Do we know enough to scale up Sustainable Agriculture in India?

Shanal Pradhan

January 2022

Outline of the presentation

Setting the context

- State of agriculture in India
- Sustainable agriculture, a promising way forward
- Research motivation, scope and approach

Key findings and takeaways

- What is the level of adoption of the SAPSs in India?
- What is the available evidence and where are the gaps?
- Where are we allocating our resources?
- Way forward to scale-up sustainable agriculture in India

Source of image: https://www.foodandlandusecoalition.org/media/

State of agriculture in India

Economic

Net exporter
in cereals

Rise in farm incomes is the **slowest**
compared to other sectors

Share of agriculture in rural GDP declining **twice**
as fast compared to share of agriculture in rural employment

Social

Production increase since 1970s

310% Wheat | **160%** Rice | **45%** Nutri-cereals

22% population
remains undernourished

~50% India's net sown area, which is rainfed, untouched by green revolution

Environmental

78% of applied urea goes into environment

30% of the land is degrading/ desertifying

Crop response to fertilisers reduced by **3.5 times**
between 1970 and 2005

The big challenge: Enhancing economic and social outcomes in a climate-changing world

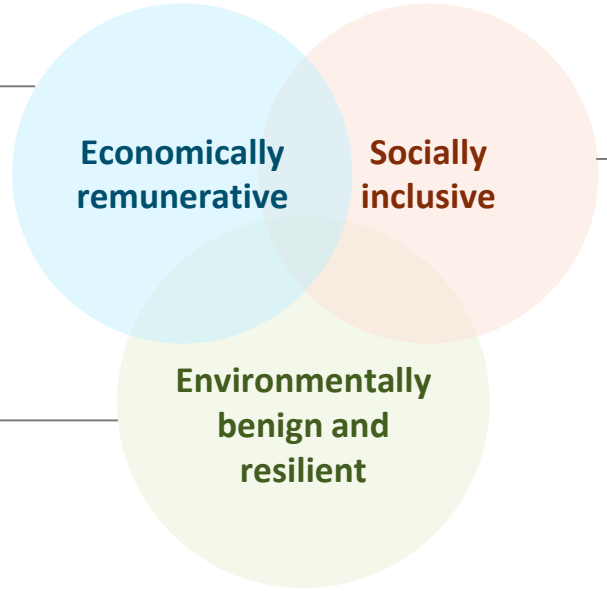
Source: https://onlinelibrary.wiley.com/doi/full/10.1002/app5.269; https://www.theindiaforum.in/article/farm-crisis-runs-deep-higher-msps-and-cash-handouts-are-not-enough; https://www.financialexpress.com/opinion/indias-fertiliser-drain-urea-of-darkness/1781237/; Image: Gyan Shahane

Sustainable agriculture: a promising way-forward?

Sustainable agriculture is…

Lower input costs
Greater diversification
Higher cropping intensity

Reduced, natural inputs
Ecologically sensitive choices
Resilience through diversification



Enhances incomes for small holders
Sustainable incomes in rain-fed areas
Improves human health
- diet diversification
- chemical-free food

Natural Farming

Conventional

Example 1:
Natural farming fields in AP showed resilience during extreme events

Example 2:
Integrated pest management tactics helped control locust attacks

Locust attacks

Control via IPM

Image: https://foodsystemstransformations.org/wp-content/uploads/2019/04/ZBNF_ConceptNote.pdf

https://www.indiatoday.in/india/story/worst-locust-attack-in-27-years-swarms-destroy-crops-across-north-india-1681782-2020-05-25

But, do we know enough about Sustainable Agriculture in India to scale it up?

What sustainable agricultural practices are prevailing across India?

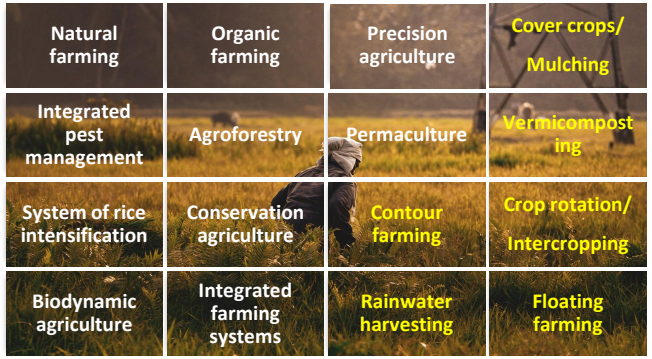
What is the current state of adoption (area, adopters, geography)?

