financial Institutions - National	Public

We are labelling the financing type as **domestic** if the funds flow from the account of Government of India, or they are raised by public and/or private entities within the territorial jurisdiction of India. Any funds raised outside India by issuing bonds, through external commercial borrowings or by using any other financial instrument are being treated as **international** financing type.

2.4 DEFINING DISBURSEMENT AND END USE ACTIVITIES

We have defined disbursement as the actual capital flows from the sources and intermediaries to the recipient. It can flow through public or private channels. We are measuring the scope of disbursement at the first level of transaction in the value chain which is categorized into three activities. We have defined end use as the type of sustainable agriculture sector being financed. An end-use sector is classified under sustainable agriculture based on fulfilling the objectives-

food security, emission reduction and climate resilience, and guiderails set by the government policy/schemes/initiatives.

For each of the sectors mentioned, we **collected data on the actual disbursements, rather than commitments**, during the financial year FY 2020-21 and FY 2021-22. It is to be noted that financial year in India starts on 1st April of the current year & ends on 31st March of the following year and all statutory publications follow this cycle. The sources of finance include Union and State Government Budgets, Public Sector Undertakings, private and state-owned Commercial Financial Institutions, Foreign Direct Investment, Bilateral and Multilateral Development Finance Institutions, and Philanthropy.

The **disbursement** refers to the flow of capital from sources and intermediaries to recipients, whereas the end-use focuses on sustainable agriculture financing that aligns with the sustainable agriculture framework. The **end-use** of these funds is defined as the type of activities being financed. This includes **downstream, agriculture/farming activity and upstream activit**y with its sectors. We have further disaggregated each of these financial flows into several sectors.

2.5 DEFINING SECTORAL COVERAGE UNDER ACTIVITIES

End use activities are further classified at a sectoral level (Table 1) to track the focus of flows into sectors supporting sustainable agriculture. This sectoral classification is arrived at using government policy and scheme literature supporting sustainable agriculture practices as demonstrated in Annexure 1.

Table 1: Disaggregating end use of Sustainable Agriculture Financial Flows

Activity	Sector
Upstream	• Input- Seeds, Fertilizer and Pesticides • Electricity • Irrigation • Financial Service -Credit • Research – Technology and Planning • Human Capital- Training and Administration • Farmer Organizations and Cooperatives • Natural Capital- Soil and biodiversity
Agriculture/Farming	• Farm Practice and Cropping Choices • Allied Sectors- Animal Husbandry, Pisciculture and Poultry etc.
Downstream	• Storage and Market • Alternative Supply Chains- Bioethanol and Waste Management • Financial Services- Insurance

SECTORS COVERED UNDER UPSTREAM ACTIVITY

Upstream activities in agricultural systems encompass the essential inputs and resources necessary for the implementation of sustainable farming practices.

- **Electricity** sector supports vital operations like irrigation systems and mechanization, ensuring efficient and consistent production cycles.

- **Inputs** such as seeds, fertilizers, and pesticides are integral to boosting productivity and crop health.
- **Irrigation** infrastructure plays a crucial role in water management, enhancing the efficiency of water use across farmlands.
- Access to modern **research technology and planning capabilities**, such as advanced irrigation systems, pest-resistant seeds, and climate-resilient crop varieties, drives improvements in yields and helps farmers adapt to changing environmental conditions.
- **Human capital** sector includes farmer training, extension services and policy administration that equips farmers with the skills and knowledge to implement sustainable agricultural practices effectively.
- Furthermore, **Farmer Organizations and cooperatives** are vital in strengthening collective efforts, improving access to markets, and fostering resource-sharing among smallholder farmers.
- The sustainable management of **natural capital**, such as soil and biodiversity, ensures the preservation of ecosystem services that are fundamental to maintaining the long-term health of agricultural systems

SECTORS COVERED UNDER AGRICULTURE/FARMING ACTIVITY

Agricultural activities encompass the processes that support core production, including both crop cultivation and allied sectors such as livestock and fisheries.

- **Farm Practice and Cropping choices** include expenditure on farming methods and cropping systems, like organic farming, SRI, promotion of millets and crop rotation etc., that support sustainable agriculture objectives- food security, emission reduction and climate resilience.
- **Allied sectors** play a crucial role in diversifying farm incomes and enhancing resilience against environmental risks. This sectoral classification tracks financial flows towards pisciculture and animal husbandry.

SECTORS COVERED UNDER DOWNSTREAM ACTIVITY

Downstream activities in agriculture encompass the post-production processes that ensure the economic viability of farming.

