
Sustainable Finance Flows to India's Agriculture Sector

Approach and Methodology

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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 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.

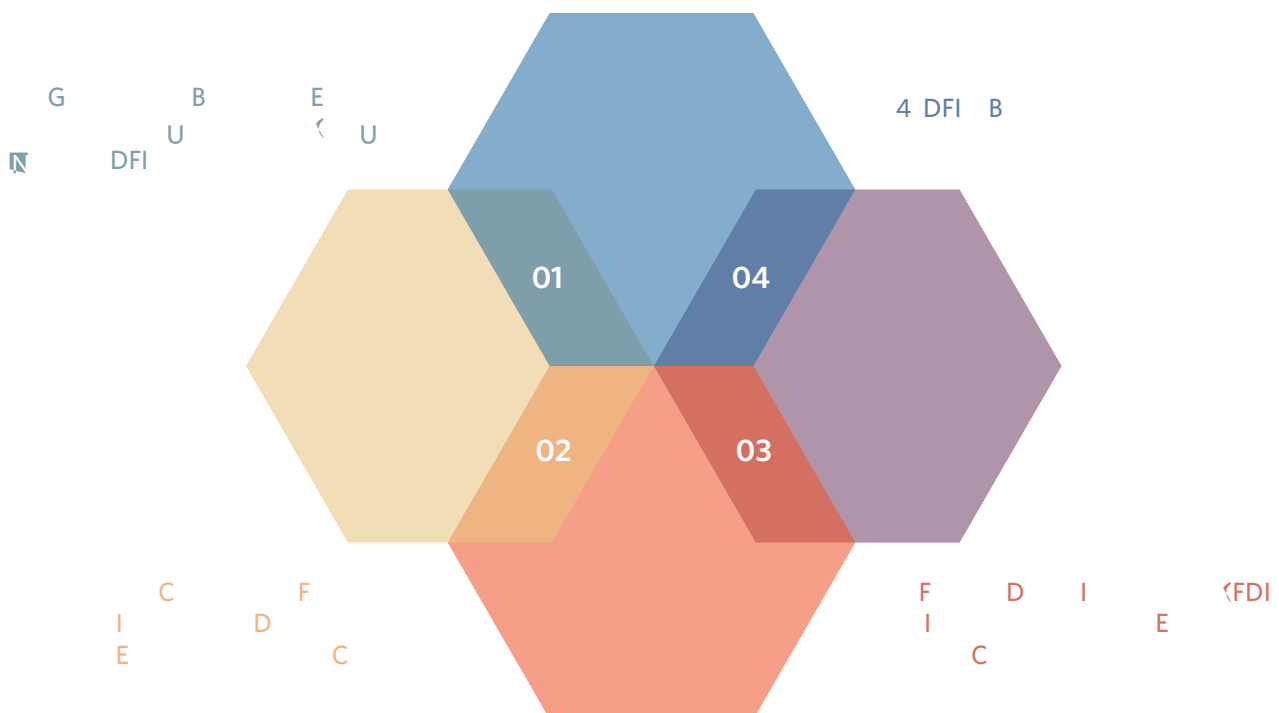
2.2 DEFINING SOURCES AND INTERMEDIARIES

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
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- **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**

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 Philanthropic Grants	Philanthropy	Grant
	Other Official Flows (OOF)	DFI- Bilateral	<ul style="list-style-type: none"> ▪ Grant ▪ Debt
	Official Development Assistance (ODA)	DFI- Multilateral	<ul style="list-style-type: none"> ▪ Debt ▪ Equity ▪ Debt- Mezzanine/Hybrid ▪ Collective Investment Vehicles ▪ Debt Securities/Bonds
Annual Financial Statements			

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
		OECD CRS (Philanthropy)	Project-level
	Private	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

The state budgets included the following:

- 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 Wea Development
- 2y on Crop Husbandry
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- 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

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

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 years⁷ (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 a rmed 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

- 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 (UNDER) State Budget The study excluded government expenditure on the following

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4.4 CORPORATE SOCIAL RESPONSIBILITY (CSR) AND DOMESTIC PHILANTHROPY

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	<ul style="list-style-type: none"> PM-Kisan Urja Suraksha evam Utthan Mahabhiyan Yojana⁹ National Agriculture Bank for Agriculture and Rural Development's solar pump project Agriculture Demand Side Management (AgDSM) Program
	Inputs	<ul style="list-style-type: none"> 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) Yojana¹¹- 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	<ul style="list-style-type: none"> PM Krishi Sinchayee Yojana¹² NMSA- National Mission on Sustainable Agriculture- Rainfed Area Development Integrated Watershed Management Programme Command Area Development and Water Management (CADWM) Programme
	Financial services (credit)	<ul style="list-style-type: none"> Priority-sector lending requirement Agriculture Interest Subvention Scheme
	Research: Technology & planning ¹³	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Central Agriculture University & State Agriculture University Krishi Vigyan Kendras Network¹⁴ ATMA Scheme
	Farmer organizations and cooperatives	<ul style="list-style-type: none"> Promotion of farmer-producer organizations and cooperatives
	Natural capital	<ul style="list-style-type: none"> 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

7. ANNEXURE 2: DEFINING INSTRUMENTS

Instrument	Definition
Grant	<p>Transfers are made in cash for which no repayment is required. It comprises the following financing types:</p> <ol style="list-style-type: none"> 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	<p>A financial instrument which specifies principal amount, interest rate, and date of repayment.</p> <ol style="list-style-type: none"> 1. Low-cost Debt - Loans extended at terms preferable to those prevailing on the market. It comprises the following financing types: <ol style="list-style-type: none"> 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 'concessional' 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 'soft financing'

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.

8. REFERENCES

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