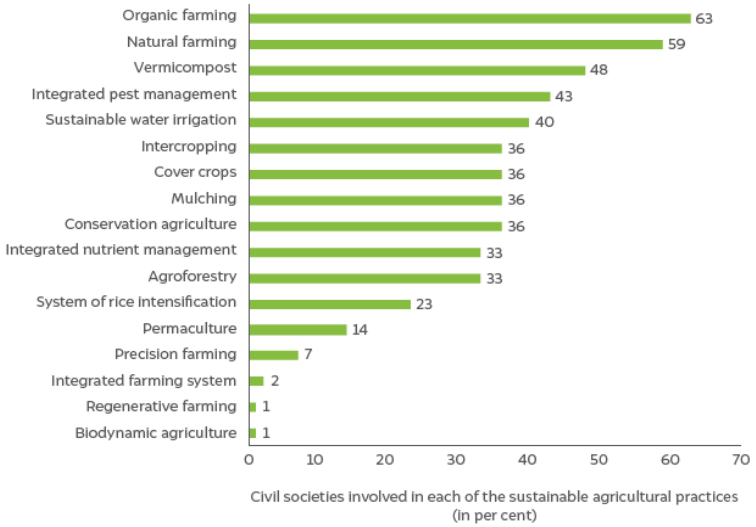
Which organizations are promoting such practices?

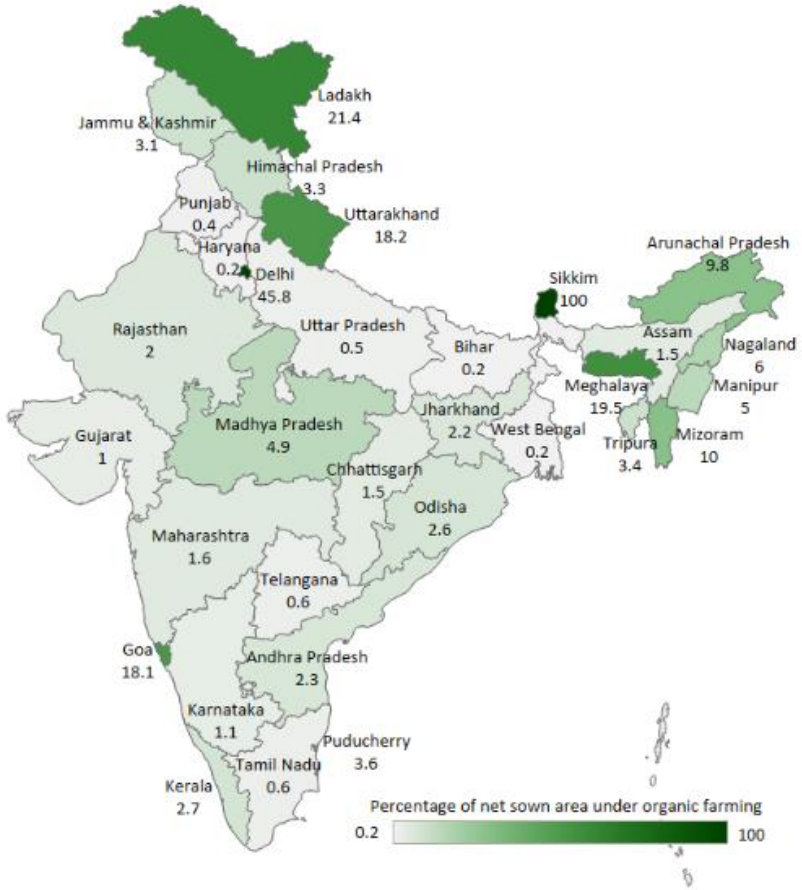
What are their impact on economy, society, and environment?

What should be the next steps?

But, do we know enough about Sustainable Agriculture in India to scale it up?