- Flows towards developing **alternative supply chains** that provide new avenues for enhancing farmer income through farm waste management and integrating farming activity in bioethanol production.
- Enhancing **storage and market** infrastructure, such as modern cold chains and warehouses, is critical in reducing post-harvest losses and ensuring the timely delivery of produce to markets.
- **Financial services- Insurance** plays a significant role in risk management, protecting farmers from unpredictable weather, pest outbreaks, or price fluctuations. Such insurance products are vital in stabilizing farmer incomes and maintaining the resilience of the agricultural sector.

2.6 DEFINING FINANCIAL INSTRUMENTS

We are capturing government budgetary expenditure, subsidies, collective investment vehicles, grants, low-cost (including concessional) and market-term loans, project-level equity, and balance sheet financing (i.e. a direct debt or equity investment by a company or finance institution without making any gearing ratio assumption). These are tabled as follows:

Data Source		Financial Actor/Intermediary	Study Instrument
Priority Sector Lending Guidelines NABARD State Focus Papers		Commercial Financial Institutions	Balance sheet financing (Debt portion)
DPIIT, Ministry of Commerce and Industries Database		Foreign Direct Investment	Balance sheet financing (Equity portion)
Traxcn Database		Private Equity/Venture Capital	Equity
OECD CRS	OECD Philanthrophic Grants	Philanthropy	Grant
	Other Official Flows (OOF)	DFI- Bilateral	▪ Grant ▪ Debt
	Official Development Assistance (ODA)	DFI- Multilateral	▪ Debt ▪ Equity ▪ Debt- Mezzanine/Hybrid ▪ Collective Investment Vehicles ▪ Debt Securities/Bonds
Annual Financial Statements		Public Sector Undertaking	▪ Balance sheet finance (Equity Portion) ▪ Unknown
Union and State Government Budgets		Government Budgetary Expenditure	▪ Grants-in-Aid ▪ Other Expenditure ▪ Subsidies

3. DATA COLLECTION AND SCOPE OF ACCOUNTING

Following an extensive data scoping exercise, we have cleaned the datasets and removed double counting, if any. Where finance flows are detailed at the project level, we have checked the data manually for consistency of information about sources, geographies, instruments and sectors. Wherever possible we have corrected data gaps and inconsistencies through supplementary research and engagement with our review group of experts. For each of the data sources referred to in this study, the level of data granularity is indicated in the following table:

The data collection involves primary and secondary research collecting disaggregated data on disbursements. The data of sustainable finance flows towards agriculture collected from various sources along with level of granularity is tabulated below (Table 3). The datasets have been cleaned and double counting, if any, has been removed.

Table 3: Data sources and level of granularity

Category	Source	Data Source	Level of Granularity
Domestic	Public	Government Budgets	Aggregated (Disaggregated by states/ UTs and sectors)
		PSU Annual Reports	Aggregated (Project-level in some cases)
	Private	NABARD State Focus Papers	Disaggregated by states
International	Public	OECD ODA (DFI Multilateral)	Project-level
		OECD OOF (DFI Bilateral)	Project-level
	Private	OECD CRS (Philanthropy)	Project-level
		DPIIT, Ministry of Commerce and Industry (FDI Data)	Investment level
		Traxcn Database (PE/VC Data)	Investment level

This report leverages CPI's methodology developed over a decade of tracking and analyzing climate finance through its global and national tracking reports. However, the scope of what is tracked has been broadened to encompass not just climate finance for agriculture, but also sustainable finance for agriculture to align with Government of India policies. Given the broader scope of this exercise and different methodological boundaries, our report covers higher value of finance flows compared to studies that focus only on climate finance.[1]

1 For example, the Landscape of Green Finance 2024 reports biennial average of INR 265 billion (USD 3.5 billion) for on farm adaptation related activities in agriculture.

3.1 ACCOUNTING BY DATA SOURCE

3.1.1 UNION AND STATE GOVERNMENT BUDGETS

In this study, we have classified all funds moving out of the Indian exchequer (central and state government treasury) as source of domestic public funds. Accordingly, we analyzed the Annual Financial Budget of the following central ministries and all the states and union territories of India and collected data corresponding to the relevant project codes. Furthermore, instead of 'Budget Estimates' or 'Revised Estimates', we analyzed the 'Actuals' for both the financial years being considered for this study. The study assumed that the end use of the financial flows from Central/State government budgets is being considered as the recipient/activity mentioned in the budget document.

We referred to the detailed demand for grants of the following line ministries in the Union Budget 2022-23 and 2023-24 (Actuals):

1. Department of Agricultural Research
2. Department of Agriculture
3. Department of Animal Husbandry and Dairying
4. Department of Chemicals and Petrochemicals
5. Department of Commerce
6. Department of Fertilizers
7. Department of Fisheries
8. Department of Food and Public Distribution
9. Department of Land Resources
10. Department of Rural Development
11. Department of Water Resources, River Development and Ganga Rejuvenation
12. Ministry of Development of Northeastern Region
13. Ministry of Earth Sciences
14. Ministry of Environment, Forests and Climate Change
15. Ministry of Food Processing Industries
16. Ministry of New and Renewable Energy
17. Ministry of Petroleum and Natural Gas
18. Ministry of New and Renewable Energy

We carried out the analysis of annual budgets of all the 28 States and 8 Union Territories of India.

The state budgets included the following:

1. Andhra Pradesh
2. Arunachal Pradesh
3. Assam
4. Bihar
5. Chhattisgarh
6. Goa
7. Gujarat
8. Haryana
9. Himachal Pradesh
10. Jammu and Kashmir
11. Jharkhand
12. Karnataka
13. Kerala
14. Madhya Pradesh
15. Maharashtra
16. Manipur[2]
17. Meghalaya
18. Mizoram
19. Nagaland
20. Odisha
21. Punjab
22. Rajasthan
23. Sikkim
24. Tamil Nadu
25. Telangana
26. Tripura
27. Uttar Pradesh
28. Uttarakhand
29. West Bengal
30. Andaman & Nicobar Islands
31. Chandigarh
32. Dadra & Nagar Haveli
33. Daman and Diu
34. Delhi
35. Lakshadweep Islands
36. Puducherry

From each of the state budget statements, we identified the following major codes and included the corresponding outlays in our track finance flows towards sustainable agriculture, based on the sustainable agriculture framework:

- 2401 Crop Husbandry
- 2402 Soil and Water Conservation
- 2403 Animal Husbandry
- 2404 Dairy Development
- 2405 Dairy Development
- 2405 Fisheries
- 2406 Dairy Development
- 2407 Dairy Development
- 2407 Plantations
- 2408 Dairy Development
- 2408 Food, Storage and Warehousing
- 2415 Agricultural Research and Education
- 2416 Agricultural Financial Institutions
- 2425 Co-operation
- 2435 Other Agricultural Programmes
- 2501 Special Programmes for Rural Development
- 2700 Major Irrigation
- 2701 Medium Irrigation

2 Data not available for 2020-21

- 2702 Minor Irrigation
- 2705 Command Area Development
- 2711 Flood Control and Drainage
- 2810 New and Renewable Energy
- 2852 Industries
- 3435 Ecology and Environment
- 3455 Meteorology
- 3466 International Financial Institutions
- 4401 Capital Outlay on Crop Husbandry
- 4402 Capital Outlay on Soil and Water Conservation
- 4403 Capital Outlay on Animal Husbandry
- 4404 Capital outlay on Dairy Development
- 4405 Capital Outlay on Fisheries
- 4407 Capital Outlay on Plantations
- 4408 Capital Outlay on food Storage and Warehousing
- 4415 Capital Outlay on Agricultural Research and Education
- 4416 Investments in Agricultural Financial Institutions
- 4425 Capital Outlay on Cooperation
- 4435 Capital Outlay on Other Agricultural Programmes
- 4700 Capital Outlay on Major Irrigation
- 4701 Capital Outlay on Medium Irrigation
- 4702 Capital Outlay on Minor Irrigation
- 4705 Capital Outlay on Command Area Development
- 4711 Capital Outlay on Flood Control and Drainage
- 4810 Capital Outlay on New and Renewable Energy
- 4855 Capital Outlay on Fertilizer Industries
- 4856 Capital Outlay on Petrochemical Industries
- 4857 Capital Outlay on Chemicals and Pharmaceutical Industries
- 5425 Capital Outlay on other Scientific and Environmental Research
- 5455 Capital Outlay on Meteorology
- 6401 Loans for Crop Husbandry
- 6402 Loans for Soil and Water Conservation

- 6404 Loans for Dairy Development
- 6405 Loans for Fisheries
- 6407 Loans for Plantations
- 6408 Loans for Food Storage and Warehousing
- 6416 Loans to Agricultural Financial Institutions
- 6425 Loans for Cooperation
- 6435 Loans for other Agricultural Programmes
- 6436 Loans for other Agricultural Programmes
- 6437 Loans for other Agricultural Programmes
- 6438 Loans for other Agricultural Programmes
- 6439 Loans for other Agricultural Programmes
- 6440 Loans for other Agricultural Programmes
- 6501 Loans for Special Programmes for Rural Development
- 6700 Loans for Major Irrigation
- 6701 Loans for Medium Irrigation
- 6702 Loans for Minor Irrigation
- 6705 Loans for Command Area Development
- 6711 Loans for Flood Control Projects
- 6712 Loans for Flood Control Projects
- 6713 Loans for Flood Control Projects
- 6810 Loans for New and Renewable Energy
- 6855 Loans for Fertilizer Industries
- 6857 Loans for Chemical and Pharmaceutical Industries

For state and central government budget data, the decision to include or exclude the codes and activity mentioned in the budget entries were based on their alignment with the drafted sustainable agriculture framework. However, there will be a few variations in the major and minor based on the classifying approaches used by states.