VAAGDHARA

srijan सृजन
Self-Reliant Initiatives through Joint Action

FES
FOUNDATION FOR ECOLOGICAL SECURITY

ICAR

Centre for Sustainable Agriculture

- Support knowledge exchange & capacity building
- Restructure the government support to incentivise outcomes, not inputs
- Support rigorous evidence generation
- Broaden perspectives of stakeholders to consider alternative approaches
- Adopt transition support
- Make sustainable agriculture visible
- Leverage and build-on the extensive prevailing on-ground CSO capacity

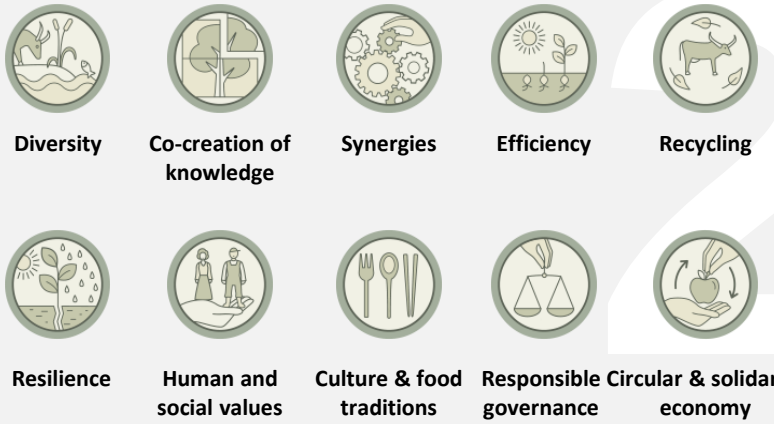
CEEW THE COUNCIL 10 YEARS

Research approach

Identifying sustainable agriculture practices

30 practices

Shortlisting using FAO's 10 agroecological elements



Literature review

Google Scholar — **First 75** results

Google Advanced Search — **First 30** results

Keyword search criteria

Inclusion and exclusion criteria

Primary survey

180 CSOs & research institutions in

36 States/UTs

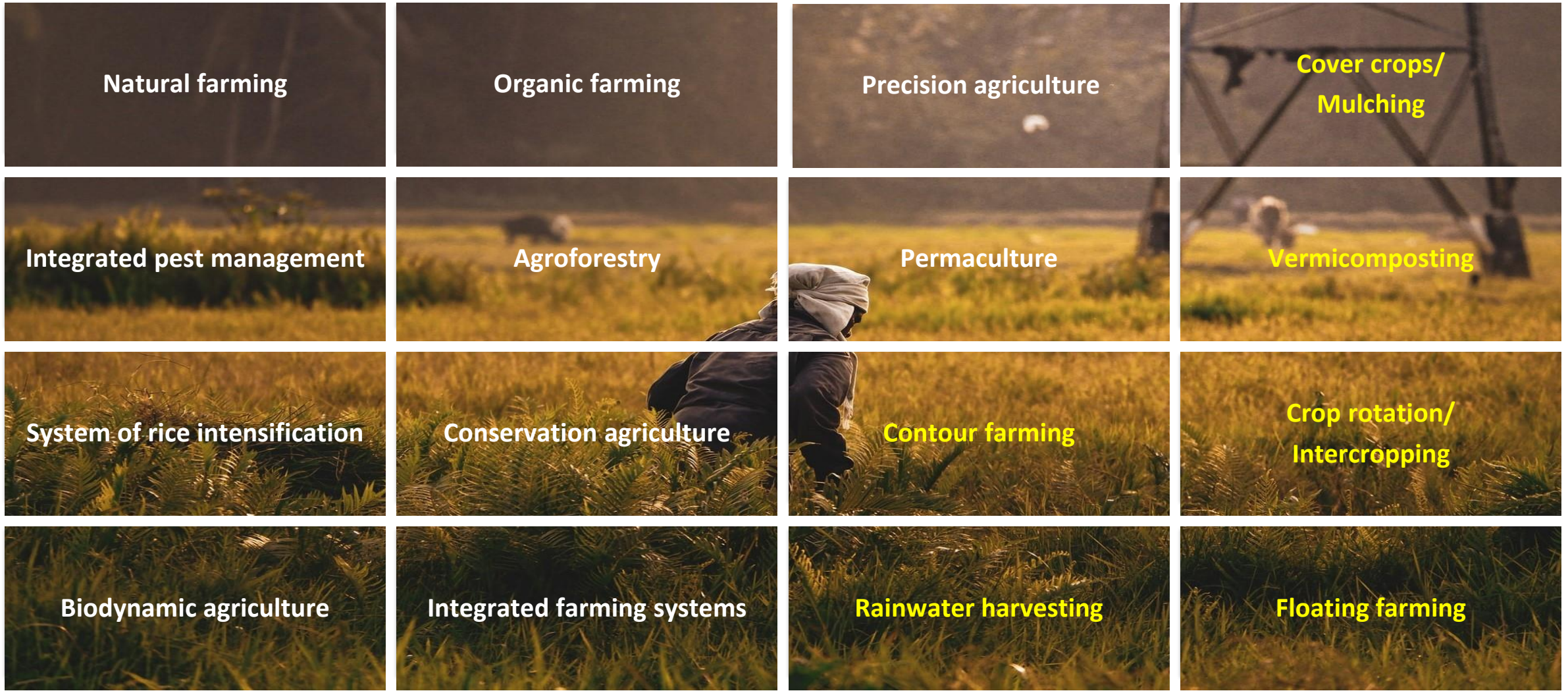
Stakeholders consultatio

25 Government Institutions

18 Research Institutions/academia

8 NGOs/CSOs

Possibilities beyond the conventional agriculture: Need to broaden our perspectives