The total transfer of financial resources from the Union to the States consists of those determined by the Finance Commission in its recommendations (which include states' share in Central taxes and other Grants) and the scheme-based grants/transfers (which include the funds for Centrally Sponsored Schemes/Central Sector Schemes).

The Centre provides 100% funding to the States for Central Sector Schemes for implementation of the dedicated scheme. In addition to this, the Centre determines the grants to the States as a part of fund allocation for Centrally Sponsored Schemes. In most cases, the Union government and the states fund these schemes at a 60:40 ratio. In some cases, the funding ratio could

be 80:20. In the case of north-eastern states, 90 per cent of the funds come from the central government. These funds are disbursed through central and state nodal agencies under different government schemes/projects. To avoid double counting between the union and state budgets, the following steps will be taken:

- Central share/assistance in the state budget, which includes State and district sector component of centrally sponsored schemes, were excluded. However, the entries that mentioned state share of central sector scheme are included.
- Central sector schemes in the state budgets entries were excluded.
- State budget entries that mentioned percentage central share were considered as central contribution so are excluded.

3.1.2 OECD CREDITOR REPORTING SYSTEM

In this study, the international public finance flows covered are limited to the primary capital flows directed from bilateral and multilateral development finance institutions towards sustainable agriculture in India. For tracking such financial flow by international public actors, the study utilized publicly available data on the OECD's Creditor Reporting System (CRS) database[3].

The OECS CRS includes reporting from bilateral and multilateral development finance institutions, government agencies, and philanthropies in the form of Official Development Assistance (ODA), Other Official Flows (OOF) and Philanthropic grants. The OECD-DAC-CRS system data collected was for 2020-21 and 2021-22, which was in calendar year format starting from January and ending in December. In our study, however, we have made use of the Indian financial year that starts in April and ends in March. Since the OECD data is not disaggregated by month, we have made an exception and considered the data as is for our analysis. In other words, we have not adjusted the data for financial year accounting.

The relevant sustainable agriculture entries were filtered and extracted from the collected OECD CRS data based on the project descriptions provided for each transaction. The study identified all the relevant transactions and mapped them with corresponding activity and sector based on the formulated sustainable agriculture framework. Any multidimensional OOF/ODA/philanthropic transactions, contributions to sustainable agriculture were accounted in full, based on the assumption that they support broader agricultural value chain activities. To avoid duplicity (double counting) of OOF with private equity and venture capital finance flows, we netted those financial flows in the final data. Additionally, the externally aided projects (EAP) mentioned in state budgets were cross-checking with OOF and ODA flows to exclude double counting.

3.1.3 PRIVATE EQUITY/VENTURE CAPITAL DATABASE

For private equity and venture capital (PE/VC) financial flows, the Tracxn database was instrumental in providing investment-wise transaction-level data. The database enabled the study to capture a wide range of investments across agri-tech and on-tech components of agriculture value chain. The portal offered comprehensive granularity on the funding round, amount raised, valuation and investor details.

3 Organisation for Economic Co-operation and Development (OECD). 2018. "Climate Related Development Finance at the activity level". Paris: OECD's Development Assistance Committee (DAC). Accessible at: http://www.oecd.org/dac/stats/climatechange.htm

The data collection began with selecting all funding stages (ranging from seed rounds to later series like A, B, and C), and extracting transaction by applying keyword filter that aligns with the study's sustainable agriculture framework. However, recognizing that automated filtering alone might not fully capture alignment with the sustainable agriculture framework, each selected company's description and website were meticulously reviewed. This manual verification process allowed for a more accurate review of the transaction data, where entries linked to activities or sectors beyond the sustainable agriculture framework were excluded.

After cleaning the data, each PE-VC transaction was systematically mapped to the relevant activity and sector as defined by the sustainable agriculture framework. Additionally, using the investor details the PE-VC investments were manually classified into either international or domestic.

3.1.4 FOREIGN DIRECT INVESTMENT

The Department for Promotion of Industry and Internal Trade[4] (DPIIT), Ministry of Commerce and Industry, Government of India formulates Foreign Direct Investment (FDI) policy and promotion, approval and facilitation in the country. It defines FDI as investment by non-resident entity/person resident outside India in the capital of an Indian company under Schedule 1 of Foreign Exchange Management[5]. (Transfer or Issue of Security by a Person Resident Outside India) Regulations, 2000). In the agriculture sector, FDI up to 100% is permitted under the Automatic Route and no prior government approval is required.

In this study, we have accessed the annual data published by DPIIT on sector-wise foreign direct investment in India. We have operated with the assumption that 100 per cent of the FDI inflow in the two years was eventually disbursed to the relevant projects within this time period.

3.1.5 COMMERCIAL FINANCIAL INSTITUIONS

Commercial Financial Institutions (such as Scheduled Commercial Banks, Regional Rural Banks, Urban Cooperative Banks, NBFCs, and microfinance institutions (MFIs)) offer credit solutions to farmers, often mandated by priority sector lending guidelines, government schemes or interest subvention programs.[x]

However, RBI's sector wise credit statistics show that agriculture credit under priority sector lending, which includes Scheduled Commercial Banks, Regional Rural Banks, Urban Cooperative Banks, constitutes majority share of the credit disbursed to the agriculture sector. Please note that the study will not be tracking the remaining non-PSL agriculture credit flows in the debt financing.

Additionally, the NABARD's State-level Bankers Committees (SLBCs), and RBI databases on agriculture financing do not offer detailed data on actual disbursements. Instead, they provide more granularity in agriculture credit projections. Consequently, given the lack of granular data, a quantitative method was developed. Where the study attributes a percentage of the total projected agricultural debt finance for a certain credit category (Activity/Sector) to the actual

4 The Department for Promotion of Industry and Internal Trade (DPIIT), formerly Department of Industrial Policy and Promotion (DIPP) is a central government department under the Ministry of Commerce and Industry, Govt. of India (https://dipp.gov.in/)
5 Foreign Exchange Management (Transfer or Issue of Security by a Person Resident Outside India) Regulations, 2000, Reserve Bank of India (https://www.rbi.org.in/Scripts/BS_FemaNotifications.aspx?Id=174)

disbursements for that financial year. Also, due to the lack of data on non-RBI regulated entities, the financial flows through these intermediaries will not be accounted for.

3.1.6 PUBLIC SECTOR UNDERTAKINGS

Public Sector Undertakings (PSUs) are government-owned corporations in which the majority (51 per cent or more) of the paid-up share capital is held by central government or by any state government or partly by the central governments and partly by one or more state governments. This study has tracked 14 union government PSUs that play a pivotal role in upstream and downstream activities of the agriculture value chain by providing inputs- seeds, pesticides and fertilizers, and storage services to the sector. These entities receive significant subsidies from the union government as these are considered critical for ensuring food security in the country. But in order to eliminate any double counting with union government budgetary expenditure, we have netted the sum of subsidies mentioned in annual financial statements of the agricultural public sector undertakings (PSUs) from the union budget entries that provide subsidies to PSUs for the corresponding activity and sector.

In this study, we have considered the investments undertaken by the following PSUs in the financial year 2020-21 and 2021-22 for analysis:

- **FCI Aravali Gypsum and Minerals India Limited** (https://fagmil.nic.in/en/introduction-2/)
- **Brahmaputra Valley Fertilizer Corporation Limited** (https://bvfcl.com/)
- **Central Warehousing Corporation** (https://cewacor.nic.in/)
- **Food Corporation of India** (https://fcivlts.in/#about-us)
- **Hindustan Urvarak and Rasayan Limited** (https://hurl.net.in/about)[6]
- **Rashtriya Chemicals and Fertilizers Limited** (https://www.rcfltd.com/rcf-at-glance-1)
- **National Fertilizers Limited** (https://www.nationalfertilizers.com/background-company-profile/)
- **The Fertilizers and Chemicals Travancore Limited** (https://www.fact.co.in/)
- **Madras Fertilizers Limited** (https://madrasfert.co.in/)
- **National Seeds Corporation Limited** (https://www.indiaseeds.com/)
- **Hindustan Insecticides Limited** (https://www.hil.gov.in/)
- **Agri Innovate** (http://agrinnovateindia.co.in/index;jsessionid=6C2F1B47B8806C3DEF693B68ACE6FF44)
- **Ramagundam Fertilizers and Chemicals Limited** (https://www.rfcl.co.in/)
- **Hindustan Fertilizer Corporation Limited** (https://hfclfert.in/introduction.html)

For both the years, we have studied the consolidated financial statements – Balance Sheet and Profit and Loss Account to identify investments undertaken by these PSUs. It may be noted that we have collectively classified all administrative expenditures like employee cost, administration

6 Data of FY 2020-21 not available

cost, finance cost and other expenditure through "Unknown" financial instrument. Additionally, the change in plant and equipment and capital work in progress, and Purchase of stock were classified as "Balance sheet equity" financial instrument. We have not included any non-cash expenses like depreciation, amortization, stock-based compensation, provision for bad debts etc. in our analysis.