Sustainable agricultural systems

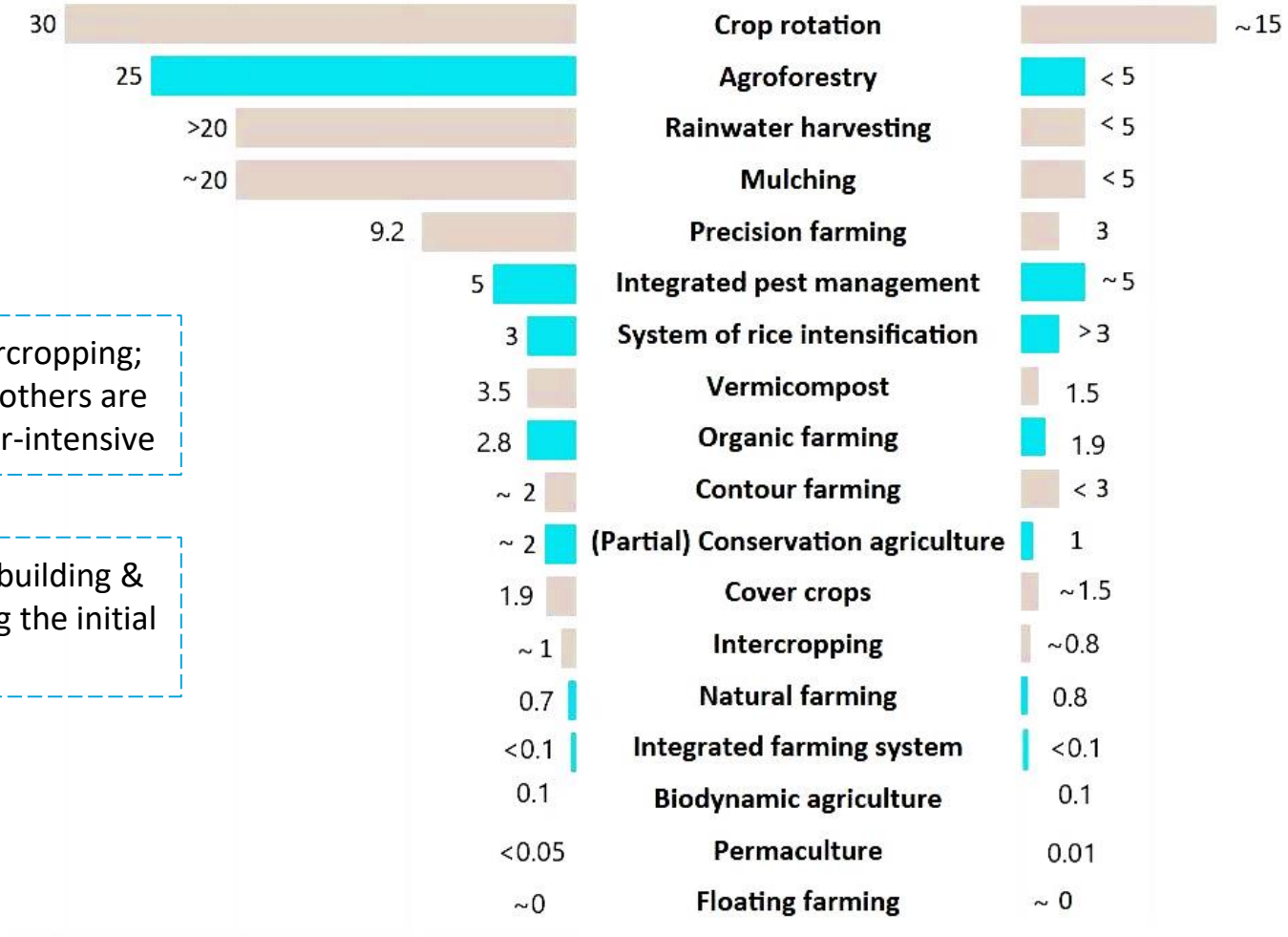
Sustainable agricultural practices

Image: By Joel Abraham Manoj on Unsplash ; Photo by shamnas Cv on Unsplash

Barring a few, most sustainable practices are yet to mainstream

Vermicomposting; intercropping; natural farming among others are knowledge-, skill-, labour-intensive

Farmers need capacity building & transition support during the initial phase



Area (in million ha)

No of farmers (in millions)