4. GENERAL ASSUMPTIONS AND PRINCIPLES

This study primarily focused on the agriculture part of Agriculture, Forest and Land Use (AFOLU) concept. The components of forestry (excluding Agro-forestry) and land-use are excluded in the study.

The study tracked the sustainable agriculture finance flows of 2 financial years[7] (FY) 2020-21 and 2021-22. It is important to note that time period tracked was a COVID-19 phase, where the financial flows and system could have been partially impacted by the COVID shock.

4.1 EXCLUSIONS AND INCLUSIONS

The agriculture value chain perspective of the study was restricted to agriculture and allied activities/sectors with its upstream and downstream activities. The list of sustainable agriculture activities and sectors included were affirmed and ring-fenced using India's existing policy literature and expert opinions which is referenced in Table 2: Sustainable Agriculture Sector: Policy Mapping Framework.

A list of excluded activities/sectors was identified, which included- food processing, pasture, sanitation and hygiene, marine fisheries, democratic participation and climate activism, policy management and planning, disaster relief, livelihood support programs and land reforms and property rights.

4.2 EXCHANGE RATE

In this study, we have used the annual average exchange rate published by the Reserve Bank of India. For the financial year (FY) 2020-21 is USD 1 = INR 74.23, and for the financial year (FY) 2021-22, it is USD 1 = INR 74.5.[8]

4.3 DATA CONSIDERATION AND LIMITATIONS

GOVERNMENT BUDGET DATA:

a. The study tracked the government's expenditure on direction and administration, which includes salaries, office expenses, maintenance and administrative costs. While this may not necessarily qualify as directly contributing to sustainable agriculture, it is impossible to isolate such values from the aggregated transaction data.

7 Please note that financial year in India starts on 1st April of the current year and ends on 31st March of the following year.

8 Exchange rate for the year derived from Reserve Bank of India TABLE 139 : Exchange rate of Indian rupee vis-a-vis the SDR, US Dollar, Pound Sterling, Euro and Japanese Yen. (Financial Year – Annual Average and End-year Rates). Reserve Bank of India (https://rbidocs.rbi.org.in/rdocs/Publications/DOCs/139T_13092024245FFE1BB8CB45C3A51183FB6ADA6DC8.XLSX)

b. Due to the lack of detailed budget data in Arunachal Pradesh, data collection was based on major codes rather than specific activities, while in Manipur, actual budget figures are only available for the year 2021-22.

c. The study tracked "Interest Charges" activities mentioned in the state budget documents.

d. The study excluded "Deduction" and "Suspense" expenditures mentioned in the state budget documents.

e. The electricity subsidy or expenditure by union/states towards rural electrification and agriculture sector under major code 2801 was not accounted in the data, except for expenditure pertaining to new and renewable energy programs/activities.

f. The government budget data excludes livelihood support initiatives and welfare schemes, like Mahatma Gandhi National Rural Employment Guarantee (MGNREGA), income support schemes or government debt relief to farmers.

g. In public finance, the NABARD supported works were included in the state budgets data as these are not part of the debt financing projection under NABARD's State Focused Papers (SFPs).

PUBLIC SECTOR UNDERTAKINGS DATA:

a. The study only tracked the union government's agriculture public sector undertakings (PSUs) data and not the state's agricultural public sector undertakings (PSUs).

b. The annual financial statement of FY 2020-2021 for Hindustan Urvarak & Rasayan Limited was not available.

COMMERCIAL FINANCIAL INSTITUTION DATA:

a. Private debt financing data was primarily covered through Priority Sector Lending under agriculture credit.

b. Non-RBI regulated entities were not covered due to fragmented availability and lack of detailed end-use information.

c. For private equity and venture capital finance, the study accounted for all series and round finance flows under equity instrument.

d. For project-level private finance data, information under the agriculture sector category was available in a fragmented manner on various databases. Hence, it was not included as a part of the study.

e. We have excluded all secondary market transactions like refinancing of project assets, mergers and acquisitions, and purchase and sale of shares to eliminate double counting.

OECD CRS SYSTEM DATA:

a. For ODA/OOF/Philanthropic financial flows, the study accounts sustainable agriculture activities in full, based on the assumption that they support broader agricultural value chain activities.

4.4 CORPORATE SOCIAL RESPONSIBILTY (CSR) AND DOMESTIC PHILANTHROPHY

We have excluded the finance flows towards sustainable agriculture value chain through the corporate social responsibility (CSR) funding due to lack of granularity of end-use in the publicly available data. Similarly, the domestic philanthropic financial flows are also excluded due to lack of aggregated and verifiable data aggregated at the project-level to show end-use.