IFS; conservation; natural; organic farming can support farmers in rainfed areas

Many SAPSs promote crop diversity furthering nutritional security & diversity

Systems

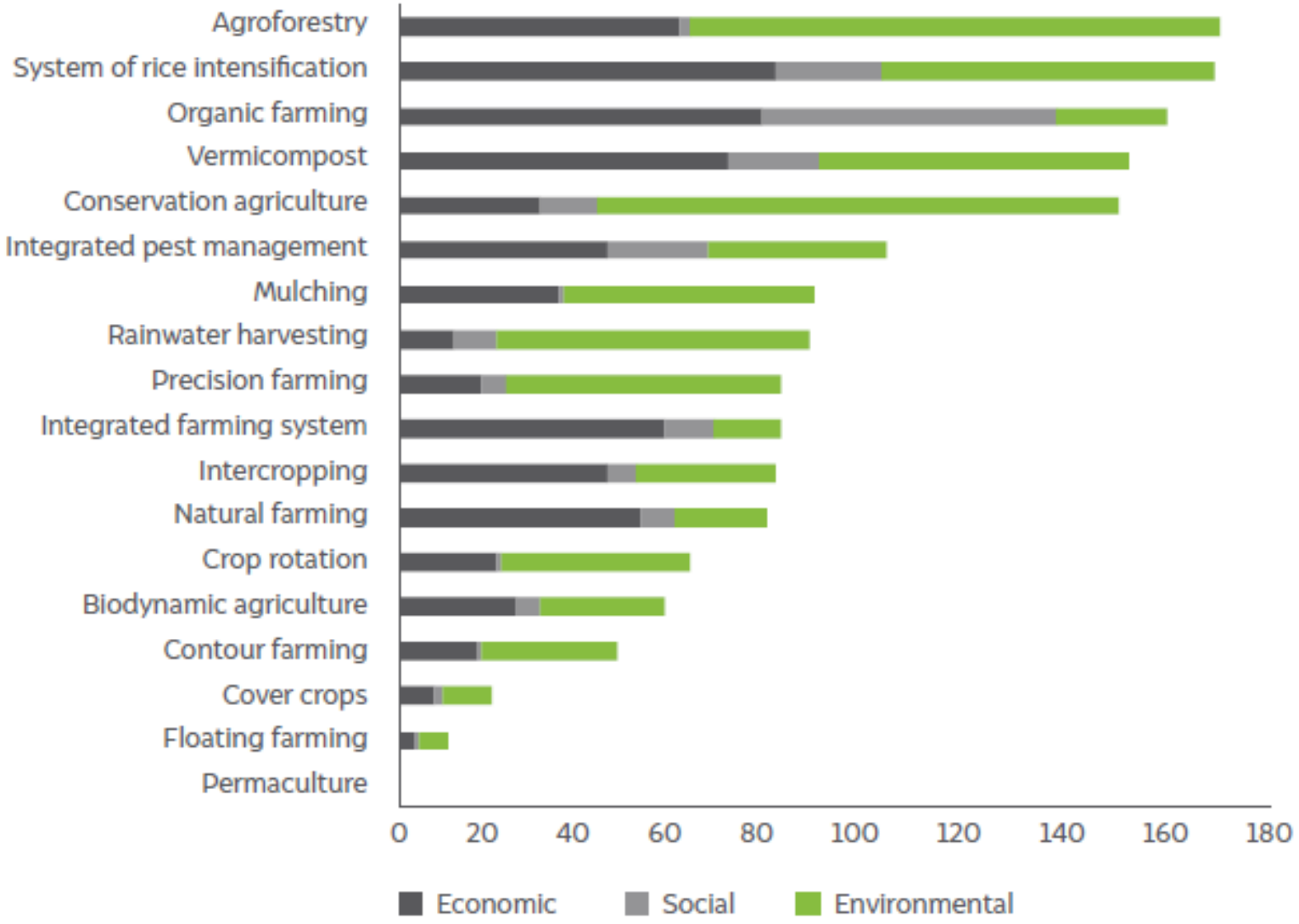
Practices

We must improve visibility of SAPSs in national/state database & information systems

Source for area/adopter: Authors compilation from literature, stakeholders' consultations, and estimations thereof.

Positive indications, but need to support conclusive evidence generation for SAPSs

- **Mainly researched** - Yields, income, soil, water
- **Blind spots** – Health, gender, biodiversity, carbon sequestration, energy
- **Inadequate indicators of measurement**
- **Long-term impact assessments** are missing
- **Landscape level studies** are missing