5. GROUND TRUTHING AND DOUBLE COUNTING

In the events when complete data, context, terminologies or other metadata isn't available, we made certain assumptions in our analysis. Our assumptions are based on industry specifications to the best extent of our knowledge and informed by our multiple discussions with our experts. To establish credibility and avoid double counting in financial flows, special attention and methodology steps with respect to all data sources.

6. ANNEXURE 1: SUSTAINABLE AGRICULTURE SECTOR POLICY MAPPING FRAMEWORK

Activity	Sector	Government of India policies/schemes/initiatives (Since 2004)
Upstream activity	Electricity	• PM-Kisan Urja Suraksha evam Utthan Mahabhiyan Yojana[9] • National Agriculture Bank for Agriculture and Rural Development's solar pump project • Agriculture Demand Side Management (AgDSM) Program
	Inputs	• Nutrient-subsidy scheme for fertilizers • Paramparagat Krishi Vikas Yojana (PKVY)[10] • PM Prime Minister's Programme for Restoration, Awareness, Generation, Nourishment, and Amelioration of Mother Earth (PM-PRANAM) Yojana[11]- biofertilizers promotion • Neem Based Urea initiative • National Mission for Natural Farming • Integrated Pest Management • National Innovations in Climate Resilient Agriculture- Seeds • Sub-Mission On Seed and Planting Material
	Irrigation	• PM Krishi Sinchayee Yojana[12] • NMSA- National Mission on Sustainable Agriculture- Rainfed Area Development • Integrated Watershed Management Programme • Command Area Development and Water Management (CADWM) Programme
	Financial services (credit)	• Priority-sector lending requirement • Agriculture Interest Subvention Scheme
	Research: Technology & planning[13]	• ICAR: Agro-climatic zoning farms/models • ICAR'S NICRA (Climate Resilient Agriculture) • Indian National Agricultural Research System (NARS) • NMSA-National Mission on Sustainable Agriculture- Climate Change and Sustainable Agriculture: Monitoring, Modeling and Networking • Mission on Agricultural Mechanisation • National Mission on Strategic Knowledge for Climate Change • NDMA-Disaster Alert System
	Human capital	• Central Agriculture University & State Agriculture University • Krishi Vigyan Kendras Network[14] • ATMA Scheme
	Farmer organizations and cooperatives	• Promotion of farmer-producer organizations and cooperatives
	Natural capital	• NMSA-Soil health management • Soil Health Card Scheme

9 PM-Kisan Urja Suraksha evam Utthan Mahabhiyan Yojana translates to Farmer Energy Security and Progress Mega Program Scheme.
10 Paramparagat Krishi Vikas Yojana translates to Traditional Farmer Development Scheme.
11 PM PRANAM Yojana is a recent government scheme launched in 2023. The framework mentions the scheme to highlight the policy shift in the input sector, but for the time period tracked in the study the financial data will not be available.
12 PM Krishi Sinchayee Yojana translates to PM Farmer Irrigation Scheme.
13 The term Research: Technology and Planning encompasses research of innovation and technologies (inputs, machines, or equipment), better methods, and practices in the agri-value chain. Moreover, this covers activities that involve setting up research centers, policy planning and capacity building around them.
14 Krishi Vigyan Kendras Network translates to Farmer Knowledge Centres Network.

Activity	Sector	Government of India policies/schemes/initiatives (Since 2004)
Farming / Agriculture Activity	Allied sectors	▪ Pradhan Mantri Matsya Sampada Yojana ▪ National Fishery Policy 2024 ▪ National Horticulture Mission ▪ Rashtriya Pashudhan Vikas Yojna[15]
	Farming Practices/ Cropping Choices	▪ NMSA-National Mission on Natural Farming-Direct seeding, zero tillage, soil mulching ▪ PKVY-Organic farming ▪ Rashtriya Krishi Vikas Yojana[16] ▪ NMSA-Sub-mission on Agro-forestry ▪ National Biogas and Manure Management Programme ▪ NMSA-National Bamboo Mission ▪ System of Rice Intensification ▪ National Livestock Mission ▪ ICAR-GSM & AGR Division ▪ National Mission for Food Security-Crop based ▪ National Mission on Edible Oils (NMEO) ▪ National Oil Seed Mission ▪ Production linked incentive Industry for Millet-based products ▪ Initiative for Nutritional Security through Intensive Millet Promotion
Downstream Activity	Alternate Supply Chain	▪ National Biofuel Policy 2018-Bio CNG ▪ PM JI-VAN Yojana with ethanol blending targets ▪ SAMARTH Scheme ▪ SATAT Initiative
	Storage	▪ Integrated Cold Chain Infrastructure ▪ FCI & WCI storage infrastructure
	Financial Services (Insurance)	▪ PM Fasal Bima Yojana[17]

Source: *CPI Analysis, 2024*

15 Rashtriya Pashudhan Vikas Yojna translates to National Animal Wealth Development Scheme.
16 Rashtriya Krishi Vikas Yojana translates to National Farmer Development Scheme.
17 PM Fasal Bima Yojana translates to PM Crop Insurance Scheme.