- Studies assessing multiple outcomes, simultaneously, are rare



Source: Authors' compilation; based on several types of publications (peer reviewed journals, reports, articles/case studies, etc) of which only those papers which clearly established the evidence for different indicators were selected

Impact of sustainable practices on various outcomes

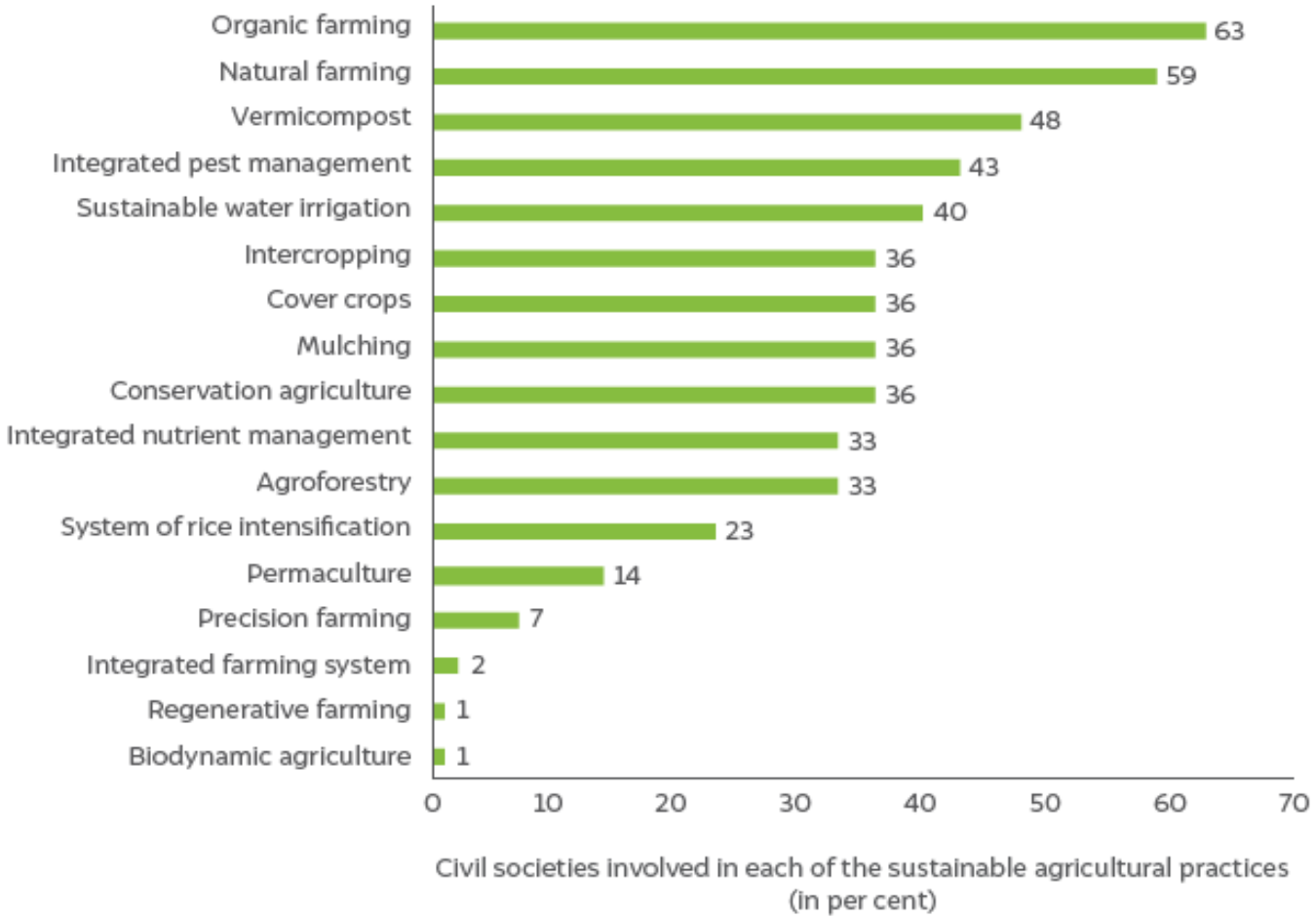
	Income	Yields	Gender	Health	Soil & nutrients	Water	GHG emission	Biodiversity
Natural farming								
IPM								
SRI								
Biodynamic farming								
Organic farming								
Agroforestry								
Conservation								
IFS								
Precision farming								
Permaculture								
Contour farming								
Rainwater harvesting								
Cover crops-mulching								
Vermicompost								
Crop rotation-intercropping								
Floating farming								