7. ANNEXURE 2: DEFINING INSTRUMENTS

Instrument	Definition
Grant	Transfers are made in cash for which no repayment is required. It comprises the following financing types: a. **Budget support** - Disbursements from the Consolidated Fund of India/State under different heads of account. It includes both revenue and capital expenditure b. **Technical Assistance (TA)** – Grant-in-aid provided to help developing countries implement projects effectively, improve capacity, promote technology transfer and stimulate regional cooperation. It helps the recipient obtain development financing by improving its ability to manage projects. c. **Core contribution, pooled programs and funds** - For contributions under this category, the donor relinquishes the exclusive control of its funds by sharing the responsibility with other stakeholders (other donors, NGOs, multilateral institutions, Public Private Partnerships) d. **Grant** – A financial award given by a federal/ international authority for a beneficial project. It often includes stringent compliance and reporting measures to ensure that the money is well spent. The grantee is not expected to repay the money but is expected to use the funds from the grant for their stated purpose e. **Project-type intervention** – Financial assistance provided to recipient country to reach specific objectives/ outcomes within a defined time frame, with a defined budget and a defined geographical area. It includes feasibility studies, appraisals and evaluations (whether designed as part of projects/programs or dedicated funding arrangements) f. **Viability Gap Funding** - A grant, one-time or deferred, provided to support infrastructure projects that are economically justified but fall short of financial viability. The lack of financial viability usually arises from long gestation periods and the inability to increase user charges to commercial levels
Debt	A financial instrument which specifies principal amount, interest rate, and date of repayment. 1. **Low-cost Debt** - Loans extended at terms preferable to those prevailing on the market. It comprises the following financing types: a. **Aid loan excluding debt reorganization** – Loan extended by international institutions which is concessional in character and each transaction of which is administered with the promotion of the economic development and welfare of developing countries as its main objective b. **Concessional loan/Official Development Assistance loan** - Loan extended on terms substantially more generous than market loans. The 'concessionality' can be achieved either through interest rates below those prevailing on the market or longer maturity or grace periods, or a combination of those. Concessional loans typically have long grace periods. According to the OECD, the 'grant element' of ODA loans is at least 25%. c. **Export credits** - Government financial support, direct financing, guarantees, insurance or interest rate support provided to foreign buyers to assist in the financing of the purchase of goods from national exporters d. **Investment-related loan to developing countries** – A type of foreign investment that involves bank loans issued by domestic banks to businesses in foreign countries or the governments of those countries e. **Soft loan** - Loan with no interest or a below-market rate of interest. Also known as 'soft financing' or 'concessional funding', soft loans have lenient terms, such as extended grace periods in which only interest or service charges are due, and interest holidays. They typically offer longer amortization schedules (in some cases up to 50 years) than conventional bank loans. Soft loans are often made by multinational development banks to developing countries that would be unable to borrow at the market rate. 2. **Market-rate Debt** - Loans extended at regular market conditions. It comprises the following financing types: a. **Bond/Notes** - Units of corporate debt issued by companies and securitized as tradeable assets. Bond is a fixed income instrument that represents a loan made by an investor to a borrower (typically corporate or governmental) to finance projects b. **Credit line/Revolving facility** - An agreement that allows a borrower the flexibility to access money up to a preset amount, known as the credit limit. When the borrower repays a portion of the current balance due on the revolving credit, that money is once again available for use, minus the interest charges and any fees. c. **Loan** - Debt issued by a financial institution for a fixed amount and fixed repayment schedule with either a fixed or floating market interest rate d. **Mezzanine** - A hybrid of debt and equity financing that gives the lender the right to convert to an equity interest in the company in case of default. It is a way for companies to raise funds for specific projects and is one of the highest-risk forms of debt

Instrument	Definition
Equity	A stock or any other security representing an ownership interest. There are two primary methods that companies use to obtain equity financing: the private placement of stock with investors or venture capital firms (private equity) and public stock offerings. We are not considering secondary market transactions (e.g., re-selling of stakes) because they do not represent new money targeting climate-specific outcomes, but rather money changing hands.
Balance Sheet Financing	Direct debt or equity investment by a company or financial institution. We are not making any gearing ratio assumption to make a distinction between debt and equity for the project investments.
Guarantee	An agreement that guarantees a debt will be repaid to a lender by another party if the borrower defaults. Essentially, a third party acting as a guarantor promises to assume responsibility for a debt should the borrower be unable to honor its payment obligation to the creditor.

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