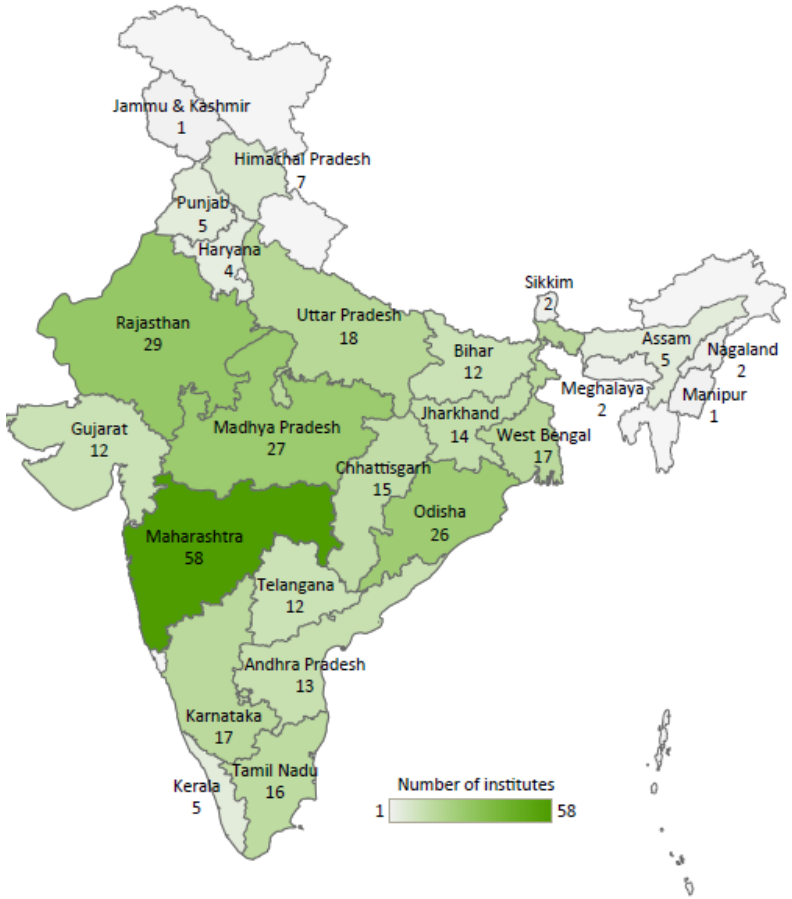
Positive impact | **Inconclusive evidence** | **No impact**

Negative impact | **Sufficient evidence, but no conclusive direction**

Source: Authors compilation from literature, stakeholders' consultations, and estimations thereof.

Leverage the drive of the CSOs to scale up sustainable agriculture

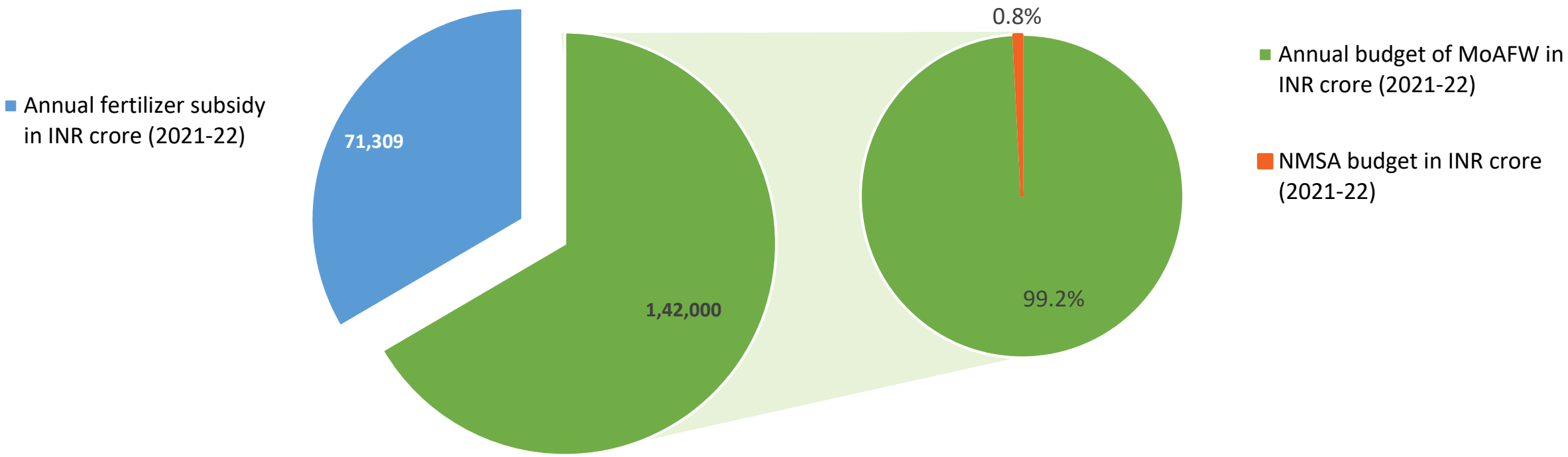




- **About two-thirds are involved in organic farming** while very few deal with precision, integrated farming systems, & biodynamic
- CSOs promote SAPSs by **conducting training activities, capacity building & awareness generation of farmers, support for inputs preparation & seed management, field demonstration activities, technology transfer.**

Source: Authors compilation from the CSO stakeholder survey

Budgetary and policy support to SAPSs is minuscule



- **Only 8 of the SAPSs** receive some budgetary support
- **Transition support for adoption is missing**
- **Only 2 States have taken a lead** on sustainable agriculture

- Meager ₹12 crore for National Project on Organic farming
- Only ₹34 crore for National Project on Agroforestry

1000+ CSOs working on ground to drive adoption of SAPSs in India that can be leveraged for scale-up

Source: MoAFW demand for grants, 2021-22; Suyash Tiwari. 2020. Demand for Grants 2020-21 Analysis Agriculture and Farmers' Welfare. PRS Legislative Research. https://www.prsindia.org/sites/default/files/budget_files/DFG Analysis - Agriculture %282020-21%29.pdf.

Way forward for a evidence-backed scale-up of sustainable agriculture in India

- Actively promote sustainable agriculture in rain-fed areas to start with
- Support knowledge exchange & capacity building for farmers
- Restructure the government support to incentivise outcomes, not inputs
- Support rigorous evidence generation as we scale-up
- Adopt short-term transition support for net losers
- Make sustainable agriculture visible
- Promote sustainable agriculture in publicly funded universities and state departments of agriculture
- Leverage and build-on the extensive prevailing on-ground CSO capacity

Image: https://www.foodandlandusecoalition.org/media/